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Carmine Gambardella

XI Forum Internazionale di Studi

Le Vie dei Mercanti

HERITAGE
ARCHITECTURE
LANDESIGN

focus on

CONSERVATION
REGENERATION
INNOVATION

Fabbrica della Conoscenza numero 39
Collana fondata e diretta da Carmine Gambardella

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HERITAGE ARCHITECTURE LANDESIGN

focus on **CONSERVATION REGENERATION INNOVATION**

Le vie dei Mercanti _ XI Forum Internazionale di Studi

Carmine GAMBARDELLA

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Manuela Piscitelli

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Aversa | Capri
June 13th- 15th, 2013

Conference topics:

Heritage
Tangible and intangible dimensions,
Heritage management,
History,
Culture,
Collective identity,
Memory,
Archaeology,
Cultural landscapes.

Architecture
Survey,
Imaging,
3D modeling,
Techniques for analysis, diagnostics and monitoring,
Preservation,
Restoration,
Conservation,
Architecture Design,
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Landscape design,
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Peer review

Scholars has been invited to submit researches on theoretical and methodological aspects related to Heritage, Architecture and LanDesign, and show real applications and experiences carried out on this themes.
Based on blind peer review, abstracts has been accepted, conditionally accepted, or rejected.
Authors of accepted and conditionally accepted papers has been invited to submit full papers.
These has been again peer-reviewed and selected for the oral session and publication, or only for the publication in the conference proceedings.

Conference report

200 abstracts received from:

Australia, Austria,
Brazil,
Canada, Chile, China, Cyprus,
Denmark,
France,
Germany, Greece,
India, Israel, Italy,
Jamaica, Jordan,
Kingdom of Bahrain, Kosovo,
Lebanon,
Malaysia, Malta, Morocco, Mexico,
New Zealand,
Poland, Portugal,
Russia,
Serbia, Slovak Republic, Spain,
Tunisia, Turkey,
Ukraine, United Kingdom, U.S.A.

About 300 authors involved.

157 papers published.

Preface

The XI edition of the International Forum Le Vie dei Mercanti entitled Heritage, Architecture, LanDesign aims to promote an international debate on local experiences relating to the issues of conservation, regeneration and innovation in heritage, architecture, landscape and design.

In recent years, technological developments have revolutionized not only the forms that surround us but also our daily routines. However, this new global language often does not take into consideration the identity and vocation of the area, which require appropriate courses of action in relation to both the individual context and local traditions.

The historical memory of the characteristics of the identity, local materials, building traditions as well as the tangible and intangible cultural heritage is a repertoire of signs to draw from in order to operate within each historical context and consequently enhance its uniqueness.
The recovery of the authentic vocations of a place does not mean inaction, but rather regeneration through measures to enhance an area by increasing its natural strengths, transforming the weaknesses into opportunities for future development based on innovation.
The international comparison can be an opportunity to share good examples of conservation, regeneration and innovation related to the tangible and intangible heritage in its broadest sense; architecture intended as the identity of the places that shapes the landscape, from traditional to global forms; design at all scales, from the object to the territory, in a sustainable way to start a process of regeneration through a new relationship between man and the environment.
The conference is open to multidisciplinary experiences of one or more of the proposed themes. Scholars are invited to submit research on theoretical and methodological aspects as well as present experiences and practical applications carried out on these issues.

Carmine Gambardella

Pag. 24 **ID 000**
Architecture, heritage, landscape, in time of crisis
Carmine GAMBARDELLA

Table of contents _ HERITAGE

P. 35 **ID 001**
Noli Me Tangere – On Touch
Monika BOGDANOWSKA

P. 43 **ID 002**
A New Cultural Landscape: The Historic District of Zhong Shan
Livio SACCHI

P. 52 **ID 004**
Disclosure of Historic and Cultural Potential and Proposal for Restoration of the Castels of the Western Ukraine
Jawdat GOUSSOUS, Galina TOTOVITSKAYA

P. 59 **ID 005**
Documenting the Architecture of Modernism in European Seaside Centers. Case Study in Italy and Bulgaria
Manuela PISCITELLI, Milena KICHEKOVA

P. 69 **ID 014**
Brazilian Parties: The Transformation of Obligation into Fun
Maria Cristina CAPONERO

P. 77 **ID 015**
Pursuit of Style: the Importance of Historical, Archivistic and Treatise Heritage
Cristiana BEDONI, Daniele CALISI

P. 87 **ID 016**
Heritage Management in Sydney, Australia – a Case Study on The Replacement of Degraded Sandstone on Heritage-Listed Buildings
Elanor PITT, Emma CULLEN, Gwénaëlle PROUST

P. 97 **ID 023**
The “Neustadt” of Strasbourg: Perception and reception of a late 19th century urban extension project at the interface of France and Germany
Johannes DAHM, Sophie EBERHARDT

P. 107 **ID 028**
From the Concept to an Environmental Design of Gaudì: The Batllò House
Leonardo BOGANINI, Lidia PADRICELLI

P. 114 **ID 030**
The Reconversion of Italian Fortress Through the Use of Modern Tools
Alice PARRI, Laura BENASSI, Denise LA MONICA, Eliana SIOTTO, Marco CALLIERI Paolo PINGI, Roberto SCOPIGNO

P. 123 **ID 032**
Investigation and Knowledge for promoting cultural heritage
Antonella DI LUGGO, Riccardo FLORIO, Massimiliano CAMPI

P. 132 **ID 034**
Beauty and Sustainability - Survey an Liberty Heritage an Varese and Ticino Area
Anna ANZANI, Angela BAILA, Claudia CARAMEL, Margherita GUARISCO

P. 142 **ID 036**
Heritage and Sustainable Development: The Middle East and Doha
Francesca Romana MORETTI

P. 150 **ID 038**
Industrial heritage, the *Fabra I Coats* engine room in Barcelona: a terrestrial laser scanning pointcloud classification
Juan Manuel CORSO, Alejandro MARAMBIO, Pilar GARCIA-ALMIRALL

P. 160 **ID 039**
Southeast Asia's Built Heritage at the Cross-Roads –
How to Reconcile Tradition and Modernity within Competing Constraints
Ahmad Najib ARIFFIN

P. 170 **ID 040**
Archaeology and Architectural Design. Project for Alexandria in Aria-Herat (Afghanistan)
Luisa FERRO

P. 181 **ID 047**
A Settlement of The Knights of Malta in Campania: the *Castrum* of Cicciano (Na)
Maria Archetta RUSSO

P. 191 **ID 048**
The valorisation of Italian rural historical buildings and territory
Valentina CINIERI, Emanuele ZAMPERINI

P. 201 **ID 053**
Peripheral Porosity: Cultural Landscapes of Indigenous Heritage Conservation
Hannah Hunt MOELLER

P. 208 **ID 054**
The End of Urban Exploitation and the Rise of the Urban Imaginary:
Histories and Futures of Detroit, Michigan
William MARTIN

P. 218 **ID 055**
The San Antonio River: a Rich and Complex Cultural Landscape in Texas
Angela LOMBARDI, Sedef DOGANER

P. 227 **ID 056**
Managing Heritage Sites while Accelerating Cultural heritage. Tourism in Antalya, Turkey
Sedef DOGANER, Angela LOMBARDI, Ege Uluca TUMER

P. 236 **ID 057**
The Historic Center of Lima, Peru: a Gis Database as a Tool for Safeguarding and Developing
Angela LOMBARDI, Patrizia MONTUORI

P. 245 **ID 061**
Memories in stone
Ornella ZERLENGA

P. 256 **ID 063**
Eminent De[con]struction: Conservation Acts of Modern Vandals within Built Forms, Landscapes and Cities
Catharine PYENSON

P. 262 **ID 066**
Hidden Cultural Landscapes: Survey and Digital Enhancement of The Catacombs of San Giovanni in Syracuse
Elisa BONACINI, Graziana D'AGOSTINO, Mariateresa GALIZIA, Cettina SANTAGATI, Mariarita SGARLATA

P. 272 **ID 068**
Integrated Approach to Museology: Proposal for a Route Linking Archaeological sites in Çanakkale, Turkey
Harun BATIRBAYGIL, Susana ALVES, Bahar BASER, Ayse Özbil TORUN

P. 278 **ID 069**
Comparison of 3D Documentation Methods in Sculptural Figures with Poor Radiometric Information: Shape from Stereo vs Shape from Silhouette
Antonio ÁLVARO TORDESILLAS, Jorge GARCÍA FERNÁNDEZ, Salvatore BARBA

P. 287 **ID 076**
Ancient Ruins of the Future
Adriana ROSSI

P. 297 **ID 079**
The Monumental Unit of Massenzio: environmental requalification project and development of the archaeological emergencies
Maria Grazia CIANCI

P. 308 **ID 081**
The Matter of Architecture: the Medieval Walls of Benevento
Luigi GUERRIERO, Luigi D'ORTA, Antonietta MANCO, Francesco MIRAGLIA

P. 316 **ID 088**
Dwelling on the Past - Built Heritage and Urban Development Policies.
The Case of Vienna (Austria)
Barbara RIEF VERNAY

P. 325 **ID 092**
Turin for the French
Nadia FABRIS

P. 330 **ID 095**
Building a new landscape. Land reclamations and new rural towns during the fascist regime along the Coast South of Salerno
Antonella MARCIANO

P. 341 **ID 103**
Sensory Experience in Architectural Memory: Transformation of Industrial Buildings
Mads Harder DANIELSEN

P. 349 **ID 106**
Characters of The Rural Heritage in the Var
Laura BLOTTO

P. 357 **ID 109**
Permanences and morphologies of historic landscapes. The hill of the Vomero in Naples
Maria MARTONE

P. 367 **ID 111**
A Landscape in Transition or a Landscape in Danger? The Olive Groves' Cultural Landscape of Corfu
Spyridoula ARATHYMOU

P. 372 **ID 112**
Landscape as Cultural Heritage – the Several Dimensions of Heritage Management – Aljezur and the Vicentina Coast Portugal
Maria João PEREIRA NETO, Mário S. Ming KONG, Andreia GARCIA, Pedro JANUÁRIO

P. 379 **ID 116**
Becoming the Olympics: the Sound Proof Series of Exhibitions (2008-2012)
Monica BIAGIOLI

P. 389 **ID 117**
The rural landscape in Campania. The role of the graphic representation in the documentation and valorization process
Stefano CHIARENZA

P. 399 **ID 127**
Milan-Turin: a bundle of infrastructures to access to a network of places, between cultural heritage and landscape
Andrea ROLANDO, Alessandro SCANDIFFIO

P. 407 **ID 128**
Water and its forms. Natural elements semantic icons in Turin
Maria Paola MARABOTTO

P. 414 **ID 129**
Historic Gardens as a Part of the National Cultural Heritage – a short view on a garden history in Bratislava, the Slovak Republic
Tamara REHÁCKOVÁ

P. 424 **ID 137**
The origin of the conservation of the twentieth century architecture in France: the action of Andre Malraux in favor of Le Corbusier's work
Antonella VERSACI, Alessio CARDACI

P. 434 **ID 142**
Understanding Location Preferences of Entrepreneurs and Innovators in Historic Maritime Cities
Laurie ZAPALAC

P. 444 **ID 144**
“The Fragile Ecosystem of Memory”: Literary House Museums in New Zealand
Elizabeth AITKEN ROSE

P. 454 **ID 145**
Representation and Continuity. The regeneration of the area, the city and the architecture
Paolo GIORDANO

P. 464 **ID 147**
The Conservation of Jerusalem's City Walls
Avi MASHIAH

P. 473 **ID 155**
Two Different Approaches of Urban Renewals of Historical Districts: the Comparison of Bordeaux, France and Cincinnati, United States
Ana Gisele OZAKI

P. 483 **ID 160**
Palazzo Marziani in Furnari Project of Restoration and Reuse
Alessandra MANIACI, Caterina GULLO

P. 491 **ID 161**
Greater Amman: Metropolitain Growth and Scenarios for Sustainable Urban Development
Ahmed ABU AL HAIJA, Rob POTTER

P. 502 **ID 164**
The Challenge of Urban Sustainability in Seaside Cities Between Unlimited Growth and Serene Degrowth
Massimo CLEMENTE, Daniele DEMARCO, Eleonora GIOVENE DI GIRASOLE

P. 510 **ID 171**
Port Cities, Peoples and Cultures: Waterfront Regeneration and “Glocal” Identity
Gabriella ESPOSITO DE VITA, Stefania OPPIDO, Stefania RAGOZINO

P. 522 **ID 176**
Bioclimatic Structures Design for the Archaeological Park of Nola
Antonella VIOLANO, Lucia MELCHIORRE

P. 529 **ID 177**
The Missing “Fan Vineyard” in San Leucio (Caserta, Italy). An “Agri+Cultural” Heritage” of “Two Sicilies” Borbone House
Andrea BUONDONNO, Eleonora GRILLI, Rosaria PARENTE, Nicola PISACANE Pierclaudio ODIERNA, Gian Franco CAPRA, Sergio VACCA

P. 538 **ID 181**
The "Capri style", a Debate Over a Century. Architecture, Environment and Preservation in the Island of the Sirens Since the Convention on the Landscape of 1922
Elena MANZO

P. 547 **ID 182**
The Management Plan of Unesco Sites: from the Conceptual Model to the Methodology Application through Gis
Lina ABATEGIOVANNI

P. 557 **ID 190**
Promotion of cultural heritage as an engine for territorial development in France
Alessandro CIAMBRONE

Table of contents _ ARCHITECTURE

P. 568 **ID 006**
"Santa Sapienza allo studio" Chapel in Rome: a representation of its domed ceiling. Borromini master of "Trompe-l'œil"
Antonio MOLLICONE

P. 578 **ID 007**
Survey of the architectural and historical characters of the Pavone "ricetto" for the retrieval of its own environmental identity
Pia DAVICO

P. 588 **ID 009**
The Conservation Project of the Roman Theater of Málaga
Esteban José RIVAS LÓPEZ, María Victoria, LÓPEZ GALLARDO

P. 598 **ID 013**
Designing Future Heritage: Aldo Rossi’s *Citta Analoga* as Incomplete Algorithm of Individual Expression within Collective Imagination
Jean-Pierre CHUPIN

P. 606 **ID 018**
Kultur-Fabrik-Perugia
Paolo BELARDI, Valeria MENCHETELLI, Luca MARTINI

P. 614 **ID 019**
Interpreting the Transformation of the Identity of Asmalimescit
Avsar KARABABA

P. 623 **ID 020**
Avalanche hazard on mountain chalets: prevention and modelling
Bernardino CHIAIA, Barbara FRIGO, Valerio DE BIAGI

P. 632 **ID 027**
The gap between the developed and the experience in the architectural space
Najjar ONS

P. 640 **ID 033**
Love_As
Iosif DAKORONIAS-MARINA, Michalis STOUPAKIS

P. 650 **ID 045**
Urban strategies to regenerate the moroccan public space in the urban tradictioanl tissues
Fatimzahra BENHAMZA

P. 659 **ID 046**
Spomenik in Flux
Erika LINDSAY

P. 666 **ID 050**
Assessment of the Bioclimatic Elements of Vernacular Architecture. The Historic Centre of Nicosia, Cyprus
Maria PHILOKYPROU, Aimilios MICHAEL, Stavroula THRAVALOU

P. 676 **ID 051**
Structural Assessment of a Roman Aqueduct 'Pont Del Diable' in Tarragona by F.E.M.
Jaume FABREGAT, Anna ROYO, Agustí COSTA, Gerard FORTUNY, Josep LLUÍS

P. 685 **ID 064**
Plurisensory Approach as a New Technological Way for Building Design
Luigi MOLLO, Rosa AGLIATA, Carlo GIUDICIANNI

P. 691 **ID 065**
Monitoring and storage: integrated survey of the old towns “crater”
Caterina PALESTINI

P. 697 **ID 072**
Relocating the Past in Amman: Iraqi Architecture and Identity after Displacement
Sonia AL-NAJJAR

P. 708 **ID 077**
A virtual garden: the scenographic Jappelli’s engravings for “Palazzo della Ragione” in Padua
Andrea GIORDANO, Cosimo MONTELEONE, Isabella FRISO, Marco PEDRON

P. 719 **ID 080**
Semantic 3D Models: Surveying and Drawing the Virtual City
Maurizio UNALI

P. 724 **ID 082**
The functional node of traditional house in Kosovo
Flamur DOLI, Jetik DOLI

P. 734 **ID 083**
Modular low-cost scenery to mounting some events: the example of the church of San Giuseppe delle Scalze
Alessandra PAGLIANO

P. 744 **ID 084**
Practice of reuse and recycle in retrofit interventions
Raffaela DE MARTINO, Rossella FRANCHINO, Caterina FRETTOLOSO

P. 750 **ID 089**
Drawing for the analysis of architectural language: the case of Giuseppe Palazzotto
Eugenio MAGNANO DI SAN LIO, Mariateresa GALIZIA, Cettina SANTAGATI

P. 758 **ID 094**
Air Movement: from Tradition Towards Innovative Experiences
Fosca TORTORELLI, Francesca MUZZILLO

P. 764 **ID 096**
The everyday and the monument, a case study of two UNESCO World Heritage sites: the wooden churches of Vilupulli and Ichuac
Constantino MAWROMATIS

P. 774 **ID 097**
The quality of bridge design in the general design process
Michele CULATTI

P. 780 **ID 098**
Historical centers in seismic area: methodology for conservation, prevention and reconstruction. The case study of Villa Sant'Angelo
Davide INDELICATO

P. 788 **ID 100**
The roman amphitheater of Syracuse: archaeological artifact forgotten
Giuseppe DI GREGORIO, Domenico GIACCONE, Angelo MONTELEONE

P. 796 **ID 101**
The Interlacing Arches System in Salerno and Amalfi Coast
Barbara MESSINA

P. 806 **ID 105**
Digital Reconstruction of the Maritime Theatre in Hadrian's Villa at Tivoli
Alberto SDEGNO

P. 815 **ID 113**
In Place
Maria Ines PASCARIELLO

P. 821 **ID 114**
Structural building information modeling of casale castello
Ingrid TITOMANLIO, Giuseppe FAELLA

P. 829 **ID 120**
Functional recovery and structural refurbishment of disused industrial buildings: an integrated approch
Ingrid TITOMANLIO, Giulia MATERAZZI

P. 838 **ID 121**
Challenges in the field of heritage conservation in the developing world: a case study of Bihar, India
Kamini SINHA, Shailendra Kumar MANDAL

P. 846 **ID 122**
Decoding a merchant town: photograpy, history and survey
Antonella SALUCCI

P. 855 **ID 123**
The historic fabric of Naples. Via Banchi Nuovi between regeneration and conservation
Daniela DE CRESCENZO, Carmela FRAJESE D'AMATO

P. 860 **ID 124**
Characterization of Uncertainty and Approximation in Digital Reconstruction of CH Artifacts
Fabrizio I. APOLLONIO, Marco GAIANI, Zheng SUN

P. 870 **ID 125**
A Synergy of Addends for the Definition of a Charter of Protection
Giacinto TAIBI, Rita VALENTI, Mariangela LIUZZO

P. 880 **ID 130**
Multidisciplinary team activity for BIM using interoperability. A PhD course experience at Politecnico di Torino working on existing buildings
Anna OSELLO, Andrea ACQUAVIVA, Anna PELLEGRINO, Elena CANDELARI Giacomo CHIESA, Daniele DALMASSO, Matteo DEL GIUDICE, Kamila MANNANOVA Iasef MD RIAN, Michel NOUSSAN, Edoardo PATTI, Marco PIPPIONE Alessandro SERRA, Rajabzadeh SHAGHAYEGH, Zhu SHICHAO, Riccardo TOMASI

P. 890 **ID 132**
The Arab-Norman civil architecture in Palermo: enhancement strategies
Irene TRENTO, Liboria Laura ZABBIA

P. 899 **ID 133**
Cultural Heritage and “Freedom of Panorama”. Representing Italian Identity
Enrica BISTAGNINO

P. 905 **ID 136**
Between anti-museum and interactive museum: the case study of Paolo Orsi in Syracuse, Italy
Alessio CARDACI, Antonella VERSACI, Luca FAUZIA

P. 915 **ID 138**
A New representation of an Ancient Monument. La Piscina Mirabile
Raffaele MARTINELLI

P. 923 **ID 140**
The oval cloister of Santa Maria alla Sanità Church: a virtual representation of the original destroyed shape
Roberta MONTELLA, Emanuela LANZARA

P. 929 **ID 141**
Geoconservation analysis at Ackendown, Jamaica defining geoarchitecture
Patricia Elaine GREEN, Sherene Andrea JAMES-WILLIAMSON

P. 939 **ID 146**
Building information modeling. An instrument of knowledge for the fortified architecture
Luigi CORNIELLO

P. 949 **ID 150**
Control and reuse of the rainwater in the urban context
Rossella FRANCHINO

P. 954 **ID 158**
Standardisation of the design process using BIM Software
Saverio D’AURIA, Davide BARBATO

P. 962 **ID 162**
The court house in rural and urban by Campania - Private and public in educational experiences and design architecture
Massimiliano RENDINA

P. 970 **ID 163**
The museum of the territory. Notes for active conservation
Efisio PITZALIS

P. 980 **ID 166**
Design of multimedia archaeological park in the mediterranean area. Survey, modelling and communication. The case of Leptis Magna
Andrea MANTI, Chiara SCALI, Domenico TOSTO

P. 988 **ID 169**
Smart communities and local company museums: two new concepts for the Mediterranean Museum System of Design and Applied Arts
Claudio GAMBARDELLA, Jochen SIEGEMUND

P. 999 **ID 178**
Measurement, Representation and Rural Architecture Exploitation: Knowledge through Historical Maps from Mills to Hydropower Stations
Fabio CONVERTI

P. 1013 **ID 180**
Sprawl Repair. Site-specific tools for Neapolitan sprawl town
Fabrizia IPPOLITO

P. 1017 **ID 183**
Design the monument in the twentieth century. Innovation and tradition
Saverio CARILLO

P. 1027 **ID 184**
The Beuronese School and the Schwarz's essays in the architecture sacred of the XX century
Maria Carolina CAMPONE

P. 1037 **ID 185**
The contribution of diagnostics in architectural survey; case study of combined thermography application
Gerardo Maria CENNAMO

P. 1044 **ID 188**
The room ablution of Hafsid era in Tunis (XV cent.): architectural and artistic aspects
Lamia HADDA

P. 1051 **ID 189**
18th Century's cheap and lower-class dwellings in Caserta
Riccardo SERRAGLIO

P. 1061 **ID 192**
Borgo Appius - Borgo Domitius
Gianluca CIOFFI

P. 1071 **ID 196**
New urban models in the vesuvian Sarno plain
Carlo A. MANZO, Marino BORRELLI, Emanuele CARRERI, Carlo COPPOLA, Francesco COSTANZO, Efisio PITZALIS, Massimiliano RENDINA
Gianluca CIOFFI, Maria Antonia GIANNINO, Gaspare OLIVA, Andrea SANTACROCE, Pasquale ZEPPETELLA, Rejana LUCCI, Enrico CARAFA

P. 1079 **ID 197**
Urban Regeneration. Methods and Strategies
Maria Antonia GIANNINO, Agrippino GRANIERO, Gaspare OLIVA, Ferdinando ORABONA

P. 1089 **ID 198**
The Rural Homestead of Casignano: taken from Documents Regarding the Monument
Rossella BICCO

P. 1093 **ID 200**
Saint Lawrence outside the walls. Notes one the nineteenth-century restoration by Virginio Vespignani
Cesare CUNDARI, Gian Carlo CUNDARI, Maria Rosaria CUNDARI

Table of contents _ LANDESIGN

P. 1104 **ID 003**
Kusadasi, the Ancient 'Scalanova'
Ahmet Vefik ALP

P. 1110 **ID 010**
New Contemporary Art Museum Buenos Aires
Anna MANDIA

P. 1115 **ID 012**
Confronting Contemporary Sustainability Norms with the Durability of Historical Buildings
Carmela CUCUZZELLA

P. 1123 **ID 021**
The Influence of New Technologies on Sustainable Parks: Duisburg North Park and Central Park Valencia
Carmen VESES JIMENEZ, Ignacio BOSCH REIG

P. 1132 **ID 024**
Linear limbic spaces between land and sea: landscape designing in river Evro's delta
Eleni OUREILIDOU

P. 1142 **ID 031**
Affirmation and Integration of Architectural Heritage in Urban Landscape: Contribution of Landscape Architecture
Jelena RAKOCIJA, Marko DIMANIC

P. 1150 **ID 052**
Making Belief: Taste-Making, the Public Imagination, and the Spaces of Everyday Life
Tim WATERMAN

P. 1158 **ID 060**
Planning Form the Awareness of a Place
Miguel A. MEDINA

P. 1168 **ID 062**
A Dıcussıon On The Mıcro-Scale Urban Preservatıon Projects In Turkey
Seyda GÜNGÖR AÇIKGÖZ, Burcu CEYLAN

P. 1176 **ID 067**
A Transparent Choice
Antonella VIOLANO, Francesca VERDE

P. 1183 **ID 073**
Approaches to environmental impact assessment of physical pollutions of territories during design and construction of industrial objects and its realization in Samara Region of Russia
Andrey VASILYEV, Vitaly BUKHONOV, Vladislav VASILYEV

P. 1191 **ID 074**
Approaches to classification and to reduction of negative impact of lubricating cooling liquids
Andrey VASILYEV, Pavel MELNIKOV, Vlada ZABOLOTSKIKH

P. 1196 **ID 086**
The ISO 50001: a tool of energetic management of architectural public heritage
Monica CANNAVIELLO

P. 1200 **ID 087**
Design and handcraft for new creative dimension of industry
Marco BORRELLI

P. 1210 **ID 090**
Visione sostenibile (Sustainable Vision in the Conservation of Cultural Heritage Project)
Anna MAROTTA

P. 1220 **ID 110**
The quarry landscape of Guidonia Montecelio in Lazio. Knowledge, survey and project of a built environment
Laura FARRONI, Annalisa METTA

P. 1230 **ID 134**
Cultural landscapes in transition: representation and relationship between shape and context
Serena ABELLO, Chiara CANNAVICCI

P. 1240 **ID 152**
Sustainable LanDesign for Archeology
Ottavia GAMBARDELLA

P. 1245 **ID 153**
Use of a scale model under artificial sky for daylighting design
Antonio ROSATO, Michelangelo SCORPIO, Sergio SIBILIO

P. 1253 **ID 154**
Simeto valley
Alessandra MANIACI, Alessandra BRANCATELLI

P. 1261 **ID 167**
Towards a theory of impermanence
Silvana SEGAPELI

P. 1268 **ID 168**
Landesign "Between Agnena and Regi Lagni"
Vincenzo POLLINI

P. 1275 **ID 170**
The project expression of aesthetic quality within the culture of physical transformation
Paola GIANNATTASIO

P. 1286 **ID 174**
Design of energy systems through the crop circles geometry
Claudia CENNAMO, Rosanna DRAGO

P. 1294 **ID 175**
The Analytic Network Process (ANP) as environmental assessment tool to design an eco-museum in Pompei
Maria Cristina MIGLIONICO, Giuseppe D'ANGELO

P. 1301 **ID 179**
Sustainable Design and sense of funny
Cognitive survey methods and riassertion of identities
Antonino CALDERONE

P. 1314 **ID 186**
Representing urban landscapes. Narration and sense-making
Alessandra CIRAFICI, Caterina C. FIORENTINO

P. 1324 **ID 187**
Authenti-city. A militant design project
Caterina C. FIORENTINO, Alessandra CIRAFICI

P. 1334 **ID 191**
Hyperspectral and thermal airborne surveying for the characterization and the monitoring of natural and anthropized environment
Carmine GAMBARDELLA, Pasquale ARGENZIANO, Alessandra AVELLA
Stefano BASTONI, Giuseppe CASBARRA, Flaviano TESSITORE

P. 1358 **ID 194**
The New Landscape
Mario PISANI

P. 1364 **ID 199**
The SEEM project: a Solar Eco-Efficient Envelope Model
Stefano ALBRIZIO, Bernardo BUONOMO, Lorenzo CAPOBIANCO,
Corrado DI DOMENICO, Amedeo FIORE, Walter FIORE, Rossella FRANCHINO,
Caterina FRETTOLOSO, Carmine GAMBARDELLA, Luciana MAINOLFI, Oronzio MANCA,
Francesca MUZZILLO, Sergio NARDINI, Paolo ROMANO, Antonella VIOLANO

P. 1372 **ID 201**
Regina Viarum, Appia Antica
Gilda EMANUELE

P. 1377 **ID 202**
Landscape design and sustainable development: from smart City to the smart Land
Tatiana KIRILOVA KIROVA, Davide MEZZINO

Architecture, heritage, landscape, in time of crisis

Carmine GAMBARDELLA
Department of Architecture and Industrial Design "Luigi Vanvitelli", Second University of Naples, Italy
carmine.gambardella@unina2.it

In this times of crisis, there has been a return to discussing the value of cultural, architectural and landscape heritage, with the use of quite worrying terms such as "consumption" of art or "offer" of culture, almost as if they were goods to be sold to "consumers" or sold off to the highest bidders.
The problem of the commodification of cultural and environmental assets in Italy, launched more than 10 years ago, is still far from having found a solution. It was July 2002 when the most important German newspaper, the "Frankfurter Zeitung Allgeimeine" broke the news of the Italian law which made the alienation of state assets possible, including the cultural ones, with an article entitled "The Taliban of Rome. End of season sales. Italy is going to sell out its cultural heritage."
The article referred to the Tremonti Decree with "Urgent provisions for the privatization and exploitation of public property and real estate development investment funds", which are still today the fundamental regulations for the dismissal of public assets. In conclusion, the journalist Ute Diehl commented: "Today the cultural heritage of Italy has been degraded to a mere economic value, as a resource that can be discarded at will. However, there is nothing that gives the measure of the state of health of a society as the relationships it is able to have with its monuments and its own landscape".[1]

Taking a stand with his 2002 book "Italy S.p.A., The assault on cultural heritage", Salvatore Settis explained that "What is being destroyed is neither the Coliseum nor a castle in Aosta, nor the Parco degli Abruzzi nor the smallest and most beautiful church in Tuscany, but a much larger monument, even more significant (because it is the safety of all others): the age-old culture of conservation developed by the Italians over generations, on an institutional level and in terms of social conscience".[2]
The desired institutional consideration and reversal of the trend, unfortunately, has not arrived, nor have investments been made in education in order to make citizens understand, and in particular young people, that the landscape, coast, mountains, cities with their churches and palaces, constitute our identity, our consciousness, our soul, and that commodifying them would mean selling ourselves, an identity built by generations of Italians who were the first in the world to create a culture of conservation that is now at risk of disappearing.

The results have not been slow to emerge, involving the most famous and valuable monuments: to give just one example, the area of the excavations of Pompeii, the most famous archaeological site in the world, a UNESCO World Heritage Site, has been hit by a series of collapses and upheavals, which began in November 6, 2010 with the collapse of the Schola Armaturarum, the gladiator school along Via Abundance, and has continued until today with relatively severe episodes.
Unfortunately, Pompeii is not an isolated case, but is the most emblematic example of the degradation that is eroding many monuments, in the absence of effective planning of interventions and adequate funding.

There seems to be the idea of making a profit from cultural heritage without investing. In an article last year, Sergio Rizzo reported the Court of Auditors' report on the reduction of public funds to artistic and cultural heritage, equal to 0.19% of public expenditure compared to the 0.34% of a few years ago, while the French state invested a budget five times higher than ours and Germany had increased its expenditure by 7%. [3]

In the same article, data from the Court of Auditors were also reported about the size of the Italian cultural heritage, amounting to 3,430 museums, 216 archaeological sites, 10,000 churches, 1,500 monasteries, 40,000 castles, towers and fortresses, 30,000 historic houses, 4,000 gardens, and 1,000 historical centres. It also drew attention to the responsibility of Italy compared to the rest of the world, as the guardian of the greatest number of assets protected by UNESCO: 45 out of 911.
A cultural heritage of this magnitude, widespread throughout the country and in addition to a natural heritage and landscape of great variety and beauty, is a special case within a global context, and as such, should be understood and protected with appropriate solutions. It seems that this heritage is mostly seen as a burden, to be freed of at the earliest opportunity by selling it off and with the only advantages being for the private buyer.

It is clear that the Italian heritage needs to adequately managed, even if it may not be easy. In Italy, there is no sense in trying to apply the American model of sponsorship to isolated “emergency” cases as attractors of tourist and consumer flows: our museums, churches, works of art, are incardinated into the territory, the landscape and the city, being essential elements of continuity, not severable and not to be understood outside of their context. This was fully understood by the Italian legislators of the past. From the edicts of the pre-unification states to the Constitution of the Italian Republic, up to Law 1089 of 1939 on the “Protection of the things of artistic and historical interest”, it is possible to recognise the respect of two guiding principles that have now seem to be forgotten: the public artistic heritage is property of citizens as holders of popular sovereignty, and the State has a duty to protect the cultural heritage in its entirety, promoting knowledge through research.

The American museum-centric model, characterised by strongly attractive collections completely unrelated to the context of the host, is absolutely misleading and inapplicable to the Italian context.
Unfortunately, life in capitalist society in general has become a build-up of shows, and culture is no exception, as claimed by Mario Vargas Llosa in a paper recently published entitled “The civilization of the show”. The contents of literature, music and art are oversimplifying: everything has to entertain and amuse; artists does not have to justify their talent through their own works, but by becoming shows themselves; museums have to attract throngs of conformist admirers through major events, when “The number is not the quality. Culture was never justified statistically”. [4]

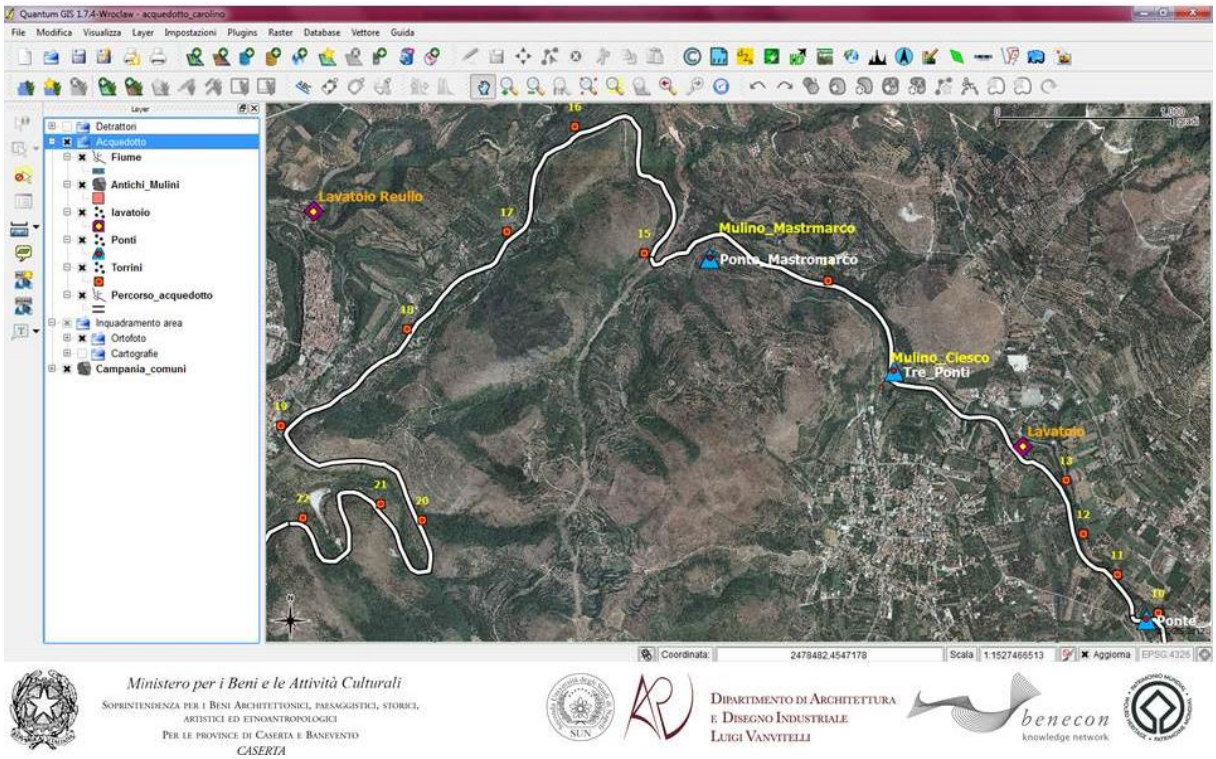

Fig. 1: Management Plan of the UNESCO site "Royal Palace of the eighteenth century in Caserta with the Park, the Aqueduct of Vanvitelli and the complex of S. Leucio. "
Geographic Information System.

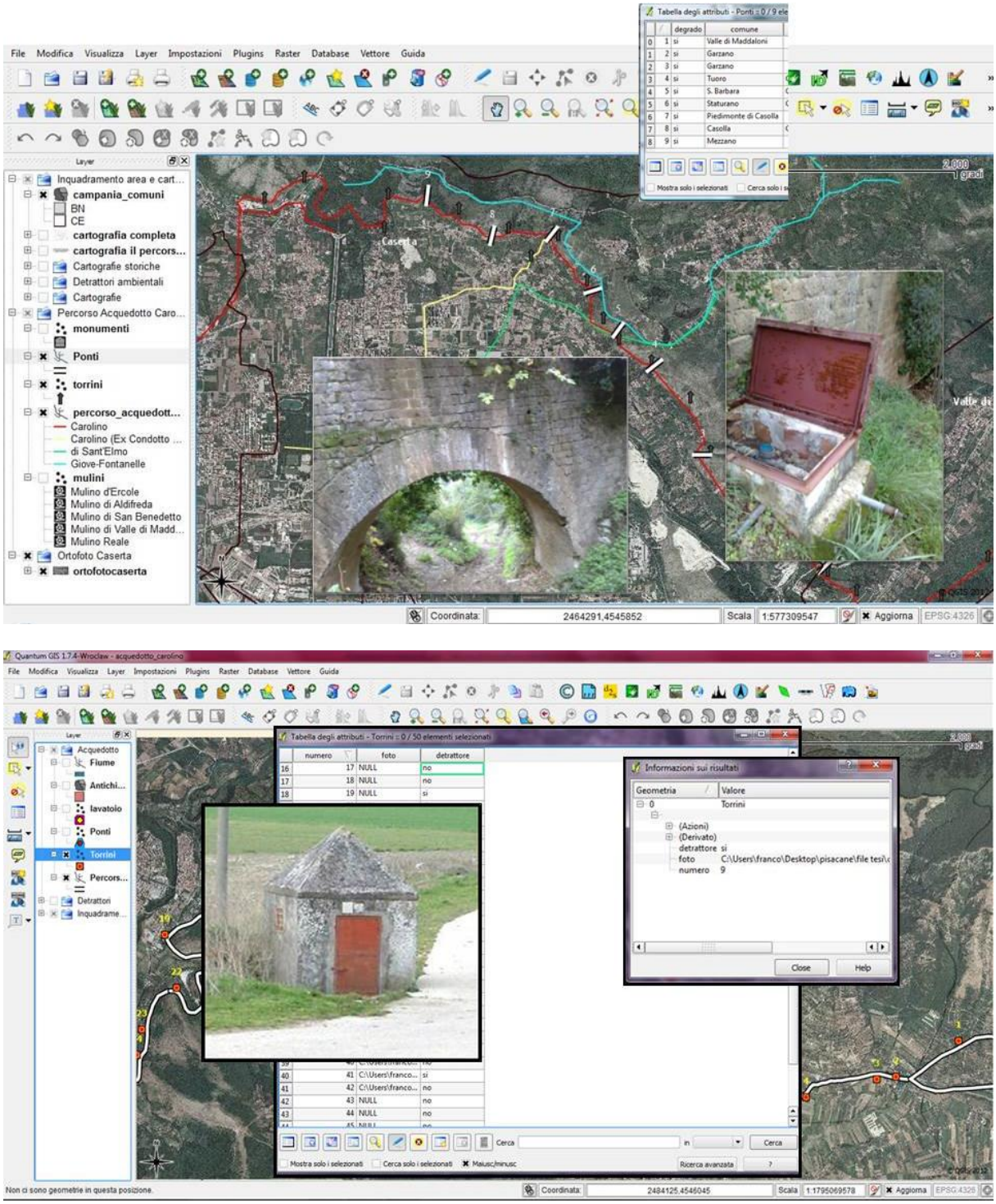

Fig. 2-3: Geographic Information System: analysis of the bridges (fig. 2) and the towers (fig.3).

In our country, the cultural heritage, both inside and outside museums, must be considered as a unicum (whole), within which it is a mistake to focus on ephemeral and spectacular events rather than on the knowledge and protection of the heritage itself as a structural and permanent objective.
The idea of spectacularising culture is ruining the symbol of Italian art cities such as Florence and Venice, reduced to tourist fetishes, money making machines, a sort of amusement park or shopping centre in which citizens have lost the spaces of their everyday lives.
This is what emerges from the words of Tommaso Montanari in “A Manifesto for our heritage”, in which he reiterates the civil and constitutional function of heritage, which must be maintained with public money, but is the property of every citizen. “The Italian historical and artistic heritage is coextensive and fused with the environment and must be protected, understood and communicated in its organic and continuous aspects. It is unacceptable for any cultural policy that focuses on so-called “absolute” masterpieces (i.e., literally, “freed” from any network of signifiers), to explant and force them

into exhibition routes with a cognitive value of zero. In other words, the events in Italy are killing monuments and, therefore, there is a need for a drastic change of direction. The vast majority of ancient art exhibitions are also marketing operations which exploit the works, ignore research and promote a passive reception based on the television model". [5]

The same issue had been raised by Settis for whom "The concept of the exhibition as a tourist trap is not only culturally backward, but is a short-sighted economic calculation, likely to cause sudden ignitions of interest and increase in visits, followed by desert and silence [...] The only exhibitions encouraged should be those aimed not at the ephemeral but the permanent, opportunities for knowledge which lead to a reassessment of the lesser known parts of the heritage, and therefore forms of winning investment (in money and energy)". [6]

Against the mis-education produced by the dominant models, the only way out is to start from the educational role of art, culture and the landscape. Heritage is like school: it is a powerful tool for citizenship education and spiritual upliftment. It cannot be considered a luxury or entertainment, and especially not with an ultimate goal of producing an income.
Any consideration of privatization, hiring, contract management or disposal, gives citizens a distorted view of the assets as a "cultural bed", like Italian oil, to be extracted and put to use.
The same is true for the landscape, systematically destroyed for profit, with a short-sighted perspective that does not take into account the enormous damage arising from the hydrogeological instability that subsequently entails, in addition to the loss of environments in which national identity is no less reflected than in cultural heritage. Also in this case, the defence of the environment and landscape includes ethical values, the civil and social associated with them, to contribute to building a better future.

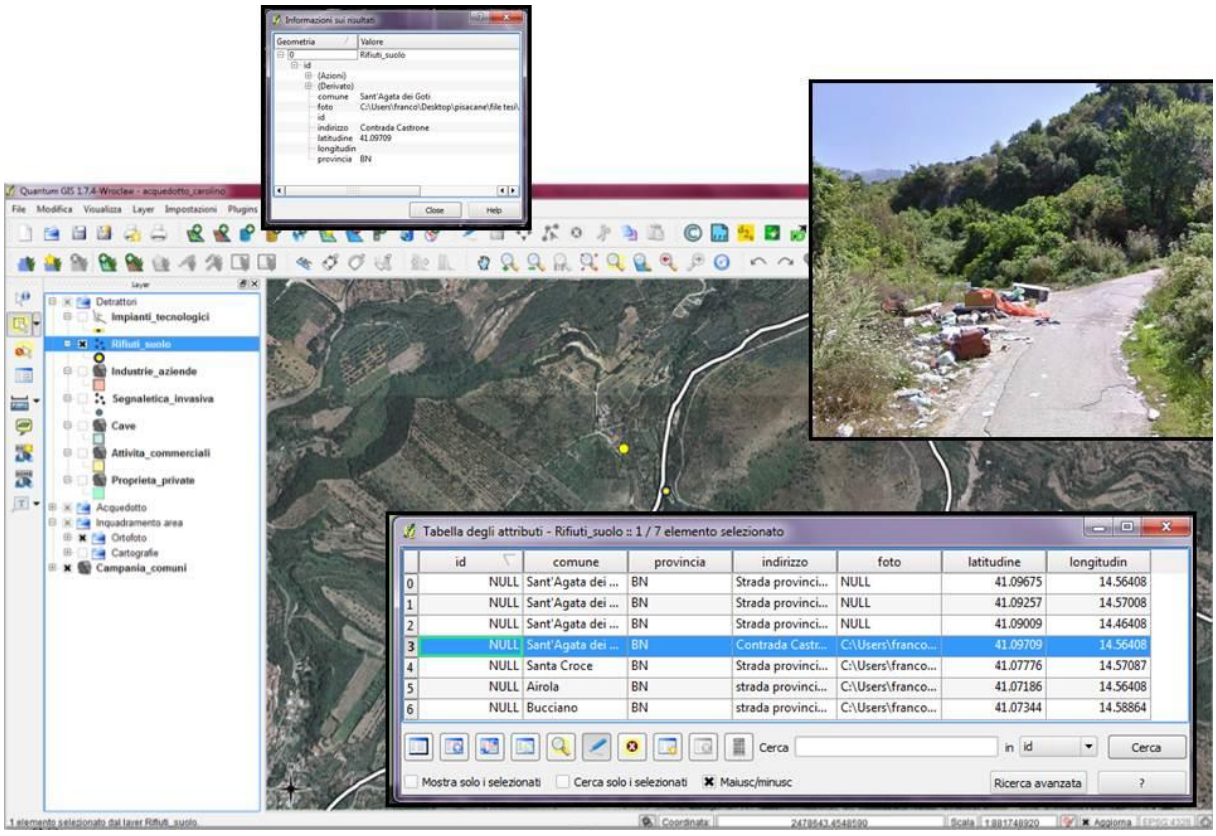

Fig. 4: Geographic Information System: survey on waste.

Starting from education means counteracting widespread figurative illiteracy, making the art, history and culture of the country, which are essential for full conscience of the nation to which one belongs, known and loved by children and young people within the Italian education system.
Young people, when at school, must be the first and most important recipients of the initiatives related to cultural heritage and landscape, in order to be able to understand the national identity understood as a connective tissue which includes monuments, language, literature, theatre, music and so on. The

investments made in this direction would certainly pay off in terms of wealth for the country itself, as is always the case for any investment in human capital, which should never be cut in times of crisis.
The museums, instead of investing in ephemeral events, should be seen as places of research and education, to develop, in cooperation with other research institutions, strategies of knowledge and access to their heritage, differentiated by specialists, for the general public as well as for the younger members of society.

Regarding the role of specialists, who must be professionals with technical and cultural skills, or in other words art historians, archaeologists, architects and restorers, and in addition, they should have a civic and institutional sense that only education can give. One of the roles of universities today is to form young people from both a moral and intellectual point of view as well as a technical and professional one, so that they can act with due sensitivity in this area.
University also has a key role in research, assuming that the acquisition and dissemination of knowledge is a worthwhile investment for the protection (i.e. to preserve the value of assets) but also to increase its value through proper communication activities.

Also in this case, research should be specifically addressed to the peculiarities of Italian heritage. It has been said how this is a unique connective tissue. It is therefore important to create a network, a sort of virtual museum of the territory, in which the relationships between the artefacts stored in museums, the other works in the area, villas, churches, monuments, and so on are highlighted. The aim is to broaden knowledge and hence the widespread interest in the assets, creating alternative itineraries to major attractors, allowing less well-known sites to enter the virtuous circle of knowledge.

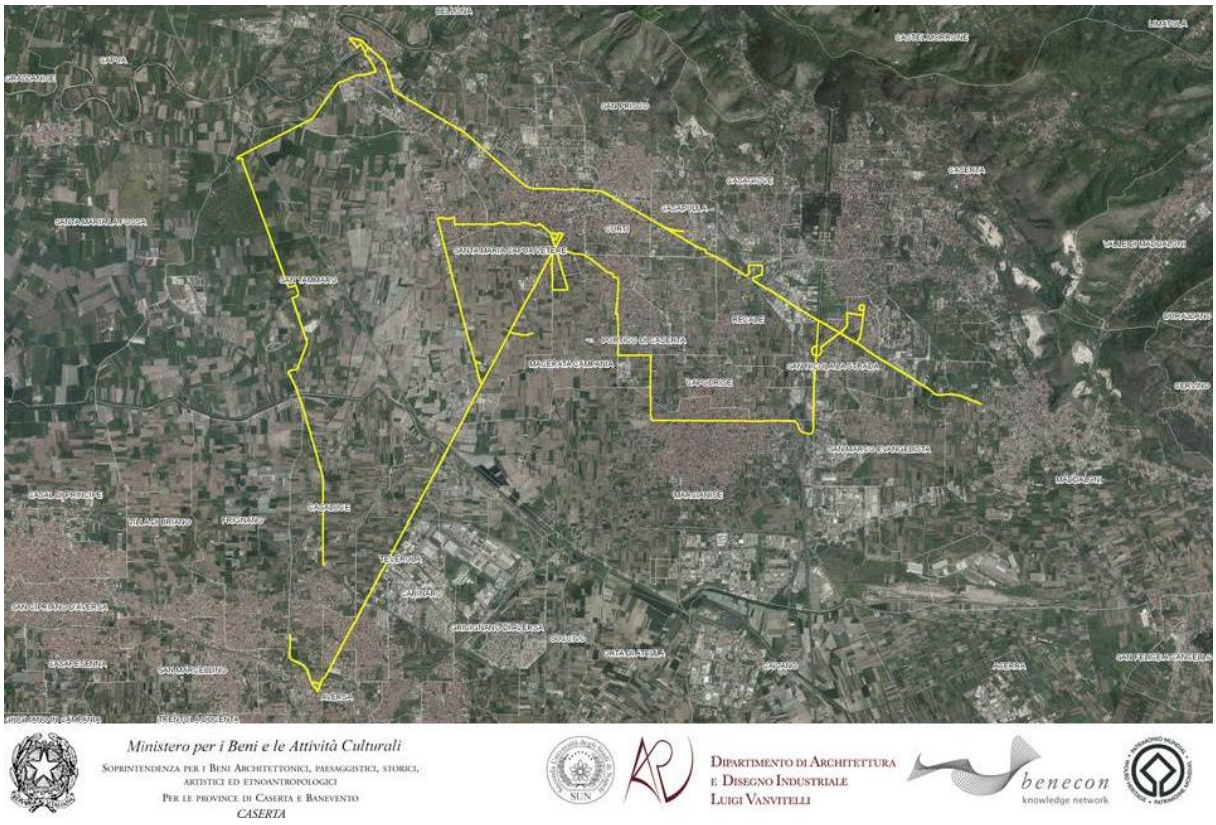

Fig. 5: Management Plan of the UNESCO site "Royal Palace of the eighteenth century in Caserta with the Park, the Aqueduct of Vanvitelli and the complex of S. Leucio. "
Path surveyed by platform Topcon IP-S2 Mobile Mapping installed on a dedicated vehicle.

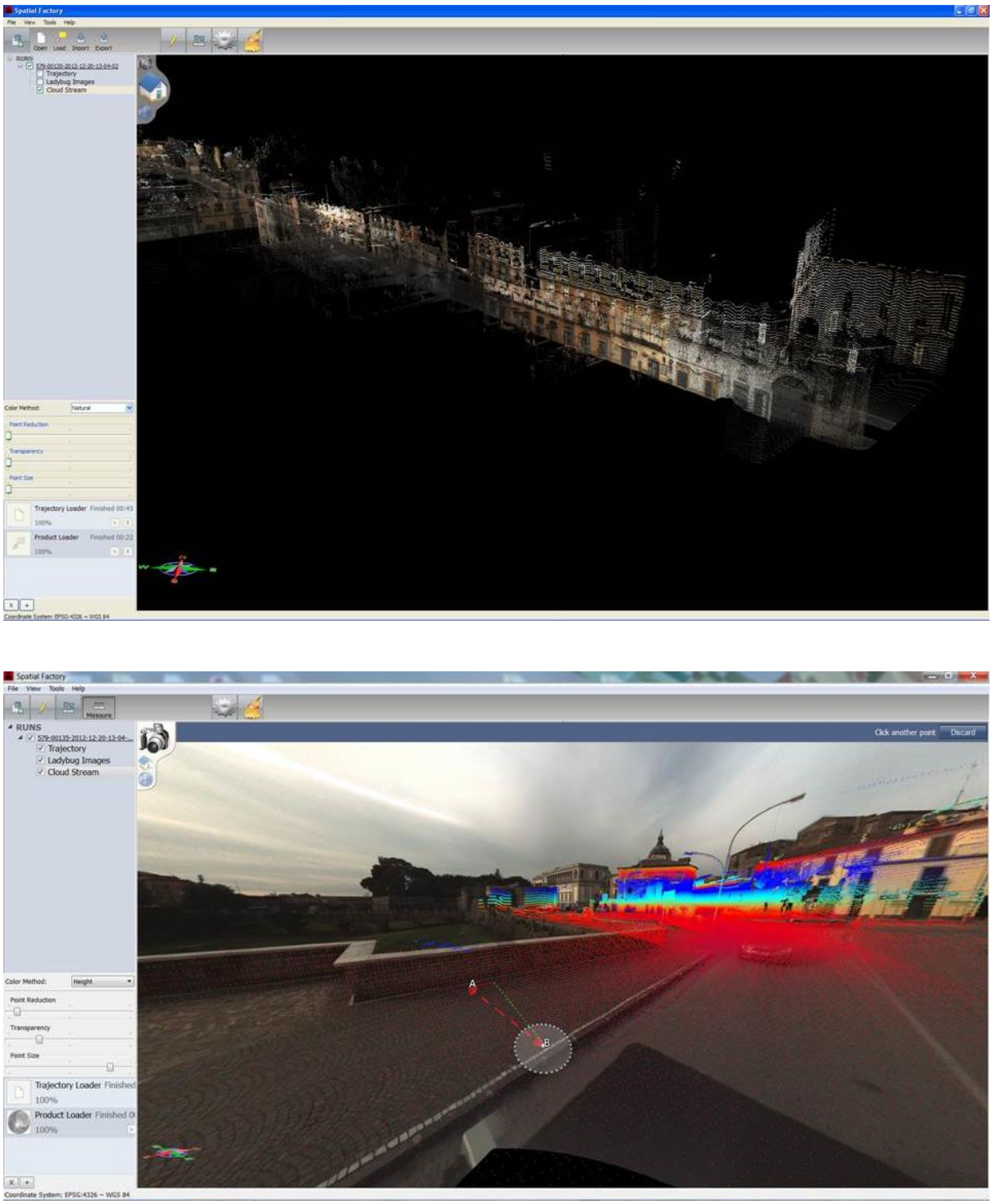

Fig. 6-7: Images captured by platform Topcon IP-S2 Mobile Mapping installed on a dedicated vehicle.

As stated by Settis, in his recent “Landscape. Constitution. Cement” when he wrote that “museums and monuments, so as not to die, must converse with the city and the world that surrounds them, re-positioning themselves through knowledge and communication mechanisms suitable to the times. To start from the museum, it must be an essential urban node that is grafted onto the heritage, civil and social fabric of the city, the distillation and showcase of the historical sedimentation and collective memory”. [7]

The network would have a key role in reconnecting the works to their tissue of belonging and reuniting lost contexts or geographically dispersed collections, for a better understanding of the work, the artist and the cultural context that produced it. Technology makes it possible to multiply indefinitely the connections, as well as display the logical, chronological, stylistic, geographical, genetic relationships

and so on between a given object and a variety of other items.
Thus, knowledge becomes alive, attractive, accessible. The route is not approved and imposed onto the visitor as exhibitions-event, but it is in progress, in the sense that it depends on the relationships that individual users prefer to view, creating their own specific cognitive approach.

In this direction, a collaboration between universities, research centres and institutions, against every self-referential mechanism, would be essential in order to develop strategies and objectives that maybe, without following the logic of income, could really generate wealth for our country.
To conclude with the words of Montanari, “We have to fight so that the historic fabric of our cities returns to being the instrument of cultural growth guaranteed by the Constitution, and escape the choice between destruction and transformation into an entertainment theme park”.

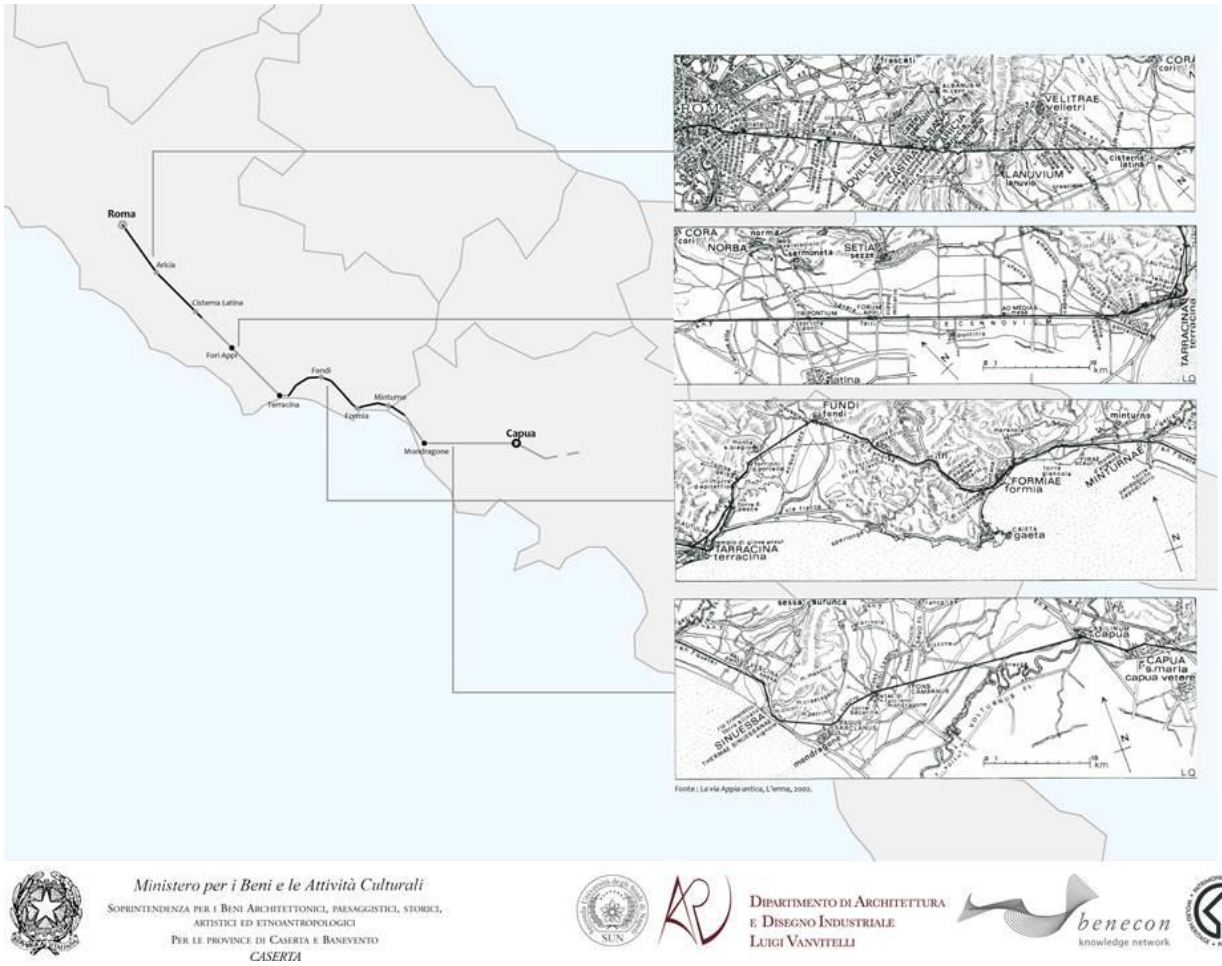

Fig. 8: Management Plan of the UNESCO site "Royal Palace of the eighteenth century in Caserta with the Park, the Aqueduct of Vanvitelli and the complex of S. Leucio. "
Identification of the tracing of the Via Appia.



Fig. 9: The Via Appia between the town of Caserta and San Nicola La Strada.



Fig. 10: The Via Appia in the area to be redeveloped.



Fig. 11: Architectural and urban design on the part of the Via Appia within the buffer zone.

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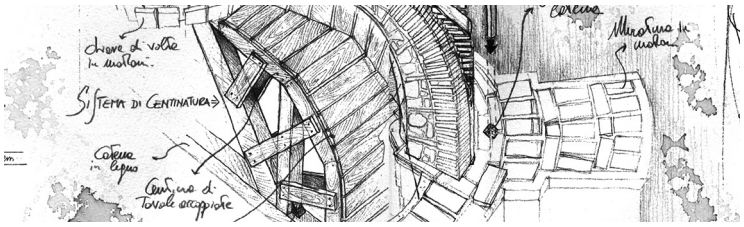

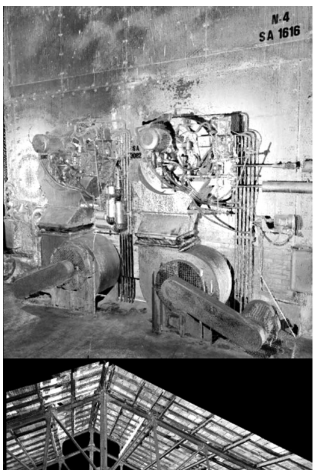







HERITAGE

focus on
CONSERVATION
REGENERATION
INNOVATION

NOLI ME TANGERE – ON TOUCH

Monika BOGDANOWSKA

Department of Drawing, Painting and Sculpture, Faculty of Architecture, Krakow University of Technology, Kraków, Poland
mimero@interia.pl

Abstract

This paper discusses the issue of physical interaction with monuments. John Ruskin suggested that "…*we have no right whatsoever to touch them...".* At the same time, Violet le Duc took the opposite position, encouraging contemporaries to enter into creative interactions with relics of the past. During the hundred and fifty years this controversy remains a classic issue. At the beginning of the 21st century we face new quandaries as a result of our 'traditional reality' gradually migrating into 'virtual space'. Do we still need physical interaction with authentic historic items during the current era, given that our perceptions can be so readily deceived? The human need for creativity and experience may be satisfied by digital tools, which are created and exist in the 'virtual world' – away from physical reality. Perhaps this is the ideal moment to discuss such dilemmas, since we have the benefit of more than a century of informed discussion and an urgent need to understand our presence in the context of the modern world, before change overwhelms our understanding of the past. Shifts in attitude towards Neo-Gothic structures are illustrated through examples from Kraków and Oxford, plans to demolish urban heritage in Vienna, Chester and Liverpool and through commercialisation of prehistoric artifacts in the Lascaux cave system.

Keywords: theory of conservation, heritage, conservation philosophy

Introduction

Impatiens noli tangere is the Latin name of the 'touch-me-not', a common herbaceous plant often found in damp places. When touched, its pods explode seeds and the life of the flower reaches its end – hence the name.

In "The Lamp of Memory" John Ruskin wrote about monuments: '…They are not ours. They belong partly to those who built them and partly to all the generations of mankind who are to follow us. The dead have still their right in them…' [8]. Both the dead, that is and our successors, but not us. What sense did this interdiction have? Is it still relevant today?

We are a generation experiencing the end of an era: we have witnessed the collapse of the free-market myth, together with the pyramid built upon faith in unceasing economic growth. This is the end of a two-hundred-year era of industrial revolution based on fossil fuels and the relentless conquest of the Earth. Some say that we are heading towards a global environmental disaster. As a civilization, we still have huge potential but surprisingly few ideas how to put it to good use. We are the first generation who will bequeath future generations a world covered in waste, polluted by radioactive leaks, with a disturbed and genetically modified ecosystem. It is a great paradox of our production-governed times that, leaving heaps of indestructible waste, we are not in the least focused on durability! Our knowledge, experience and even art are ephemeral; we record it onto non-durable media which require complex technology to be decoded – the recordings are not even resistant to cosmic radiation. How far are they removed from works carved in stone, created with the use of lengthy and complex technological processes? It is all mind-boggling and difficult to comprehend. Obviously, also for us – art restorers and preservationists, the time has come to make some crucial reassessments.

As history suggests, each period poses new challenges for conservation-restoration. However, this does not mean that old principles are no longer used; it means that nothing gets accepted once and for all and principles undergo verification, sometimes in a very painful way, as a result of dramatic events. This does not necessarily mean that old principles should be discarded, thus: how should the Ruskinian 'do not touch' mantra be understood today? Times and the world have changed and new technologies have appeared. In the context of more than one hundred years of experience, this appeal sounds like a warning, like a directive coming from the past. Can it inspire us, in whose hands lies the duty to preserve what we inherited from the previous generations and the choice of what we should pass on to those who will follow?

It can be concluded, rather perversely, that even *no* intervention is *some* kind of intervention in fact; for leaving an object to itself means agreeing to it being transformed – destroyed by natural processes. However, this is not what Ruskin meant. He simply opposed any material interaction with the historic fabric, because he wanted it to be preserved with all secondary additions brought on by the passing of time. But let us look at those whom Ruskin denied the right to touch. During his era, conservation of architecture was synonymous with rebuilding and renovation; archaeological sites were freely dug through and irreversibly damaged and discovered artefacts went to supply private collections. Coats of varnish and overpainting were brutally removed from paintings, frescos were experimentally transferred. Those were times when methods of structural consolidation or hydrophobization were still unknown; times when Violet le-Duc, a self-appointed constructor of Gothic cathedrals, raged on the Continent. In a phrase: those were entirely different times.

To be honest, however, it seems that no one ever did take the Ruskinian principle literally. His appeal was a reaction to a specific situation and it sprang from his exceptional sensitivity. Ruskin was a person – if I may put it this way – who was deeply aware of the essence of what he was looking at. A mind incapable of reflection, which looks without seeing and listens without hearing, will fail to perceive the hidden values of the surrounding world. A visible sign of Ruskinian insight is Venice, which he discovered for his contemporaries, even though at that time most travel guides suggested it was best to steer clear of the city.

'Not to touch' is perhaps the most difficult task for a restorer, for how can one resist touching when it is so easily possible? In its classical definition, art conservation excludes passivity – it is an action whose aim is to preserve, protect from damage and deterioration. Even 'preventive restoration', whose aim, as defined by Brandi, is to bring back the artefact's value into a recipient's consciousness, not necessarily involving any direct interaction with the artefact, is an action [1]. According to every definition that has ever functioned, the restorer's task is to maintain the life of an object and take care to preserve its fabric and meaning. So we preserve the fabric, the substance of the work, and take care of its artistic form and its meaning by documenting it.

As I mentioned above, each new era poses new and surprising challenges to restorers. The period of Romanticism, of searching for national identities, was a time when relics of the past were cherished, collected and contemplated. Collecting passions gave rise to scientific research and development of new branches of knowledge: archaeology, conservation and art history. A dilemma unavoidably appeared - how should one deal with historic artefacts? What should be done to preserve their state, restore their greatness and reveal their exceptional features? The nineteenth-century instances of restoration sprang from the needs of that society and while they did contribute to increasing interest in monuments and more generally in historic artefacts, the scale of damage they caused must have made those sympathetic to Ruskin's view cry out: *Noli tangere!*

Then, just when it seemed that the principles of handling relics of the past, as formulated by Riegel and developed by Dvořàk, would remain unchanged, the two world wars brought out the necessity to verify them. The complete reconstruction of destroyed built heritage became not only acceptable, but simply necessary. The object's existence in a specific, historically documented form became more important that its authenticity. The trauma of war damage showed how addicted we had become to matter, how submissive we were towards the primacy of historic fabric. It took a major re-evaluation of the former way of thinking for the decision to be taken to rebuild the Old Town in Warsaw, which meant to reinstate the *genius loci* of the destroyed capital using entirely new materials, while not being entirely faithful to the original form.

The second half of the 20th century, with the economic prosperity of the West and the poverty of the East, brought new challenges. After years of estimating losses and rebuilding destroyed historic cities, in

the ruins of which millions of artefacts of lesser and greater importance and of different periods got lost, there appeared a new slogan – *modernity*. This slogan, inscribed on banners displayed by proponents of 'progress', became a challenge to the past and, although it was not entirely clear then, to historic artefacts and buildings. It is surprising that the power of this word circumvented the barrier of the Iron Curtain and despite the economic differences between the East and West, the process of destroying cultural heritage proceeded in a similar fashion simultaneously on both sides. The need to break away from the aesthetics of the old and the destroyed was overpowering. In Poland, some objects carried the additional burden of the Partitions; being branded as work created by invaders, while others, in turn, were seen as exposing the backwardness of the Polish countryside vernacular. There was absolutely no place for them in the modern Socialist reality.

And so, the 1960s irreversibly changed the appearance of many European cities. For example, in Liverpool during 1966, the city council earmarked for demolition *seventy-eight thousand* buildings which made up the core of the residential area in the city centre. Derek Latham commented of that time: "Councils seemed to vie with each other to complete destruction of their built heritage, encouraged by government and supported by architects and planners, who presented watercolour images of a sunlit concrete world peopled with brightly painted figures living under a blue sky" [6].

Mario Schwarz and Manfred Wehdorn, discussing one hundred instances of restoration of historic town buildings in Vienna, recall the danger which loomed over many of them in the 1960s and 1970s, giving the example of Spittelberg, a street which was planned to be entirely razed to the ground [9].

On our Cracovian ground, an excellent illustration of those changes is the discussion about the leading Neo Gothic building in Cracow – the Jagiellonian University, Collegium Novum. This is probably the most important building of Cracovian Historicism. The modern seat of the oldest Polish university, the edifice was erected between 1882 and 1887, mainly using funds drawn from the Austro-Hungarian invaders thanks to the cunning of University professors. The building was designed with passion; every detail was discussed by a circle of professors, eminent architects and historians of art and the main idea held by the building committee was to introduce as many motifs typical of the Polish Gothic style as possible. At the time it was constructed, it was a synonym of Polishness for the nation living under partition.

Subsequently, in the 1960s, Karol Estreicher, the most eminent Cracovian historian of art at that time, publicly voiced an opinion that the Neo Gothic style in Cracow was first and foremost a tool of Germanisation. This was a very strong argument, especially if we take into account the fact that it was voiced only 20 years after the war. What is more, Estreicher not only criticized the architectural design, but also questioned the knowledge of art historians participating in the project, calling them flatly dilettantes. In his article, Estreicher writes: "The most important work by Księżarski, which up to this day is regarded as his original architectural creation, that is the Collegium Novum of the Jagiellonian University, is – simply put – an instance of architectural plagiarism. It has to be said once and for all for the sake of truth. Księżarski reproduced here, from the outside, the Kreuzgymnasium in Dresden (…), and from the inside, in the staircase, the vaults of the Teutonic Castle in Malbork" [3].

The opinions voiced by Estreicher affected not only the architectural value of the Collegium Novum, but the value of Neo Gothic architecture in general, although obviously one cannot put the whole blame on Estreicher. He was, in colloquial terms, "a child of his times," involved in a common trend contesting Historicism and Art Nouveau. Even though one might have expected that the war experience and commonly accepted principles of conservation-restoration would have been an effective antidote which protected historic buildings from devastation, the objects erected at the end of the 19th century were not under protection; they were eagerly adapted and their furnishings were thoughtlessly destroyed.

At almost exactly the same time in Oxford, a dramatic decision was taken to dismantle the Oxford University Museum of Natural History – an architectural masterpiece, co-created, paradoxically, by John Ruskin. This magnificent building, which masterfully resolved the dilemma of constructing a modern structure on the basis of historical patterns, which displayed ingenious solutions concerning the interiors and through which Ruskin could actually bring to life his conceptions concerning granting creative freedom to simple workers – this magnificent edifice was to be pulled down to make way for a modern concrete structure. The *opus magnum* of the nineteenth century architecture of Oxford ceased to be attractive, which was borne out by the words of T.S.R. Boase, the English counterpart of Estreicher: "The museum has never been widely admired" [7].

Obviously, the heritage protection millieux did not stay put. In 1962 in France, the *Loi Malraux* was formulated: it was the first directive which expressed the need not only to protect, but also to revitalize historic sites as a whole [10]. Another document was the *Venice Charter*, whose entire fourteenth chapter

was devoted to this subject; it was the first to take into account the inextricable connection between an object and its context, thus making Max Dvorak's conceptions legally valid. The Charter also emphasized artistic and cultural values displayed by "humble objects". In Polish circles, the Venice Charter was supported by the Warsaw-Nairobi Recommendation.

The 1970s carried a whiff of a breakthrough. Several phenomena contributed to this fact. First and foremost, there appeared the so-called 'best preserver' – the money shortage caused by the recession during the second half of the 1970s. Due to the economic slump in Western countries, demolitions were suspended, which rescued, for example, the market square in Chester – one of the more valuable medieval cities in Britain, even though the rest of the city was unrecognizably transformed. The 1970s also brought an important cultural breakthrough, mistakenly perceived only to be 'rebellious youth' and the associated rise of new musical forms. However, it was the 'Flower Children's' generation who appreciated the history of civilization and culture and by searching for Romantic references in the past, they changed the approach to historic artefacts. The year 1975, hailed as the European Architectural Heritage Year, turned out to be crucial for European art restoration. Many initiatives and organizations were launched and the first entries appeared in the UNESCO World Heritage List. The following years further widened the scale of protection, whose range was then defined in the Washington Charter of 1987. Apart from historic architectural assemblies, the natural, archaeological and social aspects were noted, thus making cultural landscape the object of heritage protection.

The rehabilitation of the Neo Gothic style did not happen until the 1980s, when the first art history sessions devoted to art of the second half of the 19th century were held. It was during this period that Collegium Novum was finally accepted as one of the peak achievements of the Polish Neo-Gothic. Shortage of money also rescued the Oxford University Museum of Natural History, although part of the assembly, i.e. the curator's house, was demolished.

It is difficult to estimate the scale of damage done across Europe as a result of earlier aversions. Today, we can freely call it 'a holocaust of cultural landscape'. Under the excuse of 'progress' and modernity, not only thousands of buildings, but also their furnishings were destroyed. Amongst the Neo-Gothic furniture of Collegium Novum only that of the assembly hall remains; the rest was burned. No one appreciated the splendid artefacts of pre-war craftsmanship: tiled stoves, wooden staircases, old chandeliers, wrought iron bars, stuccos, or window woodwork. The arrival of the entry-phone led to the loss of decorative door handles. Changes came, as they still are coming – the world is in a state of flux, under permanent reconstruction…

Noli tangere. Today we, the next generation, are crying and lamenting the damage done by our predecessors to artefacts which, according to Ruskin, did not belong to them. Our fathers only inherited them from their fathers. If only they had listened to Ruskin – the historic centres of European cities would look very different today. Wooden and military architecture, so mercilessly demolished in Poland, would have survived.

And what about today? Let us have a look at the most recent years which preceded the end of the neoliberal economic boom and left us in the dramatic present-day situation. In the 1980s profit expectations were transferred from money-markets to production efficiency, which resulted in the lowering of employment costs through automation and consequently the rise of mass-produced items. This process caused massive social changes: traditional craftsmanship declined and mass production began to oust local products. Ruskin's anticipations became reality: the creator turned into a consumer.

With mass production there naturally appeared a mass culture. The roots of this culture can be traced to the process of cultural globalization. It is assumed to be remote from local creativeness, hence locally created objects are alien to it, although they may be attractive – but only as products. That is why, at one point, marketing specialists suggested we refer to monuments as 'tourist products' and those whose interest should be awoken – the 'target'. Thus, heritage became subject to economic estimation. Today, nobody speaks of memorial or historical values anymore; the historic artefact has been given a new *material* value. It had to be so, since every historical period tends to perceive the world 'through its own glasses'. Who is going to spend money on protecting something of an intimate unspecified sentimental value? Ours are different times. Since the material value is part of the value of a historic artefact, its merits will be considered in the context of it being 'a worthy investment', and consequently worth protecting. This breeds tension between restorers and users, for the values for which we protect historic artefacts are not always saleable. On the other hand, searching for consensus is necessary if we truly want to save our heritage.

Is there still a place in contemporary culture for objects which are deeply rooted in native tradition and landscape, but fall short of economic challenges? Where in this globalized reality is there room for historic artefacts? What is the restorer's place?

A possible answer to these questions may be found in the case of the mosaic on the façade of the Cracovian Biprostal building. A magnificent abstract 600-square-metre decoration, on the wall of the only high-rise building erected in Cracow in the 1960s, was to be torn down during thermal modernization in 2010. Information about this appeared on social networks and was quickly picked up by the media. The proponents for its destruction put forward the following arguments: the owner is allowed to do anything to the building, the economic aspects of using the building are more important than the mosaic and insulating the walls would lower the running costs. Why should the building be protected when it is not even a monument? and, last but not least, the mosaic is "hideous" – even if some people like it, it is devoid of any value. It is worth noting that none of the arguments quoted above belongs to the realm of art, culture, restoration or heritage protection. They all belong to a world driven by the logic of the free-market and consumption. The conviction that the mosaic is not a monument springs from a belief that a monument must be a listed object protected by the law. Moreover, a contemporary perspective conforms to the idea that a monument should be "pretty". Unlike their 19th century predecessors, who may have appreciated the charm of ruins, for example, the materialists fail to reflect upon the passing of time. In turn, the proponents for keeping the mosaic intact emphasized its uniqueness as well as its perfect integration with the building for which it had been designed. (It should be noted that such ceramic decorations, popular in the postwar period, were almost all destroyed during the last two decades). Eventually, social pressure and numerous protests, along with letters and appeals to conservation-restoration authorities rescued the mosaic, since it is one of the very few left in Cracow. *Noli tangere*. After all, it didn't belong to us!

The above example shows that we cannot discuss cultural heritage protection using the language of economics. This language is suitable for planning a budget, or concluding a credit agreement, but not for heritage protection. In the same way, nobody will discuss the intangible value of goods within the field of banking.

The best illustration of the change in approach towards cultural heritage during the 20th century are perhaps illustrated by two prehistoric painting galleries: the caves in Lascuaux and Chauvet. The Lascaux system of caves, discovered in 1940, was quickly opened to visitors and became a major tourist attraction, bringing economic revival to the region and attracting thousands of visitors. With time, it became evident that such intensive intrusion distorted the caves' delicate microclimate, leading to an invasion of microorganisms which is causing problems to this day. We now know that re-establishing the climatic balance inside the cave through air conditioning is impossible. The cave contains a complex ecosystem and functions like a living organism. Letting people enter it irreversibly distorted that balance. The Chauvet cave was discovered half a century later in the 1990s and was immediately sealed. The assembly of paintings discovered inside is nearly twice as old as those in Lascaux. It is possible to enter only with a consent from the French Ministry of Culture for research purposes and only for a few hours a year, with a small group of people. Werner Herzog's four-member team were allowed only three hours to shoot material for the film: '*Cave of Forgotten Dreams*'. It was recorded in 3D and gives one a feeling of being inside the cave – even of experiencing the almost physical presence of the prehistoric painters. No tourists. No crowds, stalls or shops – the cave is closed. The stone walls and steel doors protect its unsalable values. The paintings in Chauvet are not to be touched.

Ironically, it is during our extremely materialistic and consumerist era that tools have been created which allow us to protect historic artefacts without touching them. We have the power to restore an object, make it readable to contemporary tastes – as Brandi desired – using no treatment at all. A damaged original can be placed safely in a repository. An art restorer can apply virtual treatments to it: remove yellowed varnish, reconstruct it and then invite visitors to view it in a virtual gallery. Given that even now we can take virtual walks, soon we will likely be able to experience an almost real-life full-sensory experience of visiting, for example, the Acropolis from any geographical location. Will this possibility heighten or diminish the rank of this place, which for many today is little more than another 'must-see' on a trip itinerary, unreal in the sense that it is usually filled with crowds of perspiring and disinterested tourists?

Let us put these futuristic visions aside. If there is one important lesson to be taken from the experience of the past then it is that we are unable to foresee what will happen next, what needs will arise, what principles and expectations will appear. Our task is to protect heritage from thoughtless destruction and to persuade people that even if they cannot respect the works of past generations, at least they should grant their successors freedom of choice. In the face of looming cultural homogenisation, it is art restorers who

will lay claim to objects belonging to different periods and cultures. It will be a new and important challenge for them, for they will no longer fight for individual masterpieces, but for the very embodiment of the cultural richness of the past.

Looking back at the damage done during the 20th century, we may arrive at the conclusion that the erroneous thinking lay in ascribing specific values to cultural objects and in the continuous assessment of whether they were of value and what exactly that value and the rank of the objects were. It happened regardless of whether the highest value was perceived as historic, as it was in the past, or material, as it is today. A generation will perceive particular values in a particular way and future generations will formulate their own perceptions anew. However, is it possible to protect historic artefacts without ascribing *any* value to them? Yes, if we think like Ruskin did: "They do not belong to us." They just *are* and the only thing we should do is pass them on to our successors. We can interpret them, use them as a source of knowledge or aesthetic experience – they may even evoke anger or repulsion in us – but we have no right to destroy them simply because we fail to notice in them values that we currently deem significant. Not touching, then, will be an indicator of the highest form of respect, not only to an artwork itself, but also to previous and future generations.

Conclusion

Noli me tangere are the words with which resurrected Christ addresses Mary Magdalene, who is the first person to meet Him outside His tomb. "Touch me not," or, "Don't hold me." The words that follow sound very mysterious: "Touch me not; for I am not yet ascended to the Father" [11]. Thus: "Do not touch" so as not to disturb an ongoing process.

What significance do these considerations have for us as people of the 21st century? Perhaps, before touching, it is worth asking, "What is the point of touching?" Maybe this question should be asked more often today. Perhaps sometimes it will help us verify our attitude towards an artefact and do what for the art restorer is the most difficult thing to do – accept the state of the work and the process it is in; agree to its untouched state and in this way, paradoxically, step out of time, in that very moment. *Noli tangere* tells us – do not touch, instead, look, see or think, or as a philosopher would put it: Just rest within your being, if by some curious coincidence you have been given this experience.



Fig. 1. Collegium Novum, Jagiellonian University, Kraków, 1882 – 1887, F. Księżarski. Photo: M. Bogdanowska, 2012.



Fig. 2: Collegium Novum, Jagiellonian University, Kraków, 1882 – 1887, F. Księżarski. Assambly hall after restoration carried in 1998/ 99. Photo: K. Polesch, 2003.



Fig. 3. Oxford University Museum of Natural History, 1855 – 1860, T. Dean, B. Woodward. The main court. Photo: M. Bogdanowska, 2007.



Fig. 4: Biprostal**,** Kraków, 1964. M. Wrześniak, B. Czapczyński, mosaic decoration designed by C.Styrylska – Taranczewska. Photo: M. Bogdanowska, 2010.

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A new cultural landscape: the Historic District of Zhong Shan

Livio SACCHI
Department of Architecture, Università degli Studi "G. d'Annunzio", Chieti – Pescara
livio.sacchi@archiworld.it

Abstract

An agreement between three Italian schools of Architecture - the School of Architecture of the Università degli Studi "G. d'Annunzio" di Chieti Pescara, the School of Architecture of the Università degli Studi di Camerino in Ascoli Piceno and the IUAV, Istituto Universitario di Architettura di Venezia - the Zhong Shan Design Institute and the Municipality of Zhong Shan, has recently made possible a new Master Plan for the Historic District of the Chinese city of Zhong Shan. As a whole, considering the relationships that, originally, linked the Jiu Qu river (natural) to the (man-made) built environment, the District is a complex cultural landscape, a combined work of nature and men, its urban space being the product of different generations. The most interesting built examples date back to the so called Golden Age - the Twenties and Thirties of the 20th Century - when the merchants of the Guangdong region opened themselves to a new global attitude, successfully conquering the foreign markets. Many of these buildings, all of them accurately surveyed and laser scanned, date back to that period. Our design proposal aims at the conservation of the urban diversity; the rediscovery of the now underground river; the transformation of this valued, though run down, area into a lively and attractive one for Chinese and foreign tourists; at making it a significant part of China's *green* leap forward; at conserving and showcasing its peculiar southern Chinese cultural identity.

Keywords: China, Zhong Shan, Guangdong, heritage, laser scanner surveys

1. Architectural history and the future of the city

The architectural history of a city and its cultural heritage is among the priceless and irreplaceable assets, not only of Zhongshan and of China, but of humanity as a whole. The loss, through deterioration or disappearance, of any of these most prized assets constitute an impoverishment of the heritage of all the peoples of the world. Since the adoption of the UNESCO Convention in 1972, the protection and conservation of the cultural heritage constitute a significant contribution to a sustainable development. Based on the principles of the 1964 International Charter on Conservation and Restoration of Monuments and Sites (the so called Venice Charter), our specific duty is the identification, protection, conservation, presentation and transmission to the future generations of a cultural heritage of outstanding universal value, promoting the application of theory, methodology and scientific techniques to this valued, Chinese urban area.
The Historic District of the city of Zhongshan is made of different parts and of quite different buildings; most of them, because of their history, their architectural qualities, their typology, their building materials, their decorative apparatus, their homogeneity and the social and relational qualities of the public spaces, can certainly be considered of "outstanding value" from the point of view of history as well as art. As a whole, and considering the very interesting relationships that originally linked the river (natural) to the (man-made) built environment, the complex may even be considered as a true cultural landscape, a "combined work of nature and of men" and its urban space considered the product of the creative genius of different generations. "Outstanding value" means a cultural significance which is so exceptional as to transcend local (Guangdong) or national (Chinese) boundaries and to be of common importance for the present and the future generations of humanity. Nowadays, local Administration is



Fig. 1: Figure caption

demonstrating its full commitment - in the forms of appropriate policy, legal, scientific, technical, administrative and financial measures adopted and proposed - to restore and protect this urban complex and its great value: we are willing to cooperate with our specific scientific culture and technical know-how and with the experience made in decades of field studies on similar Italian and foreign urban complexes. well as art.



Fig. 2: Figure caption

As a whole, and considering the very interesting relationships that originally linked the river (natural) to the (man-made) built environment, the complex may even be considered as a true cultural landscape, a “combined work of nature and of men” and its urban space considered the product of the creative genius of different generations. “Outstanding value” means a cultural significance which is so exceptional as to transcend local (Guangdong) or national (Chinese) boundaries and to be of common importance for the present and the future generations of humanity.
Nowadays, local Administration is demonstrating its full commitment - in the forms of appropriate policy, legal, scientific, technical, administrative and financial measures adopted and proposed - to restore and protect this urban complex and its great value: we are willing to cooperate with our specific scientific culture and technical know-how and with the experience made in decades of field studies on similar Italian and foreign urban complexes.
The central part of the city represents an interesting example of the Southern Chinese urban and architectural creativity; it bears a significant testimony to a very specific cultural tradition and to a living civilization; it is also a very peculiar mix of different building types, an architectural ensemble which illustrates a significant stage in the city’s history; quite a few areas of the Historic District, though partly spoiled by recent buildings of debatable quality, meet the conditions of integrity and authenticity (authenticity is expressed through a variety of attributes including: form and design, materials and substance, use and function, traditions and techniques, location and setting). It is also very important to note that the entire area is very lively and densely populated, if not as attractive, for tourists as well for the inhabitants of “modern” Zhongshan, as it should be.
The most interesting built examples date back to the so called Golden Age, a period that can be located in the Twenties and the Thirties of the 20th Century, when the many merchants of Zhongshan opened themselves to a new global attitude and successfully conquered the foreign markets. Many of the most interesting historic buildings, that have been accurately studied and surveyed, date back to that period. The rediscovery of the identity of Zhongshan is clearly linked to the rediscovery of this anonymously, but competently and also stylishly designed and built architectural heritage and of its original, now unfortunately lost, relationship with the underground river. We and our Chinese colleagues share the opinion that the city has to look back at its memories if it wishes to come to a fresh start for a brilliant future.

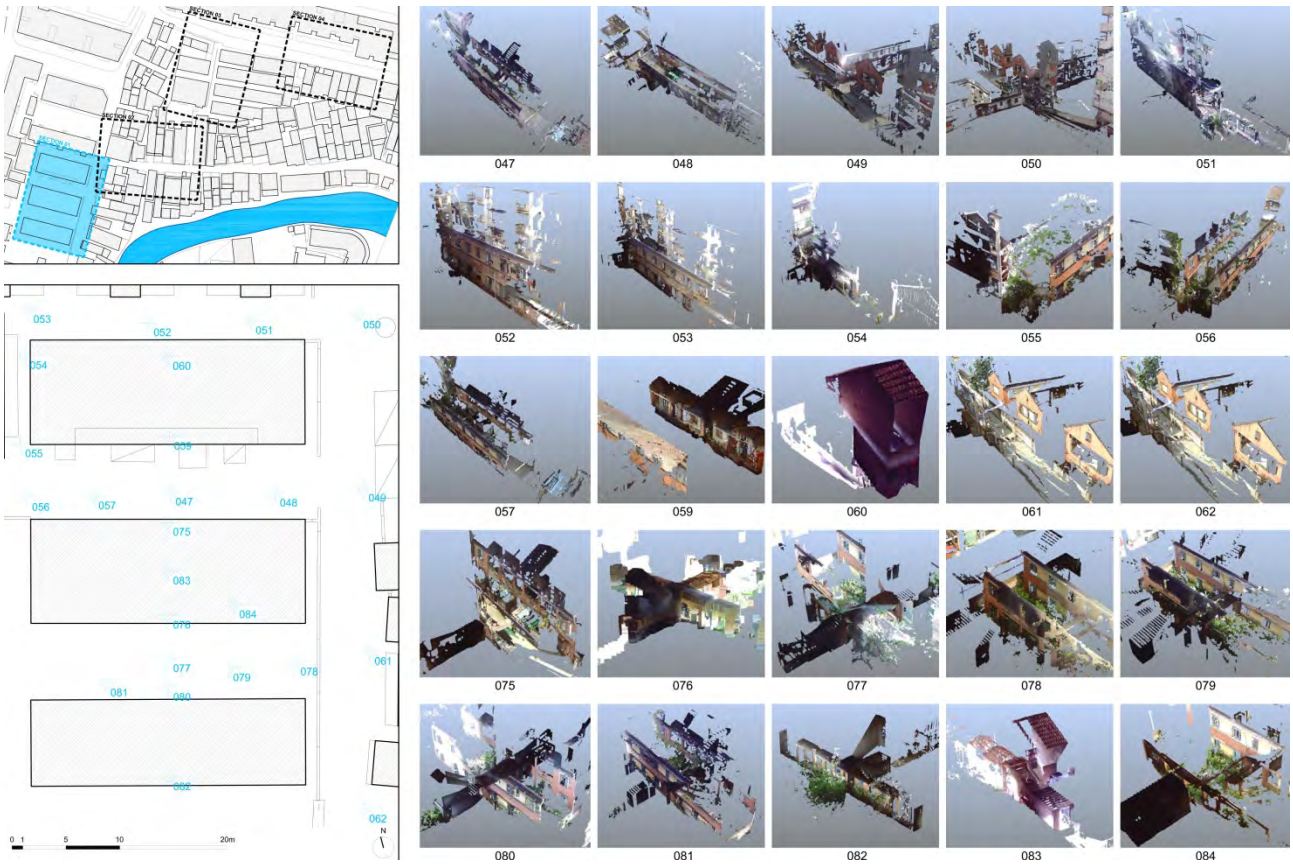

Fig. 3: Figure caption

Our project will aim at the conservation of the entire Historic District, prolonging the life and the integrity of its architectural characters, its built forms, its constituent materials, its original colors, its once strict relationship with the Jiu Qu river. In the mainframe of our proposal, we shall distinguish diverse interventions such as preservation, rehabilitation and restoration.



Fig. 4: Figure caption

Preservation emphasizes the retention of all historic fabric through conservation, maintenance and repair. It reflects a building's continuum over time, through successive occupancies, and the respectful changes and alterations that were and are made. It is a very important stage: preserving is better and cheaper than restoring and accurate and competent maintenance is essential for the healthy survival of our built heritage.



Fig. 5: Figure caption

Rehabilitation emphasizes the retention and repair of historic materials, with some latitude for replacement and reconstruction of the deteriorated or missing parts. The upgrading of the historic standards to contemporary ones is a necessity: nobody wishes to live now as our grandparents lived in the past. This is true in terms of size of the rooms, in terms of natural light and ventilation, in terms of service areas such as bathrooms and kitchens etc. But properly upgraded historic buildings can be more efficient and can provide a more comfortable, contemporary living than many recently built ones.
Restoration focuses on the retention of materials from the most significant time in the city's history, while permitting the removal of materials from other periods. It is the most delicate part of the intervention and it has to be executed by highly skilled craftsmen under the supervision of experienced scholars and professionals.
A subtle cultural sensibility and a deep critical know-how are evidently requested in order to correctly read and interpret the built architectural and urban heritage. Italian architectural and urban culture has possibly been the most actively and widely interested in interventions on the built heritage all over the world. As it is the case for China, Italy has been continuously inhabited since very ancient times; its historic cities are universally recognized among the most valuable western urban models of humankind; the quality of life that the historic central districts of some of our cities can boast is rated at the highest ranks in the world urban competition. Italian experts, though sometimes overcome by the quantity and the artistic quality of their extraordinary built heritage, have usually been very successful in preserving and restoring historic towns and as a whole.
The result of all this is that, though post war Italian suburbs share the same problems (and ugliness) of many other contemporary cultures all around the world, its historic urban legacy is still nowadays very successful among its citizens and extremely appreciated and looked after by tourists. It's understood that the built heritage should not be considered a heavy burden on the municipal finances, but an exciting opportunity to exploit – not without a high degree of cultural sensibility - for the future of the entire local community.



Fig. 6: Figure caption

2. Section *Architectural history and the future of the city*

The Historic District in central Zhongshan also has to become a significant part of China's *green* leap forward. Our current way of life, here as anywhere else, is clearly unsustainable, and that which is not sustainable does not continue. Our cities have to rely on renewable resources, they must be dramatically more ecologically sustainable and we have the challenging task to redesign them in order to achieve an entirely different kind of civilization.

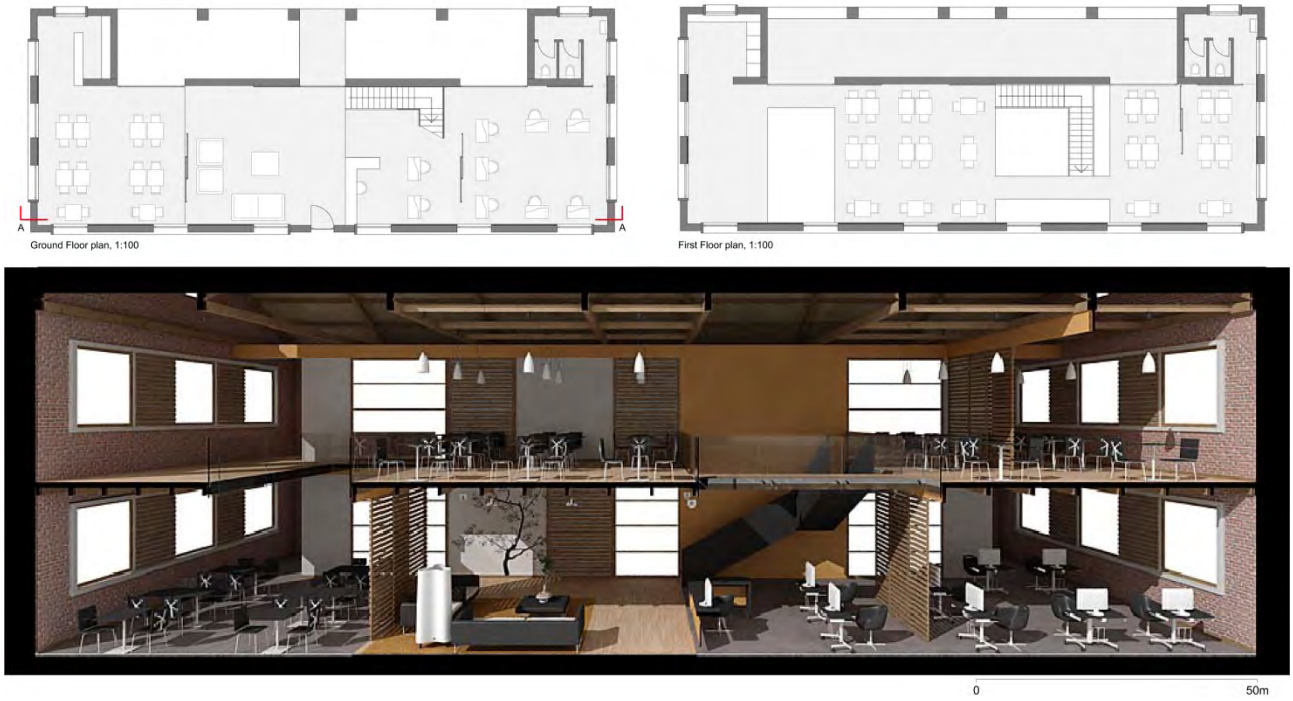

Fig. 7: Figure caption

A green city can have a great, positive impact on the planet's future. Cities have to grow smart and old historic districts, if properly upgraded, can be way smarter than most recently built suburbs. The idea

of a green city can coexist perfectly well within an historic district. A well redesigned historic district won't just help comfortable people become prosperous, it will also meet its inhabitants most basic needs – from clean water and adequate housing to education, healthcare and other social services – better than spread out, car dependant suburbs do. Designers (architects, engineers, urban planners, technicians etc.) have to know the place well in order to make it better, because a given urban-planning tool never works for every city, and because the more we know and love a place, the more we want to participate in determining its evolution. This is the reason why the Italian architects and planners involved in this design proposal must strictly cooperate with their Chinese colleagues in order to share an exciting, common vision for the future of Zhongshan.

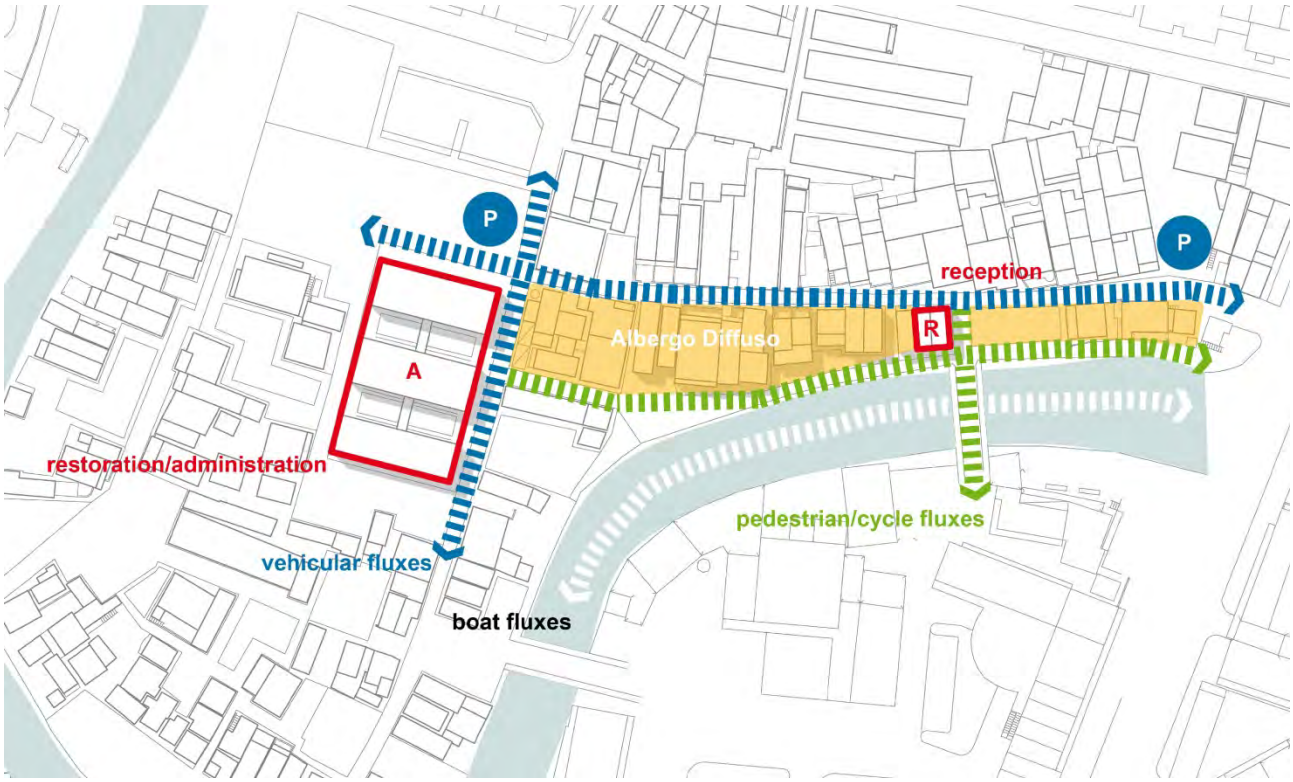

Fig. 8: Figure caption

Central Zhongshan will thus experiment a great variety of challenging and entirely new issues, like, for example, new forms of urban farming: people will be able to produce a significant percentage of their food using their small gardens, their terraces and green roofs and the public, green areas along their newly discovered river. The linear park along the Jiu Qu river will also preserve biodiversity in the midst of a densely populated urban environment. This park and other green areas, with their abundance of shade trees, will act as passive means of cooling, blocking hot sun rays from the houses. Achieving a high density - which is very much part of the Chinese as much as Italian urban traditions - is extremely important for achieving a more general urban efficiency: though contradictory, a dense compact neighborhood use less energy and spew less pollution. People can walk or bike, and everything gets cheaper and easier to provide: electricity, sewage and other basic services. And when more people share these services, they all have far less of an impact on the city and on the planet. We all know that we have to build in existing communities – it's the so-called *infill* housing – in order to have comparatively minimal impact on surrounding ecosystems, since the most damage has already been done there. Zhongshan, as any other contemporary metropolis, has to fight hard, avoid the urban sprawl and increase the quality of its urban life: improving air and water quality, creating vibrant and friendly neighborhoods and becoming a walkable city, at least in its central areas.
The new houses that will be built there and the old existing houses that will be competently and creatively renovated, will adopt solar panels to bring clean energy and refrigeration in the humid season and will make good use of the rainwater that falls on the roofs; passive solar energy will also make use of existing conditions and natural methods like conduction and radiation to heat the water; discarded hardwood coming for existing buildings that have to be demolished can be reused in new constructions; a ReBuilding Center will hopefully be opened in order to provide a vast selection of readily available material coming from these previously discarded buildings. The renovated houses, properly designed *ad hoc*, will be more flexible, adaptable and interactive than the old ones; smart

home technologies, for example, can easily be proposed in the renovated Historic District; geothermal pumps may also be adopted in order to achieve a natural cooling of the indoor temperatures: these and other similar design strategies, will produce homes that act not only as a passive shelter, but as an efficient, active service system, keeping up with its inhabitants' demands for a comfortable and convenient space; in the end they will prove ecofriendly but also wallet friendly.

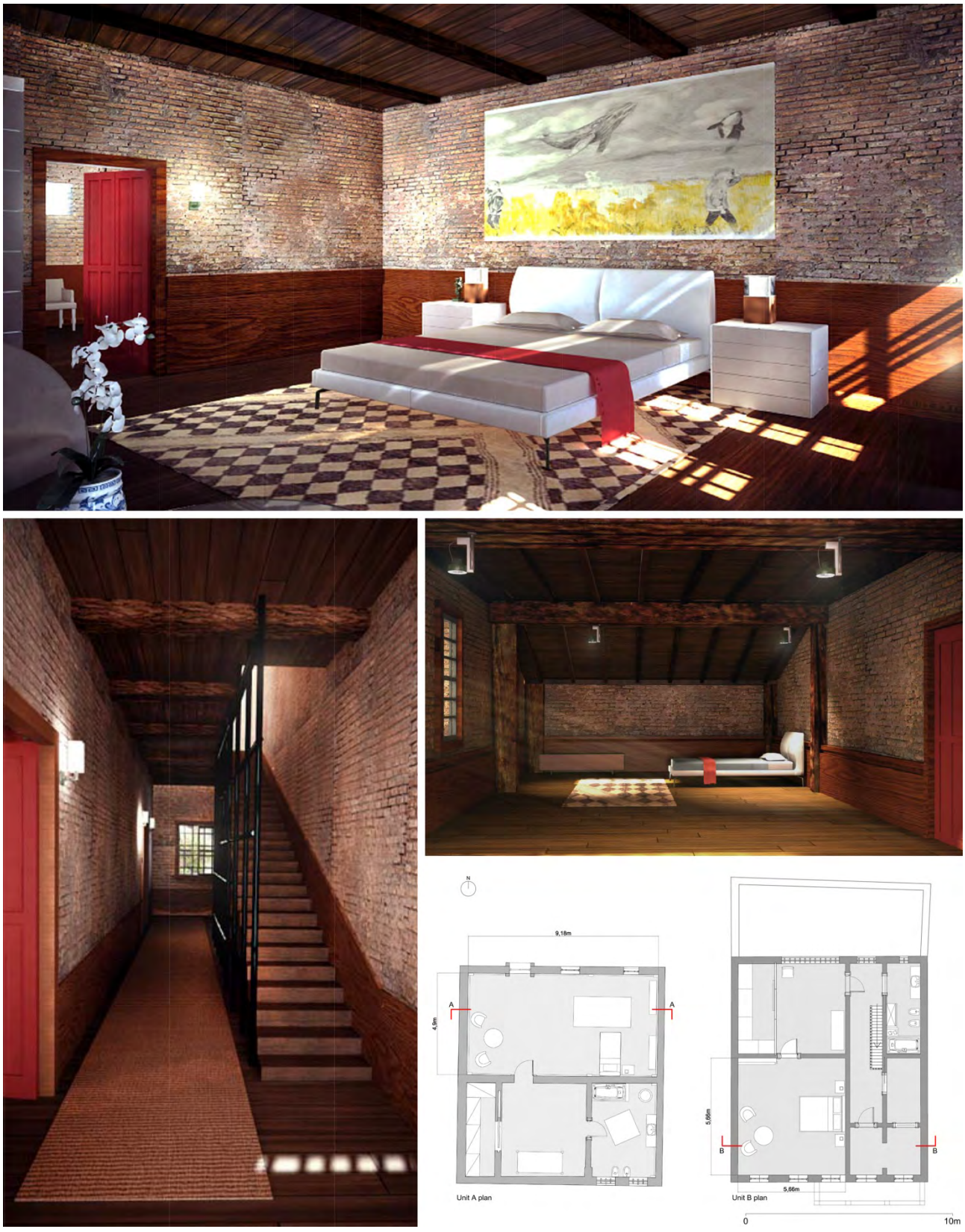

Fig. 9: Figure caption

Housing must be dedicated to a range of incomes and mixed with offices, shops and a wealth of beautifully designed, low maintenance green spaces: parks, community gardens and playgrounds. Everything will be on a human scale to make pedestrians, elderlies, disabled and children feel welcome. We have to make walking not only easy but pleasurable. Shopping areas and public transit must be within a five-minute walk of every home. Public transit (also on the river), walking and bicycle use, under the right circumstances and with appropriate long-term public policies, can serve as viable alternatives to reliance on the automobile. We have to discourage car ownership and invest in making public transportation safe, cheap and reliable. We have to protect key views of the river and of the many historic buildings that dot the area and introduce green roofs, rain gardens and green facades in order to reduce the heat-island effect, decrease ground-level ozone and limit the demand for AC. At the urban scale, for example, permeable pavements will be used in order to preserve all the functionality of regular pavement eliminating the downsides: they will allow rainwater to filter through into the ground, preventing street flooding and keeping urban greenery healthier, with less work and less water. Effective water technologies must obviously become a very important part of our design proposal: the homes of this neighborhood will be part of a natural system, considering the pivotal role played by the river in the new Master Plan.



Fig. 10: Figure caption

In the end, the Historic District will become a very interesting and lively area, crossed by the Jiu Qu river and highlighted by a variety of historic buildings that form a rich urban pattern, clearly different and easily recognizable from the more recent parts of the city. A mix of residential, educational and commercial buildings will also include showrooms, ateliers, galleries, exhibition halls, offices, boutiques, craftsmen shops, little hotels etc.: the result will be an exciting and creative neighborhood, very attractive for the locals (especially for young people) and their activities, but also open to the international trends and influxes, in a very similar way to what can be found in many successful and tourist oriented Italian historic towns. But, most of all, we must never forget the importance of carefully keeping the precious, cultural identity of the place, of its architectural and functional characters, in a more general attitude aiming at showcasing the traditional southern Chinese culture. The chosen methodology will be the same that has been used in similar projects by Italian architects in Italy and elsewhere, aiming at the conservation of urban diversity (in terms of building types, materials and functions), an extremely difficult quality to achieve in new interventions; the strengthening of civic pride (people must feel that they are part of a vibrant and deeply rooted community, that they are citizens and not city-users); the creation of a sustainable environment (the buildings should produce more energy than they request etc.); and - last, but not least - at the transformation of the Historic District into a very attractive and deeply rewarding area for Chinese and foreign tourists.

The Historic District of Zhong Shan has been surveyed and redesigned by professor Livio Sacchi with architect Luigi Valentino Losciale, Ph.D., architect Alessia Maiolatesi, Ph.D. and architect Sergio Di Tondo, Ph.D; the group is part of the Research Unit of the Department of Architecture of the Università degli Studi "G. d'Annunzio" di Chieti - Pescara.

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Disclosure of historic and cultural potential and proposals for restoration of the castles of Western Ukraine

Jawdat GOUSSOUS[1], Galina TOTOVITSKAYA[2]

(1)Department of architecture , University of Jordan, Amman, Jordan
E-mailjawdatgoussous@hotmail.com
(2) Chief architect of VERES co. Kiev, Ukraine
tot-g1@bigmir.net

Abstract

In 1989, Professor Nikolai Bevz (Lvov Polytechnic Institute) noted that the number of castles in Ukraine and their quality of architecture, showed a potential for it to become a leading European centre for heritage in this field.

In Ukraine, there are presently about a hundred castles. Due to scarcity of funding, there is a pressing need to halt the natural destruction of these castles, which are an integral part of the landscape of Ukraine, and assess the prospects for a sustainable restoration program that would contribute significantly to the national image and boost tourism revenue.

Due to geographical and historical factors, the majority of the castles are located in the west of the country.

Therefore, this Article focuses on castles in the Transcarpathian region, presenting an analysis of the current state of conservation of these monuments, the disclosure of historical and cultural potential, and possible reconstruction projects of some of these castle complexes.

Keywords: castles, restoration, architecture, monuments, style

Introduction:

All cultural monuments that are located in Ukraine are inviolable national property that presents scientific, historical and artistic value.

In Ukraine (income from tourism is 3.3 billion dollars) a year. For comparison, in Germany the figure is 80 billion dollars per year.

Historical and cultural objects in particular, are not valued as tourism resources, most of the sights are not entered in the tourist routes, which leads to their restricted use. All of this affects domestic tourism business; with proper advertising it can provide significant economic and social benefit.

Many monasteries in Ukraine as centers of pilgrimage, palace and park ensembles, castles and other historical and cultural monuments, are rarely used with a cognitive purpose and are out of the active tourist process in Ukraine.

The purpose of the article:

1. Introduce the audience to the early settlements and Carpathian foothills of Western Ukraine.

Particularly castles were the centers of life, future cities and settlements were built around them.

2. Typical plans for construction of fortifications in 14-17 century in Ukraine.

The layout configuration of castles was based on elevation contours, where the fortifications were built.

All castles were surrounded by a deep moat and an earth mold.

3. Example of luxury hunting lodge castles built in the style of French castles of Louis 14th - Schonborn castle in Beregvar district.

4. Example of reconstruction of castle ruins - creating historical and landscape park in its place.

Ukrainian castles mostly date from XIV - XVII centuries. We want to pay special attention to Carpathian and Transcarpathian castles, for two reasons: they are the closest to the European countries / easier to resolve travel issues / and the picturesque location at the foothills of the Carpathian Mountains.
Mostly, first castles were built of wood, then - of stone and brick. Since they were constructed for defensive purposes, most common for them was to be located on rocks, hills and river banks. Castles were peculiar life centers with settlements forming around them.
In total, there are 12 Transcarpathian castles. Most castles are under destruction, and from some there is no trace, however each of them is worthy of attention because these structures played a significant role in the life of Ukrainian lands and were associated with well-known families, individuals, and have left their mark in history of Ukraine.
Special attention needs be given to 4 castles of Carpathian region that have unusual popularity among tourists.

Nevytsky castle is considered to be the oldest in Ukraine reflecting defense architecture of XIII century. **Nevytsky castle** was founded in 12-13 century.
The uniqueness of castle is that it has an authentic style of architecture which is unique in Europe. However at present, you would rather call it romantic ruins than a castle, which are also magnificent and unique. The ruins of Nevytsky castle are located on a picturesque hill above the valley of the river Uzh. Stone castle in place of the wooden fortress was erected in the XIII century. Its plan determines the shape of the upper terrace of the mountain - close to oval. Along the defensive wall two-story buildings were placed forming a narrow castle courtyard with galleries, which was close to the parameters 35*12 m. Most of the fortified castle buildings were square in plan; the four-story tower dungeon is located in the south-east side of the building. Entrance gate was apparently locked from the south of the courtyard. The castle was surrounded by a deep moat and an earth mold.
All of this you can see in the plan of the castle below.

Unfortunately at this time **Nevytsky castle** is in the process of destruction and it's a pity that the castle is destroyed not only by time but also by people. They break the walls, draw pictures and throw trash around. Some of the buildings are in critical condition, so they are closed to the mass visit.

Uzhhorod castle
Uzhhorod castle — historical heart of Uzhhorod and Carpathia. The castle was built in middle ages by Drugeth family, and then rebuilt several times, now it is open as a museum.
The castle is located on a high hill of volcanic origin that hovers over river Uzh. Stone building was built in the XIII century on the site of ancient Kyiv Rus settlement of IX-XIII centuries. During the XIII - the first half of the XVI century castle repeatedly withstood the siege - it was destroyed and rebuilt. At the end of the XVI century the castle was rebuilt under supervision of the Italian masters with the latest achievements of fortification art of that time.
Uhhorzod castle - a masterpiece of Romanesque architectural style. The main building of the castle was the palace, additionally protected from the south-eastern and north-eastern side by the low wall of the bridge, which was built across the moat and drove to the northern palace entry.
Architectural structures of the castle at this stage are in good condition, which cannot be said about the landscape. Earlier, castle was surrounded by lush gardens, among which was the flower garden, recalling French parks. Restoration of the park - this is the main task of the reconstruction of **Uzhhorod castle**.

Shenborn castle.
The same thing should be noted about Schonborn castle, to emphasize the greatness and beauty of the building by landscape design that meets the requirements of that era. Castle of counts Schonborn is an elegant hunting palace located in Beregvar district, which is 10 km from Mukachevo.
Romantic view of the French castles of Louis XIV era is given to the building by an eclectic architecture dominated by Gothic and Renaissance elements. Astronomical year was taken as the basis of the project: 365 windows correspond to the number of days in the year, 52 rooms meet the number of weeks, and 12 entrances - the number of months. The building is decorated with numerous turrets, weather vanes, colorful tiles, stained glass, heraldic molding. Family crest with lion and a crown of Shenborn can be seen on the clock tower. Interior is partially preserved with a grand staircase and a fireplace. The palace is located in the heart of the English park with area of 19 hectares, with the natural landscape, of rare breeds of trees and shrubs: Boxwood, Cherry, Weymouth pine, Canadian spruce. Outline of the park pond resembles the map of Austria-Hungary. Each fall, nobles across Europe came to Schonborn hunting grounds for hunting and leisure.
Since 1946, clinical sanatorium "Karpaty" was open in the area of the estate, where they treat cardiovascular disease. There is a well-room with a unique mineral water "Polyana Fonts."
See the photo:
Pic.11 Clinical sanatorium "Karpaty"
Castle Palanok in Mukachevo is most visited castle by tourists. **Mukachevo castle** - is an example of medieval fortification architecture, which combines different styles. **Mukachevo castle** is located on a volcanic mountain with height of 68 m. and covers the area of about 14 sq. m ². The castle consists of three parts and is placed on three terraces. The oldest - Upper Castle of XIV-XVI centuries is located on top of the mountain, the Middle of XVII century - on the terrace 6 m. below and the Lower Castle also of XVII century - 10m. below the Middle. At the beginning of the XVIII century, on the fourth terrace 10 m. lower, the tower was built for the protection of the gate and road to the castle on the western slope of the mountain. This road is preserved to this day, and the tower was destroyed in the early XX century, leaving only its foundation.
Each part of the castle is surrounded by stone walls 3-3.5 m. thick, dry moats with depth of 10-12 m., where they used to place lifting wooden bridges. The castle was under protection of 8 powerful bastions adjoined in XVII century on the corners of all three parts of the castle, where the artillery was placed. Gateway to the Lower Castle, where the guards were located, was protected by two powerful circular bastions. Middle Castle had four bastions, a large courtyard surrounded by a two-storey building, which housed the barracks for the garrison, an arsenal, knights' hall, kitchen, barns. On the north side of the yard once stood the house of the commandant, which was demolished in the second half of the XX century, leaving only the foundation. Behind Middle castle there are stone walls of the Upper Castle of XIV century, on which you can climb by the stairs from left and right. On the left - stairs of the square tower of the late XV century. On the right - the so-called "walking-trap", cut out by the south-east tower at the end of the XVI century.
Upper Castle - former residence of its owner, has the yard closed on all sides, two-three storey buildings - the luxury apartments of the former duke of XVI-XVII centuries. Three round towers of XIV century, completed in XVII century, the castle chapel of XVII century. On the north side of the Upper Castle there are two defensive bastions. In the southern part of the courtyard is a well with the depth of 85 meters, the water of which was used until the end of the XIX century (from Austrian sources XIX of century). In the well, at a depth of 71 m. there were two stone cut spiral staircases, which ended at 1.6 m. from the bottom niches. The first stairs were in the south, the second - in the north. According to legend, at the bottom of a well there was a secret underground passage to the shore of Latorytsa . Around the castle mountain in the XVI century, was a cut water moat, which was filled with water from the river Latoritsa. Later, in the XVII century, moat was fortified with oak palisade - Palanca. That is why the castle is called - **Palanok Castle**.

At this time, the castle is in good condition. The flow of tourists is probably the biggest compared to other castles of Transcarpathia. This is one of reasons why the souvenir shops are located inside the castle.

This shows to be a minus, because medieval structure loses its beauty and that is why there is a needed to remove all trading points inside the castle. Special area near the castle can be assigned for this purpose, where souvenir shops could be built along with food facilities. Otherwise, shops and cafes can be placed in the internal structure of the castle, so that they would not affect the architectural beauty.

Majestic and beautiful are also the castles of Ivano-Frankovsk region. To be clear with the specification, they are more considered to be ruins than castles. There are totally 5 castles in Ivano-Frankovsk region, though one of them could hardly be called a castle due to its tasteless reconstruction – **Rojnyatovsky Castle/Scarbek castle**.
Four castles in Carpathia take part in a contest «7 wonders of Ukraine: castles, fortresses, palaces». These include: **Starostinsky Castle** Halych city), **Pnivsky Castle** of 16-19 century (Pniv village of Nadvirnyanskogo district), **Chernelitsky Castle of** XVII century (Chernelitsa city), **Rakovetsky castle** of XVII century (city Rakovets, Rogatyn region).

Halych castle
It is worth noting **Starostinsy castle** in Halich, which can be called a model for transforming ruins of the castle in the place of interest for tourists. The project design for restoration of the complex has been already made, see the photo.

Wooden structure was first mentioned in 1144. Subsequently, strong citadel was turned into a castle of Halych dukes. There are allegations that it had a two-story basement.
Halych castle or they also call it Starostinsky castle, was constructed in 1367, during polish feudalism. The castle is located near Dnestr River near the dock of Halych. By one of the versions it was built by Volyn governor Lubart, in place of ancient Kiev Rus citadel, which stood on the site in the days of Daniel Galitsky. Until the fifteenth century the castle was one of the largest in Halych, the area of the castle-seven thousand square meters; the garrison consisted of one thousand men.
During XVI -XVII centuries, the castle was repeatedly attacked by Turks and Tatars, and only in 1649 it was retaken by the troops of Khmelnytsky. At first it was a wooden structure, which already, in 1658 by the orders of elder Count Andrei Galitsky Potocki (founder of Stanislav city) was turned to stone by the project of Italian engineer fortifier F. Korassini.
Citadel area of 1.7 ha was triangular in shape and consisted of two parts, one above the other. The towers were tetrahedral and pentagon. The castle had an underground storage of ammunition, food and arsenal. Moreover, the fortress was surrounded by two lines of defense. In good shape remain Shlahetskaya tower and the chapel of St. Catherine, which was part of the defense system.

Now the castle is a part of the National Park of Ancient Halych. There are also plans to open the exhibition of ancient weapons.

At present, from the castle of the end of XVI century remain the ruins of pentagon corner tower (west) at the second level and what is left of the defense walls with loopholes. Numerous basements still remain in the castle.

Not less romantic are the ruins of Chernelsky castle built in the 17th century. It is characterized by the architectural style of Renaissance.

The remains of the castle are located on a right rocky bank of the Dniester River. The castle was built in the early XVII century, however, during Polish-Cossack battles its construction was in deterrence. It was completed in 1659, by Duke George-Michael Chartoriysky, governor of Bratslav. It was a bastion fortification, square in plan, with four bastions and two story gate tower with side porches along the western wall of defense. Its walls were six meters in height with up to two meters in thickness. A palace was standing out in complex of castle structures, which was repeatedly visited by Jan Sobieski II during his Moldovan campaigns in 1685-1691. When Duke Chartoriysky was involved in military actions, he left the castle to his wife - beautiful dark-haired Duchess Frosini Chartoriysky. Hence, by the legend is the name - **Chernelitsky castle** and settlement Chernelitsya.
After the loss of the function of the defense castle it was used as premises. Its owners were Galecki, Potocki, Stanitskie and other noblemen. Starting from XIX century castle gradually began to decline.
At present there are only ruins of the gate tower and parts of the structures of western defense walls. Including, white stone arch portal access gates, made in plastic Renaissance architectural style. Above it, imbedded in the wall, is the carved crest "Race".

Pnivsky Castle is located in Ivano-Frankovsk region, near Nadvirnynsk city. It is extremely interesting and valuable sight of military-defense architecture. The foundation of the castle - the second half of the XVI century. **Pnivsky Castle** - is one of the southern defense outposts of Halych lands of XVI - XVII century.

Pnivsky castle is located on high hill of Carpathian foothills. It was built in the second half of the XVI century by local landowners Kuropatvy. Regular layout configuration is determined by features of the **castle** area. Almost pentagon, it was formed with two story walls of 1.7 meters thick and with five corner two story towers. Out of these, south and south-east were round the northern and south-west - hexagon, and between them at the turn of the north-west wall is a semicircular tower with the built in rectangular house.

On the opposite side of the yard, along the south-eastern wall of defense, was a three-story palace, with and adjacent triangular tower behind the line of walls. The gate tower housing and half-bridge over the moat were on the axis of the southern wall. Now remain the ruins of defense walls, the remains of the foundations of the palace, and towers with loopholes at a level of the second floor. And now foundation is the only trace of the southern round corner tower.

Pnivsky Castle - a large, well-planned and well thought-fortification. It was the largest in Carpathians before the construction of Stanislav stronghold (1662). The castle is located on a natural hill, turned to the western side of the river Bistrica Nadvernyanskaya .
Number of towers of the castle stepped out over the general line of the walls, which allowed having a good view and a shot around the castle walls. The last, fifth tower was the entry. The entrance to the castle was through a lifting bridge over the special moat that was filled with water. Moat was artificial and it stretched along the south wall of the castle. On the eastern side the castle defenses were strengthened by a deep gill, with the small river flowing at the bottom. In the west, castle stands on a natural hill with a cliff. The most vulnerable and unprotected part of the castle was on the north side, nevertheless, during that time it was one of the most fortified and equipped places for a long siege in entire Ukraine. Strength of the walls of the castle was repeatedly tested during the past centuries.
Northern wall survived the most, without losing its integrity and original height, and without any traces of more recent works. It even has the part of the original material of plaster. Traces of the original appearance of the walls have also survived on the round tower, which connects the northern and eastern walls of the castle. This was a high tower and had several floors. Overlaps between the floors were made of wood. Inside the tower is a special place to fasten the woodblocks. There are still remains of them inside. In relatively good shape is the eastern tower. It is laid out not only of stone, but of red brick that was used for reconstruction. The eastern wall gives a clear idea of the difference in the ground levels of the castle and the surrounding area: the outer walls are more than double in height than the internal, and this forms the idea of the existence of underground system hidden beneath the castle. This was also proved by the numerous entrances leading down beneath the floor. Eastern wall has windows with bay overlaps made of stone beams. You can see cornice stepping out above the windows. Other walls and towers are in much worse condition, having cracks or being completely dispersed. Window bays and entrances to the inner yard were made by dome technique. Walls of the castle and especially towers have a large number of channels cut into the thick masonry, through them came out the smoke. This was a heating system in middle ages. The availability of these channels, as well as plaster and windows shows that from the moment of its appearance castle complex was planned and built not only as a fortification, but was also used as a place to live in.
Living quarters also existed in the entrance tower, which were located on the second floor. The tower itself is in heavily damaged condition, but the arch gates survived. On the facade of the tower entrance remains a niche for bridge and hoist chains. Castle was famous for numerous underground passages, which also greatly increased its defense, especially at the time of siege.
Underground entrances of square tower survived the most. How many were there, and which way they were leading - it is difficult to say now. However, one of them led to another citadel of round stone tower.

Pnivsky Castle
Pnivsky castle, which is now picturesque ruins of the walls and some towers, in the 15th century, was an inaccessible stronghold. Historians claim that the castle was captured by the enemy only once. And the defeat was not due to the weakness of its defenders but because of betrayal.
Here, in this historical site every year is the festival "Dzhendzhur Fist." One of the purposes of the festival is to raise funds for the restoration of the **Pnivsky castle**. Every year this festival is becoming very popular not only among the Ukrainians, but also among foreign visitors. So that the recovery, at least in part, is the initial target.
Another tragic story is associated with **Pnivsky castle** - execution of Jews during World War II. By the words of eyewitnesses there were about 3,000 people executed. The entire wall near the place of tragedy is riddled with small holes from bullets. It is near the wall we want to place a memorial to the victims of fascism.

Skarbek castle

In comparison with the previous castles, where they stood on the edge of settlements, **Skarbek castle** is located in the center of the small town Rozhnyatov. It was constructed in the fifteenth century. The castle was well fortified and surrounded by a deep moat, and had two loopholes. At this time, earthworks and loopholes are completely destroyed. It is even impossible to tell where they were because of the building near the castle.

Two underground passages led into the woods, to Baturin and Basilian Monastery district (now "Podmonastyr"). Construction of the castle is associated with the name of Count Skarbka. Skarbka together with Potocky, Yablonovsky, Koniecpolsky were the richest Halych lords. It used to serve as fortification till XVII century. The name of the owner of the castle was Stanislaw Skarbek and it is related with reconstruction of the building. He made it a hunting lodge, added European refinement in the interior, making it an apartment for his residence. Neo-Gothic architectural style of the castle became clearly defined. A beautiful pond lies at the foot of the tower. To the great regret, it was covered with earth in Soviet times.

Along with this, Skarbek built the first blast furnace in Angelova Rozhnyatovskogo area, where they found the iron ore. He also built a church in that area. It was he, who invited John Pinzel. Later he was called Ukrainian Michelangelo to make sculptures for the church. There were 12 apostles skillfully carved out of wood, but after a fire, only three survived. His castle, he connected with the church by underground passage.

The present appearance of the castle remains on paintings and old photos.

After that date, papers will not be considerate for oral presentation and publication.



Fig. 1: Nevytsky castle

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Documenting the architecture of modernism in European seaside centers. Case study in Italy and Bulgaria

Manuela PISCITELLI,[1] Milena KICHEKOVA[2]
(1) Department of Architecture and Industrial Design Luigi Vanvitelli, Second University of Naples, Italy
manuela.piscitelli@unina2.it
(2) Faculty of Architecture, Varna Free University "Chernorizets Hrabar", Varna, Bulgaria
mkichekova@gmail.com

Abstract
This paper is inspired by the Erasmus Intensive Program "Architecture of Modernism in the Seaside Resorts of Bulgaria, Romania, Turkey and Italy" that will involve the authors' Faculties, and other European Universities, in the organization of plein-air workshops and student competitions concerning cultural heritage and the architecture of the coastal areas, starting at Varna Free University in 2014. The program sets a task to rediscover any lost examples of modern architecture, and preserved ones too, which are to be documented and mapped, as well as to propose measures for exhibiting them in various forms of architectural-and-artistic lighting, revealing the specific characteristics and qualities of the sites.
The aim of this paper is to provide a preliminary documentation about examples of modern architecture in costal areas of Italy and Bulgary, that will successively be integrated with examples from the other involved Countries. The documentation has the objective of verifying the presence of a common language in the different European coasts, both regarding the architectural language and the relation between architecture and landscape.
The documentation includes the conservation conditions of the architectures of major interest, in order to propose common solutions for the knowledge, preservation and touristic valorization of an important cultural heritage. It is also analyzed the representation at the time of such architectures, and the new communication language generated by the will to promote coastal resorts.

Keywords: Documentation, cultural heritage, architecture of modernism, costal landscape.

1. Introduction
In the 1930s, the ideas of modern architecture were gaining an increasing popularity. The seaside resorts proved to be among the places in Europe where principles such as openness to the natural environment, the ease of the solutions, the use of flat roofs, terraces, and large balconies found their natural implementation. Therefore, modern architecture was spreading along the European coastal areas at same time with their development and promotion of mass-scale leisure activities.
Often these architectures show an interesting integration with the landscape, obtained by the sliding glass doors, the use of patios and outdoor living spaces, a large expanses of glass, courtyards, horizontal orientation and integration of natural landscape features into design, use of natural materials.
Architecture, in varied innovative forms, became an essential ingredient in fashioning the seaside. Designed to entice people seeking leisure and pleasure, architecture became an important characteristic distinguishing one seaside place from another. [1] It can be considered as a cultural artefact, evolving over the time through a process of cultural design.
It has been argued that from the mid-nineteen century, the visual sense was increasingly hegemonic in the relationship with the nature, including the sea, that has been transformed into a visual spectacle. The fundamental process of tourist consummation became capturing the gaze, and seaside resorts became the tool for such experience. [2]

The architecture of the seaside is the product of a cultural design process: architecture and its representation generated a series of meanings that influenced the relation between people and seaside. This cultural design involves the representation of the seaside and its architecture in visual images, promotional materials such as guidebooks, publicity posters, postcards and photographs. These representation influenced the way in which seaside architectures and resorts have been viewed and used. That's why it is important to document at the same time the architectures and the new communication language used for tourism representation at the time, presenting similar characteristics in all geographical areas.



Fig. 1: 1912, poster promoting travel to Chicago Illinois, USA.



Fig. 2: 1914, poster promoting Cesenatico, Italy. Designer Roberto Franzoni.

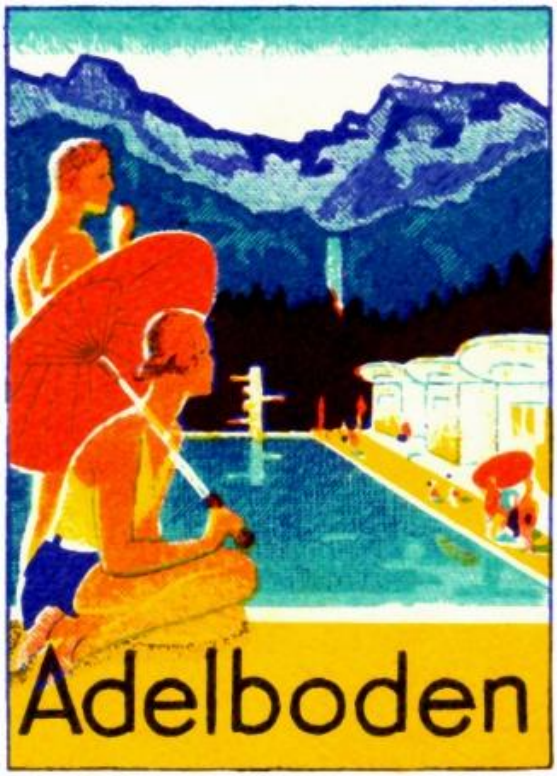

Fig. 3: 1925, art deco poster promoting tourism to Adelboden, a small resort town in Switzerland.

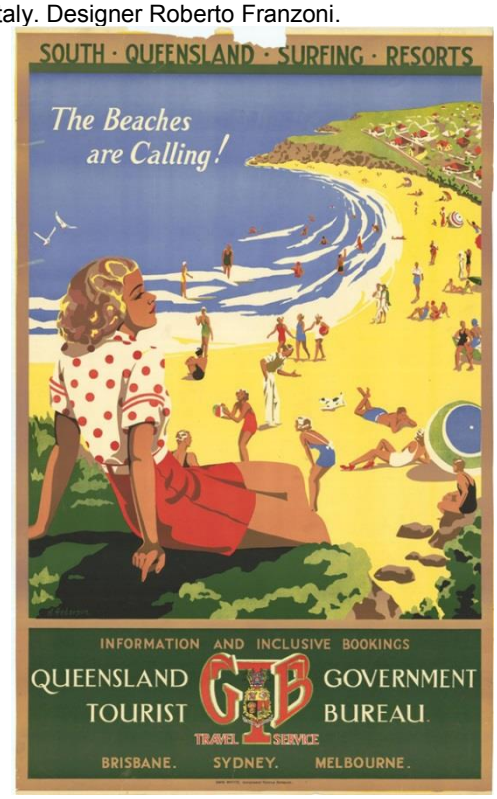

Fig. 4: 1930s, poster promoting tourism in Queensland, Australia.

2. The Italian coast in XX century. Tourism, architecture and representation *(M.P.)*

The "tourism success" of Italy, at least until the seventeenth century, was due to the image of advanced and creative urban society. During the eighteenth century, the cultural point of view took minor interest. Tourists began to appreciate the beauty and power of nature, so that the Enlightenment led to the discovery of the sea, while the romanticism preferred the mountain. [3]

The first example of "modern tourism" was the thermal tourism. Was born in Britain at the end of the seventeenth century and registered the greatest development between the mid-eighteenth and early nineteenth century.

Even the discovery of the sea as a tourist destination belongs to English aristocracy in the second half of the eighteenth century, when they began attending the first seaside resorts, the success of which depended on the ability to manage the free time of vacationers and by the investments made. In fact, people rarely used to bath: they walked on the beach conversing and protecting from the sun with umbrellas, as the sun was not recognized to have any therapeutic function. [4]

It was only in late nineteenth century that the "culture of the sun" revolutionized the map of seaside tourism and seasons. The coasts of Mediterranean, already highly attractive for winter tourism, began hosting a growing number of tourists even during the hottest months of the year, competing with the cold seashores of the North Sea. Consequently, tourism on the Italian coast had a rapid expansion during the twentieth century. [5]

2.1 The origins of seaside tourism and the Liberty architecture

The development of resorts in the Mediterranean area began in France and Spain, then spread to Greece, Italy, Yugoslavia, and after that, to north Africa and Turkey.

Surpassed the travel style of the *Grand Tour*, during the twentieth century, the Italian coast had two phases of development: the first - at the beginning of the century - was still exclusive prerogative of aristocracy and upper middle class, and is testified by the presence of numerous Liberty villas and hotels, original examples of architecture during the golden age known worldwide as the "Belle Epoque". [6]

The most characteristic architecture, at the beginnings of seaside tourism, is represented by the architectural formula of the *kursaal*: literally "treatment room", a name that echoes the connotation of the therapeutic bathing in the sea at the origins of tourism. It consisted of a large building, which today would be called multifunctional, generally located on the beach and used as an hotel, bathhouse, game room, café-concert, casino. The first to be built was the one of Ostend in 1852, followed by a long series of such facilities spread throughout the continent, that made the word *kursaal* a synonym of tourism and recreation complex serving vacationers and bathers.



Fig. 5: The *Kursaal* in Rimini, built in the late nineteenth century in neoclassical style by Gaetano Urbani, and demolished in the postwar period.

The encounter between the new demands of seaside tourism and the new architectural taste, gave rise to modern buildings intended to satisfy the dream dimension of the architecture intended for recreation and leisure. [7]
In Italy, this phase of development of the seaside town took place in correspondence of the Art Deco period. The fulcrum of the new settlements was the walk next the sea, where the architectures, built in a virgin place like the beach, were laid in line as pavilions, whose stylistic compositions showed different styles and materials, following the international models diffused by the Universal Expositions.



Fig. 6: Villa Zuzzi in Lignano, Italy (1910), one of the oldest Liberty buildings still extant, in a period picture.

2.2 Mass tourism and modern architecture

In the second half of the twentieth century, the seaside summer tourism became the central product of the new mass tourism, which replaced the previous elitist tourist fruition. Tourism became accessible to workers employed, so far excluded from the tourist circuits for economic reasons. It is obviously a turning point, destined to change forever the structure of Western society: its scale of values, its needs, its customs, its paradigms, were transformed. [8]
The term "mass tourism" has not only an economistic significance: on the one hand, it refers to the principle of minimizing costs - and thus of the maximization of profit - by offering an undifferentiated product to a mass of buyers as large as possible, while on the other hand it suggests a sociological dimension of belonging to a mass, the mass of vacationers.
People go on holiday for an identity and cultural need, not to feel excluded from their social sphere and to participate in a collective ritual. During this phase, the summer holiday in a beach resort is the most diffused holiday; for Europeans preferably in a Mediterranean resort.
There is thus a transition from the edification of private villas to resort towns, featuring a new concept of urban planning, which included areas reserved for leisure, large squares and sidewalks for walking, and the construction of recreational facilities.
This has led to the explosion of the offer of receptivity, with the construction of hotels, guesthouses, campsites, holiday villages, second homes, and tourist services (restaurants, bathing establishments, shipping), in a growing number of towns having resources related to the sea and the sun. [9]
Between the fifties and seventies of the twentieth century, the localities defined pioneer, that had already been concerned by forms of tourism in the late nineteenth and early twentieth century, such as Viareggio, Grado and Rimini in Italy, set an example for the new locations that were organizing in function of tourism, both in terms of material aspects, such as accommodation, shops and restaurants, beaches, both in terms of intangible aspects, like knowledge and skills of staff in tourist services, management methods, forms of communication and marketing, etc. [10]

The rapid growth of demand has generated a concrete prospects of development for the seaside resorts involved in the seaside tourism, but at the same time has produced an alteration of coastal landscapes often irreversible, and in many cases has introduced a spatial segregation between residents and vacationers. The result is a linear model of urbanization, immediately adjacent and parallel to the coast, where the building for tourism in many cases weighed heavily on landscape and coastal ecosystems. [11]
Apart from the speculations of scarce aesthetic value, it is also possible to find interesting experiments of the new architectural forms that in those years were spreading in Europe.
Many architects worked out projects characterized by the new architectural forms of modernism and rationalism, that just in holiday resorts had their first representative expression. In the most significant examples it can be seen an attention to the relationship between the architecture and the surrounding environment, which is expressed both inserting the shapes in the context, both using large windows to facilitate the relationship between the inside and the external.



Fig. 7: Colonia Marina, Italy, in a in a postcard of the 60s. The building in modern style was realized in 1939 by Pietro Zanini.

Among the best known examples in Italy, is the *Hotel Parco dei Principi* in Sorrento, designed by Gio Ponti between 1960 and 1961, which can be considered one of the first examples of design hotels in Europe. The architect was inspired by the preexistence for the development of heights, the disposition in plan of the volumes and the visual effect from the garden and the sea; but draw up a project that has all the elements particular to his poetic: the work on surfaces, the linearity and verticality, the "visual eyes", the decoration, the lightness, the landscapes.
Situated on the top of the promontory, the complex appears high and sober, anchored to the rock thanks to the two levels dug into tuff, but soaring up because of the walls that mark the rhythm of the volumes. The white plaster is interrupted only at the openings: air, light and the blue sea come into the rooms, in a continuous exchange between internal and external spaces.
The facades are treated as independent surfaces: one bears the mark of horizontal continuous bands of balconies; another is defined by a checkerboard of small covered loggias and terraces; others are dotted with jutting "tribunes" framed in white, alternating with openings of different sizes and recesses formed in the thickness of the masonry.
In addition to a great care in the design of coverings, Ponti gives precise indications about the type and disposition of the furniture.
The building has recently been concerned by a work of restoration, and represents a symbol of the Sorrento coast, and more generally of Italian design. [12]



Fig. 8: *Hotel Parco dei Principi*, Sorrento, Italy. Designed by Gio Ponti in 1960-61.

2.3 Representation and imaginary

The tourist imaginary strongly influences the choice of destinations. Since the dawn of tourism, a kind of hierarchy of the attractions has been defined. The tourist posters and postcards, that accompanied the birth and transformation of tourism resorts, constitute a precious witness of the evolution of buildings and landscapes, but also of tastes and customs of the public. The images of the past, especially in the photographs and postcards, have in fact also a function of social reflexivity, witness and memory of the society evolution. [13]

In the last decades of the nineteenth and early twentieth century, there was a boom in the production and dissemination of picture postcards with the most varied content. The low cost of shipping, as well as the evocative power of images, allowed a wide use of postcards, especially by the rising social classes of the middle and lower middle class, while initially it were disdained by the aristocracy, and were rarely used by the poorer classes, as was illiterate.

The diffusion of tourism, as well as the scarcity of other communication systems, decreed their success. Their representations document the evolution of the spaces of beach life progressively built up, starting from the bathhouse, to the seafront and villas that will characterize the settlement. [14] Posters and postcards were also an opportunity for graphical and pictorial experiments, especially finalized to advertising, involving in some case the artistic vanguards. The evolution of graphic communication through travel poster is therefore a starting point for interesting researches that should certainly be taken into consideration in the documentation of the development of coastal resorts.



Fig 9: Poster of Grado, Italy, by Auchentaller, artist of the Viennese Secession, 1906.

3. Modernism in Bulgarian coast. Conservation and valorization *(M. K.)*

After the Stalinist period, architecture in Bulgaria turns much more to modernism, while still has specific "socialist" characteristics, so we call it "the social modernism." There are certain "rules" that sometimes overlap with Western architecture, other times are complementary and sometimes quite different.

At the end of the 60s of the twentieth century, the resort-tourism in the country was developing and beyond the already known resort "Albena", "Golden Sands" and "Sunny Beach". Characteristic of the tourism was the diffusion of departmental holiday homes, especially in smaller communities on the south coast as Primorsko, Sozopol, Tsarevo. It was here that have been preserved more buildings typical of the development of architecture during this period, while in the larger resorts, in the first decade of the 21st, most built in the previous century was destroyed.

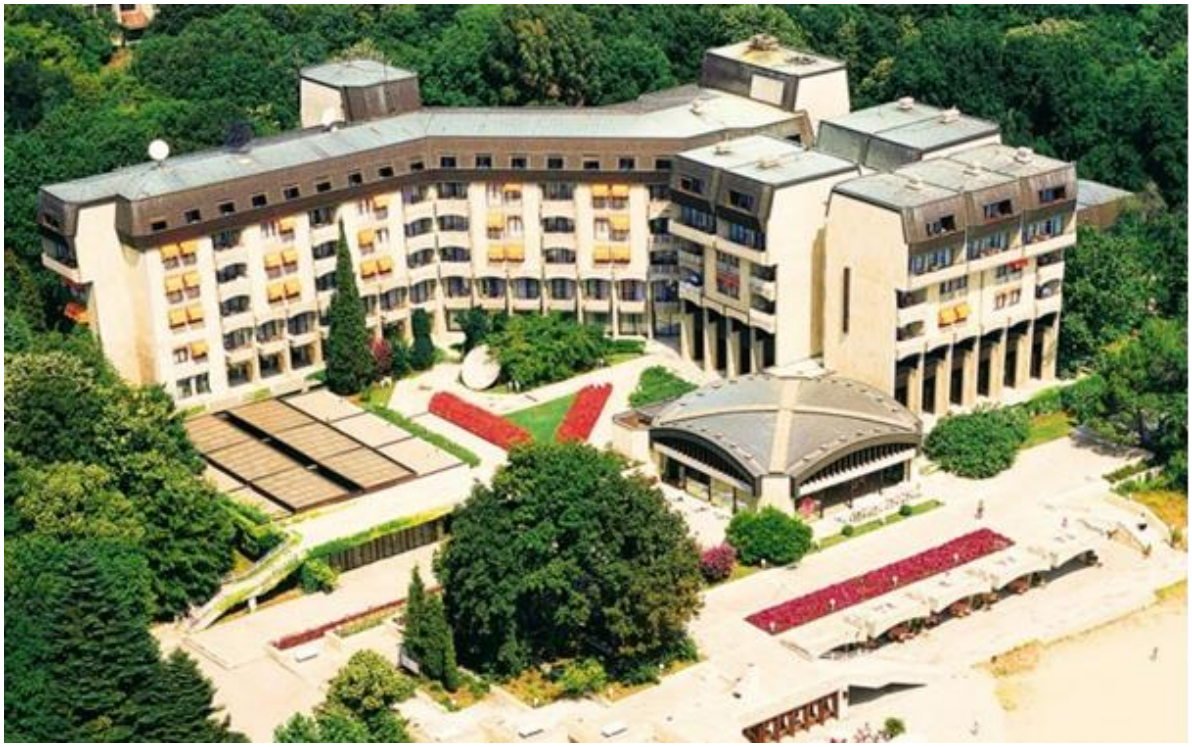

Fig. 10: Hotel "Imperial" in the ex holiday home of the Council of Ministers in the resort "Golden Sands" – Varna. Now is a resort club "Riviera".



Fig. 11: Hotel "Nymph" in the ex holiday home of the Council of Ministers in the resort "Golden Sands" – Varna. Now is a resort club "Riviera".





Fig. 11-12: 'Perla' near Primorsko.

Today, the cultural heritage of modern architecture is subject to a much greater risk than that in any other time. Even at the end of the 80s it is very overwhelmed and many masterpieces were destroyed or altered beyond recognition. Some of them are not considered as elements of inheritance; over the years their original functions have changed significantly, and technological innovation have not passed the test of time.
On a global scale has born the idea of the physical protection and moral rehabilitation of such heritage, a kind of debt to one of the biggest cultural phenomena of the 20th century. This problem is even more acute in Bulgaria and despite repeated discussions, many objects of modern architecture in the country are not registered as monuments. This topic has not yet been firmly in the curricula of all schools of architecture. Some of the problems are:
- Difficult interpretation of the causes that give rise to problems of architectural heritage; lack of operating principles and evaluation criteria; lack of professional documentation and lack of evaluation of the architecture of modernism.
- Difficult to implement mechanisms to ensure its documentation and to evaluate and create a unified digitized system database.
- Inadequate management of technical methods for protection and regeneration of the architectural heritage of the twentieth century. [15]

The documentation have the aim to rediscover any lost examples of modern architecture, and preserved ones too, which are to be documented and mapped, as well as to propose measures for exhibiting them in one of the most up-to-date solutions – lighting architecture – various forms of architectural-and-artistic lighting, revealing the specific characteristics and qualities of the sites.
Current trends and methods of exposure, keeping the design features (elements) of the buildings and their surrounding areas, such as through the implementation of adequate solutions for light design allows the general appearance of modern architecture to be presented in a new attractive, adapted and adequate lighting vision.
For light sources using advanced lighting systems (LED), which are economical, durable, compact, flexible design and energy efficiency. It also allows to obtain a uniform distribution of light without form dark areas typical of other light sources.



Fig. 13: Melia Grand Hermitage 5 *in resort Golden Sands.



Fig. 14: Hotel Helios Spa & Resort 4*, Golden Sands.

4. Conclusion

The present tourist development have changed as a result of globalization, intended as the progressive growth of relations and exchanges in the world, whose main effects are the economic and cultural convergence between the regions involved. The increasing openness that globalization has generated in the geo-political, economic, and cultural field has decisively influenced the development of contemporary tourism, dilating the territories, and making the tourism one of the main economic sectors in the world.

The reasons of this evolution of the tourist market are of both technological (improved accessibility of a growing number of locations thanks to the development of low-cost transports; wider information available thanks to the Internet), and motivational (search for alternative destinations; desire for encounter with different cultures, identities and atmospheres perceived as genuine; aspiration to expand the sphere of action in new or unusual experiences).

In such a market, the competition between destinations is very strong, and it is important to highlight the characteristics of a place identity, to differentiate it from the others. The documentation of the examples of modern architecture can be the basis for a European network for the enhancement and promotion of a shared cultural heritage with common styles and languages.

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Brazilian Parties: the transformation of obligation into fun

Maria Cristina CAPONERO
Department of History and Fundamentals of Architecture and Urbanism of the School of Architecture and Urbanism of the University of São Paulo, São Paulo, Brazil
criscaponero@usp.br

Abstract
This article aims to analyze the transformation that has taken place in Brazil since the colonial period to nowadays, once the constant celebrating has made Brazil known worldwide as "the country of festivities", especially by Carnival. Through analysis of primary and secondary sources, we note that the constant celebrate is not new: since the beginning of colonization the parties punctuate the Brazilian history, especially the religious ones. The dizzying urban transformations suffered in the last decades deleted previous forms of urban social organization: as the colonial city, strongly marked by the mandatory religious parties; the imperial city, which kept some of them, although they have entered into decline; the city under the influence of European aristocratic bias in the First Republic that controlled and laicized many parties and introduced others by the hands of immigrants, especially Italians; the modernist city and the metropolis where some parties persisted among many others that disappeared. Anyway, the city has completely changed it face over the years, clearing customs and overshadowing the traditions. The secularization happened gradually, the urban public space moved from the religious predominance in its beginnings to the secular nowadays. The parties persisted punctuating the course of people's lives, but the mandatory religious festivities are no longer celebrated, they were changing slowly and nowadays they have meaning of leisure and fun for a particular society and at a particular time.

Keywords: Brazilian parties; urban public space; secularization; leisure.

1. Understanding the Brazilian parties in a historical perspective

A long time ago, the constant celebrating has made Brazil known worldwide as "the country of festivities", especially by Carnival. Several parties, especially those of essentially religious Catholic character, have been taking place throughout the years in several Brazilian cities, each one presenting certain specificities, depending on the community in which they are inserted and on the period in question. But, this constant celebrating is not new, since the beginning of colonization, the festivities have been punctuating the history of Brazil, being essential to the organization of the societary tissue and to the Brazilian lifestyle and they also are occupying a privileged place in the building of society and Brazilian culture (PEREZ, w/d, p. 16)[1].

In order to understand the meaning of the parties and their continuity in the collective life of Brazilian cities, the big challenge is to find in the documents of the past signs of their history. The dizzying urban transformations suffered in the last decades deleted previous forms of urban social organization. The colonial city, with its mud buildings, was demolished from the late 19th century, including many religious buildings related to the early Brazilian religious parties. A new city emerged based on the capitalist and bourgeois logic, under the influence of European aristocratic bias. The policy of the First Republic governments tried to control and to secularize many parties, along with many new ones introduced by the hands of immigrants. In the modernist city and in the metropolis some traditional parties still persisted among many others that disappeared and new ones that arise, now with another different guise and profane values.

Anyway, the city has completely changed its appearance over the centuries in an accelerated process of redesigning of the urban public space, no longer marked by the religious predominance. The population increased, there was a progressive secularization of everyday life and only some

ancient parties persisted, punctuating the course of people's lives, marking the moments and collectivities periodicity, expressing and intensifying the collective life and the policies of the public space organization.

We can't say that the parties simply happen, because they have a deep structure: they are performed and have a meaning for a particular society at a particular time. The place of the party for a collective results of behaviors that ends up leaving material traces in the urban landscape. Thus, the study of parties is a way to analyze social organization forms in urban space and to check the ruptures and permanencies in long duration, verifying in which terms the public space becomes secular and mundane, leaving its religious and symbolic dimension backward and giving way to leisure and fun. We believe that the study of the past can illuminate a better understanding of the present, which means that in a historical perspective, "time" and "space" become two fundamental coordinates that interfere in the behavior and social perception.

In this way, a detailed study of daily practices and uses of public space involves the unveiling of traces left by the past, as in material terms as by means of speeches and/or images aiming to show why and how some parties took place and remained (some still persisting until nowadays) and why and how others have disappeared over time. Through the analysis of everyday life, of the civil or ecclesiastical determinations and of the functions assigned to parties and to processions in each historical period, we aim to restore a complete panorama, showing the permanencies and ruptures in the process and proving that the party has a function and a meaning for the different segments of society, at different times.

The ensemble of behaviors and practices that lead to different ways to read the world through the parties also brings us to the definition of the concept of "party" which also is changing overtime. Mary Del Priore (1994/2000)[2] explains that the Brazilian parties are a moment of utopia, a political, religious and symbolic fact, according to the meaning that they assume for the various segments of society. The parties have an important social function, since the city and the inhabitants must preparing themselves carefully for them, but this function has changed over time.

The parties that had their origin with the arrival of Portuguese settlers were transplanted in Brazil (AMARAL, 1998)[3] already modified. Of Catholic-Christian matrix, "the ecclesiastical year" has acclimatized in Brazil in the presence of indigenous peoples and African slaves (DEL PRIORE, 1994/2000), by fusion of other cultural models, assuming new guises, in a process of "cultural intercourse" (NOVAIS, 1997)[4], "cross-fertilization" or "hybridization" with the local cultural. This resulted in certain specificities and also in the introduction of new parties, miscegenated with Portuguese traditional parties, incremented with local ingredients, coated with new symbols and meanings. We note that there is a mix of values, practices, beliefs, songs, dances and musical instruments brought from the Iberian world with those of other cultures by incorporating their insights and rituals.

Although since the 16th and 17th centuries were being celebrated various religious festivities, little emphasis has been given by the Portuguese administration to their register consequently there is great scarcity of primary documentary sources relating to this period. But, we know that from the beginning of colonization there were various meanings in the functions seemingly irrelevant of the festivities that were so important "to be understood even as the model of action and participation of the Brazilian people" (AMARAL, 1998, p. 55 – free translation).

The parties implicate in a particular social structure of production and if, at first, they were imposed, becoming mandatory, their persistence depended on (and even today still depends on) the community cooperation, if not of all the members, at least of great part of them, since they need to be planned, financed, organized, prepared and enjoyed under peculiar rules typical from of each social group and in a particular historical period.

1.2 A constant presence of mandatory parties: from the colonial to the imperial period

It is noteworthy that being the Brazil, at first, colony of Portugal, for many years it was subject to the *Ordinances of the Portuguese Crown* (*Ordinances Manuelinas*) and to the ecclesiastical regulations, with own characteristics of a world dominated by the sacred and by the ritual. The parties were considered strategic in the power confirmation of the monarchy and demonstration of loyalty to the Crown. There were four parties considered "real", of mandatory realization and for which it was required the presence of the entire population in the surroundings of a league around the village (at that time): the *Festa e Procissão de Corpus Christi (Party and Procession of Corpus Christi)*, the *Festa do Anjo Custódio (Party of Guardian Angel)*, the *Festa da Visitação de Nossa Senhora a Santa Isabel* (*Party of the Visitation of Our Lady to St. Isabel)* and the *Festa de São Sebastião (Party of Saint Sebastian).* From 1756, after Portugal was devastated by an earthquake, the *Festa de São Francisco de Borja (Party of Saint Francisco of Borja)* became a mandatory celebration, because this Saint is the protector of earthquakes.

The government tried to steady itself, seeking, if possible, the spontaneous adhesion of the subjects and "when this adhesion proved problematic, the coercion was felt so that all the inhabitants take part of the jubilation of the Crown" (LAMBERT, 1992, p. 78 – free translation)[5].

In the colonial period, one of the ways (among others) that the Crown had to be present, was mainly through the so-called *Parties of Representation* (DUVIGNAUD, 1973)[6], that was parties which celebrated dates and important events relating to the life of Royal Family members and of the Portuguese governments, such as birthdays, weddings, acclamations and deaths. It was common practice, in the late 17th century and early 18th century, that these dates were celebrated not only in Portugal, but in all the Portuguese colonies, which included Brazil. These parties were present throughout the colonial period, but, because they are urban manifestations, only become more relevant in the course of the 18th century.

Also the parties for the arrival of some civil or ecclesiastical authority, known as *Entries* were present in Brazil throughout the colonial period, and they were also of mandatory realization and presence of all the civil and ecclesiastical community members. Both this two types of parties (the *Entries* and the *Party of Representation*) were considered civic parties and they had the function to increase the power of the Crown and the Church that, at that time, still ruled jointly.

In addition to these festivities and increasing the Church power over the life of the inhabitants, it was joined the *Procissão da Publicação da Bula da Santa Cruzada* (*Procession of the St. Crusade Holy Bull Publication)* (which was a religious celebration for selling indulgences), the liturgical celebration and processions and the festivities held in honor of the Catholic Saints, conducted by the vicars of parishes, along with the brotherhoods and lay fraternities, following the ecclesiastical regulations and carrying out the requirements of their own statutes and bylaws. These festivities went far beyond the devotional field, because they became the scene to exhibitions of wealth, power and frequent disputes.

During the slavery period by which Brazil passed by and left numerous traces until today, black slaves and manumitted parties also happed, but they were tightly controlled and supervised by the municipal power that allowed them but only under certain limitations of location and time, in order to avoid confusion and leaks (BRUNO, 1953/1984, p. 371)[7] .

The frequency and periodicity of the celebrations during the colonial period show that the use of urban public space was mainly religious and festive. The parties were imposed, of mandatory realization and participation, but despite this, people do not refused to participate in them, because Catholicism was the official religion and it governed the people's life. Being the Church associated to the State, the Chamber had the "right" to control the gathered human. The mandatory participation of the population in the religious festivities was the way to control the fulfillment of certain rituals required by the State and by the Colonial Administration, besides being a form of reverence to the Catholic Church symbols.

The Chamber published an edict, set in a public place, notifying the occurrence of the party, its nature and calling the residents up for the necessary preparations required that included: the cleaning of the streets, facades and churchyards; the whitewash of the houses; the ornamentation of doors and windows with flowers, towels, quilts, damasks and embroidered velvets and satins; the placement of light fixtures; the coverage of the streets (by which would pass the processions) with flowers and leaves; and the placement of arches and others. All this must be done under penalty of fines and/or jail in case of disobedience. Thus, we can realize that the parties had a role not limited to an accomplishment of a Catholic ritual.

1.3 The decline of the religious festivities the imperial period

At the beginning of the imperial period almost nothing has changed. The parties that happened were the same inherited from the colonial period. After the Proclamation of Independence of Brazil, in 1822, associated with these parties other civic ones were introduced, forming a rich calendar that moved the society of that time.

The situation began to change just after the publication of the *Constituição Política do Império do Brazil (Political Constitution of the Empire of Brazil),* in 1824, which foresaw the religious freedom (KANTOR, 1998)[8], although the Catholic religion keep on being the official and the only one to which it was allowed outside pronouncements. The Law of October 1st 1828, signed by Don Pedro I, was a landmark for this question. Along numerous others issues, it prescribed that the parties would be neither realization nor mandatory presence. The analysis of the parties of this period indicates that the religious nature ones have been gradually losing their place in everyday people's life, and, little by little, a process of secularization was beginning, combined with several other factors.

One of these factors was the desire to regulate the use and occupation of the urban public space. Under this point of view, the parties were considered "a risk to the new cities". Several *Postures* have been made over the years, many of them broached the issue of parties and their practices. Public entertainments were banned. The *Cavalhadas* that recalled the medieval equestrian tournaments and were part of the civic processions and religious festivities were prohibited, although

they belong to ancient custom brought from Portugal to Brazil in the colonial period. The *Cavalhadas* were very important to the society because they were also an opportunity to highlight and mark socioeconomic positions of their participants that were richly dressed. But, they were considered a kind of fun, consisted of a sequence of games and representations practiced on horses which duration could be extended by three days. The *Cavalhadas* were an important part of the festivities and the population shown itself reluctant to abandon this practice. The public authorities, as they could not banned them and also others practices, they decided to begin requiring licenses for the celebration of the parties, always seeking to control and to regulate the practices which took place in the urban public space.

In 1831, for example, the public authorities developed some *Postures* inhibition the fireworks, practice so rooted in Brazilian customs that it was very difficult to extinguish it, even because since the colonial period the fireworks were being used in official celebrations. Although banned, their use was permitted in the days of official parties (MOURA, 2005)[9], leading to gaps in legislation that favored the continuation of this practice, which persists to this day.

A similar process occurred in relation to the use of masks during the processions, also common practice since the colonial period. In this case, as well as in the previous one, the public authorities had ambiguous attitudes because, although prohibited from 1831, some people masked persisted in wandering on the streets in the days of religious festivities. In addition, the public authorities allowed and tolerated the use of masks in some situations, as in the days of official parties, opening once again gaps in the same legislation, but allowing farces and jokes only during the day, forbidding them at night. We can realize that the clear goal was to control the fun freedom under the guise of morality.

Another common practice that came from the colonial period and remained until the beginning of the Empire was the request for alms to the festivities of the Catholic Saints. In 1832, at the time of progressive secularization of public space that was beginning, the public authorities published an unique posture determining "fine and imprisonment for those who ask for alms to celebrations of Saints, outside the doors of churches and chapels and by the streets".

Also the peal of church bells were controlled, because it was considered abusive, prevailing the touch only on the religious festivities days in the name of what it was understood by "public order" at the time of civic or religious festivities, under penalty of prison (MARX, 1989/2003)[10].

Even vehicular traffic on the occasion of some religious or profane parties in certain and specific places was banned, especially in Holy Week Celebrations. Also the custom of making holes in the streets for the construction of a gazebo or even to nail the mast of the party was banned.

Anyway, the public authorities from 1830's to 1870's had a predominantly educational function what would change in the following years, because they would have the services as predominant goal. With all these determinations adopted, it seems that under justification of regulating the use of urban public space, they aimed also to impede or even forbid social practices directly related to the occurrence of parties, frequent since the colonial period, and which came to be seen as a "threat" to such order target. The public authorities sought to introduce a new political order and the change of customs, aimed to a standardization and consequent population submission to their authority. To do this, they appropriated themselves of parties that took place in the urban public space as "means of control, moderate and put under permanent surveillance the people gathering, because they saw it as an obstacle to their claims of political stability" (MOURA, 2005, p. 201 – free translation).

In this period, the mandatory preparation of urban public space for the realization of the parties, which was, until then, under the responsibility of the population, expired, passing it to the responsibility of municipal public institution. Simultaneously with all these obligations that ceased to be in force, many of the practices that have occurred in the course of the parties were prohibited or even allowed only if licenses were requested for their occurrence, which caused the Chamber to have full power and control over their realization. Although there has never been a sudden rupture, the Catholic religious practices were gradually coming into decline after the *Proclamation of the Republic of Brazil*, in 1889. Several aspects of the official structure have changed, resulting in impositions that affected until very recently in the way of living of the Brazilian people and in the contemporary urban arrangement.

1.4 The beginning of the rupture: the Republic

In the first *Republican Constitution of Brazil*, dated February 24th 1891, Brazil was declared a secular territory and it was broken off the secular relationship between Church and State. Because of this fact, the civic parties supplanted the religious ones in importance. With the new capitalist and bourgeois world-view, Catholicism began to be seen as a delay for the development of Brazilian society.

From the Republic, there was an intention to organize and to improve the urban public space. From the Republic, there was an intention to organize and to improve the urban public space. It was clear the replacement of the use of urban public space and urban progress indicators in the urban

space that the cities spent since the last decades of the 19th century and the first decade of 20th century.The municipal government aligned itself with the new conceptions, which sought to transform the cities into places for the realization of "modern life", aiming to convert them into healthy and of good taste, so they could receive activities and “chic” populations. While the previous system was based on the tradition, on the slow changes, the present promoted the dynamics of quick changes, imposing a disconnection with the past (BARBUY, 2006 – free translation)[11].

The city went through profound metamorphosis from the end of the Empire to early Republic, especially the years 1870’s to 1900’s, which led to profound transformations in the social order, economic relations, in the redefinition of political institutions and patterns of urban space occupation. Portraying the cities at the turn of the 18th to 19th century is handling of numerous ruptures and permanencies that took place in the conformation of the cities in general, especially in São Paulo. These changes in the form of the town planning also entailed changes in lifestyles and sociability of the different social classes, emphasizing the public parties as a transformation vector.

The urban development during this period was strongly conditioned by the laws of urban content then established by the public authorities. The popular parties were subordinated to the *Section of Police and Hygiene* that watched over the maintenance of order and occupation of public space which justifies the control exercised over the parties, by requiring *licenses* of function, and by paying bails and deposits for some eventual damage caused to public land. The parties, which took place on the streets as a process of popular appropriation of space, in the context of elation and joy of the people gathered, started having more intense control of municipal power. The executive government had a decisive influence on the daily lives of the inhabitants, exercising greater control over the life of the city through the *Municipal Postures* that regulated the works, the public hygiene, the functioning of commerce, the uses of public places etc., what means that all this interfered directly on the celebration of parties.

With the dawn of new times more attentive to the mundane, to business, to everyday life, it prevailed almost absolutely the civil laws and customs. At first, the Crown aimed to collect more taxes, saw the parties as opportune moments for trade which tended to increase, leading the urban space to secularization and conditioning the valuation and improvement of the common use areas for other purposes (trade, service, business) in detriment of their symbolic and religious use. "It could be said that the constant and slow secularization meant the decline of the party in face of the business, the decrease of the holidays in face of the increase of the days now called useful" (MARX, 1989/2003, p. 59 – free translation).

Most Brazilian cities grew quickly from the late 1890’s resulting from a population explosion due to the arrival of thousands of European immigrants, mostly Italians. Along with these immigrants came new customs, resulting, at that time, the various ethnic parties, especially the religious ones, with the intention to preserve their culture and identity, although geographically distant from their homelands. The accelerated urbanization has not been able to quell the religious festivities (although there was a certain retrenchment), arising, among others, several Italian parties such as the *Festa de Nossa Senhora d’Achiropita (Party of Our Lady of Achiropita),* the *Festa de San Gennaro (Party of San Gennaro)* and the *Festa de San Vito (Party of San Vito),* which are celebrated until nowadays

Thus, the parties that, in the colonial period and early Empire, were mandatory, being pretexts for the construction and organization of urban public space, from the Republic and mainly in the early of the 20th century are being appropriated gradually. Cities grew up and became internationalized, deleting old customs and overshadowing ancient traditions. The parties that celebrated the faith weakened, but remained in the big cities, being held in places more distant from large urban centers, and fewer centralized. There was a growing process of secularization of Brazilian society by tensioning the interests of the government and community traditions, period of effervescent changes and of redefinition of the role of city regionally and nationally, becoming urgent the "construction" of it memory.

The new clergy, formed by priests coming from the Northern Europe, followed the regulations of Roman Catholic rites, devaluing the popular practices and considering the festivities as a focus of vagrancy, stimulated by the presence of tents of games and theatrical performances. These priests believed that the clergy should be moralized and the power of the Church should be strengthened and respected. Consequently, the lay brotherhoods lost their power, determining the decrease of their ostentatious character in processions, reducing some parties to single parish meeting, very focused only on religion.

1.5 The modernist city and the metropolis: new points of view for the parties considered as intangible cultural heritage

Anyway, the universe of parties has changed, and has restricted and swerved to distant neighborhoods, leaving gradually the central area of large cities although the *Parties and Processions of Corpus Christi* follow polarizing a lot of people in mid of 21st century.

In the early 1920's, a time of nationalism among Brazilian intellectuals, it was seeking the Brazilian identity in the traditional roots of national culture, as a result of new habits and mentalities printed to everyday life by the presence of foreign immigrants.

Under the impact of the modernist movement and the various studies that discussed the "being" Brazilian, the "nation", the "national identity", it was established, from the 1930's, new paradigms for the Brazilian parties that became to be seen not just by the use and occupation of urban land, but rather as responsible for the construction of a cultural identity, since, from then on, the concern revolved around the impacts of the accelerated urbanization process over the traditional cultures, religious syncretism and acculturation processes.

Under the point of view of the administration of the Brazilian cities, these new concerns led the parties to be treated not more under the point of view of the use of the land, but of the point of view of the culture and fun, being their control transferred to the *Department of Culture and Recreation*, first institution of the municipal public power in the cultural area.

It was from the 1960's, and especially in the 1970's, under the *Nouvelle Histoire* that advocated "an anthropological approach of collective phenomena and politicization of everyday life" (JANCSÓ; KANTOR, 2001, p. 7 – free translation)[12] that the parties began to be experienced and discussed in dialogue with history, anthropology and sociology, associated to relationship and social formations resulting from the increasing urbanization process of Brazilian cities and to the economic transformations under way, along with all their symbolic and artist values.

Since then, the parties gained more power, occupying a privileged place in Brazilian popular culture, acquiring importance and particular meanings to the point that led the *Instituto do Patrimônio Histórico e Artístico Nacional (National Historical and Artistic Heritage Institute*) (IPHAN) – a federal heritage institution and an autarchy of the *Ministry of Culture* (MinC) – to consider them as history landmarks, very important to the construction of the memory and national identity, then being considered in Brazil and worldwide as "intangible cultural heritage".

Since the First Republic the public government began to intervene immensely in the urban space and the political control of the day-to-day of people, orchestrating the realization of popular parties. On a national scale, some of them have acquired importance due to their cultural and spatial dimension to be considered, in Brazil and worldwide, as cultural heritage, since the concept of heritage currently practiced has been extended and includes a list of natural material and intangible goods.

Specifically in the case of Brazil, some parties were registered from 2004 by IPHAN in the *Book of Celebrations* as Brazilian intangible cultural heritage, they are: the *Festa do Círio de Nossa Senhora de Nazaré* (*Party of the Candle of Our Lady Nazareth*) (in Belém), the *Festa do Divino Espírito Santo de Pirenópolis* (*Party of the Divine Holy Spirit of Pirenópolis*) (in Goiás) and the *Festa de Sant'Anna de Caicó* (*Party of St. Anna of Caicó*) (in Rio Grande do Norte). It should be added that there are hundreds of other religious or profane parties, many of them of great importance not only for the local community, but also for regional or national culture and they have been proving as a powerful mediation between cultural, economic, symbolic, touristic and others structures seemingly irreconcilable, making it possible to penetrate and understand the parties that moved and still move the Brazilian society.

1.6 Final consideration

Thus we observe that, over the years, the traditional parties have changed not only in Brazil but in the contemporary capitalist societies in general, where there is no hegemony of time governed by natural cycles. These capitalist societies preach the rationalization of time and economy of goods, resulting in the abandonment of certain traditions that became adapted to new situations. The *Industrial Revolution* clearly separated work time, leisure time and celebration time that became the time available after being fulfilled the obligations towards the work. The devotional and religious parties have not disappeared, they persisted, continued to exist, permeating the everyday people's life, and not just limited to the Catholic religion, but expanding themselves to several other religions and different typologies of parties and so they ended up composing a rich universe of thousands of parties that move the society and remain interrelating culture and tradition and become important moments of sociability, and gain other types of approaches: by economic importance to the community, by tourism, by popular culture, by leisure and by fun.

So the parties reach the 21st century in new hands and with new modes of action, being frequent disputes by political and economic control of those which currently increased not only in numbers but also in proportions, although when compared to parties held in the past centuries, we note that, in many ways, they suffered an impoverishment process. The parties that grow up tend to occupy large spaces in urban centers and having large space indicates their importance and their place in the life of the cities and of the country. Usually this happens in places where they have become mass parties, what can be explained by the large-scale urbanization that allows access and reception of people from everywhere.

Everything indicates that the people have been reinventing their parties in new conditions of their life, resulted from new social and urban contexts. The ancient popular parties, shared by large numbers of people (mostly religious parties) fragmented into different ways of celebrating according to they were forming groups as a result of the growing process of capitalist development, and the consequent social division of labor, of spaces, of social classes and, especially, the growth of different religious denominations with different ways of celebrating *(*AMARAL, 1998).

The sense of "obligation" as well as the parties associated with civility (that reproduced battles, yielded tributes to heroes, personalities and myths) completely disappeared. The popular parties are now increasingly coated of characteristics of rupture, innovation, leisure and fun expressed in the festivities associated with religiosity; in the liturgical ones; in those held in honor of the Saints; in those linked to agricultural calendar cycles, as the harvest parties; in folk festivals; ethnic celebrations, simultaneously religious and profane parties or even in those exclusively profane, such as the Carnival.

Anyway, there are numberless parties that compose the universe of Brazilian popular parties taking place throughout the year in several Brazilian cities and making Brazil stereotyped nowadays as the "country of festivities", "country of fun" and "country of Carnival".

It is opportune also explain that to understand the Brazilian public parties in a historical perspective as wide, it was necessary to use different sources, since there were religious, profane, civic and others parties which were organized by different and independent institution and currently they are very linked to certain public organization by their great commercial interest. In addition, most academic studies on public parties, addresses them under different ways, such as by the economic importance to the community, by tourism, by popular culture or other aspects but, generally, they do not emphasize the transformations undergone overtime, mainly relating to modifications of the use of urban public space as a place of sociability directly connected with the lifestyle of people.

Therefore, we hope that this paper will contribute to this theme still so new and so little explored under this point of view, especially if we consider the current state in which the popular parties are, not only in Brazil as worldwide, when the parties are being considered a privileged place in society, because they are an ensemble of symbolic systems that must be understood, decoded by all the people who participate on them and who govern the urban behavior, the social, economic and political organization.

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Pursuit of style: the importance of historical, archivistic and treatise heritage.

Christian BEDONI, Daniele CALISI
Department of Design and study of the Architecture - DIPSA, University of Rome Tre
Rome, Italy,
Cristiana.bedoni @uniroma3.it , d.calisi elizabeth.fentress@gmail.com

Abstract
Today we live in an era in which globalization has flattened the architecture to few stereotypes, dictated by few Archistar, unfortunately leaving little room for local identities, which for centuries have characterized not only the types of buildings and construction techniques, but also a current of treatises that revealed methodologies and practical tips to build.
It is often forgotten that, apart from the tangible element of built architecture, there is an important historical heritage that helps us to know deep within that same architecture, analyze it, understand it, and store it in last: the historical treatises, real encyclopedias of good building practice, cataloging and presenting the information necessary for a construction site in a workmanlike manner.
To each historical period are associated techniques and designs, so the good restorer must first be aware of the treatises most common in the historical reference period and then know how to approach the historical heritage: knowing even before investigating it with technological equipment.
A case of study, taken as an example, is inspired by the Baroque era treaties by Rondelet to Breymann, by Valadier to Rusconi and even up to Vitruvius; from their boards and writings has been inspired to understand how a building could be under the formal aspect, imagining how to build it, and dreaming about a representation typologic theme.

Keywords: Cultural Heritage, Historical Heritage, Treaty, practices of building, Architecture practices

1. Treatise of best practice
How many times we had a lively discussion on the future of architecture? How many times the architects contest the new (few) architectures?
Apart from the mere subjective and taste matter for which contemporary architecture can pleasure as also not pleasure, but we need to recognize two fundamental questions.
First of all, despite the inherent beauty of some contemporary architectures, there is no more an awareness of the places. The urban context given from simple physical boundaries of the plot is the only limit to the design, without being able to overcome other cultural, social and historical barriers.
It appears that the styles are now imposed by a few ArchiStar, who are more interested in spreading their *Ego* that to take an interest in the dynamic characteristics of a place, autochthonous housing types or simply lifestyles that have evolved for centuries.
However it could also give rise to a doubt: these are the personal styles to be connected to these alleged ArchiStar, or are the latter to be slaves of their own styles?
That is, who refutes that when an institution commissioned a architecture work chooses the architect for his professionalism? Occurs as the impression that one chooses the shift ArchiStar depending on how and what style it wants for that place.
It is a fact that still does not take more account of the place of intervention understood as a set of culture, history, customs and traditions, but paradoxically we are entitled to make a pitch roof in a sea area where not really snow ever, and a flat roof in the mountains that is likely to collapse at the first load of snow unless oversize (also in the costs) the ceiling.

The second fundamental issue, as premise, is that in Italy, almost for *contrapasso,* history instead is part of each of us, we grow with it, we look the history around us but distracted now. History and culture are in our baggage and are inseparable from our ways of thinking and seeing things: perhaps this is also the reason why many are horrified in front of the insertion of the contemporary in a historical context.
But, as mentioned, precisely because the story is in everything that surrounds us, we have also grown accustomed to it, to its valence and also, why not, to its importance.
It's truth in general to every sector, but in a particular way I am thinking at that local entity in the ways to build that for centuries has characterized our country, and not only in a unique way, but multiple: from north to south the construction techniques are hundreds, all beautiful, functional, and quite justifiable, from the portico Piedmont to the apulian trullo (round hut typical of the Apulia region). But in fact we don't speak only of a typical and local building typology, but also of the construction techniques that are obviously at the base of them.
On the other hand, in spate of the development of contemporary architecture, not a case, in the field of restoration has occurred in recent years the development of research merged into manuals of the recovery (of Rome, of Città di Castello, Palermo etc.) very useful to understand the practice of construction.
However, they are nothing more that the echo of a large production treatises, which has intensified since the sixteenth century to the nineteenth century, which for centuries had bestowed and absolved practical advice on how to build things, transcribing of course what daily was done in practice in building yards and job sites.
In most cases the authors begin by giving basics on practical constructive, from main definitions to the choice of sites where you can build, and then move on to more specific information on materials to be used in the construction industry or to the ways to reinforce, from the cleaning of the surfaces to the geometries and classical proportions. Not missing also information on ways to build more engineering architectures, as the aqueducts and the military building. Of course it also give the precepts to be able to draw maps through the ancient art of the gnomonic, by exploiting the principles of the projection and the theory of shadows.
Perhaps the ancestor of this vein was the *De Architectura* (between 40 and 25 b.c.) of Marcus Vitruvius Pollio, repeatedly translated and expanded, as was use by literary renaissance, through diagrams and drawings often by the same author.
And it is not by chance, given the premise, we start from the "foundations", from the perfection of of Vitruvius: we architects we lost those values that for centuries have governed the way to make architecture? We are still able to join *firmitas* (*firmness), utilitas (usefulness)* and *venustas (grace)?*
In the version translated by Antonio Rusconi in 1590, which among other things contains some splendid drawings, it speaks very clearly of the three components: the *firmness* which of course includes the use of the material, from the brick to the mortars, from pozzolanas to the stones and the woods; the *functionality*, which depends on the quantity and quality of architecture; finally the *beauty* or *grace* based on the rules of symmetry, harmony and decoration.
Upstream of this virtuous "trinity", there is the very act of the manufacture. It is interesting to note that Vitruvius already distinguished between a manufacture in theoretical action and practical action. From practical action is prosecuted for the three components mentioned above, while the theoretical action is expressed with numbers (you could say the modern science of constructions') or with lines, i.e. , the drawing in its likenesses of plan, elevation and profile.
It is evident that a text of the I century B.C., which still today is so contemporary could not have that overwhelming dissemination that he had from the Renaissance onwards, influencing obviously also all new writers that also put themselves on trial with constructive techniques more innovative.
But what is more interested in the vitruvian treaty is the methodical and clear explanation of the different materials, their use and the way of laying, how one can check in the second book.
The first material quoted is the brick that was also the most widely used in historical buildings.
It explains that to create the bricks you must use a chalky ground, not sandy or rocky because it crumbs over time, and it would still be too wet if exposed to rain.
The better period for their manufacture is the spring or the autumn, as in the days of solstice the sun should dry too quickly the superficial parts of the brick leaving raw those inside, which dries posthumously and will crack the portions already dried. the drying time should be approximately two years, good time to ensure that the brick is completely dry and not continue to contract their own forms and consequently rub the other bricks and compromising the stillness.
There are three types of bricks called *didoron, pentadoron* and *tetradoron* (compounds of *doron* in Greek) i.e. two, five, or four palms. The type most commonly used in ancient Rome was the *didoron* which corresponded to the brick of measure a foot by half foot that corresponds to two palms.
The way to lay the bricks by and equally explained in a contemptuous manner, so as to avoid any type of ov\erlap the joints, and also depending on the thickness masonry: one, two, three or four heads.

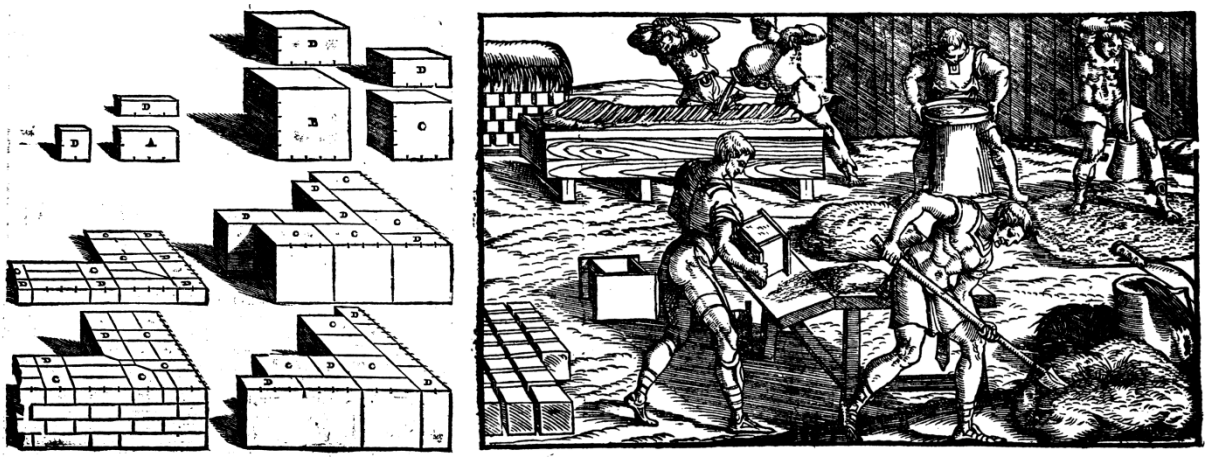

Fig. 1: The types of bricks and their laying; an illustration showing the tasks and functions inside a brick factory. Images from "The ten books of Architecture" by A. Rusconi, 1660, pp. 49, 50.



Fig. 2: an actual brick factory in Fez in Morocco still applies the ancient techniques (photo by Daniele Calisi).

Most of the information that is given by Vitruvius, not only for the brick, but also for other materials, they are real practical knowledge which usually were handed down from generations, but that actually were missing on a coding the make them overt and public.
However it is somewhat difficult to treat in this place all the materials (sand, pozzolana, stones, wood) that are described in *De Architectura.* We will restrict ourselves to deal with some materials, also based on the complexity of the representing boards that characterize the treaties also later then the reprints of the opera Vitruvius.
In particularwe have chosen, both for the importance of works, both for the beauty of the drawings, some treaties that perhaps better explain the importance of this literary genre.
One of the most beautiful and interesting is without a doubt the treaty "The architecture practice" by Giuseppe Valadier of 1829, which actually is a collection of his lessons as a teacher at the Accademia of San Luca, divided into five volumes, each with their own topics analyzed elaborately.
The same Valadier cites and praises the ten books of Vitruvius, criticising the many translations, or perhaps better interpretations, that have been made, and praising those few cases in which the original text was rendered faithfully (as with Antonio Rusconi or with the Marquis Bernard Galiani in 1758).
Also in this treaty we can find many useful information for every type of construction; in the first place on the choice of the land on which to start the foundations, which must of course have certain characteristics, but also all the information you need to solve the problems of the land. An interesting step can be summed up in a few sentences all the problems of contemporary architecture described at

the beginning: *" …check this information, will redound the building in these aspects, which, according to the geometric knowledge, and astronomical you will find more convenient to take the parts, and environments appropriately; using the practice which requires the way to base your compass to discover aspects of the sky, and can with the cognition of the geometry will mark the wholeness, and the parts of the yard with precision. If this building will be surrounded by houses, or by roads, you will always consider the best aspects of that locality, and in this you adapt in the composition of the plant, the scale, the rooms, the library, the wardrobe, the closets, tinelli, stables, barns, and anything that is wanted to by the owner, by giving them these aspects convenient for having at the end a advantageous and commendable result."* (Valadier, 21-22 p.).
Which in practice means that it is not possible to disregard the context when doing architecture.
The text clearly describes the ways to build, making continual reference to the figures in the attached tables, of ten a lso m asterfully watercolor, b ut a lso s hows t he t ools t hat ar e used i n c onstruction phases, often also by providing the right way to achieve them.
Among the many tables in different volumes there are some worth mentioning.
First of all, the LXVI (but also the following), in the second volume, which is the right way to achieve the *capriata* (truss). Today, s ome of t hese wooden structures, f ascinating ba lances of f orces, ar e made per haps on ly in rare c ases f or r ollbacks, but n ew t echnologies (such a s the l aminated w ood) have gradually replaced them. But who is it t hat deals with restoration of monuments cannot i gnore the ex istence of s uch a v aluable drawing that with detail and f igures, d iagrams and n omenclature, shows almost the whole survey of joints wood - wood, wood - wall, iron-wood.

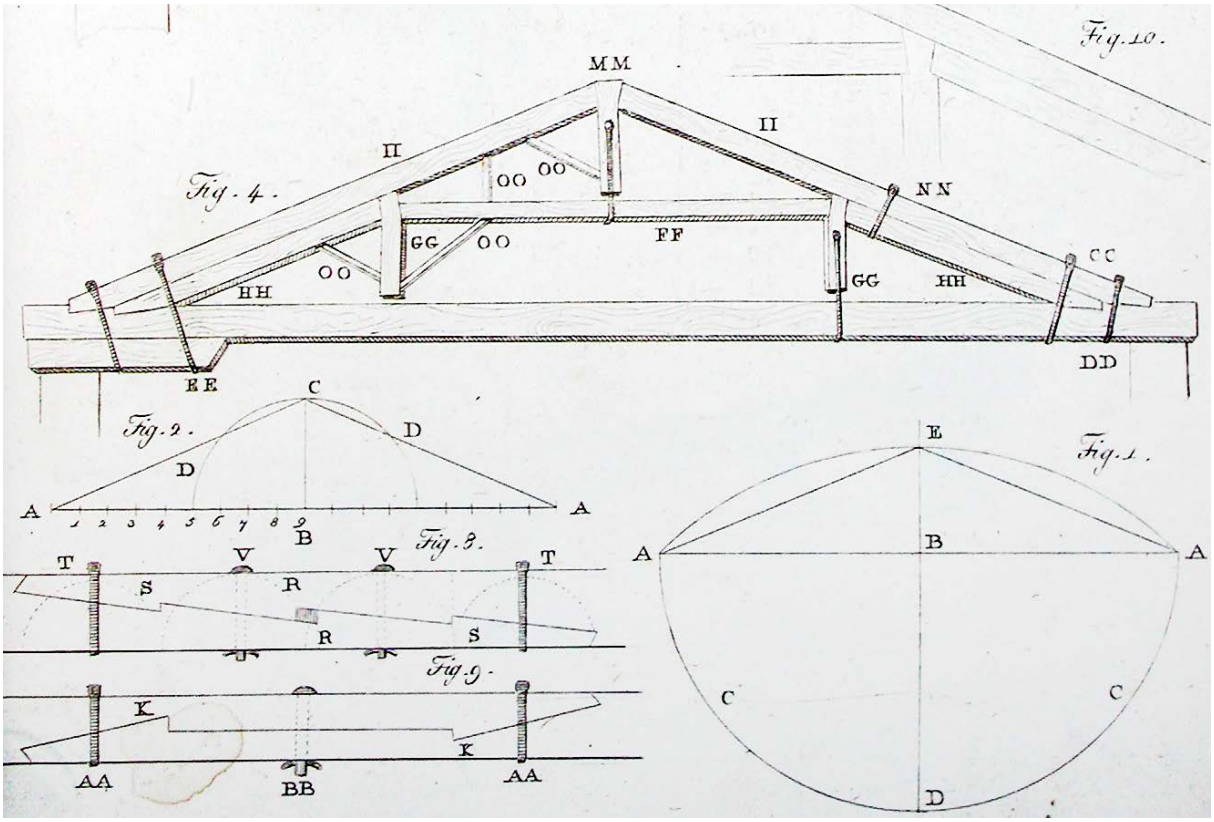

Fig. 3: Truss with three monks and details of the couplers between two half beams to form a single link, table LXVI.

The first type of joints had to be made with a roughening stepped version of the terminal part of the wooden beam, in a manner perfectly complementary with the other beam that was to connect perfectly to it. The adhesion was also guaranteed by due brackets and hoops of iron. Of course the trussed roof had to be clasped to the masonry to ensure maximum stability, often using the metal chains to clip to the trusses and drown in the masonry itself. The one of the chains of iron was a method widely used to increase the stability of structures, because (as for the reinforced concrete) obviously resisted the traction forces.
Even the art of forging of these chains is widely described, both in the diagrams of interlocking of tie and bolted end - plate, both in particular terminals (heads) in a way "half and half" or "beak of flute", with accurate brackets to avoid the reopening of the beak itself (table CCLXXVII).

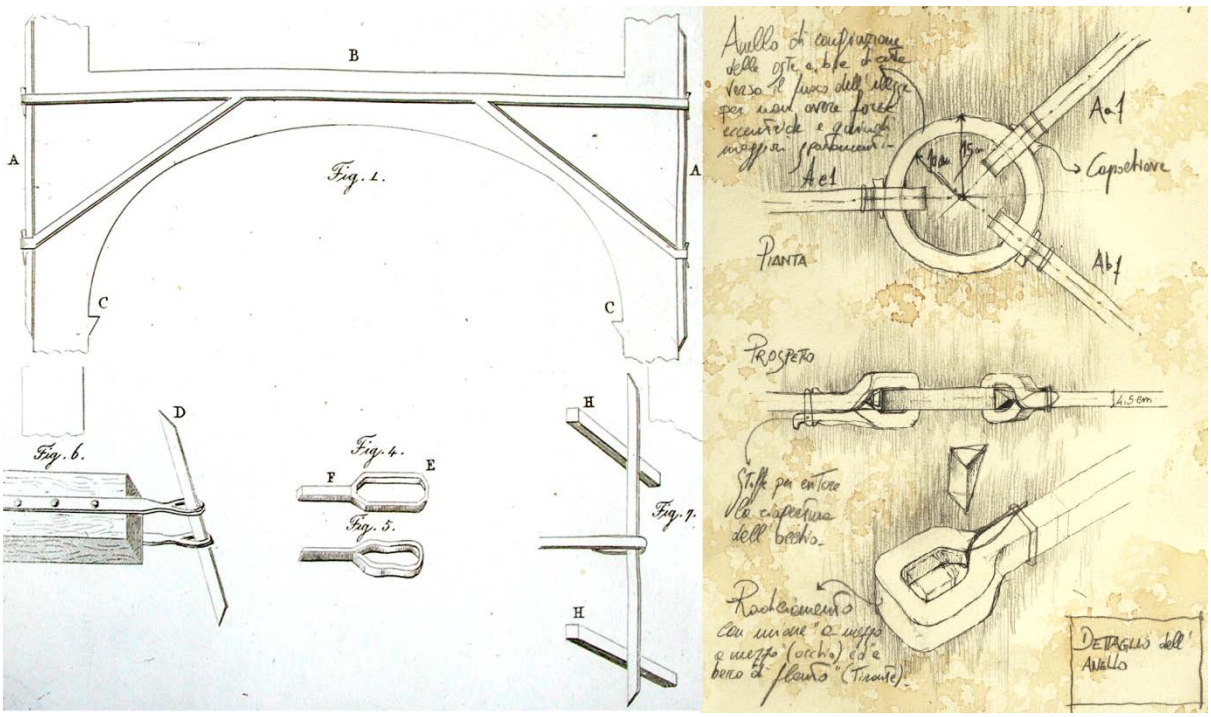

Fig. 4: Masonry vault reinforced with the use of a chain in iron. This first example shows a type of chain very rudimentary and probably the same used by Borromini. In fact are of this type the chains that join the four bases of the tower of the clock at the Oratory of the Filippini. The chain has a terminal with union "half and half" (eye E) and "beak flute" (tie F).
The chains are then anchored with bolted end - plate. At right a drawing by Daniele Calisi.

Another interesting pattern is found in the table CCXLVI of part IV, in which Valadier shows a way to realize the vault in brick masonry with filling in concretion.
In this case Valadier also assumed a further lightening the weight of the vault through the use of empty vessels or amphorae as often did the Romans (one example among many is the Mausoleum of Sant'Elena on the via Casilina , 300 A.D.).
The practice is always dictated by common sense and, of course, also from the experience of generations that experiencing have understood best practices, more suitable.
It is no coincidence that a technique of lightening of the floors, which has been used for centuries, it is also conceptually at the base of many modern construction techniques, that even using different materials, new and more technological, there is no shortage of insert parts resistant but empty for precisely reduce the overall weight of the floor.
It's fascinating analyze how techniques, materials, tools, be handed down for centuries, and remained almost unchanged for generations in generations.

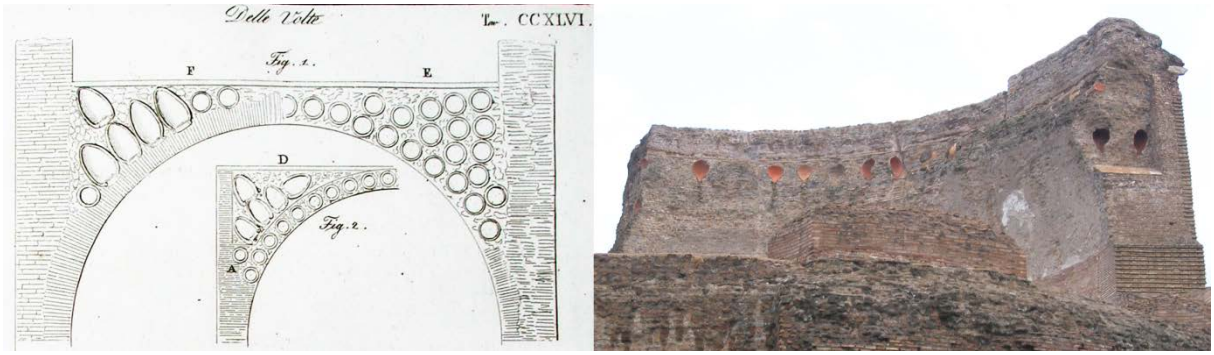

Fig. 5: masonry vault lightened with the use of amphorae and detail of the set of the vault of the Mausoleum of Sant'Elena in Rome.

The vitruvian opera on the other hand could only be the prerogative of a few writers during the dark ages of the Middle Ages, when the majority of the scientific production is moved to Middle East. It is extraordinary that such techniques have survived the passing of time only thanks to the daily practice of workers in yards, and their ability to teach and pass on these techniques.
It is also true that if these techniques came to us and thanks to the many treaties that allow us to study the techniques even in different historical periods, to understand how they have evolved, and what more important, to be able to determine with good accuracy how an architecture has been made, what materials, what can we expect to find inside (chains, tie-rods, lighteners, amphorae) that is essential for a good restoration. Therefore, it would be desirable that all the staff in operations of maintenance, consolidation and rehabilitation of the historic architecture study from time to time, the treaties contextual to the historical period of the building on which to intervene.
On the other hand the architects used those manuals in their own time to find the best way to realize their buildings.
Another very important treatise is written and illustrated by John Rondelet published between 1802 and 1817, divided into five tomes for a total of ten books.
On this treatise must be particularly praise the wide description of the systems of centring for multiple structural or support purposes.
The ribs are the wooden structures of aid, more or less complex, which were used for the manufacture of the vaulted structures and floors (but on the other hand, even if using modern materials, these operations are also made in modern job site). So they also have a centuries-old tradition in the construction industry, we need only think of the use of wooden structures in Roman architecture, evidenced also by the presence of holes tips on travertine.
However, the complexity and beauty of those described and particularly drawn by Rondelet are such as to make them unique in their kind. On the other hand a good part of the treatise is dedicated to stereotomy, the art of cutting the stones for the building industry, for which it is clear that in order to withstand the weight of stone blocks masterfully carved served of wooden structures very complex capable of withstanding the thrusts.

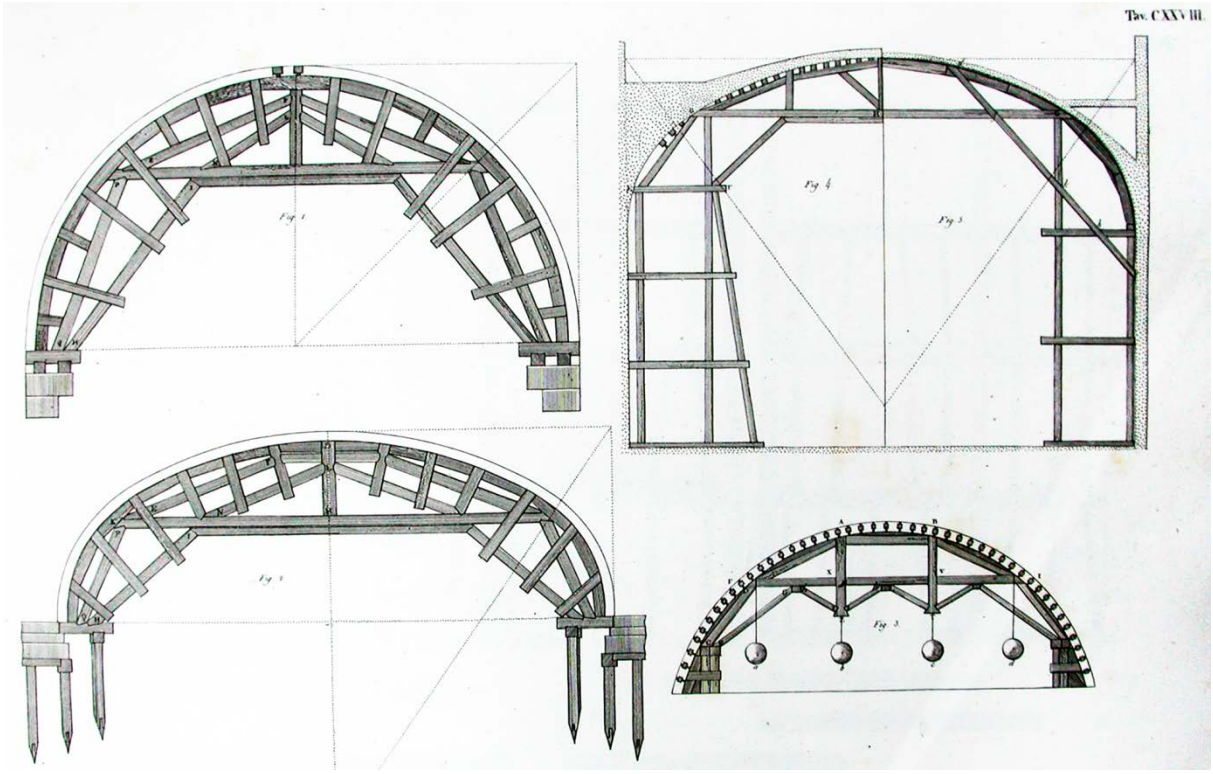

Fig. 6: Some examples of the centring useful to support the vault as shows by G. Rondelet on his Theoretic and practical Treatise on the art of build.

Obviously the ribs also served for the construction of vault in concretion, creating a plan of support for the bricks.
In general, they were put into shooting thanks to the use of sandbags placed under the main beams, a method useful for the next disassembly of the ribs themselves: once the vault is finished and dried

properly, it proceeded to disarm simply emptying the sandbags, releasing the tension of the centring that leaked accession with the vault and finally could be dismantled with ease.
Among other things, as we often tend to do with the "tubi innocenti" today, the disarmament could occur gradually, so as to accustom the turn to their own loads.

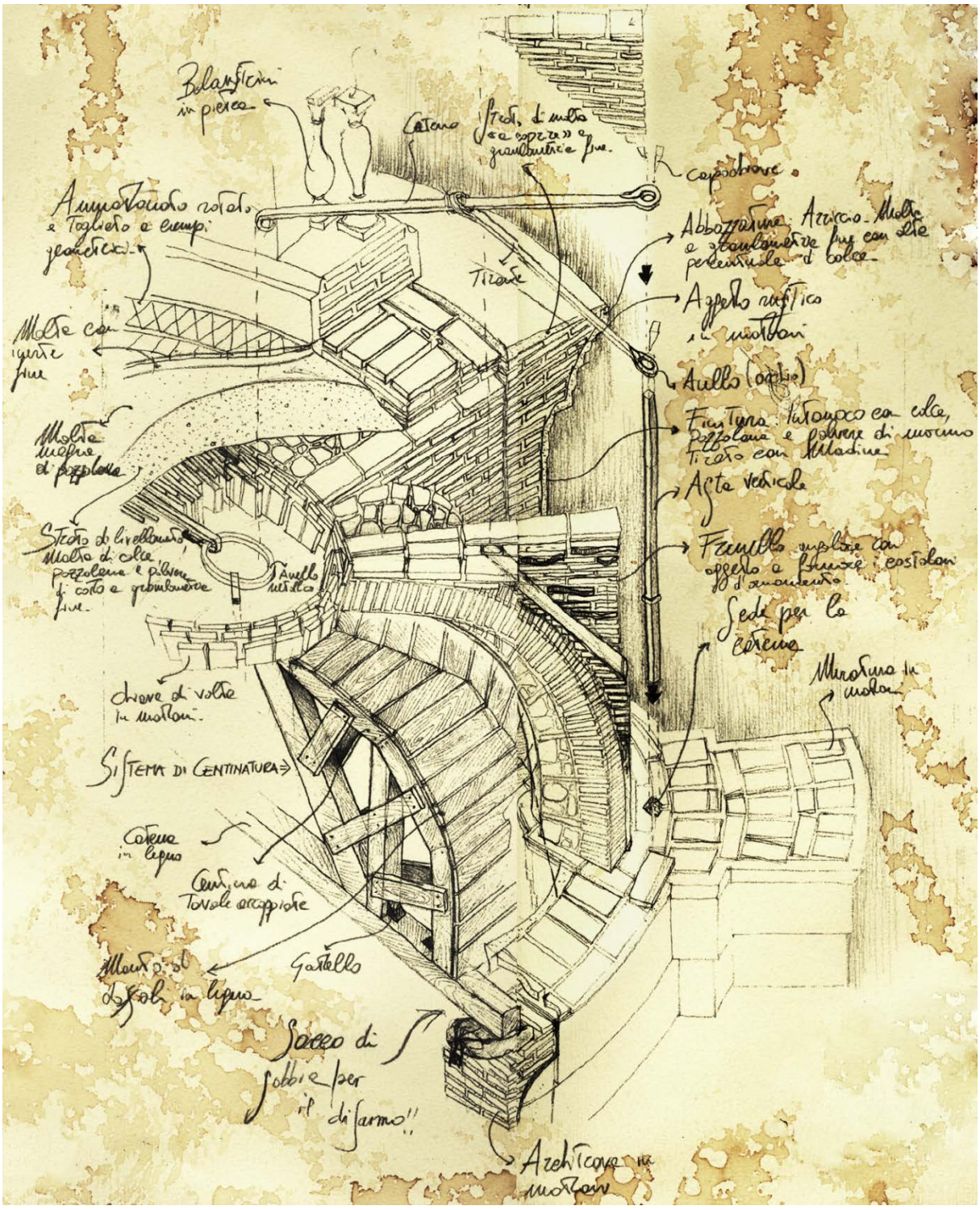

Fig. 7: Axonometric view that highlights some of the load-bearing structures made of bricks and concrete, those of aid as the centring, the finishes of the plasters and paving and those of aid to the stillness as the chains and tie rods. In particular, for the hypothetical construction of this architecture, are used a kind of vaults composed of structural arcs called "*frenelli*" and fills in stones and concrete. The key to the vault is composed of a disc of bricks placed in cutting and the chains follow the trend of key and the angular *frenelli*. The brickwork follows the rules to avoid the overlap of the joints. A nomenclature and short descriptions are directly related to the individual parts. Drawing by Daniele Calisi.

The last, but not for importance, is the "general treaty of civil construction" by Gustav A. Breymann of 1884, in which, compared to other similar writings, the theme of the construction of masonry brick is treated in a very in-depth manner.
Especially Breymann exposes, accompanying the text with excellent graphic boards, the manner of making brick walls in one, two, three heads, and beyond, providing several special cases: the angular solutions and sharp edges, the columns also of complex shapes, the way to intersect the main walls with secondary walls also not at right angles, the way to built the compartments for the flues inside of the walls themselves, and more.
All solutions are extremely fascinating, also because Breymann also provides a way to built a solid wall and statically efficient thanks to the alternation of different layer of bricks., The ability to not coincide the joints between bricks, in the transition from one layer to another, ensures a better stability to the wall itself, and for this reason, the treatises provides in its tables, and for each example he shows, the diagrammatic representation of the positioning of the bricks for four consecutive layers. After the fourth naturally one has to start again from the first.
These schemes are of course dictated by experience, by the practice of job site, and a logical reflection on the static nature of masonry brick. On the other hand, the vast majority of the historical buildings of a certain importance was built in bricks, which were then coated with plaster, the most used over the centuries.

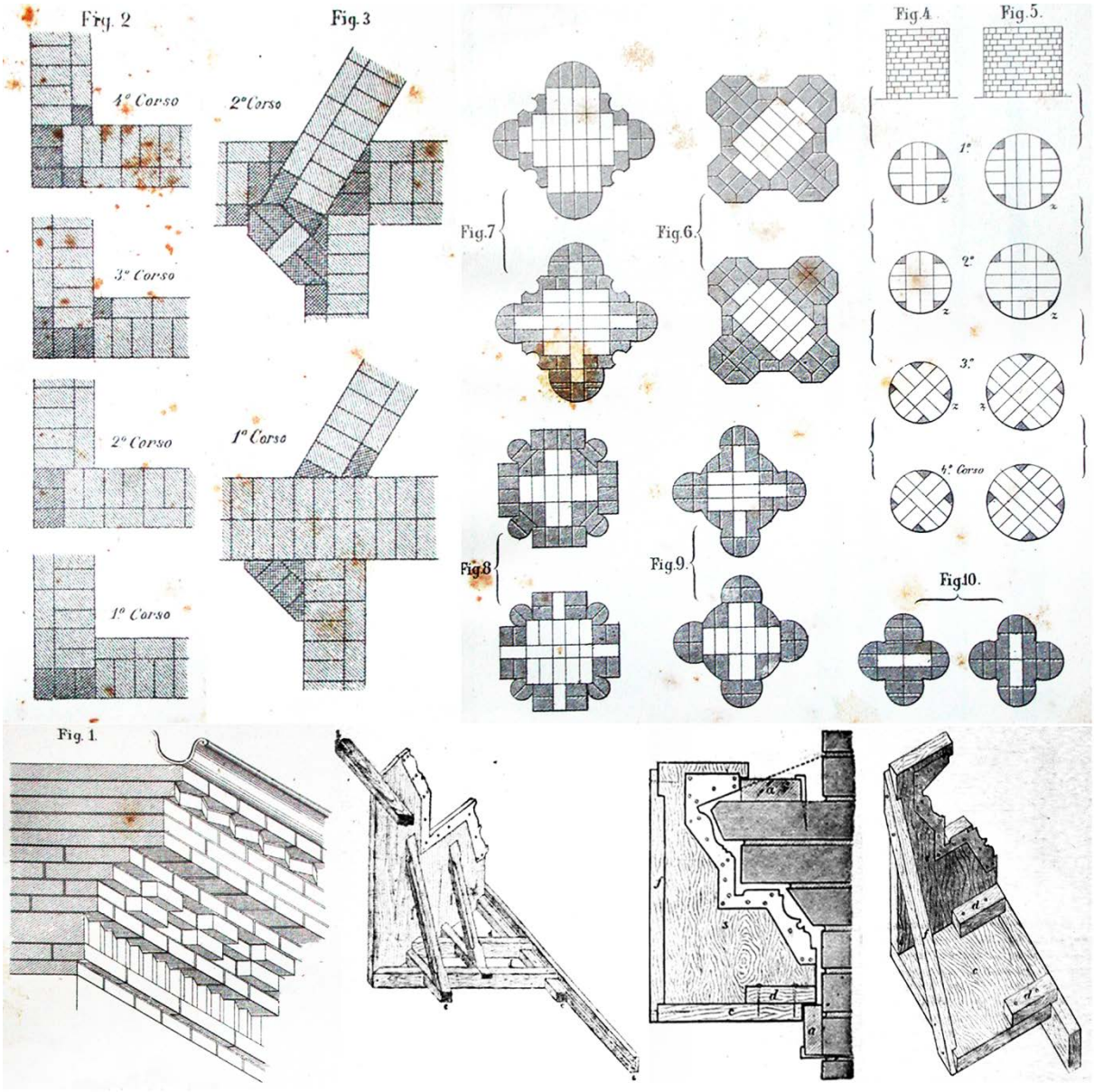

Fig. 8: Execution of a wall i three heads with more layers and interlocking with other walls; correct execution of pillars in bricks of different shapes; rustic brick lug by finishing with a plaster to more layers pulled with *modine*; two types of *modine* for making classic moldings.

Also on the right way to make the plaster one can find a large amount of advice, since the treatise vitruvian where the author exposes the materials to be used to create a plaster-of-the-art in seven layers with different granularity. In the treatise of Breymann we also find an interesting explanation of the instrument for achieving the moldings, called "*modina*": made in wood allows you to pull the plaster giving it the shape of the moldings designed, and, in the version mentioned, also allows you to not to fall off the plaster in excess on the lower floors, but to exhaust it in the side container always in wood.
The basics that one can learn from these treaties are many, and very useful also in contemporary construction. Perhaps today cannot be built using these techniques, but they may first be useful for the restoration of the monuments, but can also provide inspiration for new constructive technologies: good knowledge of the evolution of the construction techniques, understand the errors and achievements over the centuries, imitate also (if you want to) are the best starting point to create new ideas.
The great importance that today is given to the cultural and architectural heritage (theme more and more popular) must obviously be extended not only to what is tangible and verifiable.
Our heritage is also done by customs and traditions, and sometimes need to remember that the local entities are very important and should be protected. In that sense also the treaties mentioned in this article, but also the whole production correlated, are part of the cultural heritage because they contain very important information on the evolution of the building, historic architecture, and the society itself.

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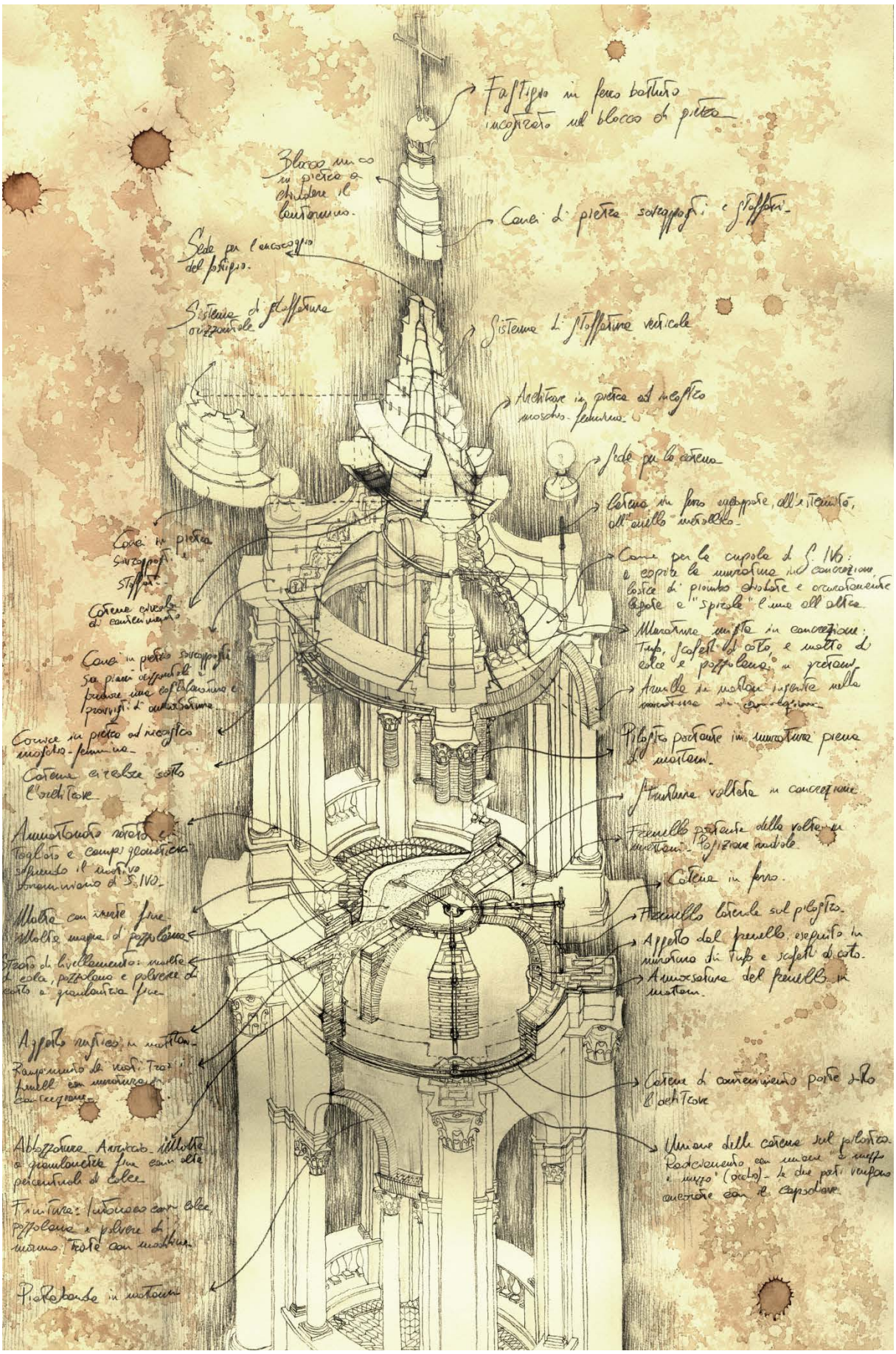

Fig. 9: An axonometric view that highlights some of the load-bearing structures made of bricks and concrete, angular *frenelli* to withstand the vault, tie rods and bolted end-plate, paving brick laid on several layers of mortar and concrete, protrusions rustic brick plastered and *abbozzatura* in *arriccio* with mortar in different graininess. Drawing by Daniele Calisi.

HERITAGE ARCHITECTURE LANDESIGN
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Heritage Management in Sydney, Australia – A Case Study on the Replacement of Degraded Sandstone on Heritage-Listed Buildings

Elanor PITT[1], Emma CULLEN[2], Gwénaëlle PROUST[3]
(1) School of Civil Engineering, The University of Sydney, Sydney, Australia
epit9249@uni.sydney.edu.au
(2) emmacullen89@gmail.com
(3) gwenaelle.proust@sydney.edu.au

Abstract
Australia is often dismissed in the world of heritage as uninteresting because of its so-called "short" history. However, Australia has a rich cultural and natural heritage spanning tens of thousands of years. Colonial and Post-Colonial heritage, in particular, demonstrates a unique response to an unfamiliar environment in a remote outpost of the British Empire. Over 200 years since colonisation and over 100 years since the formation of the Federation of Australia, the question of what to do with the monuments and structures built within the first two centuries of occupation has been much discussed. The choice between preservation and reconstruction is paramount. A building which has undergone much alteration, repair and replacement of fabric over the centuries is Sydney Town Hall, originally built with oxidising sandstone from Pyrmont in 1868. The issue of what stone to use for the replacement of the original fabric is vital to the conservation programme. This programme dictates that badly degraded stone be replaced with an equivalent or "like" material. Investigations into the location of active sources of sandstone have been undertaken, including the consideration of a non-exhausted section of the Pyrmont Quarries known as Hell Hole. Although the stone was found not to be of high enough quality for the repair of heritage buildings, this study shows the importance of finding new active supplies of sandstone for the conservation of Australian heritage.

Keywords: Australian heritage, sandstone, conservation, petrography, mechanical characterisation.

1. Introduction
Australia has a rich cultural heritage spanning tens of thousands of years which needs to be conserved for posterity, so that future generations may know and understand Australia's past. It is vital that built structures, as important markers of past events, communities, people and shifts in ideology, are conserved so that they continue to visually demonstrate the unique response to an unfamiliar environment in a remote outpost of the British Empire. These Heritage-listed buildings cannot be left on their own, as over time they will slowly decay and become ruins. They must therefore be conserved, whether by preservation or reconstruction.
In terms of built structures, preservation, according to the Australian *ICOMOS Burra Charter*, involves the maintenance of the fabric in its present state and the prevention of further deterioration, while reconstruction ascertains to replacing existing fabric with new materials in order to restore the building to a previous state [1]. Once the cultural significance of a building is determined, the decision between preservation and reconstruction is a difficult one to make. The *ICOMOS Burra Charter* of Australia offers a careful approach to change to heritage buildings: change "as much as necessary to care for the place and to make it useable, but otherwise change it as little as possible so that its cultural significance is retained" [1]. The fabric that undeniably needs replacing in heritage buildings must be replaced, and with like materials, so that historical and cultural significance is maintained. The major problem is that of finding a source of material that matches the fabric and history of the building [2].

The problem of sourcing new material for reconstruction of elements of Heritage-listed buildings is demonstrated in the case study of Sydney Town Hall. Originally built between 1868 and 1889 with oxidising sandstone from the Pyrmont Quarries in Sydney, Town Hall has played a central part in the history of Sydney and is a significant part of the historic streetscape [3]. Over time, much conservation work has been conducted on the building, including alteration, repair and replacement of fabric.
Sandstone, though a permanent material from which to build a structure, is not completely indestructible. Deterioration of the stone is caused by continual wetting and drying, erosion from water and wind, salt and pollutant ingress and spalling of the stone surface [4]. Sydney sandstone in particular will deteriorate within half a century of being cut from a quarry [4]. Thus, the conservation, including restoration, of Sydney Town Hall is vital and must be undertaken periodically.
The City of Sydney Council is currently working on the conservation of Town Hall, the sandstone for that project is being taken from the Public Works stockpile from McCaffrey's Quarry. This stockpile is rapidly being used up and it seems it will run out shortly, so a new active source of stone needs to be found. The stone used for the restoration of Sydney Town Hall must be of the best quality possible [5,6]. If the sandstone does not meet current Australian and International standards, the restoration work will deteriorate quickly and the sandstone will have to be replaced regularly. Thus it is vital that the stone used is strong and durable enough to withstand decades of weather effects. As the properties of Sydney sandstone vary significantly throughout the region, the analysis of the microstructure and physical properties is an important step to be taken prior to the opening or reopening of a quarry [7,8].
The problem of where to look for a new active source of sandstone for the restoration of Town Hall was thought to be solved in a yard owned by the City of Sydney Council. The yard is part of the old Saunders Quarries, known as Hell Hole Quarry, which may have potential to provide an active source for the much-needed sandstone. Quarrying in Pyrmont started in the 1840s, utilising this oxidising sandstone for many of the most famous sandstone buildings in Sydney [7]. Charles Saunders opened the Saunders Quarries in the early 1860s, and by the 1890s, this sandstone was known as the highest quality sandstone suitable for carving, being uniform in texture, hardness and colour [7,9]. The Saunders Quarries gradually became known as Paradise, Purgatory and Hell Hole, said to be named by the Scottish stoneworkers [7,10]. The Saunders Quarries were well-known for their quality of stone, which was exported interstate, to New Zealand and even to Fiji and Canada [11]. Buildings in Sydney which sourced their sandstone from Pyrmont include Sydney Town Hall, the NSW Art Gallery, the Queen Victoria Building and St Mary's Cathedral [7]. It is unknown whether any suitable stone remains nowadays. As Town Hall is built from oxidising Hawkesbury sandstone from the Pyrmont Quarries, it was thought likely that the sandstone from Hell Hole would be of a similar colour and geology.
The purpose of the investigation is to determine whether Sydney oxidising sandstone from the Hell Hole Quarry in the Saunders Quarries, Pyrmont, conforms to current Australian (AS/NZS) and International standards (ASTM) for dimension stone, as well as the more strict criteria specified by experts in the field of restoration of sandstone structures. As this quarry has not been exploited in 230 years, the state and character of the sandstone is unknown.
The tests that were conducted assessed the stone in regards to strength, durability and mineral composition. The tests included: bulk specific gravity (bulk density); water absorption; compressive strength; modulus of rupture; and resistance to salt attack. Petrographical analysis, utilising a Scanning Electron Microscope (SEM) to conduct imaging and perform Quantitative Evaluation of Materials by SCANing Electron Microscope (QEMSCAN) bulk mineral analysis, was also employed to characterise the microstructure of the sandstone. These results were also compared with previous research on Pyrmont sandstone.

2. Methodology

As mentioned above, the stone used to replace any existing damaged sandstone in a heritage building cannot simply be any sandstone. Not only does it have to match the fabric, history and culture, it must also be strong and durable enough to meet the Australian (AS/NZS) and International standards (ASTM) for dimension stone, as well as the more strict criteria for the restoration of heritage sandstone structures. Thus, the property characterisation test methods conducted were chosen due to their universal acceptance as standardised methods for the testing of sandstone to determine the stone's potential for use as a dimension stone. The results are therefore comparable with typical results from other sandstone quarries and minimum requirements for use in Heritage-listed buildings. The tests conducted included: bulk specific gravity (ASTM C97/M-09); maximum water absorption by weight (ASTM C97/M-09); average dry and wet compressive strength perpendicular and parallel to the bedding (ASTM C170/C170M-09); average dry and saturated modulus of rupture perpendicular and parallel to bedding (ASTM C99/C99M-09); and resistance to salt attack (AS4456.10-1997, Method A). The ratios of the saturated/dry compressive strength and modulus of rupture were also calculated (ASTM C170/C170M-09 and ASTM C99/C99M-09). Petrographic analysis was undertaken in order to

understand the microstructure and mineral composition of the material and to attempt to account for the way the stone responded in the property characterisation tests.

2.1 Material

The Hell Hole oxidising sandstone material tested in this study was supplied by the City of Sydney Council. The Hell Hole sandstone was quarried by the Traditional Stonemasonry Company, and cut into specimens and supplied by the City of Sydney Council. For absorption, specific gravity, rupture modulus, compression and soundness, 50 mm length cubes were cut and supplied. For rupture modulus tests, 200 mm by 100 mm by 60 mm beams were cut and supplied, while broken pieces of sandstone from the compression tests were used for petrography. Note that all tests were conducted over 8 weeks after coring, resulting in them being tested after the period of strength-hardening.
Good sampling is vital when petrographical analysis and property characterisation are undertaken, as only small pieces of stone are analysed [8]. These samples may not be a proper representation of the quarry, as sandstone properties differ between bedding and even laterally along beds [8]. In order to create samples which were representative of Hell Hole Quarry, the cores were taken from two areas along the west-facing cliff face. However, the exact location of each sample from these cores is unknown. This means that these two areas cannot be compared. This was assumed to be satisfactory, as this investigation aimed to understand the general nature of the stone from the quarry.

2.2 Standard Requirements

Each property of a stone has a requirement that needs to be met in order to be used for a certain application. The American Society for Testing and Materials (ASTM) prescribes internationally-recognised standards for sandstone dimension stones for use in buildings (C616-08). The NSW Department of Public Works also has certain requirements that need to be fulfilled in order for a stone to be adequate for restoration. These requirements are strict due to being solely for sandstone in NSW heritage projects [5]. Spry also provides requirements for a stone of good quality for NSW sandstone which can be used in all applications in industry [6]. Though these requirements are not specific to restoration, sandstone used in the restoration of Heritage-listed buildings needs to be of the best quality. This is because it is often used in overhangs or carved decorations; situations which place much stress on the stone [5]. Thus, these strict requirements are often used to assess stone considered for restoration. Table 1 below lists all the requirements mentioned above.

Property	Standard Test	International Requirements	Department of Public Works	Restoration Requirements
Bulk Density (t/m^3)	ASTM C97	2.003		Minimum, 2.2
Absorption by Weight (%)	ASTM C97	8		Maximum, 4 or 5
Dry Compressive Strength (MPa)	ASTM D2938	27.6		Minimum, 50 (best) 40-60 range
Wet Compressive Strength (MPa)	ASTM D2938	27.6		Minimum, 25 (best) 20-30 range
Wet:Dry Compression Ratio				Minimum 0.5 (best) down to 0.4
Dry Modulus of Rupture (MPa)	ASTM C99	2.4	6	Minimum, 8
Wet Modulus of Rupture (MPa)	ASTM C99		4	Minimum, 4
Wet:Dry Rupture Modulus Ratio			0.6	
Durability % Loss Salt Cryst.	AS/NZS 4456.10	Maximum 1% A grade		Maximum 1% A grade
Deleterious minerals				Limit as required; smectite, mixed layer clays, sulphides, zeolites etc.

Table 1: Comparison of properties of sandstone and their standards. Includes International (ASTM), NSW Department of Public Works and restoration standards [6].

3. Results

3.1 Property Characterisation

The results from the required property characterisation tests can be seen compared against the different requirements for sandstone in Table 2. As little to no property characterisation has been carried out on sandstone used in the structure of Town Hall itself, nor that removed for replacement due to degradation. Typical results for sandstone from the Pyrmont Quarries have been included in

this table as a means for comparison with the results from this study. As can be seen in Table 2, although a small number of the requirements were fulfilled, including bulk density, dry compressive strength and dry modulus of rupture, it is all too clear that the stone tested does not fulfil all the requirements for stone that is adequate for restoration. The stone generally fails in wet conditions, including absorption, wet compressive strength, wet modulus of rupture and durability.

	International Requirements	Department of Public Works	Restoration Requirements, Mean (Range)	Hell Hole Mean (Range)	Typical Pyrmont Sandstone Mean (Range)
Bulk Density (t/m^3) (Min.)	2.003		2.2	2.3 (2.2-2.3)	2.3 (2.3-2.4)
Porosity (%) (Max.)	8		4 or 5	5.0 (4.8-5.2)	(3.0-4.2)
Dry Perpendicular Compressive Strength (MPa) (Min.)	27.6		50 (40-60)	57 (52-60)	
Wet Perpendicular Compressive Strength (MPa) (Min.)	27.6		25 (20-30)	22 (19-29)	(13-31)
Wet:Dry Compression Ratio (Min.)			0.5 down to 0.4	0.39	
Dry Perpendicular Modulus of Rupture (MPa) (Min.)	2.4	6	8	9.2 (8.4-11.4)	
Wet Perpendicular Modulus of Rupture (MPa) (Min.)		4	4	1.9 (1.7-2.9)	1.7-4.3
Wet:Dry Rupture Modulus Ratio (Min.)		0.6		0.21	
Durability % Loss Salt Crystals (Max. for A grade)	1		1	4.5 (3.7-5.8)	0.6-2.2
Deleterious minerals			Limit; smectite, mixed layer clays, sulphides, zeolites	Trace of calcite found.	

Table 2: Comparison of Hell Hole sandstone results with typical Pyrmont sandstone with ASTM, NSW Department of Public Works and restoration standards [6]. Typical Pyrmont sandstone values taken from Spry [6].

3.2 Petrographic Characterisation

Though the Hell Hole sandstone samples from compression proved problematic for polishing due to their friability, the samples could be imaged as can be seen in Fig. 1. Although the surfaces are not flat, it was possible to identify the microstructure of the sandstone. The main constituent was found to be large grains of quartz, with an intergranular clay matrix. Quartz grains were angular and varied from 100 to 400μm. Mica was identified in the microstructure due to its characteristic sheeting, while iron oxide was identified due to its high density, which appears white in a backscatter electron image (see Fig. 1).

Bulk mineral analysis was conducted on the specimens from Hell Hole in order to identify the proportions of the mineral constituents which make up the microstructure of the stone. Rather than providing all of the mineral constituents, those which are deemed important by experts in the field of petrographical analysis of Australian sandstone are provided in Table 3, next to the published Pyrmont sandstone results from previous tests [7,8]. There are no standards for amounts of mineral constituents, but it is recommended that deleterious materials including smectite, mixed layer clays, sulphides and zeolites are limited. The only possibly deleterious mineral here is calcite, but as this is present in only a trace amount, it is should not affect the properties of the stone. However, the lack of deleterious minerals does not directly mean that the stone is adequate for use in the restoration of Town Hall.

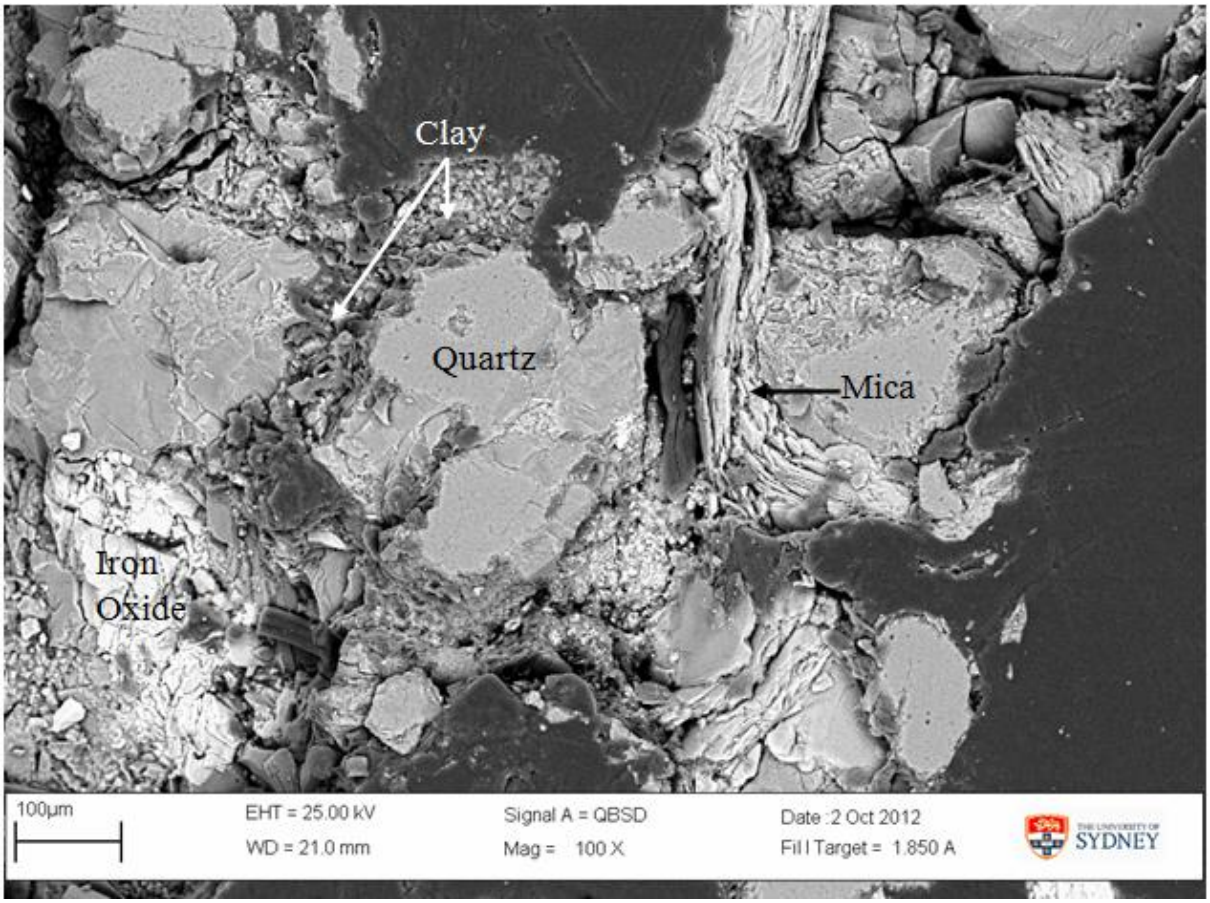

Fig. 1: Backscatter SEM image of Hell Hole Sample C64A.

Mineral	Hell Hole Stone Composition			Typical Pyrmont
	Mean (%)	Range	S.D. (%)	Range
Quartz	70.6	68.2-71.9	2.1	63-68
Clay, total	8.2	6.9-9.1	1.2	16-25
Siderite	1.2	0.9-1.3	0.2	2-6.5
Iron Oxides	1.8	0.9-2.7	0.9	0.2-4
Muscovite Mica	10.6	9.7-11.2	0.8	0-2.5
Feldspar	2.5	2.2-2.8	0.3	0-2.2
Calcite	tr	tr	-	n.d.
Carbon/ Graphite	n.d.	n.d.	n.d.	tr-0.2
Minor Accessories[#]	0.5	0.4-0.6	0.1	-

Table 3: Mineral Composition of Hell Hole samples from QEMSCAN analysis compared with typical values for Pyrmont from a compilation of Spry and Franklin [6,8]. . tr = trace amount; <0.1%. n.d. = not detected. [#]Minor accessories include tourmaline, zircon, rutile/ilmenite, leucoxene.

4. Discussion

The purpose of the tests conducted was to determine whether or not the disused quarry known as Hell Hole could be exploited as a supply of oxidising sandstone for use in the restoration of Sydney Town Hall and other Heritage-listed buildings. It was expected that the results of the property characterisation for Hell Hole would fall somewhere in the range of results from earlier tests on Pyrmont sandstone, as given in Spry [6]. These results in Spry are representative of Pyrmont sandstone from 19th century buildings as well as stockpiled Pyrmont sandstone from more recent excavations [6].

As shown in Table 2, the property characterisation of the stone from Hell Hole demonstrated that although some of the requirements were met, the stone did not generally fulfil the requirements for stone used for restoration purposes. This is generally due to the stone's poor performance in saturated conditions. We will discuss now the importance of meeting these requirements.

4.1 Bulk Density

A dimension stone must have sufficient density in order to be sufficiently durable and strong to bear the weight of any courses above it. The bulk density of a stone used for the restoration of heritage buildings such as Town Hall must therefore be high enough to support such forces. The testing conducted on the Hell Hole sandstone resulted in a bulk density range of 2.2 to 2.3 t/m^3 (mean, 2.3 t/m^3). This bulk density was high enough to meet both the International standard (ASTM) as well as the requirement for restoration for Australian sandstone. As previously-tested Pyrmont stone resulted in a bulk density range of 2.3 to 2.4 t/m^3 (mean, 2.3 t/m^3), the density was almost identical to the expected value [6]. As a reduction in bulk density can be caused by physical weathering, it could be possible that the Hell Hole samples are slightly weathered, causing the bulk density to be slightly lower than typical Pyrmont values [12]. Despite possible weathering, the Hell Hole sandstone fulfils the bulk density requirement and is therefore acceptable for use in restoration in this regard.

4.2 Porosity

Porosity is a measure of the amount of voids in stone [14]. Porosity has both a direct and indirect effect on most of the physical properties of sandstone, so it is sometimes seen as the most important rock parameter [13]. A high porosity can demonstrate that a stone has a high resistance to water infiltration, and is thus safe from rising damp and salt attack [14]. As Pyrmont sandstones typically have a low porosity ranging from 3.0 to 4.2%, a similar low value was expected from these tests [6]. However, while the mean Hell Hole sandstone result of 5.0% easily passed the ASTM requirement of 8%, it only just met the restoration requirement of 4 to 5% (Table 2). Two of the samples had porosities higher than 5%. This higher porosity may be indicative of weathering of the stone due to its exposure on the edge of a cliff for 230 years.

4.3 Compressive Strength

Compressive strength is an important indication of the potential for a sandstone's use in the restoration of heritage buildings. The compressive strength must be analysed, as a dimension stone must have sufficient strength to bear the weight and forces subjected to it from the rest of the structure. It should be noted that the results from this study, as those from previous studies, provide results for strength where the force subjected is perpendicular to the bedding plane of the stone. This is because sandstone blocks are strongest when the force is perpendicular to the bedding. This is why they tend to be laid in a course with the bedding plane parallel to the ground; they have sufficient strength to bear the weight from higher courses. The response of sandstone to compression when tested parallel to the bedding plane is variable and unpredictable because the force acts directly along the bedding plane, which is weaker than the surrounding bedding. It was expected that the Hell Hole sandstone would have saturated compressive strengths ranging from around 13 to 31 MPa, in accordance with Spry's compilation of different properties for Pyrmont sandstone (Table 2) [6]. No results for dry compressive strengths have as yet been published and so there were no typical resulted to be expected.

As can be seen in Table 2, the range of wet compressive strengths fits directly in the range for typical Pyrmont sandstone. This means that the Hell Hole specimens are approximately of the same quality as the sandstone from Pyrmont which was used in Heritage-listed buildings and therefore, likely similar to that used in Sydney Town Hall. The compressive strength of the dry perpendicular specimens was much higher and also marginally more consistent than that of the wet perpendicular specimens. This was to be expected, as sandstones are strongest when dry and when the bedding plane is perpendicular to the loading [6]. The wet compressive strengths are less than half of the dry results. This shows that the compressive strength is greatly reduced by saturation of the stone with water. Loss of strength in the wet condition is possibly related to the clay content, which becomes soft during saturation and results in a reduction in strength [6,15].

As wet to dry ratios of sandstone are indicative of durability, sandstone with a high ratio is durable, while sandstone with a low ratio is not [14]. The failure of the stone in the wet condition resulted in a low wet to dry ratio: 0.39. As the ideal wet to dry ratio is a minimum of 0.5, and the lowest acceptable for dimension stone is 0.4 [6], it seems that the stone is potentially unsound and not durable, and is therefore not adequate for restoration [14].

4.4 Strength – Flexural Tensile Strength Modulus of Rupture

The modulus of rupture, being a method of assessing the tensile strength, simulates the real-life failure of dimension stones in a sandstone building [15]. Tensile strength is important to test, as sandstones are generally much weaker in tension than compression [15]. It was unknown what could be expected from the Hell Hole sandstone in terms of dry tensile strength, as only the results for the wet modulus of rupture of Pyrmont sandstone had previously been published in Spry [6]. The testing conducted on the sandstone from Hell Hole resulted in low wet tensile strengths, but relatively high dry tensile strengths. The dry tensile strength of the stone, with a mean value of 9.2 MPa, exceeded the minimum requirements of ASTM, Public Works and Spry's restoration guidelines [6], which were 2.4, 6 and 8 MPa, respectively (Table 2). The wet tensile strength, in contrast, does not meet either the Public Works or restoration requirements, with a mean value of 1.9 MPa, far below both requirements of 4 MPa (Table 2). Due to the poor wet tensile strength of the stone, the wet to dry ratio was also poor and far below the Department of Public Works' requirements (Table 2). This drop in strength from wet to dry indicates that the clay matrix is weak and that the stone may be susceptible to moisture ingress and strength variations [6,14]. This means that the stone is adequate in the dry condition, but as soon as water is introduced, the sandstone fails to meet requirements. The Hell Hole sandstone is therefore not recommended for the restoration of the façade of Town Hall in terms of tensile strength, as façades are constantly subjected to wetting and drying cycles due to the weather conditions in Sydney.

4.5 Soundness –Resistance to Salt Attack

The resistance to salt attack measures the durability of a stone. To be used for restoration in the Sydney environment, it must have sufficient durability to resist ingress of salt-water and pollution. The soundness test thus provides an indication of how well a sandstone can resist salt ingress. The deterioration of the stone in the sodium sulphate solution is due to the pressures in the stone caused by the crystallisation of the salts and hydration, which are stronger than the tensile strength of the stone. In a sodium sulphate solution, weathering is caused by the transformation of the dehydrated sodium sulphate into its hydrated form [16]. The deterioration normally results in a reduction of the dimensions of a stone block, generation of fine particles and weakening of the rock itself, which was seen in the tests conducted [15]. It was expected that the Hell Hole sandstone would have a similar mass loss as the typical range for Pyrmont stone found in Spry [6], 0.6 to 2.2%. However, the mass loss for Hell Hole was greater than twice this range (Table 2). This is most probably due to the weathered state of the stone, having a higher porosity and slightly lower bulk density than expected of a Pyrmont stone. This higher porosity indicates that more salt will be able to ingress into and crystallise in the stone than for fresh Pyrmont stone. As the best quality sandstone is needed for restoration, both Spry and ASTM dictate that the maximum weight loss in a stone used in restoration is 1% by weight [6]. Clearly, the Hell Hole sandstone does not meet this requirement.

4.6 Petrography

A petrographical analysis was conducted to understand the microstructure and mineral composition of the Hell Hole sandstone, and to understand its behaviour in the property tests. The backscatter images of the specimens from Hell Hole from this study clearly show that the microstructure of the stone is made up of angular to rounded quartz grains which vary in size from 0.1 to 0.4 mm, with a grainy intergranular clay matrix (See Fig. 1).

The mica, which can be made out by the characteristic sheeting, is bent and weathered, and the iron oxide is friable and weathered (See Fig. 1). There are also gaps between the quartz grains, possibly a result of the clay leaching out of the microstructure, but also possibly due to the polishing ripping the clay and other minerals out. The physical act of polishing the Hell Hole sandstone demonstrated that the stone was particularly friable, as the grains were simply ripped out instead of polished. This indicates that the clay matrix, which binds the stone together, is not particularly strong. The two compression test specimens that were used for petrography were not particularly weak compared to the other specimens in compression, so the friability cannot be attributed to this. In fact, specimen C07 had a dry perpendicular strength of 59 MPa, and specimen C64 a dry parallel strength of 54 MPa. These specimens had the second highest compressive strength for their condition.

The Hell Hole specimens from this study had higher quartz and mica content, but lower clay and siderite content than expected of typical Pyrmont sandstone (Table 3). These minerals have the most influence on the properties of oxidising sandstone, aside from detrimental minerals [8,21]. The high amount of quartz found in the Hell Hole specimens indicates that the Hell Hole sandstone has the potential to be stronger than most Pyrmont stone. This could account for the high dry compressive and tensile strengths of the Hell Hole sandstone, but may be also be a cause for brittle failure [8].

No deleterious minerals were found, save for traces of calcite, which should not affect the properties of the stone due to its small proportion.

4.8 Variances in Results

Variability is normal for stone; it can vary in properties significantly across a site [8,20]. Due to the sedimentary and diagenetic formation processes of sandstone, a small difference in elevation or lateral position can radically change the physical properties [17]. Unless the exact original position of the test specimens in the rock face is known, it is difficult to correlate results [17]. The variances seen in the results of this study are thus a result of the original location of the samples. The lower strength samples tested in this study were taken either closer to the surface of the cliff face, where more weathering occurred or close to the fault line, discovered during the drilling process, where a drop in sandstone quality may occur. With the property results in mind, the Hell Hole sandstone cannot be recommended for use in the restoration of Town Hall.

5. Conclusions

As demonstrated above, the sandstone tested from the Hell Hole Quarry was not of a high enough quality according to accepted standards to be used in the restoration of the façade of Sydney Town Hall. This means that the City of Sydney Council cannot turn to Hell Hole when the McCaffrey's stockpile runs out. However, it must be noted that the results from this study are limited by the original location from which the stone was taken. Tests were only conducted on stone from two places in the cliff-face of Hell Hole, so the results are probably not a real indication of the quality of the stone of the whole quarry. These locations were also at the same height from the ground and were most likely from the same strata. As Hell Hole was the deepest of the Pyrmont Quarries and it was well known that the best quality sandstone in the Saunders' Quarries was found deep below the surface of the stone outcrop [9], it is very likely that the higher quality stone is far below the current ground surface of the yard. Therefore, although the stone from this study was not of high enough quality, it is likely that the yard could reveal less weathered and higher quality stone for the restoration of Sydney Town Hall.

Another important point to ponder is whether or not sandstone used in the restoration of heritage buildings really needs to meet today's standards. During the construction of such buildings, there was no geologist on site to test the stone according to specific standards before it was used. Instead, the site supervisor simply had a general feel for what a good block of sandstone looked like to be adequate for use in construction. Sometimes, he clearly made a mistake, evidenced by the blocks that today need to be replaced. If such a stone is replaced with what is deemed a high quality stone according to the standards, it may be much stronger, less porous and denser than the stone that it sits between. If this is the case, preferential decay of the weaker original stones can occur, causing more damage, resulting in replacement of even more stone. With this is mind, it can be argued that there is a more appropriate standard to test the stone against than ASTM or restoration guidelines; the quality of the stone on either side of the stone block to be replaced. This would ensure that the stone used for restoration would not cause preferential decay.

Although the sandstone studied here cannot be used for restorative purposes, if it is deemed necessary to make use of this material in the future, it could be used for other purposes, such as dimension stone in domestic structures. The Hell Hole stone, due to its high tensile and compressive strength in a dry state with the bedding perpendicular to the direction of loading, could also be used in the restoration of interior elements of Heritage-listed buildings which are moisture free. Despite the sandstone from Hell Hole not being of high enough quality for exterior restoration, the results of the tests from this study are significant as they provide important data for comparison of the properties of sandstone from Pyrmont and the greater Sydney area

Aside from the Public Works stockpile of oxidising sandstone from McCaffrey's Quarry, the closest quarry from which oxidising sandstone is currently used is Gosford Quarries [18]. There is no currently active quarry in Sydney itself, as the old quarries of Sydney were either exhausted or closed, filled in and built over [9]. Further research must be conducted into potential sites for new quarries or old quarries that could be reopened.

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The Neustadt in Strasbourg: Perception and reception of a late 19th century urban extension project at the interface of France and Germany

Johannes DAHM[1], Sophie EBERHARDT[2]
(1) Fakultät 2, Abteilung für französische Sprache, Literatur und ihre Didaktiken, Pädagogische Hochschule Karlsruhe, Germany
dahmjohannes@yahhoo.fr
(2) UMR 5600, Université Jean Moulin – Lyon 3, Lyon, France
eberhardt.sophie@gmail.com

Abstract
The research studies aim at assessing how the Neustadt ("New Town") of Strasbourg has been built, perceived and interpreted at the local, national and international levels from 1878 to the present. It is progressively becoming a recognized and valued site, in particular since the 1950s. The present study emphasizes the ways in which the different considerations for this site both in France and in Germany influenced and changed its reception in order to make it part of the city's heritage.
This architectural and urban site, built in Strasbourg between 1871 and 1914 under the German administration, will firstly be approached in this article as an architectural, urban and environmental object and secondly as bearing aesthetic, historical, technical, political, economical, cultural and social values according to different people since the end of the 19th century - population, tourists, institutions, politics, professionals, historians, press, etc.
The major interest of this study lies in the possibility it offers to consider the heritage process in a multicultural context, in which different influences interact as much as they distinguish themselves in the concrete and physical space, the architectural and urban territory, and at the same time in the intangible field, enlivened by collective consciousness.

Keywords: Neustadt – Strasbourg – Architecture – Heritage – Reception

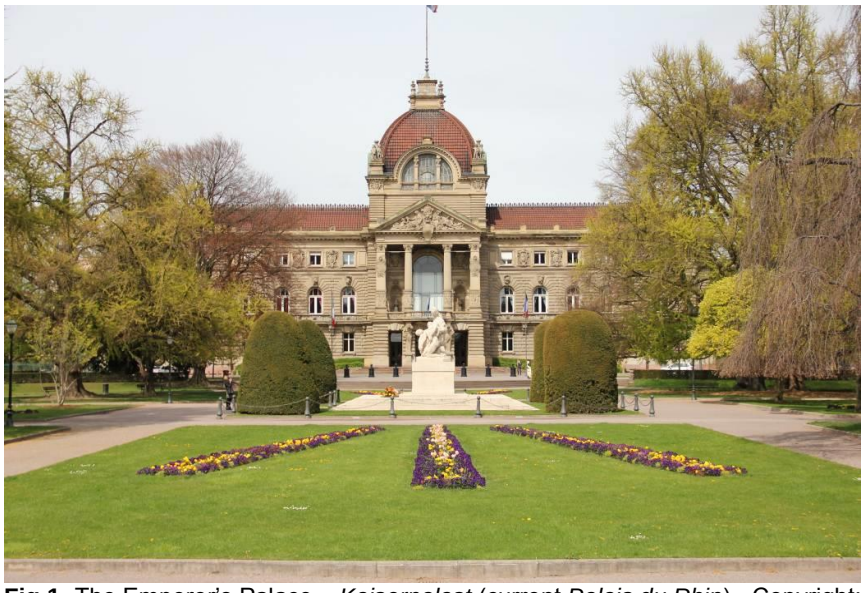

Fig 1: The Emperor's Palace – *Kaiserpalast* (current *Palais du Rhin*) - Copyright: Sophie Eberhardt

1. Introduction

The research project which we will introduce here is incorporated into the interdisciplinary study "Genèse et réception de l'architecture et des formes urbaines dans une région frontalière (1850-1950)" launched in 2010 and conducted at the University of Strasbourg by Alexandre Kostka and Hervé Doucet. This program officially phased out at the end of 2012. Nevertheless, a number of research projects of the same nature still continue and grow. The research group is getting bigger and new experimental fields are being discovered and explored.

Originally the project brought together architects, historians, specialists in German studies, sociologists and linguists in order to work on the architecture and urban forms that emerged between 1850 and 1950 in the border region of the upper Rhine overlapping France and Germany. Therefore, two main axes – that are still relevant in the current research – have been defined. On the one hand, researchers work on the genesis and the context of the construction of architecture in the border regions of Alsace and Lorraine. The political context of the period and the choice of architects – who passed through different kinds of educations in Germany and France – are, among others, details which are at the centre of the analysis. On the other hand, the reception and the perception of the architecture are the focus of investigations. Therefore press articles, magazines devoted to architecture, novels, interviews and other kinds of texts are explored in order to capture the reactions, opinions and feelings of the public towards the architecture and the constructions in question.

In the following article a concept of a fruitful combination of two scientific perspectives, a cultural-historical approach and a sociolinguistic approach is presented. Benefitting from the fact that both authors live in Strasbourg and work on the same project, the idea to realize an interdisciplinary approach out of the respective works, will be presented.

First, the object of our research – the urban area of the Neustadt in Strasbourg – will be presented. Therefore the genesis of the urban extension in its cultural and political context is briefly demonstrated with a plan layout. Following the introduction will be a discussion of the notion of reception and possible points of contact with a theoretical framework in view of our project. Next, we will present an interdisciplinary approach by demonstrating initially the two respective perspectives before we accomplish them in the subsequent chapter. Eventually we demonstrate our first tendencies concerning the reception of a particular building – the Emperor's Palace – in the past and the present using examples of discourse material which we compare and analyze. Finally we'll present further research perspectives.

2. The conception and construction of the Neustadt

The Franco-Prussian War, opposing Napoléon III and Wilhelm I, started on the 19th of July 1870. The city of Strasbourg was bombed by some 200,000 shells during the siege that lasted from the 13rd of August to the 28th of September 1870. Even the cathedral, whose construction was launched when the city of Strasbourg was part of the Holy Roman Empire, was hit. The structure of the roof was damaged and the finial of the spin tower was unhinged.

The reconstruction of buildings and bombed-out neighbourhoods started the first year of annexation in 1871. This program was a way for the German Empire to dress the wounds inflicted upon the newly annexed territories.

Stemming from the will to expand and to modernise the fortifications, the urban extension project of Strasbourg finds its origins in the military ambitions of the German Empire to ensure the stronghold role of the border city. The new surrounding wall, approved by the *Reichstag* – the *Reichstag* was, from 1871 to 1918, the Parliament of the German Empire – in 1877 and completed in 1882, defined the new limits of the regional capital.

The urban design, defined by the urban extension, also constituted a political project. It aimed to create a window to the German sovereignty, and to the power beyond the frontiers of the Empire. The objective was to provide the city with dwellings, notably for the population coming to germanise the city, mainly military servicemen, notables, public figures, industrial workers and civil servants.

Berlin asked two architects to work on the urban plan, August Orth from Berlin and Strasbourg's city architect, Jean-Geoffroy Conrath. The two architects provided their projects in 1877. A draft was also proposed by a third architect, Hermann Eggert, responsible for the plan layout of the University.

An exceptional commission of experts from France and Germany was organised between the 18th and the 23rd of September 1878 to discuss the projects. It was mainly the project of the Alsatian architect Conrath, respecting the old city ensemble and offering parallelepiped blocks, easier to built, that would be carried out.

The discussion concerning the urban plan expansion notably dealt with the disposition of the *Kaiserplatz* (current *Place de la République*) - conceived by August Orth in the continuity of the axis Kléber-Broglie – and was suggested in a symmetric way on a large slab covering the canal. The city architect, Jean-Geoffroy Conrath, proposed, on the other hand, to locate the Emperor's square at the intersection of two major axes: the first one turned towards the University, of which implantation is already determined before the urban plan, and the second one being the visual perspective between

the Schiltigheim Gate (current *Place de Bordeaux*) and the cathedral, allowing a delicate seam between the old city and the urban expansion (Fig. 2). At the intersection of these two axes, the circular garden of the *Kaiserplatz* aims to canalise the traffic.



Fig 2: The *Kaiserplatz* (current *Place de la République*) - Copyright: Sophie Eberhardt

The urban plan (*Bebauungsplan*) of the Neustadt constitutes the program implemented in Strasbourg. Officially approved by the *Bezirkspräsident* of *Basse-Alsace* on the 7th April 1880, it expands the surface area of the city of 386 ha, passing from 232 ha to 618 ha (Fig. 3).

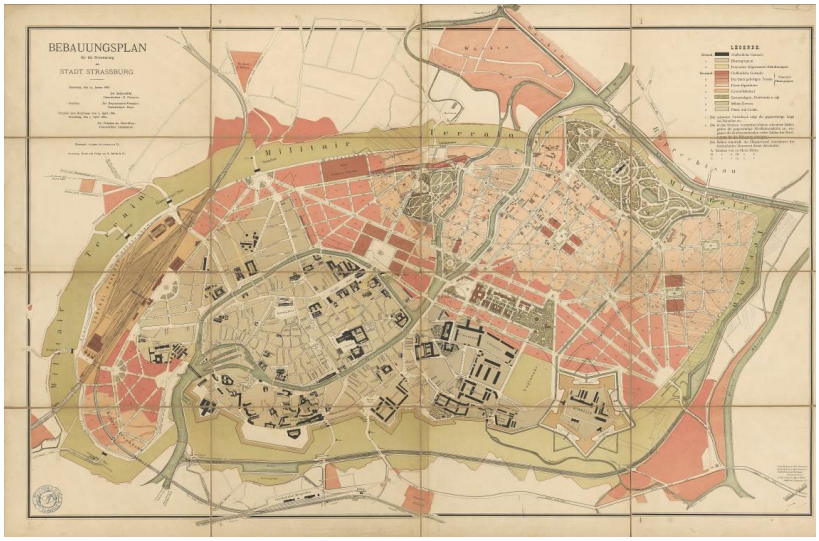

Fig. 3: *Bebauungsplan für die Erweiterung der Stadt Strassburg* (urban planning of the city of Strasbourg), Jean-Geoffroy Conrath, Strassburg: Schultz, 1880 - Copyright: Archives of Strasbourg (Brb 1561)

The *Bebauungsplan* constituted a working tool that anticipated the building's location by establishing the housing scheme according to the density, the type of buildings and the functional zoning.
The official buildings were organised around a monumental avenue linking the administrative ensemble, embodied by the *Kaiserplatz* - current *Place de la République* – with the Emperor's palace – current *Palais du Rhin* -, the Assembly palace – current *Théâtre national de Strasbourg* – the two ministers – current *Préfecture and Service général des impôts* – and the imperial library – current *Bibliothèque nationale et universitaire* – to the centre of knowledge symbolised by the University.

3. Theoretical frame: the definition of "reception"

After having presented the object of investigation, we will now discuss possible points of contacts with theories linked to perception and percipience of architecture. A definition of the idea of « reception » is mentioned in a quotation by Walter Benjamin in its essay *The Work of Art in the Age of Mechanical Reproduction* published in 1936:

> Architecture has never been idle. Its history is more ancient than that of any other art, and its claim to being a living force has significance in every attempt to comprehend the relationship of the masses to art. Buildings are appropriated in a twofold manner: by use and by perception – or rather, by touch and sight. (p. 240) [1]

From the excerpt of the « diverted perception » of Walter Benjamin to the considerations of institutional, professional and civic fields, the study of the reception aims at revealing the senses and values granted to buildings. It shows the cultural, ideological, political and social dimensions that architecture and urban spaces embody all along the centuries and according to the people, which are conveyed through images and symbols. By a subtle cross-influenced exchange, these interpretations have an effect on the place of buildings in the collective consciousness. These considerations can also pertain to the increased status and the validation of architecture and urban spaces to the "heritage" status.
In order to understand the Neustadt and its reception, we have chosen to proceed to the analysis of discourses about the site - and particularly a selection of buildings of the district – found in written sources. For example the building files of the Archives of Strasbourg, the Histories of Strasbourg, travel guides and travel pieces, architectural and urban planning reviews, interviews and public-opinion polls.
The content of historical sources, put in perspective with the observation of the ornaments and the architecture and urban spaces, allows reconstituting the intentions at the origin of the realisations of the Neustadt - the way(s) the primary contractor and the architects apprehended and orientated the interpretation of the public - and the reception at the time. The survey (Dahm 2012) [2] allows finding and analysing empirical knowledge on the basis of social and cultural representations.
The analysis of the discourses further allows for the evaluation of the parallels and distances between the intentions of the primary contractors and the builders, how those took shape materially, and the visions of the public, according to their historical, ideological, cultural and social background.
Within the framework of our research project the reception is hence considered as the discrepancy between the intentions (the program) of the primary contractors and the architects, their anticipation of the reception, and the real and concrete reception of the realisations in time, embodied in the discourses and the interventions on the buildings.
The theoretical framework of the research is also rooted in the literary approach "*Rezeptionsästhetik*", founded by Hans Robert Jauss (*Literaturgeschichte als Provokation der Literaturwissenschaft*, 1967) [3] and further developed by Wolfgang Iser (*Der Akt des Lesen*, 1976) [4]. This approach engages the cognitive and emotional perception of art - including architecture. From a literary perspective, the concept constitutes a change in paradigm of the reading of literary works, placing the reader at the heart of the production of the work.
The study of reception also includes a sociological and hermeneutic perspective, which aims to question the general approaches applied for the study of architecture, mainly relying on restricted analysis of techniques and practices in the field. The approach, which we present here, encompasses the interpretation of works and discourses, including their immediate understanding, their appropriation in history, and the effects that the interpretations have on the works themselves.

4. Context of the research: cross-disciplinary approach

As exposed in the introduction and the first chapter of this article, our research concentrates on the Neustadt of Strasbourg which constitutes a considerable and well preserved part of the architecture on the upper-Rhine that emerged between 1850 and 1950. Our goal is to combine the analysis of historical and contemporary texts and discourses in order to understand what kind of representations and values have been attributed to the Neustadt from the second half of the 19th century until today and how these representations changed and developed in the course of the 20th century.
Both approaches function for themselves with their respective methods and theoretical frameworks. When crossing the two perspectives we need to redefine the methodological framework towards an interdisciplinary and comparative approach. In order to combine the two approaches we will briefly expose their inherent particularities in the next two chapters.

4.1 Cultural historical perspective

In the framework of the cultural historical approach the perception of the Neustadt will be explored from the end of the 19th century until today while considering possible links and bonds that exist with the perception of the old town, the so-called "*Grande-Île*" – a UNESCO World Heritage since 1988. Eventually the construction of today's heritage site and the identification of its cultural, historic and social values are in the centre of the investigations. The images and representations that were created in France and in Germany concerning the urban extension of Strasbourg contributed – throughout the course of the 20th century – to the perception of values attributed to the heritage of this district. The main interest of the historical approach lies in the consideration of the mechanisms of the construction

of heritage from the end of the 19th century until today – when images were shaped and unshaped in the border region of Alsace-Lorraine.
In order to analyse the developments and processes that contributed to the creation of representations, text sources of different kinds and from certain periods will be analysed. One major aspect is the reception of the urban extension project by specialists in the field of architecture and urban planning. These considerations and statements can be found in specialised French and German magazines like *Deutsche Bauzeitung*, *Zentralblatt der Bauverwaltung* and *L'Architecture,* which were created at the end of the 19th century – at a time when the Neustadt had already been constructed. But also the daily press of that time reveals interesting insights into the topic and the reception on behalf of the public. Other crucial sources are the publications *Histories of Strasbourg* and books dealing with the architecture and urban spaces of the city. In addition, travel texts of local personalities such as Louis-Eugène Seinguerlet [5] but also known writers such as Gérard de Nerval [6] and Victor Hugo constitute a relevant source of information. Moreover French and German tourist guides from different epochs reveal crucial facts about how the imperial district of Strasbourg has been perceived. The guides we have consulted are *Baedeker*, *Joanne* – current *Guide Bleu* - and *Conty*. Eventually, discourses of historical monuments can be found in the archives. Those texts represent a corpus which is at the center of the cultural-historical approach.

4.2 Sociolinguistic perspective

Within the scope of the sociolinguistic approach, the analysis of a sample population's social representations of the former imperial district of Strasbourg will be in the centre of the investigation. The concept of social representations is an epistemological option so as to apprehend the reception of the quarter. The way in which it is used in our research should help us to understand the collective and individual perception of the participants of our survey towards the Neustadt.
This concept has its origins in the fields of sociology and social psychology and goes back to Emil Durkheim who, by the end of the 19th century, marked the notion of "collective ideation" (Schmaus 1994: 183) [7]. Durkheim thought that the process of the creation of representations is a collective one and therefore a social experience [8]. Furthermore, he developed the concept of "social morphology" in order to explain the material form of social phenomena. In this way, Durkheim emphasized the importance of the consideration of material substance when investigating and analysing the social world. Seen from this perspective, any kind of built architecture is considered a manifestation and a result of social products and exchanges (cf. Schroer 2009: 21) [9].
Further developed and re-thought by the social psychologist Serge Moscovici [10] in the 1960s, the concept of social representations made its way through other fields in the humanities. In the study of the Neustadt, we will eventually combine - in the form of a triangulation - a social psychological perspective with a linguistic perspective of the concept of social representations.
According to Bernard Py [11], whose concept represents a rather linguistic perspective of social representations, representations are created during a conversation. They are mentioned and then they arise and are modified. Therefore, the analysis of discourse material seems to be an adequate way in order to identify and to investigate pertinent elements which are associated with the German quarter of Strasbourg.
Social representations can appear in different forms and sometimes are analysed in an isolated way. They can, for example, take the form of a stereotype ("cette architecture marque bien le style allemand qui est fort et bien carré"), an opinion ("monumentale, et puis il me fait plutôt peur son architecture") or an informative element ("je le vous disais, ce n'est pas allemand, c'est l'architecture d'une époque répandue dans toute l'Europe centrale qui a moins existé en France"). These elements have in common, that they all refer to the respective object and therefore to reality (cf. Jodelet 1989: 53) [12].
Apart from the material collected in the context of the historical approach, we dispose of another text corpus which consists of transcribed interviews. Those texts are the results of a survey which we conducted in the Neustadt in 2012 during the course of a sociolinguistic study (Dahm 2012) [2].
In the context of the sociolinguistic approach, and contrary to the historical approach, we analyse discourse material which is contemporary and not historical. It arises from interviews which we conducted with inhabitants of the city of Strasbourg and therefore reflects the current (2012) reception of the passersby. Until now, we have at our disposal the transcriptions of 80 short interviews (with a length of two to seven minutes). In the near future, the corpus will be enlarged with 8 to 10 semi-directive in-depth interviews and the methodological structure is currently being changed and improved. The research design of the 2012 survey, which was marked by a hypothetic – deductive approach, will be revised in favour of a more empirical-inductive proceeding in order to construct new hypotheses out of the collected material.
The four questions asked during the study focussed on the identification of the elements in the district that are perceived as being German. Furthermore the qualities that people associate with the Neustadt were made an issue. The reception of one of three concrete buildings (*Palais du Rhin*, *Palais*

des Fetes and *Bains Municipaux*) was the theme of the third question. What the participants thought about the fact that an apparently German architecture (constructed during the German administration) might be labelled as a French UNESCO heritage was asked in the fourth question.
The aim of the sociolinguistic approach is to analyse the content of these and more interviews in order to categorise and interpret them. In the course of a discourse analysis we'll try to identify the social representations which reside in the material: How are these representations structured? How are they distributed? Are they dynamic and do they differ a lot from each other or are they rather consolidated and recurring?
Social representations, as Denise Jodelet [12] points out, often belong to and are joined to cultural, ideological and other bigger systems, not least to the current scientific knowledge of a specific field. She further highlights that certain institutions and authorities as well as communication networks play a very important part in their creation, stabilisation and manipulation (cf. Jodelet 1989: 52) [12]. If we think for example of the role accorded to the touristic guides of Strasbourg, it becomes evident in what way they might have influenced the process of stabilisation and distribution of certain social representations of the Neustadt.

5. Combination of the two approaches

When we brought together our findings we were very interested in comparing the outcomes and in detecting and identifying the first tendencies that would arise out of the analysis. Therefore, we concentrated on our discourses that deal with three public buildings in the Neustadt: the Emperor's Palace (*Palais du Rhin*), the former singer house (today *Palais des Fêtes*) and the City Baths (Bains *Municipaux*). We started to detect and to collect discourse material (empirical and historical) that deals with these three buildings.
After a first content analysis we could carve out certain tendencies in the reception that seem to be valid and significant for the historical as well as the empirical material. In combining the historical with the sociolinguistic approach we are able to analyze the reception of the Neustadt throughout a specific period of time and from different points of view. Moreover this comparative method allows a very profound view on our data since we can try to reconstruct the development of certain representations from the past till today. What people think of the quarter, of a certain building and its architecture, can be compared to what the public or subjective point of view was like, for example, before the Second World War.
At the very least the comparative approach enables us to examine the deviation that exists between the intended force and effect wanted by the constructors and the actual reception of the quarter by the public.

6. Representations of the Neustadt: first tendencies

We will now have a look at some discourse extracts from the historical material and from the interviews. After a first analysis of the text material – in which we focused on the reception, opinions, beliefs and attitudes concerning the three buildings (*Palais du Rhin* – Emperor's Palace -, *Bains Municipaux* – City Baths -, *Palais des Fêtes*) – three pertinent tendencies have emerged out of the discourses. Due to article size restrictions we will concentrate mainly on one building: the Emperor's Palace.
At first we came across, what we call, the "**monumental character**" of the Neustadt and its architecture. This trend shows up, often with a kind of ferocity from the end of the 19th century until today. Starting from the intentions of the builders, the *Kaiserplatz* was realized as a symbol of German modernity and excellence within the framework of nation construction in Europe. The massiveness of the institutional realizations was aimed to impress, in order to establish the new sovereignty. After the Second World War, when the animosity between France and Germany was at its height, Paul Ahne wrote in *Strasbourg 1850-1950, métamorphoses et développement* published in 1959 : "Quant au fameux Palais du Rhin, construit un des premiers en 1886 pour l'Empereur Guillaume Ier, c'est un parfait exemple de démesure, d'un effet déplorable (…)" (p. 29) [13]. The impression of the Palace as a perfect example of exorbitance and immoderateness is not only resented by locals. Some decades later, in 1981, Annemaria Giusti asserted in her book entitled *Strasbourg*: "Le palais du Rhin se distingue par sa construction énorme et imposante sur la place de la République, et s'inspire des édifices berlinois de style néo-Renaissance." (p. 58) and, by referring to the constructions in Berlin, stressed the "triumphal" hallmark of the building (p. 62) [14].
When we look at the answers given during the interviews (Dahm 2012) that we conducted in front of the former Emperor's Palace, the association of this building with a monumental character turned out to be crucial [2]. To the question: "Please describe the building in front of us. What are the words, the adjectives that come to your mind when you look at it?" the participants gave diverse answers. Alongside positive statements like "beautiful […] historical", "c'est un beau bâtiment" and "ça fait toujours un peu rêver […] ça fait travailler l'imagination", the answers were predominantly connoted

with a rather negative impression which seems to be associated with a monumental and imposing character: “massif et un peu pompeux”, “imposant […] une architecture assez particulière”, “son architecture me fait plutôt peur, elle me rappelle une mauvaise époque de l’Allemagne”, “on sent que quelqu’un veut imposer”, “impérial, monumental”, “monumental […] relativement esthétique”, “[…] on arrive à voir [….] la rigidité de l’esprit allemand et ça traduit bien les caractéristiques de, comment dire, de simplicité, d’efficacité”, “une architecture qui dégageait de la puissance et de la prestance […] c’est le témoin d’une époque” [2]. Those statements reflect the participants’ attitudes and representations towards the former Emperor’s Palace. Words like “imposing”, “heavy”, “massive”, “powerful” and “impressive” reflect what we refer to as the monumental character. The prodigious hallmark mentioned in these cases is very often attached to the “German style”.

Concerning the second trend, that we could carve out and that we call the “**German character**” of the Neustadt, we found interesting material, too. In 1987, Théodore Rieger and Georges Foessel wrote in their book *Strasbourg, Deux mille ans d’art et d’histoire*, that the Emperor’s Palace was marked with Bismarckian pride (“tout hérissé d'orgueil bismarckien”), referring to the building as the "Elephantenhaus" (p. 74), which was the term coined by Wilhelm II at the end of the 19th century [15]. Robert Durand de Bousingen, in the book *Strasbourg, urbanisme et architecture des origines à nos jours* published in 1996 mentions an “imposing germanity” and a “foreshortening of the German history” (p. 242) [16].

Similar tendencies, the excess and heaviness, can be recognized when we have a closer look at the discourses extracted from the interviews. When we analyse the interviews conducted in front of the Emperor’s Palace (Dahm 2012) we can see that the participants of the survey partly associate the architecture of the building with a “German character”: “c’est un peu lourd je trouve, mais voilà, c’est allemand”, “on arrive à voir [….] la rigidité de l’esprit allemand et ça traduit bien les caractéristiques de comment dire, de simplicité, d’efficacité”, “chargé d’histoire quand même […] ça symbolise un peu le lien franco-allemand”, “c’est de l’architecture allemande, donc les cariatides, pierre de taille, les sculptures de force, les colonnes” [2]. The building radiates a kind of massiveness and ponderosity as we can learn from the answers. One of the participants thinks of the notions rigidity, simplicity and effectiveness when looking at the facade. At the same time he associates those words with what he calls the “German spirit”. Moreover, sculptures that radiate strength, columns and caryatids are named in order to describe the German character.

The German character as well as the monumental character seems to have in common that they activate similar reactions on the part of the interviewed persons. The fact that the palace radiates some kind of heaviness for the participants seems to be closely connected to the fact that the architecture had been built under German administration (“c’est un peu lourd je trouve, mais voilà, c’est allemand”). The fact that the building is charged with history is mentioned, too. Therefore the former Emperor’s Palace seems for one of our participants to emblematize a kind of French-German bond (“chargé d’histoire quand même […] ça symbolise un peu le lien franco-allemand”). Interestingly, the Palace seems also to have kept its primary symbolic power – as the political centre of the German administration in Strasbourg – since a participant of our survey mentions that the architecture lacks in some kind of facileness and therefore appears imposing: “ça manque de légèreté […] on sent que quelqu’un veut imposer”. The aura of the building is described as being imposing. For one participant the building radiates something angst-inducing: “son architecture me fait plutôt peur, elle me rappelle une mauvaise époque de l’Allemagne”. This very last citation, as others too, reveals the fact that the architecture is often brought in connexion to the French-German history. But often, as other results of our survey show, the participants are not able to contextualize the origination of the Neustadt correctly. During the time of the German Empire – when the Germans made Strasbourg their showcase in a westward direction – the French-German relations were other than after the Second World War. The latter seems however to have a strong impact on the reception of the architecture which has already been constructed by the end of the 19th century, namely the Wilhelminian style. The brutal history has, as we can see, left its marks on the perception of the architecture.

The third tendency we could deduce out of the discourse material – and which seems to be valid for both the historical material and the interviews – is what we named the **“criticism of the eclectic architecture”.** This trend becomes obvious in the historical texts written by architects and professionals, particularly until the 1970s and 1980s. Before that time, experts and researchers in architecture and urban planning rather despised the eclectic character of the architecture in the Neustadt. Recently, and especially within the framework of the elaboration of the application of the Neustadt for the inscription on the World Heritage List, the historical and heritage value of the entire district is being better documented and highlighted. In his book untitled *Strasbourg du passé au présent*, Philippe Dollinger refers to the Emperor’s Palace in 1962 as being a Neo-Florentine pastiche : “un lourd pastiche néo-florentin, dépourvu de tout attrait et rendu massif encore par la surcharge de la décoration” (p.65) [17]. In the author’s words the massif and surcharged building is lacking any kind of appeal and impulsion.

Some decades later, in 1996, Robert Durand de Bousingen, in the book *Strasbourg, urbanisme et architecture des origines à nos jours* acknowledged the heaviness of the building conveyed by the historical style, asserting that the Emperor's Palace represents a successful application of historism architecture: "son imposant avant-corps, son dôme et sa décoration ostentatoire, le palais impérial n'est certes pas un modèle de légèreté, mais un bel exercice de style éclectique teinté d'influences florentines et antiques." (p. 242) [16].
Not only experts recognise the eclectic aspect of the Neustadt. The juxtaposition of different architectural styles also strikes the interviewed passersby of our survey: "ben, ça s'inscrit dans l'architecture en vogue à cette époque alors il y a certains bâtiments qui sont de style néo, par exemple l'immeuble à Gallia c'est néo-renaissance allemande, d'autres sont néo-gothiques", "il est dans le style typique historiciste de cette période que l'on trouve en gros de Strasbourg et au bout de l'Europe centrale", "il y a une architecture typique de la période allemande du début du XXème" [2]. Different architectural styles like neo-renaissance, neo-gothic and historism – typical of the first construction period of the Neustadt – are mentioned. One person recognizes that the style of historism can be found in other parts of central Europe. The contextualization of this urban site and its eclectic architecture however is not clear without ambiguity: "Pour moi ils ne sont pas très allemand [les bâtiments], il y a quelque chose bien plus allemand que ça, pour moi ça reste français". In a way this statement reveals the eclectic character of the architecture. On the one hand the architecture of the Emperor's Palace consists of eclectic elements. On the other hand, the reception of the building on behalf of different people has an eclectic character as well since some of our participants define what they see as German, others as French architecture. However, the existence of different architectural styles next to each other seems not to be inconvenient for the participants of our research since they do not evaluate this fact as something negative or un-aesthetic. The complex character of the Neustadt recognized by our participants becomes clearer when we also consult the results of the sample of interviews that we conducted in front of the *Palais des Fêtes*, the former singer house: "les constructions sont un petit peu massives, mais finalement […] c'est très proche des immeubles haussmanniens de Paris qui n'ont rien à voir avec le quartier allemand". In this citation the person clearly separates the architecture around the singer house from German architecture since he sees a close connexion and similarity to buildings in Paris. Contrary to his point of view, another person sees a similarity to the buildings which were constructed around the Emperor Palace. In this context, terms like "massive", "imposing" and "solid" are named: "l'architecture est proche avec celle qu'on peut trouver vers la Place de la République […], massif, imposant, solide et espacé". As eclectic as the architecture of the Neustadt may be defined by experts, its reception by the passersby seems to be equally eclectic and diverse.

7. Further research for the future

Now that we have started our project, we will have to go further with the analysis. We will have to look for more text fragments that reveal information about the reception of the three buildings in question. Since the scope of our historical sources is vast (literary texts, tourist guides, architecture magazines from the turn of the century) we will need some more time to filter the pertinent elements out of the texts. In our next step we'll have to continue to enrich our database with this material that we'll have to classify.
In order to enlarge the empirical material we will conduct a new survey. About ten in-depths interviews with chosen contemporary witnesses – who lived in Strasbourg in the 1940s, the 1950s, the 1960s and the 1970s – will be prepared in the next few months. After the transcription of the semi-directive interviews, in which we will place impulses and keywords in order to trigger positioning on the part of the participants, we will continue a content analysis to find out more about the structure of the social representations associated with the former imperial quarter of Strasbourg. Furthermore we'll have to define and specify the theoretical and methodological framework in order to allow a fruitful content analysis.
Since representations may appear in the form of stereotypes, attitudes, opinions and informative elements, we'll try to classify the diverse declarations. We will also have a closer look at the differences of the variable and the stable characters of the cultural and social representations and try to establish a kind of map that gives us an overview of the solid and widespread, as well as the more flexible representations of the Neustadt.
Using an inductive approach analyzing the discourse material we will try to create more hypotheses directly out of the material in order to test them and to adjust them with the historical material in the comparative approach.

8. Conclusion

In this paper we introduced the first tendencies of our research project aiming at identifying and analyzing the cultural and social representations associated with the Neustadt of Strasbourg all along the 20th century. The results allow stressing the importance of intangible material, which is the result of

the reception of architecture, in the process of building and heritage construction. The cross-disciplinary approach allows for the consideration of the dynamic character of social and cultural values and helps to overstep the restrictive description of buildings rooted in artistic considerations.
The tendencies that we could find in the historical texts reflect in a certain way the social representations of the participants interviewed today. We targeted certain continuities in the creation and the structure of the social and cultural representations associated with the former "Imperial district" of Strasbourg: a monumental character, a German character and a criticism of eclectic the architecture.
Nonetheless, the data analyzed in the present article is not sufficient and representative to describe the reception of the overall quarter. The results conveyed do only concern the most emblematic building of the imperial program - namely the Emperor's Palace - and cannot be extended to the entire Neustadt, especially as the vast surface of the district does encompass a wide range of architectural styles and a moving urban planning scheme. Moreover, we are still at the beginning of our research project and we need to adjust our methods and theories.
While further research concerning cultural and social representations linked with other buildings of the Neustadt will help to detect the values recognized for the urban ensemble, and to understand how those values were ranked at the "heritage" status, the social representations associated with the Neustadt might help to gain a better insight of the current reception of the entire district. Since in the next interview series which we are preparing for we will not focus on one specific building, but try to capture the representations of the entire district, we might get a better picture of the reception of the Neustadt as an urban ensemble.

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FROM THE CONCEPT TO AN ENVIRONMENTAL DESIGN OF GAUDÍ: THE BATLLÓ HOUSE

Leonardo BOGANINI,[1] Lidia PRADICELLI[2]
(1) University of Florence, ABITA research center San Niccolò 93,Firenze 50100, Italy; SUN, PhD in History and Technology oh architecture and Environment, XXV cycle, Aversa (Caserta), Italia
Leonardo.boganini@unifi.it
(2) SUN, PhD in History and Technology oh architecture and Environment, XXV cycle, Aversa (Caserta), Italia
Lidia.padricelli@unina2.it / lidia.pad@libero.it

Abstract
Declared World Heritage cultural property in 2005 by the UNESCO, House Batlló is considered one of the most poetics and decorative works of the Catalan artist Antoni Gaudí. The refurbishment of the house, realized since 1904 to 1906, is based on: the widening of the internal patio, a new façade at first and second floor, the design of the roof and the functional distribution of the residential space.
In the unique design of the House we can identify some principles of modern buildings refurbishment: it's interesting how Gaudí achieve comfort performances through the application of these building technologies, aimed to reduce overheating in summer period. The cladding "trencadìs" gives a specific aesthetic language to the building and contributes also to improve thermal mass and reflectance of the envelope. The distribution of flat around the indoor courtyard and new design of windows (both road and inside façade) develops a passive system of ventilation. This approach, which can be assimilated to the modern "environmental design", contributes to improve the energetic efficiency and indoor comfort. This study wants to improve the connection between the "technical intuition", expressed by Gaudí in his historic contest within the refurbishment of Batlló House, and our modern approach, through the technic and legislation on energy retrofitting. This research leads to a thought of the Catalan architect that is as much deep as synthetic: "La originalidad consiste en volver al origen, y este origen es la Naturaleza como creación divina"[1].
Keywords: environmental design, bioclimatic architecture, Antoni Gaudí, trencadìs, free cooling.

1. The main project: the Batlló House

House Batlló, located in the *Passeig de Gràcia 43* in Barcelona, was declared as a UNESCO World Heritage Site in 2005, and its listed on the treasures of Barcelona by IBOCC, the International Bureau of Cultural Capitals, in 2008.
The urban context was designed by the engineer Ildefons Cerdà and approved in 1859 by the Spanish Ministry of Development. Cerdà draws up a topographic plan to develops this new area, the *Eixample*, purpose-built to host the middle class, moving from the oldest area of the city, the *Barri Gótic*, after the demolition of the walls in 1854. The peculiarity of Cerdà's project was the planimetric organization, composed by octagonal districts, where all the buildings were designed with a depth of 28 metres and two façades: one on the street and the other in the inner courtyard of the block. The shape of streets and the positions of buildings creates a particular microclimatic conditions in relationship with the wind and the different orientation of buildings and façades.
Antoni Gaudí was commissioned, in 1904, to modernise the apartment block owned by the textile industrialist Josep Batlló i Casanovas. Gaudí starts from a simple redistribution of spaces, to created one of his most complete, inspired and poetic, artistic compositions. Particularly the renovation is realized by the enlarging of the interior courtyard of the house, the demolition and rebuilt of lower level, up to the first floor, the adding of two more floors, the crowning of the roof and the re-design of the external walls, with a wavy shape that gives to the house an original and fantastical façade. (Fig. 1-2).

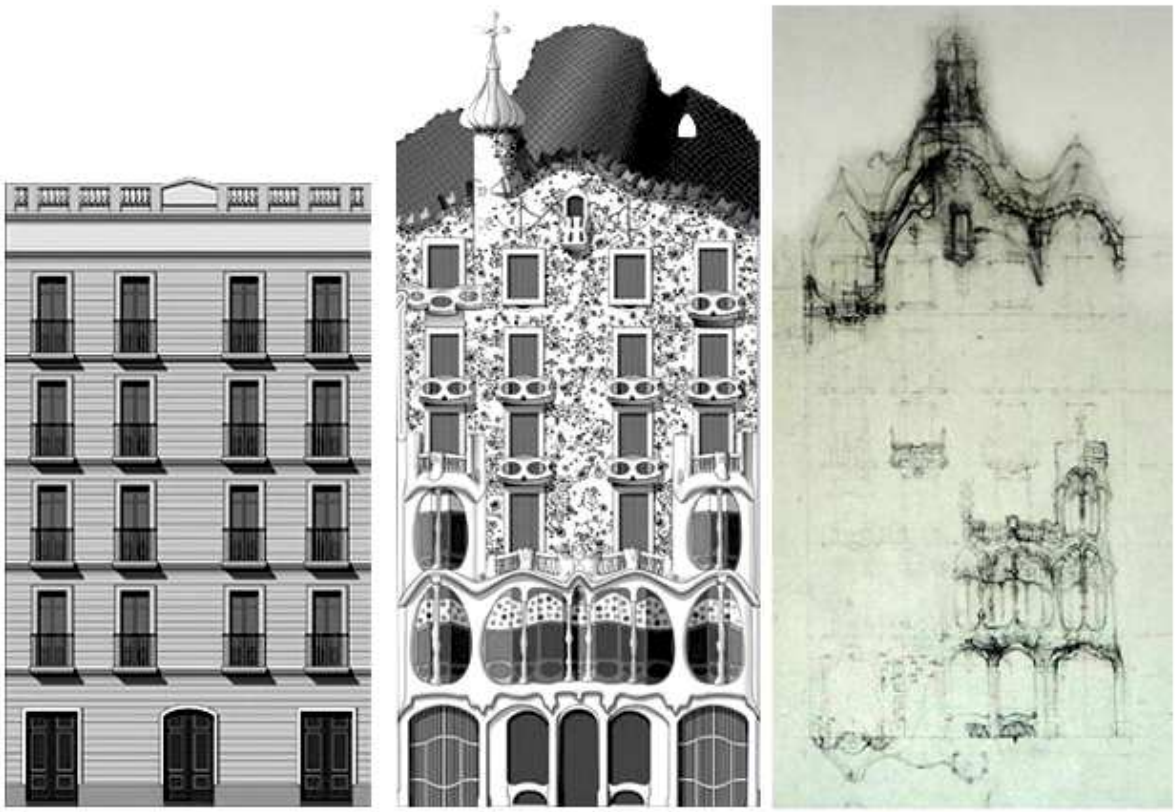


Fig. 1: Façade of the House Batlló before and after the refurbishment of Gaudí, and sketch of elevation for the building remodeling 1904-1905.

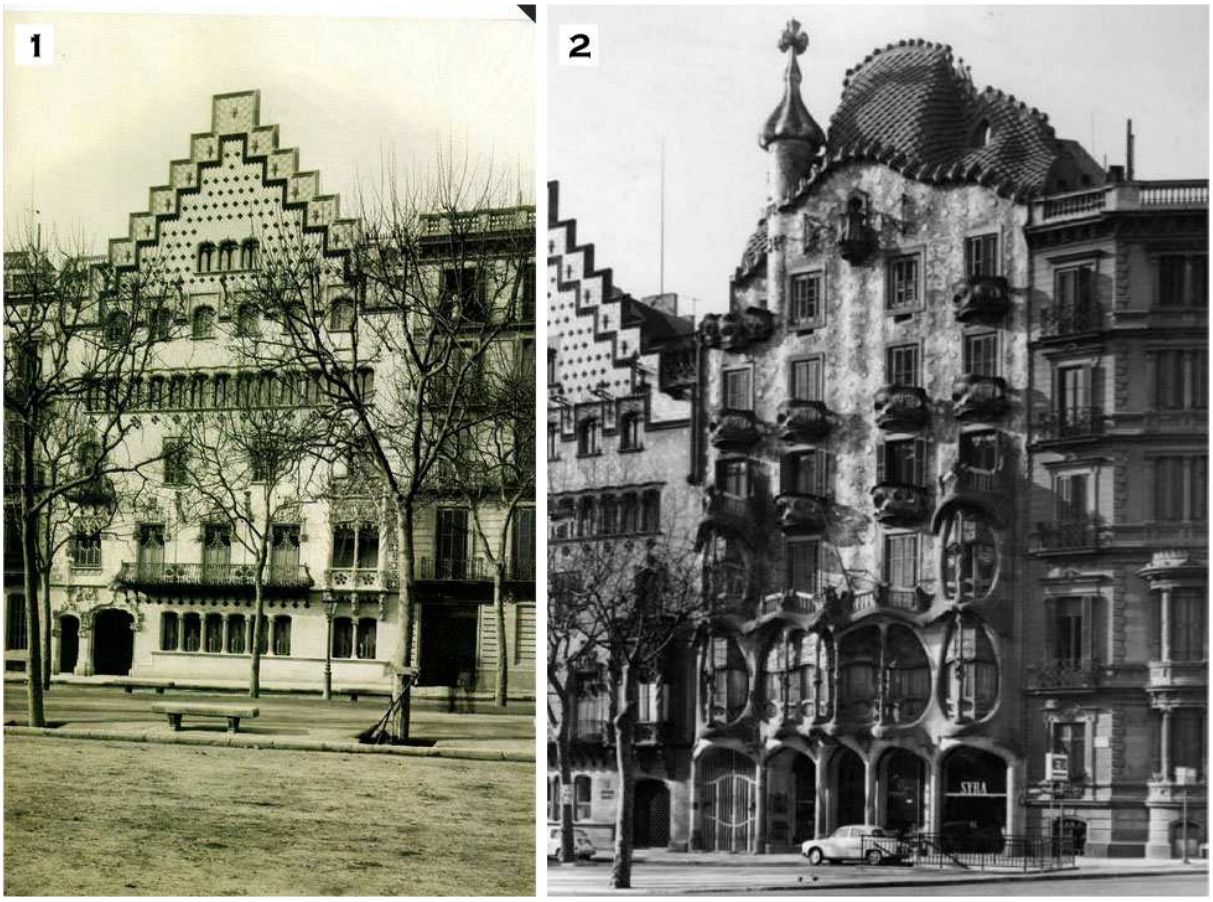


Fig. 2: 1- Photo of the House Amatller. To the right there is a part of the House Batlló before the work of Gaudí. 2- Photo of Batlló House, 1906.

The Gaudí's work is not the only example in the prodigious plan designed by Cerdà: in this area there are uniques works of architect-engineers such as Lluis Muncunill, Joosep Puig i Cadafalch and Lluis Domènec i Montaner. The works of these masters, real gesamtkunstwerke, are distinguished, as well as a refined decoration, in line with the other contemporary architects like Guimard, Horta, Sullivan and Wagner, for an all-out experimentation that leads to innovative technological solutions, both in the details of decoration and finishing that in the structures.
In Batlló House is possible identify a plus-value that derive by Gaudí capacity to go beyond the simple decorative language with his a practiced eye. Every stylistic choice (from the design to the internal organization of flats, to the decorative elements) shows his sensitivity using passive systems to achieve indoor comfort for Mediterranean climates. In many works of Gaudí is frequent find refined regulation systems of solar radiation and the use both natural lighting and ventilation: all those principles are now defined by the European and national regulation.
The specific study of plans and sections of his projects identifies a common scheme, where the spaces are enlightened correctly to satisfy the indoor comfort of users. In Batllò House is possible find this organizing principle in the central common courtyard (visible especially in the sections) that is similar to the traditional style of the Mediterranean "casa con patio" (Fig. 3).

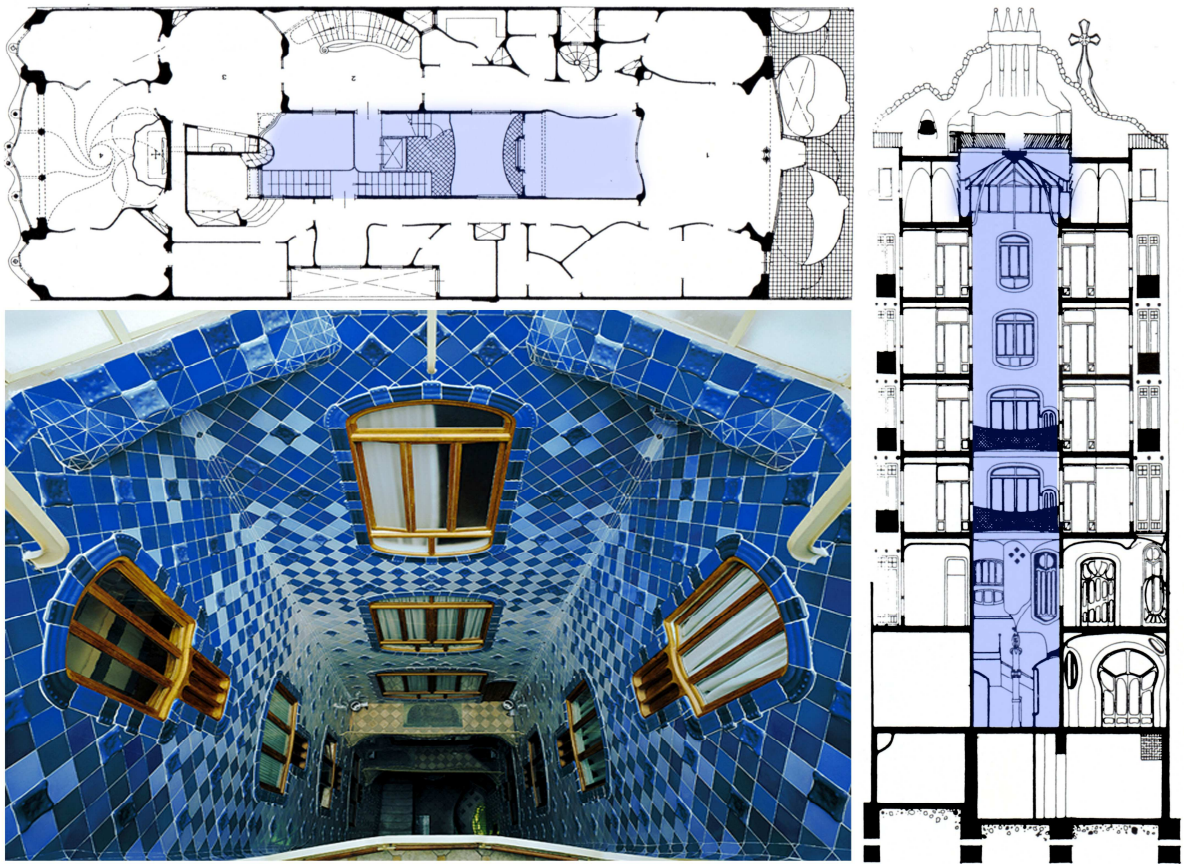


Fig. 3. Batlló House. Plan of the principal floor and transverse section through rebuilt stairwell with the color blue is shown the patio, also in part visible in the photo.

To fully understand this design approach it is important to outline some essential climate information, about the house Batlló and his position for appreciate the innovative technical solutions adopted by the Catalan architect. The building, as we have already mentioned before, is located in Barcelona, at latitude N 41° 23’ 29,43” – E 2° 09’ 53,39”, in a climatic area B-W (UNE 240445/6).
The weather in Barcelona is characterized by a Mediterranean climate, with wet and temperate winters and hot, humid summers, typical in Catalonia. In winter, temperatures are between 8 and 11 degrees Celsius with a 55% relative humidity (RH); while in summer range is between 23 to 25 degrees and 68% of RH.
After analyzing the technical data about the specific climate of the area we can proceed to examine the important recovery strategies of the Batlló House. In the specific we can be divided into three categories: the use of trencadìs in façade, that improve the energetic behavior, the expansion of

internal staircase, with the enlargement of new windows (indoor and outdoor) and the new concept of top floor (skylight) to create a passive system of ventilation. Is possible find an advance of our energy regulation in those different strategies; UE and Italian regulation, indeed, is based on use of technologies and spaces, to reduce the energy consumption: this approach lead this design in our time, like one of the first examples of energy retrofitting

2. The trencadìs: energetic analysis of the "new" envelope

The trencadìs is one of the most characterization aspects of Batllò architecture: this technique is a type of mosaic realized with ceramic fragments, scrap or by white china cups and plates, joined together through a binder, usually mortar. Full of symbolism in all Gaudí works, the trencadìs becomes an important part of energy performance both envelope and building in agreement with modern regulation.

Indeed the Italian regulation on envelope design solution define the energetic performance through the imposition of U value (transmittance), mass and thermal lag. At the same time it's possible identify a bottom to top approach, that develop different systems of eco-labeling inside the construction market: this increase the diffusion of other indicators, like solar reflectance index (SRI),[1] based on thermal emittance (E) and solar reflectance (R).

In this section we want analyze the Trencadìs through this indicators, to identify the real increase of performance in "new" envelope of Batllò House: to simulate the energetic behavior we use the UNI EN ISO 6946:2008. The energetic simulation are made by Termus-g (ACCA Software) and Calc311 (TermoK8). The SRI share is identified by application of ASTM E1980 - 11 standards, adjusting the insolation value to use in vertical surface.

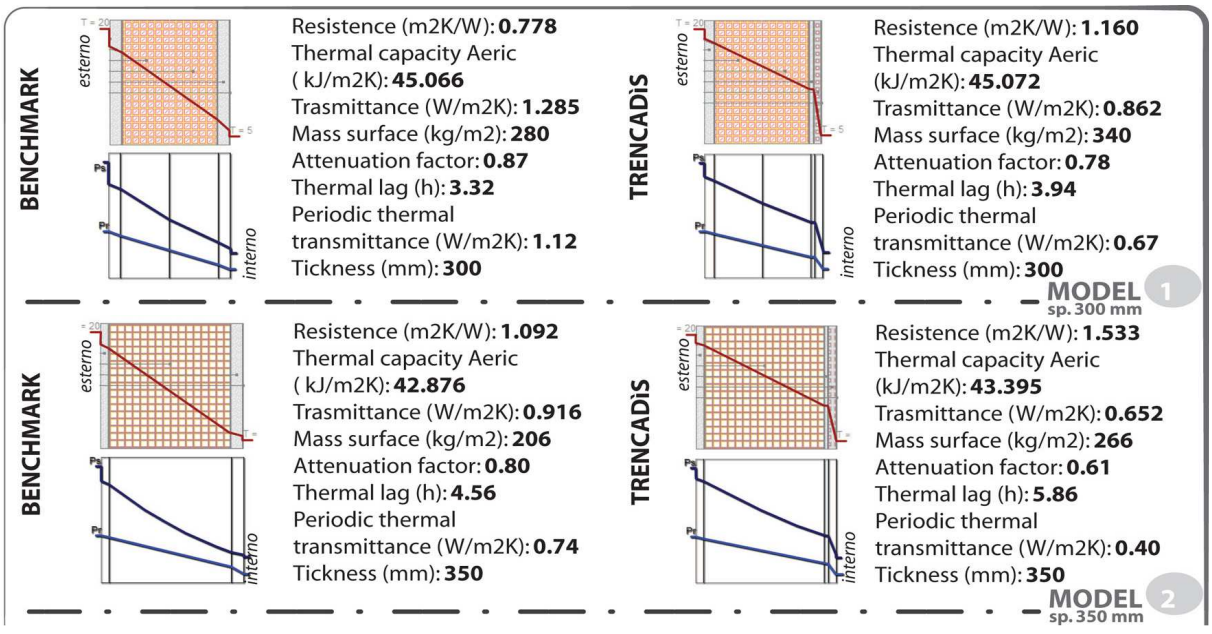
2.1 Performance simulation of wall: transmittance, mass and thermal Lag

In order to identify the improving of envelope we take as benchmark the simple curtain brick wall, plastered on both side: due to movement of wall we use four different thicknesses between 30 and 42 cm. The calculation models of technical solution are based on energetic performance of material defined by specific sector literatures: plaster and curtain brick wall are defined in UNI-TS 11300 standards. The performance of trencadìs layer is identify by the interpolation of data between tiles and plaster, in relationship with the covered percentage in one sqm: this aims to considerate inside the calculation model the real composition of trencadìs. The broken tiles, used to create the mosaic of envelope, are put in place by the use of binders, this create a continuous grid where it is possible identify a performance variation.

Indeed to simulate the performance of trencadìs we adopt this value:

- Tickness: 30 mm (including the system of laying)
- Thermal resistence: 0,46 (sqm*K)/W
- Surface mass: 46 Kg/sqm
- Heat capacity: 900 J/(KW*K)
- Permeability: 3,45 (Kg/msPa)*10^{12}

From this data it's possible define the "trencadìs" layer usable in the calculation model: the simulation aims to compare the thermohygrometric performance of the benchmark with the actual envelope.



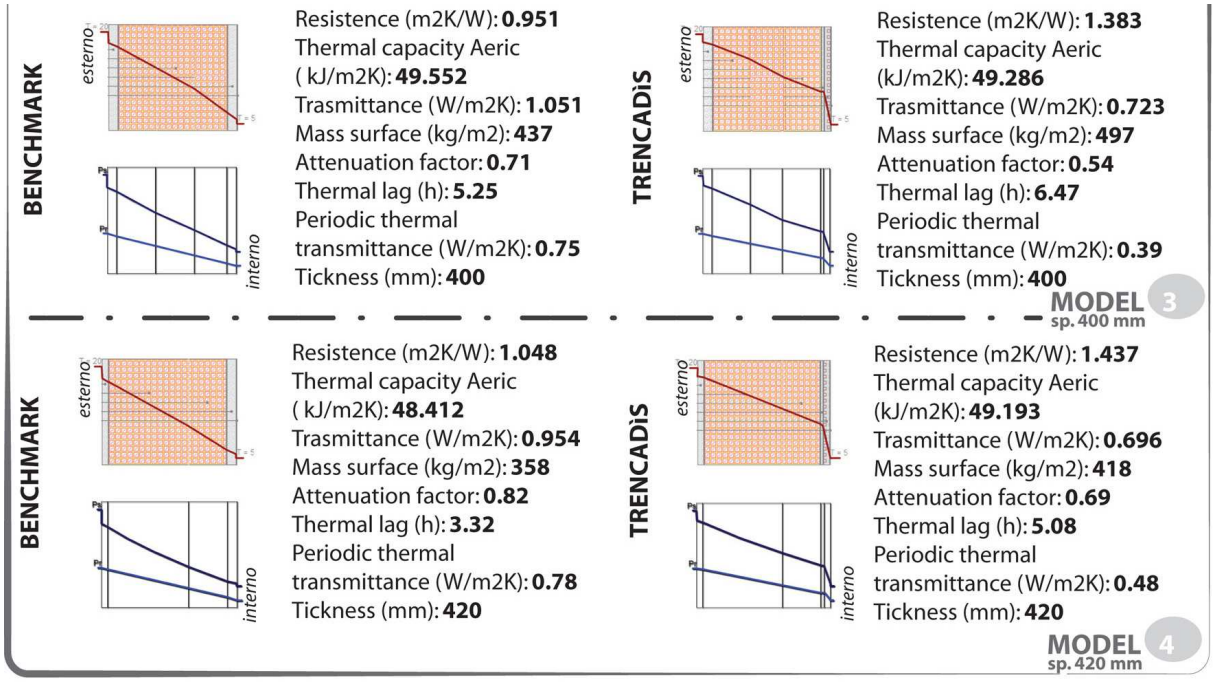


Fig. 4: 1-4 comparison data between plaster curtain brick wall (benchmark) and the "new" envelope of Batllò House (trencadìs): the output data derive from an averages of results of Termus-g and Calc311

The output data define an interesting increase of envelope performance in relationship at his energetic behavior: the first aspects regard the resistance, that increase, on average, by 43%. This define a development of performance mainly in winter season, although it represents the greater improvement, it's also the less interesting value in relationship with the problematic defined by climate condition of Barcelona. The second aspects concerning the performance in summer periods: with the use of trencadìs the thermal lag increase about by 29%, and mass surface by 19%.
In practice, this improves the capacity of building to soften the thermal wave, by shifting the perception of peaks of heat inside: the mass surface reducing the fluctuation of indoor surface temperature, that contributing to comfort. This effects it's also amplified by the nature of the material: the tiles of trencadìs create a cool effects on façade, entirely similar to "cool roof" theory.

2.2 Solar reflectance index (SRI) of trencadìs

The solar reflectance indicates the material's ability to don't assimilate the solar radiation. In urban area indicate also the capacity of building to reduce the local heat-island and, at the same time, improve the envelope energy performance in summer period. The SRI value is a rapport between thermal emittance, the ability of materials to give off absorbed heat, and the solar reflectance (albedo), that makes up the power to ruminate sunlight. It's adopted 100 the comportment of perfect white color and 0 for the black: this performance is subject at the quality of the surface finish.
The Trencadìs SRI it's an important factor to understand the summer behavior of envelope: the tiles indeed have a very high albedo, thanks to reflective finish typical of tiles, but the thermal emittance it's in relationship with the color. Furthermore in this technique the blinder (white) cover a parts of surface and improves the performance.
To identify the real value we have studies one smq of trencadìs to identify the percentage both binder and broken tiles: the binder covered around 30% of surface. It's possible assimilate this parts whit the performance of rough white surface, like plaster.

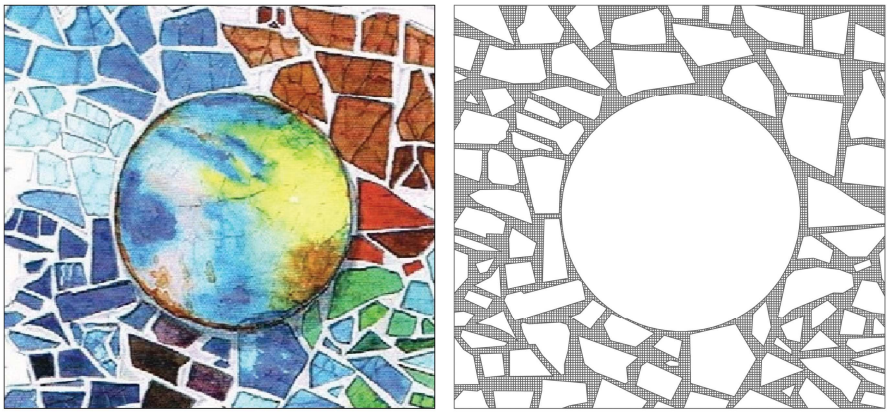


Fig. 5: percentage covered by blinder in the trencadìs of Batllò House façade.

The value adopted are:

- Binder: emittance 0,88; albedo 0,9
- Tiles: 0,60; albedo 0,95

The SRI value of trencadìs is 114: this output, assessed through the LEED and GBC certification, defines a optimal behavior of wall, in relationship with the criteria SS (sustainable site) and the reduction of urban heat-island.

3. Natural ventilation: courtyard, windows and doors

The organic aesthetic of Batllò House goes beyond the decorative view to define both functional and technical aspects: with the refurbishment of the building is created a natural ventilation system, where the design of new elements contribute to achieve the summer indoor comfort.

As seen, Batllò House orientation and the contraposition of façades creates an ideal situation to take advantage from natural cross ventilation. With this aims Gaudí improves all his buildings activities: in the new design of windows (both front and back façade) and internal doors, it's possible identify a manual control mechanism for open/close a ventilation wooden grid, integrated in the frame, that allows to take the fresh air from outside in safety (intrusion, animals, etc..). Those grids permits to regulate the intensity and direction of cross ventilation, and represents a remarkable technological provision by Gaudí. In this first approach it's possible identify an anticipation of two modern concepts: night free cooling and adaptive comfort.

The adaptive model is based on relationship between humans' behavior and the thermal expectations and preferences: today ASHRAE Standard 55-2010 states that the presence of control point wide the range of temperatures tolerated by users.

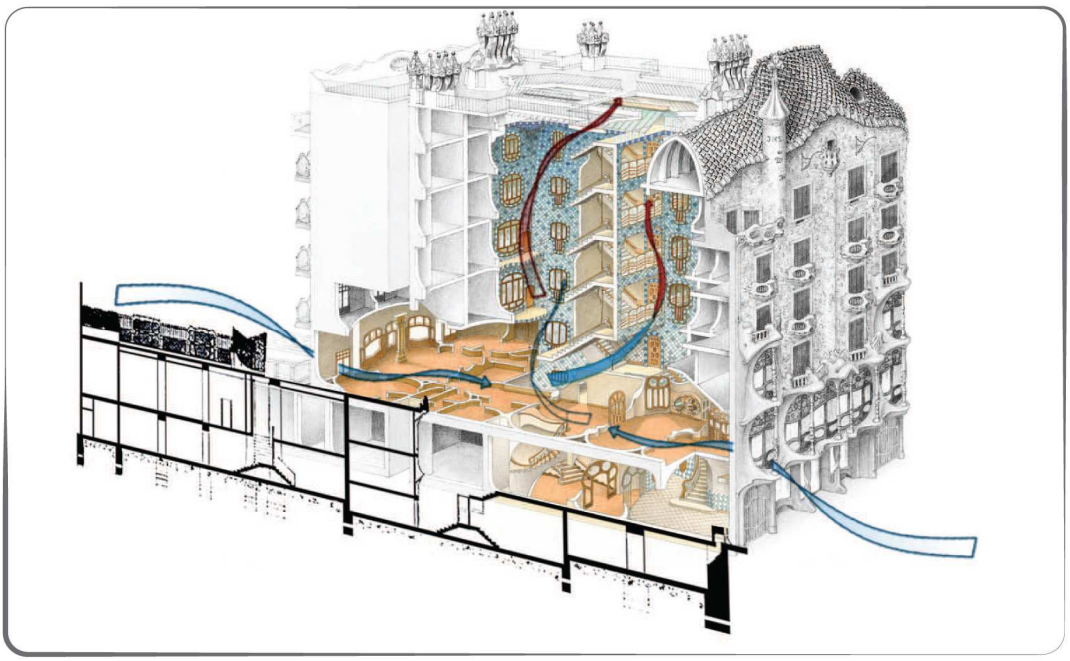


Fig. 6: Batllò Ventilation system: windows, doors and the courtyard create a natural ventilation based on thermoventilation and pressure difference

The ventilation grid is also presents in the internal windows: in this case its used to extract the hot exhaust air from the flats to the courtyard that become the core of ventilation system, where, once time again, it's possible find the mix up of aesthetic and technical of Gaudí's work. In the new courtyard, indeed, Gaudí use the color and material of trencadìs to give the aesthetic of continuum dream journey, but at the same time turn the courtyard in a solar chimney, through the use of dark colors to the top, that increase the local temperature. He uses the summer sun to improve the extraction of hot air from the flats: the high temperature in the top of courtyard expands the air that, lighter, go out from the opening of skylight. At the same time the vacuum created, draws the air below and structured a complete ventilation system jointly with the windows grids and some tubes that cooling the external air (from *Passeig de Gràcia*) through the passage in the basement. This approach is the combination of two variants of natural ventilation: thermo ventilation and pressure difference, both system improve the ventilation generated by sea breezes.

4. Conclusion

In conclusion it's possible classify the refurbishment of Batllò house like one of the first energetic retrofitting in Mediterranean climate: but Gaudí go beyond this, and changes the point of view.
In his design the function and technical aspects are merge with the aesthetic language, transporting the users in a new world. The environmental intuitions, now all coded and regulated, are not perceived as an addition, but parts of the design language: through the use both trencadìs and ventilation, the house become a complete integrated system where is impossible identify singles bioclimatic components, but find a complete and amazing architecture.

[1] Originality consists in returning to the origin, and this origin is nature as God's creation
[2] In the LEED labeling we can identify the use of SRI like indicator in the SS area (sustainable site) in relationship with the inclination of roof: the SRI factor is representative to reduce the urban heat-island effect.

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The reconversion of Italian fortresses through the use of modern tools

Alice PARRI[1], **Laura BENASSI**[2], **Denise LA MONICA**[3], **Eliana SIOTTO**[4], **Marco CALLIERI**[5], **Paolo PINGI**[6], **Roberto SCOPIGNO**[7]
(1) (2) (3) (4) Scuola Normale Superiore, LARTTE, Pisa, Italy
alice.parri@sns.it
laura.benassi@sns.it
d.lamonica@sns.it
(4) (5) (6) (7) CNR, ISTI, VCG Lab Pisa, Italy
eliana.siotto@isti.cnr.it
marco.callieri@isti.cnr.it
paolo.pingi@isti.cnr.it
roberto.scopigno@isti.cnr.it

Abstract
The Italian historic architectural heritage includes a special and widespread category of buildings: the fortresses. Fortresses characterized for centuries the image of many Italian towns and landscapes and their presence modelled their urban or rural settings. Today these military buildings have lost their original function and very often create difficulties in current urban policies, in consideration of their dimensions, their collocation and the high costs for their preservation. As consequence, they are often in critical conditions of conservation and they have been frequently transformed in empty spaces disconnected from the current city life. The better way to protect these huge architectures consists in a long-term planning of sustainable reuse. Obviously these structures cannot be used to fulfill their original military functions and their peculiar architectural features clash sometimes with actual needs. It is necessary to study each structure according to its environmental, social and cultural contest to facilitate its best reconversion. The use of multimedia instruments suggests a method to reach satisfactory results but also it engenders some questions and doubts. The goal of this paper is to analyze the problem of fortresses today and to explain some meaningful cases of reuse in central Italy. Particular attention will be paid to the fortress of Verrucole near Lucca. This is an emblematic case study both for the choices of restoration and new display and for the difficulty to select new functions.

Keywords: fortress, preservation, reuse, 2D and 3D technologies.

1. Section. The reconversion of Italian fortresses: criticalities and examples
Fortresses are a huge architectural historic heritage made up of buildings of different types located in strategic urban and suburban areas. These types of buildings were erected in particular historical contexts and lost their original function after political changes and the transformation of military techniques. The loss of the original function has caused the abandonment and neglect of these buildings. After their abandonment, the military complexes slowly began to decay. This abandonment is a phenomenon which has involved fortresses in different historical periods. Since the nineties the Military State Property Administration has been selling its unused or useless properties [1].
Today these places live the paradox of the perception which the local communities have always had of them. In past times they were inaccessible, militarily top secret, perceived with strong symbolic and identifying values; today they are empty boxes, without a meaning yet still full of appeal.
The emptying of their functions has generated hypotheses regarding the functional reuses of fortresses and military areas in general. These complexes, which are buildings within walls or squares,

are often a combination of open and closed spaces and can generate different processes of urban requalification [2].
Their functional reuse (that is their transformation into buildings with new uses different from the original ones) and the urban or suburban requalification around them subvert their original role: from an inaccessible military area the fortress becomes a place reused for civil purposes acquiring social and cultural functions.
The term “reuse” does not necessarily mean giving economic functions to the historic buildings, but attributing new productive functions which aim at the social development of their context.
In every case it is necessary for the functional reuse plan to be compatible with the historical features of these complexes, to which it is important to attribute functions coherent with general urban planning. It is evident that a historic building cannot be reused on the basis of designs which jeopardize their preservation.
In reuse planning a key factor is the analysis of local needs, which can have residential, cultural and social values. The answer to those needs corresponds to the desire to generate common areas where people can live.
In order to understand the current transformations or what may happen in the near future, it is important to look back to recent past times. After the loss of their original role, many military buildings were reused with various functions. The case-studies are more numerous if we distinguish between the transformations which have involved fortresses located in urban areas and those located in suburban areas.
Suburban fortresses often had harsh destinies, as in many cases they were difficult to reach, difficult to maintain and difficult to reuse. So many of these became henhouses, vegetable gardens, storage rooms, private gardens. Many cases are reported in archival documents. An example is the fortress of Verrucole in Garfagnana near Lucca, which was used as a vegetable garden until 1980, when it was acquired by the Municipality of San Romano in Garfagnana.
Nowadays some of these military areas - abandoned between the XVIII e XIX centuries - have new roles within a more general context, which includes landscape, cultural and historical values.
In the case of fortresses or military buildings located in urban areas, their presence has been sometimes perceived as bulky and as a barrier to urban city planning. It has been difficult to make their reuse compatible with current social and cultural life.
In some cases fortresses were built after the demolition of existing urban fabric. This created discontinuity. The fortresses seem to be integrated perforce within the city conquering areas which today relegate them to a marginal role. After losing their original function, it was difficult for these fortresses to find a new role. A significant case-study is the fortress of Leghorn, a huge historical box which is again in a state of decay as it is difficult to give it a new cultural vocation or a new social connotation.
These empty areas can be filled with new values, new meanings and new activities and can become the object of re-appropriation by local communities. In reuse planning, it is necessary to answer a few questions regarding the functions compatible with these fortresses.
How can historical complexes with such defined and exact features be used? What role can the fortresses have within the local cultural and social fabric? What functions are compatible with their historical features? What forms can the functional reuse have? The answers to these questions are the solutions to some criticalities which arose during the abandonment of these fortresses. It is necessary to understand if an abandoned military box can reply to social and cultural needs, what impact its reuse can have on the city, how much its maintenance cost, what type of management could be applied, what economic resources could it stimulate, etc.
One of the criticalities concerns the size of these complexes, which are huge, and for this reason a lot of money is necessary in order to promote their restoration and functional reuse. Due to the current crisis, the chronicle lack of economic resources does not allow owners (both public and private) to carry out a uniform planning; the interventions are often fragmentary and concern only certain parts of the complexes.
Another criticality is represented by the contemporary additions. In some cases the adaptation to new functions needs integrations or new additions to the existing buildings; as a result architects must have the skills and awareness needed to guarantee the respect of their historical features. In other cases it is possible to requalify without building and give more emphasis to open spaces than to closed ones through the planning of new areas open towards the city. In all cases the requalification of these complexes, carried out traditionally or through the introduction of contemporary features, has to be planned within the general territorial development program and it is necessary to involve public and private resources from the very beginning. Functional reuse should be a common choice, compatible with the peculiarities of the places. Reuse could help new values to emerge by defining a strong liaison with social urban fabric.
The less invasive functions or the functions which requires fewer transformations are usually those with a cultural intent. The adaptation of these empty areas to cultural aims has become widespread,

but such adaptation should be strengthened; on the one hand this is useful, while on the other hand it has generated superficial restoration projects planned by public administrations which want to transform these buildings into cultural boxes at any cost. This planning has resulted in the restoration of these complexes and their transformation into empty boxes filled by occasional cultural events such as exhibitions, shows, conferences, etc,. These occasional uses do not help their enhancement or maintenance. Some historians correctly believe that cultural reuse (in particular museographic reuse) is a non-choice, an easy choice due to the lack of interest in designing concrete functions for historic buildings. Reuse is a social and common practice in order to introduce an empty monument in living urban context and to avoid its transformation into a museum. This kind of use is perhaps the most difficult way of heritage enhancement"[3].
The reuse of abandoned areas must open new opportunities of intervention which can offer to the city new requalified and functioning places, new occasions of enhancement and economic development, an improvement of cultural, environmental, physical and ecological conditions [4].
The choice of a new function and the development of a coherent design are the first steps in order to preserve a huge historical complex. The buildings which are not restored and reused suffer decay, lose their functions and their deep values. The changes in their functions, even if very different from the original ones, allow the building to live again within its context; the reuse must be planned in respect of its history and its historical features and must be "sustainable, autonomous, compatible and recognizable" [5].
The definition of new functions related to these types of buildings requires a study of their transformability features. The starting point is a deepened architectural study in order to highlight the features which need to be respected and enhanced. The data is necessary to create a correct balance between preservation and transformation; it could also be used at different scales in order to promote regenerating processes regarding the buildings and their urban/suburban context. This data can also activate creative processes of enhancement of the same buildings.
The main criticalities about the reclamation of fortresses shown above are three: 1) the size of the buildings and their economic management problems; 2) the way to add new structures to these ancient buildings; 3) the effectiveness of cultural reuse. On the basis of these criticalities we have selected three case studies: the Rocca of Narni (Province of Terni), the Castle of Formigine (Province of Modena) and the Fortress of Verrucole in San Romano in Garfagnana (Province of Lucca).
These examples are evidently without demanding completeness, and they do not wish to express value judgments on the single choices made by the administrations which currently own the buildings. They merely want to compare different typologies of 'cultural' reuse, think about the potential of the fortresses and the identity and peculiarity of their social and topographic environment, show the difficulties involved in a renovation project and generate new questions.
This small selection of buildings is carried out according to certain parameters:

- public property of buildings;
- location in north-central Italy;
- large size;
- historic, architectural and documental interest, but no presence of art collections or decorated rooms of special artistic interest;
- functional recovery plan devised in the last 15 years;
- proposal of using information technology and multimedia instruments with the aim of enhancement and broad fruition.

Each building represents a different way of looking at cultural recycling. In our brief analysis we will speak about the benefits and doubts regarding the use (or not use) of information technology and how the latter can benefit the public, both citizens and customers.
We will begin our analysis starting from the Rocca of Narni, located in Umbria. It is a large fortified site, built in the second half of the 14th century by Cardinal Egidio Albornoz (Fig. 1). It was for years a residential and military building used by popes and cardinals. In 1999 the municipality of Narni, which became the major owner of the building together with the Province of Terni, decided to insert this fortress into a structural and functional restoration project thanks to European Community funding. The size of the building implied great economical responsibility for the public administration; the choice regarding its cultural destination has to take into account urban, economic and social planning.
The financing was used to restore the structure and also to buy several electronic devices (big screens, computers, softwares etc.) – according to some "without any exact and oriented project" - and the purchased material was left for years in the wine cellars of the Rocca [6]. In 2003 the municipality of Narni entrusted the management of the Rocca to the "LightArchitecture" company, which should have carried out certain activities related to promotion, services, planning and organization of exhibitions and events. The "LightArchitecture" is a company which promotes a large use of information technology and the idea of a 'Media building', that is the enhancement of a building as a space in which the future society of information can communicate [7]. The engage of this

company would have been able to transform radically the traditional methods of fruition of the Rocca. However, in 2004, after the inauguration of the fortified site, this company suspended all activities.
In 2012 the municipality gave the management of the building to the 'Rocca of Narni company' which inaugurated within the Rocca a thematic 'Medieval Park' [8]. An imaginary 14th century village was reconstructed and animated by costumed characters which carry out several educational activities or trade typical products. The idea is not original but attracts visitors interested in folkloristic features. The large part of activities are carried out outside the Rocca. The paths regarding to the restoration of the building are located only there. Inside, few rooms house the modern reproductions of some medieval objects: dresses, musical instruments, arms, armors etc. These objects are not explained with any panels. There is not an itinerary to explain the true history of the castle and this kind of exhibition confuses visitors. A large room, equipped with long tables, is rent out for weddings and birthdays (Fig. 2). The Rocca also houses a little shop of false medieval gadgets, a café and an auditorium. In substance, these activities allow the building to live but a question arises: is it enough to requalify a building in a social and cultural manner by offering temporary exhibitions and various other events (planned periodically) or is it necessary to create an enduring exhibition itinerary within the building itself? The Italian experience confirms the incapacity of managing a historic building from an economic point of view if it is only an empty place used for spot-events without a cultural and economic long-term planning [9]. Another question: is it possible to reuse a building only in an evocative sense, through an imaginary thematic reconstruction without historical and architectural in-depth analysis? If it was the case, it would be possible to apply a standard, interchangeable and permanently reproducible model of reuse to all historic buildings and fortresses. Historical, architectural, archeological, anthropological and social studies instead represent the principal feature of diversity and individuality of each building and this cannot be ignored.
The well-known Castle of Formigine near Modena is quite different (Fig. 3). It was restored by the architects V. Vandelli and D. Biondi between 1999 and 2006 and its restoration began with an accurate study of the structure [10]. It was carried out thanks to in-depth historical and archaeological research, metric surveys, chemical and physical analyses of materials, stratigraphy and decay mapping. These structural and archeological studies were carried out by the University of Venice in collaboration with the Universities of Modena, Reggio Emilia and Bologna and thanks to public and private funding. The municipality of Formigine offered most of the financing, but the Emilia-Romagna Region, the Istituto per i Beni Artistici, Culturali e Naturali of the Emilia-Romagna Region, the Province of Modena and the Fondazione Cassa di Risparmio of Modena also gave substantial financial aid.
Thanks to the involvement and coordination of these institutions the architectural restoration was carried out correctly, but in other cases financial problems often prevent restorations from being carried out properly. In the case of Formigine the funding was the result of the collaboration of various authorities interested in taking part in a project of local and national importance. In the preliminary phases of this reuse project serious evaluation of management practices useful for the new function of the castle was done.
The museographic choice was to open the castle to the public and offer various services. The building spaces have been organized to house rooms for the mayor and the city council, this choice links the building to its original institutional function; a restaurant-bar; meeting rooms, space for symposiums and temporary exhibitions; finally, a museum and documentation center (both focused on archaeological findings) and a multimedia and sensorial itinerary created by the 'Studio Azzurro' art center [11].
In the castle there are not art collections or particular decorative features, but thanks to the reuse planning this large and empty space currently represents a good example of preservation and shows how the history of a building can help its enhancement process. In this case the use of multimedia tools is the result of an alternative choice to the traditional museum paths.
The 'Studio Azzurro' work increases the value of the whole recovery plan. It aims at connecting visitors and objects/spaces and creating interactive systems to experience with different perceptual effects. It also allows the interaction between several levels of fruition, both the multimedia fruition (characterized by movies projections, virtual windows, acoustic and perceptual effects etc.) and the classical fruition (characterized by the use of few but significant objects and slim and fluid panels).
In the last 15 years the idea of the sensorial and interactive museum has been applied in our country, but not enough because of its high costs. The goal of this kind of interactive equipment is to captivate the visitor-spectator with its active experimentation and to allow him a large freedom of movement within spaces and narrative itineraries.
As a result the revitalization plan of the castle won the praise the Italian Institute of Castles thanks to the quality of the architectural restoration and the enhancement of public fruitions and functions.
The Emilia-Romagna Region is highly knowledgeable regarding the study and enhancement of fortified sites of its territory and the creation of projects and touristic circuits [12]; it has also supported the development of the Formigine reuse plan and this marks an important point in this venture.

But there's a doubt: how long will this kind of interactive and multimedia applications last? It is necessary to consider the consumption and decline of information technology tools, which require periodical maintenance and updating, the continuous changes of the customer desires, the progress of computer science. Will do these set-ups lose their communicative function? We think they do not. Probably we will wait for their transformation into an 'historical' kind of fruition, at the moment it is one of the most suitable to enhance empty buildings which have lost their original functions (not only fortresses, but also palaces, churches, monasteries etc.).
The last case we will expose is the Fortress of Verrucole in San Romano in Garfagnana, near Lucca (Fig. 4). This fortress was built by Gherardinghi family of Lucca in 11th century and it was transformed into a military garrison by the Este family. After the loss of its military function, the fortress was abandoned at the end of 18th century and it became a private property at the end of the 19th century. In 1985 the fortress was purchased by the municipality of San Romano in Garfagnana, which since 1992 has begun a project of restoration and enhancement funded by public contributions. Before the restoration plan, an archaeological campaign was carried out inside and outside the fortress. A lot of materials were found, they were compared with archival research and used in order to recreate the history of the area [13].
The building was in deep decay and needed significant architectural integrations. The restoration was directed by the Florentine architect GianClaudio Papasogli Tacca and it was carried out step by step with many stops and ongoing changings. The first plan was approved by the Soprintendenza of Lucca, but during the long-lasting works it was transformed due to the lack of funds. As a result the restoration was different from the expectation; some choices are not convincing such as the integrative and 'philological' principles of restoration. In particular, new additions to the fortress are objectionable: a new stone level was added in the Round Stronghold; a new floor was built, new windows were opened and the floor was covered by a circular metallic roof. This intervention has generated new usable areas, but some doubts arise. The original ideas of covering the building with a prismatic glass roof and the use of light materials with a modern design has been abandoned because of the lack of funds. The alternative project of covering the fortress was based on the 'philological' copy of a 16th century design by the Este architect Marcantonio Pasi. Anyway, this historical design is not sufficient to justify scientifically the choice of rebuilding the fortress according to some historical features. The historical design does not have metric references and represents the fortress at an exact and short moment of its life. As a result the current reconstruction is not properly in accordance with the current methodologies of architectural restoration.
During the restoration plan of Verrucole, which was completed only in the summer 2012, the main question was how to reuse the fortress. The municipality of San Romano and the architect Papasogli Tacca decided to transform it into a documentation center regarding castles and fortresses located in ValdiSerchio. The idea was perhaps inspired by the example of Formigine, whose castle has been transformed into a documentation center regarding castles in the territory of Modena.
As a result the museographic set-up of the round stronghold of Verrucole has been divided into two parts. The ground floor houses the description of the history of the fortress and the evocative reconstruction of its spaces (prison, kitchen, bathroom etc.); on the first floor the large round room, completely rebuilt, houses a big table, three computers and six panels with the descriptions of the military art and history of some castles around the fortress of Verrucole (Fig. 5). Initially an auditorium and a documental center were planned, but not realized. Unfortunately, inside the stronghold there are not a library or a bibliographic corpus dedicated to the history of the territory, neither comfortable workspaces for research and consultation. In a room of the castle of Formigine three multimedia chests offer various and diversified information about the building construction, restoration, new set-up, while in the fortress of Verrucole the multimedia information is incomplete and less communicative. Despite of the good-faith of the public administration, the choice of the cultural reuse has been in this case the easier choice and, in this form, the cheaper one.
This choice of cultural function could be efficient only if all the municipalities of the ValdiSerchio will support a common design in order to enhance their fortified sites. In the past this agreement didn't come, we hope it will be reached for the future. Consequently, the fortress of Verrucole is currently a restored and partially set-up building, but empty of its true cultural intents.
Until 2011 the entrance to the fortress was free, while today the municipality of San Romano has introduced a ticket and offer guided tours on appointment. The building does not match the functions for which it was restored. The choice of the documental center also overlaps another choice made by the municipality some years ago, that is to set-up the archeological evidences found in the fortress and currently located in the city library. A local library and a little museum already exist in the urban center of San Romano in Garfagnana; they are more comfortable, accessible and equipped buildings and people prefer usually go there than in the empty inaccessible round stronghold. Thus the documental and museographic intent of the project is losing its value.
Compared with the castle of Formigine, located in the city center, the Fortress of Verrucole is placed on a rocky spur, far from the city and not easily accessible. This is an evident and objective limit to its

exposure and fruition which the municipality has to consider. However, the isolation of the building could become a form of attraction, if the territorial municipalities will elaborate common activities in order to enhance their fortified sites.
Thanks to its incredible naturalistic context, the Fortress of Verrucole could be considered the place of destination, the finish-line and the refreshment area for some sportive activities such as trekking, mountain-bike, excursions, which could engage several castles in ValdiSerchio. Simultaneously inside the Fortress some multimedia equipment could be projected in order to show the connection of the building with the territory and the other castles. A multimedia low-cost proposal, less sophisticated than Formigine's one, but coherent with a possible revitalization plan of Garfagnana territory, is that we are going to display.

2. Section. The fortress of Verrucole as a case-study

The medieval Fortress of Verrucole is isolated from urban center and castled on a hill about 600 meters above sea level. Today this location, which at one time has placed the fortress at the center of the history of Garfagnana, creates the need for more attention during the documentation step and the conception, analysis and implementation of a plan for its use and enhancement. Currently there is a wide range of different technologies that can help during the study activities of the building and the dissemination of results to a broad audience, either experts or common users. For the documentation phase of the Fortress of Verrucole it would be possible to make 2D and 3D acquisitions with photographic device and scanning systems [14]. In particular, the use of three-dimensional technologies would allow to create 3D models in order to document the structural geometry state of conservation and support the restoration plan [15]. Moreover these data combined with architectural and historical information would allow us to show the evolution phases of the fortress through animated virtual environments and narrative models. We would have several ideas to promote this fortress and all aim at creating new thought-provoking systems. The limit is that the restoration of the historic building has already been completed and we could only create a low-cost tool in order to enhance the fortress by keeping in mind the current set-up. Three touch-screens have been placed in the centre of the large room on the second floor and they could be used together with some projectors in order to create a virtual vision of the surrounding territories and castles, which are not visible from the fortress (Fig. 6). The work is meant to represent an alternative to the traditional museum visit by mixing the history of the fortress with history of the surrounding area. The final goal is to provide an interactive system that allows to communicate and visualize the historical contents easily and to complete the information of the panels located within the room around the multimedia station.
In the past centuries the fortress has dominated the valley, the Apuane Alps and the Apennines, and was part of a network of castles and medieval villages of the Garfagnana. Therefore, we designed a 2D digital tool that would allow to re-contextualize the Fortress of Verrucole within the territory and make the history and culture of the place known. We created a panoramic image, which enables the user to view a full 360 degrees the landscape and to get history information (Fig. 7). In particular, a photographic campaign was made in the surrounding area of the fortress. After creating the panoramic by aligning the different images (Fig. 8), it has been integrated with information and historical photographs regarding the Garfagnana's castles visible during a virtual navigation. These data are easily accessible in interactive way and give a direct communication to the visitor (Fig. 9). This digital result could be enriched with multimedia contents by adding music and audio in order to stimulate the different sensory perceptions and also to be an aid tool for knowledge of the cultural heritage by people with disabilities. Obviously the Virtual Tour can be implemented and make available to more levels of detail. Currently, the obtained result is not accessible from the multimedia stations, but the technology used allows the user to access it on the web (http://artesalva.isti.cnr.it/en/virtual-visits-verrucole-garfagnana).

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*The present contribution is partially the result of the ArTeSalVa project activities, promoted by the Scuola Normale Superiore in Pisa and ISTI-CNR in Pisa. The project starts from the observation of the neglect and disuse of historic public buildings and aims at combining archival research and use of new technologies tools in order to create an integrated information base for their reuse and enhancement. The project website is http://artesalva.isti.cnr.it. The Section 1 is elaborated by Alice Parri, Laura Benassi and Denise La Monica; the Section 2 is elaborated by Eliana Siotto, Marco Callieri, Paolo Pingi, Roberto Scopigno.

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Fig. 1: The Rocca of Narni (Province of Terni)



Fig. 2: An interior room of the Rocca of Narni (province of Terni).



Fig. 3: The Castle of Formigine (Province of Modena).



Fig. 4: The Round Stronghold of the Fortress of Verrucole (Province of Lucca).



Fig. 5: The round room of the Fortress of Verrucole (Province of Lucca).



Fig. 6: Screenshot of “Verrucole Virtual Tour”: view a full 360 degrees of the landscape around the fortress and different kind of icons to indicate a presence of historical information or photographs.

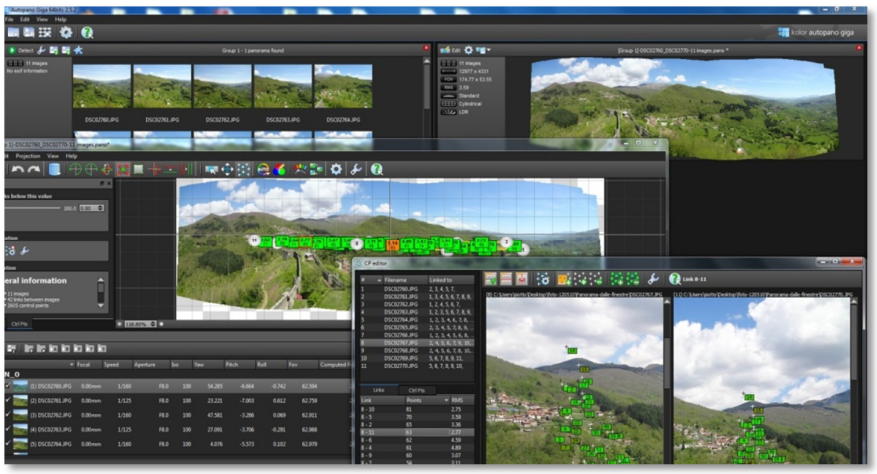

Fig. 7: Screenshot during the creation activity of the panoramic image of landscape around at Verrucole’s fortress.



Fig. 8: Screenshot of “Verrucole Virtual Tour”: view a full 360 degrees and historical information about e.g. Fortress of MonteAlfonso (LU).

HERITAGE ARCHITECTURE LANDESIGN
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Investigation and Knowledge for promoting cultural heritage

Antonella DI LUGGO[1], Riccardo FLORIO[2], Massimiliano CAMPI[3]
(1) Department of Architecture, Polytechnic School and Base Sciences, University of Naples FEDERICO II, Naples, Italy
antonella.diluggo@unina.it
(2) riflorio@unina.it
(3) massimiliano.campi@unina.it

Abstract
The area of Campi Flegrei can be considered as an open-air museum of ancient history. It represents a cultural and natural heritage of great significance which is based on environmental values and on historical memory of the places, that is tangible in many vestiges of the past.
The entire area is marked by great archaeological sites, but also by a widespread presence of minor archeological ruins on which overlies contemporary urbanization.
This unusual condition, where archaeological sites and modern constructions coexist, makes the territory unique, where the ancient and the contemporary, along with the particular natural environment, characterized by the presence of ancient volcanic craters, defines a cultural landscape of inestimable value.
The knowledge of this extraordinary heritage can contribute to determine a process of local development. It is therefore possible to give a positive impulse to local economies only if there is knowledge, awareness and capacity to attribute meaning and value to cultural experiences.
The paper intends to explain an ongoing research concerning the knowledge of the archaeological and environmental heritage of the territory, carried out through the survey of archeological ruins and of all significant evidences of the ancient and actual urbanization and trough the definition of a data base serving an interactive map in order to create cultural connected paths, to diffuse knowledge in network between local communities and therefore stimulate development policies.

Keywords: Cultural Heritage, Archeology, Survey, Drawing.

1. Investigation and Knowledge for promoting cultural heritage

In recent programs of protection, conservation and enhancement of cultural heritage, architectural survey plays an important role not only in order to study the specific monument, but also to discover the relationships with the surrounding territory.
This is particularly evident when survey concerns the study of archaeological ruins. In this case, all analyses made at different scales are particularly important and, therefore, the study must be extended from the single detail to the architectural system to which it belongs and thereby to its location. This will open the way to all interpretations that can be made by reading all the clues found in the area of interest.
The archaeological survey necessarily requires a multiscalar approach that can be expressed in the representation by a rich and various body of information and involves a comparative reading of the data. This can be possible today in the new digital documentation systems, particularly referring to interactive maps specially conceived and able to provide information at different levels, paving the way for new readings and interpretations of history and giving rise to a parallel and diversified knowledge of cultural heritage.
In particular, the area of Phlegraean Fields is the truthful expression of the close relations that the archaeological heritage weaves with the landscape and the surrounding area. Witness is the long tradition of views and representations, made since ancient times, portraying the territory in its complex morphology, continuously variable, according to different points of view and where the traces of the

past contribute to increase the quality of a unique place with extraordinary values environmental and of landscape. In addition to traditional perspective views, there are numerous representations that transcend the picturesque character in wanting to make a contribution to knowledge through the precise indication of the different archeological remains within an overall vision capable of render the historical and cultural value of the site. This is a need always felt to communicate through the representation some aspects of sites that could hardly be made through descriptions very attentive, but also shows the implicit desire to create connections through specific drawings that put together data that could not be perceived in reality but at the same time are useful to reading the whole.
During the centuries many researchers have been interested to the area of Phlegraean Fields, studying different periods of its history, of its architectures and of its artifacts in order to give an information framework. It must be told that all studies could never be definitive, not only because history reveals traces of the past during time, but also because the different techniques of investigation, particularly referring to the survey of cultural heritage, enable investigations increasingly targeted that, by improving the knowledge, implicitly modify the same object of study.
The development of new technologies concerning to survey and the new methodologies to store data involve a high information potential. At the same time the way to communicate foreshadows the possibility of creating archives that can be used at different levels, from technicians responsible for the management of architectural heritage who work in the institutions, to scholars and to all those who for various reasons are interested to the history of the past. Currently the Institutions responsible for the management of cultural heritage have set up a general catalogue, that however remains limited to an institutional use, while instead should be available at different levels, in order to promote a spread knowledge of the site and of its particular values.
In fact, the simple tour to archeological ruins doesn't help to overcome the cultural gap that results from a lack of knowledge of the places, of the history, of the events that led to the transformation and to the decay of the place. Therefore it is necessary to have an overview that shows the consistency of the archaeological heritage and at the same time to have a documentation that can provide specific information on individual artifacts. Sometimes in fact the stones by themselves are unable to that tell us about the past and in order to increase cultural interest, new technologies can help to provide useful information in situ as well as at your desk.
That's why it's necessary to map all the archaeological complex of Phlegraean Fields, providing details of the individual artifacts, setting up an information system that can increase the attractiveness of the area and thus implicitly lead to a promotion of the environment. So, the classification that has been made aims to distinguish the archeological ruins on the base of the specific typology, the state of preservation, its usability and the accessibility in order to create a framework with the localization of all the traces of the past that can be found on the area.
The whole area that extends from Pozzuoli to Monte di Procida is an open-air museum where archaeological intense and old urbanization live side by side to contemporary constructions. The goal is to give rise to an action of cultural promotion for the development of such immense wealth through a preliminary project of knowledge, based on an informative base which prefigure augmented reality systems, in order to establish a communication project, designed from the specifics characters of the territory. The aim is to document the current estate by survey and through the subsequent representation, highlighting the potential and the interconnections between places. In particular, making use of new communication systems, the purpose on which the team of the Department of Architecture on Naples of the University of Naples Federico II, is to set up information and data that can implicitly trigger a development of the overall system of the Phlegraean Fields characterized by extreme density and widespread distribution in the territory of the archaeological remains - small in size, but of great historical and documentary-which now seem destined for a progressive decay and appear overwhelmed by the recent buildings. This may be possible through a comprehensive and detailed knowledge of the project, that at the same time could become explicit in an interactive map that allows to navigate on the territory as in reality, reproducing the history, the happenings and the hypothetical reconstruction. In this way, where the archaeological remains do not result explicitly evocative of their history, the system itself will be mediator and support to the narrative.
Furthermore, the possibility to use media technology in order to enrich the experience through a series of information readily available that can integrate the inspection tout court with other information through the use of data accessible thanks to tablets and smartphone, will help fill that cultural gap that derives from the lack of knowledge of the places and of the history that the artifact in its few remains cannot tell. In this perspective our team is working to configure a project of knowledge that is based on documentary data and reconstructions appreciable through augmented reality that must necessarily rely on the fundamental contribution of other disciplines through as multidisciplinary approach to the knowledge and that see the presence of archaeologists, art historians, geologists and all those figures that can provide an interpretation coherent with the reality of the place. *(AdL)*

1.2 Methodologies of survey and representation of the multi-stratified urban sites. Rione Terra in Pozzuoli. The Temple-Cathedral area in Rione Terra.

Rione Terra of Pozzuoli is a singular multi-stratified site. It is characterized by a complex urban-architectural structure where diachronic events, shaped by the succession of cultures and interventions, charmingly overlap and intersect themselves in a single space.
It is already confirmed that the Rione Terra's structure which is still readable today dates back to the settlement of the Roman colony of the 194 b.C. [1]; the theories that attributed this regular urban fabric to the Greek period are definitely outdated [2]. Nevertheless, the hypothesis of the presence of the temple, in a preeminent position, the highest and most central position of the hill promontory, in a much more ancient period, is confirmed. According to this hypothesis, the temple dates back to the foundation of Dicearchìa, the city founded around 530 b.C., almost surely in the place of the future Pozzuoli, by some exiles of the isle of Samo; these exiles took refuge in the territory of the ancient Cuma, in order to escape the tyranny of Policrate [3].

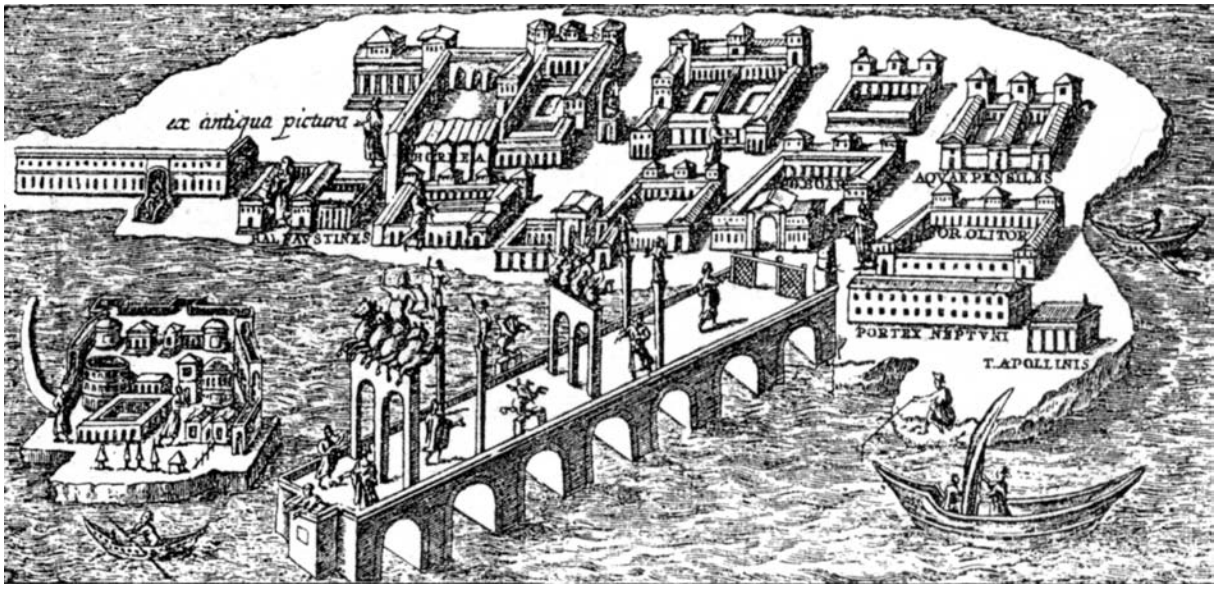

Fig. 1: Pietro Sante Bartoli, Il porto di Puteoli da una pittura antica, in G. P. Bellori, Iconografia veteris Romae, 1764.

Pozzuoli's Acropolis was subjected to alternate events, which led it to the state of abandon of the last decades, before the beginning of the recovery operations of the whole Rione Terra.
The most salient phases, which we necessarily summarize here, are the phases begun from the prosperity of August period. In this period, the temple risen on the ancient tuff Capitolium of the 194 b.C. was rebuilt, entirely in marble until the roof. Despite the relocation of the ancient dock close to the shore and the transfer of some important functions on the plain underlying the tuff promontory, Rione

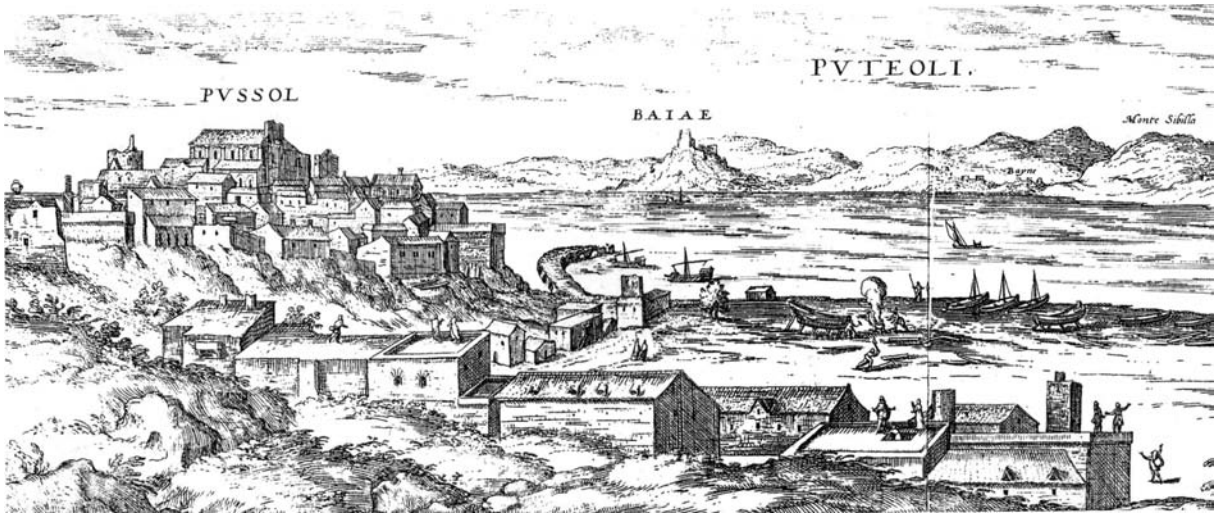

Fig. 2: Frans Hogenberg, Centro antico di Pozzuoli, in G. Braun, Civitates orbis terrarum, 1574.



Fig. 3: Plano de la ciudad de Puzolo, y castillo de Baya con su Puerto y terreno de sus Cercanias, 1734.

Terra conserved its prerogative as settlement until the 1st century A.D., when the threat of the bradisism caused the abandonment of some urban insulae and the cancellation of some street axes. This impoverishment persisted until the high Middle Ages, when the small town assumed a strategic role in the Neapolitan defensive system insomuch as, in 1296, Carlo II d'Angiò declared it state city, bestowing a series of important privileges on it. There was also a strong stimulus from the architectural point of view, with the proliferation of numerous churches and the confirmation of the urban structure of the castrum until the seismic events of the beginning of the 16th century, which culminated with the Monte Nuovo eruption in 1538. The abandonment of the city by its inhabitants, which took refuge in Naples, led the viceroy don Pedro de Toledo to promote the rebirth of the city, giving a great attention to Rione Terra. So, Rione Terra was subjected to a massive reconstruction which upset the Roman age foundation: it was buried because of the creation of new streets; however, these new streets traced the geometries of the ancient structure.
Lo stesso tempio venne più volte interessato da interventi di rifacimento a partire dal XIII secolo sino all'intervento di barochizzazione compiuto tra il 1632 e il 1636, per volere del vescovo Martino de Leòn y Càrdenas, e affidato agli architetti Bartolomeo Picchiatti e Cosimo Fanzago.

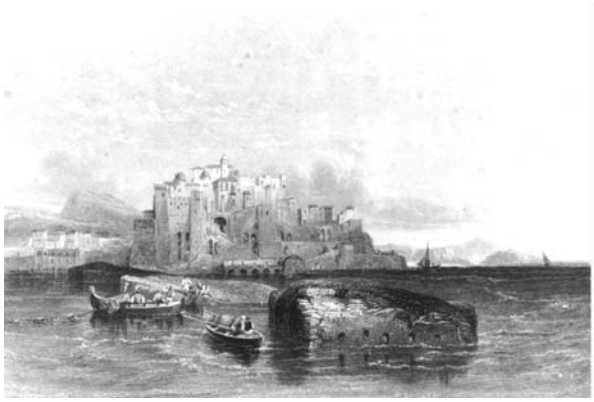

Fig. 4: James Thomson, Pozzuolo, the ancient Puteoli, sec. XIX.



Fig. 5: View from the pier of Rione Terra, *2012.*

The same temple was many times subjected to interventions of remaking, starting from the 13th century until the intervention of baroquization made between 1632 and 1636, in obedience to the bishop Martino de Leòn y Càrdena's will, and committed to the architects Bartolomeo Picchiatti and Cosimo Fanzago.
Nevertheless, this phase marked the beginning of a new decline due to the transfer of numerous inhabitants and the arrival of the XIXth century modernization with the explosion of the industrialization. These facts increased its nature of peripheral district which continued until the last century when, first of all the bradyseismic phenomena of the beginning of the 20th century, then the fire of the Cathedral and the last events of the 70's and 80's, which are still connected with the bradyseism, decreed its complete abandonment.
The underway research, recognizing the necessity to create fact-finding structures in order to support a hierarchy of interventions of protection, conservation or transformation in the bodies of the historical cities, focuses on the methodological choices and the definition of the work instruments.
The main objective is developing and experimenting survey methodologies able to effectively interpret and represent the complexity of densely stratified urban areas, which need interventions of integration between memory and contemporaneity.

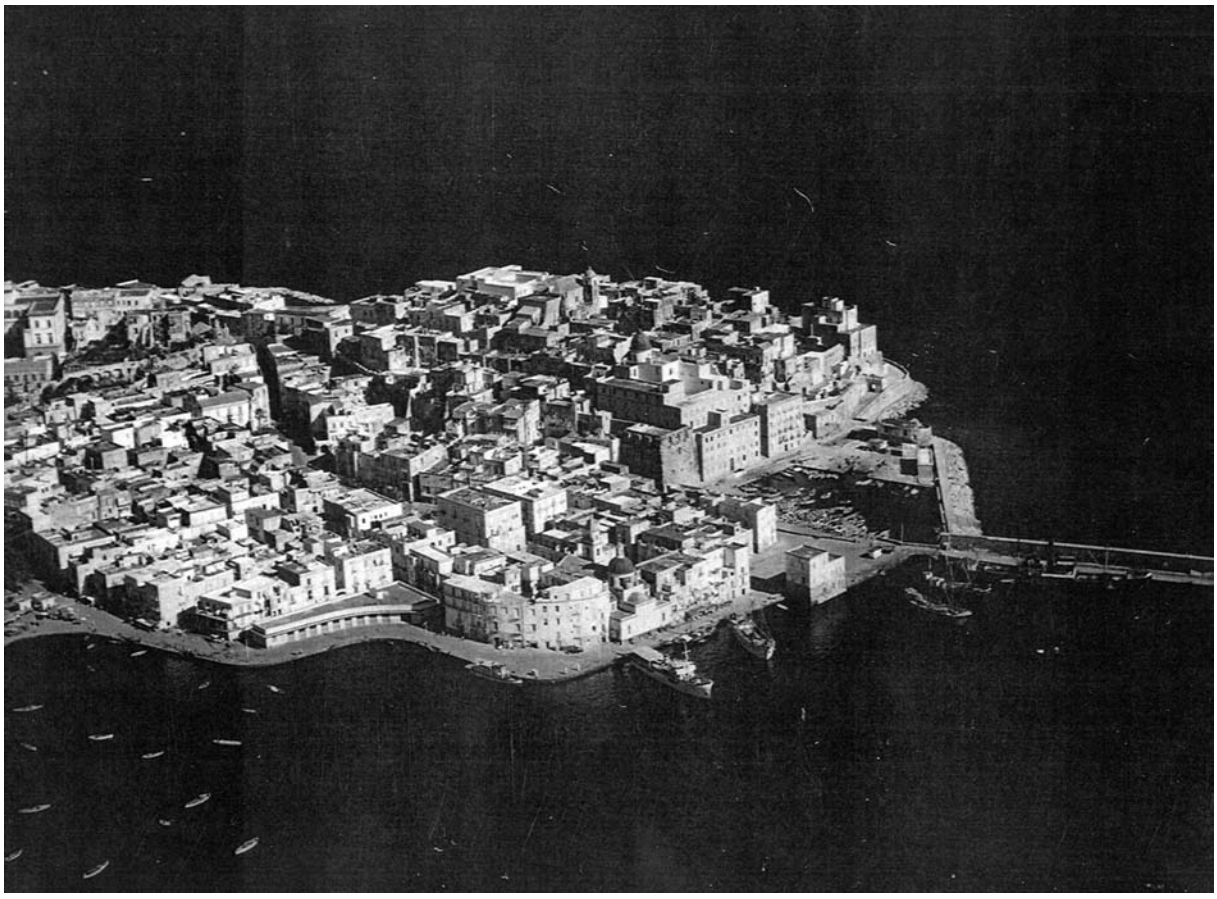

Fig. 6: Aerial photograph of the old town of Pozzuoli, about 1955.

The critical-cognitive evaluation and the historical and interpretative reading, absorbed in a spatial dimension from which the sense of the architectural and urban becoming emerges, are accurate testimonies of an elaborate space-time complex where contaminations and superimpositions of architectural parts and apparatuses, along with the disastrous effects of external events, have produced the actual configurative arrangement.
The application area located within Rione Terra is the area of the Temple-Cathedral of Pozzuoli. This area is an extraordinarily significant example of a site that expresses an unique compresence of archaeological sedimentations on which the sedimentations of the modern city and the evolving contemporary one insert themselves, both from the point of view of the historical processuality and that of the physical-material superimposition.
The history of the place, considered as an architectural material, embraces the survey experience and qualifies it as an unique possibility of reflection about the constituted reality, examining not only the characteristics of its formal expressions, but also the characteristics of the significances which are not immediately disclosed and reveal the traces of the route of the sedimentations in the textual recomposition.
So, a fertile process activates itself: the process that incorporates and makes indissoluble the connections existing between the results of the explorative and restitutive investigations and the programs of the planning hypotheses. This complementarity within our program of survey, interpretation of the superimpositions and individuation of the transformation strategies, has been assumed as a necessary operation for the definition of any decision of data management and planning projection. “Because there is not a judgement of analysis that does not cause a mental inclination of the architect towards a particular planning hypothesis…” [4]. Therefore, it is evident that the necessity of the survey includes in itself the same necessity of the project. In other words, and in the reference case more than ever, the various phases of the survey operation (survey, measuring, dimensioning, comparison with the documents of archive and the historical sources) identify the need to build up the original architectural and urban conformation, already from the first graphic elaborations, within a vaster reflection which has a regard for the elements that can be considered part of the new and transformed architectural structure, although they are transformed and added.
The adoption of three-dimensional data capture techniques (in particular the laser scanning, which strongly innovates the processes of interpretation and re-elaboration of the external data), together with the use of traditional techniques and the solid modelling ones, which permit the controlled management of the complexity, intend to achieve representation methodologies which are able to communicate the sense of the multiple interrelations and interferences between the sedimented parts. So, it is possible the appropriation of the global meaning of the place.
The research operations were grounded on a preliminary fact-finding investigation, which was both documentary and practical and was conducted in the whole area of Rione Terra, in order to contextualize the area of the Temple-Cathedral in its own complex system of belonging.
For this purpose, in particular, in addition to the study of the available urban and archaeological cartography and an accurate photographic sample taking from the land and the sea, we have used a lot of the same results which were pointed out and elaborated by the long operations of intervention still underway in the site.
These operations were just begun on the structures of the Temple-Cathedral, when in 1964 the tests which ensued from a powerful fire permitted to highlight part of the ancient Temple of August; then, they were extended to the whole Rione Terra. Considering their inseparable complexity of study, investigation, excavating, restoration and recovery, these operations have to be considered a prime example of urban archaeology which have produced outcomes that represent an extraordinary opportunity and foundation for every knowledge. *(RF)*

1.3 Revealing a Cultural Heritage: a relationship between ancient architecture and the process of knowledge for its transmission to the future.

We all know that the main goal of survey and drawing is to reach for more information we can catch from the analysis on an architectural space. The technology can improve this process and, as researchers, we would make a big mistake not considering it as a way to enlarge our capability to see what it is not visible.
So we well know that tools are just tools and that the main considerations we have to care about is how to preserve the cultural aspects that an architecture can transmit to future generations.
Technological development has changed tools used to measure and represent our reality, but the cultural fundaments have still the aim to simplify complexity of geometric models.
A rapid technological development is going on. This change determines the digitization of information across platforms that allow to dematerialize some use of physical space.
We must analyse this period of profound transformation of relational habits also suggesting new tools to interventions for the rehabilitation of the places where we live.

These issues and how they can be resolved at best, deal with the current debate focused around the new concept of living our cities as if they were “smart city”.
One choice could be the change of paradigms of the study of architecture, considering the multiplicity of source of knowledge that are in the new media, changing point of view about what is considerable for generating good spaces and what is not.
This is an horizon of sustainability that doesn’t mean less development or cultural downgrade, but it means more interest for what it is really important to re-discover the fundamentals of practing architecture: a smart balance of technique and cultural aspects.
We are going to have a smart progress when we will understand that what it was considered as reduction of a high-profile culture means simplicity and what we believed to be slow growth, instead means more coherence in the path of evolution.
This aspect of a worldwide consciousness that creates a new vision about architecture is growing higher and wider by a knowledge networking.
Survey has, therefore, the task of analyzing and documenting the relationships that are set up between the different parameters that define the environment where we live in.
Let’s see how this theory can be realized by a documentation made with all the information that we can take from operations of survey.



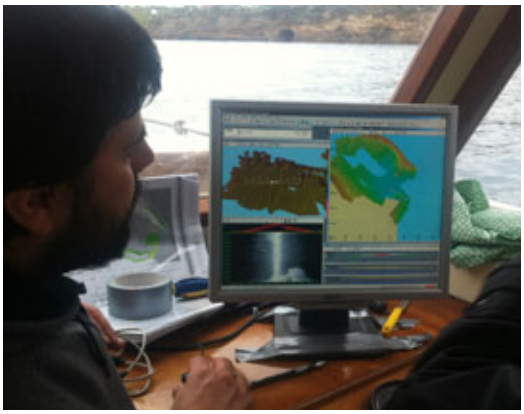

Fig. 7, 8: The area emerged of the ancient roman port in Punta Pennata, Baia, and some of the operations for the survey from the boat.

For over two decades it was developed experimental systems to introduce new ways of enjoying cultural heritage. In this testing ground, technology had a lead role, often to the detriment of contents, increasing the need of defining new way of communication in sync with contemporary iconography culture.
This topic has been felt as a contribution to a new possibility to renew the attention that the archaeological sites around Naples deserve.
The theme proposed has as its object the study of submerged archaeological heritage of Campi Flegrei and of its connections with archaeological areas. In this context the phenomenon of negative or positive territorial bradyseism set rapid changes over the centuries with the collapse of ancient coastline and submersion of all buildings built on this area.
The result is that sites of great value, such as Miseno’s seaport, with the Roman navy, and old town of Baia are now largely submerged. So, it is necessary to build a knowledge and communication project that is able to recognize its authentic context.
Considering the conditions just descripted, the principal aim of the research is to build an interactive map of the archaeological area of Campi Flegrei, able to obtain a territorial improvement and to explore new methods for the survey, analysis and representation of underwater archaeological heritage.
So, it seemed to be very important to use the recent tools of investigation, as the laser static, dynamic scanners, and the techniques of monitoring and control in condition of remote survey.
Survey’s technology based on various technics of scanning achieved full maturation. Today it is possible to scan heterogeneous objects supporting to different and appropriate techniques of scanning.
Side-scan sonar can be considered besides others survey instruments, being a category of sonar system that is used to efficiently create an image of large areas of the sea floor. This tool is normally used for mapping the seabed for different purposes, including detection and identification of underwater objects and bathymetric features. It may be used to conduct surveys for maritime archaeology.

Definitely, laser scanners and underwater Interferometry, besides the applications of digital photogrammetry in submarine environment, represent the state of the art of the technology applied to the environmental survey.
The models deriving from these kind of surveys are often supported by philological reconstructions to enhance understanding of ruins.
The project we developed wants to explore diversified systems of investigation and communication of the preserved artistic and architectural patrimony.
The investigation – that is in a *working in progress* mode - proposes the development of the methods to be effected for the knowledge of the submerged archaeological places, through surveys of the

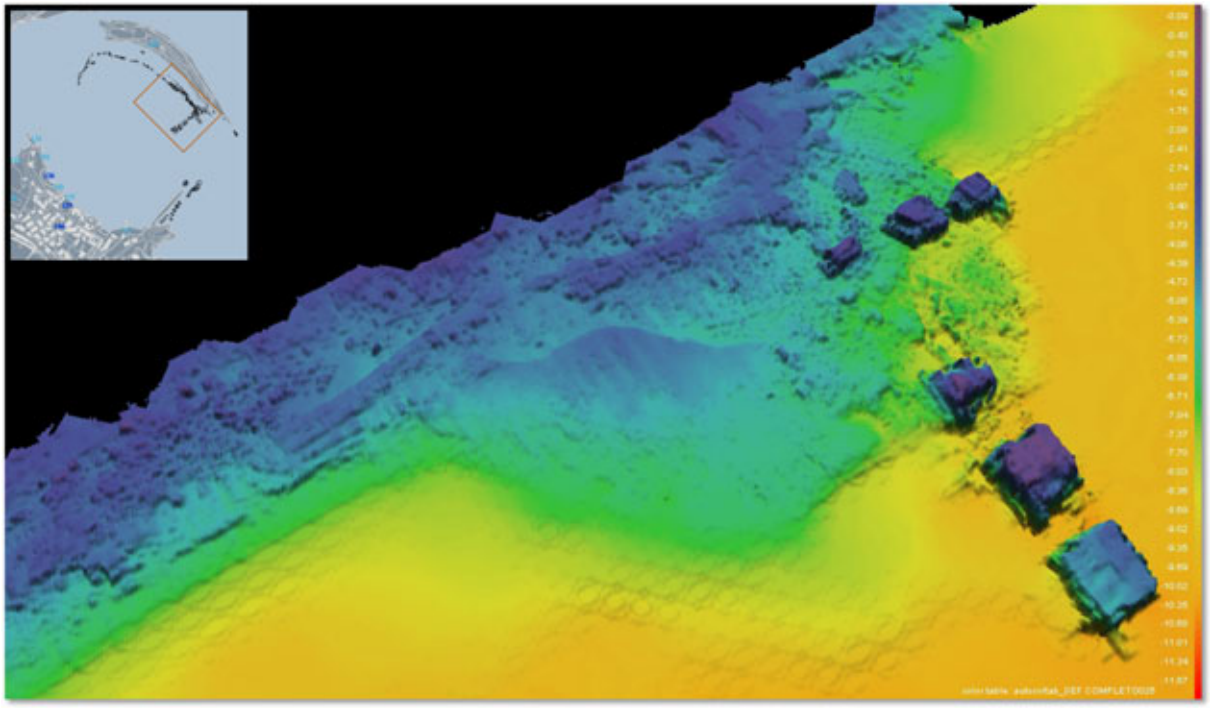

Fig. 9: Image of the 3D model generated by the points cloud obtained by the integration of different tools.

backdrop with the inferometric system, producing the cloud of points with intensity of signal, the DTM of the batimetry and the images side scan, while for the scannings of the emerged areas it can be realized with the use of terrestrial laser scanner. The surveys took place from preceded boats, must also introduced the use of multifrequencial GPS and of inertial bases, necessary for the instant georeferenciation of the clouds of points acquired by that two different instrumentations. The data gave object of post processing finalized to the realization of a cognitive model, useful to the hypotheses of exploitation and retraining of the studied areas[1].
Depending on the condition to be submerged, the archaeological site of Miseno harbour can not be studied in any other way that is not using advanced technological equipment. Only in this way it is possible to interpret the surveyed data according to the demands of the specific case.
The potential final product is a three-dimensional model derived by the conjunction of batimetry and topographical analysis of the surface. To such model complex can be assistant the mapping of images realized with digital cameras, to implement the realistic perception of the data related to the investigated area.
To obtain comparable results at international level we tend to find rules and criteria to attempt to construct and display 3D models, as in the case of the criteria established by ICOMOS, in *Charter for the Interpretation and Presentation of Cultural Heritage Sites*.
This procedural method for architectural modelling allows the creation of a measurable and navigable model that is undoubtedly a huge advantage, not only to document and to monitor an architectural work of great value, but also to preserve its status.

In conclusion, we can say that during the last few years we assisted to a real change in procedures for surveying architecture and townscape. A digital revolution has over crossed the entire discipline,

[1] The survey has been possible thanks to the technological contribution of the team from CODEVINTEC, which collaborated with the research team to all the operations useful to catch the data base, supporting us with their knowledge and experience.

bringing new unexpected horizon and creating great opportunities for knowing the deeply aspects of architecture.
These considerations make clear how much necessary is an investigation phase to pick up, to systematize and to experiment the new formalities of scientific growth to realize a whole intellectual products, to be able to be used in the exploitation of important architectural and monumental compartments.
Considering this way of thinking, survey gives us the possibility to preserve cultural heritage by a great capacity in documenting them, to recognize all their value and to create a database, useful for those processes which have the task to find the right project, to make their value even bigger. *(MC)*

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Beauty and sustainability - Survey on Liberty heritage in Varese and Ticino area

Anna ANZANI,[1] Angela BAILA,[2] Claudia CARAMEL,[3] Margherita GUARISCO[4]
(1) Department of Design, Politecnico di Milano, Milano, Italy
anna.anzani@polimi.it
(2) angela.baila@polimi.it
(3) caramelclaudia@gmail.com
(4) margherita.guarisco@gmail.com

Abstract
Since the beginning of XX century the Liberty heritage in Varese and the Ticino area has undergone a slow abandon, due to both the development of new architectural trends and the speculative demolition, and is at great risk of loss. The vital element of the Liberty period is the importance of beauty. Protecting this architecture and landscape system allows to taking care of our identity, finding a thread from the relationship between man and nature, to the most recent findings on sustainability and an "ecological" design.
The paper presents the results of a survey carried out on the Liberty architectures of the Varese and Ticino territory, a limited geographical area where nature and architecture are complementary elements that blend into a whole to be preserved in its unity.

Keywords: Liberty, beauty, Varese, memory, Ticino, identity

1. Beauty, memory, identity
In “The Architecture of Happiness”, de Botton investigates the influence and the interactions that the quality of the environment plays on our relationships with each other and on our happiness and misery: observing the multiple aspects of buildings and objects surrounding us is an opportunity for a deeper self-knowledge, which constitutes the real base of happiness [9]. Capturing the secret nature of places, which subsists together with the soul of the world, allows us to rediscover beauty, to awaken from the anesthesia and the failure of sense which is restraining our culture, and to discover the animistic, pagan conception, according to which everything is alive, everything tells stories [21]. It is precisely the trust in beauty which can only give sense to the architecture, the landscape, the city and our own lives.
Resuming a still actual text by Pane [15], it is worth considering the need to bring the aesthetic experience back to the sole condition which makes it actually possible, namely considering it not as an exceptional gratification once the work is done, but as a normal attribute of our daily existence. The aesthetic appreciation of environmental values should be the basis of a rightful citizenship, affirming that both public art and nature heritage aren’t a marginal object of contemplation for they involve our inner life and its relations with fantasy, history stratification and memory. Indeed, since the beauty of the urban landscape is linked to the memory of who we are and reminds us of what has taken place, preserving the landscape protects memory, and also defends physical and mental health [19].
The so-called *invisible city* lays *within* and can only be grasped through a profound investigation. If we could use the unconscious, the city would appear different and certainly richer. The unconscious cannot be touched, or shaped into defined forms, yet it upholds every building. It seems reasonable that people be practical and organize the environment effectively, according to their needs. Actually, what we have to ask ourselves is what these needs are and, in the case we also admit psychological needs, how it is possible to activate the psychic reality, and look at both the past and the future.

Walking through the city, we need to meet the past and to recognize ourselves in it. In the city, where the destructive force opposes to the creative one, the continuity of meaning is suggested, the memory is proposed in view of the project, the tradition for the future, utopia for reality. Tradition and progress are opposite and interrelated poles, both essential: they should become enjoyable objects. Therefore, archeology and restoration are only valid if grafted in history, nourishing its continuity, not being isolated in respectful and static veneration of monuments [17].
In broader sense, the city represents identity and safety achieved through the community. It is through the interaction between members of the social community and into the cultural contexts that identity develops and defines itself: whereas this process builds within the individual in isolation, still it has a social nature. Moreover, identity isn't fixed and immutable but constantly evolving, in a process where each individual must choose between infinite variables and connections, adapting to endless change of the living conditions [18]. Recognizing the authentic vocations of a place and protecting its aesthetic values requires therefore a complex design process and is also strictly subjected to environmental ecological conditions, since the preservation of its surroundings is unavoidable, interdisciplinarity turning out to be the key condition of culture [15].

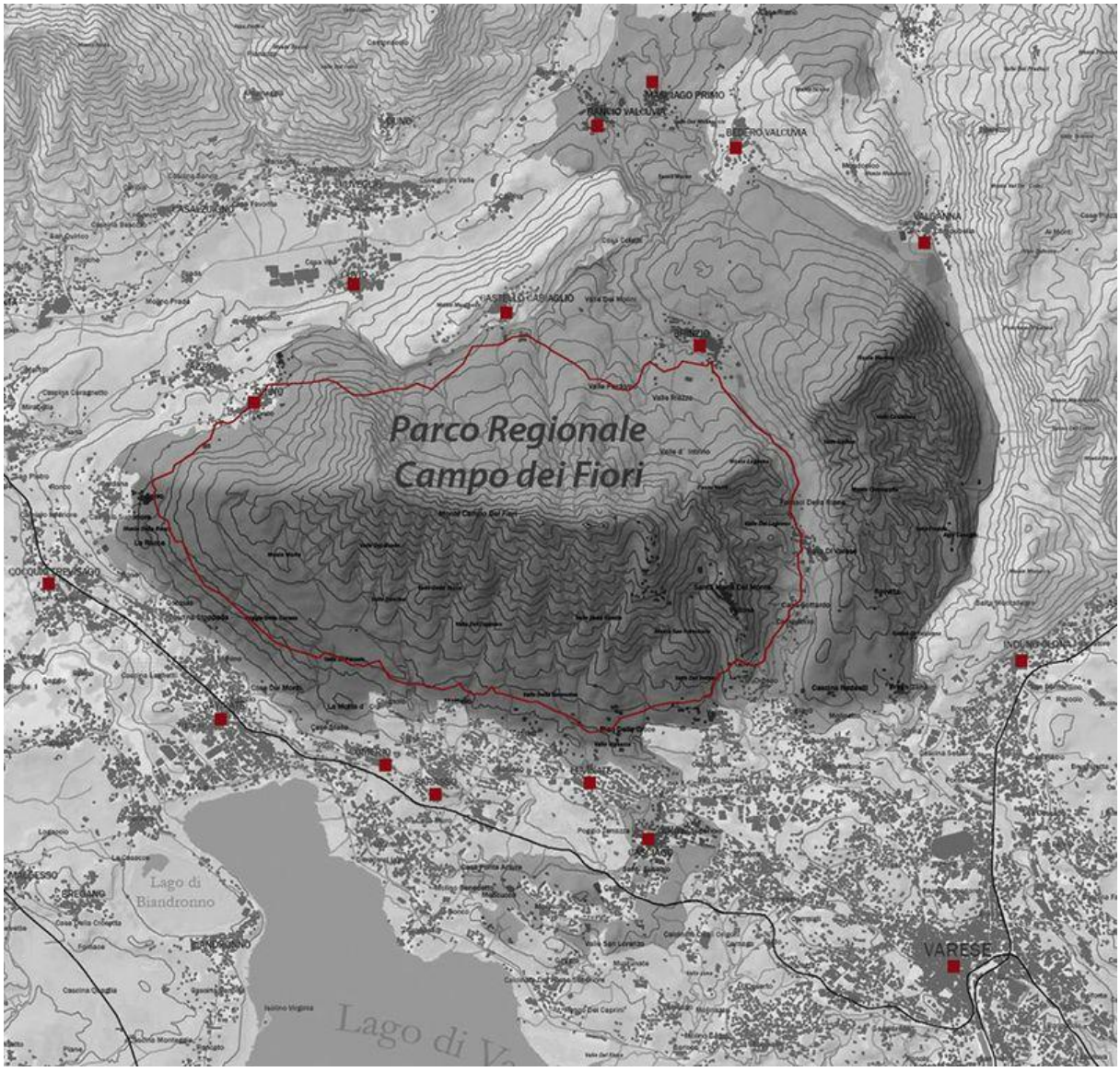

Fig.1: Route of Path 10 of Regional Natural Park *Campo dei Fiori* and surveyed towns in the Varese area.

2. A methodology for the enhancement of architectural heritage

In the context of European policy aimed at sustainable and quality cultural and touristic offer, given an interest in Liberty shown beyond the Alps through the international network, a methodology has been

set up aimed at the protection and enjoyment of landscape and architecture, to promote a highly significant regional realities of which Italy and Europe are richly endowed.
A census of the architectural creations is the first step to raising public attention toward the cultural heritage and to protect local identities in front of a European scale through a sustainable, ethical and social model of territory knowledge and fruition.
The research presented here is the result of collaboration between different partners joined by a common desire to safeguard and promote Liberty style as one of the peculiar characteristics of Varese and Ticino area that in the Liberty period found its vocation for tourism. The project, which includes Lombardy Region as leader organization and funding body and the Province of Varese, is divided into different events dedicated to art, architecture, literature and landscape.
The present work is the result of a first research phase aimed at identifying Liberty buildings and architectural artifacts still present on the territory of the Varese Province and of Canton Ticino [10] [20]. In particular, the geographical area assumed for the investigation was that of the municipalities crossed by the route of path 10 of the Regional Natural Park of Campo dei Fiori (Barasso, Bedero Valcuvia, Casciago, Castello Cabiaglio, Cocquio Trevisago, Comerio, Cunardo, Cuvio, Gavirate, Induno Olona, Luvinate, Orino, Valganna, Varese) and the area of lower Ticino.

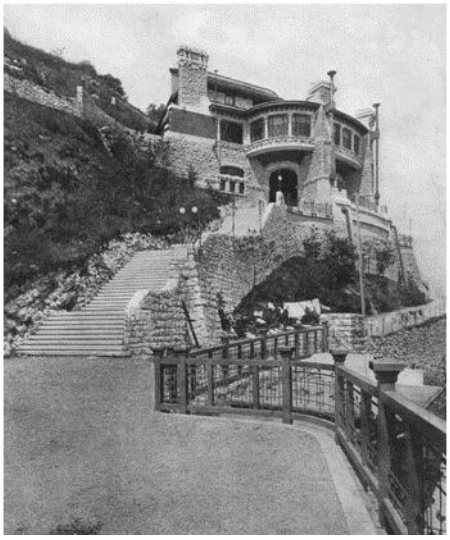

Fig.2: Historical view of Grand Hotel at Campo dei Fiori by Giuseppe Sommaruga (Restaurant and Funicular Station)



Fig.3: Brickwork vault of the Restaurant at Campo dei Fiori by Giuseppe Sommaruga

The project, aimed at safeguarding an extremely vulnerable heritage and to promote its knowledge, has started by surveying and cataloguing all the buildings and architectural structures which are included within this period, recognizing the typical expressions of the studied style, with a special emphasis on those buildings that can be considered minor examples, often omitted from the numerous studies already performed on the subject. The initial survey was aimed at identifying and taking a census of buildings located on a limited territory, in order to experiment a working method with the possibility to both evaluate its effectiveness and introduce necessary refinements in progress, so that it could then be spread to the whole territory of the province and of the cross-border area.
The direct observation of the building was the most important step of the investigation. The first phase of data recording about the geographical location of the building and its visual observation to identify the overall articulation and the most interesting details was followed by a further reading of the morphological and compositional architecture. Especially valuable in this regard turned out to be, when available, drawings and papers found through historical and archival research, in addition to a targeted photographic survey[2] [5] [6].
A photographic campaign was then carried out with the purpose to obtain pictures as complete as possible to describe the characteristic architectural elements. A general shooting was taken, followed by monographs dedicated to the most significant details. The real possibility to access the buildings and the shooting conditions dictated by the context were in fact critical for the desired result.
The photographs were carried out trying to keep the optical axis perpendicular to the facade and to eliminate the parallax error. According to the articulation of the complex and to the accessibility of the building, all the house fronts were photographed trying to eliminate the surrounding environment, even if natural, then considered apart. Any individual facade was subsequently divided into orders (plinth, second order, third order, gable or pediment), each of which was then subjected to a series of shots

aimed at highlighting its architectural elements, construction materials and finishes. This information was then recorded to complete the evaluation based on morphology and layout.
With the same approach adopted for the general views, photographs of the details were taken in order to describe the characteristic features of each order, starting from the plinth, paying a particular attention to the entrances and their structural, material and decorative elements such as pillars, wrought iron, and other relevant details.
Details shots have been indispensable for the cataloging and description of the decorative details, like for example cornices, string courses, emblems, symbols, racemes, wrought iron and stained glass, together with the openings corresponding to doors and windows, often very complex and articulated elements in Liberty architecture. For each of the different type of openings recognized on the fronts of the studied buildings a monograph was therefore carried out, so as for accessory elements like turrets and porches, where present.

3. Survey on Liberty in Varese and Ticino area

Between the end of 19th and the beginning of 20th century, Liberty has developed in Europe in a phase that is placed in between the use of traditional and innovative constructive techniques, adopting heterogeneous design solutions having different local connotations, also favored by the great universal exhibitions (Paris 1889/1900, Barcelona 1888).
The research of a national style produced various architectural experiments contemporary to Liberty, such as the eclectic, Neo-Gothic and neo-Romanesque style, which in many cases were intertwined to form "hybrid" solutions [3] [4] [13]. As for the two areas considered here, the main causes of Liberty spread are similar for both the Province of Varese and the Canton Ticino. The new rail links joined local areas, while also providing the circulation of new building materials, and created new lines of communication with Europe. These new tourist routes became not only a source of development related to tourism but also to private construction [7]. The Varese and Ticino region began to offer important places for daily and seasonal resort. The landscape was transformed by the presence of large leisure and sporting facilities but in this area also houses for the residence of the local entrepreneurs and large factories were flourishing.

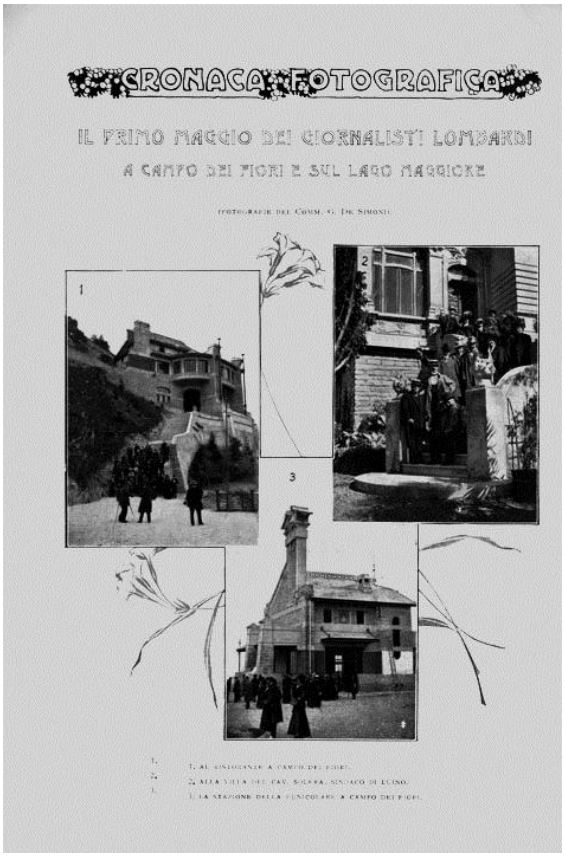

Fig.4: Cover of "Cronaca Fotografica" with architectures by Giuseppe Sommaruga at Campo dei Fiori (Restaurant and Funicular Station).

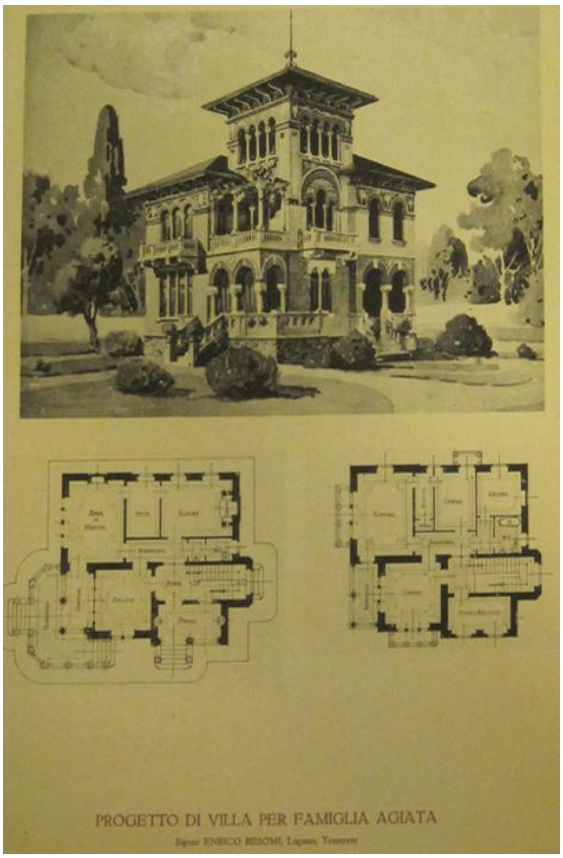

Fig.5: Project presented by Enrico Besomi at 2nd competition for the Typical Ticino House, 1917. From Fondo Vecchio, SUPSI Library, Lugano.

Both for their homes and for their industries many entrepreneurs chose the emerging Liberty as a representative example of their new easy circumstances. The Liberty territory is seen as the product of the stratification of both human and natural intervention, coordinated in a pattern where the curved line is the ordering element of an apparent disorder. In Liberty, especially in large villas, nature and architecture are complementary elements that blend into a whole to be preserved in its unity.

3.1. Studying the case of Varese Liberty

In the province of Varese, Liberty spread with a few years of delay compared to Milano, more open to the new avant-garde style. Some events are associated with this change and development: the birth of the Poretti brewery (1901-1908), the creation of an electric railway between Varese and Luino (1894-1895, 1904-1905), the foundation of the company Grandi Alberghi Varesini (1907 - 1913), the continuation of the electric railway from Porto Ceresio through Ponte Tresa to Lugano which connected Italy with Switzerland [7]. Varese finds itself to be well connected both to nearby cities like Milano and Como and to the central states of Europe, and these new tourist routes become a source of development also because of private construction.



Fig.6: Photographical survey of the architectural orders, example of application on the facade of Palazzo Castiglioni, arch. G. Sommaruga. Milano, 1904. Photograph by G. Dall'Orto.

The architectures attributable to Liberty, which have connoted the surrounding of Varese since the beginning of the twentieth century until the First World War, are now an essential part of the landscape in which they blend in perfect harmony. The "house", usually on two floors with tower and adorned with innovative floral or geometric patterns, as well as the hotels themselves, are the types of buildings that better expressed the local manifestation of Liberty, which featured the design sometimes of the whole building, sometimes of merely decorative facades more or less valuable.
There are many protagonists bound to Varese Liberty, belonging to different disciplines: architecture, sculpture, painting, iron forging, only to name a few.

Giuseppe Sommaruga (1867 -1917) is the most representative architect for originality and importance of works in this area. In Varese, his name is linked to the Company Grandi Alberghi Varesini, for which he designed and manufactured the Grand Hotel Tre Croci (1908-1912) in Campo dei Fiori, the arrival station of the funicular (1909-1911), the restaurant (1910 -1911), the theater of Kursaal (1910-1911), Grand Hotel Palace and some houses on the mountain slopes [1]. Many other holiday homes were built in the same years along the slopes of the Campo dei Fiori, like Villa De Grandi, besides the Station of the electric tramway at Ghirla, in the municipality of Valganna [23]. Here, another construction is particularly significant, Villa Chini built in 1904 at Boarezzo by Giovanni Chini, sculptor and master in the use of decorative concrete, artificial stone widely used to create the ornamental elements of the Floral style. Moreover, protagonists like Boito and the students of his school have contributed in those years to the architectural debate about the need of a national style, and to the spread of Art Nouveau architecture in these areas.



Fig.7: Gargoyle. Palace Grand Hotel, Varese.



Fig.8: Fountain. Private Villa. Induno Olona.



Fig.9: Railing with floral motifs. Cunardo.



Fig.10: Brickwork bracket. Restaurant, Campo dei Fiori

Emblem of Liberty Varese season is also the Poretti Brewery complex, extraordinary outcome of the collaboration between the illuminated patronage of the family Poretti and the experience of Studio Bihl & Woltz Stuttgart, called in the early years of the twentieth century to renew the original production plant at Induno Olona.
Part of the complex is also the main villa designed by Ulisse Stacchini for the Magnani family between 1903 and 1905. Several other houses and smaller buildings, where elements proper to the New Style can still be recognized, dot the area of Induno Olona and of other municipalities included, albeit only partially, within the Park and showing the uniqueness character that the Liberty assumed in the area next to Varese.
The numerous specific studies already carried out on the subject and the more general ones dealing with the local history of the area, had offered a basic knowledge on which further reflections could be developed. In addition to the work conducted by other researchers, the study has found a fundamental support in all forms of documents preserved in libraries and archives. Writings, photographs, notarial documents, communal practices, cadastral maps, but also oral information, have given for many buildings a complete picture allowing in some cases to discover the name of the manufacturer and the

year of construction. Thanks to the documentation, the main architectural work in the area could be identified. However, it was then the direct contact with the territory, achieved through several surveys, through both the observation of individual cases and the meeting with the people, that allowed to detect the existence of numerous minor examples, often unknown or underestimated.
The recognition of such presences was primarily based on the affinity of the observed stylistic characteristics, often present only in the details, then on the certain attribution of buildings to the investigated stylistic period, supporting the knowledge with other sources of information and finally through the local historical memory on the material identity, the manufacturing techniques and the typical cultural signs.
The complexity of the documentation doesn't allow the research to be considered completed. The final result depends on the cooperation of all those who, for various reasons, retain useful material, and needs a collaboration process be started between the public and the private sectors.



Fig.11: Detail of decorative concrete. Restaurant at Campo dei Fiori, arch. Giuseppe Sommaruga. Varese.



Fig.12: Villa Chini. Giovanni Chini, 1904. Boarezzo, Valganna.

3.2. Studying the case of Ticino Liberty

At the beginning of the last century, Canton Ticino has seen the emergence and spread of a proper Liberty style enriched with trends from neighboring European countries. However, the institutions of the cantons, especially those made to protect the environment and landscape, opposed to the new style, because it was seen as a cosmopolitan fashion going against the search of a style that could be representative of national identity [13]. Despite this defense of tradition, cantonal schools of drawing taught their students to put patterns inspired from nature close to forms inherited from the past. In

addition, as it was happening in the rest of Europe, rather than the institutions it was particularly the middle class who invested in new buildings, entrusting the floral style of the renewal of its image. Promoted by the tourist attraction exerted by cities like Lugano and Locarno, hotels, villas and leisure facilities become elements characterizing the hills and mountains of the Italian canton of Switzerland. Due to the major renovation carried out by the construction industry over the last thirty years, examples of this type of architecture related to holidays in Ticino are less and less numerous. Still, significant examples survive like the former Hotel Felix in Chiasso, designed by Carlo Brambilla in 1907, much criticized by the institutions at the time of its construction due to the opulent Art Nouveau decorations [5].
But, in addition to buildings related to tourism, the choice of Art Nouveau style made by the clients is still evident in many other building types. In Lugano, whole streets are characterized by both this style and the experimentations made by various architects using streams contemporary to Liberty, as an example Via Nassa with the Eclectic palaces of Augusto Guidini and Paolito Somazzi, or Via Canonica with the double apartment building by Giuseppe Bordonzotti, characterized by rich adornments in decorative concrete celebrating a lush and luxuriant nature. Related to Bordonzotti, surely one of the greatest exponents of Ticino Liberty, is the jewel ex Cinema - Theatre - Variety of Mendrisio, intact today only in its main front. The compositional tension of the facade is concentrated in the large trefoil arch opening and in the decorative concrete, which emphasize the layout of a modest size building. Clearly inspired by the Belgian French Art Nouveau, Ticino Liberty has a sole example due to the Viennese school, the powerhouse of Biaschina in Bodio, designed by Milanese engineer Ugo Monneret de Villard and by engineer Agostino Nizzola between 1906 and 1911 [13].



Fig.13: Ex Cinema, Theatre, Variety. G. Bordonzotti, Mendrisio.

4. Further development of the research

The aim of safeguard pursued by the present research, inevitably involves the dissemination of knowledge. In this sense, a project of sharing the collected information should be carried out through easily accessible communication tools, available to as many users as possible in the belief that the derived knowledge can be the most effective way to protect the existing heritage.
Further steps of the project will include the preparation of a catalogue of the surveyed architectures that would offer a view of Liberty heritage in the Province of Varese and in Ticino as most comprehensive as possible, the organization of the collected material on a data-base accessible both through links activated from the websites of the involved municipalities, and through mobile applications which will offer the users the chance to easily locate the worth noting objects and identify

new knowledge paths of the area. Sharing the data-base with the local population will also provide an additional tool for testing and integrating the documentation and will help to improve the results of the project.
The research will include a wider "cross-border" program aimed at the implementation of measures of protection, promotion and development of the landscape and the historical and cultural heritage. The strategic objective is to strengthen the common identity of the studied territories historically detectable in the network of pedestrian crossing and connections of the studied regions. The paths among Liberty architectures lead the visitors in the vicinity of the towns and in the most beautiful residential areas of the municipalities where the territory stretches. An interesting way to find these places is to get there through the network of walks, some of the trails allowing walking or cycling seamlessly to discover gems of Liberty architecture of which the buildings reported here are only the most prominent examples. Aim of the project, through the synergy between experts in cultural itineraries, governments, landscape architects, designers and the local population, is to strengthen the common identity through the preservation and the promotion of a greater understanding and enjoyment.

5. Conclusions

The need to promote effective sustainable practices at the European level requires extending the concept of sustainability, adopting a systemic approach that includes both the renovation of the built heritage and the improvement of the quality of life, through the integration between economic, environmental and social issues with the complexity of the territory. Assuming a holistic view can enable to integrate as much as possible appropriate technologies and policy measures to obtain advantages in terms of quality of life, environmental protection and local businesses. In this context historic centers, landscapes and existing architectures form an essential resource as well as culture and events. According to an "extended" and complex concept of "cultural heritage", traditional monumental and artistic objects, territorial and municipal systems, environmental landscapes contribute to form local identities. In the paper, a methodology for the enhancement of cultural heritage has been proposed and its application to Varese and Ticino Liberty has been presented. The collected census data are going to be networked through online tools such as the Information System of Cultural Heritage of the Lombardy Region (SIRBeC) and the Réseau Art Nouveau Network [22]. Public attention toward the Varese and Ticino Liberty heritage is going to be raised through a sustainable, ethical and social model of knowledge and fruition of the territory, based on the use of easily accessible communication tools, applicable to other significant regional contexts and to other historical periods.

Acknowledgments

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HERITAGE ARCHITECTURE LANDESIGN
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Heritage and sustainable development: the Middle East and Doha

Francesca Romana MORETTI
Dipartimento di Cultura del Progetto, SUN – Seconda Università di Napoli, Aversa, Napoli.
frmoretti@hotmail.com

Heritage and sustainable development: the Middle East and Doha

Heritage and tourism have become, in the last two decades, dynamic areas of development especially for the Middle East Area. The idea of heritage is crucial to the critical decision-making process as to how irreplaceable resources are to be utilized by people of the present or conserved for future generations in a fast changing world. The importance of heritage to the development of a tourist destination, the emphasis on developing appropriate adaptive reuse strategies has certainly been overemphasized. Already the general assembly of ICOMOS (Mexico, 1999) stated, that in the context of sustainable development, two interrelated issues need attention, cultural tourism and historic towns. Without adequate adaptive reuse actions to ensure a sustainable future for these resources, may lead to their complete vanishing. The growth of cultural tourism and its role in dispersing heritage to everyone is developing rapidly. According to the World Tourism Organization, cultural heritage resources are and will remain motivating factors for travel in the foreseeable future; according to the experts, people choose destinations where they can learn about traditional and distinct cultures in their historic context. The Qatar rich urban heritage is now being recognized as a valuable resource for future development. The role of heritage and its implications for urban conservation in the context of the historic Doha is central for understanding the new phenomenon of the heritage tourism in Qatar.

Keywords: Heritage Tourism, Urban Conservation, Development, Identity, Sustainability

1. Urban heritage, tourism and sustainability: the Arab World

“Arab heritage, one of the main strands of world heritage, is rich and diverse. It represents, with all its myriad manifestations, a cultural capital that can be mobilized, at a time of radical political and economic changes in the region and the world as a whole, as a means of enhancing prosper and as a foundation for effective and productive dialogue among nations.”
The central urban districts are, following the mediterranean tradition, the centers of the historic cities in the Arab World; they are the locus of economic, cultural, and residential activities, and are often overpopulated and densely built-up. Moreover, they are the containers of major souks, monuments and districts of architectural and historic significance. Therefore, they need a particular attention to survive under the waves of the current globalization era. In the face of rapid economic development, population growth, people increasing needs and changing lifestyles, most centers in the Gulf have experienced problems in making the necessary adaptation to the present waves of change.
The marked deterioration of the physical fabric in these centers greatly mitigated the identity of the Arab city. In the last decades many of these areas have been marginalized and left to face their fate alone, of neglect and dilapidation. The growth of cultural tourism and its role in dispersing heritage to everyone is developing rapidly; the balance that must be maintained is between visitor access and conservation needs. The regional and global transformations underway require a serious examination of the mind-sets that have influenced humanity over the last centuries leading to the current situation in order to assess the potential for accommodating change and participating in the ongoing global developments. Mind-sets influence the way people see themselves and others, and how they make decisions in a changing world. At times of dramatic change and uncertainty people are likely to cling to traditional beliefs and practices, often without re-examining their suitability for coping with new situations. The tendency to cling to the past and sometimes to adhere to its formulae represents a

flight mechanism and an escapism to the comfort of what has been tried in the past, following the Arab saying: Elli ti'rafu ahsan min elli ma t'rafoush (what or whom you know is better than he/what you do not know). As such, tradition provides patterns of knowing and acting under uncertainty.
This may often be a good thing, but at times this conservative policy may lead to a denial of the present and blindness to novel opportunities and solutions.
Sustainable development can be seen today as a powerful motivation for urban conservation planning. Basically, it would consist of a process of urban development based on the constant reuse of existing built resources, associated with a low input of energy for adaptation to new requirements conceived in society. It is also viewed as a process founded in the local culture, in an equitable distribution of urban services, the use of democratic principles of management, the maintenance and regeneration of traditional social values and practices. From the perspective of sustainability, cultural heritage is understood as a non-renewable resource. It encompasses some of the most important cultural values of society (identity, memory, self-consciousness and artistry), and is an asset capable of attributing value to new things through the creation of new processes based on established values.
In old cities and centers, history and heritage have become the dynamic assets that combine the local and the global. They establish the local distinctiveness so attractive to a globalized tourist market. From the sustainable approach, the city is understood to be a unique ensemble that needs to be conserved in its historical integrity. This means understanding the city as a dynamic process, a structure in permanent and continuous change. There is yet another argument for conserving old buildings and areas: the uses to which they are put and the people who occupy them.
At one time, conservation of urban heritage related only to fabric, then its scope widened to character. There is now a growing realization that the activities and communities accommodated in old buildings and souks are themselves worthy of conservation. Therefore, keeping the fabric and areas of character may go a long way to retaining the life within them. Adaptive reuse is a phenomenon which has great significance, not only because a symbiotic functional usage in historic buildings steps up the maintenance of the structure and thus delays its decay, but also because the resultant monitoring prevents cases of vandalism and scavenging of materal heritage as is seen in buildings that are abandoned.
The importance of integrating economic and cultural activities cannot be overemphasized, for it is highly impossible to conceive of an economic activity that does not have a cultural impact, and vice-versa. Buildings represent such a great economic, social and cultural investment that it would be unwise for the community to waste. However, the conservation and re-use of buildings does not mean that towns and villages should remain unchanged. For a town to be sustainable it must be viable; to remain viable it must change as circumstances change. Architecturally, a historic souk or area may appear delightful but economic activity is essential for its survival. It is not only the preservation of the physical fabric that helps conserve its meaning, but its usage and function that helps it to withstand the rapidly changing urban dynamics. It is the activity and usage of these souks and areas that continues to make them meaningful artifacts in the present city and a strong vehicle to sustain their life and cultural identity. After discussing the main issues related to heritage tourism it is necessary to analyze down to earth experiences where heritage tourism was a catalyst of regenerating rundown and derelict historic areas. For instance, the case of Souk Waqif in Doha might provide potential lessons that can be learnt and adopted in other souks in the Gulf and elsewhere.

2. The city of Doha

Doha, the capital of Qatar is the largest city, with over 80% of the nation's population residing in Doha or its surrounding suburbs. It is also the administrative and economic center of the country with a population of 998,651 in 2008. In 1825, the city of Doha was founded under the name of Al-Bida.
The name "Doha" came from the Arabic *ad-dawha*, "which might have been derived from "dohat" — Arabic name for bay or gulf — referring to the Doha bay area surrounding corniche.
In 1820 Major Colebrook described it as following: "Guttur - Or Ul Budee [Al Bidda] once a considerable town, is protected by two square Ghurries near the sea shore; but containing no fresh water they are incapable of defense except against sudden incursions of Bedouins, another Ghurry is situated two miles inland and has fresh water with it. This could contain two hundred men. There are remaining at Uk Budee about 250 men, but the original inhabitants, who may be expected to return from Bahrain, will augment them to 900 or 1,000 men, and if the Doasir tribe, who frequent the place as divers, again settle in it, from 600 to 800 men." (Rahman, 2005).
The city of Doha was bombed about three times which explains the disappearance of a large number of its historic buildings and areas. First it was bombarded by the British vessel Vestal in 1821, then it was bombed again in 1841 and the village was completely destroyed in 1847 after a battle against the Al Khalifas of Bahrain near Fuweirat. Al Koot, the Turkish fort established by the Ottomans in 1880 adjacent to Souk Waqif and near the main *maqbara* (cemetery) to control Doha and secure Souk Waqif from stealing, as most of the prominent traders had their houses in the Souk.

A small force was garrisoned in the Koot, but left with the signing of the protection agreement of 1916 between Great Britain and Qatar. Subsequently Al Koot Fort was used as a prison for a time.
Al Koot fort was a home for the guards who patrolled the *suq* at night, a service paid for the traders who refused to pay taxes in the Souk. This confirms that Souk Waqif is well deep in history and was established well before 1880 when the Ottomans built their fort. According to Mr. Mohamed Ali Abdullah a designer from the Private Engineering Bureau, in charge of the rehabilitation of Souk Waqif that the latter goes back as far as 1850s. (Boussaa, 2010).
In 1916, the city was made capital of the British protectorate in Qatar.
During the early 20th century, much of Qatar's economy depended on fishing and pearling, and Doha had about 350 pearling boats. However, after the introduction of the Japanese cultured pearls in the 1930s, the whole region, including the town of Doha, suffered a major depression and Qatar became a poor country, plunged into poverty.
Oil was discovered in 1939, but its exploitation was halted between 1942 and 1947 because of World War II and the Bahrain embargo. Oil exports and payments for offshore rights began in 1949 and marked a turning point in Qatar.
The 1950s saw the cautious development of government structures and public services under British tutelage.
During the 1960s, new administrative centers sprang up to manage the vast revenues. In 1969, the Government House opened and today it is considered to be one of Qatar's most prominent landmarks.
Following the withdrawal of the British, the State of Qatar declared its independence on September 3, 1971. Doha as the capital of the new state, attracted thousands of foreign experts and workers, employed in the construction and engineering industries.
Since then, Doha has seen the most extraordinary expansion in international banking, sporting and tourism activities, as evidenced by the many modern towers, malls, hotels and seats of power scattered throughout the city, and through huge developments like the Pearl, a whole commercial, residential, tourist and leisure complex beyond the West Bay area.
The physical development of Doha and the various conurbations of the peninsula have been accompanied by extensive preparatory work, which led in many occasions to the destruction of historic buildings and areas. There is a national pride in the redevelopment with demolition being seen as a necessary process.

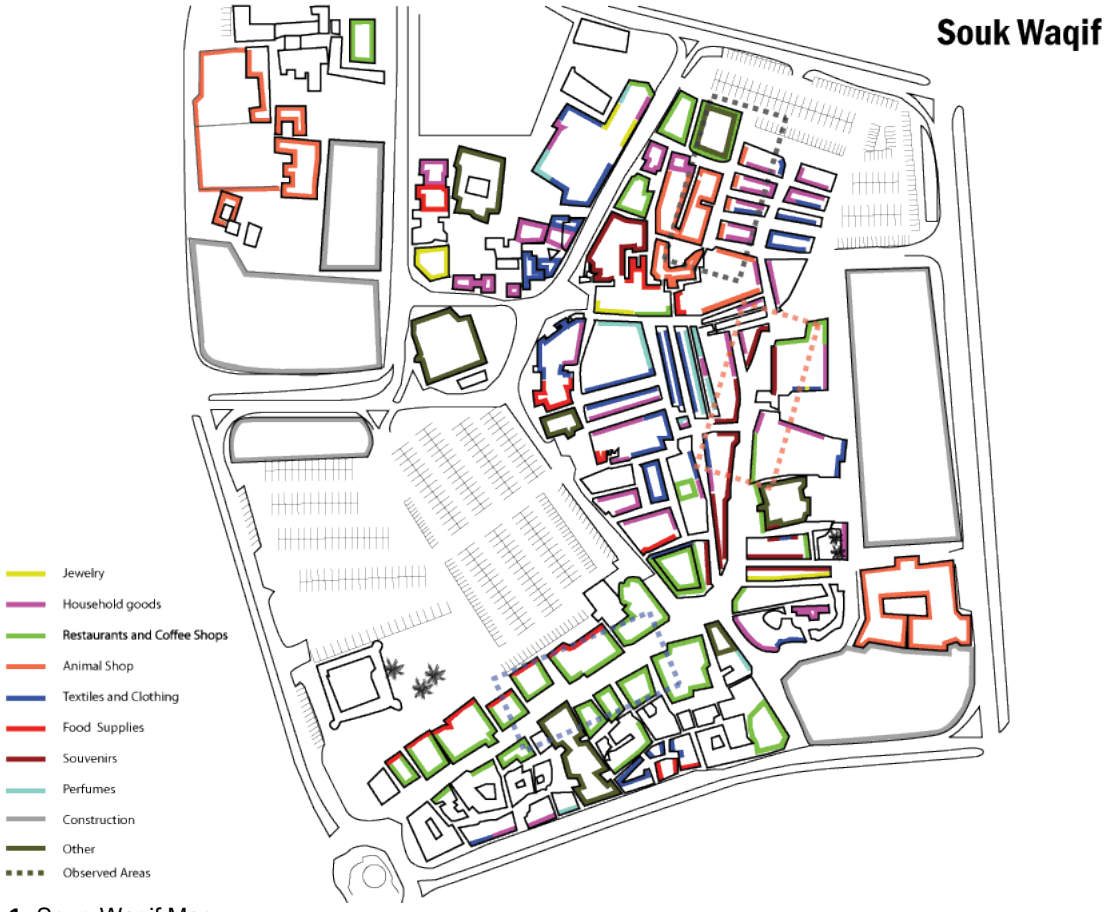

Fig. 1: Souq Waqif Map

2.2 Souk Waqif: From Survival to Revival

Located behind the Corniche, off Grand Hamed Street, Souk Waqif is a showpiece of traditional architecture, handicrafts and folk art, and was once a weekend trading area for the Bedouin.
The origins of the Souk date from the time when Doha was a village and its inhabitants gathered on the banks of the Mushaireeb *wadi* (river) to buy and sell goods. Waqif means in Arabic (standing); refers to the merchants and inhabitants who were obliged to do their businesses by standing because of the water flooding on both sides from the Wadi Mushaireeb, and pouring to Al Khrais area in the souk before reaching the Corniche.
Souk Waqif is a maze of alleyways covering a wide area, with separate sections selling perfumes and traditional forms of Qatari national dress, luggage, tools, general hardware and gardening equipment; tents and camping equipment; kitchenware, spices, traditional sweets, rice, nuts, and dried fruits.
This shopping destination is renowned for selling traditional garments, spices, handicrafts, and souvenirs. It is also home to tens of restaurants serving cuisines from all over the world.
Although this market dates back to the 1850s, it has been recently restored back to its original character. It is now considered one of the top tourist destinations within Doha.
The Private engineering Bureau of the Diwan Amiri launched the rehabilitation project of Souk Waqif in 2003. Since most of the buildings in Souk Waqif were privately owned, the government bought these buildings from their owners in order to start the work. After a detailed survey it has been found that 2/3 of the buildings were authentic, however only one third of the historic buildings were demolished and replaced by modern structures.



Fig. 2: Msheireb Urban Regeneration Master Plan by a consortium of AECOM, Allies and Morrison Architects, and ARUP (Source: T. Makower)

The strategy adopted in conserving Souk Waqif consisted of the following measures and actions: restoration of the old part of the Souk; replace the new structures with new ones reconstructing the old ones; modernize the infrastructure of the Souk; remove all the advertisement signs and all what disturbs the image of the authentic image of the heritage area. In order to achieve an authentic restoration, local buildings were used, such as Danjal, Bamboo in the roofs, the glass doors were replaced by the original wooden doors and windows. After 7 years of work the dream of rehabilitating Souk Waqif has become a reality. It has become a living heritage in the middle of a global environment; it has strengthened its place as a major hub for the Qatari people, and all residents of Doha. People go to Souk Waqif for shopping, entertainment and gazing around. Souk Waqif has become a major attraction for all tourists and official visitors to Qatar.

Recently, Souk Waqif has become a major hub for art galleries and workshops, hosting several art galleries and local concerts during holidays and special celebrations. In addition to shops, cafes, restaurants, hotels the Souk Waqif Art Center is located in the restaurants area. The Center combines a selection of small artistic shops with a number of exhibition rooms laid out around a long narrow courtyard. Beginning in 2004, the Souk started to be rehabilitated according to traditional Qatari architecture techniques, using local building materials. Currently enjoying the last phase of rehabilitation project, Souk Waqif is a major tourist place to explore. There has been a Souk on this site for centuries, as this was the spot where the Bedouin would bring their sheep, goats and wool to trade for essentials. It grew into a scruffy warren of concrete alleyways in recent years but now its tourist potential has been recognized and it's been cleverly redeveloped to look like a 19th-century Souk, with mud-rendered shops and exposed timber beams. Despite the fairly 'Densification' of the area, the chief business of the Souk continues unabated and it remains one of the most bustling and thriving traditional markets in Doha.The revitalization project was based on a thorough study of the history of the market and its buildings, and aimed to stop the dilapidation of the historic structures and remove a number inappropriate alterations and additions that were introduced.

The Private Engineering Office in charge of rehabilitating Souk Waqif attempted to revive the memory of the place. In order to achieve this, modern buildings were demolished, metal sheets on roofs were replaced with traditional roofs of *danjall and* bamboo with a binding layer of clay and straw, and traditional strategies to insulate the buildings against extreme heat were re-introduced.

Some new features were also introduced, such as a sophisticated lighting system that illuminates the market's streets. In complete contrast to the fake heritage theme parks that are mushrooming in the region, Souk Waqif is both a traditional open-air public space that is used by shoppers, tourists, merchants and residents alike, *and* a keeping as a living market day and night.



Fig. 3: DOHALAND; signature project Heart of Doha 1

Developed on a 35-hectare site at Mohammed bin Jassim District, the project is located in inner Doha, comprising five phases, ending in 2016. Turnera has entered into a joint-venture with Dohaland to offer project management and construction services. The other groups that form a part of the project are DTZ (financial feasibility) ARUP/EDAQ/Allies and Morrison (design regulation and site planning approval), Rider Levett Bucknall (Cost consultancy), ARUP (infrastructure) and Urbis (retail).
The Phase 1A, is a cluster of three civic buildings, and has been designed by Allies and Morrison, Burns McDonnel and Gillespies. The first construction contract of the project has been awarded to Bauer International Qatar. While creating the masterplan, the project team drew inspirations from Vision 2030, the basis of the "Twelve Perspectives" for the development of the Heart of Doha.
The 12 perspectives include history, culture, continuity, urban planning, heritage, landscaping, challenging architecture, water, environment and sustainability, citizenship and community, commerce and business, implementation and the future.
The final master plan was ready by summer of 2008. The main focus of Heart of Doha is to construct places that are compatible with the unique environment and culture of Qatar. The CEO of Dohaland, Eng. Issa M A l Mohannadi, said that the sustainable model being developed for the Heart of Doha project, involves working with environment, while living as a part of it.
Dohaland has spent more than three years researching and collaborating with world-class institutions such as MIT and Harvard, to develop the best model, he added.
The mixed-use development will feature 226 buildings in total, ranging from three to 30 storeys, including a national archive, theatre and museum, hotels and heritage quarter. The project has a projected population of 27,637 and the entire scheme is estimated to be complete by 2016.

2.3 Epilogue

Rehabilitation of Souk Waqif is a successful example of sustaining souks and markets in the present global environments in the Gulf. After long years of dilapidation and neglect it has become a sustainable living heritage in the heart of Doha. Despite the threats of the expansion of high rise developments around the souk, it is a strong statement and message that a souk can survive despite the proliferation of laborious shopping malls around. In complete contrast to the heritage theme parks that are becoming common in the region, Souk Waqif is both a traditional open-air public space that is used by shoppers, tourists, merchants and residents alike, and a working market.
Due to the efforts undertaken to rehabilitate this souk during the period 2004-2007, the Aga khan Award for Islamic Architecture has pre-selected this souk from the 400 entries to compete amongst 19 nominees for the 11th Cycle of Aga Khan Award for Architecture.



Fig. 4,5: Souq Waqif

There are three key lessons learnt from the Heart of Doha project; first, the success of this project can be attributed to a good brief from the client Dohaland, an excellent project team and a gilt-edged peer review panel which includes eminent professors from MIT, Harvard and Princeton Universities. Second, the cost of retro-fitting a city district which has grown up with motorcars cannot be underestimated. In order to create tighter streets and a fine urban grain, the impact of private cars and delivery vehicles has to be mitigated. A substantial basement infrastructure is thus created to cope with these modern demands whilst maintaining a strong public realm network above ground.
Lastly, environmental sustainability [LEED] can be achieved much more effectively at a Master plan level than at an individual building level. By positioning buildings closer together, deep shadows are created to shade adjacent buildings and thus reduce the overall cooling load during the shoulder seasons of March to May and Aug to October. This also creates a shaded and comfortable public realm for people to enjoy.



Fig. 6: Souq Waqif

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INDUSTRIAL HERITAGE, THE *FABRA I COATS* ENGINE ROOM IN BARCELONA: A TERRESTRIAL LASER SCANNING POINTCLOUD CLASSIFICATION

Juan M. CORSO[1] , Alejandro MARAMBIO[2] , Pilar GARCIA-ALMIRALL[3]
(1) Laboratorio de Modelización Virtual de la Ciudad LMVC, Escola Tècnica Superior d'Arquitectura de Barcelona, Universitat Politècnica de Catalunya UPC, Barcelona, Spain
juan.corso@upc.edu
(2) alejandro.marambio@upc.edu
(3) pilar.garcia-almirallupc.edu

Abstract
This paper is divided into two parts: the first seeks to compare the results of two surveys made with a time of flight scanner, Riegl z420i, and a phase based scanner, the Faro Focus[3D]. These surveys were conducted inside an industrial heritage building, the Fabra i Coats boiler room (built between 1910 and 1920). The complexity of this construction allowed us to make a comparison between technical characteristics of the instruments, settings, data collection and lighting conditions. The second part develops a classification workflow for this information. Architectural parts and installations were separated in relation to three topics: historical construction, function and architectural program. A high density point cloud model was generated, over 1.300 million points in a building volume of 7.000m³. Finally, advantages of this process in relation to the diffusion of heritage, conservation documentation for the proper understanding of the current state are discussed as well as the representation of its historical evolution in an interactive real-time point viewer.

Keywords: Laser Scanning, Industrial Heritage, Digital Preservation, Classification, Point clouds.

1. Introduction
Although there are several techniques for cultural heritage documentation, terrestrial laser scanner (TLS) technology allows a survey of very complex sites in short periods of time without compromising precision. Standard workflows are required in this type of surveys for a better understanding of the building. It is a complex task to propose a unique methodology, given the technical characteristics of instruments, the complexity of the objects and the piping facility, and the diversity of materials in these scenarios.

An example of this methodology is presented for the classification of a high density point cloud of an industrial heritage interior. A structure for the database is proposed to facilitate the access to existing information and documentation generation by users involved in the process of heritage conservation, in terms of planning, interdisciplinary communication, evaluation of outcomes and as a dissemination tool [4].

The case study is the Fabra i Coats engine room, an industrial heritage icon of Barcelona, where boilers supplied the energy for the textile factory to work, first by coal and later by gas. This room is part of a larger complex consisting of several buildings built in different periods, the oldest dates from 1890. The complex has witnessed the history of Sant Andreu de Palomar (the old town where he was born) before its annexation to Barcelona. The Fabra i Coats, textile factory represents an exceptional moment in the city's development and industrialization process which Catalonia lived in the XIX century.

This study covers different levels and scales of detail, ranging from machinery cables to brick walls that compose the main body of each boiler. A comparison of the technical characteristics between two different laser scanners is made relative to the survey proposed, looking to improve the process in relation to the data needed to identify the classified elements for a proper documentation and the time required for each survey. In this process, a comparison between two technologies is also made; a time of flight, Riegl z420i, and phase scanner, Faro Focus^{3D}, is discussed.

The paper is organized as follows: section 2 describes the case study and section 3 is a comparison of the results of the two surveys in terms of data acquisition, resolution, accuracy and density of points. Section 4 presents the workflow in the segmentation/classification of the point cloud model in relation to the data density and the complexity of the geometry. Finally, section 5 focuses on the structure of the database, designed to communicate the historical evolution of the different engines, data accessibility and its interactive visualization.

2. Case Study: Fabra i Coats engine room, Barcelona

In the nineteenth century, Catalonia was a major player in the Industrial Revolution, leaving its mark in history by changing the traditional craft production structure for the organization linked to the factory. With an urban and productive progress so fast and intense, many industrial buildings ceased to exist, others continue abandoned until further use or where destroyed. Fortunately, others have been rehabilitated. Today, these buildings are part of the identity of Catalonia; they are part of the rich urban and architectonic heritage of Barcelona, as well as a representation of the collective memory [2].

One of the most prominent examples of these processes is the rehabilitation of the industrial complex of Fabra i Coats, cataloged as Architectural Heritage of Barcelona with the “C” level [1]. Being a building that meets historic, artistic and aesthetic values, it has a relevant urban impact in the area where it is located. The Barcelona City Council bought it in 2005, turning its main buildings into a Cultural Center. It is a group of warehouses, currently under construction, with resources for the creation, practice, and dissemination of multi-disciplinary art, and the flagship project for the "Fàbriques de Creació" program.

The survey with the TLS was focused on a central chamber of the industrial complex, built between 1910-1920. It consists of a boiler room, a power plant room and a pump room. These last two rooms are located on the ground floor of a four level building. The construction has a brick structure, with English laminated profiles as columns and beams.

3. Laser Scanning Data Acquisition

As a preliminary step to the classification of the point clouds, technical questions have been raised in relation to the characteristics of a TLS survey to identify small elements in industrial heritage buildings in relation to adjustments, yields and analysis data. This data must take into account the density of points necessary to identify all elements, the optimum distance for capturing data, involvement by angles of incidence and occlusion, considering the different characteristics of both of the equipment used.

The survey of the interior of Fabra i Coats was performed with two high precision scanners:

- The first is based on a flight time principle, Riegl z420i, with a field of view 360º H * 80º V, accuracy 10 mm and a distance range from 2 m up to 250 m, 1.5 million points per 5-10min scan at 0.1º resolution.

- The second scanner is based on Phase-Shift, the Faro Focus^{3D}, this scanner system allows for a larger field of view 360º H * 305º V, with a range accuracy 0.6 mm @ 10 m, 0.95 mm @ 25 m (wavelength in nm 905), ≤ ± 2 mm systematical distance error at 25 m, beside intensity of reflected beam the Faro is able to acquire RGB, with an integrated camera 70 megapixels [5], 38 million points per 5-10min scan at 1/8 resolution.

At the end the resolution of the survey depends largely in the number of positions and the resolution established per scan. The importance of the registration process is key to the final point cloud resolution as every single element in the room, including the cables or lamps, is pretended to be registered and classified. An ICP method was adopted (figure 1) instead of the traditional target registration technique as it performs a validation error in the binding of each position. This process allows a great level of accuracy as all the information of the acquired data is considered, rather than only a limited number of points. The principal advantage of the ICP registration is independent to the nature of the geometric data (points, curves of different degrees of the surfaces). It is based on minimizing the distance between

two point clouds, point by point, by successive iterations. The main disadvantages of this process in its original form, is the convergence to a minimum which may be false, especially when data contains a lot of noise, and it takes a large number of iterations for the convergence of the model. A final 1.300 million point cloud model was obtained from 82 registered scan positions for the Faro, and a 45 million point cloud model was obtained from 16 scan positions for the Riegl.

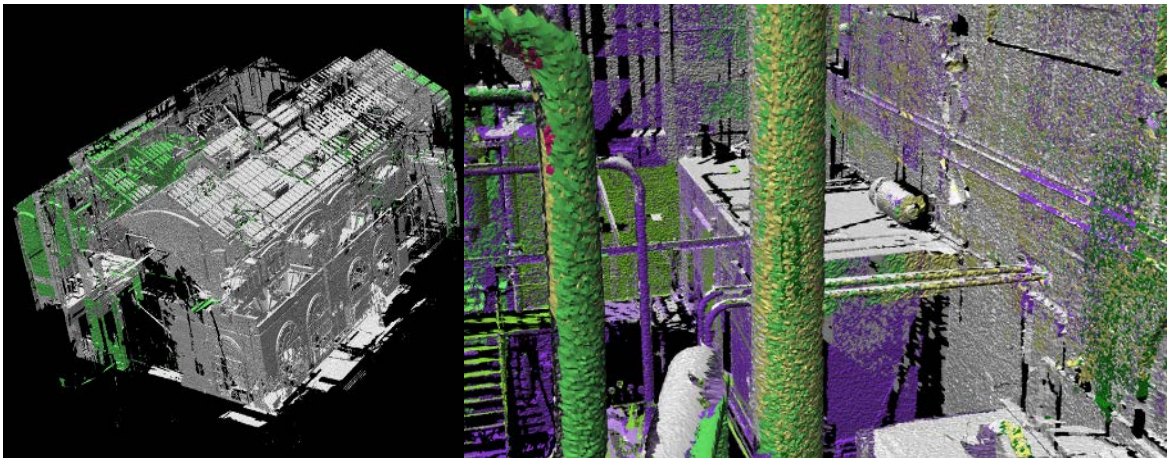


Figure 1: Scan positions ICP registration

The first comparison between the two surveys is clearly the final number of points per square centimetre. The Riegl data was acquired with a 0.1º angle (1.5 million points per scan), and the survey with the Faro was acquired with a 1/8 resolution and a 4x quality (38 million points per scan). Figure 2 shows a direct comparison between instruments, scanned at the same distance, about 2,5 m from the center of the boiler to each scanner with a 0.5-2mm resolution with the Faro Focus^{3D}, and a 5-10mm with the Riegl z420i.

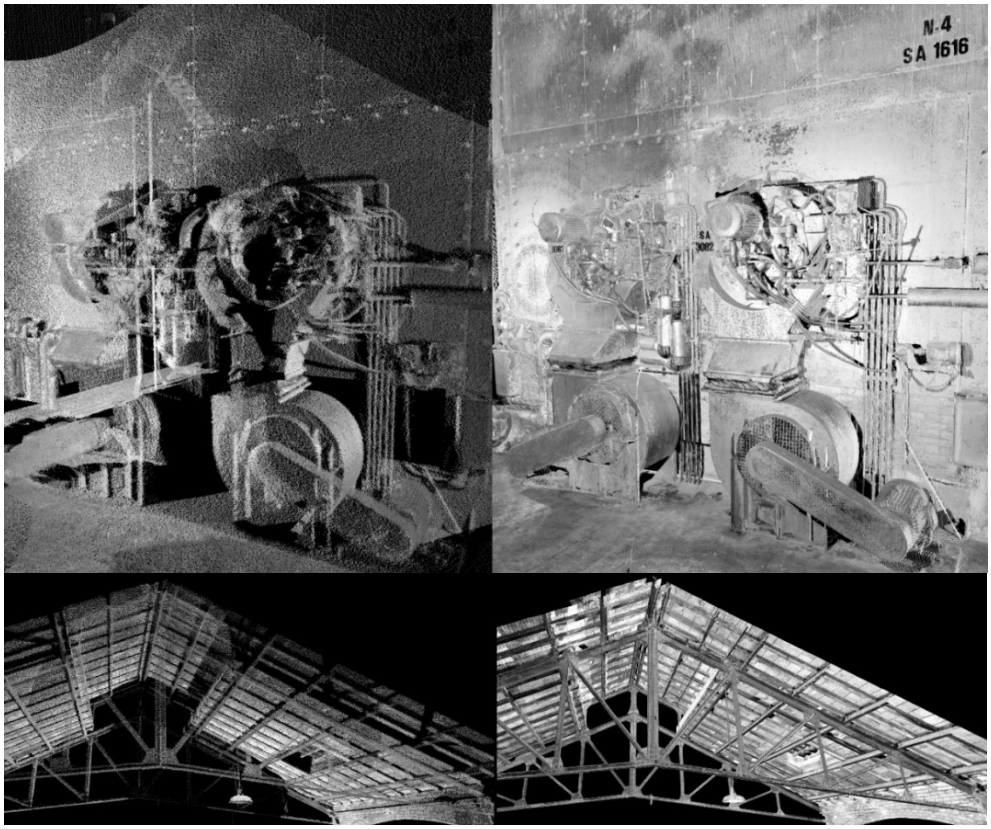


Figure 2: Comparison of resolution between Riegl z420i (left) and Faro Focus3D (right).

One of the reasons between the differences in the point cloud models are not only the number of points acquired but also occlusions. The accessibility between the boilers, the different heights, the complexity of the piping distribution allowed a limited number of scan positions, which had a direct relation with the

occluded areas (figure 3). The final point cloud model had a resolution of 0.2 mm with the Faro Focus^{3D}, and of 1cm with the Riegl z420i.

The density of points change between the interior and exterior in both surveys:

- In relation to the distance of the scanner and the complexity of the space-object, the scan distance in the exterior with the Faro and Riegl varied between 3 to 5 meters. A homogenous point cloud was generated.

- In the inside of the building, distances varied significantly between objects. Figure 4 shows some of the typical problems that we face in this survey. This image represents an architectural plan-section from the Riegl point cloud with a high percentage of occluded areas. As the data collection instrument is limited to an 80º angle in the vertical axis, it fails to document every part of the building. On the other hand, the Faro scanner has a 305º vertical angle in data acquisition, covering all the elements of the building, minimizing occluded areas and overlapping positions, decreasing the time in surveying and making easier the work plan. Number of positions where minimized, reducing overlapping, solves problems caused by the scanning angle, like problems with the normal of points (point direction in relation to the geometry), allowing a better illumination using the normal information.

In the data collection process the ambient lighting conditions were different between both scanners, for example inside the basement there was no direct lighting, only indirect lighting (specular), this affected the intensity information in the phase-shifting scanner (Faro), changing the range of intensity between levels, this problem was corrected using an equal falloff compensation for each position, modifying the current range at a distance of 20 meters for each scan and applying an auto-scale level for the intensity values, this also meant that the information out of this rage will not have a correct intensity value, and each scan needed to be distance-filtered within this distance. This range depends on the quality of the data and the distances in the space. The Riegl did not showed any significat change in the value for the intensity.

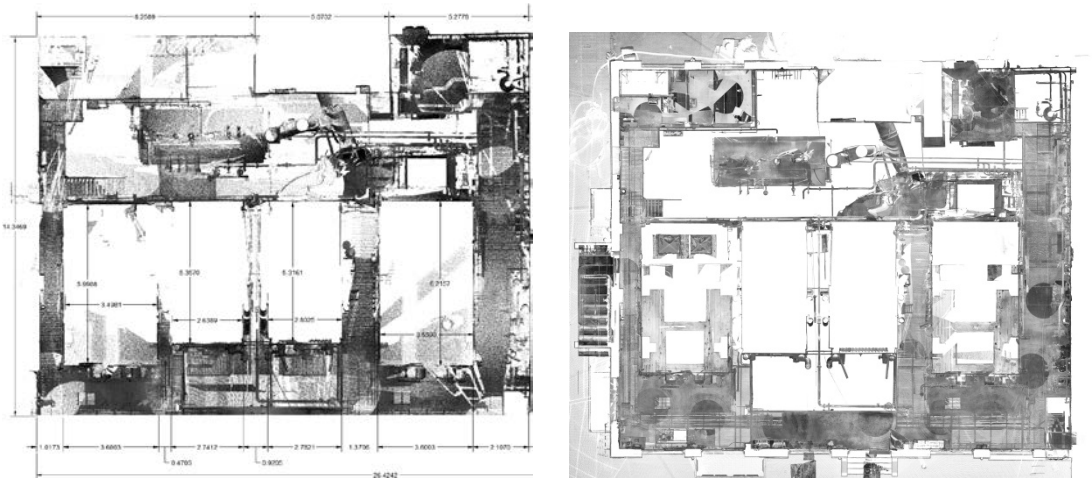


Figure 3: Architectural ortho image. Riegl z420i, and Faro

4. Classification / segmentation workflow

The high density of points in the final Faro model (1.300 million points in a 7.000 m³ volume) made a direct segmentation a difficult task. Segmentation by architectural levels was first proposed, starting with the organization of the TLS position by levels; each level was divided in three files using a predefined height, via Pointools[1] clip box tool.

The next process was the extraction of the architectural elements of the building. In this process the floor was recognized as the principal element, as without it, walls and engines were easier to identify. The area containing the floor was first extracted using a clip box tool, and then a RANSAC process in Matlab was applied for a finer selection. RANSAC considers this information a plane for the extraction, taking in to count that the data contained handrail bars on the ground.

[1] Point cloud visualization software. *pointools.com*

After the floor was extracted, we proceeded to divide the walls from the pipes along the walls (figure 4). For this process a combination of RANSAC extraction and a manual edition in Pointools Edit software was used. The same process was repeated from the information containing the wall and the boilers, the pipes and the machinery. The segmentation between the roof, the wall and the structure needed manual interpretation, because of the complexity of these elements as they blend together, for example a structural beam can be considered either supporting element or a part of the cover.

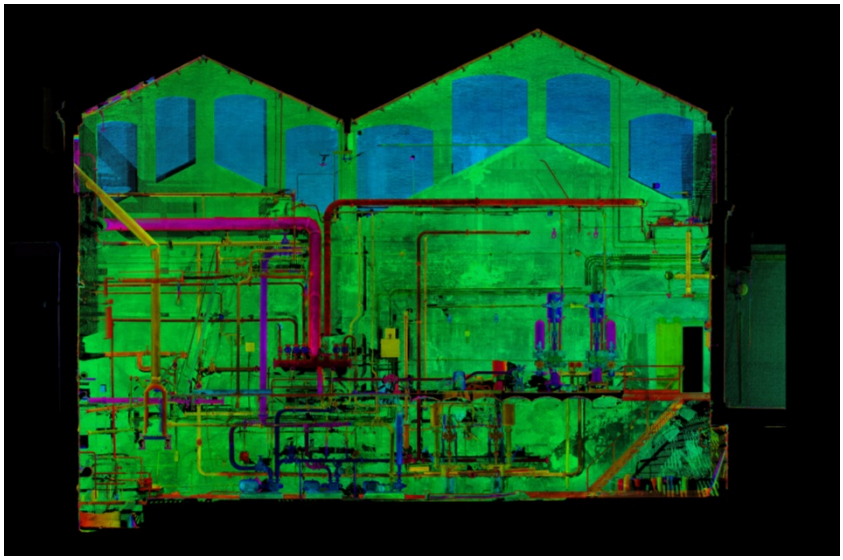


Figure 4: Complexity of classified surfaces

4.1 Classification in relation to the historical development, function and architectural program

In order to simplify user's access to the different parts of the heritage building, a classification based in architectural characteristics was required, although it can also be divided further taking into account three different variables:

- The historic development: integration of different boilers, changes in the building, evolution or modifications of the machines
- The function: coal boilers, gas boilers, electric system, hydraulic system
- Architectural program: areas were divided by different activities

The structure of the segmented point cloud to a classified one was mainly a manual process as it required a specialist interpretation to assume this differences, is not only based on geometry characteristics but rather on the knowledge of the buildings characteristics. Pointools Edit software was used for this division (figure 4). Classification order started from the first two coal boilers (N2 and N3), coal was served by hand, and supported by a system based on hoppers, supported by the bearing wall and a complementary metal structure. These boilers were modified to gas as energy source, with the addition of a burner and a steam accumulator on top.

The introduction of two new boilers (N4 and N1), forced an architectural expansion, the height of the roof and walls were raised 3 meters, reaching a final distance of 10 m height at the lowest point. The new gas boilers were elevated with respect to the previous ones from the floor by 3 meters in order to facilitate the cleaning of the used coal. The last boiler was introduced in the building by making an opening in a peripheral wall, as the tank was smaller and did not required the disassembly of the roof for installation. This last boiler only worked with gas and gave the same energy power of the four old ones (N5).

The ventilation systems associated with the boilers were modified over time, leaving at the outside of the complex a brick chimney and others metal made. Complementary to this system, two parallel systems worked together, one electric and one hydraulic. They were used to distribute energy to the other buildings through steam from hot water boilers, and to act as a fire prevention system. These combined with the boilers, generate a complex network of pipes and auxiliary machines, distributed onto walls and connected at the top with the boilers.

The architectural part is in close relationship with these machines, on the lower level with warehouses, on the upper floors with a metal frame for circulation (Figure 6), that reaches the highest point of the machines, the roof with its modifications with a metal structure trusses and a metal structure that is still being modified, as a reinforcement to the complex.

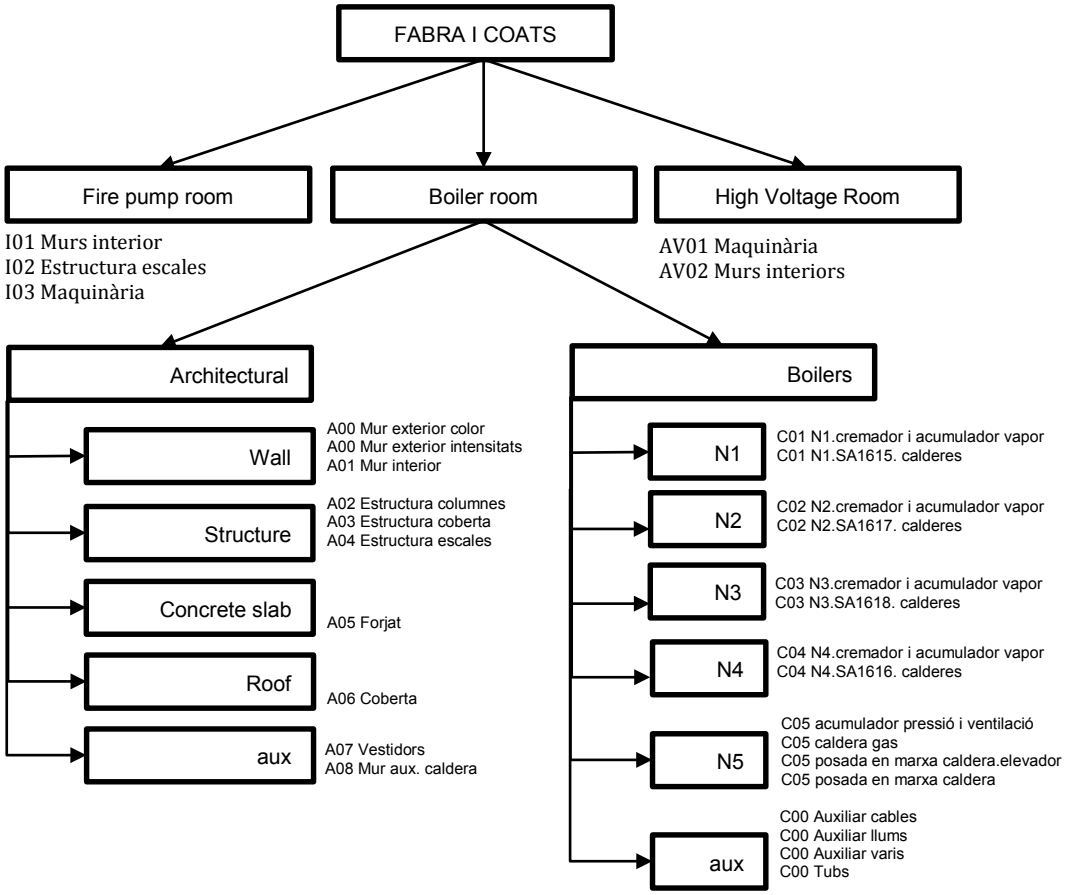
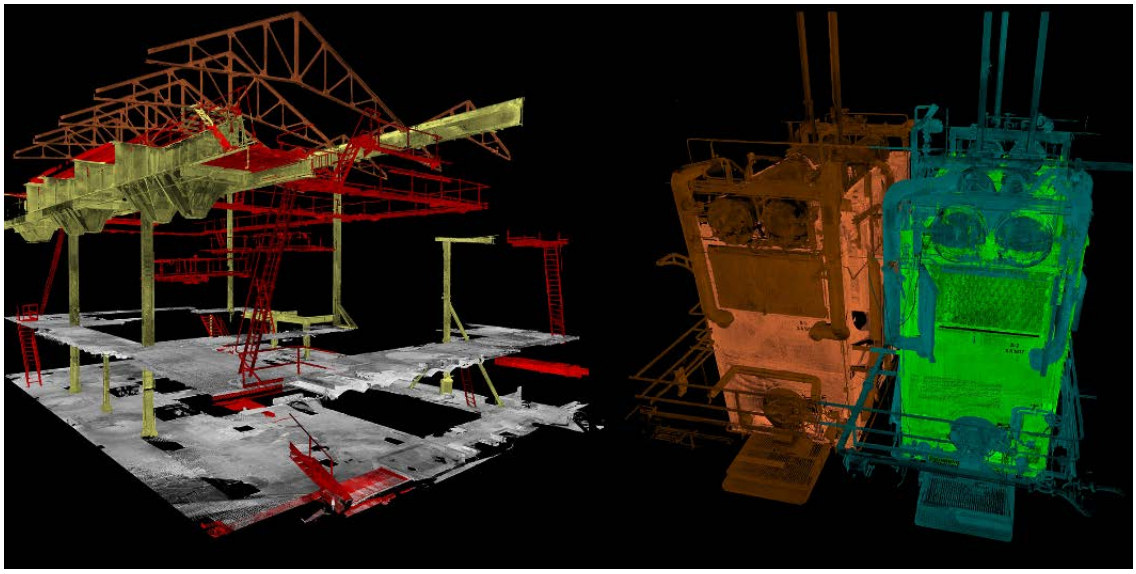


Figure 5: Database structure for the final point cloud model (31 parts).

In general the data structure is represented above (figure 5), the tree principal spaces; the boiler room, the high voltage room and the fire system room, this last one is considered as an important innovation in the industrial revolution of Catalonia.

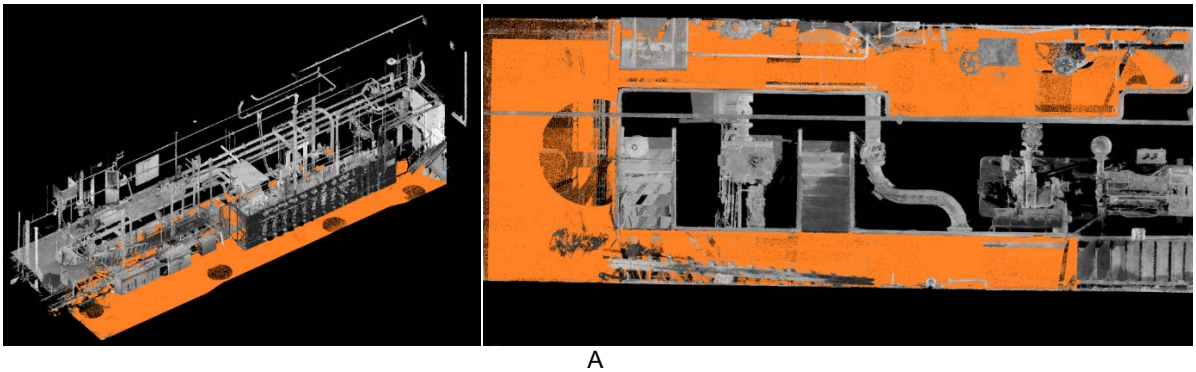


a) b)

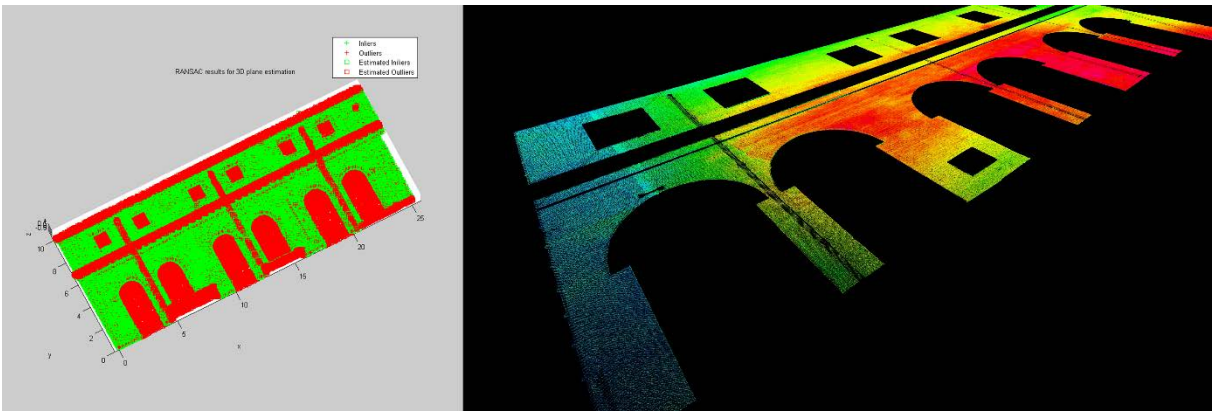
Figure 6: a) circulation left in red, trusses in orange, coal storage hoppers in yellow, and ground in gray. b) N3 and N2 isolated boilers

4.2 Fine selection and extraction with RANSAC

The process RANdom SAmple Consensus (RANSAC) is proposed by Fischer and Bolles (1981) is an iterative method for estimating parameters of a mathematical model from a set of observed data. This method comes from the field of computer vision. Used as geometrical segmentation algorithm due to its ability to automatically recognize the forms through the data (planes, cylinders, spheres and bulls), despite the noise.



A



B

Figure 7: RANSAC detection to extract the ground and facades in complex models. A) Classified ground points. B) Example of a segmentation of the major plane in a façade.

The method RANSAC used is RANSAC.m from the RANSAC Toolbox for Matlab™ [6]. The principal options assumed are: for the scalar value of the noise variable sigma a value of 0.01m, the probability of error P_inlier 99%, percentage points to be considered as a plane 25%, we use the equation 1 for the selection of the minimal base points (m) to establish the relationship between the points and the plane. This calculation requires the P_inter (P), the minimum number of points required for the calculation (p), the fraction of abnormal values observed (outliers, ε).

$$\mathrm{m} = \frac{\log(1-P)}{\log(1-(1-\varepsilon)^{p}} \qquad 8.4 = \frac{\log(1-0.99)}{\log(1-(1-0.25)^{3}}$$

Equation 1: minimal base points for the detection of a plane

The resulting shapes are tested against the original data points to determine how many of the points come close to the shapes (Figure 7). From the extraction of these data the surface can be calculated, striving to outline the geometry.

5. Diffusion of Heritage: the virtual model

The final part of the process is the appropriate diffusion of the information. We divided the final classified model into three categories: a model for specialized users, a model for general users, and a model for mass users (Figure 8).

- High resolution model: This information is the basic information for scientific-historical analysis and historic documentation, with a resolution of 1 point each 3 millimeters. This kind of information changes the heritage analysis, as the new technologies and process allows us to go deeper in the knowledge of the parts of the building, from characteristics of material (for example material

alteration of an object over time) to structural studies (like deformations analysis). New research opportunities are open describing the current state and the evolution of the heritage in technical terms.

- Medium resolution model: This model allows the exploration of the whole building by non-specialized users. The classification structure is maintained for data accessibility. This information is oriented to users who constantly work with this building. In this case, to the *Museu d'Història de la Ciutat de Barcelona (MHCB)* and *amigos de Fabra i Coats*, who administer the building.

- Low resolution model: This model is made for webcasting purposes, in the process of building a virtual museum buildings online (figure 9 b). With resolutions of 5 and 10cm, with no classification, mainly use for navigation purposes.

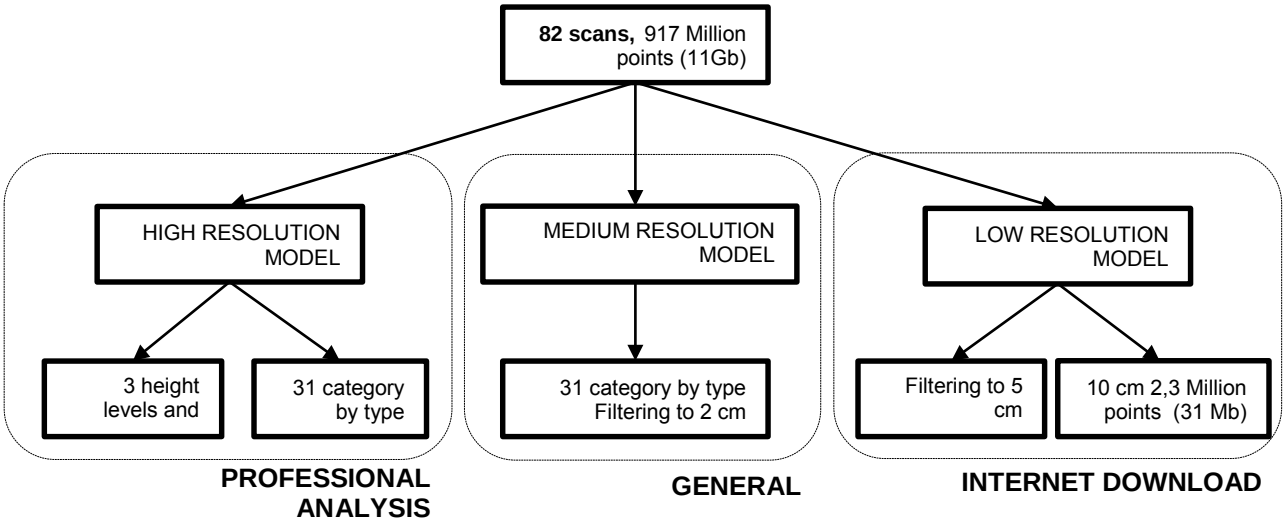


Figure 8: Tree levels of information for diffusion



a) b)

Figure 9: a) High Resolution Model: 917 million points, b) Low Resolution model: 2,3 million points

Point Cloud model viewers are increasingly growing in the industry, as professionals fell more comfortable working directly with points rather than mesh models. We recommend both Meshlab[2] and Pointools software for visualization purposes. Web point cloud viewers are starting to appear such as

[2] MeshLab is an open source, portable, and extensible system for the processing and editing of unstructured 3D triangular meshes or point clouds. *meshlab.sourceforge.net*

cloudcaster[3], or XB point stream[4], all of them allow point cloud navigation and simple measurement in the basic interface.

6. Conclusions

Riegl Laser scanner, time of flight scanner, is not an appropriate scanner for detailed interiors surveys where data obtained is in the 2 to 10m range, as a larger number of points per position are necessary for high detail acquisition. On the other hand, Faro's portability and high number of points in short period of time is the appropriate tool for this type of interior surveys where a measurement every 0,5cm is needed to extract every object detail.

Changes in lighting conditions affect the intensity value directly of the Faro scanner, as well as distance to objects, making this information useless when scan positions are registered. This is not the case while working on single scans information. Riegl intensity value does not have a sensitive change if lighting conditions changes or as to the distance to the objects. Incorporated RGB camera in the Faro scanner, as it cannot be controlled by the user, provides unwanted color images. Texture value coming from these images is very important for a correct 3d interpretation.

Obtaining a high density point cloud model is nowadays a fairly simple task. The discussion needs to focus in two main aspects: how this model needs to be subdivided for an agile and appropriate use, and how many different models need to be delivered for different users and applications. The subdivision of the model presented is far from an automatic classification, as it needs to respond to historical, architectural or program needed. This step is necessary as it adds accessibility to the model. On the other hand, different resolutions are necessary to be generated for the accessibility of the model for different users.

[3] High Definition Point Clouds in the browser. *cloudcasterlite.com*

[4] A cross-browser JavaScript tool which emulates Arius3D's PointStream viewer. *https://github.com/asalga/XB-PointStream*

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Southeast Asia's Built Heritage at the Cross-Roads – How to Reconcile Tradition and Modernity within Competing Constraints

Ahmad Najib ARIFFIN
Nusantara Academy of Development, Geocultures and Ethnolinguistics (NADGE)
Kuala Lumpur, MALAYSIA
najib@nadge.org and **nadge.my@gmail.com**

Abstract
Southeast Asia has a wealth of tangible traditions and intangible heritage; where the Malay Archipelago was the key part of the historic Spice Routes, with the city of Melaka (or Malacca, a UNESCO World Heritage Site) being the epicenter of the spice trade - and thus part of Le Vie dei Mercanti.

While acknowledging that the cultural legacy of the Malay Archipelago region is astonishingly rich, it's alarming to see the rapid disappearance of many of its diverse heritage structures and practices; many of which are valuable not just for their intrinsic value, also for their lessons in managing human civilisation.

One example is the timber Malay house on stilts, once common throughout the Malay Archipelago in Malaysia, Indonesia and the Philippines. It was an environment-friendly form of architecture requiring great skill to make but the result was a masterpiece of both form and function that saved occupants from floods, wild animals, tropical heat etc. Yet today this house form is dying out.

Here multiple constraints are at play; modern influx of new technologies, foreign influences, demographics and economic exigencies that affect the built environment and not least the people's own perception against tradition.

However there is a way to reconcile these constraints: it is simply to go back to the root of how these houses came about in the first place. The reasons are still there: the local environment, climate and lifestyle – these lead to the possibility of revitalising a living heritage.

Keywords:
Southeast Asia, built heritage, architecture, architectural conservation, cultural revitalisation

1. Background and Introduction

The region of Southeast Asia has an acknowledged wealth of native as well as foreign-influenced traditions and heritage; be it in the tangible built and physical environment or intangible culture and lifestyle.

The Malay Archipelago and especially the Malay Peninsula, which is today the western half of Malaysia, was a key part of the historic Spice Routes with the port city of Melaka (Malacca, a UNESCO World Heritage Site) being the epicenter of the spice trades – and thus indeed a part of Le Vie dei Mercanti.

In fact, a growing number of international researchers, practitioners and writers in the Humanities and Sciences including history, archaeology and anthropology are discovering that Southeast Asia's Malay Archipelago region has a civilisational existence and historical context that is much older and more extensive than previously thought; as shown for example in the works of Dr. Stephen Oppenheimer in his book 'Eden in the East – The Drowned Continent of Southeast Asia'[1]. Closer to home there are Prof. Dr. Zuraina Majid and Prof. Dr. Mokhtar Saidin's teams of archaeologists whose ground-breaking discoveries have pushed back the earliest evidence of human civilization and networks in the region by literally thousands of years.

Historians, heritage practitioners and cultural researchers who acknowledge the cultural antiquity and built heritage of the Malay Archipelago region as astonishingly rich and mind-bogglingly varied, will also be alarmed at the rapid disappearance of many of its diverse heritage structures, artifacts and practices; many of which are valuable not just because of their humanity and historic value, but also for their environmental and educational lessons in managing human civilisation and the earth.

A simple example is the nail-less timber Malay house on stilts, once common throughout the Malay Archipelago in today's Malaysia, Indonesia, the Philippines and other regional countries. It was a most environment-friendly form of architecture requiring great woodcraft skill to make, but the result was a masterpiece of both form and function that saved the occupants from floods, wild animals and the tropical heat. Yet today, this house form is not only dying out but the existing ones are also rotting away. Here, multiple constraints are at play.

2. Conditions and Challenges

Several issues and problems can be identified that plague the natural continuation and full sustainability of the various types of heritage in the Malay Archipelago countries. This paper attempts to outline them below and share the various ideas in the effort to save this human heritage of native building traditions and even try to make them thrive again.

These conditions and challenges to positive heritage perpetuation include the population's changing perceptions due to modernisation and/or foreign influences, which are not necessarily positive or negative but are nonetheless pervasive; the need for funding in the effort to preserve and continue heritage conservation but which compete with other national economic development and financial needs, especially for these developing countries; the possibility of tourism as a source of funds but which could also be counter-productive if not managed well or if it brings in over-whelming outside influence; and other problems that will be discussed.

Sometimes these challenges are multi-faceted and need the cooperation of many social and professional players and parties. For example the effort to conserve and continue the authentic traditional architectures of the Malay Archipelago require the understanding, agreement and collaboration of property owners and the community or even local neighbourhood; governmental authorities; also funders/financiers as owners frequently have no spare money; specifically-skilled architects, engineers and specialised contractors or restorers or even traditional building craftsmen who are not always easy to source. After all those comes the question how to sustain the buildings' maintenance; maybe through tourism; thus also needed are tour agents/marketers and knowledgeable tourist guides. Do not be surprised that in Southeast Asia at any one part above, the party may not have the ability or even willingness to collaborate. There are various interesting and instructive reasons for this, which this paper and presentation will try to address.

3. Efforts and Effects

There are certainly efforts made in each country such as Malaysia, Indonesia and the Philippines to try and conserve the cultural heritage and stem the tide of diminishing traditions before they face the danger of extinction. Some conservation efforts and heritage items are successful; some are still struggling while some may be lost causes.

Various examples of each respectively such as individual traditional buildings around Malaysia and Indonesia that are successfully saved; or the old shop-house cityscape of Georgetown, Pulau Pinang (or Penang, another UNESCO World Heritage Site in Malaysia) which is in a partly-political struggle for survival, while the quaint and unique Malay village enclave of Kampung Bharu in the heart of Kuala

Lumpur, Malaysia's capital, may already be a lost cause, and tourists are flocking to see it before it is demolished: gone forever due to the pressure of development and lure of monetary gain.

Some of the efforts include local organisations that have advocated certain principles for heritage conservation or preservation of traditions and tourism benefits. Among them are the NADGE/Nusantara Academy's Five Principles for Heritage Tourism, somewhat enigmatically abbreviated in acronym as WF2PA in Malaysia, and other efforts in other neighboring countries as well. NADGE is also working with Malaysia's heritage authorities to help identify for example, traditional building elements that are culturally significant, architecturally meaningful and environmentally useful to incorporate into local modern buildings. A guidebook on this effort is being produced for edition this year, and in a way this Forum is its international 'soft debut' as a critical example of architectural heritage discourse.

Indeed, this paper and presentation as described above hopes to deliver and share the Southeast Asian region's experiences and state of heritage, be it in the tangible or intangible dimensions, its heritage management encompassing local or interconnected history, culture, collective identity, communal memory, and even archaeology that all make up parts of the Archipelago's cultural landscapes.

"History is a valuable guide; heritage is a priceless crown – without which a society loses its way and its wealth". Hopefully this paper records and shares some of the history and heritage that Southeast Asia has to offer.

4. Southeast Asia's Malay House – A Meaningful Heritage

In our haste to embrace everything that is modern or progressive and which may appear advanced and convenient, we sometimes forget and discard previous knowledge, technologies and practices that were very suitable and sustainable to the place and circumstances of where we live.

While some old or traditional architectural practices may be thought of as 'outdated', that is in cases because we have forgotten the overall wisdom that came with the traditions. Yet the modern designs or technologies that replaced them have not truly solved current living problems, and may even create new unsustainable conditions, such as increased air-conditioning use, environmental conflicts and so on.

A new and continuous examination is needed on the characteristics and suitability of traditional architectural designs and practices for modern requirements. This effort also relates to identity, in which the typical contemporary built environment lacks an identifiable image of, say Malaysia or the Philippines, which in many developed countries can still be seen in their built heritage. Yet once we find the relevant elements and usage that are derived from our local characteristics, we may strengthen our built identity.

5. Traditional Architectural Heritage – Malaysia's as One Example

Overview of the historical origins and the cultural and environmental factors that influenced traditional architecture in Malaysia, which has many similarities with others in the Malay Archipelago region.

Malaysia has a very rich indigenous building tradition. Its various forms are born from the wisdom of long experience and exposure of the native peoples to the land's natural conditions and their local cultural framework since time immemorial. It was thus highly suited to the region's environment; using organic materials in sustainable ways and responding to lifestyle practices that did not waste, and as such respected the earth.

It is unfortunate that this wealth of traditional architecture is not widely recognised nor duly appreciated with more study and utilisation of its beneficial features.

In fact, nowadays one would be hard-pressed to find traditional houses in original forms in urban areas in Malaysia anymore. The dwindling authentic houses that remain are seen only in the *kampung* or village areas. Many have been modified with ungainly modern extensions, while so many utilise corrugated zinc roofs – making them unfairly look like poor squatter houses instead.

This is really a pity as the true traditional houses of Malaysia were actually intelligent buildings and part of a wider environment-friendly way of life. It is essential that architects and builders practicing in Malaysia recognise why and how this is so in order to continue a consciously sustainable tradition.

Before the arrival of foreign or modern influences, the local peoples of Peninsular Malaysia and their related indigenous tribes of Sabah and Sarawak had already highly evolved their traditional dwellings with forms that excellently suited their lifestyles in the tropical environment.

Whereas on the Malay Peninsula single extendable family houses were the norm besides palaces and mosques, many of their cousins on Borneo island also built *Rumah Panjang* or 'long-houses' hosting a string of family dwellings in one complex, each in its own 'apartment' with a common multi-purpose verandah linking the front called '*Ruai'*. Designs and concepts were rarely exclusive to just one area or group and there were many shared elements across regions and sub-ethnic groupings.

After all, it should be remembered that before "Independence" there were no national divisions between Malay Archipelago countries such as Brunei, Indonesia, Malaysia, Philippines and so on. Among all the distinct but related native ethnic groups across the region, there were no fixed man-made borders and movements between people and their ideas were fluid, without being nomadic.

Seafaring and traveling for trade and cross-migration were very common. This sailing affinity is even reflected in some of the traditional architectural designs and terminology such as *tebar layar* (unfurled sails) and *pemeleh* (carved oar), which are shared with navigation and sailing elements.

In explaining this 'movement culture' phenomenon, the Historian and Researcher T.N. Harper[2] wrote, "The civilisations of the Malay World are founded on movements of people rather than the settled accumulations of population."

This observation encapsulates why the Malay World needed relatively few cities to sustain its civilisation of a well-organised society with states and kings, religious cohesion and prescribed laws plus writing and trading long before colonialism. The city of Melaka was one of the exceptions that prove the above rule, since no comparable city was needed to maintain civilisational continuity even after it was lost to invading foreigners. Also, the Malays' lack of long devastating wars among themselves is why stronghold structures such as stone castles were rarely needed.

These factors above also explain why buildings were somewhat 'impermanent' by modern standards i.e. made of wood and other organic materials (not stone or brick). Even then these wooden buildings were purposely designed as prefabricated timber structures that can be dismantled, or even carried around. Thus once these houses were made, their usage was maximised with minimum waste.

Yet when their houses or even whole settlements had to be abandoned, being of wood and organic materials, the structures would simply biodegrade and return to pristine nature over a relatively short time, leaving no trace whatsoever of having hosted native human habitation. This is, for example, why it is difficult to locate evidence of old Malay trading centres mentioned in historic accounts but no longer exist today. Traditional Bumiputra (Malaysian term for 'indigenes') organic architecture fully returned to nature.

This is the historical background of our traditional architectural heritage, much of which is now lost, forgotten or misunderstood. It is the history of a society that was mobile and yet at the same time was rooted to the land, that respected the earth and the impermanence of life and yet had developed an artistic and architectural culture that had sustained them and the land untainted over the ages.

6. The Built Environment

Malaysia, like much of the rest of its shared Southeast Asian co-cultural region, is located in a hot and humid equatorial zone. Vast and thick jungles of stunning floral and faunal diversity cover every inch of land right up to the beach and even beyond the shores, such as the mangroves in coastal water.

Rainfall is very high, no less than 2.5 meters per annum, with floods common as rivers regularly overflow. Impermanence was expected as Malay proverbs attest:

Sekali air bah, sekali pasir berubah
'Once the flood comes through, the land changes too'

With thick rainforests surrounding them everywhere, it was natural that tropical people would use the readily available jungle resources to build their dwellings.

Using these replenishable natural materials i.e. various kinds of local hardwood timber such as *cengal*, *merbau*, *meranti* and other species as well as bamboo and rattan, the native folk moulded their houses and their lifestyles in a way that respected the Earth more than any other settled society in the world. So much so that their organic houses fully biodegrade or disappear if they were neglected.

Responding to climatic exigencies, traditional timber houses also incorporate design principles still relevant to contemporary architecture such as minimising conflict with nature and maximising ventilation and shading; qualities easily seen in the house's basic features as described in the following sections[3].

6.1 Living on the Air, Just Touching the Earth

A main characteristic of a typical Malay *kampung* or village house includes the obvious fact that it is raised on stilts or columns. There are at least six advantages for this:

- to be above flood waters,
- to avoid wild animals and creepy-crawlies,
- to enhance ventilation,
- to deter intruders and thieves from easily entering,
- to become a sheltered storage area, and
- to act as a day-working area below the house.

The fact that the house is elevated, called "*panggung*" style (meaning 'platform' or also 'theatre'), is indeed very environment-conscious.

For instance, in one stroke of elevating the house, contact with wild animals from tigers and snakes to centipedes and scorpions is greatly lessened. Being raised, the houses also did not impede the movement of wild animals who have the right to roam the earth too. Yet plants such as certain herbs and vegetables can still be grown to a certain extent beneath the house.

Thus conflict with nature is minimised.

One can make a point that the inhabitants basically 'live in the air', occupying a space where there was none, with only the tips of their house - the stilts – touching the soil. This shows great respect for the *Bumi* (the Earth), by covering minimum surface and disturbing the land as little as possible.

6.2 Unwelcoming the Heat, Celebrating the Roof

For ventilation and dissipation of heat, the elevation of the traditional house into the wind's path and also its many windows, perforated carvings and slatted panels around the walls plus the high ceiling roofs made of woven thatch or light clay tile all contribute their respective cooling effects.

The roof plays a huge role in the prevention of heat build-up as well as rainwater dispersion. All traditional roofs are *always* pitched to quickly drain off rainwater.

Traditional house roofs also always have wide overhangs; critically important for sun-shading and protection from heavy downpours in tropical climes.

The result of this pitched or sloped form and multiple function of the roof is that it becomes a dominant feature of traditional architecture. In other words, as the head-covering or even head of the house's body the roof thus dominates the 'look' of traditional houses.

The thatch roofs, usually made from the prepared woven fronds of the *nipah* or sometimes *rumbia* palms in downward overlapping arrangements, not only physically protect from heat and rain but psychologically give a cooling feel as well.

A similar effect is achieved with the thin '*senggora*' clay roof tiles common in the Malay Peninsula's east coast. The name is from Senggora which is the original Malay name for what is known as

Songkhla in Thai in today's southern Thailand. Nonetheless these tiles were once made all over the Peninsula's East Coast region.

The senggora tile is purposely thin for at least four reasons: it is light to carry around, it would not burden the weight of houses on slender stilts, its thinness reduces its heat absorption and re-radiation capacity that thick roof tiles have, and if damaged it could be more easily removed and a replacement piece slid in; all very practical and environment-conscious qualities.

However the popular use of exposed zinc sheets, because of its ease of installation and cheap supply, unfortunately increases heat and is noisy during rain. Nonetheless, in the early years of the nation's development it served its purpose of being a time-saving and economical cover over one's home.

The traditional roof eaves, in many cases have beautifully carved timber eave-pieces or boards (called '*papan cantik'* and other names) to decorate the visual connection between roof and sky, and also contribute to the cooling feel.

Some roofs hold attic rooms called *lenting* or *loteng* as in many Melaka houses; effectively making the already raised structure a three-storey edifice. This is no surprise as even in the 15th century, the Melaka Sultan's palace was a six-storey edifice built entirely in nail-free timber.

6.3 Materials from the Surroundings; And No Need for Any Nailings

Using hardwood timbers that were locally available and regrowable, the traditional folk engaged expert *tukang kayu* or *tukang rumah* (wood or house craftsmen) who manufactured structures in such a way that they did not need a single nail, and was in fact a prefabricated building system.

Instead the Malays used an ingenious system of pre-cut holes, wedges and dowels called '*Tebuk, Selak dan Pasak*', among other names. These holes or openings need to be precisely positioned and made on the pre-measured timber pieces to fit the building elements into one another, effectively making it a 'prefabricated house'. When all the timber elements were ready; cut, holed and grooved, the pieces would then be brought to the pre-determined site and by tradition, or even taboo, the main structure needed to be raised with the pieces slotted into each other up to the roof cover before sunset. This was simply to prevent overnight rain from soaking the structural pieces and potentially damaging its material integrity.

In Sarawak and Sabah *rotan* or rattan ropes were used to fasten pre-cut-and-grooved bamboo pieces that were fitted together, a system called '*Tarahan Tanggam*'.

Interestingly these were thus all precursors to what is now touted as IBS, or *Industrialised Building Systems* that are gaining (or *regaining*) popularity today.

The Malay craftsmen and house-builders knew the qualities of timber inside-out and how wood should be used in their structures. There was very little waste of logs as almost all parts of each tree were used, even down to the leftover pieces used for dowels, wedges, small panels and carvings, or kept under the house for replacement parts.

Houses were built without nails. Although nails had been invented and in some newer traditional houses used for non-structural or supplementary elements, there were benefits of structural flexibility that the rigidity of nailing defeated.

Without nails, a timber house could be dismantled piece by piece, packed up and taken to a new location, as and when the owner needed to move to another place or to sell the house but not the land.

In fact, for short distances, the nail-free flexibility and relatively lightweight timber even allowed a traditional-style house on stilts to be lifted on many shoulders through '*gotong-royong*' (community cooperation) and carried to another spot.

7. Principles & Issues on Heritage Architecture in Modern Use

This discussion centres on the principles of usage and main issues and difficulties in heritage infusion.

The desire to continue a society's traditions, in our case in architecture, is a universal one.

If a society's traditions are not overly disrupted by new changes such as from foreign influences and/or the introduction of radically different technology, the tradition may evolve accordingly. However in most cases the changes are new and radical, as in most Malayo-Polynesian cultures where the architectural transition involved traditional nature-based materials and craft technologies to a modern industrialised and even synthetic context.

The matter can be quite complex, as it involves not just materials and design but many other human factors such as patriotism, politics and so on. The typical result is a certain level of confusion through the differing attitudes and approaches to the issue. There would be many different interpretations on how to continue tradition and identity in the face of new challenges and changes from the traditional ways to the modern onslaught, which can't be ignored.

Different people will have different arguments and levels of acceptance of the various approaches in handling the matter of continuing and infusing tradition in buildings.

A term that is used this kind of discourse is 'vulgarisation', which refers to the improper, (hence 'vulgar' as opposed to 'rude'), usage of an element from one context to another.

In our discussion it refers to the 'improper' use of traditional architectural elements in modern contexts. This is subjective and is a long-standing argument that exists everywhere there is a prior architectural tradition, even in the West where the Post-Modernism movement provides one of the many discourses on this issue.

For some, using traditions in any different context from the original is charged as 'vulgarisation', as in translating traditional Malay timber architectural designs into modern concrete buildings. Yet these detractors have no qualms about seeing alien elements from non-tropical cultures or temperate innovations from the modern West plonked into an intensely hot and rainy equatorial context.

Thus we have Neo-Classical European façades or modern unprotected surfaces open to the hot sun and windy rain, bulbous domes with ugly water-streaks or modern open walls discoloured after a short while, and expanses of unsheltered glass baking their interiors if no artificial cooling is exploited. The same goes for decorative items such as alien or modern 'feature elements' jutting about with nil or dubious meaning.

Some argue for clean modern architecture or some amorphously similar concept. The issue about "clean modern architecture" is that when the inevitable tropical dirt-stains, water-lines and fungus or mold stain the building; it has no carved mouldings, human-scale elements as in framed windows or meaningful carvings nor importantly a "sense of place" to keep it from being, yes, outright hideous.

Indeed, in all architecture before the early mid-20th century's industrialism one can feel the human craftsmanship or artistic touch. This is absent in the HVAC-heavy industrialised modern boxes of today.

Yet much of these above improprieties are 'accepted' as part of progress, modernity or even 'diversity' but why not the cooling traditional roofs and adorned overhangs, or other local tried and true elements born of the land and friendly to the enviro-cultural context.

8. Current Conditions and Utilisation of Tradition

In this age of modernity and globalisation with modern culture and 'world architecture' permeating the planet, more and more voices are calling for a stop to the spread of near-identical, industrial-looking concrete boxes that rid our cities of any sense of local identity.

It may not be that practical or desireable at present for us to build completely in timber and bamboo as before but these materials are regrowable, so it's a matter of replanting them – exactly as our ancestors in the Malay kampungs did by planting a tree for every child born.

In any case, we can still use our timber or bamboo heritage for select buildings in modern ways (two vastly different examples of this come to mind, Galeri Glulam in Johor Bahru, Malaysia and The Green School in Bali, Indonesia) OR use traditional elements in contemporary buildings of modern materials.

Most aspects of traditional Malaysian architectural designs are very environment and climate-friendly, not only physically but psychologically as well, as they promote both the practice and propensity of safety, shelter and shading; as in not just overhanged roofs but also the *cucur atap* or *papan cantik* that elicit the feel of shadow and coolness. Indeed all traditional Malay-Bumiputra architecture with its pitched roofs, wide overhangs and even being raised on stilts is very eco-friendly.

Thus the 'vulgarisation' of architecture, meaning when a modern building takes on 'traditional' designs that are 'unsuitable', is actually not as big an issue as it is made out to be when the usage fits the enviro-cultural context of the place.

But this is also subjective, wherein some accuse that using traditional designs in modern Malaysian or Indonesian buildings is vulgarisation, as that depends on how it's used and also its context. These same critics then love modern or Western elements in local buildings, which are worse as they're alien and many are not environment sensitive.

Thus as long as the traditional architectural elements fit the enviro-cultural context, physically and psychologically they can *not* be accused outright as architecturally vulgar or improper.

After all, and most of all, the traditional forms of Malaysia's Malay-Bumiputra architecture are actually very universal. The forms exist in many other distant cultures, such as the *Bumbung Panjang* long roof*, Bumbung Limas* gabled roof or the *Bumbung Meru* pyramidal roof with finials and so on. So much so that sometimes they are claimed to be influences of others, which in fact reinforces their universality and usability.

It is alright to have a diversity of other and all types of architecture in our urbanscape, but it is a sin to dismiss our own homegrown architectural styles, elements and embellishments that can give a traditional identity to our buildings and cities, and so prevent us from being just another concrete jungle with modern boxes that can be plonked down anywhere in the world.

There is such a large variety of traditional designs, elements and components that the menu of usable choices is large enough to allow different configurations, combinations and heritage-based inspirations to give each building an identity, just as each of the real traditional buildings themselves had.

While the heritage infusion in buildings may not be liberal or literal, it would need to be enough to engage and elicit a sense of recognition in the people, as well as to foreign visitors who like to feel that they are in a place with a sense of heritage or identity that they have come all the way to see.

It is thus left to the knowledge and intellect of all stakeholders, from Architects to building owners, to interpret and find beneficial use of our rich traditions in architecture that also appeals to their users' sensibilities. Here again, the logic of environmental consideration that traditional forms took on would be a first line of thinking in this effort.

8. Summary - Principles of Usage and Incorporation of Tradition in Modern

In the Malaysian or even larger Southeast Asian context, we can employ rational analysis in finding a way to meaningfully utilise our architectural traditions and avoid overly argumentative confusion. The way to rationality simply involves thoughtful analysis of these questions:

- What was the context of the traditional use of materials and forms in architecture?
- How are they still relevant in the contemporary situation?
- How can the usage of traditional concepts help our environment?
- How can the usage of traditional architecture help our economy?
- How can the usage of traditional (architectural) values help our built environment or even nation-building?

With thoughtful consideration and consensus on the above, the way forward in benefiting from our traditions in architecture, or any other heritage matter, becomes much clearer.

Illustrations



Fig. 1: An authentic Malay house in the Melaka *Bumbung Panjang* long roof style, with *nipah* palm attap roofing and *tebar layar* at the gable ends. The roof space holds an attic floor, which in the old days was used as a bedroom for maidens of the house or to store household assets. Modern buildings using this form can have the water tanks in the roof.



Fig. 2: Istana Seri Menanti in Negeri Sembilan, Malaysia is believed to be the oldest and tallest traditional timber palace in the world; at over 100 years old, it is now a royal museum and plans are afoot to apply for listing as a UNESCO World Heritage Site.



Fig. 3: The Royale Chulan Hotel in Kuala Lumpur makes a bold statement in its unabashed utilisation of Malaysian traditional elements and overall heritage look in a high-rise context; some may argue over the 'appropriateness' of the usage but undoubtedly it makes a clear statement of its identity and sense of place.

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Archaeology and Architectural Design
Project for Alexandria in Aria-Herat (Afghanistan)

Luisa FERRO
ABC Department of Architecture Built Environment Construction Engineering, School of Civil Architecture, Politecnico di Milano, Milan, Italy
Luisa.ferro@polimi.it

Abstract
Herat founded (or re-founded) by Alexander the Great, capital of Timurid Kingdom (1405-1506), oasis-city along the silk trade-route played a decisive role in the Islamic Art. Now is a devastated country. The salvation and the preservation of its cultural heritage is one of the tasks which international community must be faced.
The project proposed, therefore, from a full concept of cultural heritage, wants to build an open air museum *promenade* capable of detecting hidden forms of settlement and landscape and offer potential alternatives to architecture. Starting from the ancient cisterns, the citadel, the old fort and the area of the Timurid Musallas the project creates an urban archaeological itinerary: rather than be an obstacle, archaeological remains provide an excellent opportunity for developing a coherent contemporary project design.
The museum tour-landscaped and re-unification of archaeological sites (new excavation areas) is built through a structured path that restores the visual relationship between the heights, creating new relationships between the archaeological sites and city.
Besides, the presentation introduces an architectural design project for the Gohar Shad archaeological Park and for a new building complex around the Husseyn Bayqara minarets (UNESCO heritage). This area have not yet completely investigated is presented as a vast and fascinating stretch of land from which emerge ancient fragments and traces of three large enclosures.

Keywords: Archaeology, Alexandria in Aria-Herat, Husseyn Bayqara minarets, Open air Museum, School of Art and Craft

1. Archaeology and Architectural Design

What gives us archaeology is a complex mechanism in which design is seen immortal intelligence. Start from this is to discover the laws of things, knowing "the spirit that comes out of places" (Aristophanes, *The Clouds*).
We try to trace what returns from the ground: the former was constructed so that the parts functioned properly, with only the necessary accessories and their placement area, nothing was out of place even when expressed with apparent randomness. A set which is multiple without disorder: temples, statues, gardens, columns, capitals, regulated and open spaces. Then there was also a substantial component: the Providence, the wisdom that is to maximize the potential of a place (Strabo, *Geography*). So the architectural types (figures travelling throughout the Mediterranean and the East) were arranged and combined according to rules made directly to the place where they had to rise, the figures entered in the cycle of metamorphosis and fed the contemporary, keeping within itself the formal

character of the matrices from which they came, matrices that live deeper in the folds of the collective consciousness.
But mind you the contemporary design is neither nostalgic nor reconstruction, because of performing arts of antiquity there are traces of a life that once was full. Too much wealth of phenomena and original atmosphere has vanished with the collapse of time. The ruins are part of a whole that no longer exists.
Ruins and fragments open up for us new possibilities and the architectural project is not the reconstruction of something lost, is (again) its metamorphosis.
The project brings together the fragments, builds relationships unimagined, governs the objects according to a lyrical scansion, a wavelength of composition. Generates new rules, measuring things with the same number using an ancient discipline: rigor tempered by the imagination that creates juxtapositions apparently unheard. Returns, finally, the real meaning of belonging to another reality, unknown, but belonging to the origin of ideas in architecture and with whom it would seem necessary to innovate, confront again [1].

2. Archaeology and Urban Project
The excavation is no longer avoidable, it is one way to know of modernity, however, it can feel like a run, an obstacle in everyday life and in the construction of the city. But how is it possible to devise new strategies of cross-protection, enhancement and use of archaeological sites and what can be a good way to organize the results of the search for physical traces of history in the urban centres.
In the recent works of refurbishment of archaeological sites is often revealed a broad program of excavations, through which the sites are hit by a process of transformation without the project.
The objective of intertwining the point of view of archaeology with that of architecture is taken as a grounds for investigating the theme of a project conception in its relationship with the stratification of the city, considered as a field for research of a profound and hidden order of things and forms.
Rather than be an obstacle, archaeological remains provide an excellent opportunity for developing a coherent project design, especially in urban contexts: archaeological excavations rediscover artefacts and ancient contexts that re-emerge as “new” components for the architectural project.
The problem of protecting the historical and natural landscape from the present uncontrolled urbanisation is an urgent one.
In forecasting a future development for Ancient and its surrounding area, presents difficulties that arise in assigning a role to archaeological sites can be met with a project for an itinerary covering the city’s museums. Posing the question in this way, the aim of such a project would be to recreate a hidden compositional unity, following open air museum itineraries, thereby restoring significance to single finds severed, until now, from an earlier and more complex context to which they once belonged.
As in excavation, the project isolates single objects from their context layer by layer, restoring its renewed significance, immanence of the antique being thereby embodied within the reality of the project. Following this line of thoughts, the aim of this specific project is to envisage an “archaeological promenade” following a sequence of ruins and monuments at present detached from a context to which they originally belonged, re-arranging them to enhance their significance.
Further, the chosen places of significance constitute the key points of the urban plan worked out on a metropolitan multi-disciplinary museum-school itinerary able to express the structural features of places. As semplified by Alexandria Museum, the word “museum” thus came to mean a place devoted to study and learning.
Following is introduced a recent and on-going experience carried out in prominent archaeological places of Herat, city founded (or re-founded) by Alexander the Great. There the museum-itineraries follow the matrix route of foundation and as in great *collage* - there are excavations, ruins, the archaeological finds. There are also the fragments of townscape, theories of art and ideas of architecture, modern contemporary projects.

3. Alexandria in Aria-Herat

Herat is the only city in Afghanistan to have largely retained its traditional form. The name itself, Herat (or Harat), derives from the same Iranian root as 'Aryan', from which 'Iran' also derives, presumably reflecting the early movement of Iranian tribes from Central Asia into Iran in the second millennium BC. Thus, it appears under the name 'Haraiva' in the sacred writing of Zoroastrians in the late second millennium, and it became a provincial Achaemenid capital of the same in the mid-first millennium, known as 'Aria' to the Greeks after the conquest of Alexander. So far, the Iron Age or Achaemenid origins of the city have not been confirmed by archaeology, although an Achaemenid cuneiform cylindral seal were found by chance in or near Herat in the early century century. However, both the Qal'a-I Ikhtiyaruddīn and Kuhandazh are on large artificial mounds which, if excavated, might well reveal the ancient city. Herat remained a provincial capital during the Hellenistic, Parthian and Sasanian periods. There are detailed descriptions of the city by Early Islamic geographers from the ninth century onwards when it became one of the more important cities of the eastern Islamic world. Herat became a capital city of the Ghurid Empire from 1175 tu 1221, along with Fīrūzkuh in the mountains to the east. It was destroyed twice in the Mongol invasions in the early thirteenth century, but after 1244 there was some revival under the local Kart dynasty who rules Herat on behalf of the Mongols. Its greatest period came after 1404 when Shah Rukh, the son and successor of Tamerlane, moved the capital to Herat from Samarkand. This was the city's golden era, being embellished with many spectacular monuments by Shah Rukh, his wife Gohar Shad and their descendant Hussayn Bayqara. In 1507, Herat fell to the Uzbeks when much of it was devastated. The city's greatest architectural ensemble, the Musalla complex outside the walls to the west, were largely blown up in 1885 at British instigation as part of defensive preparations for a threatened Russian invasion, and considerably more damage to this and other monuments were inflicted in the fighting following the Soviet invasion of 1979.

3.1 Morphological urban matrix

The basic principle of the new towns by Alexander the Great and his successors (the Seleucids in particular) and the new cities that differ from those earlier Greek (erroneously identified as milesian, but rather different in some fundamental aspects) is the construction of a single longitudinal axis origin of which the whole system of functional and spatial subdivision provided the foundation project.

In the repetition of standardized units of Gran Via - the longitudinal original matrix route - becomes supreme act of the foundation and an autonomous architecture. The place of aesthetic effects combined between buildings and landscape.

In the East the Afghan cities founded by Alexander in their original morphology assume a symbolic aspect that adapts to the Buddhist culture rooted in place for some time. It is known that Alexander was the first to promote the emergence of cosmopolitan cities and are carriers of convergent traditions: Hellenism from the west, Buddhism from the east.

So foundation matrix route no longer represents symbolically the founder, but the diagram of the universal order, the particular cosmography that represent Afghanistan as the end of the World.

Herat, as well as Alexandria in Arachosia (Kandahar), Alexandria in the Caucasus (Begram), Alexandria in Bactria (Balkh in the Hellenistic re-founding) are built on an orientation matrix axis. This axis as the so called Canopic route of Alexandria in Egypt is the *plateia* of the city along which stand public buildings.

The legend of Alexander is sent in the Qur'an. And so during the Fifteenth-century Timurid empire, the new capital Herat is redrawn in the myth of Alexander. The urban design reinterprets the Hellenistic foundation assuming the shape which is still recognizable (and largely unchanged in the existing urban morphology of the old city). The squared general plan (about 2kmx2km) is characterized by a north-south matrix axis through the walled city which connects with the monumental outdoor areas (Timurid Musallas and Madrasa) and the famous gardens of delights described by Babur the last Timurid king and the founder of the Empire of India. A secondary axis perpendicular cuts in the geometric centre of the city's main axis dividing the urban fabric into four quadrants.

3.2 The Musalla Complex

Most of the city's important monuments lie outside the walls. To the north are the very fragmentary remains of a particularly elaborate ensemble collectively known as the Musalla Complex, once described as one of the most magnificent architectural ensembles in the Islamic world. Much of this was deliberately destroyed in the 1880s. These are the remains of three separate buildings. The first is the Mosque of Gohar Shad, of which only the north-western minaret still survived into the present, the finest of surviving minarets in Herat. Immediately to the north is the Madrasa and Mausoleum of Gohar Shad, of which only the mausoleum and the very further damaged by artillery. The Mausoleum is covered with the distinctive Timurid fluted dome and the interior has fine painted decoration, but it sustained extensive damage from shelling in the 1980s, with most of its tile-work lost. The third builings is the Madrasa and Mausoleum of Husain Bayqara. Only the four corner minarets still stand, all of them originally covered in faïence tilework of the finest quality; of the Mausoleum and the remainder of the Madrasa, not a trace survives. Following extensive bombardment in the area in the 1980s. the four minarets are still standing but have now lost almost all their tile-work, and one of the minarets has been punctured by shells.

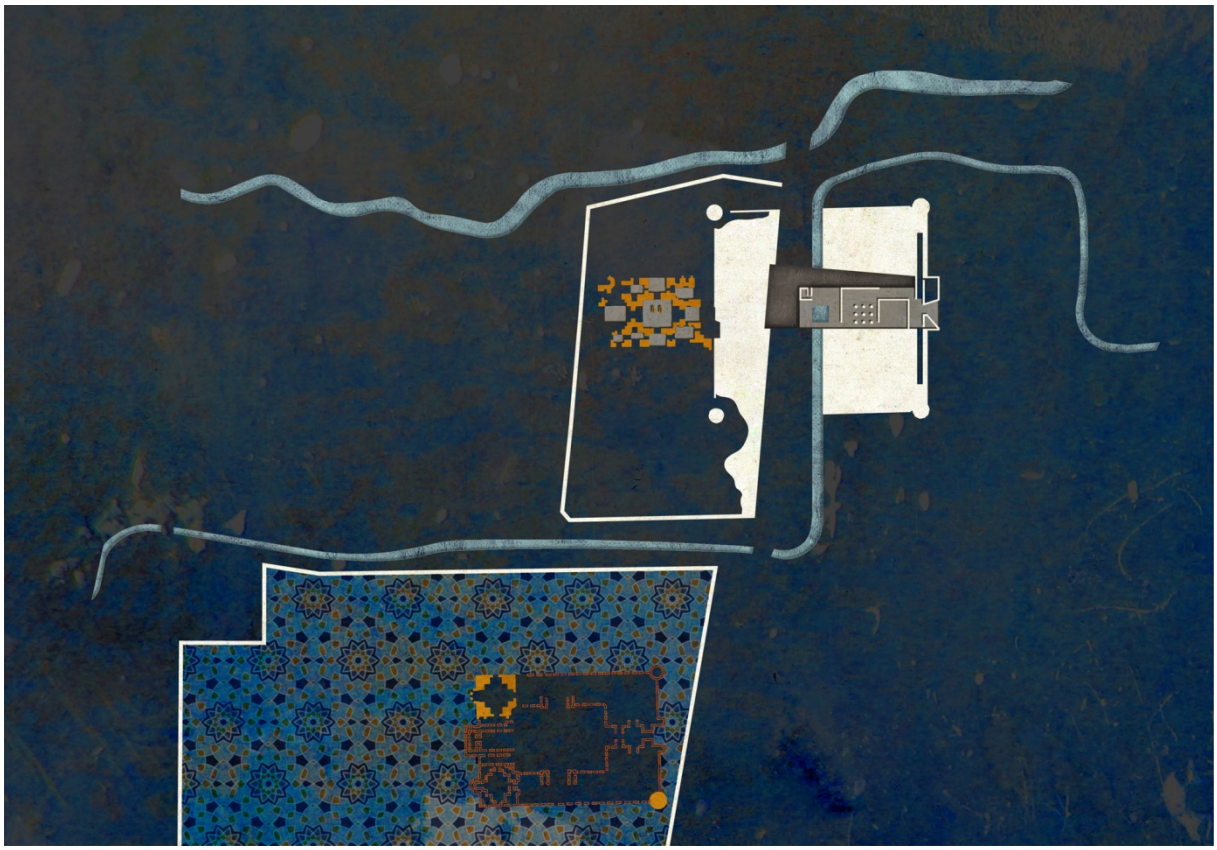

Fig. 1: Concept plan of the project for the Musalla of Huseyn Bayqara, The school of Arts and Craft of Herat and the archaeological site.

3.2 The Historical-archaeological promenade and a project for the Hussein Bayqara minarets

In the general context of rebuilding the devastated country, the salvation and the preservation of its cultural heritage is one of the tasks which international community must be faced. Along the main ancient axis (N-S) starting from the cisterns, the citadel the old fort and the area of the Timurid Musallas the project creates an urban archaeological itinerary, a sort of built itinerary where the works of arts could dialogue with the architecture, both inside and out: the culture and typology of architecture and of settlement itself are necessary and specifically involved.

This main route axis becomes an open air museum promenade to be considered as an engine for a future general plan of development and restoration of the city, but also to be understood as a itinerary of culture, in a larger meaning as well as in Alexandria (Egypt).

The milestones of the promenade: the domed cisterns, the larger ones which stand near the crossing of the two matrix routes; the immense fortress-palace of Qal'a-i Ikhtiyaruddin standing on an artificial

mound, probably incorporating earlier archaeological remains, covered by fired brick glacis. Following the Unesco project report (by architect Andrea Bruno) the lower buildings restored could become Herat Archaeological Museum. Outside the ancient city walls the large artificial mound known as Kuhandazh, which probably represents the (never excavated) remains of the pre-thirteenth century city. On top are two monumental Timurid Shrines. The promenade comes to an end at one of most astonishing landscapes: the famous minarets of Herat. The very fragmentary remains of the Musalla and Gohar Shad and Hussein Baiqara complexes have been part of the three elaborate ensembles once described as one of the most magnificent architectural buildings of Islamic world; all deliberately destroyed by English army in XIX century and further damaged by recent fighting.
The project, therefore, from a full concept of cultural heritage, wants to build an integrated system of places and paths capable of detecting hidden forms of settlement and landscape and offer potential alternatives to the architecture. Morphological characteristics of the area, water availability over time have allowed the spread of crops and gardens of delight, to be supported and regained.
The museum tour-landscaped and re-unification of archaeological sites (new excavation areas) is built through a structured path that restores the visual relationship between the heights, creating new relationships between the archaeological sites and cities along a route that follows the old matrix route, the supreme act of the Hellenistic foundation.
The research introduced aims to elaborate an architectural design for the Gohar Shad archaeological Park and for a new building complex around the Hussein Baiqara minarets: library (in connection with Bibliotheca Alexandrina), centre for the development of handicrafts, the girls' school of arts and crafts, the palace of brotherhood and tolerance.
This area have not yet investigated is presented as a vast and fascinating stretch of land from which emerge ancient fragments and traces of the large enclosures.
The new school will evoke the Iwan, the monumental entrance to the enclosure Timurid complex.
Along the promenade lined gardens will repair from a merciless summer sun, creating shadows and infusing the *mezzaombra* characterizing the performance of legendary landscapes, surrounding the visitors in the magic of myth. In excursions *en plein air* views are never natural, immediacy and linearity of the tracks is a function of memory. What we glimpse again, what has impressed in the form of the place and reappears through the project, open angles, opens scenarios, create relationships between differences and does belong to the same view [2].

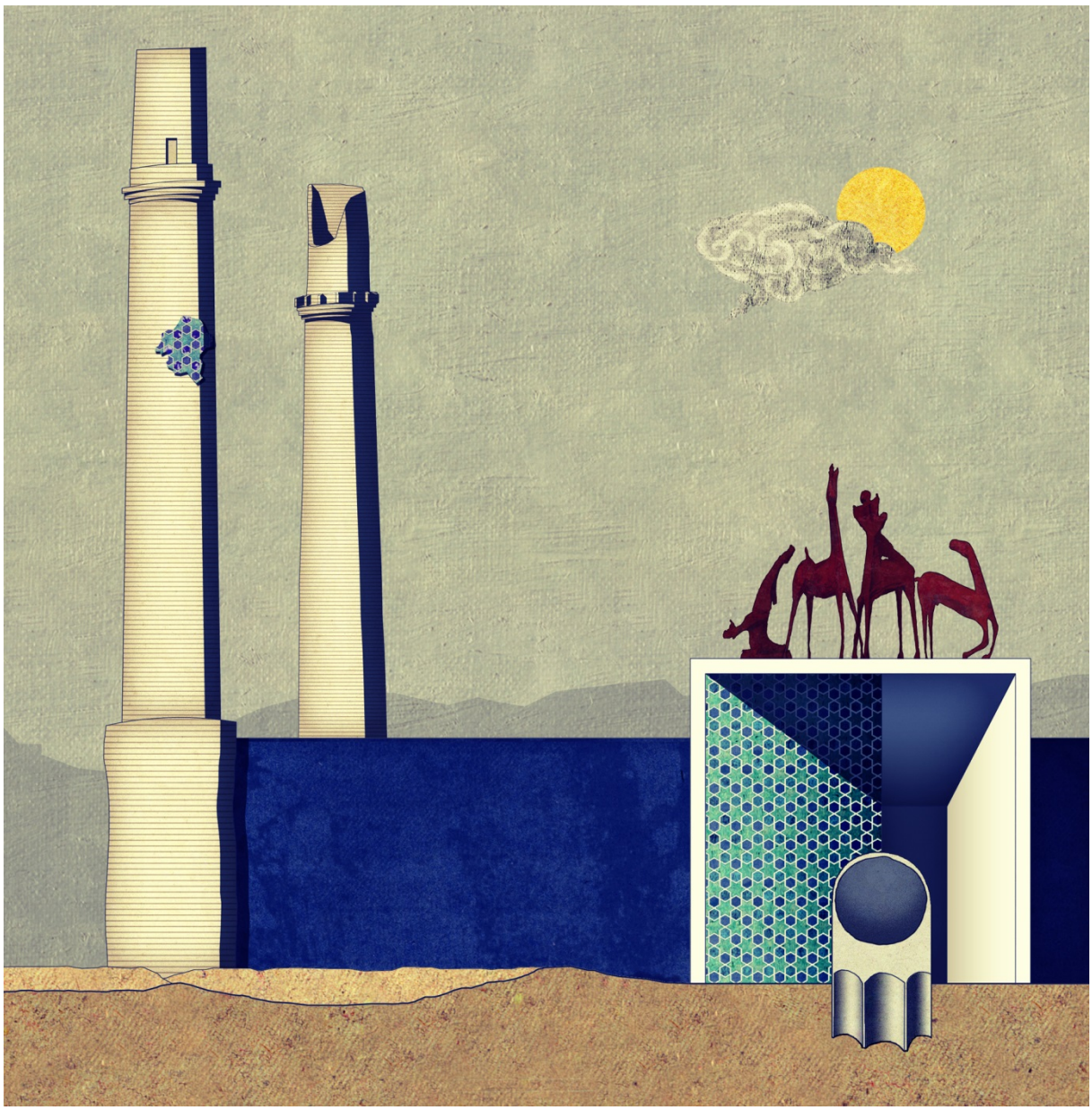

Fig. 2: Main entrance of the School. The Iwan.



Fig. 3: The new archaeological park of the Timurid Musallas and the School of Arts and Craft of Herat. General Plan.



Fig. 4-5: Plan level 0 and E-W section of the School at Husseyn Bayqara Musalla, the enclosure of the archaeological site.





Fig. 6-7: Plan of the Library level and section of the School enclosure and archaeological excavations.



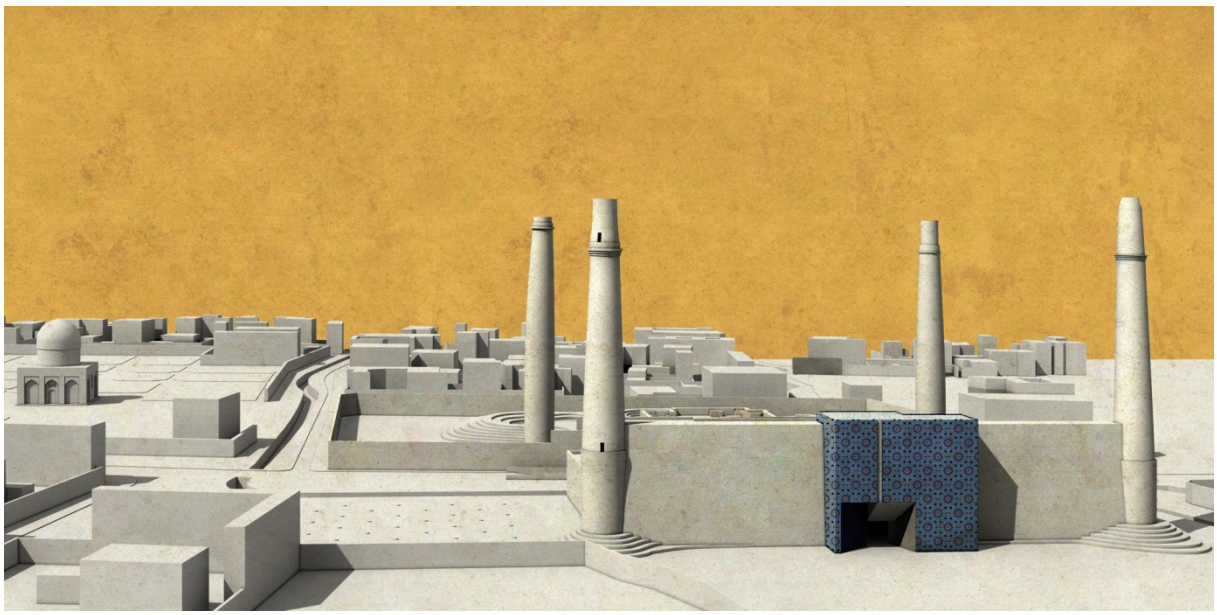

Fig. 8-9: General views of the school at Husseyn Baiqara Musalla archaeological site.

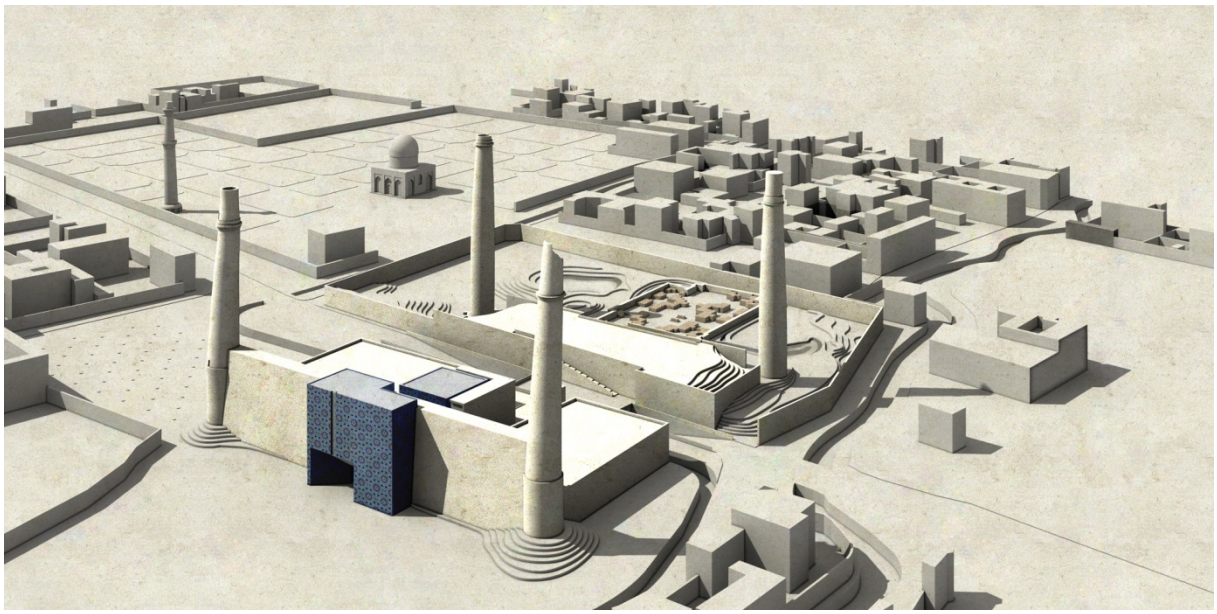

Fig. 10: Figure caption (Arial – 9 pt, Lower case letters – Left aligned – Number style 1, 2, 3

Captions

[1] This research project (title *Archaeology and Architectural design*) is part of a long-standing tradition of study and design in which theory and practice are productively combined.
Research Team group: proff. A.Torricelli, L. Ferro (coordinators), Dipartimento di Progettazione dell'Architettura, Politecnico di Milano with the Architects Viola Bertini, Elena Ciapparelli, Giovanni Comi, Davide Grazi, Maria Luisa Montanari, Sara Riboldi, Gianluca Sortino, Valerio Tolve.
The production and scientific research is closely connected to teaching knowledge and methodology in its intentions, also finding time processing in the Scuola di Architettura Civile del Politecnico di Milano (Laboratorio di Progettazione 3, Luisa Ferro e Laboratorio di Laurea Magistrale, Angelo Torricelli, Luisa Ferro); in practice activities of Dipartimento di Progettazione dell'Architettura and in the Ph.D research (Milano, Venezia).
Subjects and case studies (Atene, Campi flegrei, Milano, Villa Adriana Tivoli, Alessandria Egypt, Alexandria in Aria Afghanistan) have been introduced in several international seminars, workshops and publications.

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A settlement of the Knights of Malta in Campania: the *Castrum* of Cicciano (Na)

Maria Archetta RUSSO
Dipartimento di Architettura e Disegno Industriale "Luigi Vanvitelli", Seconda Università di Napoli – Abazia di S. Lorenzo ad Septimum, Borgo S. Lorenzo, 81031 - AVERSA (CE), ITALY
E-mail: mariaarchetta.russo@unina2.it

Abstract
Among the possessions of the Order of Malta in Campania, the Commandery of Cicciano, a town near Nola, in which it was the hamlet until the beginning of the fourteenth century and the fief of the Knights of St John until 1816, was of remarkable importance.
During the fourteenth century, the small site, documented in previous decades, grew in importance so that it became a masterful Commandery, being directly subjected to the Grand Master of the Order.
It is at this stage, in a position of barycenter compared to the existing village, consisting of small scattered centers, that a majestic fortified citadel was erected surrounded by walls and towers and surrounded by a moat. Inside, presenting the contemporary model of the settlement of Rhodes, a fort-residence of the commander, the church, the utility rooms and several houses were planted.
All this not only led the small town to get a prominent position, but it set the basis for following territorial expansions, that in the long run led to his welding with the original centers, forming an organic urban fabric.
Despite the suffered tampering, the *castrum* is still the greatest architectural and urban emergency in modern city. Its conservation can leave out of consideration neither the historical events that have produced it, nor the different phases of construction, through a critical reading of today's structures, which we intend to carry on in this study.

Key words: Order of St John, Order of Malta, Commandery, Late medieval fortifications, Agro Nolan.

Introduction
The Order of the Knights of St John of Jerusalem, of Rhodes, of Malta, today known as Sovereign Military Order of Malta, was founded at the end of the eleventh century to help the pilgrims in the Holy Land. After a few years, it also took on the role of defence of Christian places against Muslim attacks and of support to the Crusaders, turning into a military association that quickly rose to great international power, thanks to generous donations and incomes granted by the most influential figures of the time.
In order to support the travellers in the best way during their long and difficult journey to Jerusalem, the Knights opened throughout Europe, along the main roads and close to the main points of embarkation, *domus* for the reception, including churches, homes and taverns which formed the basic cell of the organization.
The tick network that formed in this way imposed a hierarchical arrangement in preceptories or commanderies, belonging to a priory or bailiwick, on its turn subjected to one of the eight "provinces or langues" in which the religious community was divided (Provence, Auvergne, France, Italy, Aragon, England, Germany, Castille) [1].
There were many assets in southern Italy, divided into grand priories of Barletta, Messina and Capua, the largest one that was documented in 1185 and including the *Terra di Lavoro*, the Principalities Citra and Ultra, the County of Molise and Abruzzi [2, 3].
After the fall of Jerusalem and the loss of Acre, the Knights settled in Cyprus and from 1309 to 1522 in Rhodes. After having been expelled from the island, about eight years later, they were granted by

Charles V the Maltese islands, where they had been staying until the Napoleonic invasion of 1798, which marked the end of their military supremacy and the survival for the only charitable purposes.
Since the Byzantine period, Rhodes had been composed of distinct zones: at the high level, the *castrum or collachium*, downstream, the *burgum or chora*. The Knights occupied the highest area, by separating it from the rest of the built-up area through a walling; the main church dedicated to St John, Santa Maria del Castello, the *auberges* of the different "langues", the hospital, the archive and equipment necessary for the community were erected inside; at the north-western end stood the palace of the Grand Master - a compact building with a central courtyard - while in the north-eastern area developed the harbour and the arsenal [5].
The suburban confinement became an almost constant feature of all installations; in particular those of older foundation were built near the city gates and in ports near the beaches, so you can receive passengers at any hour of the day and night.
Instead, in the feuds as Cicciano, that will be after discussed in detail, Maruggio, Casaltrinità and Fasano in Puglia, real citadels were created within the built-up area, or in an isolated position, in the style of the monastery of Santo Stefano in Puglia, at Monopoly [4].

1. The Master Commandery of St Peter in Cicciano. Historic-architectural events

In the framework of the southern Italy Jerusalemites settlements, has a great importance the Master Commandery of Cicciano, a town near Naples, not far from Nola, to which it belonged until the first half of the fourteenth century.
The settlement, though little known, is documented by a large amount of correspondence, consisting in the *cabrei*, asset registers, written between 1515 and 1780, which allowed it to have back its fully socio-economic and territorial cohesion.
In these above mentioned acts it is also pointed out the building consistency of the residence and of the nearby urban centre, originally composed of distinct clusters, gradually welded around the complex from the focal position respect to the various villages.
The country, in which there is still the testimony of the Roman presence in some hand-made objects and surviving traits of the *centuriatio*, is mentioned in the tenth century; at that time there was already a chapel dedicated to St Peter [6, 12].

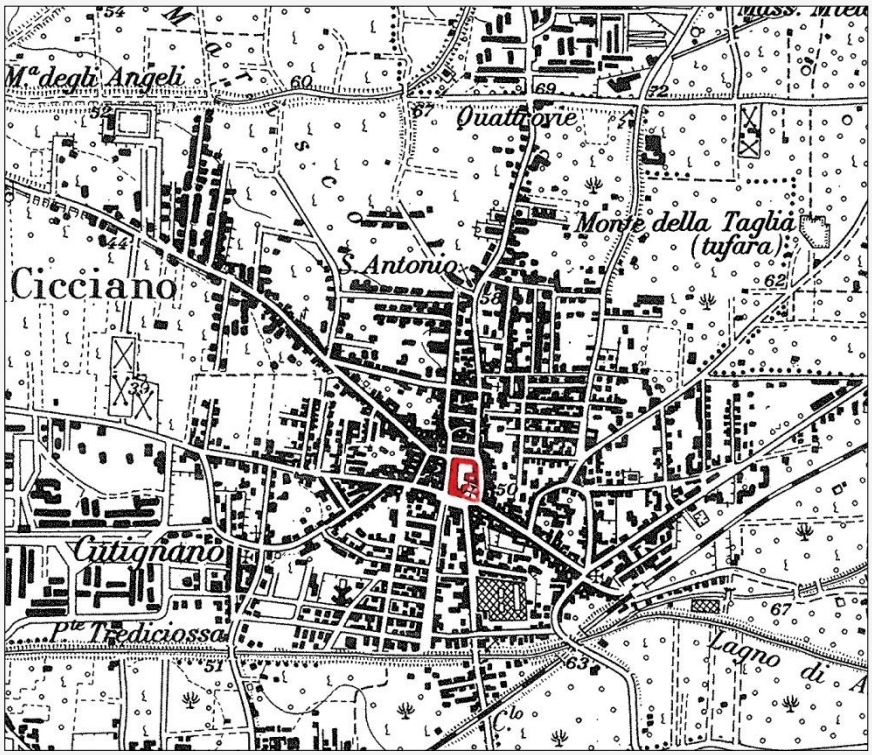

Fig. 1: Cicciano plan. In red, the area of the castle.

It is of the 1292 the earliest news of one of the *domus* of St John, whose location is due to its strategic position on the Via Popilia, the arterial road that connected Capua with Nola, detaching from Appia in Maddaloni and continuing to Reggio Calabria. Along the way the riders had already other sites.
During the next century, the small *domus* grew in importance, becoming the first preceptorie, then priory room subject to Capua, presumably for the addition of some lands that were seized to the Templars existing near there. Not only that, but since 1324, Cicciano did not belong to Nola anymore

and became a fief of the Knights, who by 1384 erected there an imposing citadel. Finally, in 1399, was declared Commandery or Master Room, that is subject to the direct control of the Grand Master, who established its entrusting to important members of the Order or who have distinguished themselves for outstanding achievements in Campania and was second only to S. Giovanni a Mare in Naples.
The fort occupied a particular site: the convergence of the streets Popilia, from N-W, the "Way of Marcello" - branch trending N-S of Appia, directed at Nola through the mountain areas - and those for the neighboring villages of Roccarainola and Avella - relevant at the time - Risigliano and Camposano. The circuit includes a large quadrangle, that took advantage in the east and west of the perpendicular track of the *centuratio*, and was influenced by the course of the river Clanio in the south and in the north by the oblique course of the above mentioned Popilia, incorporating the existing church of St Peter, from which the Commandery took its name.
The circumstances placed Cicciano in a historical dimension that goes beyond the purely local ones and gives it a role in the general history of the Order. In fact, being the exclusive responsibility of high-ranking within the religious body, it saw the alternation in the regency of three Grand Masters, many priories, leading figures in military organization, excellent characters of international diplomacy, ministers at the Papacy and the Kingdom of Naples.
The Commandery met the greatest flourishing between the sixteenth and the first half of the eighteenth century, but in the second half of the century, even before the Napoleonic conquest, began to decline; in fact in 1792, putting an end to a controversy that had been lasting for centuries, a Royal Decree deprived Cicciano of its status of *nullius diocesis* and brought it back under the jurisdiction of the bishop of Nola. At the fall of Malta in 1798 followed the revolutionary laws of feudalism in 1806, producing the final abolition of the institution in 1816.
Meanwhile, the rich movable and unmovable estate was divided between the Royal Order of the Two Sicilies - established in 1808, the allocation of the assets to the Constantinian Order and Order of Malta - the Curia, who took the churches, the city administration and especially the private sector, which unduly took possession of many properties.

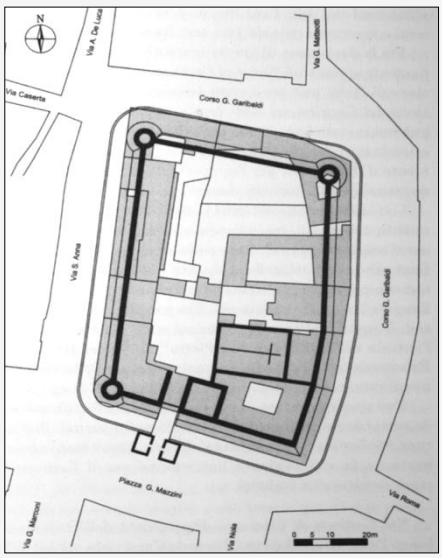



Fig. 2: Planimetric reconstruction of the castro with the expansion of the moat (by D. Capolongo, *History* ...).
Fig. 3: Cicciano, satellite view of the core with the *castro*.

2. The architectural and urban structure through documentary sources

What was the configuration of the *castrum* and metamorphosis which has undergone over time can be deduced from the *cabrei* drawn between the sixteenth and eighteenth centuries, that fortunately came down to us, full of notes, but unfortunately with no illustrations. The complex was placed in the site called "the bridge" - presumably referring to an ancient bridge over the Clanio - in a central position respect the seven cores that initially composed the feud. The possession extended to some places of worship, buildings and estates of the town and of the district and to two taverns, in addition it contemplated the usual feudal rights on the population [6, 7, 8, 9,10,11,12].
Entry was through a single port, defined *ianua magna*, placed on the south side, towards Nola, after crossing a drawbridge – that became of factory in subsequent correspondence - which led into a large courtyard. Around it was placed the *turris magna*, confining on one side with the entrance and on the other with the residence of the Commander, the church of St Peter the Apostle, the prison, a well of spring water, storage rooms and service, cellars. Instead, in the north, we had a number of private homes. All around there were the walls, separated by a moat and, in parallel, from a public road, which contributed further to the isolation from the surrounding area.

The entrance was defended by a ravelin, an advanced structure compared to the perimeter of the walls of a not specified polygonal shape.
The palace of the Commander - defined *fortillitium* by the shape of compact rectangular block - occupied the south-eastern area, with a central courtyard plant that reminded in a smaller dimension to the one of the Grand Master of Rhodes, which was clearly the inspiration of the entire organization. At the beginning of the sixteenth century it consisted of two levels, one at the ground floor, with stables, cellars and storage rooms, and a higher one in which there were the "*sala magna con la ciminiera*", that is, the reception hall and another minor, always destined to citizenship, called "penta room or pintata" as well as private rooms for the citizenship. A century and a half from the building, it still kept its medieval character, with the outer facade crowned with battlements and a "gayfo", a high place, jutting out from the tower.
This exhibition evokes strong similarities probably with that of contemporary as "castello seu Fortellezza" of the balì of Maruggio; in addition, an element common to all residences is the presence of one or more rooms for the people, large-sized, often with chimneys and paints such the ones for example also in Naples and in Grassano.
On the north side you can find the church of S. Peter, accessible from the same yard. The venerable structure had a coverage in part made by vaults and In part by roof and had some chapels inside. On the back, facing on the moat, there was a small garden, while on the side of the sacristy rose the bell tower with three bells, the biggest functioning as well as a clock.
Until the eruption of Vesuvius in 1631, there were little transformations in the complex, registering, besides unspecified operations and the construction of a barn in the west area, only embellishments of the worship building, equipped by his own expenses by the rulers of furnishings and vestments, where they put their emblems in order to keep memory of them.
In the *cabreo* of 1646 the radical works undertaken after the devastating volcanic event are described by the Commander Girolamo Branciforte, who provided for repairs and reconstruction of sacred and civil properties, first of all the *castrum* and the mother church, as evidenced by some of the survivors commemorative plaques there affixed [9].
Inside the fortress he provided for the addition of several rooms both to live and for service, including a cellar on the west side, "very wonderful, divided into two lanes, wide and high in proportion", he covered the entrance door with the spacious vaulted entrance still existing, he replaced the small and ruined staircase that led up to the building with a more spacious and comfortable and restored both the representation rooms. Similarly, he set up a residence for himself, restoring two adjacent apartments that were in bad condition, put in better condition other rooms and formed a lodge. In memory of the works carried out applied his coat of arms on the ceiling of the two public rooms and in the residence. Finally, he added a second large room and a bedroom to the tower.
The moat, now lacking of its defensive function, was transformed into an orchard, as well as the ravelin, which became a pleasant private garden. Below with the help of the university, a huge tank was dug, where waters from Avella were collected, so that it could be used from people and inhabitants of the *castrum*, that could tap into a mouth situated on the same ravelin.
Family coat of arms and learned commemorative marble inscriptions were also set on the door of the cellar and on the well curb.
The church, "ruined and dilapidated for the ravages of time, cramped, almost destroyed from the ashes of the volcano", in 1646, was rebuilt from the ground up, enlarged and lengthened thanks to the rear space of the garden, and covered completely by vaults, with seven side chapels, two of which are worn out and vaulted, while the others were included in the thickness of the walls. The space was embellished with paintings and rich furnishings, while on the back, was erected a "magnificent" sacristy. Even in this case, the reconstruction was celebrated with the marble emblem of the Order on the façade and by a marble plaque and a sign of Branciforte, on the inner side of the entrance.
Further measures in the complex were carried out by 1707, after the terrible earthquake of 1688, and in the third decade of the century. During the first ones they proceeded with appropriate and consistent consolidations and rework and among other things to the addition of a second level in the ancient residence. In the other ones they strove to expand it and make it more comfortable, restyling it with wrapped and decorations and opening up large "fashion" windows [10].
The church, described in detail in the *cabreo* of 1707, was restored and enlarged in 1724 with the help of the population. For the occasion, it was built in the north side a minor aisle composed of a succession of three large chapels, it was dressed the entire space with elaborate plaster moldings and the furniture and furnishings were renewed [11].
For memory, the Commander Giuseppe Maria Cicinelli paint in fresco the shield of the Order on the altar and its staff all around the walls and placed an inscription in marble, that has now disappeared.
The asset just given to the *castrum* was seriously compromised in the second half of the century, when, before 1780, in the absence of the Regent, was occupied by a company of chivalry, which destroyed the gardens and all the embellishments recently completed.


Fig. 4: Cicciano, the courtyard of castro and the church of S. Peter.

After 1806, even before the institution was finally repealed, it gave rise to the metamorphosis of the fortress. In 1810 it was proposed to demolish the walls and fill the moat to expand the open space standing in front of it in order to set there a weekly market. The operation, initially, was banned by the land agent of *Terra di Lavoro*, who argued that the wall protected the complex from the waters that flowed copiously around, but, nevertheless, it was the same carried out three years later [13].
In the following decades, the owners of the buildings on the perimeter of *castro* claimed their right on the slopes emerged by the removal of the fence and got the permission to build above it, towards the now levelled moat. The remaining area is now the house of a wide track that surrounds completely the citadel [14].
The tracking of the road east fueled the desire to provide the church with an independent entrance from this side, desire even heard from him since the sale of the adjacent building, made in 1817. Since the sacred building was in poor condition and was inadequate to the increase of the faithful, in 1814, it was decided to rebuild it. Had not yet been implemented due to lack of money the renovation, in 1819, took charge of the project engineer Bartolomeo Grasso, one of the more technical of the moment. They decided to get the new entry through the sacristy behind the altar, transforming the space into an imposing portico of columns, ended by a pediment, resting on an elevated platform in front of the plane.
In order to compensate for the loss of the room it would have been formed another one by bricking up the arches that connected the first chapel with the next one and the central reservoir; while the bell tower being considered unrecoverable was demolished and rebuilt on the same site.
The plan was rejected by Decurionato, believing that in this way the structure that was already of not suitable sizes will be narrowed further. Among the various solutions of the civic assembly it was realized the idea of making the church symmetrical, by erecting a third aisle on the southern side, occupying the adjacent rooms of the former palace of the Commandery, on the sale of which the owners seemed to agree , after a reasonable compensation. Consequently, a designer was commissioned for a second project, that was delivered in next year and also cast-off in the same way, because they realized that, even though the expenses for the realization had been doubled, however the needs of the population would not have been met [14].
Waiting to have the funds for the reconstruction of bigger forms, the idea was put aside; between 1840 and 1842, we had to proceed to necessary consolidation, which also implicated the raising of the floor. Radical arrangements of the interior were led ten years later by the architect Giuseppe Altieri, who provided for a general restoration, probably erasing what remained of the eighteenth-century paintings Only after the war it was possible to implement the program pursued in a very long time through state funding and citizens' offers [14].

3. The current situation

The "land that is walled around" still stands out tanks to its compact size in the urban context of Cicciano, of which is the core, which is the meeting point in radial way of the routes from neighbouring municipalities. Even if it keeps its original plant, urbanization all around and the metamorphosis being occurred have profoundly changed the volumetric and environmental ratios by turning the unitary aspect of late medieval fortress into that of a modern block.

In fact, the perspective drawings having an average of one or two floors in elevation show all the ground floors occupied by shops and the upper ones by houses and offices. By their features you can date back to the building phases that could mainly be dated to the late nineteenth - early twentieth century until the last decades.

The progress of the curtains led to the moving back of about 4 meters of the entrance hall and made the only corner tower surviving barely perceptible by the curvature of the south-west corner, while the division of properties caused independent developments in elevation and increases in the planimetry which gives fragmentation and disorder to the entire asset. It was preserved not even the *turris magna*, standing next to the impressive vaulted vestibule introducing the court, whose emergence is cancelled from the homogeneous growth in height of adjacent buildings. Not only that, but the wall above the monumental seventeenth-century stone portal in double ashlar-worked ring results seriously damaged by the decreases of the large central opening, that was divided into two dingy balconies on which the curvilinear tympanum persists, including a plaster scroll with the shield the Commander Cicinelli - symbolized by a swan, subject to the cross of the Order - all being crowned by the stratum of a nowadays storey built on it.

With regard to the adjacent residence of the commanders, it should be noted that the increase in outward has more than doubled the volume.

The old set is accessible from a door open between the base of the escarpment of tower and the original now walled door of the church, still topped by a triangular vault that support the transition to the platform from which the dignitaries attended the religious services. The long and looming vestibule following flows into the small courtyard, around which the rooms are arranged on two levels in the south and east, while the western side is occupied almost entirely by the monumental staircase of the eighteenth-century, the north, adhering to the church, has depth very small and has a portico with two arches resting on a massive central pillar and the upper two rooms surmounted by a terrace. The other two sides with rustic rooms on the ground floor and two levels high.



Fig. 5: Cicciano, view from the west on the southern facade.


Figg. 6, 7: Cicciano, Palace of the Commander. The courtyard and the staircase.

The oldest part on the court huddled factories erected on the eastern and southern perimeter after filled the moat.
The block to the south, towards Piazza Mazzini, consists of ground floor and first floor, closed for the entire course from the terrace where the balconies of the rooms out back. The facade, formally attributable to the early twentieth century, with listature bosses and angular stucco has symmetrical composition, which sees a small portal in the center and two wings advanced to extremes, corresponding to the left, adding to the "*turris magna*", in right, at the head of the addition of cross Corso Garibaldi. The latter, consisting of ground floor and two in elevation, is marked by a double row of balconies lit rooms lined up along the road, with vaults on the first floor, and floor plans, in second.
Very tampered with is also the church, which, ending an affair that lasted for over a century, has undergone a dramatic makeover in the postwar years, with the opening to Corso Garibaldi in 1948 and the completion of the prospectus and the building, next to the modern porch, the bell tower and some rooms for the storage of liturgical furniture and parish office.



Fig. 8: Cicciano, the complex S-E. In the foreground, the former palace of the Commandery.





Fig. 9: Cicciano, Church of St Peter, the current facade of Corso Garibaldi.
Fig.10: Cicciano, Church of St Peter, especially of the font with arms of Commander de Guevara.

The operation resulted in the reverse orientation, with the closure of the original entrance from the yard. At present time, the hall of Corso Garibaldi enters in the large aisle with a lunette barrel vaults that connects through arches on pillars with the three eighteenth century chapels to which is attached one of SS. Sacramento, representing a kind of smaller ship, composed of four modules with vaults.
The opposite wall is still marked by the small chapels gathered from its thickness, of which however, remains only the partition, as on marble altars all of the same twentieth century shape, there aren't canvases and painted panels anymore, but twin niches containing statues.
At the second entry can be seen through a special recess cut in the altar, a chapel planted 2 meters below today's floor and about m 1,50 deep. The basin contains the remains of an altar to the factory, on which rises a pointed niche built into the wall, laying on the bottom of the fresco of the Madonna and Child with two saints in the act of praying and in the soffit of the arch, two other figures standing.
In the chapel, part of the original medieval building, it is recognized that "Delli Virgini" which, according to the *cabreo* of 1582, stood to the right of the main altar. The existence is an important clue to reconstruct the plan of the ancient church, whose original length should correspond to that of the first three today chapels of the shorter aisle. More testimonials of the original building, whose traces can be seen also in the room accessible by a door made in the following column, which leads into a small space from the rounded edges, very developed in height and concluded by a small rib vault.
Of the really decorative and chromatic way emerging from documentary sources, which made the reservoir comparable to the Maltese churchs, that of course were known to customers for their high rank, we can not found a trace in the today white and bare appearance, enlivened only by the moulded plasters in frames, scrolls, floral decorations and angels' heads on the keystones of the arches.
Nothing remains of the effigies of saints, characters and emblems of the Order and of the commanders painted on altars and walls, while the stone arms still remain, mounted in plaster ovals on the wall, the two set by the Branciforti in the lunette on the door from the inside, as well as the plaque, affixed by the same in memory of the reconstruction of the 1646, was moved to the entrance. The signs and inscriptions once inside the *castro* are disappeared too.
As we have seen, of the precious hand-worked objects offered by the rulers the baptismal font and the font of Commander Girolamo de Guevara have been preserved. In the presbytery, built on the area,

that in the past was of entrance, below the surviving choir - still accessible from the seventeenth-century air passage to the court - stands the post-council altar, while in the middle of the bare partition wall that forms a backdrop is contained the precious case of the holy oil of Commander Carlo Spinelli, turned into the tabernacle.
The radical transformations occurred in the entire asset have unfortunately deleted significant stratification, impoverishing the consistency and depriving citizens of the most important page in its history. It is hoped that the knowledge gained will lead to a more conscious future work of conservation and development, being a complex of great significance, like the most prominent and studied complexes.


Fig. 11: Cicciano, Church of St Peter, the main nave.


Fig. 12: Cicciano, Church of St Peter, the frescoed chapel, the remains of the early church.


Fig. 13: Cicciano, the complex by S-W. In the corner, the corner tower surviving.

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The valorisation of Italian rural historical buildings and territory

Valentina CINIERI[1], Emanuele ZAMPERINI[2]
Department of Civil Engineering and Architecture, University of Pavia
(1) valentina.cinieri@gmail.com
(2) emanzamp@yahoo.com

Abstract
The architecture, connected with the rural civilization and building culture, is made with local materials and it originates from the land management needs, therefore the study and valorisation of rural architecture and territory are inseparable from each other.
Territory and architecture are exposed to anthropic and natural hazards: the gradual abandon or abuse of the rural territory favour the hydrogeological instability; on the one hand the abandonment of the historical buildings support their degradation and definitive loss, on the other hand it protected them from distorting renovations.
However most of the Italian territory has maintained yet significant landscape features, whose touristic attraction could be an important economic resource.
The paper considers the architecture and the territory of the Lomellina and of the Piacentine Apennine valleys. The Piacentine valleys are characterized by strong altitude gaps and by a marked anisotropy; the river's course and the routes on valley floors, hillsides and ridges are the main travel direction of the territory. On the contrary the Lomellina is distinguished by an eminently flat country and a dense tangle, made of land ways (main and secondary roads and rural tracks) and waterways (rivers, creeks and canals), which contribute to constitute a substantially isotropic mesh.
Only a careful knowledge of the specific peculiarities of the territories is able to allow a rational identification of the most adequate strategies for the territory access and valorisation.

Keywords: vernacular buildings, rural territory, Lomellina, Piacentine valleys, valorisation.

1. The link between rural architecture and territory

1.1 Local nature of rural architecture
Since ancient times people settled in the Italian peninsula were mostly sedentary and constituted building traditions closely linked to the nature of places and ways of living.
The population's life was based on a subsistence economy, in other words, almost all that was produced was directly consumed or traded for other necessary goods. In this type of economy surplus didn't exist and also in architecture the principle of minimum effort prevailed: the constructions were built with materials available in the area and their morphology was adapted to that of the territory [1].
The need to create adequate living conditions led to design constructive and building typologies that were strictly related with the local climatic conditions. Even the way of living and interacting with the territory was closely linked to cultural and productive factors [2], making it possible to create a balance between optimization of territorial exploitation and conservation of environmental resources [3].
Each territory was also subject to natural changes (e.g. floods, landslides, etc.) that put at risk the persistence of human productive activities and settlements, inhabitants were forced to intervene on the territory with works aimed at changing the hydrogeological regime (e.g. reclamation, terracing, etc.) to create a new balance. This balance was favourable to human life, but at the same time it was unstable: it required the continuous human intervention to remain unchanged, and this intervention was guaranteed by the permanence in time of lifestyles and agricultural production.
The strong links between rural architecture and territory is further accentuated by the lack of commercial and cultural contacts with neighbouring settlement areas, thus creating technical and

architectural cultures that were markedly local. It is for this close bond, formed over long periods of time, that vernacular architecture appears today in perfect balance with the environment in which it is set, and its study and enhancement cannot be dissociated from the knowledge and understanding of the historical territory in which it is located [4].

1.2 Evolution of the relationship with rural heritage

After the mid-twentieth century the Italian population's life styles and technological context changed significantly. Starting from the post-war a process of radical economic, social and building transformation started, the so-called "economic boom". In this period, the industry had a rapid development and agriculture introduced a widespread use of machines, reducing the demand for manpower and leading to abandon the agricultural use of mountain and hill territories.
The increase in demand for manpower in the industrial centres and its decline in rural areas caused mass migration of the most humble population from southern to northern regions, from countryside and mountains to urban centres.
Many social changes (e.g. extension of compulsory education to eight years of study, spread of television, etc.) contributed to the progressive loss of centuries-old traditions and to the homogenization of national culture.
These economic and cultural transformations engendered an evolution of the way of inhabit territory along with a change in the needs of the population and therefore of building standards.
On the one hand internal migration caused the depopulation of countryside and mountain areas with the consequent abandonment of many rural buildings. On the other hand the attraction of modern lifestyles had induced a refuse of traditional buildings and techniques, firstly because their performances didn't reach the modern building standards, but often because there was also the desire of getting over a humble past. Who managed to get rich aimed to build a new house or renovate old buildings, using new technologies, symbols of renovation and modernity [5, 6].
Modern needs engender modern building requirements, which the original design hadn't considered (e.g. plant systems, bathroom and other services, accessibility for all, security, safety). Therefore users have often produced severe architectural alterations, in order to adapt buildings to their needs. These alterations have been caused by a lack of recognition of rural heritage's historical and cultural value and have profoundly affected these architectures mortifying their intrinsic characteristics [7].
This frame of technical social and cultural changes constituted a real anthropological caesura, originating the regret of something that was lost and people wanted to reconquer [4].
The population who moved to the outskirts of cities – made up of anonymous and intensive housing estates, and lacking the necessary spaces for the report – had not been able to create new social relationships on the model of those that characterized historical dwellings. Rural world was idealized and seen as «a kind of lost paradise in which to return sporadically in the hours and days of leisure», because it was considered as a bearer of higher morality, contact with nature, and as far away from pollution and hectic pace of urban life [8].

1.3 Hazards to the preservation of rural heritage

Territory and architecture are exposed to anthropic and natural hazards: the gradual abandon or abuse of the rural territory favour the hydrogeological instability; on the one hand the abandonment of the historical buildings support their degradation and definitive loss, on the other hand it protected them from distorting renovations.
Following the aforementioned regret, in recent decades there has been a growing interest in the recovery of the smaller towns and rural architecture. This recovery process goes through a phenomenon of "re-colonization" to get away from urban centres due to economic reasons and also in an attempt of cultural roots' re-appropriation.
The phenomenon of re-colonization may allow to save rural buildings from abandonment. However, the recovery of these buildings also implies risks for their conservation. A contrast between traditional building features and new ways of living arises, and from it a situation of anthropic risk originates.
It is possible to identify three levels of risk for the preservation of rural architecture and landscape: territorial level, functional level and technological level [4].
Territorial level risks are connected to the reoccupation of rural areas – especially the peri-urban ones – that can lead to the creation of new settlements often incongruous with the morphological and hydrogeological characteristics the territory and with its history and economy: architectures that do not relate neither to the surrounding landscape, nor to the pre-existing settlements' building fabric; new neighbourhoods larger than those of historical centres, that create imbalances and strong contrasts between historical population and productive or commercial activities and the new ones.
In addition, the end of traditional agriculture – that characterized mountains and hills and had created a virtuous balance with them – has led to the gradual abandonment of those lands or to the establishment of cultivation systems deducted from intensive lowland agriculture and not adapted to

the specificity of the territory. The lack of maintenance of drainage systems and terraces and the abuse of soil have led to profound changes in the hydrogeological structure.
To these factors, unauthorized building and unaware (or shamefully colluded with real estate speculation) urban planning must be added, that have allowed the construction of settlements in areas at high risk of flooding or landslides, further aggravating the already critical situation.
Functional level risks derive from a lack of adequate capacity for readaptation to traditional lifestyles. The way we live has changed and this raises the request to adapt old houses to the new needs related to it: safety, environmental comfort, addition of modern toilets and vertical connections, etc.
Technological level risk result from ignorance of the traditional knowledge related to original materials and construction magisteria. Refurbishment work, are often unable to relate to the constructive nature of historical artefacts and to understand it, therefore they involve the demolition or radical alteration of constructive elements. Added to this there is a frequent "functional forcing", for example the conversion to residential uses of buildings with non-residential functions (e.g. mills, dryers, stables porches, attics, etc.). This leads to their profound transformation that requires: dismantling of machines; elimination of unevenness in flooring, of drainage channels, of feeders; change of interfloor heights and superelevation of existing roofs, with the purpose of obtaining a greater number of residential floors or of using as a dwelling even rooms originally with too low ceilings.
In recent decades, the already mentioned socio-economic transformations are also associated with climate change and evolution of global economy that causes the increase in energy demand of developing countries, factors that make energy consumption of buildings increasingly important.
Architecture is therefore undergoing a period of profound technological rethinking, that leads to overcome/reject the myth of energy-consuming plants as the only control instrument for the relation between buildings and external environment. On the one hand there is the obsolescence of the model of building with lightweight and insulated envelope, in favour of the recovery of the traditional model of building with massive walls, characterized by high thermal inertia; on the other hand this creates an additional source of anthropogenic technological level risk: in fact the satisfaction of performance standards established by current legislation is required even to existing buildings, sometimes engendering very invasive interventions.

1.4 Tourism potential of rural heritage and territory

The beauty of Italian landscape – born on the balance between nature and human work determined by the needs of agriculture, and enhanced by artistic representations – became famous throughout Europe at least since the 17th century, so that the Italian journey became a status symbol for European scholars and artists [9].
The high quality of Italian landscape remained substantially unchanged until the country maintained its agricultural nature and its industrial backwardness, when it began to compete with central and northern Europe industrial production, a delicate balance was broken. A building frenzy frequently replaced the thoughtful and often extremely slow changes typical of the past, thus profoundly altering large portions of the multilayered Italian landscape palimpsest [10].
Furthermore, landscape is not static, but changes over time and with the seasonal rhythms, offering possibilities to use differentiated in the course of the year. These changes are connected both to the climate, and to the changes of cultivations that follow it, and they offer food products – as well as rituals and traditional events of rural culture – differentiated according to the seasons.
Many rural areas still maintain, however, significant landscape values, which must be protected from the intrusiveness of private speculation and from the delirium of unnecessary and costly public works, promoted as an instrument for production growth of material goods, but at the expense of the most important Italian industry, in which the nation has probably the greatest increase margins: the tourism industry based on the landscape and artistic heritage.
This industry has differentiated developing ways, according to the area where it operates and that it wants to valorise. In particular, in rural areas the so-called "green tourism" may be developed, which is defines as the combination of «all types of nature-based tourism for which the main motivation of the tourists is the appreciation of nature and traditional cultures» (World Tourism Organization) and attracts all age groups, regardless of their cultural level. Against a decrease in the number of hotels and guest houses, in rural areas non-traditional accommodations (e.g. bed & breakfast, agritourisms, etc.) are spreading. Many small centres located in inner areas – partially depopulated, but with high environmental characteristics – are revitalizing, because the maintenance and enhancement of their characters made it possible to attract visitors and new residents [11].
In detail, tourism in rural context can be distinguished in several types often overlapping each other: relaxation, active rediscovery and cultural reappropriation. *Relax tourism* distances the citizen from the usual work rhythms, leading to a healthier environment. *Active rediscovery tourism* pushes tourist back in touch with agricultural activities and lifestyles, or to retrace ancient trade (salt trading ways) or pilgrimage (Viae Francigenae) routes. *Cultural reappropriation tourism* aims, instead, to a learned

knowledge of traditional rural ways of life and production (e.g. visit to historic rural architecture, museums of rural life, ancient mills and manufacturing centres that are still active, etc.).

2. Rural historical architecture in two areas of the Italian territory

Although the territories are geographically very close, the Lomellina and the Piacentine Apennine valleys reveal particular attractiveness because of the distinct territorial morphologies, which gave birth to different technological and building traditions and to a different relationship between territory and built fabric, that involves distinct ways of valorisation.

2.1 Rural architectures in Lomellina's flat territory

Lomellina is a quadrangular area of Lombardy belonging to the province of Pavia; it is clearly bounded on three sides by natural borders made up of the riverbeds of three major rivers (to the west the river Sesia, to the south the Po, and to the east the Ticino), while to the north it presents a more blurred border towards Novara's area.

The region is distinguished by an eminently flat country and a dense tangle, made of land ways (main and secondary roads and rural tracks) and waterways (rivers, creeks and canals), which contribute to constitute a substantially isotropic mesh. However the current landscape of Lomellina, is the result of the stratification of more than two millennia of human activity (fig. 1).

Lomellina was originally naturally characterized by a series of sandy ridges (generated by ancient fluvial deposits or by the wind). Despite being crossed by important Roman roads (that connected Emilia to the Montgenèvre and the Little and Great St. Bernard Alpine passes, going from Pavia [12]), for its uneven flatness this territory was reclaimed and centuriated in much more limited proportions than the area around Pavia.

During the Middle Ages, Lomellina's territory remained largely wooded or swampy and only between the 11th and the 13th centuries some monastic orders created the first settlements from which to conduct a comprehensive reclamation of the territory; the systematic work of deforestation and water regulation in fact required large amounts of capital that were missing in the previous period [13]. The reclamation works created in the wetlands a dense network of drainage channels that led the water thus collected to the dry lands. The fragmentation of land ownership between large feudal landlords, religious bodies and minor property owners, and complex water rights gave rise to a heterogeneous and articulated irrigation system [14], which required the creation of various types of artefacts for the extraction of water from subsoil (resurgences), for water control (locks, sluice gates, dividers, etc.) and to manage the intersection between the different channels (water bridges and siphons) [15].

Thanks to this complex system of territorial infrastructures a highly productive cereal agriculture – that since the 15thcentury saw the introduction of rice – developed, accompanied by bovine, pigs and poultry breeding and by water-meadows that produced grass also in winter, thanks to the higher temperature (9-12 ° C) of the water coming from resurgences that keeps the soil at a constant temperature and prevents freezing [15].

Land ownership was mainly concentrated in the hands of a number of large owners who organized its exploitation dividing the territory in medium size allotments, the management of which was given for rent. Such allotments were equipped with buildings – the courtyard farm – in which the residence of the farmer's family was flanked by the employees' houses and by more strictly agricultural buildings: barns, warehouses, stables, etc. Starting from the 18th century there was an evolution of the agricultural land management towards capitalism, with huge investment in land reclamation and in new irrigation canals (which in the course of time allowed to flatten and definitely convert to agriculture almost all the ancient sandy ridges) and the spread of the rice culture [13] (fig. 2-3). The large farms often take on the character of self-contained socio-economic units, with a church, blacksmith's and carpenter's workshops, and since the nineteenth century, also a school [1].

Urban centres are almost all very small and scattered throughout the territory, and they are inhabited mainly by peasants emancipated from their reliance on the work required by capitalist farms. Around the villages the character of the territory changes and it's defined by small grain farms and vegetable gardens [13].

The panorama of the fertile plain was also characterized by the widespread presence of proto industry of the mills for grinding of wheat, rice and other cereals. In Lomellina mills were always activated by a large water wheel (2÷3 m in diameter) and their position was therefore bound to the presence of a hydraulic jump; therefore mills were disseminated throughout the territory: isolated, inserted into a farm or an urban centre.

The materials that characterized Lomellina's rural architecture were bricks made from local clay (used for walls, floors and roofs) and timber, almost always obtained from the rows of trees separating the plots of land, which also provided wood for current needs of the farms; rare the use of stone slabs, limited almost exclusively to stairs and to the protection of parts of the mills directly exposed to water;

unusual (and restricted to areas close to the course of the rivers) was the use in the walls of pebbles alternating with courses of bricks.
In the 20th century Lomellina's economy retained a marked agricultural character, with few manufacturing settlements in proximity of the major centres (well known is the industrial district of footwear in Vigevano). Agricultural mechanization, however, has partially modified the landscape, expanding the size of the plots and forcing the cutting of most of the rows that subdivided them, who changed form fundamental source of timber and firewood, to simple hindrance to agriculture; however, at the same time the poplar cultivation spread in special plots showing the characteristic pattern with aligned rows.
The Lomellina rural landscape is preciously preserved thanks to the high profitability of cultivations, which favoured the permanence (albeit with the above changes) of agricultural activity and has been a disincentive for conversion of the lands to other uses. The conservation of this landscape is, however, currently at serious risk due to a large public work, unwelcome to local people and imposed from above: a highway that would cut Lomellina from east to west to connect two small towns (Broni - 9˙500 inhabitants; Mortara - 15˙500 inhabitants), running alongside the existing road and developing almost parallel to two other highway routes, the A4 Turin-Milan and the A1 Milan-Naples (approximately 30 km north), and the A21 Turin-Piacenza-Brescia (about 30 km south).

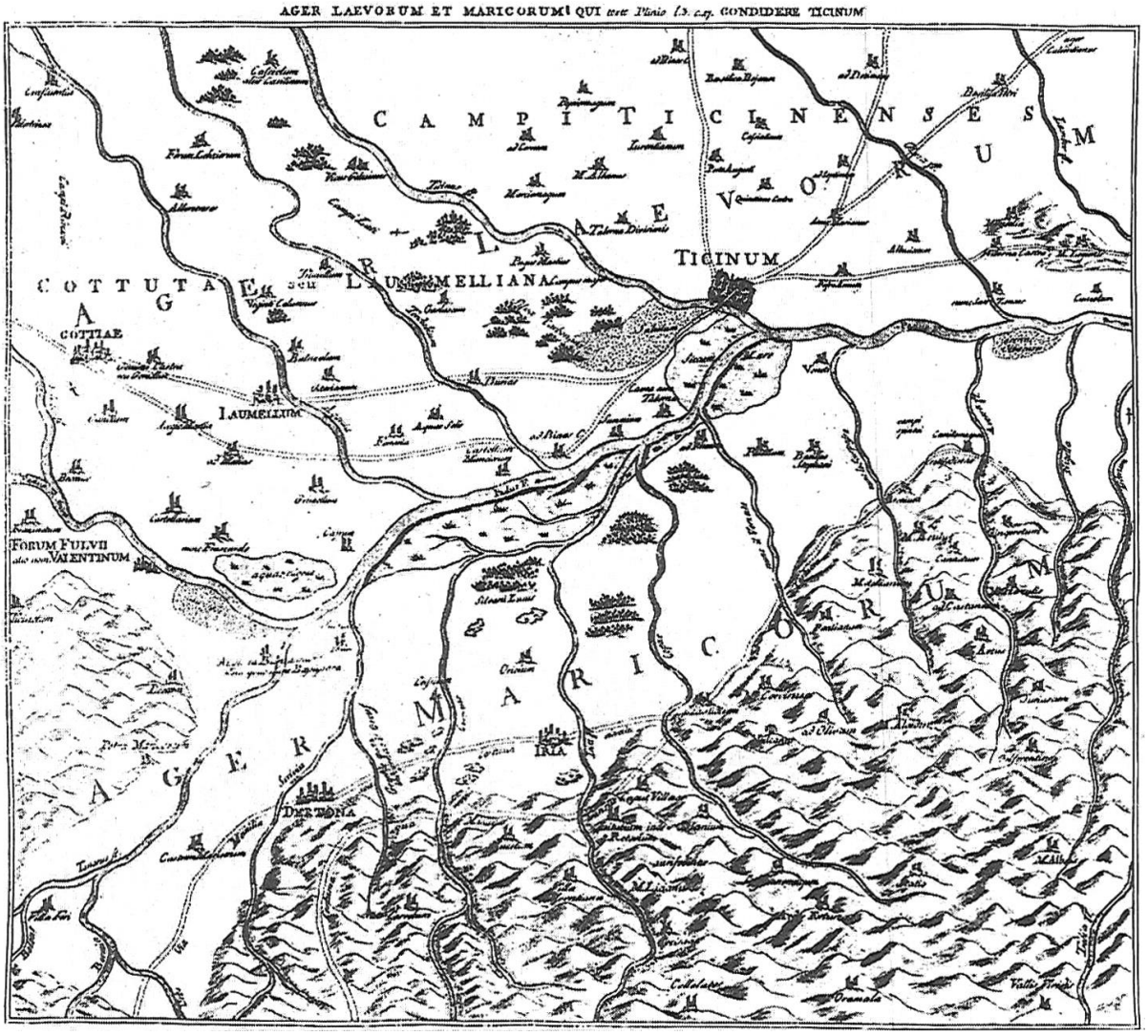

Fig. 1: Map of the Lomellina and of the neighbouring territories in the 3rd century B.C. (drafted by Siro Severino Capsoni in the 18th century [16]) at the time of the Battle of Ticinus between the Carthaginian and Roman armies. We clearly recognize the Po (which bisects the map horizontally) and the Ticino River, the city of Pavia, and – at the bottom of the map – the hills and valleys of the Oltrepò Pavese.



Fig. 2-3: The countryside of Lomellina (photographs by Emanuele Zamperini, 2012). On the left: a flooded paddy field with a courtyard farm in the background. On the right: hydraulic artefact of the second half of the nineteenth century for deriving water from a channel.

2.2 Historical architecture in the rural territory of the *Piacenza* hills

The Piacentine valleys are characterized by strong altitude gaps and by a marked anisotropy; the river's course and the routes on valley floors, hillsides and ridges are the main travel direction of the territory.

Over the centuries, the Apennines chain has always been a barrier to the connections between opposite sides. The most important directions followed the valley bottoms, but the crossing of the watersheds had obligated the roads to conform to their morphology. In the past, «minor entrenchment (arroccamento minore)» roads had been given rise by the presence of settlements, which were located in not easily accessible places for safety problems [17].

In Roman times, the Apennine valleys had already held an economy bound to pastoralism and agrarian production. In the early Middle Ages, following the fall of the Roman Empire, we witnessed a process of heavy decline of commerce and of agricultural activity of the plain's territories, with the resulting abandonment of the Romans roads. Failing the plain's towns, the society found itself downsized a semi-natural economy, recovering the ancient rural villas as places of local life organization. Village communities were developed according to cohabitation rules, that were based on the communal exploitation of the territory. The ruralisation process continued in the Lombard period (VI-VIII century; the old system of communication routes was supplanted by new road network, which facilitated high ground localities. The Piacentine Apennine valleys acquired particular importance as connection routes between Pavia – capital of the Lombard kingdom – and territories of Liguria and areas of central and southern Italy. The importance of these ways grew further due to the gradual spread of religious pilgrimages to Rome and the Holy Land. *Hospitales*, agricultural settlements, villages with the aim to travellers' stop or to defence the territory,

Through the organization work led by the St. Columban monks of Bobbio, the territory was divided into territorial units (*celle*), where there were a place of worship, a farm or a livestock, and, in some of them, a free hospice for wayfarers. Testimony of this territorial subdivision remained in subsequent periods, with the feudal organization promoted in the Carolingian era and with the birth of the communes [18].

With the occupation of the *La Cisa* pass – initially in Byzantine territory – and the rebirth of the plain's economy, the crossing ways trough the Piacentine Apennine valleys gradually lost some of their importance; the final areas of the valleys were affected by more cultural and mercantile changes with the plain and they had a more dynamic and in progressive transformation economy; on the contrary the mountain territories and the more central areas of valleys were characterized by greater static nature of the economic systems, which had conserved Medieval type organizations and territorial management for a long time.

In mountain territories, isolated houses were rare and villages evaded the valley floors, less sunlit and mainly humid, opting for placing along the hillsides, on spurs or level grounds; in the hills, at lower altitude, settlements were situated on ridges, visually communicating among themselves, but there were also some cases of villages which rose along banks of streams whose beds formed real natural ways (fig. 4). The economy was agrarian and self-support, based on horticultural farming, on small cereals fields, or on viticulture (which is particularly important in the low *Tidone* valley), and supplemented by harvest of chestnuts in wooded areas or of juniper berries in uncultivated plots in mountain territories [15].



Fig. 4: Detail with the Val Chiarone of the map of 1713, which represents the feud of Count Giromonte dal Verme. One of the largest centers was Pianello, which was located downstream along the Tidone creek, near the confluence with the Chiarone; Pianello was a reference point for the neighbouring villages because of in the past it had a particularly important market. Along the course of Chiarone, there were settlements and rural hamlets. The current road that connects Pianello to these localities cut the hills slopes, but the original road was adjacent to the creek. The represented villages in the map have already been. State Archive of Parma, *"Confini", busta LL, filza ll, vol. 3°, doc. 4.*

Starting from the nineteenth century, the long decline of valley's economy led to the agrarian decrease and to the disappearing of traditional activities, as herding. The increasingly unpopulated mountain met the abandonment of many settlements and the advancement of woods, which have reoccupied plots, before that, cultivated or intended to pastures.
The northern Apennines mountain territory has conserved yet charm and features of places where human presence has not completely transformed the natural landscape peculiarities [17].
The building typologies of rural areas are related to territory and uses. In mountain, as in *Trebbia* valley territory, the traditional buildings are connoted by stone masonry, roofing made of limestone slabs – called *ciappe* – and floors with wooden beams and planks (Fig. 5-6). Indeed, stone and wood were easily available materials in the territory. The masonry was characterized by visible regular stonework made of partially worked ashlars, thin joints and mortar that doesn't appear in facings [18]. The ground floors housed stables and services rooms and the real dwelling was at the upper floors (one or two); this arrangement allowed to create better indoor environmental conditions of the residence, which was placed between the ground floor, often warmed by the presence of animals, and attics. The stone entrance stair were outside and the internal vertical connections were wooden ladders. The *Estimi Rurali Farnesiani* (XVI-XVII century), a kind of land register of rural properties decreed by the Farnese, Lords of Piacenza, relate information about surveyed buildings which has still been found in rural historical buildings (stone roofing, stone masonry, ovens, etc.).
At lower altitudes, on hills, the building materials are again stone and wood, but bricks appear more frequently and roofing is made of clay tiles, because of the proximity to the plain areas, where the clay were extracted in order to produce bricks. In these territories the stone masonry was made of irregular blocks and, traditionally, it was plastered (fig. 7-8). Also in this case, documents of the *Estimi Rurali Farnesiani* give us some useful information about the rural buildings. The buildings were characterized by stone masonry and clay tiles roofing. Most of houses were one or two floor buildings and they had sometimes an attic or a basement, which was used as tools or agricultural products storage; the stairs could be external or internal.

The stable was placed next to one of the house's walls and over it, there was usually the hayloft, which sometimes had straw roofing; many buildings had cobble farmyards for grain drying and beating. Other typical buildings were porch, oven, dovecote, wine press and chicken coop. There were also other rustic constructions, isolated or adjacent to houses – probably huts or temporary shelters –, which had wooden structure and roofing made of straw or of sorghum bundles, now missing by now [19]. Along the streams there were also many mills.





Fig. 5-6: *Val Trebbia*, district of *Bobbio*, *Piacenza*. At left: a building in *Sambuceto*, which is characterized by visible stone masonry and stone slabs roofing (photo by Paolo Dallavalle, 2012). At right: *Freddezza,* the centre of the hamlet with its fountain/laundry (photo by Valentina Cinieri, 2010).





Fig. 7-8: *Val Chiarone*, district of *Pianello Val Tidone*, *Piacenza*. At left: *La Costa* – "the shore" –, rural building characterized by stone masonry and clay tiles roofing; next to the house there is the stable and, over it, the hayloft. At right: the *Casotto* with its dovecote tower and the surrounding landscape; it is evident the position of the compound in relation to the hill (photos by Valentina Cinieri, 2013).

3. The rural territory valorisation

Only a careful knowledge of the specific peculiarities of the territories is able to allow a rational identification of the most adequate strategies for valorisation of the territory. Indeed, as we have seen, the knowledge and rediscovery of many "minor" heritage buildings and their preservation are indispensable conditions for rural areas' promotion, which are inseparable from them.

It is therefore essential to define intended uses which are compatible with rural architectural heritage preservation, and don't involve its deep transformation, but, at the same, are able to promote an economically sustainable utilization of the heritage itself. In fact economic sustainability is a necessary prerequisite in order to manage, to maintain and to enjoy heritage over time; a limit of use that considers unprofitable activities may lead to abandonment and loss.

In the first instance, it would be preferable to preserve the agricultural use, which could safeguard the strong relation between building and territory. However, this isn't often possible, due to the end of rural activities or the changing of agricultural organization (different size of the area cultivated by the single

farm, changes of machinery and consequently of required spaces, new hygienic and sanity standards for breeding farms, etc.), which would require an architectural distortion.
Key question is the promotion of an integrated conservation of material and functional issues, together with social ones; in order to achieve this goal, it is necessary to start from the popularization of the awareness that rural built and landscape asset is a prime importance heritage [20].
In any way, the imposition of a compatible use should be made along with control and limits imposed by local administrations and it should be compensated by actions which don't demand a direct economic outlay by the same administrations: grants or tax relief in case of rehabilitation or preservation plans, or concessions to build additional volumes (typologically and morphologically compatible with the existing buildings) notwithstanding the current urban regulations.
The tourist valorisation of rural territories can't be based exclusively on the attraction offered by the "emergent" built heritage. In territories where this is scarce, it can attract only a quick getaway tourism, as "half a day" trips; to focus the attention solely on the "emergent" monuments leads tourists to follow a series of "canonical" and always identical routes, and it drives to neglect the territorial dimension of the local culture, overlooking large areas of the territory.
The territorial promotion must be based on a slower pace tourist fruition, and suggest itineraries in which the interest isn't limited only to one destination or a series of stages, but it is extended through the route, consisting of a "diffused museum" (rural and fortified buildings, hydraulic structures, anthropized territory), which we feel «as a mosaic of synchronic coexistence, and concurrently as a diachronic layered palimpsest» [9].
With regard to strongly anisotropic and unidirectional valley territories – such as the Piacentine Apennine valleys – the valorisation could still be based on the "classic" system of an itinerary that notch up a series of consecutive steps, but expanding the view to the whole surrounding landscape. On the contrary, the Lomellina is a flat and substantially isotropic territory, which is constituted by a multistratified palimpsest of various levels of interpretation (irrigation system, system of the mills, system of farms, agricultural landscape, historical medieval testimonies, etc.), and is characterized by many minor elements, whose relevant interest is originated by their systematization; therefore the modalities of its promotion must be different and must allow the overview of a little part of the territory or a thematic interpretation of larger areas.
The system that we consider to be useful in both cases – and indispensable in the second one – is the creation of a web portal, managed by a consortium for territorial development, in which the material and immaterial cultural resources of the territory are stored and geo-referenced with a GIS-based system, and which permits a quick interface with other provided resources of the web 2.0 (e.g. images from Panoramio, Wikimedia commons, etc.). This portal should allow the realization of a personal travel guide, that could be consulted online or downloaded as an e-books (and easily upgradeable or adjustable in case of change of plan with the access to the portal by a smartphone), concerning routes designed according to available time, adopted means of transport, specific knowledge interests.

4. Conclusions

The rural architecture arises from needs of territorial management and it is in close connection with the territory; its material, typological, morphological and social features depend on a long history of agrarian use of territory and they can't be separated from it. In recent decades, the socio-economic transformations have led to the gradual moving away of population from rural buildings and their context. On one hand this caused their abandonment or manipulations, on other hand a widespread need for revival.
The valorisation of rural territories should be based on the promotion of this need for rediscovery and on a process of preservation and of compatible reuse of agricultural built artefacts.
In today's society, the tourist activities are more strongly related to the use of electronic tools and web 2.0, therefore the key issue of the valorisation is considered the implementation of territorial knowledge instruments, that are highly interactive and customizable as, for example, a territorial web portal in which useful data are stored and by which a personalized tourist guide could be created on the base of needs (available time, means of transport, etc.) and of user's interests.
In order to engender the valorisation of the territory, public initiatives are essential to fund and promote this kind of system: consistent with the type of access to the mentioned territories, able to support tourist activities without distorting the territory, and capable of generating more important "income multipliers" than large public works [21].

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HERITAGE ARCHITECTURE LANDESIGN
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Peripheral Porosity: Cultural Landscapes of Indigenous Heritage Conservation

Hannah Hunt MOELLER[1]
(1) Architecture, Taubman College of Architecture and Urban Planning, University of Michigan, Ann Arbor, USA
Hannahmo@umich.edu

Abstract
In 2007, the United Nations instated the Declaration of Rights for Indigenous Peoples, promoting an agenda of human rights. However, postulating the 'indigenous' evokes preservationist tactics, meriting value through classification and boundaries. Textual and spatial definitions assert control. This paper examines the foregrounded spatial divisions demarcated by the Declaration, questioning the ostensibly generous provisions that may inhibit, not enrich, the conservation of indigenous cultural heritage.

The paper examines Bolivian legislation issued in direct response to the United Nations Declaration, asserting indigenous autonomy evoking distinctly rural spatial demarcations. This notably avoids predominant indigenous population living on periphery of urban centers as result of post-colonial migration. The paper posits that the ambiguous peri-urbanity is a 'border' as sociologist Richard Sennett explains as 'at once resistant and porous.' The paper argues that the level of porosity of peripheral settlements is essential for a dynamic cultural landscape; at once maintaining heritage ties to indigenous lands while engaging the urban center's labor force.

This paper examines the definitions implicated by the Declaration. It analyzes definitions of people and space, and the subsequent lack of definition for social or spatial ambiguity 'between the lines' of these definitions. The paper acknowledges the ambiguous territory that resists definition and the beneficial affordances of undefined land. To end, the paper argues for new strategies to maintain and nurture cultural heritage. It distinguishes tactics of conservation from those of preservation strategies. Beyond a semantic difference, conservation engages sustained practices of indigenous cultural heritage amidst a dynamic urban ecology.

Keywords: United Nations Declaration on the Rights of Indigenous Peoples, Bolivia, Land Rights, Heritage Conservation, Peri-urban

1. Definitions

> Article 26, *United Nations Declaration on the Rights of Indigenous Peoples*
> *1. Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired.*
> *2. Indigenous peoples have the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired.*
> *3. States shall give legal recognition and protection to these lands, territories and resources. Such recognition shall be conducted with due respect to the customs, traditions and land tenure systems of the indigenous peoples concerned*. [1]

In 2007, the United Nations instated the Declaration on the Rights of Indigenous Peoples, promoting rights to self-determined autonomy and control over cultural heritage. Twenty-two years of long

deliberation and debate between nations and indigenous communities ultimately produced the Declaration celebrated as ‘a living document for the common future of humanity’. [2] While the Declaration is not legally binding, it establishes a standard for the treatment of indigenous peoples worldwide. This paper critically examines the spatial and social divisions demarcated by the Declaration, problematizing the ostensibly generous provisions that may hinder conservation of indigenous cultural heritage.

The rhetoric of a moralized ‘common future’ resists critique and opposition to any of the articles is deemed discriminatory. However, at the risk and defiance of this critique, the following paper seeks to evaluate the ‘commonness’ of the Declaration as a means to evaluate best practices by which to achieve this ‘common future’. This paper argues that the territorial and textual demarcations of indigenous evoke preservationist tactics, meriting value through classification and boundaries. Ultimately, the paper problematizes notions of *preservation* and presents instead *conservation* as a generative strategy that maintains connection to heritage whilst acknowledging dynamic socio-cultural processes.



Fig. 1: Indigenous Aymara Celebrate the Winter Solstice with Offerings of Llama Fetuses in Tiwanaku

The Declaration’s rhetoric acknowledges the presumptive minority status of indigenous peoples. Thus, the implications are particularly potent in the South American country of Bolivia, which boasts a 62% population majority of indigenous peoples. [3] Defining spatial demarcations are preliminary steps to determining land rights and seeking self-governance. Beginning with ancestral territory presumes continuity of inhabitation both traditionally and contemporaneously, lacking acknowledgement of either migration or nomadic cultures. Foregrounding traditional spatial occupation is problematic as it renders space stagnant and impedes the dynamic socio-spatial development of cultural heritage.

1.1 Defining People

Remarkably, the United Nations’ Declaration of Indigenous Rights lacks a formal definition of indigenous in its dossier of affirmative declarations. This perceived oversight received adamant critique from opposed nations in the General Assembly. Textual formulations of identity resist definition as it narrows identity to legal categories and preconceived criteria. Determining indigenousness is thus relegated to self-identification and ‘buttressed by an ethos of self-determination’. [4] However, a proximate pamphlet targeted at ‘indigenous adolescents’ articulated the foregrounded concerns for such definition:

> *Indigenous peoples are descendants of the original people or occupants of lands before these lands were taken over or conquered by others. Many indigenous peoples have maintained their traditional cultures and identities (e.g., way of dressing, language and the cultivation of land). Therefore they have a strong and deep connection with their ancestral territories, cultures and identities.* [5]

Foregrounding the spatial claims create a direct link from land to culture. Ownership of territory is deemed central and the essential quality to distinguish a cultural identity. Nowhere more significant are indigenous land rights than the South American country of Bolivia. In 2005 the country elected its first self-proclaimed indigenous president, Mr. Evo Morales. His presidential inauguration by Aymara priests at the ceremonial site of Tiwanaku set a tone for his political promotion of indigenous rights. [6] In 2009, Bolivia implemented a new constitution that espoused the UN Declaration into formalized legislation as a means to grant greater self-determination to its indigenous peoples. Mr. Morales spoke to his country: "We are the first country to turn this declaration into a law and that is important, brothers and sisters. We recognize and salute the work of our representatives. But if we were to remember the indigenous fight clearly, many of us who are sensitive would end up crying in remembering the discrimination, the scorn." The following year, the Autonomy and Decentralization Framework Law introduced procedures for indigenous communities to establish autonomy, as a form of self-governance and recognition of self-determination.

Mr. Morales' citation of the 'indigenous fight' reflects the atrocities against native peoples by non-native imposters. Spanish conquistadors entered the region in the mid sixteenth century, extracting silver and exploiting the Incan empire. More present in national memory are neoliberal policies of the early 1990's, alluring multinational corporations exploitative concessions for resource extraction. Those who came drew new boundaries and claimed spatial control to assert authority. The responsive legislation rhetoric of Mr. Morales's new constitution attempts to decentralize control, declaring a plurinational state. The goal to re-establish indigenous autonomy through the Autonomy Decentralization Framework Law begins with reclamation of traditional indigenous territory. The Framework Law attempts to reverse the travesties by facilitating indigenous self-determined autonomy. Recognition of autonomy accompanies the textual declaration, affirming ownership, usage, and control as means to manage cultural heritage of native lands. However, seeking to re-establish indigenous autonomy through recognition of traditional spatial occupation is problematic, as ethnic communities no longer inhabit native territories, live nomadic livelihoods, or have migrated to new regions.

1.2 Defining Space

Arguably the most contested articles in the UN Declaration on the Rights of Indigenous Peoples consider the space inhabited by indigenous peoples. As mentioned in the epigraph, Article 26 gives rights to traditional territory 'possessed by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired'. [7] During the United Nations General Assembly deliberations regarding the Declaration, four nations vetoed the declaration in contestation of Article 26**.** Australia, Canada, New Zealand and the United States lamenting problematic assumptions of land rights. While internal national politics certainly played a role, the Declaration defines space only in pre-colonial terms, rendering space stagnant. Primary concerns against the policy argued that the article might supersede national legislation allocating territorial rights to native peoples.



Fig. 2: Crosswalk guards in zebra suits embody urban processes of appropriate city street behavior

The indigenous lands are customarily located in rural regions. In practice, this presents spatially dichotomous categories of rural and urban. Increase in rural to urban migration has raised awareness of fear of losing essential cultural heritage of the indigenous. Upon moving to urban areas, assumptions hold that traditional dress, religion, language, and customs fade in mere generations. One extreme example of the drama of extremity is a contemporary practice to urbanize new rural migrants to city life. One customary scene is of costumed crosswalk guards donning zebra suits to alert both pedestrians and motorists of the white stripes notifying where to walk. The costumes provide a visual pun, as "cebras" signifies both zebra and crosswalk. Though humorous, the intent is to civilize outsiders to engage the city on urban only city's terms. The space of the city is seen as one in which new migrants not only occupy but gain new urban behavior.

This example posits an exceptional socio-spatial dynamic. Henri Lefebvre reminds us that space is a social product. He argues that space is not limited to a priori Cartesian geographic coordinates, but generated. Space is co-created socially and spatially. [8] This understanding of space is produced and continually *being* produced. The practices of the cebras exemplify this social conditioning of urban space. In this way, the urban space in Bolivia is understood to be where traditions of past are shed for ostensibly modern ways of living. Within this dichotomy, extreme examples of pre-colonial or urban living locate indigenous space in rural regions and the city as the locus of modern life. This distinction is limiting to both people and space operating outside distinct categories between the lines of definition.

2. Between the Lines

For Bolivia's indigenous, spatial occupation is continually in flux. While the majority of Bolivian indigenous peoples live in rural highlands, many are located here as result of migration post-colonial occupation. In lowland rural areas, however, the 2009 Constitution provided frameworks for state designation of Original Peasant Indigenous Territory, defined as "ancestral territory where common lands or community of origin was constituted". [9] However, much of the land is fragmented, privatized or shares ownership with national parks. The lack of cohesive territory does little to solidify collective cultural identity.

The final zone of inhabitation for Bolivia's indigenous resists definition either rural or urban. Deemed the peri-urban, peripheral settlements surrounding urban centers lack discrete definition. The ambiguity of both ruralized urban and urbanized rural provide certain affordances lacking in spatially demarcated zones. As rural to urban migration escalates, this is increasingly the site of Bolivia's indigenous. Often living in informal settlements and makeshift housing arrangements, this geography affords no legal benefits toward recognized autonomy. However, I argue, that the ways in which migrants inhabit this ambiguous territory provide opportunity for grassroots self-designation and self-identification. The informality instead enables residents to formalize their territory through dynamic socio-spatial occupation.



Fig. 3: Overlooking peri-urban Communidad Maria Auxiliadora along the southern fringe of Cochabamba

3. Self Definition

Urban edge conditions are precisely the ambiguous territory ripe for negotiating the categorically indigenous rural and urban modern. Sociologist Richard Sennett distinguishes such urban fringes to biological phenomena akin to a cell membrane. The peri-urban enables a spatial porosity, “at once resistant and porous.” [10] Linkages between rural and urban maintain a space complicating the rural/urban dichotomy. It is a transitional zone and a landscape continuum. It lacks formalized definition or uniform construction, instead situated as a ‘both/and’ between dichotomies of rural and urban or indigenous and modern. “The peri-urban interface is characterized by strong urban influences, easy access to markets, services”. [11] Regardless, it is distinctly not urban. Living on the edges of urban centers allows indigenous peoples access to the economic incentives of a city. Desirable amenities include commercial markets and an expanding labor force as well as access to the municipal infrastructural amenities such as water, electricity, and transportation. Yet, cultural ties to rural communities remain significant. Members return to help family farms herd llamas or participate in community councils. These urban edges become permeable borders between cosmopolitan living and indigenous lifestyles.

This study of peripheral settlements in the agrarian valley region of Cochabamba demonstrates one example of the sustained practices of indigenous cultural heritage amidst a dynamic urban environment. The community of Maria Auxiliadora is located in the southern zone of the city of Cochabamba. Though its location within the vague peri-urban landscape may render it normative, the community is an anomaly. The community Maria Auxiliadora formed in 1999, after a group of six women purchased the 16.8 hectares of land to establish the community as a communal land trust. The community earned a World Habitat Award in 2008 for its exceptional model of self-initiated democratic governance and collective ownership. [12] It is in fact the informal qualities of peri-urban area that allow residents to establish collective systems of governance, resource management, and cultural production.

Invoking Lefebvre once again, in this ambiguous territory indigenous cultures produce new social space. In its formation, a team of women collectively purchased the territory on the fringe of Cochabamba. In a country where masculine machismo is a cultural norm, the self-initiative of these women is notable. The community foregrounded gender equality as a way to establish new modes of operating. Additionally, the contemporary occupants have emigrated from multiple regions and do not share the same ethnicity. The community chose to purchase this territory outside of the urban center. The implications are a formalization of informal territory and an affirmation of establishing new spatial practices that meld between indigenous and modern ways of living. This example showcases a moment in which a transitory space is defined by grassroots momentum, not by bureaucratic top down spatial control.

4. Redefinition

The motivation of this argument is to present a critical read of the United Nations Declaration on the Rights of Indigenous Peoples with specificity to the case of Bolivia. The implications position anew the stakes of heritage preservation with an eye toward the socio-spatial. The field of preservation has an affinity for borders. This manifests most commonly in historic building zones of city districts, where it is the restrictive codes that give most value to sites through constriction. Meaning is added through the sites’ separation to its surrounding context. The cordoning off of space preserves through spatial division. Boundary-making is the present mode of operation for preservationists. Similar tactics are at play in the United Nation’s Declaration of Indigenous Rights. Defining indigenous through spatial demarcations positions these peoples into categories of indigenous rural or modern urban. Yet the reality of the dynamism between space and culture results in ambiguous territory.

In the case of Bolivia, the presidential regime of Mr. Evo Morales is ironically using similar tactics of definition to maintain control. Ability to self-govern decentralizes control. As such, critics of Evo Morales have been weary of the ostensibly generous proclamations for indigenous autonomy. Divisions of groups via textual divisions ultimately give control to the one drawing the lines. An outstanding 62 % of the population self-identify as indigenous, however closer examination of statistics reveals few purely indigenous peoples is to be found in the country. The 2012 census raised outrage as census forms lacked ‘mixed-race’ status. The ethnicity of “mestizo” seemed blaringly lacking and ballots instead required citizens to select one of forty ethnic groups. Graffiti proliferated throughout the capital city of La Paz with the words "I'm not Aymara. I'm not Quechua. I'm mestizo," [13] Speculation held that allowing mixed-race status would destabilize and delegitimize the vocally indigenous government of Evo Morales. The aim to create a plurinational state of Bolivia via granting indigenous autonomy appears a preservationist tactic to assert control through classification. Equally, autonomy asserts boundary and isolation. Sociologist Richard Sennett invokes biological references to

explain, ‘the border is the limit, a territory beyond with a particular species do not stray’ and ‘like a cell wall serves as a contained to hold things in’. [14] Strict definition making asserts sectarianism, providing a leverage point for governmentality. These definitions occur both in text and space.

5. Conclusion

It is the very lack of defined spatial boundaries of the peri-urban space that enables self-determination. This paper argues accordingly for another strategy to engage indigenous heritage than preservation. I propose conservation. The discrepancy is beyond semantics. While preservation tactics assert control via top-down boundary making, conservation cultivates. Conservation is dangerous and certainly less controlled. It cultivates choice and self-determination. It enables culture to evolve and enter the urban ecology without prescribed outcomes. While the spirit of the Declaration is apparent to increase human rights for as “a living document for a common future” this “future” must be carefully scrutinized for its utmost potential. The heavy claim makes broad strokes regarding cultural definitions, perhaps missing localized nuances that render the Declaration improbable. The case of Bolivia enlarges an understanding of direct implications that result in spatial demarcations and assumptions unequivocal to empirical realities. The “living document” for global standards must re-evaluate preservationist practices to acknowledge the ambiguous definitions and demarcations of peoples and space. Recognition of cultural heritage must not limit to stagnant spatial criteria but look forward to notions of socio-spatial heritage as both dynamic and living.

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The End of Urban Exploitation and the Rise of the Urban Imaginary: Histories and Futures of Detroit, Michigan

William MARTIN
Taubman College of Architecture and Urban Planning, University of Michigan, Ann Arbor, MI, USA
whmartin@umich.edu

Abstract

Top-down urban development projects often perpetuate sociospatial injustice by focusing renewal in areas occupied by a region's most disenfranchised populations, most commonly urban minorities. Because these populations often lack sufficient political and economic power, they are left with little opportunity to democratically or otherwise oppose the impositions of the dominant urban regime. Legacy forms of urban development through public-private partnership fail to provide an equitable distribution of rights to imagine alternative urban futures even when lead by the most socially radical planners.[1] Such development is conversely complicit in ensuring and facilitating capitalist exploitation of city land. In this paper I will trace the multiple forms of this exploitation before exploring projective strategies for establishing a new urban imaginary as a productive alternatives to the existing paradigm. There exists an extensive body of analytical and critical literature concerning spatial issues of urban injustice and inequality through the lens of Marxist critique, geography, urban planning, architecture, and public policy. This literature focuses on cities as spaces of conflict. This work suggests the potential of interactive media practices to instrumentalized as a means of innovating operative spatial strategies that could enfranchise populations with capacities for self-directed planning that exist outside of both the reactionary activist paradigms of resistance and revolution, whose tools are outmoded. This argument is intended to present one of many potential modes that the paper hopes to inspire. In the first half of the paper, taking Detroit, MI as a paradigm case in a global context, I will trace historic hegemonic regimes of urban development through three phases that dominated Detroit's urban imaginary: (1) federal funded creative destruction (1949-1969), (2) globalization and entrepreneurial governance (1970-1989), (3) postmodern monopoly rents (1990-present). This history will reveal how the imposition of top-down urban imaginaries resulted in the exploitative and spatially unjust environment of Post-World War II Detroit. In the second half of the paper I will begin to theorize the potential of new forms for mediated *spatial* practices to empower disenfranchised urban populations with the capacity to lay claim to a more equitable future through the production of a radically new urban imaginary.

Keywords: Detroit, New Media, Justice, Identity, Conservation

Introduction

Top-down urban development projects often perpetuate sociospatial injustice by focusing renewal in areas occupied by a region's most disenfranchised populations, most commonly urban minorities. Because these populations often lack sufficient political and economic power, they are left with little opportunity to democratically or otherwise oppose the impositions of the dominant urban regime. Legacy forms of urban development through public-private partnership fail to provide an equitable distribution of rights to imagine alternative urban futures even when lead by the most socially radical planners.[2] Such development is conversely complicit in ensuring and facilitating capitalist

exploitation of city land. In this paper I will trace the multiple forms of this exploitation before exploring projective strategies for establishing a new urban imaginary as a productive alternatives to the existing paradigm. There exists an extensive body of analytical and critical literature concerning spatial issues of urban injustice and inequality through the lens of Marxist critique, geography, urban planning, architecture, and public policy. This literature focuses on cities as spaces of conflict. This work suggests the potential of interactive media practices to instrumentalized as a means of innovating operative spatial strategies that could enfranchise populations with capacities for self-directed planning that exist outside of both the reactionary activist paradigms of resistance and revolution, whose tools are outmoded. This argument is intended to present one of many potential modes that the paper hopes to inspire. In the first half of the paper, taking Detroit, MI as a paradigm case in a global context, I will trace historic hegemonic regimes of urban development through three phases that dominated Detroit's urban imaginary: (1) federal funded creative destruction (1949-1969), (2) globalization and entrepreneurial governance (1970-1989), (3) postmodern monopoly rents (1990-present). This history will reveal how the imposition of top-down urban imaginaries resulted in the exploitative and spatially unjust environment of Post-World War II Detroit. In the second half of the paper I will begin to theorize the potential of new forms for mediated *spatial* practices to empower disenfranchised urban populations with the capacity to lay claim to a more equitable future through the production of a radically new urban imaginary.

(1) Federal funded creative destruction (1949-1969),

In 1942 one of Detroit's more powerful companies Homer Warren & Company submitted a "scientific" report diagnosing and prescribing suggested remedies for Detroit's urban issues to the Urban Land Institute (ULI).[3] At the time the ULI had recently established itself as an advocacy organization that would provide outlines for legislative reform for dealing with issues related to the decentralization of American cities. [4] In the report Carl S. Wells, the president of Homer Warren & Company, diagnosed blight as a primary contributor to Detroit's urban issues and identified specific blighted territories on the map as locations.[5] According to the report: "The outward movement of upper and middleclass income groups has been largely due to the fact that the area, approximately 3 miles in radius, which is adjacent the central business district, has become blighted and extremely undesirable for residential purpose;" the report claims in a scientific manner that age and obsolescence are to blame, quoting that "about two-thirds of the structures are close to 40 years old, and the remaining ones are 30 years old."[6] These locations, it was argued, should be reclaimed "for the protection and conservation of those areas threatened by the spread of blight" through "slum clearance, elimination of substandard housing, and location of housing development and redevelopments, under the Urban Redevelopment Corporation law."[7] Almost all of the neighborhoods designated "blighted" were majority black**.** The manipulated stories and ulterior motives under the guise of technical analysis became the justification of the use eminent domain to displace large minority populations for the purpose of "urban renewal." The largest and most egregious case is that of Paradise Valley, which was the jazz Mecca of the 1940s and 50s and social hub of the black community, with over 300 black owned businesses was demolished. The intent was clear—the business interests of Detroit were explicitly lobbying for the power to clear slums to create space for more lucrative real-estate investment that would encourage the return of the white upper and middle classes that had fled to the suburbs.

Initially this process of "creative destruction" of "blighted" areas entailed a tacit agreement between the state and private interests in with municipal government would take on an expanded role in municipal real-estate market by incurring a portion of the investment risk burden by leveraging federal funds for slum clearance projects. Despite being sold politically as a public good the thrust behind urban renewal in the US became dominated by business interests who manipulated projects to serve exploitative practices that stigmatized and ultimately destroyed predominantly minority and poor urban communities.[8] Subjective biases became instrumentalized as objective science through the construction of a specific urban imaginary. As Weber puts it, "narratives often indistinguishable from the basic empirical identities of buildings, neighborhoods, and entire cities (Shields 1991)[9]. Encouraged by business owners, municipalities constructed an imaginary that defined "obsolete" and "blighted" buildings, that empowered them with the capacity to displace undesired communities that resided on valuable urban land near the central business district, land that was considered unsightly as they were inhabited by poor , black communities.[10] This process render the previously occupied urban land "more malleable and [therefore] potentially more valuable to investors".[11] The extent of urban renewal of this type was so substantial that "between 1949 and 1965, one million people, mostly low-income, were evicted in the name of eliminating blight (Hall 1996). The intentional

construction of an urban imaginary by specifc actors and agence dominated by the commercial interests of business and real-estate manifested in a dramatic restructuring of the physical space of the city to their particular benefit at the expense of other disenfranchised communities who failed to succeffully proposition for an alternative.

(2) Globalization and entrepreneurial governance (1970-1989)

The power to constructed the Detroit urban space through imagined futures remained with privileged private business interests. As global markets expanded competition, industry had increasing liberty to elect where it would produces its goods, these interests were agile to reconstruct the urban imaginary to again serve their interest. In this new context municipal government were forced take on an expanded role in municipal real-estate market to guarantee that development and production would actually takes place in the municipality. By incurring a portion of the investment risk burden in the form of debt in order, the municipality would benefit through increased tax revenue to be spent on other politically advantageous projects.[12] At least this was the intent. Attempts to compete for increasingly fluid investment capital in the form of real-estate resulted in a form of boosterism that lead to the exploitation of urban communities through "excavation of value" in the form of population displacement that rarely succeeded in the procurement of promised returns.[13]

In 1969 when President Richard Nixon declared that the urban development and housing crisis in the US was "over and done with"[14], the Michigan Civil Rights Commission released statistics stating that 90 percent of Michigan non-whites still lived in "urban ghettos.[15] Regardless of the local reality, the national narrative enabled the federal government to justify eliminating the programs that were financing urban renewal project funding.[16] Changing policy weakened the capacity of business interests to manipulate urban space through the previous regime of urban renewal. As a result these private interests again utilized the construction of new urban imaginary to regain control of spaces of the cities future. By this time global corporations, including Detroit's own General Motors, Ford, and Chrysler (known as "the Big Three") were increasingly capable of leveraging global networks to maximize profits by exploiting cheap production costs. These preferences became increasingly indifferent to locality. As a result, the city of Detroit found itself increasingly desperate to keep the automobile industry, the backbone of its economy, within the city. Politicians were faced with the contradictory necessity of attracting placeless multinationals (including the Big Three) and the needs of their local constituents. Faced with this dilemma, Detroit engaged in public-private development in order to lure business interests, including local business elite of Detroit's international mega corporations. However because the city was so desperate to retain big business, the bargaining power fell to the corporations who were able to once again demand control of the urban imaginary of the city. As in the post-war period, a small group of rich and powerful individuals organized to script the future space of the city.

In 1970 a small group of Detroit's most powerful corporations created the Detroit Renaissance Inc.. Their intent to vision the future of city is clear in their name, even if the specifics of that intent were different than their publicity would suggest. Guided by its president Henry Ford II, Detroit Renaissance Inc. constructed an imagine of corporate pride and commitment to Detroit. This public relations and "corporate responsibility" campaign however had serious ambitions to again free large spaces within the city to the flow of global capital through the construction of several massive downtown riverfront developments. The flagship project, the Detroit Renaissance Center, which opened on the river front in 1977 and was intended as a "catalyst for the renewed growth of Detroit," however, much like the other large projects directed by the Renaissance Inc., became a sink hole for public financing.[17] The corporations manipulated the city to subsidize their private interests by selling an new urban imaginary in which corporations were city patrons who would, with the aid of city funding, make downtown an attractive place for the business that the city so desperately desired. This imaginary however, in reality, operated as a mechanism of exploitation that enabled once again big business interests to make malleable Detroit urban space in order to grow their own private profits.

The successes in downtown corporate headquarters, encouraged public-private development of production facilities as well. On top of corporate head-quarters, the city also took dramatic measures to keep manufacturers in the city. In 1980 the long established Poletown, a large polish ethnic enclave in Detroit that also had strong Albanian, Yugoslav, Yemeni, Filipino, and Black populations, was razed for the construction of an automotive assembly plant with the financial support of the city.[18] In order to secure the General Motors auto plant, Mayor Coleman Young enticed GM to stay in the city by gifting $200 million through incentives to the world's larges industrial corporation; the return of this investment was hoped to be three thousand auto industry jobs—that would never come to be [19]. Total demolition for the development project included "sixteen churches, twenty-five

bars and stores, thirty-three warehousing and industrial facilities, two public schools, one hospital, one post-office, six petrol stations, and fifteen hundred homes in the cities ethnic Poletown neighborhood."[20]

(3) Postmodern Crisis and Future Frameworks (1990-present).

Today the situation of urban exploitation and the control of urban imaginary in Detroit has become much more complex as the extreme economic and financial crisis has unraveled the potential of traditional modes of asserting agency in construction of urban spaces. A report released by the cities emergency financial manager Kevyn Orr, who was appointed by the mayor to gain control of the dire situation, on May 13, 2013 revealed that Detroit has $162 million cash-flow shortfall for the current fiscal year which lead to borrowing practices that means that the city now has "effectively exhausted its ability to borrow" in the future.[21] With a crippling "debt load of $9.4 billion in bonds, loans, and other liabilities" much of has compounded from the manipulated spending on big business, as well as "post-retirement liabilities exceeding $5.7 billion," it is clear that public private partnerships with the city will no longer be a viable path for business interest to construct urban space to their benefit.[22] The slow nature of this unprecedented economic demise within a shifting cultural and demographic context, Detroit's majority black population today nearly half what is was in the 1950s when the city was majority whine, has enabled new strategies wealthy vested interests to take advantage of the situation in order to manipulate Detroit's future in their own interests.

The installment of the emergency financial manager by Republican Governor Rich Snyder, a notoriously pro-business politician, enabled the take over of any budgetary and spending decisions the city makes, without the capacity of any of the cities democratically elected officials, including the mayor and the city council to affect decision making. It is likely that privatization of public sector services as well as the sale of public land to private interests will play an strong role Orr's strategy.[23] Much of the black, democratic, population of the city see the move as a hostile take over of the city by a white, republican state government, who many fear will continue to make concession to big businesses on the back of the working class like anti-union "right to work" legislation passed by the administration in. [24]

Other opportunities for business interests in the contemporary context have been driven by the sever discounting of property in the cities real-estate market which, because of the dramatic disinvestment and abandonment of building in the city. It is estimated that there are around 78,000 abandoned buildings within the city.[25] As a result, owners of mega-corporations that are insulated from the severity of the deep regional recession, have been able to make major real-estate investments at individual private investors because the prices for land and existing buildings are so low. This year, the Illitch family, the family who started the national pizza chain Little Caesars, has announced plans for a $650 million entertainment district that plans to, amazingly give the financial struggles, take advantage of signification state and local subsidies.[26] A part of the plan is to build a new stadium for the Red Wing hockey team, who the Illitchs own, that integrates several other of the families prized possessions including, the Detroit Tigers baseball team, the Tigers stadium Comerica park, and adjacent Fox Theater which represent a large percentage of downtown real-estate. Another major private player is Dan Gilbert, Detroit's wealthiest person, owner of Quicken Loans. Operating through his real-estate investment company Rock ventures now owns 14 buildings in Downtown, has recently purchased the Greektown Casino with ambitions to expand his assets downtown into an entertainment district as well[27]. Gilbert met recently with US Secretary of the Interior Ken Salazar in order to secure Federal tax incentives for the development of the buildings that he owns that are historically designated.[28] While many of the cities disenfranchised communities are being evicted or having their homes foreclosed on, the wealthy owners of regionally headquartered mega-corporations are taking ownership of prominent real-estate in the more affluent downtown and midtown areas, which are being prepared as havens of middle and upper class constituencies. This future excludes the majority of the city's population.

Outside of the agency of ownership, new mechanism for constructing an urban imaginary have emerged in Detroit's particularly desperate situation including a new form of city planning document for shrinking city. The potential effects of the January release of a planning document called the *Detroit Future City* framework(*DFC)*.[29] will not be understood for many year to come, however given the deep history of such documents to pander to powerful business interest, the unprecedented nature of the document as one the plans for shinkage not growth, and it arrival a such a crux moment in Detroit modern history requires that the document be taken seriously as a new paradigm for Detroit's urban imaginary. Given Detroit's history of private sector exploitation being empowered by

such documents, many local residents are very skeptical of the potential ramifications of the framework while members of the planning profession and academics have sang in praise of its innovation. An extensive analysis of the document is outside the scope of this paper, but even a surface investigation raises some red flags.

A primary innovation of the 347 page document is the production of a planning document that is not based on growth but on "right sizing". As Justin Hollander, an urban planning scholar, puts it, "for much of the Western world, the ways that cities typically achieve the kinds of goals identified by the plan has been through growth," where as the *DFC* "is grounded in a pragmatism based on demographics" that identifies selected areas of growth and "if a place is growing, let's manage that growth through new infrastructure and coordination of services."[30] In general, the plan gives a rhetorically coiffed, more politically palatable plan for a spatial control of the cities remaining population through geographically discriminated service provisions, in order to reduce costs attract future investment and development. Less populated areas are primarily designated as "innovative" or "productive" landscapes. When investigates the many potential typologies for such space however, it becomes clear that they operate more as blank slates for technocratic, private industry lead infrastructure development, than publically oriented landscapes.

Despite concessions in the plan to importance of the already existing grass-root service structures that have emerged as the public sector became increasingly unable to provide services, the capital intensity of many of the suggested landscape and infrastructure typologies clearly require massive private investment at potentially high risk. The document provides no financial plan for the project. The unstated financial reality would severely limit the pool of potential business that would benefit from the large scale land use changes proposed by the plan to large, established, outside corporations. While the document claims to "encourage local entrepreneurship and minority business participation" the nature of its dominant spatial restructuring of the city would seem to discourage their potential participation.

Other facts surrounding the inception and production of the *DFC*, specifically concerning the funding of its research, demand that the document be analysed critically as a new and potentially dominant urban imaginary that could ultimately pander to private interests, much like Detroit previous, dominant imaginaries. To start, a large portion of the funding that went into the production of the *DFC* research and production came from the Kresge Foundation, who has also committed $150 million to seed early projects.[31] However, in the past the foundation has been directly involved in less publically oriented development projects in the city including ambitious and unrealized plans to develop Detroit's waterfront with Luxury condominiums; a project that failed because of the economic crash in 2008-2009. The foundation, which as a part of their involvement had made initial investments in the waterfront in 2002, doubled it's the donations in the city of Detroit. [32] Detroit related projects included city infrastructure projects like a $9.1 million grant in 2008 to establish a public-private partnership M-1 rail line, a mass transit line along Detroit's main North-south axis Woodward Ave., "anchor institutions."[33] In 2011 alone they provided $25.5 million in grants for their "Re-Imagining Detroit framework" with the stated goal of "to change the city of Detroit's trajectory to one of long-term economic opportunity that advances social equity, promotes cultural expression, and re-establishes our hometown as the center of a vibrant region."[34]

As a private foundation, The Kresge Foundation is by definition a 501(c)(3) non-profit which makes any explicit private benefit of its operations technically illegal, however at the scale in which the Foundation is operating in Detroit, private benefits, and losses, are inevitable and such ambiguity privileges larger business that have the skills to understand and exploit new imaginary delivered by the document. Even the format of the document, which is extremely long and text heavy, excludes a large portion of the population of which nearly half are considered "functionally illiterate," according to the National Institute of Literacy.[35] Despite the rhetoric of equity of inclusion and equity purported by the Kresge Foundation and the *DFC* this error in format for the supposed intended audience is a major omission. Even without suggesting any specific exploitative intentions, the explicit and implicit privileging of big business by *DFC* suggests that, if it no alternative or corrective measures are taken, that Detroit's new urban imaginary will again fail to serve it's majority population much like the imaginaries the preceded it.

Already projects that are specifically heralded as models within the *DFC* are underway that reveal potentially exploitative nature of such future projects. These projects represent a significantly different type of land acquisition than the more historically traditional forms of concentrated land clearance and public-private development practices. In March, the City Council of Detroit approval the purchase of 170 acres of vacant land to Hanz Woodlands and Farms, a business venture of the Hanz Group, a regional real-estate investment corporation. The president of the Hanz Farms says that the plan is to "make the neighborhood more attractive, more livable and, then, also, by eliminating the

publicly-owned blight, the private property increases in value."[36] Before the sale was approved Marcel Todd Jr., director of Detroit's City Planning Commission, said the Hanz deal would be "the largest speculative land sale in the city's history."[37] Outside of its scale, what makes Hanz Woodlands and Farms unique and perhaps insidious is that it is corruption of a preexisting practice, native and authentic, to an abandoned city whose aim is individual empowerment and subsumes it into a dependency model. Much of this land and land elsewhere has been attempted to be purchased by local urban farmers who struggle to purchase affordable land from the city. Malik Yakini of the Detroit Black Community Food Security Network are concerned about the long-term power dynamics of the deal: "As we struggle to foster food security, food justice and food sovereignty the question of land, who 'owns' it, who controls it, and who benefits from it, must be in the forefront of our discussions."[38] The Hanz Group, by simultaneously maintaining preexisting practices and employing local labor can maintain local support unique urban condition that will provide the unique value for the real-estate, to be traded at a later date at the cost of the native community who will likely no longer be able to afford to live their or whose homes will likely be under the threat of larger development plans. This process, though related to more traditional form of urban exploitation such as gentrification, it also perhaps signals a new battle ground on which the majority public must reassert its agency in order to take control of its future by defining the dominant urban imaginary to serve its own ambitions in order to guarantee a more equitable future.

Towards a new urban imaginary

The complexity through which the private interests of big business are served by dominating the urban imaginary of Detroit, presents a considerable practical and theoretical challenge in finding potential strategies for empowering the disenfranchised majority population in the city to galvenize a dominant urban imaginary that can overcome the historic oppression of which was layered out in the first half of the paper. I will argue that new forms of media driven spatial practices could provide options for historically exploited populations to develop their own paths towards a future of their own imagination outside of the unending cycle of capitalist exploitation that has defined their norm. While media has many advantages, including its audio/visual format and ease and affordability of its dissemination, it also has been historically a deeply problematic format that played a complicit role in historically exploitative urban imaginaries. Therefore to defend medias viability, I will first construct a theoretic argument for its potential before providing several successful examples of its constructive adoption towards the active production of a new urban imaginary the breaks from the endless cycle of capitalist exploitation in which Detroit is trapped.

A valuable framework for understanding the way the urban imaginaries are operating in today's context is presented by the geographer David Harvey in his book *Rebel Cities*. He argues that we are entering a period where global capital is now driven to exploit "monopoly rent," or the technique of corporations who "trade on values of authenticity, locality, history, culture, and action" in order to differentiate their products, so to charge premium prices for their products.[39] In relationship to Detroit, this condition is most obviously and simply observed in the use of the Detroit "brand" demonstrated by the automotive corporations like Chrysler who have cultivated the "exported from Detroit" identity in recent years. Their commercial campaign has focused almost exclusively on the identity of Detroit as a distinguishing factor of the car's value. This concept could also be extended to the DFC framework that relies on Detroit's uniquely abandoned quality to position the city a uniquely capable of absorbing innovative private investments. This exploitative condition also provides opportunities for change Harvey argues.

For Harvey the potential for resistance is latent in the contemporary condition of monopoly rent "which is a contradictory form as it seeks the uniqueness that is antithetical to its desire for homogenous commodity, therefore it can support, paradoxically, the transgressive."[40] His point is that local practices remain critical to the production of monopoly rent value, and therefore must be maintained for their exploitation to endure. His point is that this, albeit reluctant, support of autonomous cultural production could potentially be consolidated into a resistive force. The Kresge Foundation and many other corporately funded grant giving organization, for example, provides generous support to artists and community organizations that could apply their funding towards advancing a more specific, directed, and subversive agenda. In Harvey's words "by seeking to trade on values of authenticity, locality, history, culture, collective memories, and tradition they open a space for political thought and action within which socialist alternatives can be both devised and pursued."[41] I suggest that this force should be creative, not resistive. This political thought and action must take new participatory and projective forms as a new urban imaginary.

Luckily new forms of production are democratizing the availability and access to the means of producing potentially productive urban images. Yochai Benkler argues that cultural production using relatively cheap and portable video cameras is an "essential ingredient in structuring how freedom and justice are perceived, conceived, and pursued"[42] Benkler heralds the capacity of the new form: "the practical capacity individual and noncommercial actors have to use and manipulate cultural artifacts today, playfully or critically, far outstrips anything possible in television, film, or recorded music, as the were organized throughout the twentieth century."[43] Furthermore the new production methods and distribution outlets accompanying the network revolution of digital technology is enabling an unprecedented new form of expression. For Benkler "the networked information economy makes it possible to reshape both the "who" and the "how" of cultural production relative to cultural production in the twentieth century. It adds to the centralized, market oriented production systems, a new framework of radically decentralized individual and cooperative non-market production."[44] It is perhaps through this radical decentralization that cultural production can occur that is diverse enough that is evades capital exploitation yet directed enough to establish new cultural trajectories and urban imaginaries.

This path must be taken carefully and with serious intention. As Harvey stresses, defining "whose collective memory, whose aesthetics, and whose benefits are to be prioritized" is an essential operation in mobilizing a larger movement. [45] I argue that the "who" in question, does not yet exist, but must be constructed. Passive and reactive forms of identity consolidation that rely solely on place and a primary contributor to association have proven largely ineffective in Detroit, failing to withstand the top down pressures exerted through capitalist controlled narratives of big business. New forms of identity construction are needed to expand collective conceptions of self. Inclusion as opposed to exclusion must be the default policy. The strength of this approach was demonstrated in the Occupy Movement's association of the 99%. Instead of relying on place restrictive material like heritage, that more commonly looks at maintaining heritage rather than constructing new identities, we must rely on a multiplicitious yet increasingly consolidated counter imaginary, not heritage, to construct the future. Such an approach could expand the reach of interpersonal association to the global scale at which mega-corporations operate and therefore could contend with the dominating exploitative imaginary.

Relying on media to proliferate exposes new imaginaries exposes new narratives to cooption or corruption by opposing interests. Furthermore mediated approaches of constructing urban imaginaries are appealing as they are complicated in the post-modern context. This contemporary reality therefore requires a strong theoretical underpinning to maintain a directed, albeit open, agenda. Today, the radical potential of Michel de Certeau's "practice of the everyday life,"[46] the production of culture in other words, has been largely consumed by media and subverted by global capital. In this context of the "Culture Industry" theorized by Theodor Adorno. He states "culture, as it is now conceived of, exists because freedom does not." [47] Adorno, in this way, laments the destructive capacity of media's complicit relationship to guaranteeing monopoly rent. However, following Harvey, there remains in spite of this lament a potential means of transgression.

Adorno's apprehension, despite referencing dramatically different technological context, must be seriously considered. For Adorno "cultural production is no longer the repository of a reflective comprehension of the present in terms of a redeemed future; the culture industry forsakes the promise of happiness in the name of the degraded utopia of the present. This is the ironic presentation of the present."[48] Historically, this condition has been devastating for black urban identity, and its threat persists today in new forms. The rise of "blaxspoitation" films popularized in the 1970s by films such as *Super Fly* (1972) and *The Mack* (1973) had caustic and pervasive effects on the black urban imaginary. The stylish, drug dealer type who lives a life of excitement and violence was sold to black and white audiences alike. These films worked to reinforce stereotypes among white audience while romanticizing the notion of the ganger to economically disadvantaged urban black audiences. Impressionable youth who were left without opportunities took to committing "crimes of necessity" and adopted this romanticized persona believing that violence, drugs, and money were the pinnacle of cool. In the documentary *Detroit-The Murder City* (2011) interviews with men who had been incarcerated for violent crimes in Detroit specifically cited bother *Super Fly* and *The Mack* as inspirations to their behavior at the time. This very behavior resulted in long-term prison sentences for many black youth. Here we see the execution of the "controlling movement of postmodernism" according to Adorno, "the collapse of the difference between culture and practical life…"[49] The task of the disseminating transgressive locally produced urban imaginaries therefore must be a process of narration, the consolidation of a projective, local urban imaginary that expands the potential of cultural production into previously unimagined or experienced territory—the production of a new urban imaginary.

The asserting of a new urban imaginary through media must assert the imaginary of the historically disenfranchised as the dominate progenitor of the future, combating the historic submission of this collective voice. According to Madhu Dubey, an African American and Cultural Studies scholar, African Americans in the United States have been historically denied access to the cyber oriented future. [50] The African American experience itself, in other words, has been positioned as being "antithetical to futurist imagination" on the whole, systematically denying African American communities equal access to making projective claims on the future.[51] Dubey quotes Samuel Delany, the African American science fiction writer, who said that "We need images of tomorrow and our people [African Americans] need them more than most" stressing the importance of future image construction and urban agency.[52] As the cultural critic Mark Dery puts it, "the unrealestate of the future is owned by technocrats and set designers who have been white to a man." [53] Famous futurist "Detroit" films like *RoboCop*(1987), depict Detroit as a dystopic, desolate, crime infested city that buys a private technocratic solution to its urban issues, the salvation of a white, brutal, cyborg police officer. In this case the general case that Dubey describes has particular resonance with the history of Detroit, fictional and real. Therefore there is a double imperative of the internal production and construction of a projective African American urban imaginary.

Conclusion

The term "urban imaginary," as Andreas Hyssen defines it in his 2008 *Other Cities, Other Worlds: Urban Imaginaries in a Globalizing World*, is "part of any city's reality rather than only figments of the imagination.[54] Similarly for de Certeau "there is a 'metaphorical' city that 'slips into the clear text of the planned and readable city."[55] There exist tremendous agency in claiming control of such a metaphor. We see that as Weber warns "States discursively constitute, code, and order the meaning of place through policies and practices that are often advantageous to capital (Bearegard 1993)."[56] The new urban imaginary must discursively constitute, code, and order the meaning of place towards new, spatially and socially just ends.

The production of a new urban imaginary should be participatory and ritualistic. Maya Deren, an important figure in the modern avant-garde of film writes: "The ritualistic form treats the human being not as the source of the dramatic action, but as a somewhat depersonalized element in the dramatic whole. The intent of such depersonalization is not the destruction of the individual; on the contrary, it enlarges him beyond the personal dimension and frees him from the specialization and confines of the personality. He becomes part of dynamic whole which, like all such creative relationships, in turn, endows its parts with a measure of its larger meaning."[57] This capacity of the ritual when filtered through new distributed forms of media could provide a potent means to engage the production of a new urban imaginary on an expanding scale, from the local to the global.

New formats of producing media, original and remixed, are beginning to provide essential formats for such participation. In this arena, the interactive media platform *Zeega* (www.zeega.com) stands out as having particular promise. *Zeega* was developed by a team of urban theorists, economics, coders, and media producers to "[revolutionize] web publishing and interactive storytelling for a future beyond blogs." 58] According to their team " With Zeega, you can use any media in the cloud, transform the entire screen into your playground, and share your interactive creations with the world."[59] This new media format, coined "database documentary" by one of the platform's authors Jesse Shapins is the subject his PhD work at Harvard University's Graduate School of Design. Shapin's argues for the expressive and generative capacity of the database documentary to enable "kaleidoscopic perception" and "sensory estrangement" which empower platform users to construct new urban imaginaries.[60] New formats like *Zeega* could enable the simultaneous production of the expansive diversity of stories, experiences, and ambitions of disenfranchised urban populations to be collected and documented through media, in way that is both consolidating and projective. Through the democratic involvement of many users, a new, emergent urban imaginary could organically develope and be honed through the malleability of collectively produced and curated online materials. By producing original content and remixing appropriated content, adults and children of all ages given minimal training could participate, whether they are literate or not.

In Detroit a platform like *Zeega* could provide a fertile ground on which a new urban imaginary could begin to be constructed. It could also acted as a centralized means of digesting documents like the *DFC* document, which, to its team's credit, undertook a valuable oral histories video project titled *Detroit Stories* (http://detroitstoriesproject.com/). Visuals and stories from the extended *DFC* research and the document itself could be "remixed" through *Zeega* with an already existing and expanding database of content that expresses and celebrates the many perspectives and innovative urban imaginaries that were left out of the DFC framework. Content could be created through a mediated

version of the research of urban and architectural scholar Andrew Herscher which catalogues Detroit's extensive alternative urban cultures in his book *The Unreal Estate Guide to Detroit*. [61] Herscher's book "helps us to re-imagine Detroit by showing us the places where Detroit is being re-imagined—the places where new values, politics and solidarities are forming a new city of hope," according to Grace Lee Boggs, lifetime Detroit activist, community leader and author of *The Next American Revolution*. The contents of the *DFC* document and Hercher's book in the right format could be extremely empowering as material for communities to use to construct a new, alternative urban imaginary that is strong enough to compete with those imposed by the top-down powers of big business. If the content were to be put in an audio visual format, it could then be digested, remixed, and instrumentalized by Detroit's historically disenfranchised communities with the help of a platform like Zeega.

As David Harvey warns, "no alternatives to contemporary forms of globalization will be delivered to us from on high. It will have to come from within multiple local spaces—urban spaces in particular-conjoing into a broader movement."[62] The production of such an alternative, however, can and must start in some place. Given Detroit particularly exploitative history and its contemporary condition in which capitalist are willing to fund cultural production projects, it is well situated to be the epicenter of such a movement. A networked, mediated approach to constructing urban imaginaries would enable Detroit specific knowledge to mix with other urban centers and populations in the US and internationally, expanding the potential of a globally galvanized, positive and projective urban social movement that could dominate the established exploitative regime. This movement, however, necessitates a proper tactical approach and theoretic framework to proceed. This paper has intended to make one step among many toward that end, the end of urban exploitation and the rise of the new urban imaginary.

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The San Antonio River: A Rich and Complex Cultural Landscape in Texas

Angela LOMBARDI[1], Sedef DOGANER[1]
(1) College of Architecture, The University of Texas at San Antonio, San Antonio, TX USA
sedef.doganer@utsa.edu
angela.lombardi@utsa.edu

Abstract
The city of San Antonio has a rich and unique historic urban landscape: it is characterized by its river and famous Riverwalk where historic neighborhoods and major landmarks such as five 18th century Spanish missions are located.
The Riverwalk was re-shaped in the 1930s' intending to emphasize the city's Spanish heritage, creating a landscape to let the city become the 'Venice of Texas'. Today, a comprehensive, multi-year project is underway to restore and enhance 13 miles of the San Antonio River both north and south of downtown.
In the city's south section, the River Improvement Project, Mission Reach Ecosystem Restoration and Recreation Project, is transforming an eight miles stretch of the San Antonio River into a quality riparian woodland ecosystem, reinforcing the connection to the Missions and encouraging circulation along the river beyond the downtown area.
This is a unique project, which restores river features and riparian woodlands, reintroduces native plants, enhances aquatic habitat, and reconnects cultural and historical features. Mission Portals will re-connect the historic missions to the San Antonio River, will feature historic and artistic interpretations, and will highlight their social and cultural importance to the area.
This paper will discuss how the San Antonio River represents the physical and symbolic link of its rich cultural heritage with not only its landscape and architectural heritage but also with food and traditions. This paper will enhance cultural and environmental sustainability at local and neighborhood levels while giving inhabitants and tourists an option to experience the 'revitalized' cultural heritage of the region.

Keywords: San Antonio River, cultural landscape, restoration ecology, tourism

1 Introduction

Earliest Spanish settlers immediately recognized the wealth of natural resources necessary for establishing a thriving community: the narrow river, although not navigable to the ocean, offered an oasis of sorts on the far northern frontier of New Spain. Creeks, springs, farmland, and a temperate climate all were factors leading to the foundation of a settlement, to be destined to become the ninth largest US City [1].
The city of San Antonio was founded as a presidio in the first quarter of eighteen century, and the five 18th century Spanish missions were built along the San Antonio River. The River and the Spanish colonial resources along its banks have nowadays a strong significance for American citizens, as part of their own legacy, particularly for the people of South Texas [1].
The San Antonio Franciscan Missions cultural landscape is on the U.S. "tentative list" to be advanced as a possible UNESCO World Heritage Site since it can be considered to be one of the best models of the culmination of Spain's design for its mission empire, and it includes five Spanish Colonial mission complexes – Alamo (San Antonio de Valero), Concepcion, San Jose, San Juan Capistrano, and Espada – situated along a 19.3 kilometer section of the San Antonio River basin. The Spanish Crown, however, intended to create self-sustaining, socio-economic units, supporting the establishment of missions as transitory ecclesiastical settlements that would develop into permanent secular communities in defense

of the territory against incursions by other European states [2]. The construction of a network of *acequias* (water ditches), built by the Spaniards since the first half of 18th century, witnesses the high-skilled engineering system for irrigating the land and it is in deep connection with the San Antonio River.
The River South Area is the home of the oldest continuously functioning Spanish colonial dam and acequia. Within the River South Area the oldest priority water rights in the State of Texas originated from mission agricultural use and continue to influence land use in and around the missions [1].
Downtown San Antonio is characterized by its famous 'Riverwalk' and historic neighborhoods. Due to the historic importance of the Riverwalk, together with the Alamo, San Antonio is one of Texas' top tourist cities today. The famed Riverwalk has been an attraction since the 30's. However, beyond the Riverwalk, miles of river remained undeveloped within the city limits, yet deeply altered by interventions which aimed at preventing river floods.
This paper examines the San Antonio River and its transformation throughout its history, including the 1954 Corps of Engineers channelization project, and analyzes the 2001-2014 San Antonio River Improvement Project (SARIP) and Mission Reach Ecosystem Restoration Project by means of its landscape, reconfiguration of the channel, flood management, River's ecology, restoration of the flora, park facilities and infrastructure and historical connections.
This complex ecosystem restoration project aims to recreate, at large spatial scale the features and the natural balance of the historic landscape characterizing this area for centuries involving also complex stakeholder and public roles.
Finally this paper discusses the potentials of tourism in the Mission Reach area, the expansion of the Riverwalk to the south. The River improvement project reinforces the connection to the San Antonio Missions, encouraging visitors to circulate along the river beyond the downtown area.
San Antonio River Improvement Project and the possible World Heritage designation of the San Antonio Missions restores the broken balance of this rich cultural landscape, bringing international attention to the district, accelerating cultural heritage tourism, and providing "high profile catalyst" for even more cultural visitations.

2 San Antonio River and its transformations

The first documented arrival of Spanish explorers at the river occurred at the end of the 1600s: members of a Spanish expedition celebrated Mass on the banks of the river on June 13, 1691, Feast Day of Saint Anthony. During the religious function, Franciscan priest Damien Massanet renamed the waterway 'San Antonio'.
Spanish Missionaries and colonists built acequias, a series of dams and hand-dug ditches which served to bring river water to the missions and to the original civic settlement. They are considered some of the earliest recorded engineered water systems in the nation, shaping the landscape for more than two centuries.
A system of eight acequias related to the San Antonio River is documented since 1718, and was an effective water distribution system for nearly 200 years, allowing the irrigation to surrounding land for farming and pastures for the missions and for civilians. The acequias, together with some creeks and the river, allowed the growth of the urban settlement, providing potable water. The term *acequia* is derived from the Arabic al-saqiya, its ethimology clearly reveals an Arab origin of this construction technique, which was most probably brought to Spain [3]. Ancient maps and documents, however, identify an artificial water ditch, built prior to the arrival of the Spaniards, constructed by the Amerindians who populated this area.
Since the 1800s, the San Antonio River has experienced flooding problems due to its geographic location, increasing population in the area, and its related infrastructure improvements that lead to increasing rainfall runoff [1]: Spanish records reflect that the flood of 1819 swept through many homes in its path. Other Floods arrived in 1865, 1880, 1899 and 1913; a deadly flood in 1921; a major flood to San Antonio's downtown district in 1946; and the most recent floods of 1998 and 2002 [4].
A 1920 study for the city by the Boston engineers firm of Metcalf and Eddy predicted a devastating flood, like the 1819 one, would occur again [5]. In particular, the 1921 flood sign a turning point in the history of the river. In September 8, 1921 a sudden, hard rainfall over the Olmos Basin and San Antonio River resulted in over 9 feet of water downstream in the center of the city, on Houston Street, causing flooding that killed 50 people and

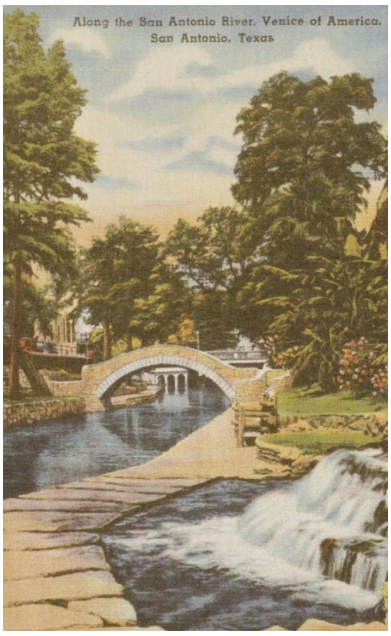

Fig. 1. Postcard of the 40s' where San Antonio is promoted as the 'Venice of America' [5].

millions of dollars in damages [1].
The San Antonio community made historic and controversial decisions to implement flood control measures: to control future flooding on the San Antonio River and on San Pedro and Alazan creeks, 2.8 millions dollars bond were issued for building a new dam and straighten the streams. Olmos Dam, a concrete wonder 80 feet high and 1,925 feet long was built in 1925, in the downtown historic area, the Great Bend's cut off channel, as wide as the Great Bend itself, was completed in 1930 [5].
The river park had its first permanent Riverwalk in 1928: this first Riverwalk segment covered three city blocks from Houston Street, and around the start of the Great bend, to Navarro Street [5]. The great bend not only kept its trees but gained gates to divert into an alternate channel. The following decades saw continuous improvements to the downtown segment of the River: the development of a more extended Riverwalk were inspired by Robert H.H. Hugman –city architect– who saw San Antonio river as a chance to exploit the city's Spanish heritage with commercial activities and open spaces [6]. He developed an architectural plan aiming at preserving and enhancing the natural beauty of the downtown and river loop area. Descriptions of old cities of Spain, Mediterranean architecture, as well as Xochimilco, Mexico City's water gardens were its inspirations. In 1929, Harlam Bartholomew was hired and he envisioned for the river to maintain a more natural, contemplative linear park through the heart of the busy city. The Depression, however, had plunged downtown San Antonio into a slump from which it would recover in forty years, Hugman's and Bartholomew's plans were only partially realized [5]. Despite the Depression, the city did not abandon the river 'beatification', the Alamo's battle centennial was celebrated, and the celebrations included the first "Venetian Carnival" on the river, along the cut-off channel.

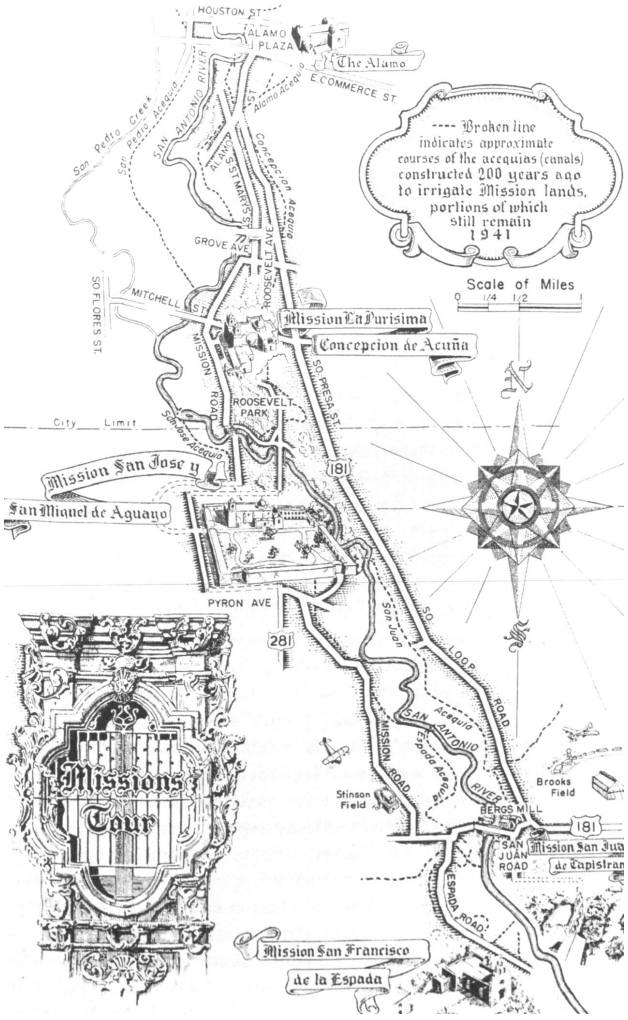

Fig.2. 1941 map showing the Mission Reach segment with relative location of the five Spanish 18th century missions. The map was published in the San Antonio Conservation Society- sponsored WPA guidebook to San Antonio [11].

In 1937 a public office for the protection for the river was created: San Antonio River Canal and Conservancy District, then renamed in 1953, the San Antonio River Authority (SARA). SARA is charged by the state of Texas to preserve, protect and manage the resources and environment of the San Antonio River and its tributaries. The agency's original purpose was to seek development of a barge canal but after floods in September 1946 which coasted San Antonio six lives and $2.1 million in property damage, the district discontinued its navigation studies in favor of flood control efforts [7].
From 1939 through 1941, the pilot channel was deepened, three dams were constructed, underground drains built, and flood gates installed at both ends of the river loop. Aesthetic features included stone walkways and stairwells and graceful footbridges. Also added was an outdoor river bend theatre – the Arneson –, preservation of indigenous trees and plants, and Hugman's northern flood gate, adorned with arches and an arbor that lend an Old World Spanish flair. San Antonio's Riverwalk was born [4].
A second devastating flood in 1946 prompted a comprehensive flood study by the U.S. Army Corps of Engineers completed in 1951. This study recommended the channelization or straightening of 31 miles of the River and its tributaries, the project was known as the San Antonio Channel Improvement Project (SACIP) and authorized by Congress for implementation by the Corps of Engineers in 1954 [1].
SARA acted as the local sponsor of the projects and was responsible for obtaining partial funding and all necessary rights-of-way, as well as for relocating all utilities and constructing all required bridges and in-channel dams.

Although the works undertaken were an effective way of managing flood water, they did not take into consideration Leopold's 'land ethic' which does prevent the alteration, management, and use of natural 'resources,' but it does affirm their right to continued existence in a natural state [8]. Leopold's land ethic is a pivotal point in America's environmental awareness since it asserts that the role of Homo sapiens has to develop from conqueror of the land-community to plain member and citizen of it, respecting for his fellow-members, and also respect for the community as such [9].
The effects of the reconfiguration of the channel of San Antonio River was effective for controlling the water flood, but it altered the traditional land use and, in general, the historic landscape of the area, but had as a result the damage of the ecosystem of the river.
Few years later, in 1961 the legislature enlarged SARA authority's jurisdiction and also expanded the duties/vision of the agency to include, 'new' environmental topics such as conservation and use of ground water, pollution prevention, reforestation, and preservation of ecology [10].
Since 1982, the San Antonio River Authority and the Corps of Engineers began to consider the feasibility of a bypass system to divert flood water through two tunnels to be built under downtown San Antonio, instead of risking uncontrolled flooding along the Paseo del Río. The construction of the tunnel began in 1988. The San Antonio River Tunnel, which was 24 feet 4 inches in diameter three miles in length, was scheduled for completion in 1995 [11].
The first projects focused on the downtown area, not taking into consideration the River South, characterized by a low-density population [1]. A community-based vision for improvements to the River emerged in the last twenty years of the 20th century, and in 2001 the scope of work transitioned from the SACIP flood control focus to the broader San Antonio River Improvements Project (SARIP) which identified "environmental restoration and recreation as project purposes" [10].
A new generation of flood management emerged in local community in 2002 with creation of the Bexar Regional Watershed Management (BRWM), a partnership among SARA, Bexar County, the City of San Antonio, and 20 suburban cities. This partnership allows the development of a community-based vision with a holistic, regional approach to managing flood control, storm water and water quality.
The program establishes uniform design, operation and maintenance standards; coordinate local, state and federal funding; and provide an opportunity to measure and evaluate the quality of services delivered to citizens of Bexar County [7].

3 River Improvement Project and the Mission Reach

The San Antonio River Improvements Project (SARIP) is $358.3 million on-going investment that targets 13 miles of river banks. The multi-phase project is focusing on improving three sections of the river that pose different challenges: the four-mile Museum Reach north of downtown, the one-mile Eagleland and eight-mile Mission Reach south of downtown [4].

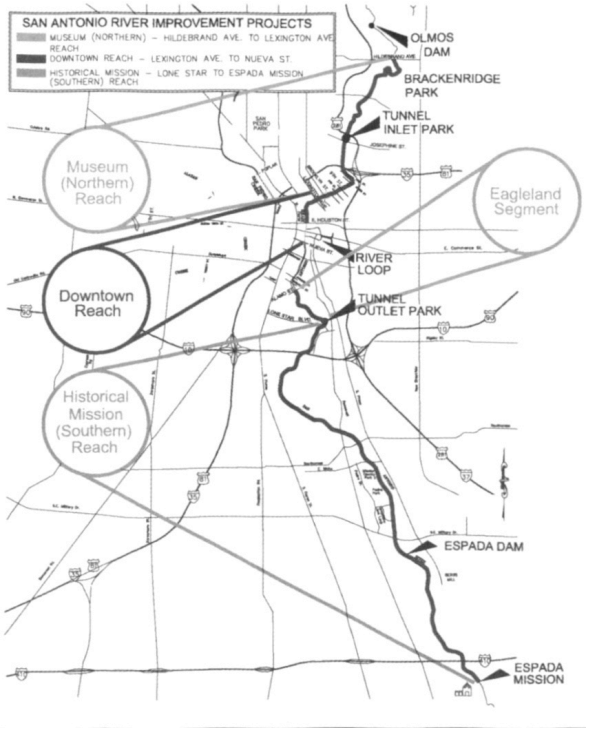

Fig. 3. SARIP is divided in 3 segments: the Museum Reach, the Downtown Reach and the Museum Reach. The planned extension of the riverbank improvements will make the Riverwalk more than six times longer [5]

Specific objectives for the Museum Reach, which is the urban segment of the project, are extending the amenities of the world-famous San Antonio Riverwalk and connecting cultural institutions and commercial centers via a linear park. The linear park, with a newly landscaped river channel, provides public access to the river, reconnecting the neighborhood to water. The creation of this capacity is expected to lay the foundation for commercial, residential and retail construction in the area [12].
The Eagleland and Mission Reach segments, however, are characterized by low-density urbanization and vegetation has been destroyed since 1954 U.S. Army Corps of Engineers project. Few original topographical features are remaining. The project in these areas aims to restore native habitat and the natural meander of the river, along with developing new recreational opportunities. These enhancements are expected to have a broad oriented impact and far-reaching benefits for all of San Antonio, from increased economic development to cultural resources and recreational opportunities connecting neighborhoods [4].

Next part of the research focuses more on the Mission Reach Area, the eight-mile section of the river extending from Lonestar Boulevard south to Loop 410 South.

3.1 Mission Reach Ecosystem Restoration and Recreation Project

The Mission Reach Ecosystem Restoration Project is the primary focus for improvements on the 8-mile Mission Reach segment and is going to have a striking impact on the River south area when it is entirely completed in 2013. The Project includes several steps: construction on the river to reconfigure the channel and create improved aquatic habitat, reestablishing hundreds of acres of native grasses and wildflowers and finally the planting of over 20,000 native trees and shrubs. The culmination of these steps will result in an environmental sustainable water source.

3.1.1 Reconfiguration of the channel, and flood management

Although the channelization of the river is an effective way of managing flood water, it has damaged the ecosystem of the river beyond being visually unappealing.

The Mission Reach project aims at correcting the damage done to the ecosystem by the channelization and restore the river's ecology while providing the same level of flood management that was attained by the channelized river [4].

River channel solutions intend to recreate the natural environment strongly altered within the last 60 years, with sinuous edges and minimizing the 'artificial' channel appearance. The Mission Reach project is focused on the ecosystem restoration, working on the fluvial geomorphology, which is the study of the processes and pressures operating on river systems. This technique will transform the straightened river by adding sinuosity where possible while maintaining flood control, reducing erosion, re-introducing native vegetation and creating an environment more suitable for recreation and wildlife [4].

Design solutions utilize a variety of low flow conditions such as riffles/run/pools sequence, approximately 13 acres of embayments in the river and restoring approximately 113 acres of aquatic habitat. Over 3 million cubic yards of soil are being removed in order to restore and recreate a more natural riverine environment [4].

These types of design solutions will increase habitat diversity and maximize fish and wildlife habitat value (master plan). The alternating sequence of the three river channel habitat types - riffles, pools and runs – usually characterizes balanced environmentally balanced rivers.

> "*Riffles* – A riffle is a shallow area of river with a substrate consisting of rocks. Water usually runs quickly over these areas, creating a choppy surface. Riffles help oxygenate the water, serve as an area to protect fish from predators and are a place where many insect species reproduce or grow to maturity. Some fish species for which riffles are particularly important include the central stoneroller, red shiner, speckled chub, channel catfish, orangthroat darter and the Texas logperch.
>
> *Runs* – Runs are areas of the river that are of average depth and velocity. Runs generally connect riffles and pools. The San Antonio River, after flood control channelization, consisted entirely of runs. The Mission Reach project restores the structural diversity of the river to support a variety of ecosystem functions and aquatic wildlife.
>
> *Pools* – Pools are deep areas of water where currents move slowly. Pools generally occur after a run structure, and sediment tends to accumulate at the far end of a pool. Overtime, this will lead to the creation of a new riffle. Pools play a critical role in maintaining water quality in the river by removing impurities from the water, such as sediments. Reducing sediment content of the water benefits a variety of aquatic organisms because suspended sediment can cause the water to be turbid or murky and obstruct fish visibility.
>
> Pools also provide great habitat for different aquatic animals than those found in riffle structures. Larger species, like fish, prefer to live in pools. During drought conditions, when the water level drops, pools provide important refuges for fish until the water level rises. Some species of fish prefer cool water conditions, and the deeper areas provided by pools moderate the temperature during high temperature month.
>
> *Embayments* – An embayment is a still, crescent-shaped body of water that is formed when a curve in the river becomes separated from the river. Other names for an embayment are oxbow lakes, billabongs and bayous. Embayments were once a natural part of the San Antonio River system and were commonly found on the river's floodplain. Embayments diversify the types of aquatic habitat found within one geographical area. Because the water in embayments does not flow, it can support myriad species of aquatic plants and animals that are adapted to still water bodies. Aquatic and emergent plant species that can easily be uprooted by fast-moving water are capable of living in the shallow, protected embayments.
>
> Embayments also help to improve water quality. When water is directed from stormwater inflows to these areas it is forced to remain in the embayment for a period of time due to the low flow velocity in these areas. During its stay in the embayment, water is processed and

cleaned. Sediment that was carried by the stormwater settles out of the water and into the bottom of the embayment. While the water continues to sit in this water body, some of the impurities, like nutrients and bacteria, are processed by the aquatic vegetation and the bacteria that live in the soil of the embayment." [4]

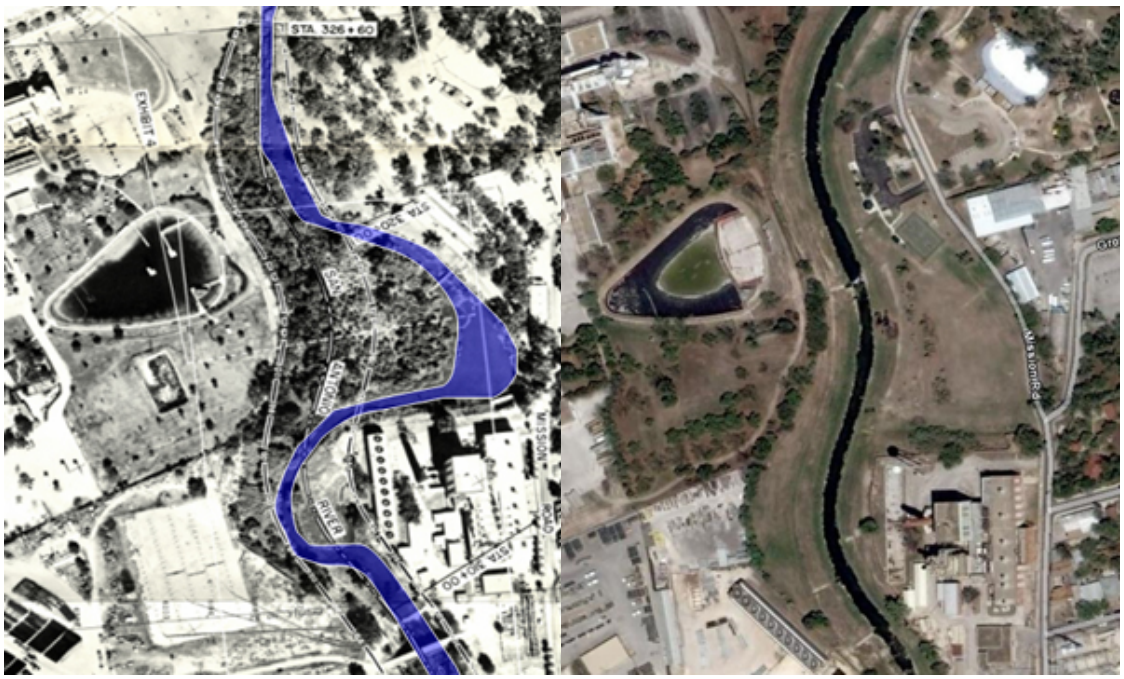

Fig. 4-5 Example of transformation of the natural ecosystem. Above left: Pre-channelization at Roosevelt Park near the Lonestar Brewery (circa 1955) Above right: Post-channelization at Roosevelt Park near the Lonestar Brewery (circa 2007) [4].

3.1.2 River's Ecology and Restoration of Flora

The Society for Ecological Restoration defines ecological restoration as an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability. The Mission Reach Ecosystem Restoration and Recreation Project is focused at increasing the quality, quantity and diversity of plants and animals (flora and fauna) along the eight miles of the San Antonio River Mission Reach area, and includes the restoration of approximately 334 acres of riparian woodland habitat [4].

Restoring a healthy ecosystem within the Mission Reach of the San Antonio River is a delicate balance of planting appropriate native plants and maintaining efficient floodwater conveyance. New tree masses are being planted including native and indigenous species, and whenever possible, existing tree masses are preserved: over 20,000 young trees and shrubs, 39 native tree and shrub species as well as over 60 native grass and wildlife species. In order to plant additional trees within the flood control channel, additional floodwater capacity must be added. This is proposed for areas where adjacent land is owned by public entities.

Native plants play a crucial role in ecosystem restoration by controlling erosion on the banks of the river. They have long root systems that hold soil in place and aid in improving water quality by filtering out storm water runoff before it enters the river. Native plants also provide food and habitat for native wildlife which leads to increased wildlife in the area. Native plants species have been attentively selected through a deed research based on literature review and analysis of sites where the ecosystem is still intact such as Salado Creek, Goliad State Park, Las Cabras, and others [4].

The Mission Reach vegetation plan has been designed to mimic the diversity and density of native riparian woodlands that exist naturally under both drought and flood conditions.

To achieve this balance, four main vegetation cover types, varying in tree and shrub density, have been incorporated into the design:

- Zone A – 250 trees per acre (most natural condition over time, and these denser areas are usually further from water)
- Zone C – 70 trees per acre (native grass understory in most location)
- Zone D – 27 trees per acre (native grass understory everywhere, and more "park like" tree density)
- Zone E – herbaceous vegetation only – no trees [13]

Vegetation placement follows two main criteria. One is to restore the natural habitat features, the other one is to recreate a recreational environment. Tree placement considerations are based on the analysis of soil moisture, which depends on the distance from the water and seral stages (early mid or late seral).
Nurturing an ecosystem comprised of native plants requires the regular extermination of non-native invasive plant species. Long-term operations and maintenance is critical to the success of the project. Trees were planted approximately two years after each phase of the Mission Reach is open to give the vegetation time to become established. Young, small trees were planted because these trees are more resistant to flooding. As young trees grow in the flood plain, they grow deep roots and adapt to periodic flooding.
When the project is entirely complete, the Mission Reach will look much different than the historic San Antonio Riverwalk and the new Museum Reach area of the river north of downtown. The native landscape will look wild rather than manicured. Grasses and wildflowers will be allowed to grow to their natural heights rather than mowed.
Although the landscape is beautiful and ready to enjoy now, it will take many years for the trees and vegetation to fully mature. The entire ecosystem restoration process will take approximately 50 years for being completed [4].

3.1.3 Park Facilities and Infrastructure
A major component of the Mission Reach project is increasing recreation opportunities on the river. Over 15 miles of trails will stretch along the river for pedestrians and bicyclists to enjoy the landscape. Paddle recreation will be encouraged in designated areas of the Mission Reach. These features will greatly improve the quality of life for River South area residents as well as attract new residents and activities. Boat traffic on the river will be limited to canoes and kayaks rather than barges.
The first section of the Mission Reach Paddling Trail is now open for public access. The total trail is currently 1.6 miles. This section of the river includes four riffle structures that were constructed to improve aquatic habitat. Each of the riffle structures is equipped with a paddling chute that allows paddlers to traverse through the riffle structure. Paddle recreation will be encouraged in designated areas of the Mission Reach. Barge traffic will not be present on this stretch of river, so paddlers can safely navigate the river without interference of motorized boats [4].
This project makes the river more accessible to area neighborhoods by creating eight street connections. The project should be completed by the end of 2013, and will provide the following amenities: over 15 miles of hike/bike trails, over 200 picnic tables and benches, six foot bridges for pedestrian access, four pavilions, four Mission portals, five overlooks with shade structures, nine water edge landings [4].

3.2 Reinforcing Historical Connections
The Mission Reach Ecosystem Restoration Project reestablishes the historic and cultural connections between the river and the San Antonio Missions National Historical Park, as well as provides improved quality of life and recreational access to the river [12].
The 1933 Comprehensive Plan for San Antonio recommended connecting the historic Spanish Missions. The importance of preserving the San Antonio River and linking the Missions became a key local effort in 1953 by the San Antonio Conservation Society and Archdiocese of San Antonio. They commissioned Robert H.H. Hugman to prepare a study to beautify the historic Spanish Missions of San Antonio, and it was decided that this goal could be best achieved by connecting all the missions with a landscaped parkway. In 1959, a plan was presented by nationally renowned planning consultant, Sam Zisman, who proposed developing a scenic park roadway. The program was reinvigorated in 1962 with the Mission Parkway Master Plan [1].
Spanish colonial resources of San Antonio are focal points of the River South area. The community is committed to increasing the boundary of San Antonio Missions National Historical Park to that envisioned since the 1930s. A proposal has been presented to the United States Congress by local leaders to increase the boundary of the existing park lands designated as a national park along the San Antonio River. The proposal is to establish these parcels as a comprehensive Spanish colonial site, the largest in the world. This initiative is tightly timed for completion to meet the National Park Service centennial anniversary in 2016 and the potential designation as World Heritage Site [1].
The Historic Mission Reach will see enhanced quality of life through improved recreational opportunities. Over time this will raise property values of land closer to the river and will increase demand for new and revitalized real estate development, thus creating a more desirable living and working environment for area residents. To maximize economic development potential in the Historic Mission Reach, visible water will be established in this section of the river, where currently the riverbed is nearly dry at times. The River Improvements Project calls for bodies of water to be developed that could vary from two to three times the width of the base flow channel, depending on the ability to widen [4].

Since specific developed land uses have not been projected for the Mission Reach, an estimate of the potential economic impacts associated with potential new employers drawn to this area is premature. However, it is clear that projects in the Mission Reach will have a positive effect on San Antonio's economy that extends well beyond the impact of the construction itself. Taken together, the projects of the Mission Reach will enhance the recreational assets of San Antonio. In particular, infrastructure investment of this type enhances the appeal of the community to existing residents, visitors to the area, and those who are considering San Antonio as a possible site to relocate their family and/or business. The role of this type of "placemaking" in economic development is becoming increasingly well understood, as communities work as hard to attract and retain talent as they once did to corporate relocations [12].

4 Tourism Potential of the Mission Reach

Cultural heritage tourism is "traveling to experience the places and activities that authentically represent the stories and people of the past and present" [14]. It is an economic development tool designed to attract visitors to an area based on the unique aspects of the locality's history, landscape and culture. This not only boosts regional and local pride but is also a good source of revenue for a community and creates jobs. It is estimated by World Tourism organization UNWTO in 2006 that between 35 and 40 percent of tourism today represents cultural tourism or heritage tourism. -Lyon and Wells [15] states "As an alternative to mass tourism, cultural and heritage tourism offer opportunities for place-based engagement that frames contexts for interaction with the "lived space" and "everyday life" [16] of other peoples as well as sites and objects of global historical significance."

Tourism in San Antonio is a multibillion-dollar industry, as millions of tourists who visit the city annually are drawn by the area's rich Southwestern cultural heritage, historical sites and numerous headline attractions. Annual survey information from the Tourism Division of the Governor's Office of Economic Development indicates that Riverwalk, together with the Alamo, boast to be one of the top two tourist attractions in the state [12].

In 1960 an anonymous writer predicted that San Antonio River which developed properly now, could one day become the "crown jewel of Texas": a 1995 study showed that of the 6.5 millions visitors to San Antonio in 1994, the most – 82 per cent – visited the Riverwalk and 27.5 showed the Riverwalk to be the single most important reason of their visit, more than three times the number listing the Alamo [17]. Today, the City receives over 28 million visitors annually.

An extensive research conducted by CSL (Conventions, Sports and Leisure) International as part of the Destination SA project clearly points to the fact that the River experience is the single most important aspect of the San Antonio visitor industry infrastructure. The research also indicates that the continued success of the Riverwalk has led to challenges with high visitor levels beginning to overcrowd a limited area along the River [12].

Mission Reach area specifically aims to attract a high proportion of cultural heritage travelers. A 2009 report found that the 78% of all tourists who are classified as cultural and heritage travelers account 90% of the economic impact from domestic tourism. Cultural tourists spent 50% more during their travels, and traveled one-third further than other leisure travelers. This type of travelers also respect and value the historic, cultural, and natural integrity of the places they visit [18].

According to a recent study, over 1.7 million visited the Missions National Historic Park in 2009, and park visitors, along with staffing, construction and maintenance activities, and other aspects of park operations, contributed nearly $96.8 million to the local economy and sustained 1,116 jobs in the region. It is expected that reinforcing the historical connection by the River Improvement project will accelerate the tourism activities in the area [J]. Tourists will circulate fluidly along the river beyond the downtown area. The River Improvement Project is making the Riverwalk six times longer [12], thereby mitigating crowding issues and offering an extended River experience including the whole cultural landscape connected with the 19th century Industrial heritage on the Museum Reach and with the Missions, on the Mission Reach.

Another potential economic impact of the Mission Reach River Improvement project is enhancing the appeal of the region to 'eco-tourists. An increasing number of "eco-tourists" are interested in nature-based travel; a study of North American travelers found that 77% had been on a trip that involved nature, outdoor adventure, or that was experienced in the countryside or wilderness. Of the top-ranked activities for travelers in ecotourism markets, three of the most important elements of a trip include casual walking, wildlife viewing, and hiking/trekking in a park or protected area [12].

By the improvements of aquatic and riparian habitat, fisherman, birdwatchers and other nature enthusiasts will have increased opportunity to enjoy wildlife in the area [4]. The restored ecosystem is generating a serene, natural landscape where visitors can enjoy the inherent beauty of the river.

Regarding the fact that one in ten American travelers shows a very strong preference for both visiting historic and cultural sites and participating in outdoors recreation and nature-based activities [18], the Mission Reach area, because of the ecosystem restoration project, is going to become a real magnet for cultural heritage tourists and eco-tourists [12].

5 Conclusion

The history of transformations of San Antonio River witnesses the alternating relationship between man and his environment and the evolving approach to land use patterns over time:

- In the pre-industrial society, the man's use of natural resources for this area was in a balanced relationship with nature;
- During the 20th century, the man's need of protection from natural disasters – floods – led to interventions which drastically modified the natural features of the river landscape and destroyed the ecosystem balance.

The SARIP shows that the community has understood the necessity to recreate a balanced environment for a sustainable future. The project has the goal to reconnect citizens to their natural resources which represent not only their legacy but also the key to maintain the city's future economic vitality and quality of life.

The SARIP impact is foreseen to be amazing at a broader scale, driving back the inhabitants to use their natural resources and to appreciate their cultural heritage. This project also represents an economic stimulus for a virtuous development of cultural heritage tourism and eco-tourism.

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Managing Heritage Sites While Accelerating Cultural Heritage Tourism in Antalya, Turkey

Sedef DOGANER[1], Angela LOMBARDI[1], Ege Uluca TUMER[2]
(1) College of Architecture, The University of Texas at San Antonio, San Antonio, TX USA
sedef.doganer@utsa.edu
angela.lombardi@utsa.edu
(2) College of Architecture, Istanbul Kultur University, Istanbul, Turkey
eulucatumer@gmail.com

Abstract
Antalya is characterized by historic sites and monuments of great importance dating from Hellenistic, Roman, Byzantine, Seljukian and Ottoman periods and is one of Turkey's most popular tourist destinations.
Xanthos-Letoon, Antalya, is inscribed in the UNESCO World Heritage List since 1988 and the city has also seven nominated properties in the tentative list.
In 1980, tourism was encouraged to constitute a new sector as an economic and political objective and now the number of tourists visiting Antalya has reached 10.7 million.
Besides the positive effects of the tourism development, some other problems occurred, such as rapid population growth and the speedy consumption of the historical, natural, and cultural resources related to this rise.
By the time tourism industry in the area has mostly focused on sea-sun-sand tourism. Historical, natural and cultural entities have almost been forgotten, and the heritage management has become an important issue to be considered seriously.
Within this context, this paper focuses on how to put forward the real values of Antalya's identity and encourage heritage tourism as a sustainable alternative. This paper discusses the strategies to enhance and accelerate the heritage tourism in Antalya, to improve the interaction between historic heritage and tourists while managing heritage sites visited by tourist flow, and to re-interpret the identity of Antalya, Turkey, as a province of many notable urban/ archaeological world heritage sites.

Keywords: cultural heritage tourism, heritage site management, world heritage sites, Antalya.

1. Introduction
The heritage sites have been frequently remembered together with tourism and have been usually accepted as the reason of attraction to many destinations. Rome, Athens and Istanbul are the cities to be mentioned as the touristic destinations mainly as a result of the richness and diversity of the cultural heritage sites located in and around these cities. On the other hand, Antalya on the south coastline of Turkey has a problem in interpretation and presentation of its abundant number of urban/ archaeological heritage sites, of which one is [1] in the World Heritage Sites (WHS) List of UNESCO and seven are in the Tentative List [2]. Although, having such invaluable heritage sites in a comparatively short distance, tourism in Antalya is not heritage tourism focused, partly as a result of dominancy of the exceptionally good weather and coasts it offers to the tourists. When the annual visitor number to the above mentioned heritage sites is compared with the total number of annual tourists to Antalya Province, it can be clearly found that the heritage sites are not the leading/ generating side of the tourism in Antalya, Turkey's most popular tourist destination [3] (Table 1). This research seeks to develop strategies for increasing the recognition of the heritage sites in Antalya and for converting the city's identity from a beach resort to a city of a diverse heritage.

Heritage Sites		WHS Status	Number of visitors	Percentage*
The city of Alanya		Tentative List (since 2000)	Approx. 2.500.000	% 23.3
Archaeological Site of Perge		Tentative List (since 2009)	272.655	% 2.54
Xanthos-Letoon		World Heritage List (since 1988)	47.558	% 0.44
Ancient Cities of Lycian Civilization	Patara	Tentative List (since 2009)	155.745	% 1.45
	Olympos		259.083	% 2.41
	Myra		448.210	% 4.18
St. Nicholas Church		Tentative List (since 2000)	485.052	% 4.52
Karain Cave		Tentative List (since 1994)	29.359	% 0.27
Kekova		Tentative List (since 2000)	34.398	% 0.32
Güllük Dagi-Termessos National Park		Tentative List (since 2000)	35.439	% 0.33

* Number of tourists visiting Heritage Sites in Antalya / Total number of tourists visiting Antalya in 2012 (Total number of tourists visiting Antalya in 2012 is 10.726.136)

Table 1: Number of visitations in World Heritage Sites of Antalya in 2012

2. The Tourist City: Antalya

Antalya is Turkey's most popular tourist destination since 1980's. It has been a very important maritime city throughout its history because of its geography and climate. Both natural and historical patterns work together to form the traditional character of the city of Antalya.

The population of Antalya began to increase in 1950's due to an increase in immigration [4]. It was 1953 when the word 'tourism' began to be used in earnest and a law promoting the tourism industry was accepted by the Parliament in that same year. Since the 1960's, tourism in the Antalya region has been a priority for the country, motivated by Antalya's densely natural and historical value. In 1969, the Turkish government defined a three-kilometer band of the Aegean and Mediterranean as a dedicated tourism region. In 1973, the Ministry of Culture and Tourism had the Master Plan of Antalya prepared.

1980 was a turning point for the tourism in Turkey and Antalya. In 1980, tourism was further encouraged in Turkey as a new sector, with economic and political objectives [4]. The support given to tourism entrepreneurs by the government through the government's decisions regarding tourism planning has accelerated the demand for resort accommodations. In the meanwhile the city Antalya, situated on the South coast of Turkey, is favored by its climate, natural beauty and historical patterns.

From the 1980's on, through the support of foreign investment aimed at benefitting from this growing industry, a different process began. This process was later improved-upon through the franchise chain system.

Tourism is now the second-largest industry in Turkey, attracting a total of 31.7 million visitors per year. Today the number of tourists visiting Antalya alone has reached 10.7 million visitors per year. Antalya has attracted visitors from Germany, Russia, Austria, Sweden, the UK, Netherlands, France, Denmark, Belgium, Norway, Poland, and the Ukraine. The visitors from Germany (28%) and Russia (27% – after the collapse of the Soviet Union) make up 55% of the market share in tourism in the city [5]. The plan of 1973 projected a 174,000-bed capacity by the year 2000 in Antalya. However, the number of beds exceeded the target bed number and reached 230,000 in 2000; today Antalya has a 412,000-bed capacity [4]. Tourists visiting Antalya increased from 800,000 to 7,000,000 in twenty-five years' time from 1980 to 2005.

Through this process, the tourism construction has quickly accelerated and mass tourism has widely grown up on its coasts [6]. The rapid growth of Tourism in Antalya since 1980's had caused a comprehensive change in its social and physical characteristics. There have been developed a range of accommodation from hostels at the lower end, small boutique hotels ın the middle range, relatively large holiday villages and high-quality five-star hotels at the top.

Throughout this rapid acceleration in the city's tourism industry, tourists' profiles, their demographics, demands and expectations, management and marketing strategies have also evolved. The increasing number of chain hotels has caused an improvement in institutionalization and standardized spatial organization in the city. Tourists expecting an inexpensive vacation have begun to flock to city, especially after tour operators began to take a more active role in marketing and the local resorts expanded to incorporate an all-inclusive accommodation system.

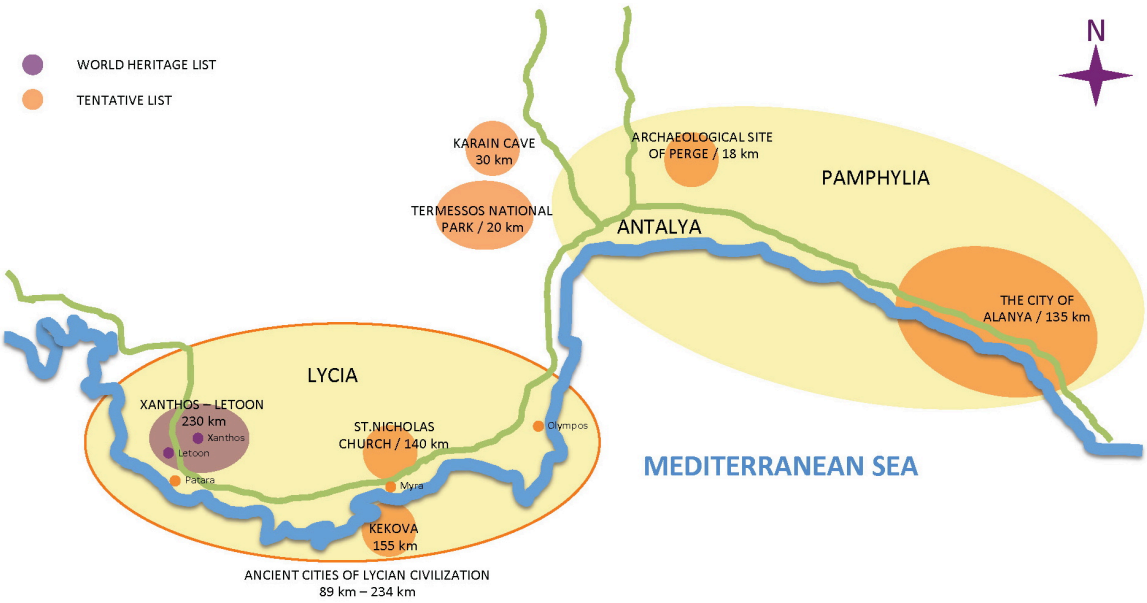

Fig. 1: Important Archeological Sites, WHL and Tentative Lists sites in the region

The city is mostly known for the beauty of its coasts and warm, beach-friendly weather throughout the year. Besides the sun-sea-sand tourism, Antalya contains attractive tourism elements that cater for a wide range of interests. Tourism investments have turned the province into the country's leading golf resort. On the other hand, the inland mountain areas cater for hikers and climbers, and the unspoiled nature for the eco-tourism [7]. However, although the city's invaluable historic heritage sites are mentioned in most of the tourism marketing campaigns, they do not attract the national/ international visitors as much as they deserve to. The province of Antalya is located on two regions of ancient geography in the south of Asia Minor: Lycia and Pamphylia (Fig.1). The ancient cities settled in these regions were among the largest and wealthiest cities of ancient Greek and Roman periods, and most of them continued to be important through Byzantine times. Excavations have been going on in most of theses ancient cities for decades. Among these numerous number of cities shown on Fig.1, two sites of Lycia, one capital city if it and the other the sacred site of three temples, are in the list of WHL and seven others have been put into tentative list, which is the inventory of those properties which each State Party intends to consider for nomination to WHL [8]. However the visitor numbers to these sites (Table 1) are not comparable to the annual number of visitors to the province. So, it can be stated that the heritage tourism is under the shadow of sea-sun-sand tourism in Antalya.

3. Management and Sustainability of Cultural Heritage Tourism

International tourism is one of the globally and remarkably growing sectors since 1950's mostly due to the development of airlines and its attainability for middle class and the increase in the flow of information. The number of international arrivals was 25,3 million in 1950, 222,3 million in 1975, 455,9 million in 1990 and 760 million in 2004. The receipts in the international tourism have grown in parallel from 2,1 billion US$ to 523,1 billion US$ from 1950 to 2003 [9]. The economical, political, social, and technological developments throughout the world have lead to significant changes in tourism consumption models and during the early 1970s, the *cautionary platform* emerged and attention was drawn to the more negative consequences of tourism. It is pointed that the costs of tourism to the local economy, including environmental impacts in destination areas, problems with seasonality, pressure on local facilities and changes in hosts' lifestyles are brought about by the presence of tourism and tourists. In the late 1970s Cohen (1978) argued that attention was being overly focused on tourism's negative effects. After that, several types of non-mass tourism such as, 'sustainable tourism', 'ecotourism' and 'rural tourism' were advocated as being less damaging to society and environment [10]. The quest for sustainable tourism alternatives has been continued increasingly as the discussions on the concepts like sustainability, global warming and ecology have been intensified.

On the other hand, the demands of international visitors have also tended to change. Baraner [11] indicates that tourists' demands for variety and innovation will increase, be polarized, and switch from the '3S' (Sea, Sand, and Sun) to the '3E' (Education, Entertainment, and the Environment) in the coming years. He also identifies the primary long-term tourism trends as: sustainability, inexpensive but high-quality resorts, multiple destination vacations, exotic and authentic locations, unique

experiences, adventure and excitement focused vacations, cultural tours and activities, recreation and sports, health and wellness, and individual tours. Finally, Baraner [11] argues that investors should focus on consumer-based sustainable tourism alternatives in order to have balanced tourism development. Within this context, the aim of these tourism alternatives has been to improve the tourism phenomenon in such a way to contribute the regional economy and social life permanently without destroying the environment, society, and historical, natural and cultural entities. It is necessary to preserve these values in tourism as the tourist season ranges over twelve months a year, to take the concept of tourism out of the monopoly of sea-sun-sand, and to diversify by means of new concepts directed to alternative tourism and enlarge the possibilities for investment [10].

Heritage is a broad concept and includes the natural as well as the cultural environment. It encompasses landscapes, historic places, sites and built environments, as well as biodiversity, collections, past and continuing cultural practices, knowledge and living experiences. It records and expresses the long processes of historic development, forming the essence of diverse national, regional, indigenous and local identities and is an integral part of modern life. It is a dynamic reference point and positive instrument for growth and change. The particular heritage and collective memory of each locality or community is irreplaceable and an important foundation for development, both now and into the future [12]. Heritage had always been an important actor of tourism since the ancient times [13]. Cultural Heritage Tourism is a part of the cultural tourism and is defined as 'visits by persons from outside the host community motivated wholly or in part by interest in historical, artistic, scientific or lifestyle/heritage offerings of a community, region, group or institution'. This is a useful definition of the phenomenon as it recognizes that the motivation of visitors to experience 'culture' in some way is what separates it from other forms of tourism [14].

Although, cultural heritage tourism and sustainability evidently share a common theme, there has been paid very little attention to explore the relation of these two concepts [15]. The increasing recognition of sustainable development has resulted in tourism being viewed as an activity, which could be developed in conformity with the objectives of this concept. The 1982 Joint Declaration of the World Tourism Organization (WTO) and the United Nations Environment Program (UNEP) expresses the goal of sustainable tourism as '*The protection, enhancement, and improvement of the various components of man's environment are among the fundamental conditions for the harmonious development of tourism. Similarly, rational management of tourism may contribute to a large extent to protecting and developing the physical environment and the cultural heritage, as well as improving the quality of life*' [16]. On the other hand, even though the pivotal idea in both of the definitions of 'sustainability' and 'heritage tourism' is clearly that of 'inheritance', the connection between these two concepts still remains largely unexplored [15].

At a time of increasing globalization, the protection, conservation, interpretation and presentation of the heritage and cultural diversity of any particular place or region are important challenges for people everywhere [12]. Most countries encourage the preservation of heritage as an asset for all the community. It can be used to evoke a sense of continuity of culture, enrichment of people's lives, as a link with the past and to allow society to make sense of the present. Heritage sites are multi-purpose - they provide a wide range of tourist attractions, a focus for community identity, a valuable resource for formal and informal education and in some crises, such as the inner cities, the basis for the economic regeneration of an area. The four variables under consideration are tourist attraction, community identity, formal and informal education, and economic regeneration [17]. Heritage sites provide the tangible links between past, present and future and ideally cultural heritage tourism should bring economic benefits to host communities and provide a significant means and motivation for them to manage their cultural heritage and continuing traditions [14].

Management of heritage sites has become a widely discussed concept in last ten years after it was highlighted in the 'Operational Guidelines for the Implementation of the World Heritage Convention' of 2005 [18] and the guide for 'Management Plans for World Heritage Sites' was published by UNESCO German Commission in 2008 [19]. The management plans are thought to be the implementation tools for achieving a balance between the conservation and restoration of cultural heritage, the priorities and needs of local community, and development of tourism and economy. A management plan takes the task of a framework that set forth the guidelines for future decisions. A management plan aims to ensure conservation of significance and values of the site and its sustainability and to help the local community and visitors in appreciating the significance and values of the site.

Although tourism is a positive force for the preservation of the heritage sites because of its ability to draw world attention to their importance, excessive visitation is in conflict with the initial goal of the management plans, and challenges the sustainability of those sites [20]. Tourism industry supports the protection of cultural heritage for future generations of the host community and visitors, and co-operation between the stakeholders is a basic necessity for a sustainable tourism industry [14].

Otherwise, heritage sites become the focus for the struggle between the potentially conflicting aspirations of conservation and tourism. Good heritage management with a major focus on heritage interpretation and presentation ensures that one complements the other. It enables the critical balance



Fig. 2: Archaeological Site of Perge

to be maintained between the needs of the resource and the needs of the visitor. Through education and entertainment and the enjoyment of heritage attractions such as nature reserves, national parks, museums, historic houses and gardens, villages or towns by people of all ages and socioeconomic groups with different lifestyles, it is possible to develop a climate of conservation awareness [17]. The involvement and co-operation of local and/or indigenous community representatives, conservationists, tourism operators, property owners, policy makers, those preparing national development plans and site managers is necessary to achieve a sustainable tourism industry and enhance the protection of heritage resources for future generations [12].

The management plans are intended to form a framework for different topics for achieving a balance to be maintained between the needs of the stakeholders and the necessities for the sustainability of the heritage site. These topics can be summarized as 'archaeology', 'conservation', 'tourism management', 'social geography', 'urban planning', 'environmental research', 'restoration', 'education', 'risk management', 'museology' and 'community outreach'. Many of these topics are related with 'community interpretation' and 'presentation' of the heritage site. Through interpretation and presentation, the unique attributes of the heritage sites can be emphasized and accommodate the needs of the visitors [17]. Through the process of preparation of the management plan sustainable conservation and management is the expected outcome. For achieving this goal, long-term conservation decisions and plans are settled, the expectations from the site are defined, social economic and politic framework is designated and recent trends and developments in related fields like archaeology, archaeometry, conservation are comprised in the management plans.

4. Management of Heritage Sites of Antalya in WHS List and Tentative List

As mentioned before, province of Antalya is settled on the ancient Lycia and Pamphylia regions and invaluable archaeological, architectural, natural, urban heritage sites are located in the borders of the province (Fig.1). Eight of these sites are either in WHS List or in Tentative List, namely Xanthos-Letoon, the city of Alanya, Archaeological Site of Perge (Fig.2), Ancient Cities of Lycian Civilization (Patara, Olympos and Myra), St. Nicholas Church, Karain Cave, Kekova, Güllük Dagi-Termessos National Park (Table 1) [2]. Unfortunately, the annual number of tourists in Antalya is not reflected in the number of tourists visiting these heritage sites. Among the listed heritage sites, Alanya seems to

Fig. 3: St. Nicholas Church and the excavations in the site, Demre [25]



have the utmost number of visitors, which is approx. 2,500,000. However, this number does not reflect the visitors to the historic cores of the city, located on the west slopes of Kandeleri Peninsula and aside from the new developed areas. Indicatively, only 343.724 of 2,500,000 have visited the Alanya Castle [3].

The second most visited heritage sites among the listed group is St. Nicholas Church, visited by 485,052 visitors in 2012 and its' neighbor heritage site in Demre, Myra, visited by 448,210 visitors in 2012 (Table 1). Surprisingly, St. Nicholas Church of Myra, which is a pilgrimage and a very important site for Christianity, could only host %4,52 of the total number of tourists visiting Antalya. The number of visitors to Xanthos-Letoon that had reached to only 47,558 (%0,44) is even more unanticipated, as this heritage site, comprised of the capital city and sacred site of Lycians is the only one in WHL among the listed sites. The attention given to the listed sites is quite different than what is expected from the WHL and Tentative List sites. In the article titled as '*Does world heritage list really induce more tourists? Evidence from Macau'*, it is discussed that UNESCO recognition has been widely used as an advertisement to attract tourists and being on the WHL seems to be effective for increasing global visibility and tourist arrivals. Furthermore, it was stated that the accreditation of the World Heritage List (WHL) was meant to identify, recognize, and protect scenic spots of global value, the WHL is now widely used as a marketing tool for national tourism campaigns and this strategy is rooted in the belief that the WHL is a powerful boost for attracting tourism [21]. In the same research, visitation increases the threat of damage or destruction of the environmental and cultural integrity of the WHSs due to excess number of tourists and an emerging line of research has focused on discussing how to achieve a balance between strict protection of WHSs and tourism development [21]. Similarly, in another paper titled as 'Tourism Development of World Heritage Sites in China: A Geographic Perspective', it is discussed that World Heritage Sites are increasingly used as tools for national tourism marketing campaigns and these campaigns draw vast numbers of visitors, and increase the international visibility of destinations through the promotional and informational policies generated by the private sector, the host country, and the World Heritage Committee. As a result, being designated as a World Heritage Site is a coveted prize, and regarded as a means of increasing tourism. In 1998, recorded annual visits to 116 of the World Natural Heritage Sites was roughly 63 million and this was almost one-tenth of international tourist arrivals, and all indications point to an increasing World Heritage Site visitation [20]. In another research it is indicated that designation is regarded very favorably by countries as a means of attracting more tourists and is a highly sought-after prize. "The coveted UNESCO designation of World Heritage Site is used for national

agrandissement and commercial advantage within the international competition for tourists, more often than it is a celebration of an international identity" [16].

So, if designation is regarded very favorably by countries for increasing the international visibility of destinations and regarded as a means of increasing tourism, why Xanthos-Letoon in WHL and other sites in TL, do not attract tourists to the area and do not even have a remarkable share from the visitors of the province. Erturk proposes that importance of Archaeological sites, ancient monuments and antiquities, as well as their values, have not been fostered in Turkey and in addition to a lack of awareness, the lack of financial resources and the lack of quality control/ monitoring are also major problems in the management of heritage sites. Insufficient number of staff and lack of communication between tourism and cultural sectors are the other factors listed by Erturk. Most of the travel agencies act independently and without any clear objectives. While one site receives visitors by busloads and becomes a must-see for all tour organizers, another nearby remains almost deserted [22]. The general framework, which is expected from the management plans seem to be missing for the heritage sites of Turkey.

The community interpretation and presentation, mentioned above, as the main concepts of site management also seem to be not properly working. Mostly, the local community does not have strong links with these sites, and they do not have chances to interact with them. Most of the archaeological and historic sites seem to them as enclosed with wire fences and allocated only for tourism. Both in the marketing campaigns of Antalya, and within the heritage sites, emphasize given to enhance the knowledge of audience on these sites is quite low. Fortunately, a new regulation entitled, "*Legislation on the methods and principles concerning establishment and duties of 'Site Management and Monument Council' and identification of 'sites to have management plans*'" was put into force in 27th November 2005, by the Ministry, and this recent attempt will hopefully help to protect and evaluate the archaeological sites within the framework of sustainable management [23]. Lately Ministry of Tourism and Culture enforces all the archaeological excavation teams to have their management plans prepared. The aim of this regulation is to ensure that archaeological sites, conservation sites, their interactive areas and junction points be conserved and evaluated within the scope of a sustainable management plan in coordination with public institutions and organizations, civil society organizations, and put forward the substance and procedures for the identification and development of management sites, preparation, approval, implementation and supervision of management plans and the determination of the duties, powers and responsibilities of the advisory board, site manager, coordination and audit board, audit unit and monument council that will have the function of managing the site [23]. The objectives of the site management are designated as:

> *a) Accurate delineation of the area for conservation, development and evaluation in its historical, social, cultural, geographical, natural, artistic integrity, and of its interactive areas and associated historical, cultural, geographical, natural, artistic junction points,*
>
> *b) within the scope of a management plan, demonstrating ways to find an appropriate balance between the needs for conservation, access, sustainable economic development and the interest of the local community,*
>
> *c) development of overall strategies, methods and tools to raise the value of the area to an international level, location of resources and fund raising,*
>
> *d) set up an active network of international cooperation and sharing with the view of developing cultural tourism,*
>
> *e) drafting implementation plans to develop regional cultural systems comprising conservation sites that have the potential to form a cluster by being associated with each other in a specific region,*
>
> *f) cooperation between public institutions and organizations, civil society organizations, persons with right to property in the area, persons and organizations working on a voluntary basis and the local community in conserving and evaluating management sites,*
>
> *g) in addition to conservation through maintenance, repair, restoration, restitution, exhibition, arrangement and landscaping of conservation sites, architectural sites and interactive areas in line with site management objectives within the framework of international principles of conservation and convention provisions, determination of principles and limits of use and development,*
>
> *h) utilization of high standards in the management of cultural property, site of conservation, design and implementation, expertise and equipment* [23].

In 'The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas', adopted by the 17th ICOMOS General Assembly on 28 November 2011, the importance of participatory process for the production of a site management plan was pointed out. Consideration of the diversity and uniqueness of each site and its importance for the effective management systems was also mentioned. The management plan is anticipated to determine the cultural values; identify stakeholders and their values; identify potential conflicts; determine conservation targets; determine legal, financial, administrative and technical methods and tools; understand strengths, weaknesses,

opportunities and threats; define suitable strategies, deadlines for the work, and specific actions [24].
Considering all of these developments in the area of heritage management, this paper concludes with the proposal of an integrated management model in order to provide a sustainable strategy for the protection of cultural heritage while accelerating heritage tourism in Antalya, Turkey. As mentioned above lack of communication among the Ministry of Culture and Tourism, tourism and cultural sectors, public institutions and organizations, civil society organizations, and local communities causes organization and interpretation problems. An overall management plan, besides the single management plans, for the heritage sites in Antalya, involving all the stakeholders and coordinating a comprehensive interpretation and presentation program of the listed heritage sites will improve the awareness of the public and attraction of these sites.

5. Conclusion

Turkey is one of the world's crossroads, with evidence of at least 13 different civilizations from Hattis to Ottomans [22]. In order to keep up with the developments in the world and increasing level of concern to the historical, cultural and natural entities, Turkey should preserve its rich cultural heritage, and incorporate them with sustainable tourism activities [6]. Sustainable tourism development would entail the adoption of planning strategies to mitigate the negative impact of tourism without sacrificing its benefits [16]. A sustainable management plan and long-term planning for cultural heritage tourism with an integral, continuing conservation policy, is essential for the heritage sites of Turkey in ensuring a quality experience for the visitor [17].
The objectives of management plans brought by the related regulation (Legislation on the methods and principles concerning establishment and duties of 'Site Management and Monument Council' and identification of 'sites to have management plans') in 2005, seems to be quite comprehensive. In this regard, it is obvious that an integrated regional management plan for the WHL and TL sites of Antalya would be beneficial to protect natural and cultural heritage characteristics, and accelerate cultural heritage tourism in the area. The management plan should develop overall strategies, methods and tools to promote and raise the value of the area to an international level, determine the duties, powers and responsibilities of the site managers and the advisory board that includes members from all parties involved. It is obvious that the Ministry of Culture and Tourism should undertake a master plan for the management of heritage sites by working with key players, such as archaeologists, academicians, local people, NGO's and other related people or institutions working in the heritage field in Turkey. The Ministry of Culture and Tourism should work closely with travel agencies, as well as the decision-makers in the tourism sector, in order to develop common objectives for better management. This collaborative effort should include four stages [22]: identification of problems or difficulties; prioritization; suggestions and the application process. Sharing resources with the help of integrated regional management plan would create partnership opportunities, from which mutual benefit could be achieved [20].
Utilizing the power of tourism to merge people with different historical and cultural background, it is necessary for the local people to be involved in planning for conservation and tourism activities which should benefit the host community as well. The relationship between heritage places and tourism should be managed in a sustainable way for present and future generations. Since domestic and international tourism is among the foremost vehicles for cultural exchange, conservation should provide responsible and well-managed opportunities for members of the host community and visitors to experience and understand that community's heritage and culture at first hand [12].

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THE HISTORIC CENTER OF LIMA, PERU: A GIS DATABASE AS A TOOL FOR SAFEGUARDING AND DEVELOPING

Angela LOMBARDI,[1] Patrizia MONTUORI[2]
(1) College of Architecture, The University of Texas at San Antonio, U.S.A.
angela.lombardi@utsa.eu
(2) Facoltà di Architettura, Università "Sapienza", Roma, Italia
p.montuori@archiworld.it

Abstract
The city of Lima, Peru, is today one of the greatest metropolitan areas in Latin America with nine millions of inhabitants. Lima's historic center, designated UNESCO World Heritage Site in 1999, still maintains its original 16th century city layout, with few later transformations, and a dense and rich architectural heritage. However, in 2008, was included in the World Monuments Watch List as one of the world's most endangered sites: many historic buildings are in poor condition, both as a result of neglect and deliberate decay for future speculative development. Recently, in November 2012, one of the few 18th century multistory buildings, the *Casona El Buque,* dramatically collapsed.
A methodological approach for successful rehabilitation strategies has been created with the necessity of surveying the features of current urban fabric.
The survey, organized in documentation forms, is going to be implemented within a GIS database. It analyzes various types of structures and takes under consideration several parameters: conditions of the existing architectural heritage, preservation of the fragile materials constituting historic structures, definition of boundaries for 'compatible' reuses of historic buildings, quality life improvements for inhabitants.
The survey represents an investigative tool preliminary to any restoration program and could become a reference point for local institution to define guidelines for protection and revitalization of the historic center.

Keywords: Peru, Lima, Cultural Heritage, Conservation, GIS;

1. Lima: History and Complexity of an Architectural Heritage at Risk.

Lima has been the capital of Viceroyalty of Peru, the most important and wealthy city among the Spanish colonies of Southern America.
Since 10,000 B.C., its territory was inhabited by civilizations of great importance, whose magnificent historical and architectural evidences are still visible in the landscape.
The cityscape is composed by buildings, archaeological remains and urban spaces dating from pre-Hispanic, Vice-royal and Republican period and it is an heritage of great historical and artistic value while in an advanced decay and threatened by speculative pressures.
In 1533 the Spaniards reach for the first time the valley where the actual capital is founded, the city of Lima is officially founded only on January 6, 1535, the Feast day of Epiphany and it is named *Ciudad de los Reyes*, to commemorate the three Wise Men.
The Spaniards encounter in this location, on the western bank of the river Rímac, a wide Inca settlement which consisted of earthen constructions or *huacas,* a series of platforms,

enclosures, paths and by an articulated and dense network of artificial water ditches built for an effective irrigation of the farmlands.
The Pre-colombian territory, dominated by the Incas, was characterized by a hierarchical subdivision of the land and was organized in provinces, which were subdivided in districts, called *hunu.*
The settlement where Francisco Pizarro decided to found the new capital was the palace of *curaca* o *cacique* Taulichusco, and was the spot from which all the irrigation ditches of a whole *hunu* were controlled. Even, these irrigation ditches are known and identifiable with streets following the imprint of the ancient irrigation channels [1].
The location of the new founded city, which was destined to become the capital of the Viceroyalty of Peru, is strategically chosen by the Spanish conqueror in order to control the territory and the symbols of power of the Spanish Crown are intended to overlap, to prevail and to obliterate those of the great Inca civilization.
The Viceroyal city, therefore, overlaps with an important pre-Hispanic settlement; on the *huacas*, placed in strategic positions, are built the most representative institutions for the new city: the cathedral, the *Cabildo*, the Archibishop palace,etc. and also the palaces of Pizarro and his companions. Classical urban models are followed, the city is organized in blocks withi an orthogonal grid, in particular, for Lima the model used is the one today called *Modelo Pragmatico* (Pragmatical Model) where the main plaza, *Plaza Mayor*, was built on the *huaca* of Taulichusco [2].
The Historic Center still houses some pre-Hispanic remains, identified in the 50s of twentieth century by Emilio Harth Terré; however their historiographical identification has yet to be established [1].
Lima, as capital of the Viceroyalty of Peru, during seventeenth, eightteenth and first twenty years of twentyth centuries, is the most important and richest city of South America, with not only highly representative civil and religious monuments but also with rich residences and with a significant vernacular architecture: great artistic, historic, typological, stylistic, and constructive relevance concerns numerous convents, churches and religious buildings belonging to different religious Orders (four of them already founded prior to 1553 [2]), residential buildings with various typologies, such as the “courtyard house”, probably of Castellan/Spanish/Moorish origin but used here with several alterations. Architectural elements of great value in the Viceroyal edifices are the famed wooden balconies, of Spanish-Moorish origin and the *teatinas*, wooden skylights located on flat roofs.
The Historic Center today still preserves almost intact his original Spanish urban layout and later extensions, all conceived following urban models developed in the motherland referring to ‘ideal’ Renaissance urban planning, classical architecture and Hippodamic orthogonal street grid.
The city, during the Viceroyal period, is spread within city walls built in 1685 while many buildings are rebuilt several times, because of frequent strong earthquakes (1555, 1586, 1655, 1687, 1746, 1806 – tsunami -, 1868, etc). During reconstruction processes, the previously used construction techniques, mostly imported from Spain, are implemented and merge with pre-Hispanic technologies, better responding to seismic shocks.
After independence of Viceroyalty of Peru from the Spanish Empire (1821), Viceroyal period Lima’s urban structure, construction systems and architectural types remain substantially unchanged for several years.
However, during the Republican period, the increase of trade with foreign countries encourages foreign immigration, especially from Europe, and the architecture of Lima begins to feel the European influence, in particular of the English and Italian style.
From the second half of the nineteenth century, the urban structure begins to be modified for aesthetic and functional reasons. Between 1868 and 1870, Vicerоyal city walls were demolished and in freed area is realized a new annular road along which some important public buildings are built (for example The *Palacio de la Exposición*, 1869-71; the *Hospital Dos de Mayo*, 1868-75; the *Escuela de Artes y Oficios* 1870; the *Escuela de Medicina de San Fernando*, 1903), inspired by the urban transformation envisioned by the Ring in Vienna (1859-1872).

Instead from the intervention of Haussmann in Paris is shooting the model of boulevard road, which is superimposed on the Vic eroyal city g rid and introduces in Lima a compl etely new type of urban space and scale.
Along the boulevard is also built a new housing type, the "compact house", usually in French Beaux Arts style, different from the "courtyard house" typical of the Viceroyal period.
However, th e traditional building te chniques co ntinue to be used until the twenties when, thanks to pr ivate investment, start t o be built ta ll buildings in reinforced concrete a nd brick, which permanently altered the image and the skyline of the historic city [3].
From the first half of th e twentieth century, the Historic Ce nter of Lima begins to undergo significant changes, not only urban and architectural but also social.
Wealthy fa milies, who traditionally lived in the foundation grid of Ren aissance pe riod, move to the suburbs in the ne w expansion's quarters, and the center begins to accommo date the poorer sections of the p opulation. The rich single-family houses of Viceroyal and Republican period are abandone d and occupied by several fa milies, who cannot o perate the maintenance and conservation interventions of the buildings due to the lack of economic resources
In 1991 the Historic Cen ter of Lima, which is lar ge only a q uarter of the old city cen ter, has been designated by UNESCO as a World Heritage Site, bu t about one hundred monuments and thousands of houses with architectural and historic valu es are still in a neglect state and at risk of collapse.
Today, the Historic Cen ter of Lima seems to have two faces: the touristic one, wit h urban spaces a nd buildings a pparently well preserve d, however, that often h ide seriou s problems of degradation; the other one, threatened by serious mutilation to the historical and artistic heritage, by traffic and pollution, by economic and unsolved social pro blems and the low quality of life of residents.
In general the perceptio n of the great historica l and architectonic value of the center of Lima seems to be low, consid ered simply an economically advantageous place where to focus the interests of a speculative nature for the abundance of customers.

1.1 **Lima's Traditional Construction Techniques and Related Issues Jeopardizing their Conservation (Angela LOMBARDI)**

Geographical and climatic features have largely shaped the construction of Lima's architecture. Peru is located just in f ront of the Nazca Tect onic Plate which interact s with the South American Plate making the coastline on e of the most seismically active area of the planet. Based on its g eographical location, th e area ought to have a tropical climate but Humboldt Current preve nts the formation of rain clouds, for these reasons the city has a temperate marine climate. The temperatures oscillate bet ween 14 and 20º C in winter, and between 18 and 30ºC in summer. Lima's climate is chara cterized by a very high relative humidity, the absence of rain and wind. In th e pre-Hispa nic era, the almost tota l lack of rainfall allo wed the construction o f buildings made of na tural materials found in the local area, such as mud, cane and wood. This made fo r a light and flexible constructio n system known as *quincha*, app ropriate for the seismic condit ion of the area. With the Spanish foundation of Lima in 15 35, builders who arrived with the conquerors, a ttempt to int roduce European construction systems: can be dated in 1538 the installation of the first kiln for brick production in order to allow the implementation of masonry construction systems, considered to be more resistant and effective and fair expression of the Spanish rule.
Religious b uildings, dat ing from sixteenth and seventeenth century, highest expression o f Lima's Vicer oyal archit ecture, are built with brick and stone walls and brick r ibbed vaulted ceilings whi ch were st ill being used in the Spanish Isa belian Goth ic Archite cture, then replaced in 17th century by barrel vaults with lunettes, always made of bricks [5].
Following the earthquake of 1687 a nd the collapse of barre l vaulted ceilings, in the church of *San Francisco de Lima*, are deve loped new architectural and struct ural solutio ns which interfuse the know-how of two building cultures, the indigenous and the European.
The result is the Viceroyal *quincha*: a wooden structure with a reed lattice framewo rk and coated with mud, analogous to th e pre-Hispanic constru ction syste m, but requiring the incorporation of new carpentry techniques. Credit for this revolutionary innovation is given to its desig ners, Portuguese architect Constantino de Vasconcelo s (d. 1668), and his

Peruvian assistant Manuel de Escobar (1639-1693), who both supervised the construction of the vaulted ceiling until completion [5].
The earthquake of 1746, which had devastating effects, confirms the stable seismic performance of the Viceroyal *quincha*: under seismic shock, it withstands deformation thanks to its resilience, absorbs vibrations, avoiding movement propagation to the rest of the structure, and, thanking to its lightness, reduces loads on the building.
Its use becomes widespread, not only in modest buildings but also in large and opulent constructions consolidating its identity as the traditional construction technique of Lima.
The use of *quincha* is associated with other similar materials and techniques; it has often been used for specific architectural elements, primarily on upper floors, such as walls or partitions, balconies, *teatinas* (dormer-type skylights), arches, vaulted ceilings, dome ceilings, towers, bell towers and windowed balconies. Elements of higher density and rigidity are placed on the lower floor: stone foundations with limestone mortar; stem walls made of brick; and adobe walls with brick reinforcement in corners, doors and windows [5].
The term *quincha* reveals (and claims) its pre-Hispanic origin, word of *quechua* origin, typically used to identify the walls of primitive huts or of other simple constructions made of cane or bamboo and mud by the indigenous peoples. A good description of these structures is given by Bernabé Cobo in his *Historia del Nuevo Mundo* (16 13-1653). Surprisingly, however, *quincha* construction has received only a general and inadequate attention in art literature of Spanish colonia] architecture; its importance and impact for the development of an original architectural expression still awaiting recognition in the history of construction [6]
Quincha, used in association with adobe bricks, is the traditional construction technique most widely used, thanks to technical performances and low cost; even utilized in modern buildings of the early twentieth century 20s, it is replaced only by the advent of reinforced concrete.
Quincha, even today characterizes the architecture of the city and, even more, it represents its real material identity, demonstrating, as well, the validity of a building tradition of pre-Hispanic origin.
Historically earthen architecture has always presented great advantages, both for the easy availability and workability of the row material, both for the moderate cost. On the other side, it is made of perishable materials. The high perishability of *quincha* materials (wood, reed lattice and coating of mud mixed with straw, horse manure, lime or lime and sand) requires continuous maintenance, while adapting perfectly to Lima's climate, poor of rainfall. Mud high thermal inertia also ensures a good thermal insulation [5].
Large areas of the historic center are characterized by an advanced physical deterioration of its architectural heritage, with structural elements on the verge of collapse as well as functional obsolescence.
In the 1990s, lived in buildings on the verge of collapse approximately 100,000 people. The causes of the advanced levels of deterioration were most varied, including damp foundations, sub-standard hygienic conditions, lack of drinkable water in rented buildings, lack of maintenance due to rent control which determines the low rents, and lack of maintenance due to abandonment of properties in the hope they will eventually collapse. There is considerable speculative pressure on vacant plots left, which after demolition, may be used as highly remunerative car parking areas.
The old and deteriorated parts of the city are inhabited by low-income people who live in rented buildings and housing complexes are referred with the derogative name of *áreas tugurizadas* (slum zones): buildings in a state of overcrowding and decay are referred as *tugurios* (slum tenements). The official term, accepted by the residents, is *solares* (tenements), rather than *tugurios*. The first planning documents on these areas use, however, the term *tugurio*, and that is how they are known to the public at large. *Tugurios*, howerer, are, in many case, relevant evidence of a unique Viceroyal architectural legacy.

1.2 The Architectural Heritage of Lima: Typological and Functional Characteristics, Conservation versus Improper Use (Patrizia MONTUORI)

The Historic Center of Lima a co mplex and precious pa limpsest of structures, buildings and spaces dating from pre-Hispanic, Viceroyal and Repub lican period, characterized by a rich architectural, constructive and typological diversity.

Lima's architectural heritage is a h uge showca se of origin al archite ctural and con structive solutions, t hanks to t he fusion of European and pre- Hispanic influences, which have produced an original architectural language and unique construction techniques

This complexity and richness ne ed adequate instruments for studying, analyzing and cataloging not only architectural heritage's construction and materi als issue s but also peculiar typological and functional characteristics.

One of the most interesting and co mplex aspe cts in Histor ic Center of Lima is, in fact, th e one regarding original typologies and funct ions of historic build ings and th eir later transformations.

In the mod ern era ma ny residential buildings, and, more marginally, public and religious buildings, have undergone an overturn of its typological and functional characteristics.

Even today, the Historic Center of Lima is main ly characterized by the presence of t raditional "courtyard houses" dat ing from Viceroyal and Republican period, which was originally a single-family typology. The "courty ard house" w as the ba sic ce ll of Viceroyal urba n fabric, which was organized according to an urban Hippodamian layout, formed by orthogonal grid.

The "courtyard houses", thanks to the semi-private courtyards open on the streets, created , in center of Lima, an urban space similar to th e one existing in south ern Europe, North Africa and t he Middle East ancient cities. Most probably, o ther types o f residential housing complexes, present in Lima since its foundation, may come from same cultural areas.

However, unlike the "courtyard ho uses", these complexe s were destined to me dium-low income social cla sses a nd were located nex t to manufacturing establishments, where the inhabitants worked, or in peripheral urban areas.

The *callejón* was a complex characterized by small houses with one level, consisting of one room and a courtyard, arranged on e beside the other and accessed b y semi-priva te alleys with little shrines for saints, with sq uares, with small chape ls where th e inhabitant s met.

Instead the *quinta* was a type of collective housing usually consists of a partments, arranged next to each other, directly accessible from the st reet or, more rarely, by a semi-private alley. The *quinta* was initially with a single level, but as a result of demographic growth of the city, it has been added a second level to already exi sting complexes and it start to be built new complexes directly with two floors, with galleries of access and distribution.

By the mid-twentieth century the movement of the midd le class fro m the area of Lima founded in Viceroyal period to the n ew quarters of expansion has sign ificant effects on both the center and the historic buildings of Lima, in particular those for residential use.

On the one hand the ancient sing le-family residences of Viceroyal and Republican period were occupied by several families, usually without financial resources. The buildings are in a serious state of disrepair and have undergone improper transformations, even for the modest economic conditions of the inhabitants to operate maintenance, conser vation and f unctional and sanitation upgrading. Also the residential housing complexes , typologically more adequate to accommodate several families are also in a pre carious state of conservation for the lack of maintenance due to the limited resources of the inhabitants.

On the other hand, the center has lost manage rial functions, that have moved in the south of the city, due to the drastic reduction of the social level of the inhabitants, and is progressively characterized as a place of itinerant trade, legal and illegal: the flourish of the commercial activities ca used the improper transformation of man y buildings, including historic, in small firms or sho ps; the st alls of street vendors occupy the side walks of center and occlude the view of the historic bu ildings, streets and squares, often causing considerable damage to the facades [4].

Some cases of commercial re-use an d irreversible alteration of artifacts of historic center are emblematic such as th e house of Manuel Ricardo Palma Soriano, well-known Peruvian essayist an d writer from the mid-1 800s. The house was built probably during the era of the Viceroyalty and remod eled during the Repu blican perio d, was designated a National

Monument in 1989. Today only the wing facing the street, with its typical wooden balcony, is partially preserved, but parts of the building have been demolished around the interior courtyard, and a small informal market and stalls have been built.
Many buildings of historical and architectural value are intentionally destroyed, partially or totally, for creating parking, commercial activities or for building new edifices: significant is the recent collapse of El Buque building, caused by a fire, possibly arson. The building dates back to the eighteen century and was the only three-story building in the area of Barrios Altos: the ground floor was built of *adobe*, while the upper levels were made of *quincha*. It appears to have been initially a spacious courtyard house, later becoming an apartment complex with a balcony running along the exterior of the third level that provided access to the small apartments.
Since 1991, and particularly after the proclamation of the historical center of Lima "World Heritage", the government has tried to chase away the street vendors from the center with regulations, plans, and even with the police and tear gas. However, the opposition to such measures has been very strong, and the results are quite disappointing.
In fact it is important to understand that today Lima's historic center of, like others, especially in Latin America, is characterized not only for the artifacts and urban areas of historical and architectural value: the viability induced by the numerous inhabitants and by the widespread dissemination of commercial activities, on the one hand causes the problems mentioned but on the other hand is now an integral part of its image and of its social and economic structure.
So organic and effective re-qualification policies of the Historic Center can be processed only through a complex and multi-level analysis of historical, architectural, functional, economic and social aspects, which helps to understand how to regulate and integrate different needs and goals.



Fig.1-2: *Casona* El Buque before and after the collapse. In November 2012, a fire caused the collapse of this historic mansion built in 1753 and designated national monument in 1988.

2 From Cultural Heritage Survey to Development of a GIS Database for Safeguarding and Revitalizing the Historic Center of Lima

2.1 A Documentation Form for Surveying the Architectural Heritage of Lima (Angela LOMBARDI)

The Historic Center of Lima is a rich ensemble of historic buildings, archaeological remains and urban spaces with high architectural and historical significance, the area is therefore characterized by such extremely problematic social, economic and functional conditions that any form of architectural heritage conservation is extremely hard to be undertaken.

For these reasons, during the research developed in 2012 by SAPIENZA University of Rome in collaboration with the National University of Engineering of Lima and the World Monuments Fund, has become apparent the necessity of gathering and coordinating extremely diverse data related to the relevant features of the Historic Center of Lima, not only focusing on historic structure but also involving its context.

A preliminary survey of the city's architectural heritage has been implemented through the creation of a survey form, which revealed to be the most effective and flexible tool for gathering and processing relevant data and make them comparable [7].

The analysis is carried out on two different levels: the first focuses on the structure itself, identifying the layering's, transformations, construction systems and state of conservation of the buildings; while the second level examines its relationship with the city and the similarities that enable diverse elements within urban space to co-exist, change, integrate and replace each other over time.

The documentation forms represent an investigative tool preliminary to a rehabilitation program for each single building and its spatial context, aimed at "re-qualifying" its specific components, related to both the local and general urban context. The acquired data have been methodically subdivided into seven separate sections, each designed to classify the information into groups of options or *tables* containing the required data.

The first section of the form deals with STRUCTURE TYPE: Four recurring types have been identified: monument, building, neighborhood and, archaeological remains.

The first two definitions refer not only to the *Charter of Venice* of 1964, but also to the *UNESCO Recommendations* of 1972 which underline the extension of the heritage concept from single monuments to "vernacular buildings which have acquired a special significance with the passage of time" (Art.5). However, the presence of archaeological remains in an urban settlement needs to be documented and will lead to an evaluation of its archaeological potential, to be synthesized in a "Charter of Archaeological Potentials", tool never taken into consideration by Lima's city planners.

The second section considers the structure in its CONTEXT and refers to the Charter of Venice of 1964, which recognizes the need to preserve not only the "single architectural work", but also the "urban or rural setting" formed by the vernacular built fabric. The second section requires the description of the buildings' location and adjacent urban fabric, documenting the relationship between heritage buildings, new architecture and the more general cityscape.

The third and fourth section contains HISTORICAL DATA and DESCRIPTION, including information on construction period, original and current uses. Defining the original and actual uses of a structure under analysis requires a complex cultural background and involves non only typological studies, considered part of the historical and archaeological disciplines, but also social study, analysis and demographic data connected with each single structure.

The fifth section is an analysis of BUILDING TECHNIQUES AND DETAILS characterizing the object, it collects relevant information of the significance of the structure, its layering and its construction technique. Significance (singular features) describes the qualities that distinguish the structure and render it culturally significant. In the form four categories have been identified: 1) typological, 2) technical and construction-related, 3) historical and, 4) artistic. This section is critical, being able to document, although in a synthetic way, the physical features of Lima's architectural heritage.

Understanding these characteristics is indispensable to develop a program of intervention as it has a direct bearing on the future utilization of the cultural heritage and the modalities to be adopted for its rehabilitation.
No such analytical and scientific oriented documentation has been undertaken until our study.
Section six of the form looks at the LEVEL OF RISK, i.e. the problems related to the conservation of the structure, through an analytical matrix combining two significant variables, the most important for Lima's architectural heritage assessment, the "level of usability" and the "level of conservation".
The level of risk is the result of a possible combination of the two variables above mentioned and is evidenced in a table showing five possible levels: 1) very high risk requiring immediate intervention; 2) high risk requiring interventions aimed at redressing the damage; 3) medium level risk requiring interventions aimed at mitigating the damage; 4) low level risk requiring further analyses and investigations; 5) no risk and no need for controls, analytical investigations or upgrading of the hygienic and utility standards.
The survey form's seventh section collect information about OWNERSHIP AND PRESERVATION instruments, examining the relevant preservation decrees, the actors and beneficiaries of the rehabilitation process, the source of restoration/conservation/rehabilitation funds and the existing legal instruments, both at national and international levels, that may have a bearing on the building in question.
The form will have to indicate a) if the building falls within the area of the historic center of Lima, declared by UNESCO in 1991 a World Heritage Site, citing the norms applicable; 2) if it is a national monument of historic and artistic interest, mentioning any binding legal instruments; 3) if any relevant town planning laws are applicable in the case of vernacular buildings; 4) if other legal preservation instruments or actions are in place which may be supported by private associations or institutions. The ownership status has to specify, whether public, private or religious, and, where applicable, indicates the existence of expropriation decrees. It should be noted that, based on the available statistical data, ownership titles are often impossible to trace.
During the 2012 study, with the use of the above described documentation form, have been undertaken survey and documentation of numerous buildings and sites, particularly representative for their historical- architectural- constructive- typological features.
Next objective is to extent and implement the survey during the following research phases and make accessible and immediately usable the collected data [7].

2.2 A GIS Database for the Architectural Heritage of Lima: Characteristics and Potentials for Analysis, Monitoring and Interventions in the Historic Center (Patrizia MONTUORI)

The analysis of spatial information is not a new concept. Over the past centuries mathematicians, geographers, cartographers have started to analyze spatial relationships through paper cartographic bases and thematic overlapped lucid, which can be considered a sort of first analogical GIS.
As is well known the G.I.S. (Geographic Information System) is a software tool that consists of a set of functions used to analyze the spatial properties and potential relationships between objects and events. In fact the GIS technology combines the mechanisms and operations of common database with the geographic analysis and the ability to display on the map. This single information system is a valuable tool to analyze the events and planning strategies since all the information available, from micro to macro scale are always readily accessible.
In fact, through the interrogation of the designed and built database today you can easily manage and implement all archived data; build in real time information plans based on queries made; formulate new questions based on the answers obtained; build interpretative hypotheses and predictions of intervention. The GIS systems are related to other database applications, but with the important difference that all the entered information are united by spatial references, since the geo-referencing is the main criterion for storage and management of information.

So the GIS, with its set of functions are a real methodology for placing, storage and analysis of data that can be used for a specific search and / or to plan and make decisions.
It is a tool for monitoring and analysis that can be very useful for the evaluation and planning of interventions in hist oric centers, where us ually add u p complex and very d ifferent problems: the protectio n of historical and architectural values, the con servation needs, the functional needs, the socio-economic conditions.
The Historic Center of Lima is certainly emblemat ic in th is sense becau se it is char acterized by socio-economic, functional and conservative conditio ns very problematic. T he survey developed in 2012 as part of the study conducted by SAPIENZA University of Rome in collaboration with the N ational University of Engineering of Lima and t he World Monuments Fund [7], was elaborat ed in order to collect n ot only historic, artist ic, constructio n related, typological and conser vation-related data but also social, economic and fun ctional information.
As part of th is project on the Historic Center of L ima is now planning to start the ne xt phase of research in which the collected d ata will be entered into a geo-referred database to be proposed as a "pilot project" to organizations and local authorities.
The aim is to provide a new tool to Lima's municipality, today not e xistent, not only for documentation and research but also for the management and planning for the conservation, revitalization and development of the Historic Center. With t he support of Lima's architectural heritage ge o-referred database, for example, you could m ore simply set up a pr ogram of "planned conservation" for buildings of historical and architectural value.
In fact, the increasing d atabase tha t could be created would allow monitoring the state of degradation, identifying main causes (both physical and fu nctional, so cial or econ omic), to evaluate the conservation procedures and to plan maintenance interventions of the artifacts, like in a "risk map".
In fact, in a database GIS the value of information on a building increases with the number of buildings managed with the same criteria of documentation. So its quality and pote ntial are evident whe n you need to check and compare different data such as, for exa mple, the incidence of the different factors in t he processe s of degradation of hist orical build ings; th e effectiveness of the materials and t echniques u sed in the r estoration a nd maintenance; the verification of the cost s of conservation and maintenance. Particularly useful in th e case o f Lima is the possibility offered by the GIS syst em of cross an d compare with immediacy and simplicity the data on t he original characterist ics of the buildings (typological, historica l, architectural and co nstruction); on the state of conservation and interventions a lready made; on the current function al use of buildings and areas; on t he number, class and economic conditions o f the inh abitants. In fact , this allows not only to identify the interventio ns most effective for the physica l preservatio n of the artif acts but a lso to plan br oader strate gies for the rehabilitation and development of the center.
With a GIS database would be easier to est ablish guid elines for t he conservation and development of the historical center of Lima wh ich are sust ainable in t erms of historic and architectural as well as function al, socia l and econo mic and previously verify its effectiveness. It could be an excelle nt tool to su pport both t he management and planning of conservation interventions both of architectural design and urban planning.
In fact, thanks to its versatility this a pplication le nds itself to be customized accordin g to the specific needs and the problems to investigate and develop from time to time. To understand the infinite possibilities that this instrument may have in the conservation and development of the Historic Center of Lima, as in ot her cities, we can say th at thanks to GIS the knowledge of an object, always partial and provisional, cou ld be part of a complex system, always fully available, q uery able, comparable reinterpretable and imple mented. An instrument that, in other words, could he lp to manage the comple xity of the historica l cen ter of Lima through chance of informative associations so far unimaginable, that may guide future choices of conservation, transformation and development, today mostly fragmented and disorganized.

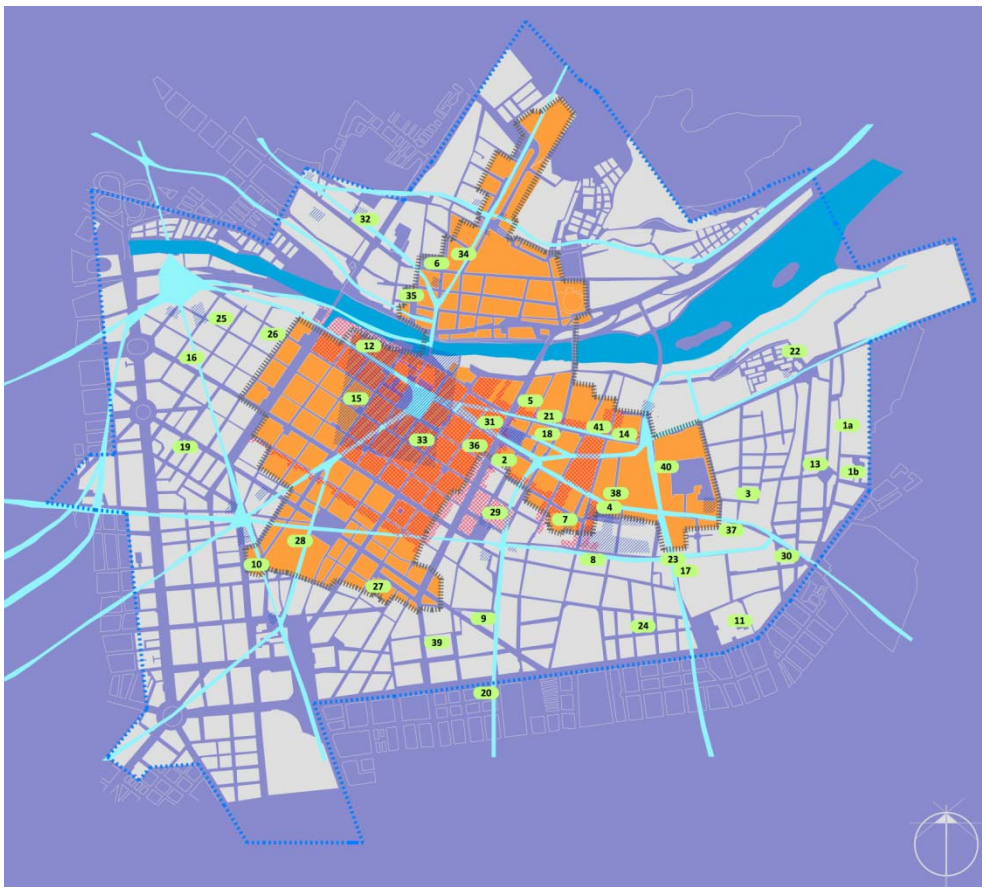

Fig. 3.

Integrated plan of the Historic Center of Lima. The map shows the structures surveyed for setting up the survey and GIS database.

In orange:
UNESCO boundaries
In blue:
pre-Hispanic settlement
In red:
the city in 1553
(Lombardi, 2012)

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Memories in stone

Ornella ZERLENGA
Department of Architecture and Industrial Design, Second University of Naples, Aversa, Italy.
ornella.zerlenga@unina2.it

Abstract
Most of the portals and stairways of historical Neapolitan buildings were made of stone, often, a dark stone, known as piperno. In general, the year of construction as well as the designer of the portal or stairway is known only for those buildings of considerable historical and architectural importance. It is possible to attribute to architects such as Bartolomeo Picchiatti, Cosimo Fanzago, Ferdinando Sanfelice and Ferdinando Fuga several huge portals and stairways, while in most cases only the century of manufacture can identified, with the work being accredited to local craftsmen (often Fanzaghiana or Sanfeliciana). These "stone memories" are therefore an epochal expression of culture, with the art of *lapidum incisores* being a cultured and refined testimony of a craft tradition that binds a multiple formal inventiveness to a constructive use and treatment of stone. The knowledge project of typical and atypical examples highlights the variety of inventive designs as well as skillful ability to adapt to the shape and structure of the stones. Simultaneously, an architectural survey of the portals and stairways as well as a modelling and subsequent rapid prototyping will make it possible to intervene on degraded stone elements.

Keywords: Neapolitan historic buildings, portals, stereotomy, tourist guides, architectural survey.

1. The portals of the historic buildings of Naples
The complex entrances of residential buildings – consisting of the portal, entrance hall, courtyard, stairs – characterize most of the historic buildings in the city of Naples. In general, since the portal is an attractive element, it catches the passer-by's attention due to its shape, size, material, decoration, as well as its function – to allow the transition from an external to internal space – which ever since ancient times has been recognized as being full of symbolic meaning. Functionally, the portal, as well as the door, represent an opening. An opening, which allows the passage from one environment to another. On an ideological level, this symbolic function originated in ancient Rome with the triumphal arch, a monumental building designed to be a symbolic gate of victory, with a celebratory nature and, therefore, along the street where the triumphal processions took place and under which the commander marched with the spoils of war, treasure and slaves.
Over the centuries, the portal has maintained the symbolic value of 'passage', to the point that its pictorial representation has been used as a metaphor in the title pages of several treatises to allude to the entering of the reader into the world of knowledge, as well as in numerous copies of treatises on geometry and military art dating from the XVI-XVII centuries (Fig. 1).
In this sense and specifically in the historic buildings in Naples, the portal is the first link in a continuous sequence of space (hall, courtyard, staircase) placed to mark the site of the transition from a public space (the street) to a private one (the building). Whether it is minor or noble architecture, the portal is a means of celebration and symbolic representation that, by virtue of size, shape, material and decoration, invades the street calling the attention of the passers-by. Even today, despite numerous attacks, this spatial system continues to play a prominent role in mediating the relationship between the space of the roadside and that inside the building, surpassing the eloquence of the road in establishing itself as a kind of filter or diaphragm . In close connection with the road, the plastic and figurative space of the portal and the wise scanning light-darkness-light (which connotes the sequence road-entrance hall-courtyard) attract the passer-by whose gaze, having passed the entrance hall, runs



Fig. 1: Title pages of treatises on geometry and military art dating from the XVI-XVII centuries.
In order:
1 – MAROLOIS, Samuel. *Geometrie contenant la Theorie et practique d'icelle necessaire a la fortification. Mais du depuis corrigée el la pluspart du Discours changé et redigé en meilleur estat par Albert Girard Mathematicien*. Amsterdam: Ian Ianssen, 1638.
2 – COMMANDINO, Federico. *Euclidis Elementorum Libri XV*. Pisa: 1572.
3 – SCAMOZZI, Vincenzo. *L'idea della Architettura universale divisa in X Libri*. Venezia: 1615.
4 – POMODORO, Giovanni. *La Geometria prattica*. Roma: Gio. Batta De Rossi, 1667.
5 – DE VILLE, Antoine. *Les Fortifications avec l'Ataque et la Defence del Places*. Lyon: Ireneée Barlet, 1629.

into an enclosed, cosy and intimate space, the courtyard. An open space, that is pleasantly perceived – as shown by the majority of Neapolitan buildings – with a stairway, that according to the local tradition, is an 'open staircase', often located in front of the main entrance, with the specific aim of visually seducing the passers-by (going along the street) thanks to the force of a spatial dynamism generated by the changing movement of the buttresses and a plurality of vaulted structures, that are typologically different and variously articulated. In several cases, behind the stairway, there is a garden, with the whole being transformed into a multidimensional perceptual context, consisting of multiple spatial forms, colours, sounds, smells, of which the portal is the mediator [1], which include the "gullwing" stairway by Ferdinando Sanfelice in the neighbourhoods of Vergini and Sanità in Naples.
The portals that characterize the housing of the historical buildings in Naples (in the neighbourhoods of Vergini, Sanità, Avvocata, and Montecalvario) have been the subject of cataloging by the writer on behalf of the Office for the Environmental and Architectural Heritage of Naples and province between 1992 and 1993. In 1995, during the "XI edition of Cultural Heritage Week", the Office for the Environmental and Architectural Heritage of Naples and province organized the first exhibition on the "Portals of Naples" along the Spaccanapoli, of which the writer dealt with graphic design of the tables included in this show. The model adopted for cataloging the portals corresponds to the table "A" (Architecture), whose compilation as indicated by the Central Institute for Cataloguing and Documentation in the rules for drawing up (1974 and subsequent updates), is aimed at data collection as well as graphic and photographic documentation of individual buildings or architectural structures not related to only emergencies but can also be used for smaller sized objects [2].

2. The configuration and morphology of the portal: elements and forms

The portals of the Neapolitan historic buildings are characterized by a wide variety of *exempla*. During the academic years from 1987 to 1991 during the course "Design and Survey" by Professor Rosa Penta (Faculty of Architecture of the University of Naples "Federico II"), with the scientific and didactic collaboration of the writer, a study of the architectural stone portals of the Neapolitan historic buildings (scale 1:10 or 1:20, and all relevant details and figurative designs in the scale of 1:5, 1:2, 1:1) was carried out. The graphic documentation included the design of portals, porches and stairways of one hundred and fifty residential buildings in the historic centre of Naples, and is both considerable historical and architectural as well as minor fabric value. The scientific survey and graphic documentation of the portals, albeit in an apparent reduction of the metric scale, has restored a frontal view of the same section that is often prevented from the narrow road [3].
From a structural point of view, these are grouped into two construction systems: an architrave and archivolted, with the later having more declinations in virtue of the variability of the profile of the arch. In the Neapolitan context, the recurrent categories of archivolt portal use curvilinear profiles (mainly, the circular type or low arches, as well as oval), mixtilinear (including polycentric to concave-convex sanfelician type) and straight.
In addition to the construction system, the main elements that characterize the design of the portal are the frame, entablature, pediment, shelves, and architectural order.
In general, the frame highlights the gap. It may be unique or stand out in more bands with an internal and external movement with respect to the archway (often treated with different motifs and interrupted by the door, in key and by the socket) or present a prolonged architrave with either a frieze or 'pulvino'. From an ornamental perspective, the frame can use as well as make up elements of classical moulding (strip, astrangolus, bull, straight and reverse parallels, 'echino', 'ovolo', 'cavetto', 'scozia', rod) as well as be decorated with carvings (floral or geometric patterns in relief or bas-relief) or appear indented, presenting – in this case – an ashlar movement in relation to the blocks in which several blocks are highlighted in a significant position such as the doorway and keystone. In the case of an embossed frame, this may be limited to a simple indentation of the lines of junction between the blocks (smooth ashlar or 'gentle') or propose 'cushioned' bosses (rounded edges) or 'diamond point' (prismatic), or admitting a treatment of the stone block, crudely roughed or tapped. In addition, the plastic-perceptual variability of the dimpled frame is also given by the different treatment of the whole (sharp-edged, rounded, etc.). Finally, there are various cases in which the portal frame has an alternating rhythm in the plastic treatment of the abutments (typically, by interchanging moulded and flat strips) or in the use of different materials (usually, 'piperno' and white marble to give a distinctive two-tone effect).
The entablature, a horizontal frame supported by piers, may be part of the crowning element of the portal (often under a panel, which in turn is placed above the frame) or can be surmounted by a pediment. Typically, in Neapolitan portals, the pediment may either jut out from the edge of the entablature or have the central part of the entablature missing, so as to show the slopes of the everted pediment (i.e., broken and pushed forward), which is why it is often also associated with the entablature. In some cases, the apex of the pediment placed in a recessed position is omitted, with this solution not infrequently being associated with the stretch of the entablature below. The pediment

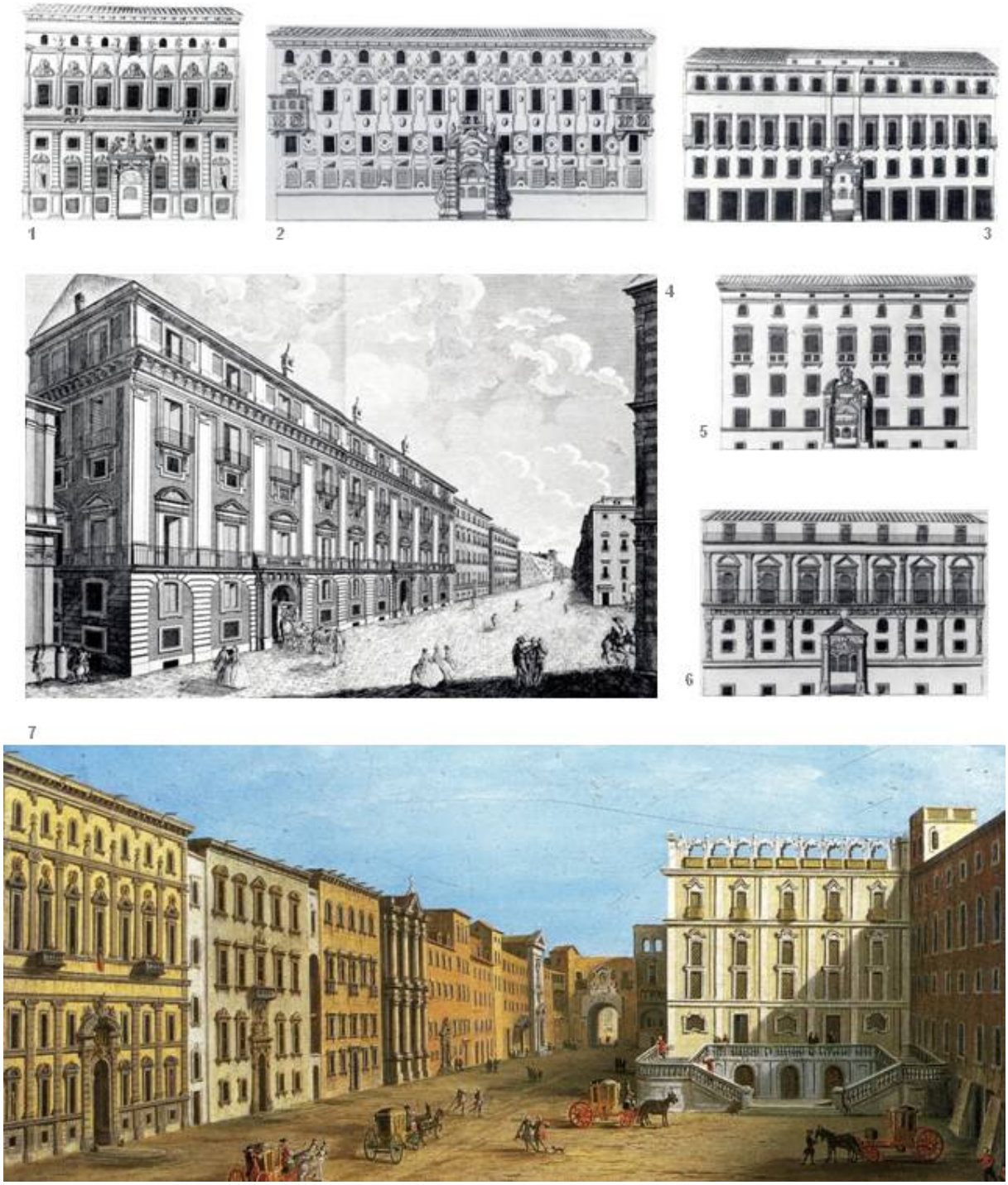

Fig. 2: The design of the Neapolitan historic buildings: tourist guides and paintings.
In order:
1 – Palazzo Firrao (in PETRINI, Paolo. *Facciate delli Palazzi più cospicui della città di Napoli*. Napoli: 1718).
2 – Palazzo Maddaloni (in SARNELLI, Pompeo. *Guida dè Forestieri, curiosi di vedere e d'intendere le cose più notabili della regal città di Napoli e del suo amenissimo distretto*. Napoli: Antonio Bulifon, 1685).
3 – Palazzo del Principe di Sonnino Colonna (in PETRINI, Paolo. *Facciate …*).
4 – Palazzo Casacalenda (in GIRAUD, Etienne. *Le grand Golphe de Naples*. Sans lieu: sans imprimeur, 1767).
5 – Palazzo del Principe di S. Seviero Sangro (in PETRINI, Paolo. *Facciate …*).
6 – Palazzo del Duca di Limatola Gammacorta (in PETRINI, Paolo. *Facciate …*).
7 – JOLI, Antonio. *Strada di Santa Maria di Costantinopoli*. Napoli: 1756-59.

is generally triangular in shape, but in the Neapolitan context, it is commonly curved, i.e. 'tilted', and has the same height as a triangular one (presenting similar declinations), or has a semi-circular profile. In baroque and rococo types, there are several different curves, such as the sloping curved curl (together or separately), polycentric to concave-convex or mixtilinear. In addition, in some cases, the broken pediment includes windows, statues or emblems (symbolic or decorative busts and sculptures).
Another significant element of the design of the portal is the ornamental shelf, with it being a support structure in horizontal projection which can be placed flat against the wall or in profile. The shelf is usually placed at the top corners of the opening or holding the entablature and the pediment. There are various shapes, depending on whether they are shelves with elements linked to the architectural order (mutulo) or scroll or volute shelves (with multiple ribs, crumpled roll or spiral shaped around an eye).
In the portals of the Neapolitan historical buildings, it is quite common for the composition of the elements to be related to the order architectural. However, there are several examples in which the columns are either totally absent or semi-columns in front of pilasters as well as some of the motifs of the portal being different those conforming to the order. In fact, the capitals are configured both in accordance with the architectural canon as well as plant, animals, anthropomorphic or allegorical motifs. In other episodes, however, some elements may conflict with each other (for example, the lintel of the portal with the entablature of the order).
In conclusion, the richness according to which these elements participating in the spatial configuration of the portal is remarkable, to which there is the further presence of curbstones, wooden doors, as well as iron or wooden fanlights. Similarly, there are few cases in which the score composition of the portal includes a greater number of floors, with a window or a balcony (with doors) being located above the entablature, thus returning a spatial solution that, reinforced by the shoulder and pediment, gives the portal as the protagonist of the urban scene by virtue of a search for plastic effects capable of configuring it as a powerful and privileged presence, with majesty and splendour that characterizes it as *unicum* in the design of the facade.

3. The design of the stone portal: the stereotomy of stone

Most of the portals of the Neapolitan historic buildings are made of 'piperno', including a rock stone that incorporates dark lenticular, with the whole presenting dark compact 'litoide' features with 'flames' of various sizes. It is well known that this stone has been mined in the quarries of the neighbourhoods of Soccavo and Pianura since the thirteenth century, precisely in 'Vallone del Verdolino' and 'Masseria del Monte'. The latter is recognizable today by the entrance located at the foot of the 'Collina dei Camaldoli' in Via dei Monti Vicinale and was recently the subject of multiple studies and surveys [4].
In general, the year of construction and designer of the portal are known only for buildings of historical and architectural important In fact, the information about several important great Neapolitan portals is known, with them being attributed to excellent architects such as Bartolomeo Picchiatti (palazzo Sansevero di Sangro), Cosimo Fanzago (Zevallos di Stigliano, Firrao and Carafa di Maddaloni), Ferdinando Sanfelice (Pignatelli di Monteleone e Filomarino), Ferdinando Fuga (Cellamare). While in most cases, only the century can be distinguished, with the work being attributed to local craftsmen (often fanzaghian or sanfelician), whose art of *lapidum incisores* – expression of their culture – amply testifies a tradition of craftsmanship that combines a multiple formal inventiveness and ability to skilfully use and constructive treatment of stone. Traditional methods based on the integration of the extracting and processing of stone, which correspond to two main stages: the first, by the 'tagliamonti', which, after extracting the piperno from the quarry, proceed to cut it into blocks that are more or less the size of the final element so as to be able to transport them to the worksite, where the 'pipernieri' carry out the second phase with the outlining, profiling and implementing the final abutments.
The work of the stonemasons was a fundamental prerequisite for the development of a peculiar science, that of cutting stones, a significant branch of architecture called 'stereotomy' – from the Greek, 'solid' and 'section – which was given its name by Jacques Curabelle, author in 1644 of a work entitled *Examen des oeuvres du S^{R} Girard Desargues par J. Curabelle* [5]. Stereotomy is therefore a complex science, highly integrated by multiple operational and theoretical knowledge including knowledge of mathematics and geometry (the theory of surfaces and their intersections) of materials and their static behaviour, as well as practical and technical construction and shipbuilding management in the working of the equipment. Above all, stereotomy is the learning of a wealth of scientific knowledge that allows for the production of pieces off site, and then placing them on site as elements 'pre-fabricated' according to a precise plan based on the geometric configurative-morphological control of the architectural whole as well as of the parts that compose it. The study of stereotomy is thus a considerable and fundamental support in the cognitive assumption of what is happening today through digital technologies. In fact, similar to the standardization process operated through stereotomy, modern technological innovation makes it possible to obtain through the acquisition of three-dimensional digital models of mouldings and stone blocks of the portals prototypes



Fig. 3: The design of the stone portals: tourist guides and current architectural survey.
In order:
1 – Portal of Palazzo Maddaloni (in SARNELLI, Pompeo. *Guida dè Forestieri, curiosi di vedere e d'intendere le cose più notabili della regal città di Napoli e del suo amenissimo distretto*. Napoli: Antonio Bulifon, 1685).
2 – Sketch of a portal by Ferdinando Sanfelice.
3 – Current architectural survey of portal of Palazzo Filomarino (project of Ferdinando Sanfelice).
4 – Current architectural survey of portal of Palazzo Maddaloni.

(three-dimensional plastic model) to subsequently carry out with the same stone materials belonging to local traditions to replace any damaged 'pieces' [6].
Stereotomic knowledge was first made public in the sixteenth century, when scientific culture was mature enough to consider the idea of the project as a privileged place of theoretical speculation and operational verification and, at the same time, the practice of geometrical drawing in orthogonal projection (plant and raised) as a vehicle for control of the entire design process from intuition to realization on site. Stereotomy became a science, with its theoretical and practical basis dedicated to the principles of cutting stones being spread through the press in the face of centuries of secrecy by the medieval guilds. The publication in Paris in 1567, of the *Traité d'Architecture* by Philibert de l'Orme marks the end of this fundamental shift, followed during the seventeenth and eighteenth centuries by a remarkable amount of treatises on the subject (not only French) as well as theoretical studies on surfaces and curves, including those with a double curvature (i.e., oblique surfaces), the knowledge of which assumes a fundamental importance to the stereotomic project up to the Treaty by Amédée François Frézier significantly entitled *La Théorie et la Pratique de la Coupe des Pierres et des Bois, pour la Construction de Voutes et autre Parties des Bâtiments Civils & Militaires, ou Traité de Stereotomie a l'Usage de l'Architecture* (Parigi, 1737-1739), in which all the knowledge on the latest stone cutting and surface intersections is contained, allowing for the project management of increasingly complex forms of space as well as the construction of more innovative equipment [7].
From the perspective of the stereotomic project, works in cut stone are constituted by blocks or wedges and their assembly is determined by a careful control outside of the work of the geometric behaviour of the facing surfaces (visible) and the junction between the abutments (not visible). This results in the stereotomic project having to respond to the best identification and installation of the equipment or the combination of surfaces of the junction between the ashlars preferably plane, preferring, in the case that the joining surfaces are curved, the use of a particular type of surfaces, grooved, since being generated by the movement of a straight line in space, this geometrical condition can be easily reproduced by *lapidum incisores*.
Based on these considerations, the design of the stone portal should distinguish the apparatus of the abutments from those of the arch (or lintel). Specifically, the apparatus of the ashlars of the abutments can be approximated to that of a masonry plane, considering surfaces facing flat to vertical progression (or sheer) with joining flat surfaces. Generally, the ashlars are parallelepiped in shape (or prismatic with inclined fronts in relation to the facade of the building). From an ornamental point of view, they are variously shaped (strips, clews, etc.), almost always the same size (unless there is a rhythmic pattern of ashlars) and arranged to form layers by the continuous horizontal joints. The apparatus of the ashlars of the arc (circular, depressed, continuous or discontinuous polycentric) can be approximated to a straight cylindrical arc, sharing the odd number of blocks and the structural presence of a keystone. Even in this case the joining surfaces are flat and, if the arc is circular, they belong to radial planes passing through the centre of the arc.
Within the context of the Neapolitan historic buildings, there seems to a widespread use, with numerous excellent examples (for example, the portal of the building by Carafa della Spina) of more modest sized portals, as well as the formal-structural type in which the straight side is constituted by a single ashlar, while the arc by only three elements of which one is the keystone.

4. The design of the stone portals: tourist guides

At the end of the seventeenth century, there was a renewed publishing project dealing with the type of tourist guides in Naples, which saw the introduction of accurate illustrations of specific parts of the city in the form of 'views'. In a sense, it can be said that the production of these views interfaces with a new way of understanding the tourist guide that, relying more and more on the drafting of a organically illustrative tool in accordance with the written text, justifies the frequent use to document architecture and places through figurative representations capable of better conveying the architectural and environmental values, due to faster visual communication of those salient features described in the text and brought to the attention of the reader through the references to the image represented. The result of this cultural innovation is the publication in Naples in less than thirty years of numerous city (or of the Kingdom) guides where, by virtue of a consolidated opinion, the graphic image is entrusted with the central role of transmitting knowledge of the city and its main sites [8].
Among the guides of Naples that give images of places (streets and squares) as seen on an urban scale, according to Giancarlo Alisio Domenico the one by Antonio Parrino entitled *Napoli città nobilissima, antica e fedelissima esposta agli occhi, e alla mente de' Curiosi …*, published in Naples in 1700, is «the first Neapolitan guide that has an extensive illustration program in line with the text» [9]. In this guide, many of the most famous streets of Naples (represented according to a general plan in accidental perspective) depict the building contexts and make it possible to see the main morphological features of special interest, such as scores on the facade and the main ornamental apparatus of windows and doorways . Additionally, in describing the beauties of the city, Parrino also indicates it building materials, commenting: «the mountains that crown it, provide some of the sweet

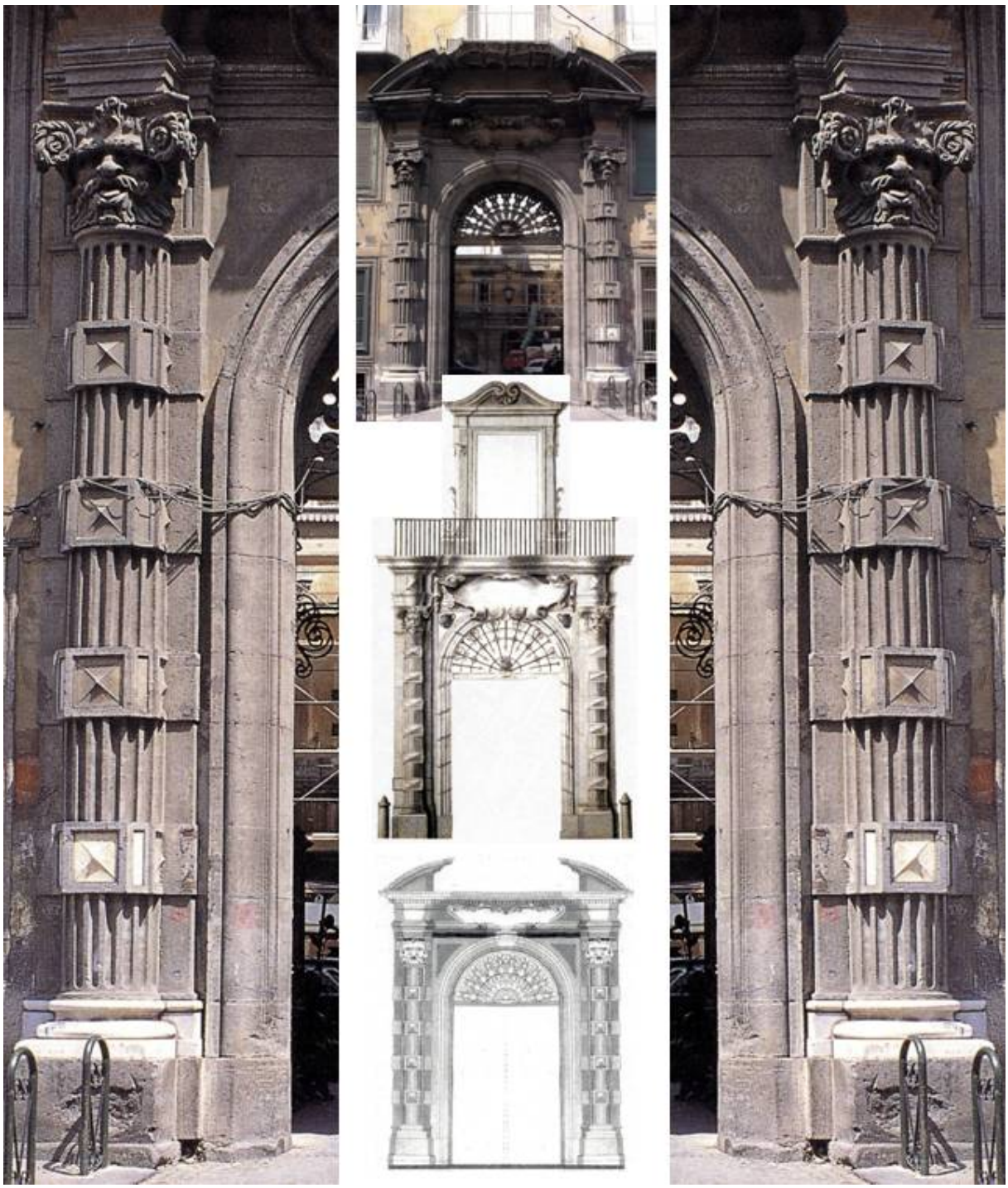

Fig. 4: The design of the stone portals. Portal of ‘Palazzo Pignatelli di Monteleone’ by Ferdinando Sanfelice.
In order:
current portal picture and details;
original sketch of the portal of ‘Palazzo Pignatelli di Monteleone’ by Ferdinando Sanfelice;
current architectural survey of the portal.

and light stone, which admirably combines with the lime giving the opportunity to raise tall buildings, and these sometimes up to a fifth or sixth apartment, others give a hard and black stone, called Piperno, which is used for the arches of the doors and windows and to strengthen the foundations» [10].
The guide by Paolo Petrini, entitled *Facciate delli palazzi più cospicui della città di Napoli*, published in 1718 is also particularly interesting. It is on architectural scale and entirely dedicated to the graphic documentation of the main palaces of the city (these include Palazzo Sansevero, Corigliano, Casacalenda, Filomarino, Gravina, Carafa di Maddaloni, Ruffo di Bagnara, Firrao) [11]. The work is significant from several points of view: the geometric method of representation used (the buildings are shown in elevation, even though there is the allusion of a three-dimensional effect due to the perspective of the roof), the scale of representation (which approximates a ratio 1:100, 1:50); the clarity and precision of the section; the abundance of detail and figurative elements represented including the design of the portal that, in these representations, is the core attraction of the composition and that, at the same time, as shown without doors makes it possible to explore the features of the building behind the façade, penetrating through the archway into the courtyard, in turn built prospectively almost simulating the perceptual experience of a dynamic view captured at the altitude of the road (Fig. 2).
About fifty years later (1767), a new publication edited by Etienne Giraud entitled *Le grand golphe de Naples* integrate the panoramic system of Parrino with the precision for figurative detail of Petrini, resulting highly aberrated roadsides in which the main palaces of Naples and their portals are represented.
The iconography that accompanies *Guida dè forestieri, curiosi di vedere e d'intendere le cose più notabili della regal città di Napoli e del suo amenissimo distretto*,, edited by Abbot Pompeo Sarnelli and published in Naples in 1685 by the publisher Antonio Bulifon, is to architectural detail scale. It contains multiple recordings, including that of the portal of Palazzo Maddaloni represented in a front view (here compared to a current survey: Fig. 3). Using the application of shading techniques, the design of the portal (fitted with a wide caption: «Caval.^{o} Cosmo Invent. Cap.^{n} Ingegn.^{o} Sebast. Indilicato lineavit/P. Del Sig.^{r} Duca di Maddaloni. Fol. 365 / All'Ecc.^{mo} Sig.^{re} / Il Sig.^{r} D. Dom.^{co} Marzio Carafa Pacecco, Duca di Maddaloni ecc., Cavalier del Tosone. Quell'unghia delineata da Fidia, al riferir di Plutarco, valse per indice d'un gran Leone. Questo vestibolo, che ho qui fatto incidere è indizio della magnificenza del suo Palagio. Le cose grandi appariscono anche dalle vestigia, ed à V. E. profondam.^{te} m'inchino. Antonio Bulifon», ivi, Tav. XLII, pp. 364-365. [12]) emphasizes the plastic value of the layout and directs the reader's attention to both the size of the portal (whose spatial solution includes more floors) as well as the presence of ashlars (which protrude from the plane of the frame), while the fornix becomes an opportunity to visually exceed the limit of the road and enter the private space of the yard where two fronts are outlined in perspective. It is no coincidence that in the caption attached to engraving and signed by of Antonio Bulifon, there is: «This hall, which I had engraved here is an indication of the magnificence of his Palace».
However, there are few iconographic authoritative sources documenting the project design of the portal, such as the case of the sketch of the portal of Palazzo Pignatelli di Monteleone by Ferdinando Sanfelice who with noteworthy graphic performance and detailed representation scale describes the front view (prospect); the drawing is housed in the 'Museo di Capodimonte di Napoli' [13]. The project represented in great detail does not entirely correspond to the final realised version (here the original design, photos, and actual portal are compared in Fig. 4), with the entire curved pediment missing and only the entablature of completion (surmounted by a balcony with a glass door) present, as well as a larger title block than that present, covering the entire keystone of the arch, in contrast perfectly visible in the variant made.
In conclusion, the examples cited show how through the design and masterful use of representation methods and techniques, these illustrations drawn in various graphic scales have not only been able to describe a product of local culture and art lacipida in working piperno, but also to evoke the main role of the portal, always using the symbolic representation and transition from public to private (Translated by Sacha A. Berardo).

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Eminent De[con]struction: Conservation Acts of Modern Vandals within Built Forms, Landscapes and Cities

Catharine PYENSON
Taubman College of Architecture and Urban Planning at the University of Michigan, Ann Arbor, Michigan, United States of America
catharine.pyenson@gmail.com

Abstract
This paper proposes that works created through methods of vandalism offer absence, elimination, and destruction as a means of conservation. Over the last century, conservation practices have focused on various reparative and additive qualities in order to sustain histories and objects of the past. The incisions made by artist Gordon Matta-Clark on built forms in the US and Paris, the ground-breaking landscape interventions of Gilles Clément in South America and Europe, and the city alterations and destructive natures of "master builder" Robert Moses in New York all propose conservation as not the glossing or patching over of the past's deterioration and decay, but rather as a celebration of befallen modes of existence.

The following paper will explore the cuts, holes, voids, and general editing of structures, landscapes and cities in the context of constructing a memory and history. The means and craft by which the designers have orchestrated their interventions, intersecting laws and conventions of practice, broaden the narrow range of conservation and give the practice a severity and intent, a focus currently lacking in the contemporary discipline. By analyzing the inverse of spatial constructs, a new means of preservation will emerge.

Keywords: Conservation, Destruction, Vandalism, Un-making

1. Introduction
Conservation efforts frequently seek to conceal scars of the past. There is a tendency to polish, clean-up and improve upon objects in demise; remedying, resolving, or even curing the "problems" of deterioration and ruin. Modern conservation practices focus on various reparative and additive qualities in order to sustain histories and objects of the past. A patching-over becomes a means to increase and extend longevity of an object – a catalyst that sets a never-ending cycle in motion where an object endures constant scrutiny to combat future stages of demise. Projects like the city of New York's High Line attempted to salvage the more wild and unrefined moments of the natural and pre-existing conditions. However, this project still seems to exhibit a degree of reparation, a fixing of what existed before – as if the wild and uncontrolled conditions of the abandoned freight rail line were insufficient. Graffiti was removed, the wild flowers tamed; the park was museumified and made sterile both by its designers and users. The High Line had been transformed into a scene where super model and celebrity sightings became part of the visit, instead of functioning as a landscape of escape from the Disneyfied city around it. The notion of un-making the landscape along the West Side of the city was not an option, though the following pages contend that the process of un-making can be viewed as an act of conservation in its own right. To visually represent this duality of interpretation, I have modified the Hong Kong and Shanghai Banking Corporation advertisements (an ad campaign running under the slogan, "your point of view"), demonstrating different interpretations of the same object.[1]

Conservation needs of an alternative practice where the remnants of the past are not concealed but rather celebrated in their unaltered shape. If architecture can generate form based on undone-ness or the void, why cannot the practice of conservation? This paper proposes that works created through methods of un-building propose absence, elimination, and destruction as a means of conservation. Conservation efforts have become streamlined and too narrowly focused. Perhaps it is time to develop alternative methods in order to understand how to apply conservation to those sites or buildings where a patching-over is not only not appropriate, but also not possible (due to cost or regulation). The following pages examine conservation efforts at three different scales. First, small-scale interventions by the artist Gordon Matta-Clark on built forms, followed by the ground-breaking landscape exercises of Gilles Clément. Finally, there is a look toward the city alterations and destructive natures of "master builder" Robert Moses and his un-doing of New York's urban fabric. I propose that these three figures are modern vandals who have created a new language of conservation.



Fig. 1: High Line, New York.

2. Gordon Matta-Clark and Built Form

Gordon Matta-Clark reveals quintessential space-making practices by his acts of un-making. He takes built forms slated for demolition and exercises acts of deconstruction: slicing, splitting, and cutting. The acts of un-doing in turn remake and recreate new ways to experience the spaces. He destroys space in order to reveal a void, a process best exemplified in his *Splitting: Four Corners* (1974). Here the artist made two parallel cuts down the center of an abandoned house in Englewood, New Jersey. Once having removed debris from the slice, he joisted up the front portion of the house while setting the other half onto a lowered foundation. The resultant space, in-between the two halves, was a wedge-shaped void bisecting the structure. The four corners on the second floor were also removed and preserved as fragments. Matta-Clark submitted his works to a violent act of destruction and vandalism, and in doing so he also revealed the opposite of space, the void. By taking away, he added the opposite of space. The work is temporal - except for the photography, film, a few relics or corners saved, and the 1970s media buzz surrounding the work, the project has completely ceased to exist. This is contradictory to the very nature of built form and conservation practices, whose efforts are made to counter destruction.

Matta-Clark's later work, *Conical Intersect* (1975) in Paris, exercised similar efforts of un-doing in a project for the ninth Biennale de Paris. The site was composed of two buildings on the Plateau Beaubourg, near the historic marketplace, Les Halles, which had culminated in a *grand trou*, or large hole, after demolition. The buildings occupied by the *Conical Intersect* had little to no historical significance, though Matta-Clark argued their value came from the fact that they were among the few remaining structures standing in the wake of the colossal construction of Centre Georges Pompidou and general modernization of the Les Halles area. He carried out an act of "anarchitecture" where he and a small demolition crew inserted a void in the form of a twisting cone through the houses near the not-yet-completed Pompidou, intersecting walls and floors, and revealing a periscoping view, with a diameter base of 4-meter viewable at the street-level moving through the building and concluding with a 2-meter diameter view of the unfinished monument beyond. In exercising acts of demolition, he was recreating space of "an abandoned building full of luminous reflections."[2] By inserting negative space, Matta-Clark brought light into a place where light would not have existed. Despite the seemingly violent act of destructions, there remains a beautifully delicate resultant. Once again, the work is temporal, the two-week process having been documented on 16 mm footage filmed by Matta-



Fig. 2: *Splitting: Four Corners* in Englewood, NJ (1974) and *Conical Intersect* in Paris (1975)

Clark and his two colleagues, Bruno Dewitt and Marc Petitjean. Shortly after its initial demolition (or insertion), the entire structure was destroyed.[3] The artist has managed to conserve by way of temporary destruction. He has referred to this process as "unbuilding" or “making space without building it.”[4]

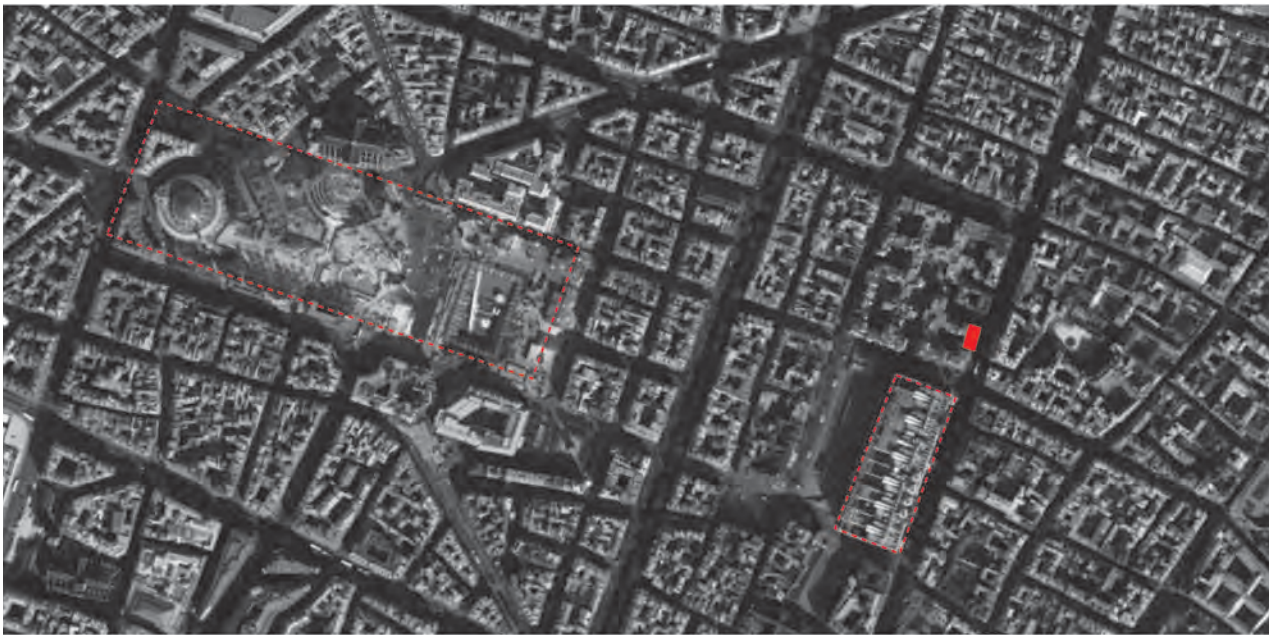

Fig. 3: Map showing Les Halles (left), the Centre Pompidou (right), and the *Conical Intersect* site (red square)

3. Gilles Clément and Landscape

Gilles Clément takes the notion of un-making and applies it to landscape design. He sees the *tiers paysage*, or third landscape, as space that is leftover. These underdeveloped plots, or fragments of land, are resultant spaces from demolition or rebuilding. They are the negative space, the anti-space, the untended to or fallow portions of land. Clément brings value to these predetermined value-less landscapes, claiming that they offer future opportunities.[5]

Clément’s project La Vallée in the Reuse Valley in the Limousin region of France demonstrates aspects of the third landscape. The project refrained from working against the natural forces. Thus, he terms the resultant a *jardin basique* where plants are left to grow in a landscape that has remained untended to for nearly a decade. The gardener and garden are separate entities that don’t interact save for the literal overseeing role assumed by the gardener; the gardener watches the *jardin en movement*. No plants are confined to beds, and no distinction is developed between weeds and

plants. The design of the landscape was not predetermined but rather allowed to organically unfurl. He writes:

> How to maintain the landscape as a technocratic grid applied to the excesses of nature, to its violence? The total control project finds unexpected allies: radical ecologists and nostalgic people. Nothing has to change, our past is at the stake; or, nothing has to change, biodiversity is at stake. Everyone against vagrancy![6]

This anti-intervention-like approach is the opposite of the traditionally manicured sense of landscape design. In this way, Clément's relationship to the land is not so dissimilar to Matta-Clark's curation of space through building destruction. Both Clément and Matta-Clark are conserving works, while simultaneously redesigning them through acts of un-building and un-intervention.[7]



Fig. 4: Gilles Clément projects of un-making in France

4. Robert Moses and the City

Robert Moses is known as New York City's "master builder," often being compared to the French civic planner Baron Haussmann, attributed with Paris' Second Empire. Moses transformed the city, making sweeping moves and exercising eminent domain practices in order to introduce improved access to public transportation, like the famed New York Parkway network. Appointed as the first city-wide Commissioner of Parks in 1934, Moses' had over thirty years of influence over the city. In 1939, he opened the Shore Front Parkway, a 6-lane highway intended to link Brooklyn to the Hamptons, leaving partially destructed homes, businesses and amusement parks in its wake (of note, Shore Front Parkway only ever went from Beach 73rd Street as far as Beach 108th Street, due to the National Park Service prohibiting roads and driving from Fire Island; the shortened Parkway assumed the title "Road to Nowhere" by the locals).[8]

A brief study of three houses along Shore Front Parkway showed that some homes remained that had been salvaged and essentially cut in half. For reasons not yet known, these houses managed to escape the call of eminent domain practices and survive as remnants of the city's past. Though not an artist, Moses has turned part of the cityscape into a canvas, making his own incisions so similar to Matta-Clarke. On the one hand, quite in opposition to the more passive responses to the land of Clément, on the other hand a counter reaction to the norm in the same vein. Moses is also preserving the city through a means of destruction. Thought the cuts removed space, they ultimately preserved the city and linked the outer boroughs. Furthermore, Moses wanted to give commuters a shared view of the beach, water and landscape.



Fig. 5: "Half-house" along Shore Front Parkway in Queens, New York (left). The resultant irregular site plans, in red, of houses cut by the Parkway (west to east: 122 Beach 93rd Street, 119 Beach 92nd street and 105 Beach 90th Street) (right).

5. Conclusion

Cuts, holes, voids, and general editing of structures, landscapes and cities can work in favor of conservation practices. In a way, conservation by un-doing or un-building is the ultimate sustainable preservation exercise. Matta-Clark, Clément and even Moses understood the idea behind constructing space by taking away. The means and craft by which the designers of this paper orchestrated their interventions, intersecting laws and conventions of practice broaden the narrow range of conservation and give the practice a severity and intent, aspects currently lacking in the contemporary discipline. By analyzing the inverse of spatial constructs, a new means of preservation will emerge.



Fig. 6: Robert Moses and Gordon Matta-Clark as both preservationists and vandals.

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Hidden cultural landscapes: survey and digital enhancement of the catacombs of San Giovanni in Syracuse

Elisa BONACINI,[1] Graziana D'AGOSTINO[2], Mariateresa GALIZIA,[2] Cettina SANTAGATI,[2] Mariarita SGARLATA[1]
(1) Department of Humanities, University of Catania, Catania, Italy
elisa.bonacini@unict.it; m.sgarlata@unict.it
(2) Department of Architecture, University of Catania, Catania, Italy
grazianadag@hotmail.it, mgalizia@dau.unict.it; cettina.santagati@dau.unict.it

Abstract
Roman underground cemeteries are an heritage to be safeguarded and enhanced. They constitute the memory of customs, traditions and rituals of a civilization. In Syracuse there are different catacombs complex (San Giovanni, Vigna Cassia and Santa Lucia). They are the most ancient document of Christianity in Sicily. Sometimes, plano-altimetric layout reuses existing hydraulic structures (aqueducts, private channels, cisterns) and earlier burial areas of the city.
The Aim of the research is the knowledge and the enhancement of the San Giovanni's catacomb complex through digital technologies for 3D data acquisition and virtual models that characterize and document its shape, size, geometry and materials. Moreover, digital enhancement project foresees the creation of a multimedia platform for archaeological complex guided tours and online ones.
That methodological approach required an interdisciplinary team composed by archaeologists, architects, engineers and experts in cultural communication.
Within digitization project our research team had to tackle wide-ranging issues and challenges: the sheer size of the complex, the intricate layout of the rooms and galleries, the surface irregularities, the bad lighting conditions, the significant amount of data to process and manage.
The scientific survey of the archaeological complex is the metric/spatial support that can be used to start innovative methods that allow you to create new scenarios for experimentation finalized to multi-disciplinary knowledge and enhancement of not easily accessible sites.

Keywords: Digital Heritage, Laser Scanning, 3D visualization, Catacombs, cultural landscape

1. Introduction
Cettina Santagati

Hypogeous Cultural Heritage represents an enormous and yet systematically and accurately un-explored heritage. The major part of European cities subsoil (for instance Rome, Naples, Prague, Nottingham, Paris) is rich of this kind of hidden cultural heritage. The knowledge and preservation of this heritage affects mainly urban archaeology research as well as the policies aimed at ensuring a safe and suitable use of our soils. The recurrent imprudent human actions and natural events make this heritage a very high risk and vulnerable patrimony. In case of collapse, it could constitute potentially a danger also for citizens' safety.
Furthermore, the difficulties related to the plano-altimetric complexity of the rooms (narrow and high galleries, irregular rooms) the lighting conditions (often poor) and the environmental conditions (ventilation, floodings, landslips, collapses) make these places difficult to access and document.
For all of these reasons this heritage remains largely not well-known, under-studied and poorly preserved.
The aim of this research is the knowledge and the enhancement of the catacomb of San Giovanni in Syracuse, according to a strategy that integrates latest technological developments in 3D data acquisition, analysis and communication of such archaeological landmark.

Effectively, digital technologies allow us to have 3D digital copies of the studied objects, a real clone, full of information where metric, perceptive and visual data can be integrated with interpretative data obtaining a 3D model whose potentialities can be exploited according to different declinations: from scientific documentation to archiving, to museum fruition and educational environment.
This methodological approach required an interdisciplinary team composed by archaeologists, architects, engineers and experts in cultural communication.
After giving an in-depth look into the issues related to 3D documentation and communication of Hypogeous Heritage in Section 2, Section 3 will give an overview of the historical and structural aspects of the Catacombs of San Giovanni. Section 4 will then focus on the digital enhancement and visitor experience. Section 5 will deal with actual surveying and 3D modelling methods used to create digital reproductions of some areas of the Catacombs. Section 6 will focus on texture mapping of the 3D model and Section 7 will examine the results of this study and consider future developments.

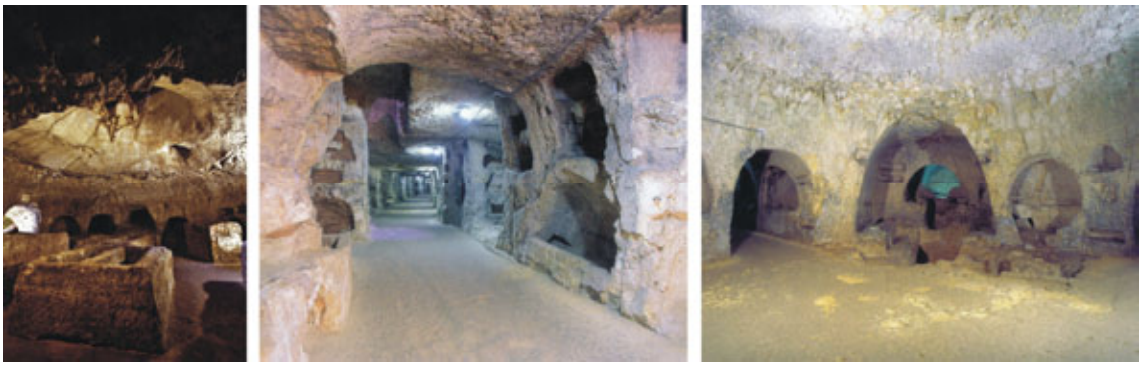

Fig. 1-3:. The rotunda of *Sarcophagi* (1), the *decumanus maximus* (2) and the rotunda of *Adelfia* (3).

2. 3D documentation and communication of hypogeous cultural heritage

Cettina Santagati

Hypogeous sites are negative spaces generated by subtraction of matter where each element is at the same time structure, form, function and it is solidly connected to the surroundings. It is very difficult to understand this heritage in its structure and articulation because underground the visual contact with all the surroundings and with the external context is lost.
3D methodologies provide a visual, metric and spatial description of the studied object and can be considered a powerful and successful tool for knowing, documenting and conveying such complex cultural heritage almost hidden to citizens' eye.
The advent of ICT has changed the traditional approach to knowledge, documentation and communication of Cultural Heritage, opening the doors to new research scenarios and as of yet not extensively explored synergies and leading to an increasingly high demand for standards and methodologies internationally shared (London Charter, Seville Charter).
At European level, the growing interest in this challenging domain is proved by different EU funded projects aimed at 3D digitization (EPOCH, 3D-COFORM), the creation of databases shared on the network (EUROPEANA, CARARE, 3D Icons, Ariadne), the identification of global shared standard (MINERVA), the creation of network of excellence on issues related to Virtual Museums (V-MUST.NET), the identification of best practices and the identification of open and interoperable formats that allow the reuse of 3D models.
Among the research developed in the field of underground heritage, we can highlight the START project concerning the Roman Catacomb of Saint Domitilla [1, 2]. The mainly aim of the research was 3D documentation of the archaeological complex along with its early-Christian funerary paintings by means of laser scanning. They have tested some solutions for the interactive visualization of the site and an out-of-core octree structure for the management and processing of the huge amount of data generated.
The Nottingham Caves Survey [3] is the first part of Caves of Nottingham Regeneration Project (CoNoRP) and is aimed at mapping, 3D documenting and visualizing of the labyrinthine complex of caves under the city of Nottingham. The project intends to encourage the city and its visitors to appreciate the caves for the unique historical resource they are. 3D acquisition is carried out by means of laser scanning, the point cloud can be cut and sliced into plans and sections, 'flown through' in short videos, and examined in detail either on the web or on desktop environment.
Among the projects aimed at the enhancement and communication of Hypogeous Heritage stands Etruscanning 3D [4]. Etruscan tomb Regolini Galassi in Cerveteri has been reconstructed on the base

of 3D laser scanning data. The funerary furniture that actually is exposed at Etruscan Gregorian Museum (Vaticans Museum) has been virtually rearranged inside the tomb. The innovative feature of this project is the interaction paradigm based on the use of natural interaction interfaces (MS Kinect).
Always related to the communication of cultural contents of Hypogeous heritage we can highlight Matera città Narrata [5]. This is a project aimed at the creation of a digital platform able to support the public before and during the visit of Matera (World Heritage since 1993), providing cultural contents by multiple communicative formats and access possibilities. The main components of the project are: the multimedia web site, adapted also for smartphone; cultural contents and applications for mobile devices.

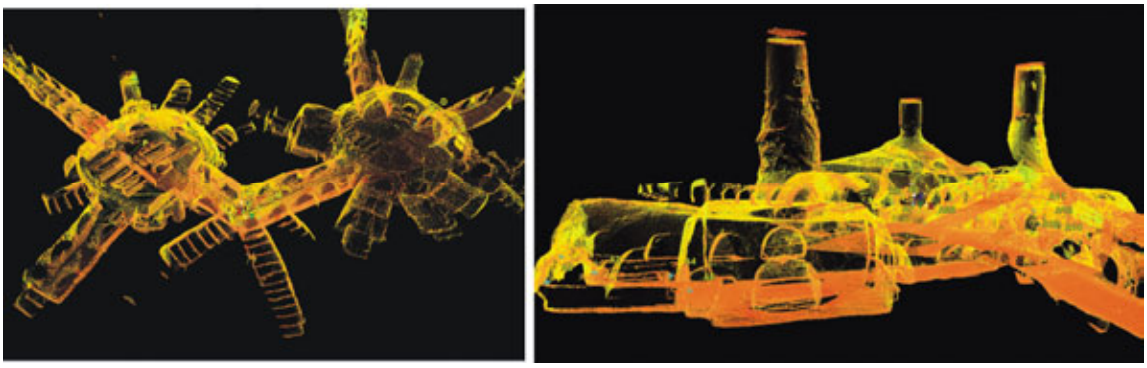

Fig. 5-**6:** The three-dimensional model of the cubicles of Eusebius and Paul in false RGB visualization.

As stated in the introduction, the aim of the study concerning the Catacombs of San Giovanni is to comprehensively document and communicate this heritage, according to a strategy that integrates latest technological developments in 3D data acquisition, archiving, analysis and communication.
Dealing with a so complex site some question arises and need to be answered:

- How to choose what is relevant for documenting this site? What is the level of accuracy needed? We can document for conservation studies, restoration, architectural analysis, history of art or archaeological research. Each of these fields has different goals and needs a different level of details. How can we integrate them and give an appropriate and scientific answer to all the disciplines involved? May we still use the same equipment that we use above the ground? Most probably the lighting conditions and the presence of narrow, high and irregular tunnels will require the development of new solutions and methodologies. Furthermore, once everything is documented, another question arises: how can we describe the process of documentation and make it transparent? It is necessary to test new ways of exploiting 3D models potentialities. Each kind of data acquired during the surveying phase should be normalized, catalogued and integrated into an articulated digital model.
- How can we organize a 3D repository which will include also legacy data, all bibliographic references and previous works? How can we link data and metadata directly on the 3D model? We need to develop an intelligent repository where all data are organized and linked to metadata and will be available in future.
- How to transform scientific data and convey it for public information/knowledge? How to simplify and optimize the 3D model in order to reuse it in different communication outputs (web, on line/desktop application, real time) and reach financial sustainability? The Virtual Reality (VR) becomes the best way to access, visualize and interact with this hidden cultural heritage. We should think in terms of Virtual Museums (VM). Which is the best way to communicate a hypogeous site? We need to investigate new creative scenarios that technology can open up; the outputs generated by the use of innovative advanced VR systems, hybridization and combination of media, artistic approaches [6, 7, 8]; think in terms of sustainability, durability and reusability of formats.

3. Historical and Structural aspects of the catacomb of San Giovanni in Syracuse

Mariarita Sgarlata

Suburban cemeteries, fanned out from the area of Fusco, in the quarter of Neapolis, to the Santa Lucia area, in the southern part of Acradina, this indicates unequivocally what the perimeter of the city must have already been in the early and mid-Roman Empire. The History of the area, which was going to hold the catacombs (San Giovanni, Vigna Cassia and Santa Lucia), spanned the centuries between the classical Greek and late antique ages, gradually giving evidence of quarries (Latomie), water supply systems to the city, characterized by cisterns and aqueducts [9: 682], handcraft workshops from the beginning of the $4^{th}/3^{rd}$ century BCE and burials datable to the early and mid-Roman Empire.

The quarter of Acradina therefore had a different designation and held in part a proper Ceramic with workshops. It is no accident that if hydraulic systems and furnaces have been found inside the three biggest catacombs. The funerary evidences prior to the creation of monumental community cemeteries – and among these San Giovanni holds a very special position – are columbaria, hypogea of different sizes inserted into the catacombs or isolated from them and *sub divo* burials, all datable to the first three centuries of the Roman Empire, if not beyond, and commissioned by pagans.
Several interest will be given to structural aspect of the catacomb of S. Giovanni, practice of funeral rituals, ethnic and cultural fruition's characters, transformation in the use, transformation in the way of using spaces for graves, to complete a general point of view about the phenomena of continuity and innovation as to previous sepulchral arrangements and, in the analyzed periods, the facies belonging to the different settling, variegated in the committees' ideological and religious themes, in choosing monumental types (like rotundas) and decorations, in self-representative aspects, in burial uses. In this perspective we will give particular importance to the study of executing techniques, of material employed, of working funerary organization. Just as in Roman catacombs, but with a bigger monumentality, the project of the catacomb of S. Giovanni involves realizing a regular urban plan for the subterranean city of the dead. In the catacombs, indeed, the exploitation of pre-existent hydraulic structures is not unusual: aqueducts, private channels, circular section well and conical or bell-shaped cisterns [10,11].
The same happens in the catacomb of San Giovanni, with the diversity due to a well-defined project; in several cases the *fossores* (gravediggers) were forced to demolish or amputate the cisterns that, because of their position, influenced the construction of the regular structure according to the project. It is feasible to see numerous cases of hydraulic installations reuse, which facilitated the realization of galleries, *lucernaria* (skylights) and private chambers (rotundas of *Marina, Adelfia* and *Sarcophagi*).
It only remains to make a choice between two possible explanations: 1) it is a case of a *pantheon* constructed *ex novo* on the pattern of the mausolea above ground, as the rotunda of Antiochia in the northern region, to suit both the local and passing members of the élite, without any influence imposed by preexistent hydraulic structures [12: 764]; 2) the rotundas reuse hydraulic preexistences and adapt them to a private vision of the space. In this case the presence of previous structures (cisterns of large dimensions), probably increased even further and whose undeniable traces remain (openings for drawing water and inspection pit with platforms) and have been the input for creating subterranean *mausolea* [13: 81-83].



Fig. 4. The ground plane of the catacombs where the areas of interest are highlighted.

The alignment of the three rotundas would be, in this sense, related to their original utilization from above (for the system of the lined cisterns in Syracuse see [9: fig 3], more than the alignment of the roads and neighboring hypogea [12: 763]. The former explanation for the genesis of this sector does not convince, mostly because of the idea of an adjustment of the alignment of the three rotundas with a nearby road, 350 m away from the catacomb, identifiable with a late mending of the supposed *via lata perpetua*, which served the theater area. A comparison with the alignment of neighboring hypogea, accessible through their own direct staircases and, as such, in necessary relation to the road network, is not proposable for the *mausolea* of the catacomb, since they are not in immediate relation with the above ground. The same central thread seems to link the three rotundas – of *Marina, Adelfia*

and *Sarcophagi* – to the solution adopted in the catacomb called “Grotta di Fragapane” in Agrigento [14: 205,215, fig 7], where preexistent granaries develop into circular chambers.
The analysis of the funerary system certifies one hand the dependence on the Roman model, and other the debt in respect of local traditions.

4. Digital enhancement and management of the Catacombs of San Giovanni

Elisa Bonacini

Cultural tourism has become faster and demands quality in culture; museum’s audience wants more information during the visit especially with reference to the context [15: 132].
Many new technologies are available, or are currently being developed in the field of cultural management. Thanks to these ongoing technological changes, museum visitors and tourists are given more freedom to move past the limits of architecture and traditional tour guides. In today’s world of wireless personal devices, visitors can become mobile or even wireless visitors, who can access high-quality multimedia contents from anywhere. This evolution is based on new buzzwords such as connectedness, freedom, mobility, accessibility, walking tour [16: 67-222].
Use of ICT in fields of cultural management and tourism fosters the development of better cultural and touristic policies and strategies, which in turn create new value, in terms of creation of cultural value (providing new cultural experiences for consumers, whose expectations regarding consumer culture are clearly on the rise) and economic value (direct effect on cultural institution and indirect effect on the local community) [17; 18:112-114]. Therefore, cultural institutions must embrace a new philosophy of cultural tourism, which will use technology to allow visitors to engage freely with their surroundings and see past the surface and the visual space using tools, as multimedia guides, that allow contents that are not easily accessible in real life, or not visible otherwise, to be “accessible digitally” and to tell them “stories” that lie beneath great works of art and historical landmarks, enhancing the emotional side of an already highly evocative cultural journey. Fostering the use of digital technology in CH management is also crucial to bringing local museums and cultural sites up to the standards of national and international institutions.

Answering these issues, Catacombs' digital enhancement and management project will see the integrated use of three systems: online and on-site communication systems and monitoring attendance, feedback and interest systems.
The museum's website will promote the Catacombs that are currently open to the public (through the creation of an *Itinerary of the Catacombs*) and offer “virtual access” to the areas that cannot be visited. It will also give visibility to other local cultural landmarks by introducing combined offers and touristic routes. The website will be available in various languages and featuring extensive descriptions and a comprehensive collection of multimedia resources (photo galleries, videos, 360° visits, 3D reproductions). The aim is to attract young visitors and schools to the museum by creating interactive games related to the Catacombs and building an online community through various forms of interaction and content-sharing.
To enhance the visitor experience on-site the museum will use innovative communication methods:
- multi-touch [19] multimedia tables featuring multiplayer interactive games that will make the visit more entertaining and fun, especially for young visitors and school excursions [16: 169-178];
- holographic projection [16: 161-169;19] of a 3D virtual reproduction *in situ* of Adelfia's sarcophagus (the original is currently on display at the Paolo Orsi Museum) at the centre of the eponymous Rotunda; Adelfia herself tells her story, according to the most recent emotionally approaches in digital storytelling [19: 106-110; 20: 27-47];
- *WiFiGuide*© [21] providing multilingual information and multimedia contents about different key items spread across the Catacombs and the Crypt, using a specific App that drives you through Point of Interest (PoI); the information will be accessible on the visitor's own mobile device or on rented devices (iPod Touch) via an underground WiFi network.
Two different platforms will be used to collect real-time statistical data that will help to define appropriate strategies: *eFlowAccess*© to monitor visitors' access at the entrance and *eFlowFeedback*© to monitor their feedback at the exit [22]. Both applications use highly customizable templates to generate multilingual feedback forms and multiple-choice questionnaires.

Particularly, these two platforms will be integrated on the same server of multimedia guide in order to monitoring internal usage data to give direct insights into quantitative and qualitative secondary data. The data thus obtained are processed to get statistics and reports (graphs, bar charts, pie charts) for each individual item. The guide allows users to send direct feedback, but it also provides valuable information about visitors' experience, both quantitatively (number of visitors, language, visitor flow by date and hour) and in terms of quality. The guide can also show the degree of interest towards different exhibits, but it also provides *performance indicators* such as the *attraction rate* (how many visitors were “attracted” to a specific exhibit) or the *sweep rate* (how much time they spent in front of

each item). With all this information at hand, the museum has a powerful tool to monitor visitors' behaviour based on primary quantitative and qualitative data.
Focusing its cultural product strategy on this guide as visit support, Catacombs of San Giovanni could provide *added cultural and economic values* and could greatly differentiate its quality of cultural supply compared to other local cultural and touristic institutions. This *qualitative differentiation* could contribute, on the one hand, to improve Catacombs' attractiveness both for tourists and for Syracuse's citizens; on the other hand, it could improve new economic conditions and management strategies [23:103-144]. Monitoring data (both quantitative and qualitative) via access and feedback platforms, as well as multimedia guide, the Catacombs will have a powerful tool to monitor visitors'behaviour based on primary quantitative and qualitative data. This should be considered the first step in building a coherent Marketing Information System (MIS), which is essential to the implementation of new strategies and cultural policies and to the segmentation of the consumer base into specific target groups in order to identify those who may require different types of services (*customer care*) and to increase overall *customer satisfaction*.
This system is in line with the latest standards in terms of integration of tourism development and cultural heritage management, which are easier to implement in areas that are not very extended [15: 136].

5. From data acquisition to geometric interpretation of the complexity of the site

Mariateresa Galizia

The considerable historical stratification of the catacomb of San Giovanni [24,25] as well as the high plano-altimetric and geometric-spatial complexity required a three-dimensional methodological approach for the survey, the representation, and the 3D visualisation. Indeed, considering the execution time and the precision and amount of data obtained, laser scanning was the best way to obtain a 3D model that reveals different historical spaces through virtual reality images [26,27,28,29, 30].
The archaeological site features an intricate network of communicating galleries and large rooms where there are innumerable burial niches and arcosolia cut perpendicularly into the rock walls and laid out side by side.



Fig. 7-8: In situ survey

During the first stage of the project, we surveyed two rotundas (Adelfia and Sarcofagi), and two quadrangular cubicles (Eusebio and Paolo) and analysed all metric data obtained, to find empirical evidence showing that pre-existing hydraulic structure such as water tanks, aqueducts or private canals had been re-used.
We used the Leica HDS 3000 ToF Laser Scanner, whose technical specifications are as follows: accuracy of single measurement position 6 mm, distance 4 mm; scan rate up to 4,000 points/sec; field of view 300°x270°.
The data acquisition project took into account:

- the complex grid system that is composed of a variety of galleries and large rooms connected together;
- the characteristics of the environments that contain multiple niches and arcosolia cut perpendicularly into the rock walls and laid out side by side.

The surveying protocol involved 6 scans: 4 for each space to be surveyed (in barycentric position, aligned with the skylights) and 2 "transition" scans. These last two were captured from the galleries so as to survey the numerous *arcosolia* in as much detail as possible, while also reducing the black areas inherent to the irregular morphology of the site's layout.

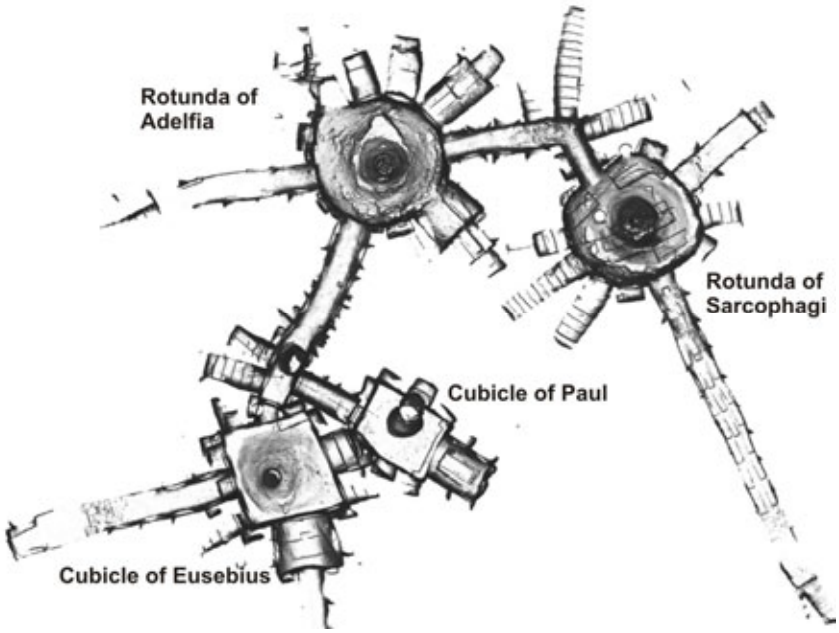

Fig. 9. Top view of the point cloud

To ensure proper alignment of the different scans in a common reference system, 29 reflecting targets were scattered across the walls' surface and they were automatically detected and registered by the scanner (minimum of 4 targeted control points for each point cloud). Once all field survey data had been recorded, point clouds were post-processed using specific software, such as Leica's Cyclone, Gexcel's JRC Reconstructor or CloudWorx. Optimising the calculation parameters (sub-sampling percentage, maximum number of iterations), the average initial maximum error of the alignment of about 10mm was reduced to 4mm. The comprehensive model thus obtained consists in 6 scans and a total of 46,940,251 points. Thorough graphic investigation of the point clouds was needed in order to document the geometry of the archaeological complex in plans and elevations without overlooking the site's spatiality and the complexities of its different areas. To draw the site plan we used two horizontal planes taken at different levels of the archaeological site, so as to be able to document its most outstanding features as accurately as possible.



Fig. 10: The vertical section of the rotunda of Adelfia extracted from the mesh model (MG & CS)

Moreover, we also carefully selected several offset vertical cross-sections, each of them showing specific views of the complex: axis between the entrances to the galleries, in the skylights' axis, in the centre of the rotundas and the quadrangular cubicles.
We also obtained section planes of the surface of the ceiling's intrados, as well as the amplitude and depth of the skylights. The arching of the intrados that covers the rotunda has the shape of a somewhat irregular, wrinkled inverted cone. This confirms the previous use of these spaces as water tanks, as can be noticed in comparison with other roman water tanks [31].

6. Problematics related to texture mapping

Graziana D'Agostino

The 3D digital "calque" of the investigated catacombs, thus obtained, provides the basis from which starting different research paths. One of the goal of this study is to give back the "visual appearance" of such complex heritage by means of realistic texture mapping [32,33] in addition to the quantitative and geometric aspects (shape, dimensions, proportions).

In this paragraph the problematic related to the 3D photographic reconstruction are highlighted. In this first phase of the study the cubicle of Eusebius was chosen. It consists of a small rectangular cistern that temporarily hosted the relics of Pope Eusebius before they were transferred into the catacombs of Callixtus in Rome.

The pipeline forecasts the passage from the numerical model (point cloud) to the polygonal one (mesh), the calibration of the images on the cloud point and the texture mapping on the point cloud.

The texture mapping phase was made using the software Cyclone by Leica Geosystem, instead the passage from the numerical model to the polygon model was made using the software JRC 3D Reconstructor by Gexcel.

Spatial information (x, y, z) relating to a single point is generally enhanced with the color component which is acquired according to three methods: a sensor inside the instrument; an external camera axial to the instrumentation; an external camera (for high-resolution acquisitions). Since the digital sensor inside the used instrument has a low resolution (equal to 1 megapixel), and the resulting effect doesn't fully reflects the real colorimetry of surface, then we proceed by applying to the point cloud high resolution pictures taken by the operator. The photographic acquisition project took into consideration the small size and the poor lighting conditions of the cubicle.

After several attempts to identify the optimal acquisition conditions (with or without the spotlight, with or without a flash, with or without a wide angle, mediating exposure and ISO sensibility), it was used a tripod and remote control distance acquisition, operating in a semiautomatic way and using a focal distance equal to 14mm, an ISO sensitivity of 800 and depth of field equal to f/18 by varying the exposure time between one acquisition and the other. Specifically, we used a Canon EOS-1Ds Mark III digital camera with 14mm objectives and a maximum resolution of 21 Mpixel. Barrel distortion of photographic images has been corrected by the software PTlens. The application process of the images is done through the manual selection of homologous points between the cloud and the image (at least 11). Particular attention has been paid to overlap two consecutive different textures, making them fit perfectly. The average deviation of re-projection was equal to 1.6 pixels (fig. 11).

Then the meshing phase was undertaken. Two different types of mesh were created. The first one was a tight mesh, in order not to lose important surface information, useful for two-dimensional representations, as orthophotos, the other one was a simplified mesh in order to obtain a lower amount of polygons for a better management and visualisation of the files in interactive virtual environment, also even on the Web (fig. 12).

Depth studies conducted highlight how the restitution of superficial and volumetric characters is particularly accurate and less subject to the operator interpretation, by using current 3D acquisition methodologies, especially in post-processing phase. The use of innovative technologies for 3D survey and representations as well as three-dimensional and colorimetric real data, is going to redefine the concept of representation and to test and to find out the extension of their use in the archaeological domain, as surplus of knowledge and information.

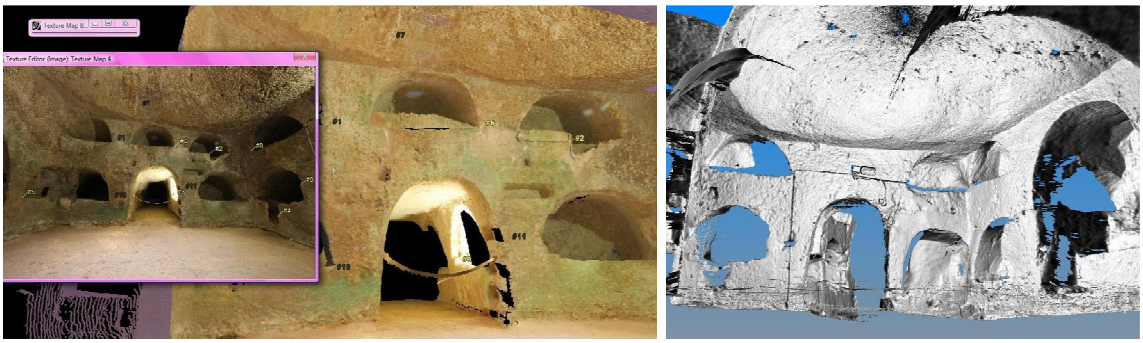

Fig. 11-12: Texture mapping(left) and mesh model (right) of the cubicle of Eusebio

7. Conclusions

Through this study, the hidden cultural landscape of the catacombs of San Giovanni is coming to light. Both the material and immaterial features (memory of customs, traditions and rituals of a civilization) have been analyzed and will be structured in a 3D information system [34] and disseminated.
To this day only a small portion has been surveyed and analysed. To complete the project large amounts of data will have to be acquired, modelled and processed, using specific procedures and advanced data processing technologies.
The challenge of this research is to develop a new methodology in the study of Hypogeous Cultural Heritage. Thus it is necessary to review the entire pipeline from data acquisition to communication: an efficient communication is based on data and information scientifically acquired and converted into engaging formats and languages.

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Integrated Approach to Museology: Proposal for a Route Linking Archaeological Sites in Çanakkale, Turkey

Prof. Harun BATIRBAYGIL[1], Dr. Susana ALVES[2], Dr. Bahar BASER[3], Dr. Ayşe Özbil TORUN[4]
Department of Architecture, Okan Üniversitesi; Faculty of Engineering & Architecture; Tuzla Kampüsü; 34959; İstanbul- Turkey
(1) harun.batirbaygil@okan.edu.tr
(2) susana.alves.@okan.edu.tr
(4) ayse.ozbil@okan.edu.tr
(3) Department of Urban Design and Landscape Architecture
bahar.baser@okan.edu.tr

Abstract
Museums represent institutions connected to local communities and their cultural life. Museums are not confined to a building and its collections, but may be located in 'open-air'
spaces, allowing a tangible relationship between people and the surrounding landscape to be studied. Based on this ecological understanding, we would like to apply Gambardela's idea of an "Mediterranean Museum System of Design and Applied Arts" to the Turkish context. The idea is for an integrated museum system to link different archaeological and handcraft sites
along D550 road from Çanakkale to Assos. Archaeological and handcraft sites are chosen due to their heritage significance and impact on tourism in Turkey. The route from Çanakkale to Assos has been less explored in terms of tourism and poses an opportunity to work with the local government to devise sustainable interventions. An inventory of the cultural landscape as well as strategies for landscape branding will be used to promote a sustainable intervention and to serve as a catalyst for the cultural and economic transformation of that region. The paper emphasizes an action-oriented approach to museology and concludes by asserting the role of architecture and landscape design in shaping cultural heritage and tourism in a sustainable way.

Key words: open-air museum; museology; landscape branding; archeological sites; architecture

1. Introduction
There is the need to structure and define museums in a new way. Open-air museums have been developed in opposition to the view of a museum as a collection-oriented work. In open-air museums, the means of representation should be accessible to people and connected to the local community. This bottom-up, community-based approach aims to protect valuable cultural and historical artefacts and promote local communities integration within their cultural landscape. A multidisciplinary approach of museology aims to acknowledge museums as a resource for the sustainable development of the environment. Both tangible and intangible aspects of person-environment relations need to be considered.
As a cultural place, the role of an archaeological open-air museum is to exhibit the heritage and cultural artefacts of a region by involving the local community. Cultural tourism has led to the discussion about the relationship between heritage attraction, tourism interests, and the local community. The purpose of this article is to discuss this relationship in the Turkish context and make a proposal for an open-air museum in the Çanakkale region. We propose an action-oriented approach to museology. It is inspired by post-processual studies (Hodder, 1985; 1982) which conceptualizes museum artefacts and the institutions that house them in critical terms--by asking how material objects are appropriated by different stakeholders in societies past and present. This critique to the role of

museum can be linked with current views of participatory planning and sustainable tourism development.
Turkey has 11 sites as part of the UNESCO World heritage and 37 nominated sites in UNESCO's tentative list (Turkish Cultural Foundation, 2013). According Hall and McArthur (1998) heritage management refers to the process by which heritage managers try to understand the relationships implicated in heritage practice in a way to accommodate the interests of many of the key stakeholders. The management of archaeological sites is thus shared by various stakeholders with different tasks and cultural backgrounds. While heritage sites have a cultural tourism purpose, they are also closely linked to a local community and to its perception and practices.
In relation to the present project--the process of "opening up a museum" needs--needs to be seen as a process of integrating artefacts with the local environment with the involvement of different stakeholders in Çanakkale. Open air museums may be a primary venue for archaeological research but can as well be integrated with nearby archaeological sites and handcraft sites to promote the economy of Çanakkale region. Turkey's most well know open air museums comprise of the Göreme Open Air Museum in Cappadocia (UNESCO World Heritage List since 1984) with its rock-cut churches and their frescos, and the Zelve Open-Air Museum, which is cave town, with religious dwellings, religious and secular chambers.
In this paper, we propose a museum intervention on the Çanakkale region in Turkey grounded on preservation, protection, and access of living communities in controlling, framing, and interpreting their own pasts. First, we describe tourism development in Çanakkale and next describe a proposal for a route linking archaeological sites in Çanakkale

2. Tourism development in Çanakkale

What are the natural-cultural resources in Çanakkale? Çanakkale has a unique potential for nature-based tourism (Yıldırım, Ak, & Olmez, 2008). The use of an environmentally integrated tourism development in the Çanakkale region will need the involvement of different stakeholders. We have been working with the mayor of Çanakkale on this proposal for an open air museum connecting different sites in that region.

3. Proposal for a route linking archaeological sites in Çanakkale

Çanakkale (Fig. 1) is settled at the North-West of Turkey, at the two sides of the Çanakkale Bosporus that separates the Europe and Asia continents. Its antique name was Hellespont and Dardanelles. The initial idea was originated from a proposal made by Gambardella (2012) for a Mediterranean Museum System of Design and Applied Arts.
Çanakkale has many archaeological preservation areas and monuments dating from 4,000 B.C. These archaeological sites are connected by a route and need to be promoted in an integrated way. Our proposal is done in conjunction with the local municipality. The initial steps will be to work with architecture students through the Erasmus programme. We have planned a Summer school to develop the initial ideas for this proposal. In September 2013, architecture students together with faculty members will drive through the route and evaluate Çanakkale's different sites. They will meet with local authorities, residents, and local handcrafters to devise a sustainable tourism approach to Çanakkale.
Some of the tasks for the Summer school involve an inventory of the cultural landscape; discussion with local community; discussion and meetings with local craftsmen; and meetings and supervision with researchers in architecture, landscape architecture and environmental psychologists to further develop the proposal. The relationship between Çanakkale's cultural heritage, the local community and cultural tourism needs to be further explored. The tourism and heritage preservation should be focused both on archaeological artefacts and on the general cultural landscape and the type of life it provides to local residents.

3.1. Towards the objective: Preliminary steps for an archaeological route in Çanakkale

In this preliminary stage, the proposal comprises of four main phases which are described below. We propose to develop an open air museum to link six main sites (Ozdem, 2012; Akurgal, 1970/2011).

3.1.1. Inventory of the cultural landscape

The World Heritage Committee acknowledged that cultural landscapes represent the "combined works of nature and of man". They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces (WHC, 2013). Based on this recognition, the inventory phase must include all physical and cultural components which shaped the total landscapes in the region. The purpose is to undertake a comprehensive evaluation of the region

and map ruins of cultural and historical significance need to be conserved and restored to allow its proper use.

3.1.2. Field research and environmental mapping

Field research will be undertaken to assess the natural-cultural resources of Çanakkale and to evaluate different archaeological sites.

3.1.3. Focus groups and local meetings

In order to understand how tourism can be linked to local handcraft activities, we plan focus group meeting to be undertaken. The long-term goal is to promote the economy of the region. For example, traditional handcrafts of the region (pottery, muslin embroidery, carpet weaving) can be introduced to tourists in small workshops by local craftsmen. Also, interim meetings with faculty members at Okan University and other institutions in Turkey and local authorities will take place to discuss how the 'Çanakkale route' can be promoted through tourism.

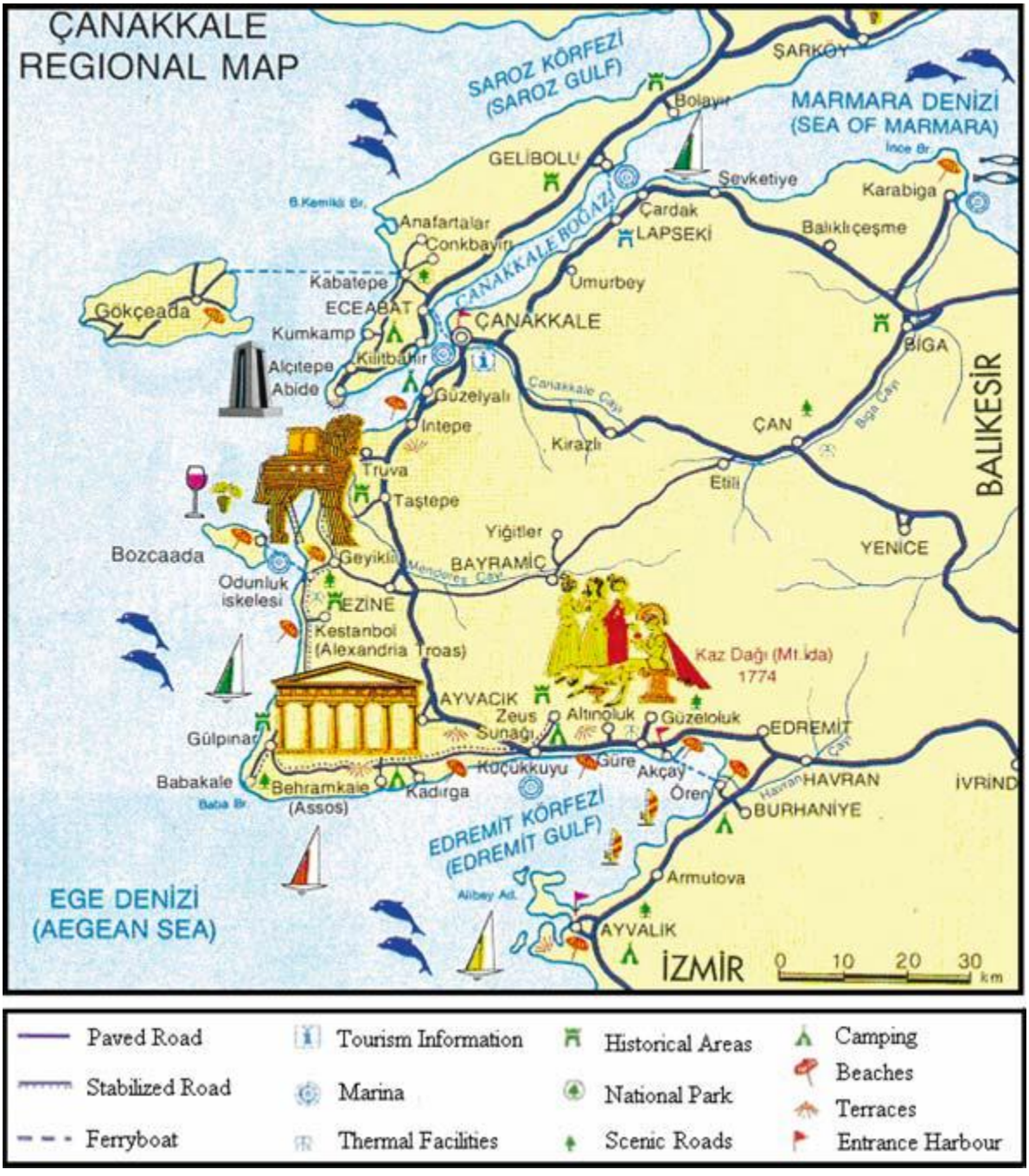

Fig. 1 The natural and cultural resource map of the areas that have a nature-based tourism potential in the Çanakkale City (cf. Yıldırım et al., 2008).

3.1.4. Landscape and city branding

In order to promote sustainable tourism in the Çanakkale region, it is necessary to create an image of Çanakkale as a centre of cultural heritage value to be used in local and international markets. The Tourism Strategy of Turkey 2023 (Turkish Ministry of Culture, 2007) proposes a collective approach to marketing touristic regions in Turkey by combining cultural and natural resources to support local communities..

Figures 1-10. Selected sites with natural-cultural resources in Çanakkale

1. Çanakkale



According to the Turkish Ministry of Culture and Tourism, Çanakkale province boasts 175 archeological sites, 34 natural sites and five historic sites of outstanding value

2. Dardanos



Hellenistic tombs of the Troad, the Dardanos Tumulus. Findings date back to Archaic periods between 7th and 6th centuries BC and to the Roman period around 11 A.D.

3. Alexandria Troas (Dalyan Village)



According to Strabo, this site was first called Sigeia. A Roman colony was created at the location in the reign of Augustus, named Colonia Alexandria Augusta Troas.

The site sprawls over an estimated 400 hectares (1,000 acres); among the structures remaining today are a ruined bath, an odeon, a theatre, a gymnasium complex and a stadium. Also, the circuit of the old walls can still be traced.

Alexandria Troas is an important site for the history of Christianity. It has been mentioned in the Bible -in the 1st century AD with reference to Saint Paul and his missionary journey in Troas.

4. Troy



Human occupation on the site of Troy (Ilion) began in the Early Bronze Age (late 4th millennium BC). Troy II and Troy VI in particular are characteristic examples of the ancient city, with a fortified citadel enclosing palaces and administrative buildings, surrounded by an extensive lower town. Hellenistic tumuli were erected over the supposed burial places of these heroes, such as Achilles, Ajax, Hector, and Patroclus.

5. Neandria



The ruins of the ancient city of Neandria are on Cıgrı mountain that is located in southwest of Ezine.

City's acropolis; walls of the city; Sanctuary of Zeus; necropolis; pithoses and monument-graves

6. Assos



Assos has an important historical asset with the 3 km long rampart surrounding the city and with the Athens Temple constructed at the highest point of the Akropol in the Dor style (530 B.C.). A historical theatre, agora, gymnasium, necropolis and the ruins of an ancient harbor are also the important structures of the region.

4. Conclusion

As Tucker & Emge (2010) have argued, the local community has played a minor role the tourism and heritage management processes in Turkey. It is necessary to clarify for the local community in Çanakkale how they can participate and benefit from the cultural tourism and heritage preservation in their area. In order to promote tourism and preserve the local environment in Çanakkale, this proposal for a route linking archaeological sites should be developed considering the sustainable use of natural and cultural resources.

An evaluation of the area's carrying capacity - to evaluate the ecologic and natural structure of the area - together with branding approaches which take local people interests in account should be developed in view of a sustainable planning and management agenda. Within this 'eco-cultural tourism' practice (Wallace & Russell, 2004), participatory planning may be promoted by involving local people in the planning, development and maintenance of archaeological sites.

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Comparison of 3D documentation methods in sculptural figures with poor radiometric information: Shape from Stereo vs. Shape from Silhouette

Antonio ÁLVARO TORDESILLAS[1], Jorge GARCÍA FERNÁNDEZ[1], Salvatore BARBA[2]

(1) University of Valladolid, Spain.
(2) University of Salerno, Italy.
tordesillas@arq.uva.es, jorge.garcia.fernandez@uva.es, sbarba@unisa.it

Abstract
The present research project is focused on the systematization of a surveying and 3d documentation of sculptural heritage by using low-cost techniques, at the Universities of Valladolid and Salerno.
Even with the eminent development of digital documentation techniques, persist difficulties in the virtualization of objects with poor radiometric information (for image-based information capture) or certain properties of materials and their textures (for range-based information capture). The present study compares in a practical manner the use, scope and result of two methods that extract and manage images in a substantially different way : [A] Based on the correspondence of stereo pairs of pixels and its neighborhood –Shape from Stereo– [B] Based on the extraction of silhouettes by interpretation of the figure –Shape from Silhouette–.
The proposed case study collects some chalk sculptures of Jorge Oteiza, chosen for their special features for this purpose, ie parts of a uniform color textures, especially white, reflective or shiny.

Keywords: Photogrammetry, Documentation, Method, Heritage, Sculpture.

1. Introduction
The evolution of the digital documentation techniques on Cultural Heritage has found, since the 19th century, the photogrammetry as one of his best allies. The transition from analogue classic photogrammetry to digital, with the arrival of laser technology (Laser Scanner 3D) has allowed to develop a theoretical-practical framework guarantor of the digital reproduction of three-dimensional models with high levels of accuracy and reliability.
Even with the eminent development of these techniques, difficulties remain in the virtualization of objects with poor radiometric information (for capturing image-based information) or certain properties of materials and textures (for range-based information capturing). This is the case of much of the Jorge Oteiza works, particularly in the chalk sculpture's collection of the Museo-Fundación Jorge Oteiza [Fig. 1]. It is necessary to have methods and mathematical algorithms, occasionally forgotten, that postpone, for three-dimensional reconstruction of the object, its geometrical characteristics to the radiometric interpretation.
In these last two years we have been working in the Department of Graphic Expression of the School of Architecture of Valladolid (Spain) in the graphic surveying through the simple digital photography of some of these sculptural pieces, with different size and shape [1].
The pieces are a set of small sculptures of Jorge Oteiza who performed in white chalk or welding sheet metal then painted black. This is a collection of pieces that never had a graphic definition prior to its execution, so it lacks of accurate graphical information that would allow their restitution to the research and documentation; even for any damage to the pieces, on particularly to the fragility of the chalk. Its graphic documentation, through virtual models, would become an insurance against any adversity, thus gaining more interest. It seems inevitable that this precaution end up taken in all those works of art of recognized value [2].

This work is part of a Research Project we are doing at the University of Valladolid on low cost surveying techniques, financed by the Ministerio de Economía y Competitividad of Spain [3].



Fig. 1: Collection of chalk figures by Jorge Oteiza [Museo-Fundación Jorge Oteiza in Pamplona, Spain].

2. Work structure

The present study, starts from the theoretical analysis of two-dimensional survey methods which extract information from images (Image Based Information): Shape from Silhouette, based on the interpretation of geometrical characteristics of the scene and, Shape from Stereo, based on radiometric interpretation and pixels correlations in RGB images.

The process of 3D models generation by both methods involve an analysis in homogenization of shooting conditions and the implementation of templates coded- targets to strengthen the process and the relative and external orientation in each of the applications tested.

The comparison, focused in metric differences of generated meshes, will have as reliable reference geometric, data obtained from a laser scanner (Range Based Information) permitting an assessment of deformations with accuracies in the order of millimeter fractions.

The proposed analysis allow the selection of more accurate and efficient tool to generate models for objects and / or scenarios with similar geometric and radiometric characteristics. Also open new lines of research to further the advantages and disadvantages encountered in the study [Fig 2].

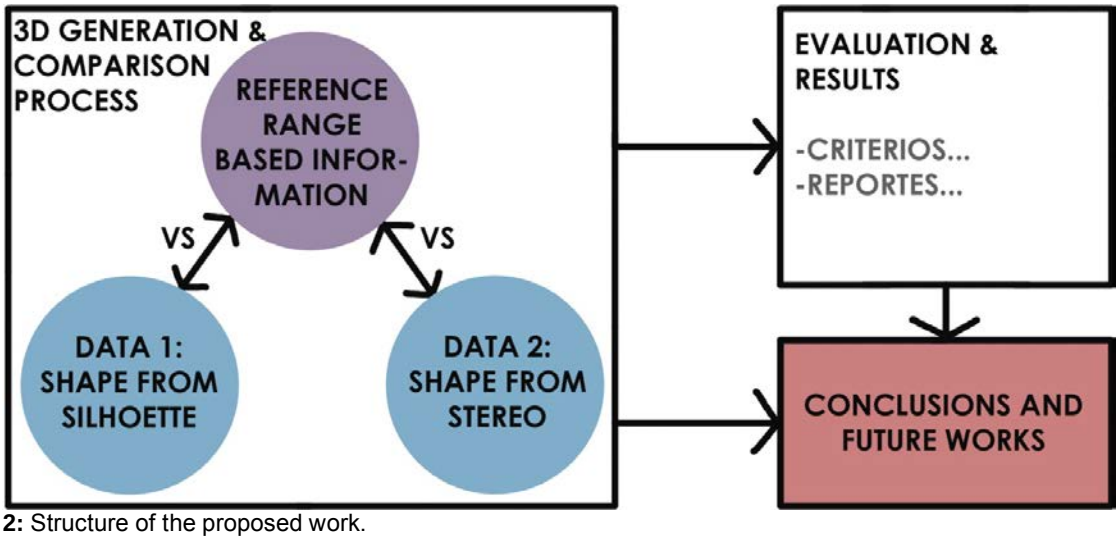

Fig. 2: Structure of the proposed work.

3. Capture from the geometric properties: Shape from Silhouette Method

One of the major difficulties for 3D reconstruction of Cultural Heritage often is the poverty information on images to reconstruct the scene. This occurs because, at present, the implemented algorithms in the most common reconstruction applications are based on the massive correspondence of pixels or set of pixels from a theoretically stereoscopic positioning. Shape from Silhouette method, however, based the reconstruction process on 3D shapes detection from different viewpoints, computing the intersections of the visually pyramids formed by the silhouettes (as generatrix) and the beam director

(irregular pyramid axis) from a well know viewpoint [4]. That's why is obtained the surface and the volume contained within the intersection of both visual pyramids (Visual Hull) [Fig 3]. The idea of using silhouettes for this purpose was first introduced in 1974 by Baumgart and formalized by Laurenti [5].

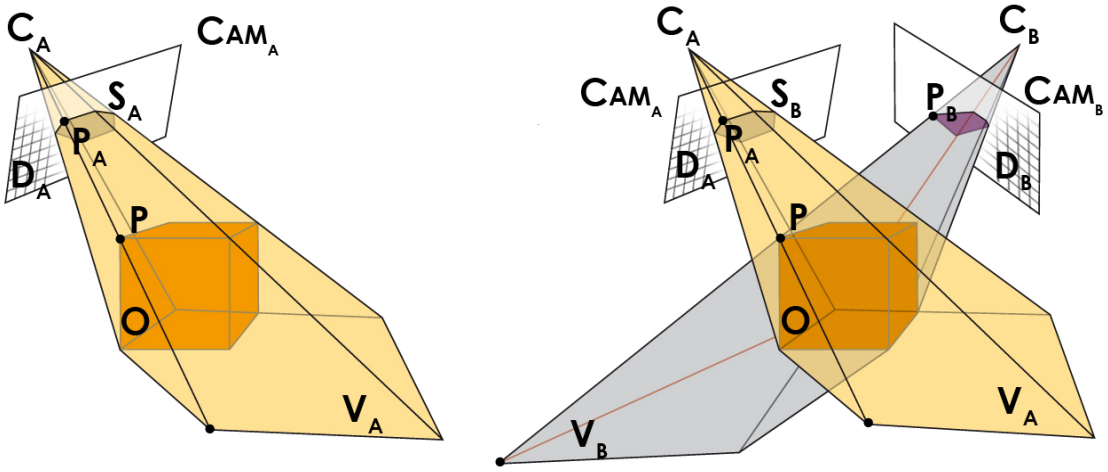

Fig. 3: [left] Visual Cone from a single point of view, [right] intersection of multiple cones on a three dimensional object.

Determining the Visual Hull, can follow two paths, from the characterization of its volume or its surface:

- Approach based on voxels: Space segmentation occurs into a large number of cubes (volumetric elements), called voxels and the shape is represented on a number of these three-dimensional measurement units. Therefore, the *Visual Hull* resolution is defined by the size of the voxels and the discrimination ability of full and empty voxels [6].
- Approach from surfaces: The second path is defined by the surface analysis, begin with the specific geometry analysis of the visual pyramids, and comprises the intersection calculus of polygons, defined by the spatial silhouettes projection through projection centers of the associated cameras, by various procedures that prioritize calculation speed (real time processing) or the quality of geometric result [7].

The limitations of the method are determined by the incapability to data capture beyond the pyramids intersections, and the inability to capture information in regions in "shadow" (occluded) from the capture points; characteristic in geometry with concave or acute angles, or in scenes structures where visibility is impracticable for a sufficient number of cameras.

Instead Shape from Silhouette provides:

- Approximations of 3D reconstructions which function as initiations or additional restrictions in complex models based on multi-view stereo [8].
- Processing with low computational cost, facilitating its implementation in Artificial Vision applications such as tracking, human motion analysis and 3D navigation [9].
- Alternative solutions when exist constraints in the number and positioning of the cameras, unlike other methods which require a redundancy in the three-dimensional approximation [4].
- Solutions front dysfunctions of Matching Methods in poor textured surfaces: These methods implement algorithms that base their operation on pixels recognition and matching (in two or more photographs), for it is not only necessary to find the homologue pixel, but also a neighborhood (more or less reduced depending on the mask used) to characterize the point in an uniquely and unambiguously way.
- Solutions to the laser scanner dysfunctions, finding especial application in cases where the laser scanner has an inefficient response to surfaces because the singular surface properties cause a poor response of the beam (the low power of the received beam introduces a large error in the estimated 3D point and sometimes does not interpret the return beam).

The software we use for this procedure is the application CX2 Strata 3D Photo v2.1. Although this is not an open source program, the ease of use through an intuitive interface, the ability to incorporate external orientation, as well as the wide variety of export formats for incorporation into assessment strategies, have proposed the application as a valid tool for the present study.

4. Capture from radiometric properties: Shape from Stereo method

The method Shape from Stereo based the acquisition process and 3D reconstruction in the encounter and detection of homologous points between stereo images. The location of these in a three-dimensional model is achieved by measurements made in two or more pictures. Once a point is

identified in each image, a line is drawn from the camera location to the point on the object. Is the intersection of these rays which determines its space position.
The algorithms are built on this principle require other complementary for the detection of coincident points, for which include calculations based on computer vision comparing different areas of each image in search of such correspondence. These are known as automatic correlation algorithms, and perform a comparison of a small window of pixels corresponding to the vicinity of one point on an image with the different possible point windows counterpart of the other image of the pair. This comparison is two-dimensional in the case of position of the pixel within the image matrix and can also be considered as a three-dimensional if we consider as a spatial attribute to the radiometric response of the pixel (gray level) [10].
The calculation algorithms try to find a unique solution and so use a technique that does not compare gray levels of a particular pixel but take small pixel matrix (NxN) as close to him.
This method, which yields surprisingly accurate results, has however, a number of major difficulties:

- The number of operations required to find a pixel of an image on the other may be very large, which implies a high processing time. Also, if digital images are not very sharp or have not gone through a prior good process of radiometric adjustment, appears a considerable uncertainty in the determination of the homologous pixels.
- It must be added the fact that the images are affected by factors of perspective changes that make that the same object have a different radiometric response; hence the importance of the images are as parallel as possible.
- Another important aspect is when we find objects whose surfaces have extremely homogeneous textures and/or repetitive. In these cases it is possible to find common ground because all search areas are equal.

For this second method has been used software PhotoModeler Scanner 2013 [PMS]; a program that is not open source, but we have been working for some time, with excellent results in well-textured surfaces and that is directly linked to the Project Research cited above.

5. Documentation of the piece from IBI: Criteria, capture and processing

Once established the theoretical framework of methods of capture of Information Based Images (IBI) the study is focuses on the experimental evaluation of the case study. As mentioned, it starts in the establishment of criteria and guidelines for generating valid information under the same conditions and it develops the capture processes and data manage in order to obtain valid information for an accurate metric comparison.

5.1. Criteria for image capture

One of the conditions we have imposed on the point clouds calculation that each program has to perform is the departure from the same information. This means that the pictures that we take to the pieces meet the specific requirements of each program. In general terms as follows:

- Firstly the camera is calibrated, for which each program proposes its own procedure. The model must occupy the entire sensor. Is important to use a fixed focal length lens and do not move or the focus ring or exposure settings between shots. Finally lighting conditions most provide an uniform light, if possible, free of shadows defined.
- Photographs used in Photomodeler Scanner DSM projects should be in a parallel or close to parallel orientation. The cameras should be approximately one quarter the distance apart, compared to the distance that they are from the surface. This would be called a 0,25 base to height ratio. Base to height ratios of 0,1 to 0,5 are suitable. Highly convergent photographs usually do not work well with DSM since the surface looks too different but are necessary to solve well. So a DSM project will have a mixture of convergent and parallel photos. Lastly the photographs need to overlap on the surface being modeled.
- Strata needs of a small and stable auxiliary installation to lift the sculpture so the image appears surrounded by the bottom all the way around. Template and support are placed on a swivel that moves every 24º which gives us 15 images for each lap; images where the camera is virtually facing to the sculpture. It takes another turn raising the camera at an angle of approximately 45º to the horizontal; although this is sufficient between 3 and 7 photographs. There is still a take overhead.

We have designed a template including both Strata marks need to cameras orientation, as a series of 12bits targets which automatically recognizes PMS with the same purpose. Circular template as we have chosen to keep the camera completely fixed, preventing any movements change the focus distance, which incorporated a small fixed support.
This template curve constructed for the measurements of the piece (around 5x5x5cm), assume that each rotation of 24º results in a horizontal movement between each pair photographic of 9cm. If the distance between the camera and the sculpture is 30cm, we have the relation b/h = 9/30 = 0,30. Thus

there were 15 takes in a first ring with an angle of 0º with the horizontal, 15 outlets in a second ring at 45º and the overhead; in total 31 [Fig 4].
For both PMS and Strata were used the 31 photographs. For the first, although all pictures we used for strengthening the orientation, for the calculation of the points cloud were taken two by two, as the two described rings, in a total of 30 stereo pairs.
Because of Strata requires a homogeneous background to furnish the profiling silhouettes and because, turning the piece and not the camera, PMS would not be able to orient the photos, these are made on a canvas of black or white, depending the color of the sculpture to survey. This also has the difficulty that the strong contrasts between the model and the background increase in the picture. Therefore, the adjustment of speed and diaphragm on takes needs to reduce these light differences of the images. In any case, the shots have been performed on RAW format, allowing to reveal the images after shooting and correct and overly burnt histograms.

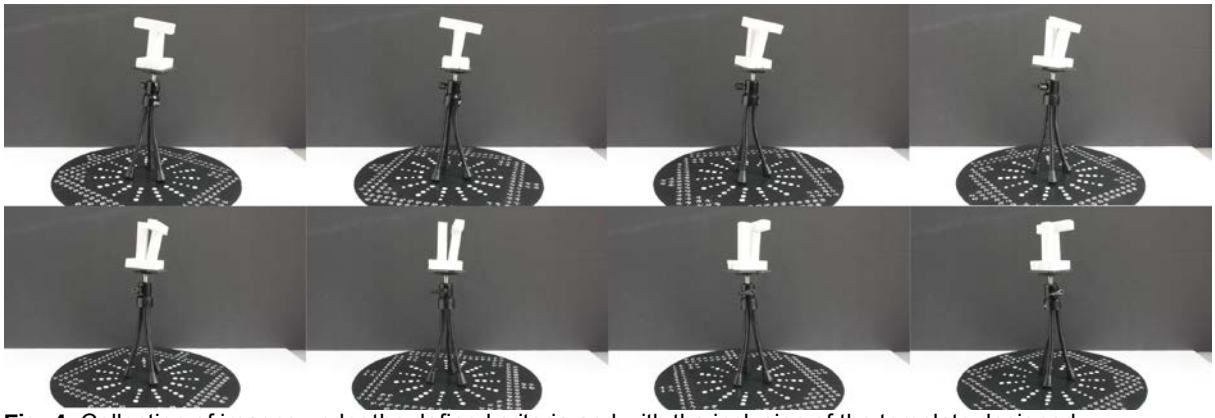

Fig. 4: Collection of images under the defined criteria and with the inclusion of the template designed.

5.2 Capture and processing with Strata Photo (SfSi Method)

For data acquisition was used a Canon 1000D camera with 24 mm lens, keeping constant its configuration over the entire sequence. Joined the encoded grid generated for the present study and were performed the photographic session raised under mentioned criteria in previous section (every 24º with a ratio b/h = 0,125 in two passes at 0º and 45º relative to horizontal axis, and a final Cenital capture) [Fig 5].
We proceeded to the automatically silhouettes extraction with good results due to the provision of dark background contrasting with the radiometry characteristics of the workpiece, and was processed in the same way the estimation of corresponding points and the three-dimensional reconstruction, yielding the surface mesh model. External orientation was defined by the introduction of general dimensions of the encoded grid.

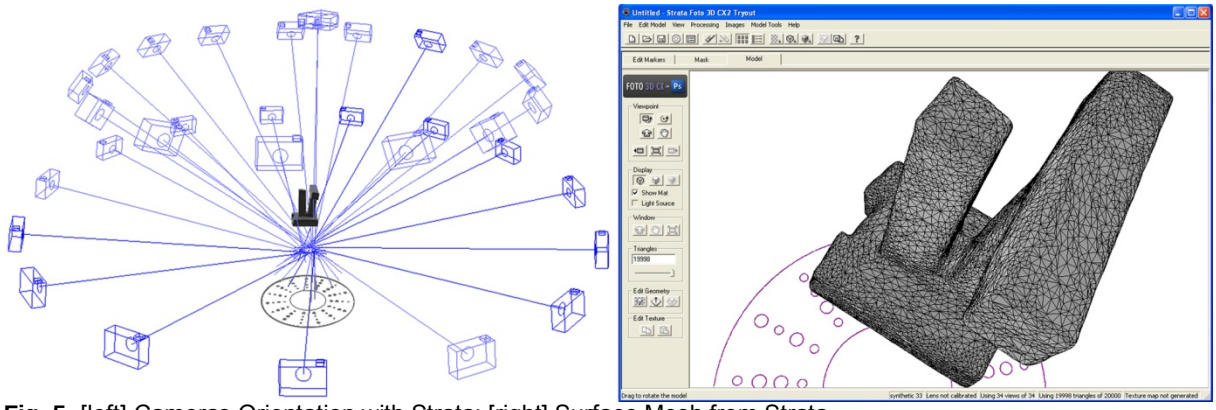

Fig. 5: [left] Cameras Orientation with Strata; [right] Surface Mesh from Strata.

5.3 Captura y procesado con Photomodeler (SfSt Method)

With the same images we performed earlier, and taken in pairs, PMS identify corresponding areas for each camera pair; and hardly able to locate homologues points due to the strong homogeneity of the texture of the surfaces to survey. Despite the settings the program includes both in the size of the areas or matrices to compare, as to be able to differentiate, and therefore understand in a different way, repetitive and not repetitive textures.

The software manual indicates how this 3d scanning process produces a dense point cloud from photographs of textured surfaces of virtually any size. Texture with radiometric properties, perhaps we should say photometric, necessaries without which it is useless to try. However, it is the subject of this paper and to analyze the results.
This premise clearly predisposes us to estimate a poor resolution of the point cloud, because the pieces do not seem compatible with the software. However, there is a strong and recognized experience on this software, supported by many and such a wide fringe of time, which encourage us to try. We know of the excellent accuracy that PhotoModeler Scanner provides their models (with appropriate textures), which is expected to decrease significantly in this case.

6. Reference Data Capture: ScanWorks V5 with Romer Arm

The lack of dimensioned planes on the object and the uncertainty that may pose manually measure in a figure of small dimensions as the analyzed, leads to the need of generate a reference geometric model with a rigorously reliable. For the proven ease of use and the metric accuracy, was used the capture through Range Based Information [11] from the triangulation functioning.
Limitations of laser scanner as active sensors in surfaces with singular properties: specular reflection, high light absorption, variables refractive index, etc. [12] often introduce data error visible or able to be determined by metric evaluations [13]. We have therefore resorted to the Perceptron ScanWorks V5 laser scanner with Romer arm using triangulation operation to capture the profiles by the intersection of a laser plane and the object topography. This industrial dynamic range scanner allows calibration respect the surface properties of the documented object, estimating individual characteristics of the emitted beam for a correct response interpretation. Moreover capture speed (up to 458.000 points higher than conventional probes or points, the field of view: 140 mm, depth: 100 mm, the minimum resolution of point to point: 12 µm [14]) as well as Romer Arm movement facilities (6 degrees of freedom), proposed as an ideal device for the reference image generation.

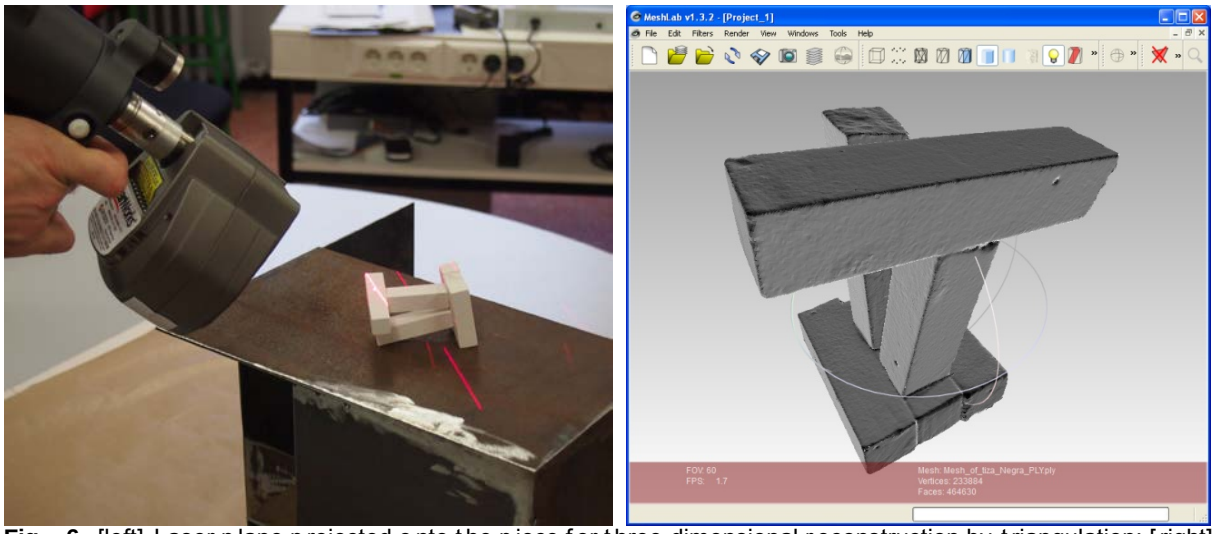

Fig. 6: [left] Laser plane projected onto the piece for three-dimensional reconstruction by triangulation; [right] mesh obtained from 3D point cloud from laser scanner, viewed in MeshLab App.

7. Geometric Data Comparison

To perform the comparison was used Ivvnometric Poliwork software and it's modules *IMAlign* for surfaces generation from the laser scanner point cloud (without application of smoothing, tolerance or reduction) and *IMInspect* for the alignment and geometric calculation of the metric differences between the reference and data surface (*SfSt* and *SfSi*).



Fig. 7: [1] Overlapping point clouds obtained from Shape from Stereo method (darker) versus Laser Scanner Data (lighter); [2 and 3] Side and top views of the overlapping meshes: Shape from Silhouette mesh in red versus Laser Scanner Data mesh in green.

7.1 Shape from Silhouette Data versus Laser Scanner Reference

12.709 points of the 13.344 were compared at a range of ±2,6mm, for 95,24% of the points within the comparison range. The average was 0,34474mm with a Standard Deviation of 0,5174mm, while all the points converge within 5 times the Std. Dev.

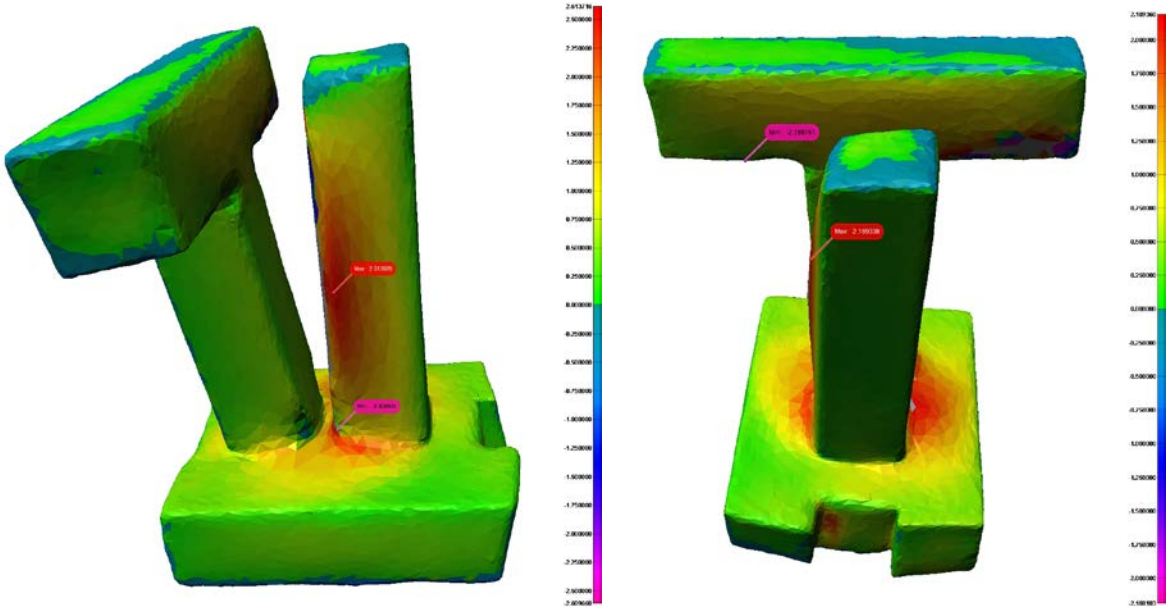

Fig. 8: Graphic scale of geometric differences of the mesh obtained from Shape from Silhouette: [left] Major errors identified in the inner edges of the figure; [right] Errors identified in horizontal and vertical parts connection.

7.2 Datos Shape from Stereo frente a Referencia Scanner Láser

1.234.952 points of the 1.281.071 were compared at a range of ±1,6mm, for 96,40% of the points within the comparison range. The average was -0,0434mm with a Standard Deviation of 0,3278mm, while all the points converge within 4 times the Std. Dev.

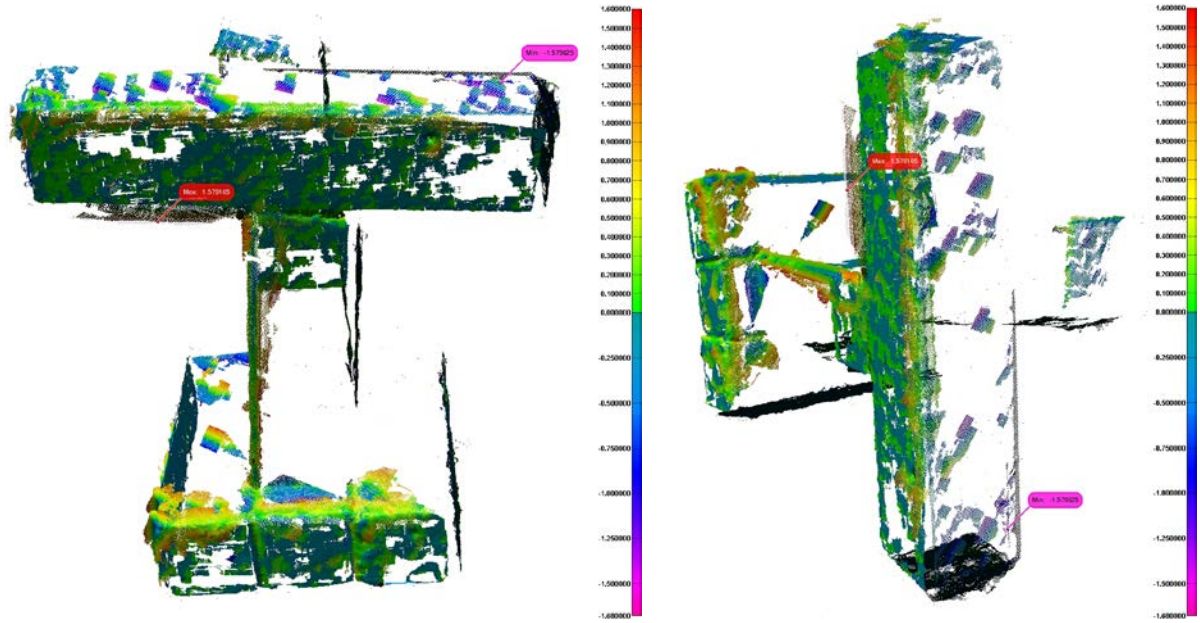

Fig. 9: Graphic scale of the geometric differences of the mesh obtained from Shape from Stereo.

While results in mesh generation suggest a superiority of *Shape from Silhouette* method because the possibility of reconstructing the entire surface without sudden jumps or discontinuities, pixel correspondence with *Shape from Stereo* was limited by radiometric poverty, with an heterogeneously reconstruction of the piece, increasing density in vertices and corners but decreasing in centrals regions of the sculpture's plane [Fig 7]. In the other hand, metric evaluations were based on the geometric comparison between the results of both methods, allowing the identification of irregularities on the generated surfaces from silhouette within a wider variation frame, detecting errors close to 3mm (± 2,6mm max.) while the surface reconstructed by stereo pairs remained an error less than 2mm (± 1,68mm). Errors distribution found also substantial differences, responding to the internal function of each method [Fig 10], detailed in sections 3 and 4.

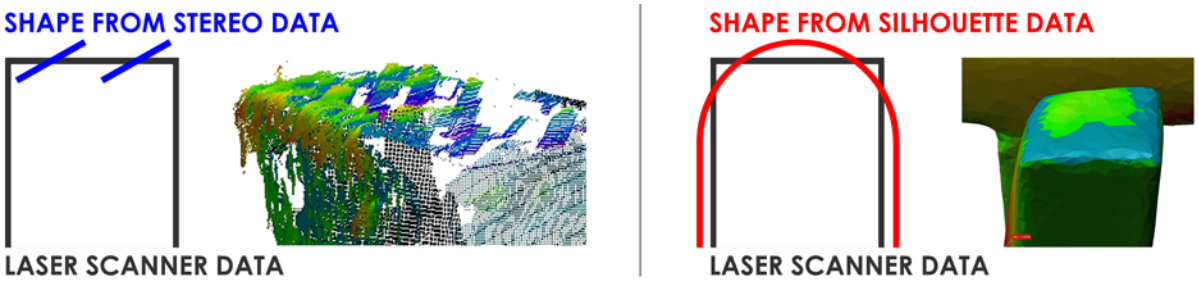

Fig. 10: Distribution of the reconstructed data from photogrammetric techniques.

8. Conclusions and future work

The theoretical study of Shape from Silhouette method allows retake math implementations over 20 years old, which can be reused at present thanks to new technologies and new society needs. For Heritage sculptural pieces, particularized in those which have poor radiometric characteristics: dark colors, repetitive patterns and materials with little response to light stimuli, this method obtains significant advantages over others as the Range Based Information capture or photogrammetry techniques based on 3D restitution and massive correspondence of pixels (Dense Stereo matching).

With the case study we proposed, we can estimate the real advantages of this system, not only in the geometric order, but also in terms of economic costs, taking into account that for the 3D model generation was needed only a Reflex Camera and software (on the order of hundreds of euros) while other systems such as the laser scanner, only the equipment can reach the tens of thousands of euros, in particular ScanWorks V5 with Romer Arm has an estimated price of more than hundred thousand euros.

Amplitude and scope of the methods implementation: *Shape from Stereo* and *Shape from Silhouette* for studying sculptures with poor radiometric characteristics, makes it impossible to cover in full in a presentation. Detected some of its weaknesses as the impossibility of identifying points in repetitive patterns, the errors introduction in silhouette segmentation or the lack of evaluation of camera calibration in relation to the results obtained, particularized studies are essential to answer these issues. This paper then proposes the following research lines:

- Study of the influence and behavior of *visual hull* calculus (surface or volume calculation systems) from figures based on curved surface to pieces with a high degree of orthogonality in its structure.
- Geometric reconstruction from a unified system, comprising *SfSi* and *SfSt* methods to try to overcome the disadvantages identified: Faults in the massive reconstruction of the surface (Dense Stereo Matching) for SfSt and precision errors for SfSi.
- Detailed analysis of the data distributions in connection with the operation of each method.

Acknowledge

We gratefully acknowledge support from the Laboratory of Architectural Photogrammetry, University of Valladolid (Spain) and from the Museo-Fundación Jorge Oteiza in Pamplona (Spain).

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Ancient ruins of the future

Adriana ROSSI
Department of *Civil Engineering, Design, Construction Industry and Environment* (DICDEA) Second University of Naples (SUN). Real Casa dell'Annunziata. via Roma, 29 – 81031- Aversa (CE)- Italy. e-mail: adriana.rossi@unina2.it;

Abstract
The *Herculea Telesina* in the region of Campania is certainly not a fragment but an almost continuous defensive wall. The strong point of this particular project for siege defense being geometric criteria that have remained practically unchanged even when the weapons themselves evolved. The ruins offer a vast repertory of useful signs: the contemporary scholar can not only acquire the teachings of a culture that was much advanced compared to the Roman world, but by observing the angles and vectors can ponder the absence of any changes in the measurements that were subordinated to tactics and thus to human needs. Decisive factors that elevate the walls of Telesia to the level of a cultural testament still to be discovered.

Keywords: landscape, ruins of defensive walls, unchanged flanking tactics.

1. The ancient ruins
Gently contained within the farmlands of San Salvatore Telesino, the city founded by Roman settlers in the 11 century BC, perhaps subsequent to a pre-existing Samnite centre, it is serenely inhabited by its residents and enjoyed by numerous visitors.
The ruins of the fortified walls are fully integrated into the particular physiognomy of a valley that united the provinces of Benevento and Caserta, adapting itself to their physical, anthropic, biological and ethnic characteristics. The vista and the significance of this archeological site that lies concealed from those rapidly passing through the main road, but that unfolds to any who venture along its packed earth roads, comprises the remains of a very ancient theatre, thermal springs and an aqueduct that brought water from the mountain located six miles away. As far as can be distinguished there were three principal gates, with an undefined number of posterns distributed along the perimeter and now partially visible.
According to the Greek historian Polybius, the Carthaginians conquered the city in 217 BC when it was still « *without walls and provided with all types of supplies*» [Musti, 1978]. Fortified by the legionnaires of Silla it was never attacked. One of the reasons being its impregnability, a trait that has prevented any verification of its system of defense, the only one of its type in the entire empire.
The unique structure of the fortification is obvious if viewed from above. It is a wall composed of a series of outwardly facing concave sections.
At the top of each linkage is a sort of hexagonal solid tower alternating, with no apparent order, with others of a circular shape. Both protrude out of the curtain wall by half, justifying the technical name of *mesopirgi* walls (*mesos*, semi; *pirgos* towers).
The segments of wall are not linear and thus have a succession of "recesses", to use an appropriate, though Renaissance, term, whose "salients" end in a single exterior edge. In this manner no side is concealed from active defense as only the sharp corner of the protruding body faces the field of battle. Furthermore, it goes without saying that in order to effect perpendicular strikes against the hexagonal facade of the avant-corps-tower, enemy artillery would have to be stationed at least 30° to the right and to the left of its axis, exposing its flank to close and perpendicular fire launched from the right or left towers.



Fig. 1: Section of the concave segment of the curtain wall with hexagonal towers



Fig. 2: Detail of insertion hexagonal tower-curtain wall.

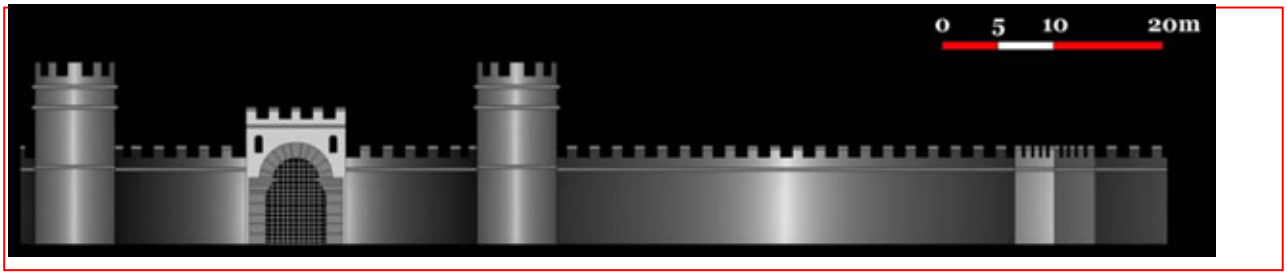


Fig. 3: Telesia: reconstruction of hypothetical layout of the Capuana Gate and in vertical sections.

The structure is in opus incertum or almost reticulatum, with an internal core of cement, which is also extended to fill the avant-corps. Their placement is irregular. To the south-west and to the east two small streams are located close to the masonry perimeter. According to experts of military architecture tactical border support is the reason why the interaxis among the projecting reinforcements passes from more than 75 meters along the Trono riverbed to a canonical average of 45 meters, that at times even descends to 30 meters: «The system of fortifications becomes proportionately more complex as natural defense decreases, the most obvious proof is the frequency of towers, sporadic on the two linear sections along the moat and built one after the other at a certain distance » [Qulici, 1986: 85]. As there is no natural defense to the north and to the north-east, the project for a good active defense of the walls was the only support possible.

The wall's unassailability cannot be attributed to the solidity of the walls as these are too slim, being little more than 1.7 – 1.9 m thick and slightly over 10 meters high. To be located inside a defensive circle certainly protects from enemy attacks, but it provides no protection from an enemy who would scale the top to penetrate within!

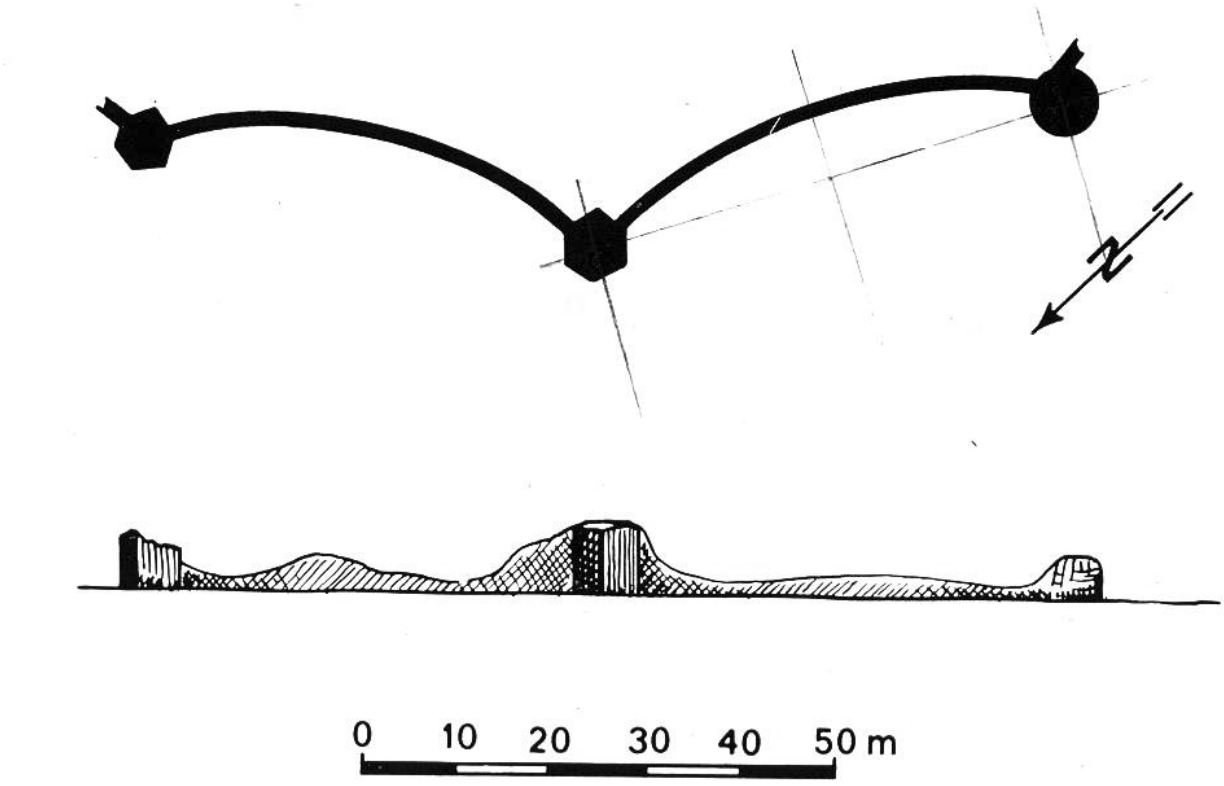
In order to stop an attacker from trying to overcome this obstacle, it was necessary to fire stones or wood against the enemy, possibly from above, thus transforming simple passive defense to active defense. Following the ancestral experiences, a vast repertory of defensive weapons became the indispensable complement to the fortification, to the point that the structure of the walls evolved to fulfill the need of optimizing weapons performance.

Since an attack took place by a mass approach toward the base of the walls, it would have been sufficient for the avant-corps to protrude from the exterior facade and to shoot arrows in rapid succession from the top toward the flanks of the attackers to inflict terrible losses. However, the interaxis between the towers had to be below the range of the bows and torsion artillery, thus no more than about fifty meters, equal to about a hundred cubits: the canonical distance for walls of Hellenic matrix. In fact the unknown architect of the walls of Telesia appears to have been inspired by this culture following the undertakings of Alexander against the Persians. There are certainly justified grounds for maintaining that the decision to opt for a non-obvious perimeter such as linear curtain walls or a fixed wall like the ones built near tactical borders was inspired by the studies of Philo of Byzantium (III century B C; ca. 280 BC – ca. 220 BC). A student of Ctesibius, Philo wrote a *Compendium of Mechanics* (Μηχανικ Σύνταξις), most of which has unfortunately been lost. Of the *Paraskeuastica* (παρασκευαστικά) – "*On Defense Structures"* – and the *Poliorcetica* (πολιορκητικά) – *"On the conduct of sieges"* – large sections have been saved, transcribed from the Greek and translated into European languages. In light of his theories, the reasons for suggesting that towers be given a hexagonal shape (Phil. bk. V, A 3-4) and curving the sections of wall between two towers [Philo, lib.V, A, 39-40. Garlan, 1974: 296]. appear evident. Not so obvious however are the parameters to be given to these curves. A plausible answer is found in the traces of ancient vestiges found in the field.

Looking at the north gate from the outside, where the ground lacked any natural conditioning that would rule out compliance to an ideal model, it was found that the span of the concavity is 44.50 meters and the height is 6 meters. If we then take six points of the curve, on the same level as the perimeter – the number required to definitively confirm the wall's transformed homology from a polylinear form, Pascal's Theorem (1640) [Docci-Migliari, 1992: 461] - we can confirm what had been visually intuited: this is a lowered arch (dummy) that, having nothing of the oval profile, is traced as a geometric site of the points equidistant from the center. How to find the center is an almost immediate procedure. After taking the distance between two *mesopirgi* it is sufficient to rotate the span from the opposite sides. The center of the curve will be at the point of intersection. One is the unknown, while three points (the two extremes and the center), if joined together, form an equilateral triangle: the internal angles each measure 60°. With extreme precision then the points of the curve are the vertices of the rectangular triangles inscribed within the resulting semi-circumference.



Fig. 4-5: Satellite views of various sections of the walls of Telesia



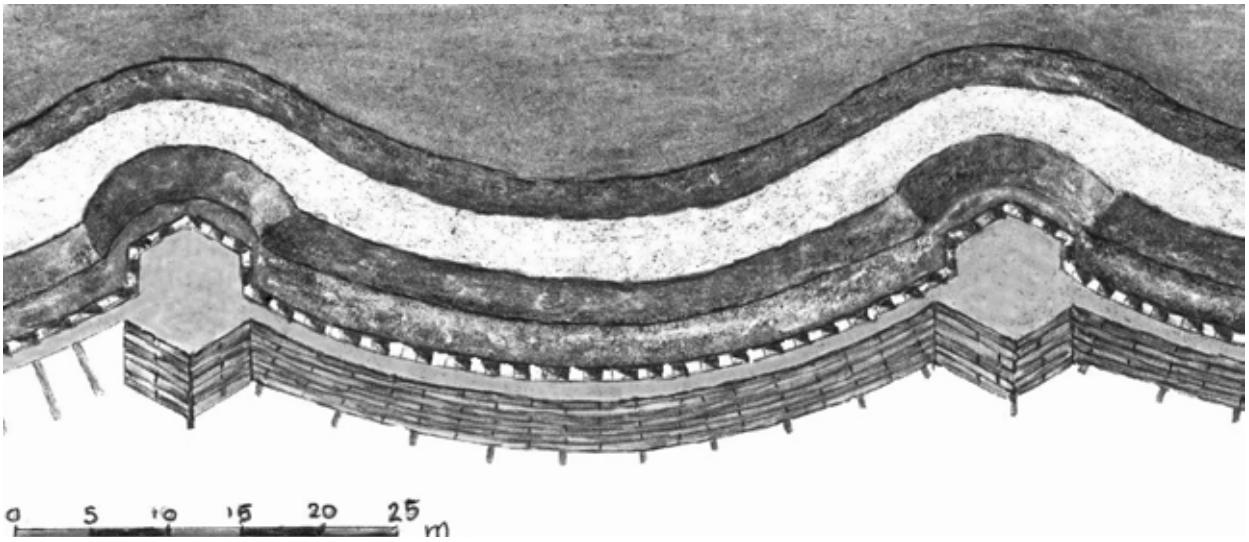


Fig. 6: Graphic reconstruction of a segment of the Telesia walls

The concavity of this layout multiplies t he number of launch stations, thus allowing them to strike the attackers in the back as well as the flanks.
The avant-corps, with a hexagonal base as stated prior, are solid structures placed in position such as to reinforce the summit, as is evident by the outward corner reinforced by thick stone quoins.

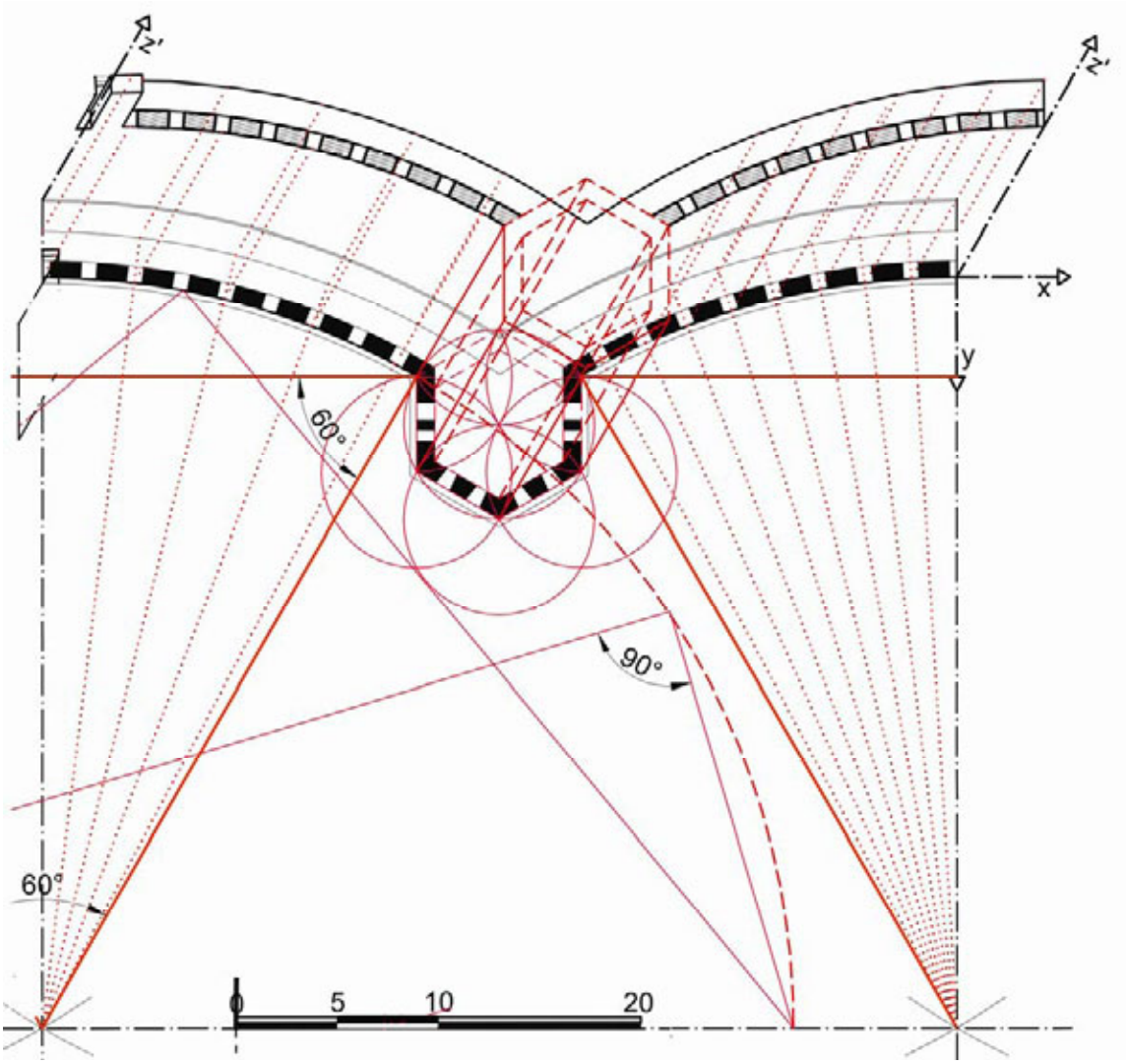


Fig. 7: Graphic reconstruction of a segment of the Telesia walls

Everything indicates that their covering was at the same height as the patrol path along the curtain wall as there would be no other way to traverse it completely. Even supposing an internal expansion of cantilevered wood, the terrace formed on the top of the towers provided a comfortable space to maneuver soldiers and equipment. From that height the artillery could easily cover a field of 250 ° instead of the traditional 180°. Considering all these aspects, supported by the results of the measurements taken in the field and compared to those suggested by the treatise of Philo of Byzantium to build «slightly curved curtain walls», we converted the measurements in meters to cubits (1 cubit = 0, 0444 m) and the centimeters to orgias (1 orgia equal to 177 cm), confirming that the canonical span of 100 cubits, approximately 44.40 m, is almost the same as the 44. 50 meters measured on site, The same procedure was followed for the height. Since the wall is not intact at any point and the ruins stop at around 7 m from the ground, in reconstructing the sites we referred to the height prescribed by Philo. Thus to the prescribed height of 10.60 metri, we must add the height of the moat located in front of the walls. [Philo, bk V, A, 45].
In spite of the unquestionable expertise of the Romans regarding military capabilities, the concave curtain wall fortifications of Telesia remained an exception throughout the Roman Empire, such that it progressively fell into decline, destroyed by earthquakes and by the nearby waters, disintegrated by brushwood and dismantled by the farmers. The concept however incredibly survived, even adapting to powder artillery.



Fig. 8: Ruins of hexagonal tower.

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2 Future legacy

If the surveys are compared to similar examples (Spanish catenary walls: *Obuleula*, the Roman *Urso* and in the same region, *Pajares)* on the one hand and to the study of a theoretical model derived from the classical treatise on the other, the surveys allow for reconstruction of a reliable picture of the scientific knowledge available to military strategists of the second century before Christ.
It appears at the very least singular that this example remained an exception in the empire as similar ones in Spain, lacking contemporary estimator or more likely obsidional verifications, had been abandoned for quite some times. But this was not actually the case if one considers the development of military architecture.
Among the multiple objectives of history, or perhaps better of histories, is that of stimulating learning and study and the consequent desire to identify the primary factors, these being the basic requirements for understanding the present and even more so the future, since human actions throughout history have always been dictated by physiological needs.
It is from these existential needs that the history of technology, of conventions and of interpretative and critical stratifications to which the works led and from which they have determined a direction, control and verification, that one may extrapolate those permanent concepts that, viewed from the perspective of a new scientific spirit, suggests new ideas. «In the intention of the scholar, the culture of a specific period expresses the manner in which, according to changing historical conditions, themes and concepts, the essential tendencies of the human mind are revealed». [Panofsky, 1973: 105].
Leaving the angles and directions unchanged, the laws applied to the defensive wall of Telesia and suggested by Philo of Byzantium, also apply to the design of fortifications built around the end of the seventeen hundreds, when the range and masses of projectiles made it necessary to reshape the bastion-towers. The senior officer, Sébastien Le Prestre de Vauban, builder of over a hundred fortresses, had conceived of a regional defense tactic of boundaries known as the *Pré Carré* tactic: a set of fortresses regularly spaced among themselves that did not allow for the passage of an army in the corridors that were left free. Today we well know that his theories led to the construction of the Maginot Line used between the first and Second World War. We may thus conclude that the only tactical variable in this context was the power of the weapons, a result of technological evolution, but certainly not the criteria of active defense subordinated to human measures and needs. In this perspective the concave segment curtain wall of Telesia demonstrates how the Silla colony that flourished at the foot of Mount Acero, acquired a merit that places it greatly in the avant garde of the contemporary roman world. Much more important than flanking tactics, and one of the many reasons for encouraging the study of the sean cient ruins immersed in the countryside of San Salvatore Telesino, is the usefulness of identifying the primary factors, essential in achieving an understanding of the present and, even more significant, in anticipating the future, given the ever present and much too obvious repetitive nature of human actions dictated by physiological needs.

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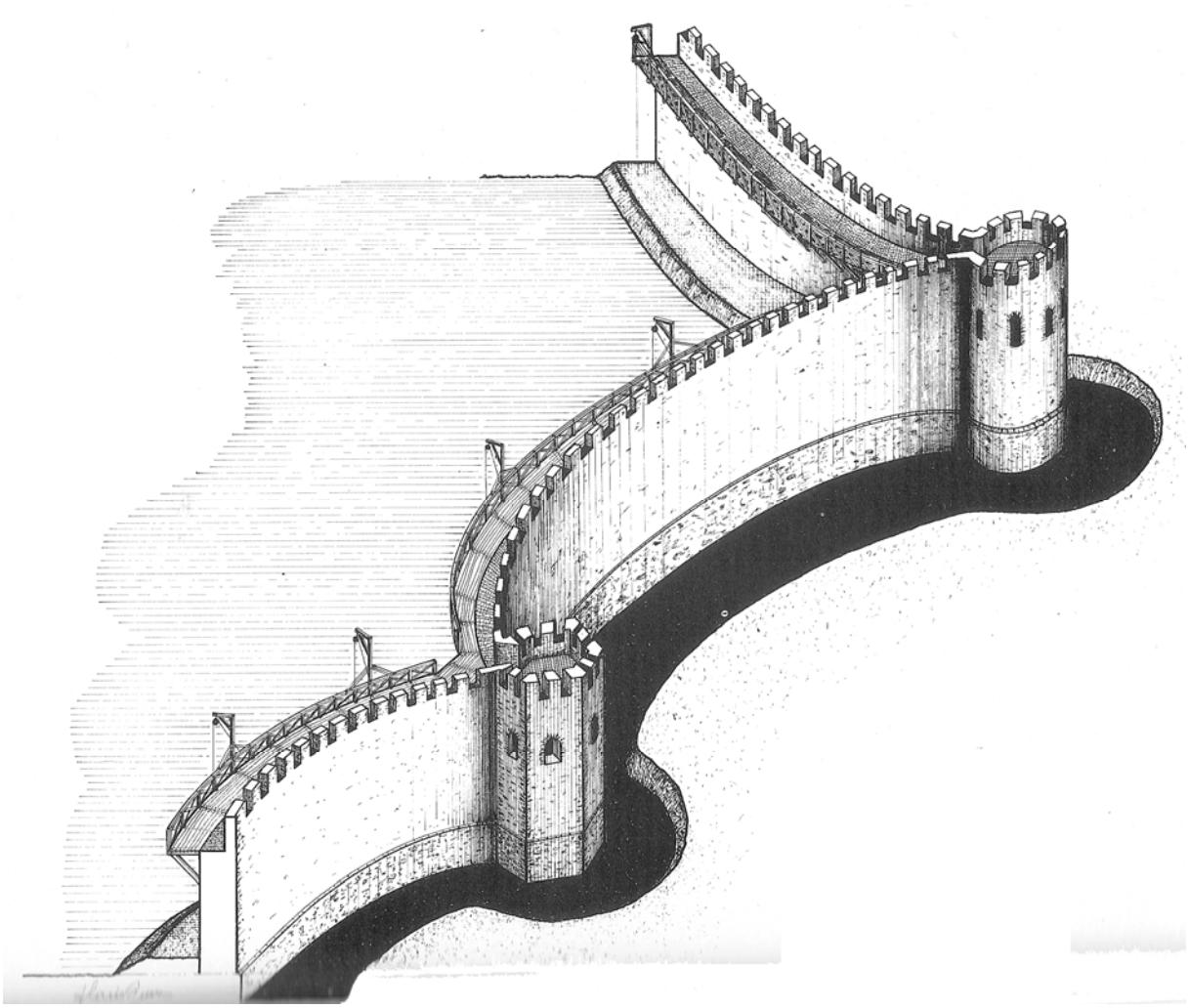

Fig. 9: Graphic reconstruction of a segment of the axonometry of the Telesia wall

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Fig. 10 – Ruin of hexagonal tower.

HERITAGE ARCHITECTURE LANDESIGN
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The monumental unit of Massenzio: environmental requalification project and development of the archaeological emergencies

Maria Grazia CIANCI
Department of Architecture, The University of Studies of Rome Tree, Rome, Italy
mariagrazia.cianci@uniroma3.it

The monumental unit of Massenzio

The unit of Massenzio, one of the most evocative archaeological areas of the Roman countryside, lies between the second and third mile of the Via Appia Antica. It consists of three main buildings: the Palace, the Circus and a Mausoleum. They were designed into a single architectural unit that was conceived to celebrate the Emperor Maxentius; the unfortunate opponent of Constantine the Great in the battle of the Milvian Bridge in 312 AD. The complexity of the space of this area is tied to the close relationship between the historical artifacts found and their relationship with the road, nature and the surrounding landscape. In terms of space, these close relationships create completely spontaneous micro-landscapes and micro-gardens within them. They naturally gather data and useful information to fully understand the system. Today, the debate is based on the need to take protective measures for the monuments of the Via Appia Antica. From a first partial analysis, the monumental unit of Massenzio showed different issues; problems tied to a correct understanding of the historical plant, problems tied to the management of the area and to the state of degradation of the ancient structures, but also problems such as the lack of incentives and services to entice visitors. In this situation, the study reported here raises a number of points to create a very articulated program subdivided into different phases to implement the requalification of the monumental unit. The objective of this work is to define a method to make sure the following projects and interventions are consistent and in line with each other and with the purposes established to develop the area in a proper manner.

Keywords: Requalification, archeological emergencies, Circus Massenzio, Mausoleum

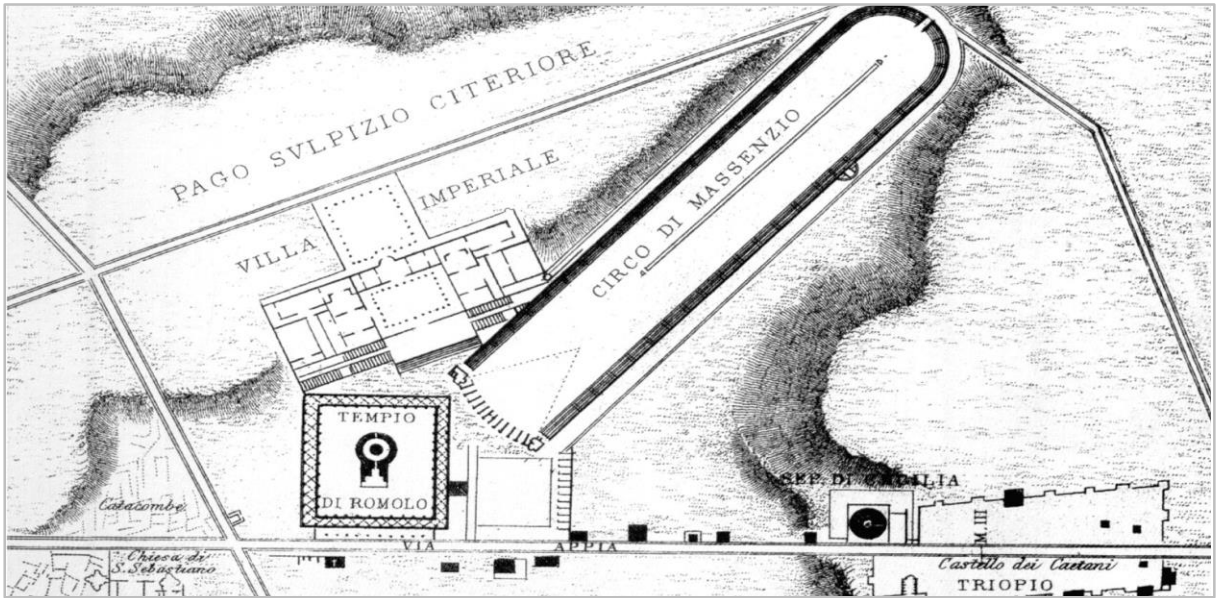

Fig. 1: L. Canina, The monumental unit of Massenzio, sec. XIX .

1. Archeology, History and Nature

The monumental complex of Massenzio, on Via Appia Antica, represents a huge heritage of memories for all travelers who, once in Rome, had the opportunity to go down this marvelous street full of charm, history, perfumes and "souvenirs".

A description can lead us to love, hate or possess a place; the way places and landscapes are described creates representative metaphors and symbols. A description intervenes, manipulates, distorts and creates an environment. It plays an active role as far as our collective imagination is concerned.

When Goethe came to Rome, especially in the complex of Massenzio, he felt like he had always lived there, as if he already knew every aspect of it or felt the emotions released by this memory keeper. The imagination that had characterized his childhood was able to move beyond the symbolism of abstraction and to grasp the warmth of reality: *"[...] It was as if he was born and raised here and was just coming back from a trip to Greenland, where he was whaling".*

Descriptions strengthen our thoughts, many of our thoughts. Our thoughts enrich reality and lead us beyond the description of a state of art.

The relationship with the surrounding world is undoubtedly a primary source of inspiration and we certainly are aware of its doubtless value. Being able to perceive a place in an appropriate manner is a natural instinct that depends on every individual's sensibility, but also the result of being able to control the information contained in a project.

A project based on the desire to promote the areas examined is subjected to the control of a close relationship between the various systems that characterize a place.

The natural system, as the historical, archaeological and architectural ones, depend on each other thanks to a natural thrust that is also determined by the sensitivity of those who go to work in them. The area around the complex of Massenzio contains many elements of this kind, even though not all of them can be felt today. However, we can feel their value, even after all this time.

Observing and feeling the sensation that a place can transmit and being able to transform this into an explicit potential means enhancing the nature of the artifact to understand it better, to bring it back to its ancient splendor and to recreate a relationship with its environmental context.

This is the objective of the study: history, archeology and nature as a whole.

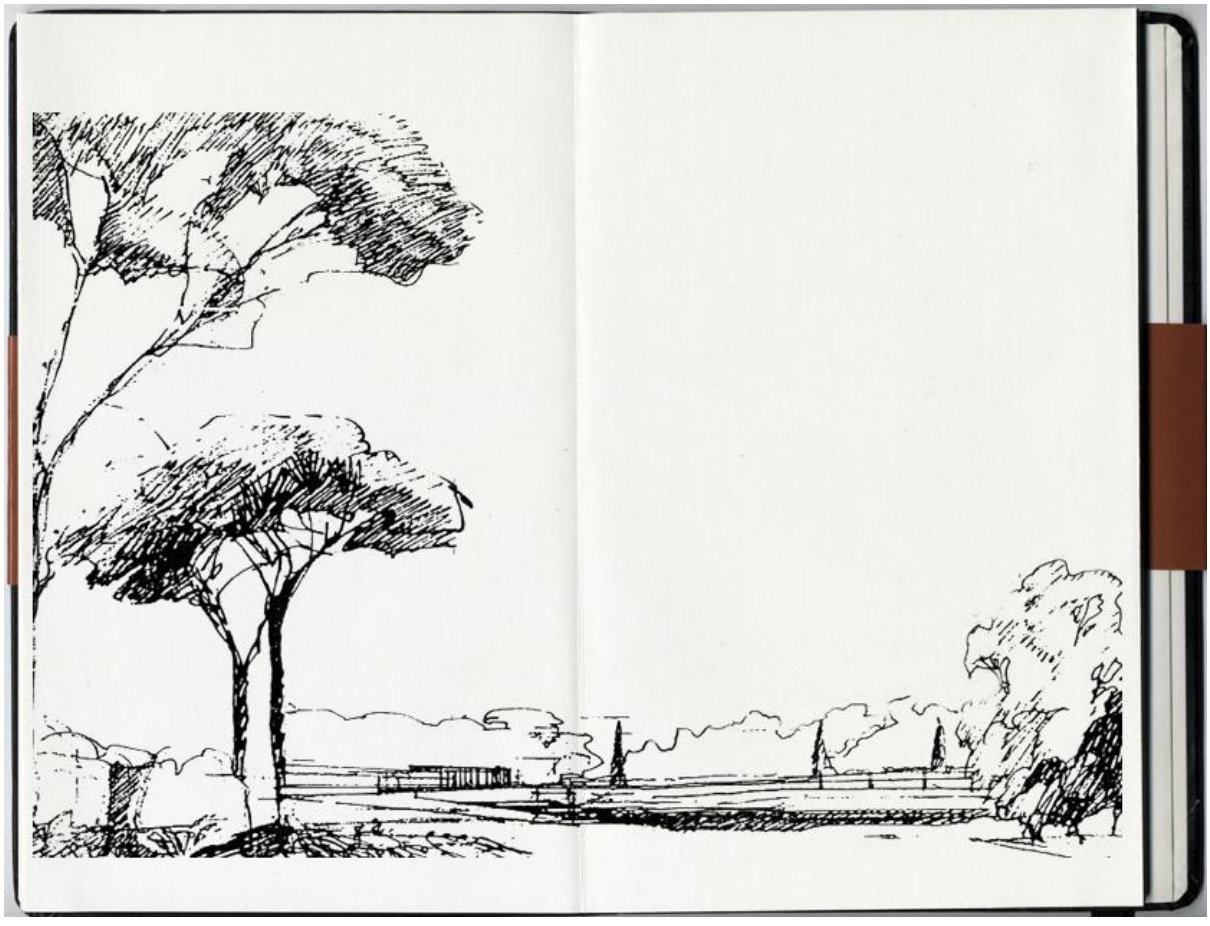

Fig. 2: M.G**.** Cianci, Sketch along Via Appia Antica near the monumental complex of Massenzio.

1.1 The artifact and its context

The monumental complex of Massenzio on Via Appia Antica is part of a zoning project within the General Regulation Plan of zone N - public parks. These areas are natural green public or equipped areas that are subjected to specific actions or tools that are approved by City Council. In the same way, they are also part of the "Strategic Planning of Archaeological Park Framework as Monumental Forums of Appia Antica". This strategic framework focuses on large green areas with a significant archaeological, architectural and environmental value.

The objectives of the framework in general are as follows:

-Promoting and protecting the organic features, already consolidated by the way the district looked during the post-unification process and with the 1911 (Archaeological path) adjustments, as well as those undertaken in the 30s.

-Greater understanding and usability of the different contexts in full respect of their historical and environmental values.

-Requalifying the areas that are intended to become Parks.

-Characterizing the history, environment and nature by paying attention to the history of the existing archaeological system.

The existing relationships between the monumental complex of Massenzio and the surrounding areas are essential for being able to understand the artifact, but also to establish the most important actions that must be taken.

The monumental axis reconnects the archaeological area of Appia Antica to the main archaeological area. The same "archeobus" line connects Piazza Venezia, the Colosseum and the Circus Maximus by passing through the Aurelian Walls to reach the archaeological Park of the Appia area. Along this path, one can identify the parts of the Park that are being used: bike rental points, services, buildings for the activities carried out in the Park.

Connection to the neighboring areas is ensured thanks to different types of roads that define the margins of this large area. The bike and pedestrian paths of the Caffarella Park sharply connect at Via Appia Pignatelli and later at Via Appia Antica in the opposite direction, which makes the visit more difficult. The route from Via Appia Antica underwent several changes that had a negative impact on its performance and original height (about 2.2 meters from the current one) in certain points; especially on the route between the complex of Massenzio and Cecilia Metella.

The Appia Park is North of the peak of the Aurelian Walls, West of Via Ardeatina and of the Rome to Naples railway, East of Via Tuscolana and of Via Appia Nuova (all the way to Frattocchie) and South of the village of Santa Maria delle Mole and of the ditch at the edge of the archaeological site.

The monumental complex of Massenzio is located in a strategic area of great historical value that clearly preserves some critical elements. Some interventions were already carried out on the latters, but the Government, especially the Managing Body of the Regional Park of Appia Antica, must still devote some attention to them. This body is a public entity with administrative autonomy that handles the recovery, protection and development of the natural habitats and landscapes. It exploits the goods of the archaeological areas, preserves the animal species and vegetation, the geological singularities or the natural environments with a special value of natural character, but it also manages the public heritage under its jurisdiction.



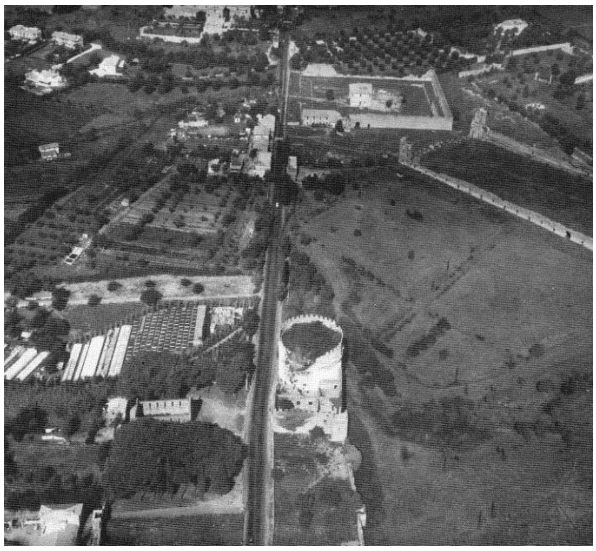

Fig. 3, 4: The area of the villas after Cecilia Metella and the track from the Tomb of Romulus to the Mausoleum of Cecilia Metella. The pictures depict the natural system of the area and the archaeological findings (Fotocielo).

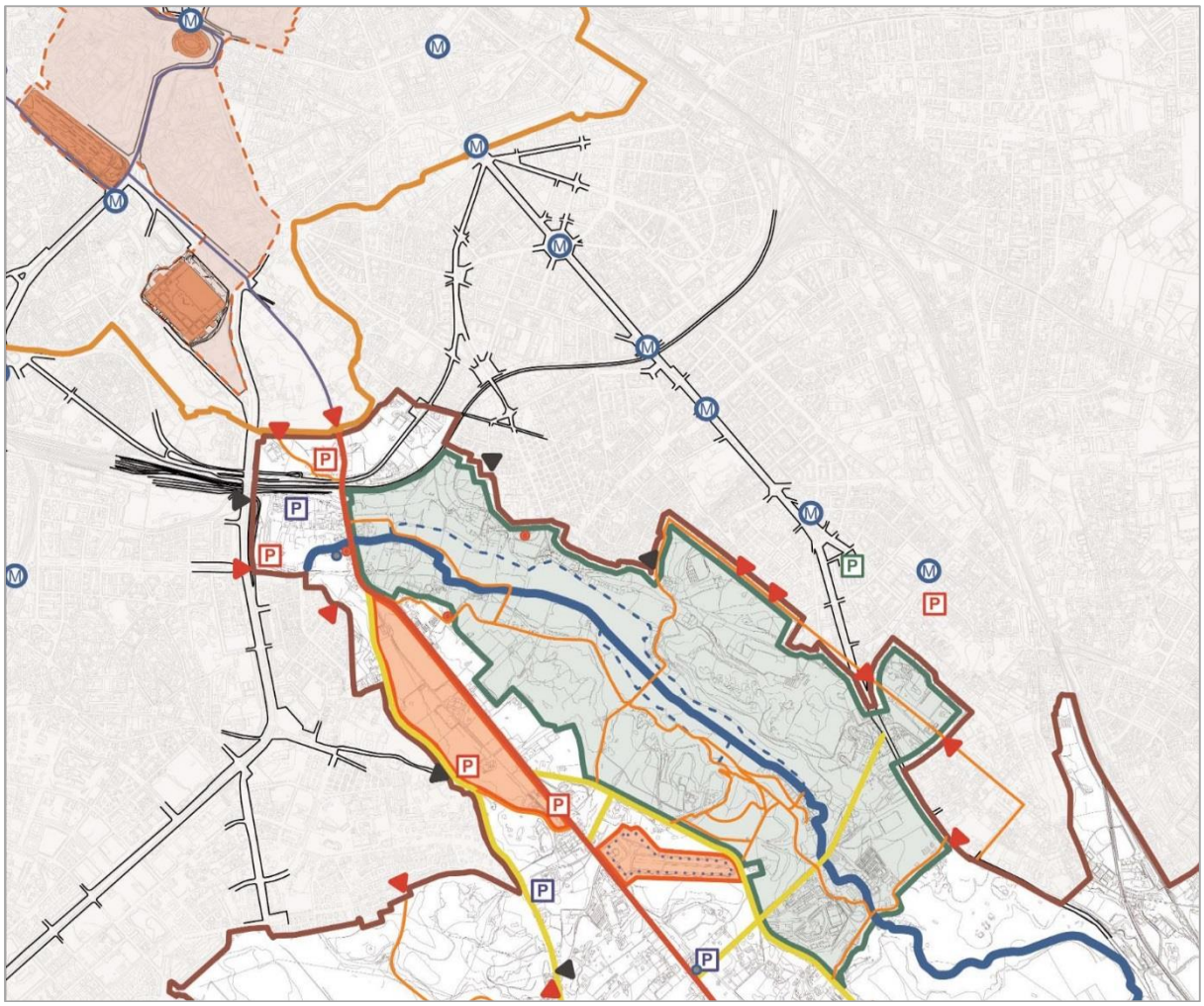





Fig. 5, 6: The monumental complex of Massenzio and its contemporary context: plan, legend and aerial photo.

1.2 The territory's physical features

The natural components of the Park of Appia Antica were greatly transformed by man over thousands of years. However, the general structure is still clearly evident. The volcanic origin of the land and the climatic conditions defined the rough appearance of this territory. This is also clearly seen on topographic maps.

The activity of the volcano of the Lazio region casted paths that were several kilometers long, especially in the Appia (Capo di Bove) area; therefore designing, shaping and creating the high grounds above the existing swampy plains.

The lava-casted area of Campo di Bove was used as the main road of Via Appia Antica for its emerging position with respect to the surrounding swampy areas, but also for its excellent soil, which was used to make the road foundations. In addition to the volcanic activity, the deep and superficial water also affected the land in a very special manner depending on the level of erosion. The water erosions made the land undulated, therefore creating obvious differences with regards to the way it was "originally."

In certain periods, the presence of these deep grooves, therefore determined by the soil's weak ability to resist to erosions, created a continuous activity of water canals both above and under ground, but this also caused the land surface to collapse. The mixed composition of the soil defines the different morphological design of the area.

On one hand, the presence of “pozzolana” and tuff defines the profiles that were detected. On the other, the “leucite” of Campo di Bove appears to have a rather flat course. The presence of volcanic activity from the underground sources led to the detection of significant natural phenomena.

An important aquifer concerns the red “pozzolana” and the ancient tuff; this underground source is 35 to 45 meters deep with respect to the fields of “leucite” of Campo di Marzio. It has supplied many Roman sources such as the sources of the Virgin Waters from the Appia area. These physical features of the territory are essential for an appropriate reading of the intervention area.

The morphological and hydrological aspects can help individualize the environmental interventions of the area that are needed by defining their structural setting.

Based on an observation of the stretch of the Appia Antica that was under examination, the corrosion of the land and a new resulting image were obvious.

The route of Via Appia, beyond the San Sebastian gate, crosses through a first trough through which flows a stream called "Acquataccio" or Marrano della Caffarella, or the ancient Almone river, and slightly goes up after the curve of the "Domine quo vadis" church; a first fifth of the hill that goes down towards another trough is occupied by the complex of the catacombs and of the Basilica of San Sebastian on the right and by the Massenzio circus on the left of the same trough.The road layout is the mirror of the morphological aspects of the place.

The various levels of the Appia depend on it; the troughs and straight ways are a result of the composition of the land.

As already affirmed, the hills around Rome are made of exploited and excavated layers of tuff that often form dense tunnels that intersect each other; like for the tunnels of the catacombs. This intersection is also present in the complex of Massenzio area.

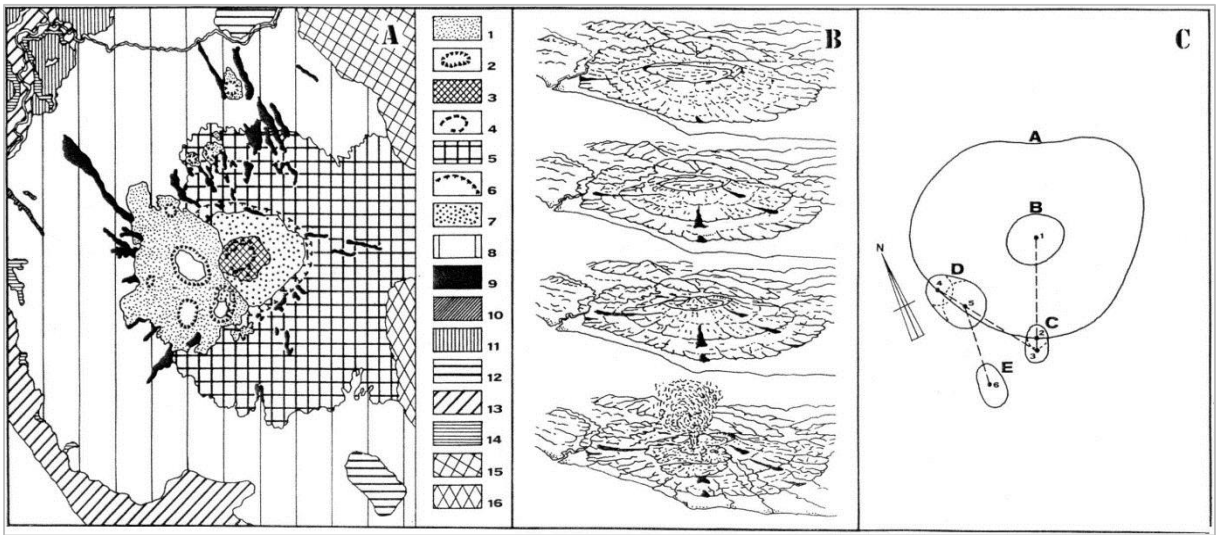

Fig. 7: The genesis and geological characteristics of the area of the volcano of the Lazio region from a "Plan for the Appia Antica park", A: geological map of the volcanic apparatus of the Lazio region and its adjacent areas, B: reconstruction of the major episodes in the history of the volcano of the Lazio region, C: diagram, according to Sabatini, of the subsequent movements of the eruption axis.

On both sides of the Circus, there are two small hills on the right, there is the one that is occupied by the ruins of the Imperial Palace, of tuff nature, and that stretches all the way up to the tomb of Romulus.
Here, repeated earthworks were carried out, which is why there is a difference in height between the “quadriportico” and the villa. The hill on the left, on which the tomb of Cecilia Metella is located, is formed by the foothills that were made by the enormous lava flow of Capo di Bove. The entire area can be visited through the straight path of Via Appia. However, Via Appia Pignatelli.

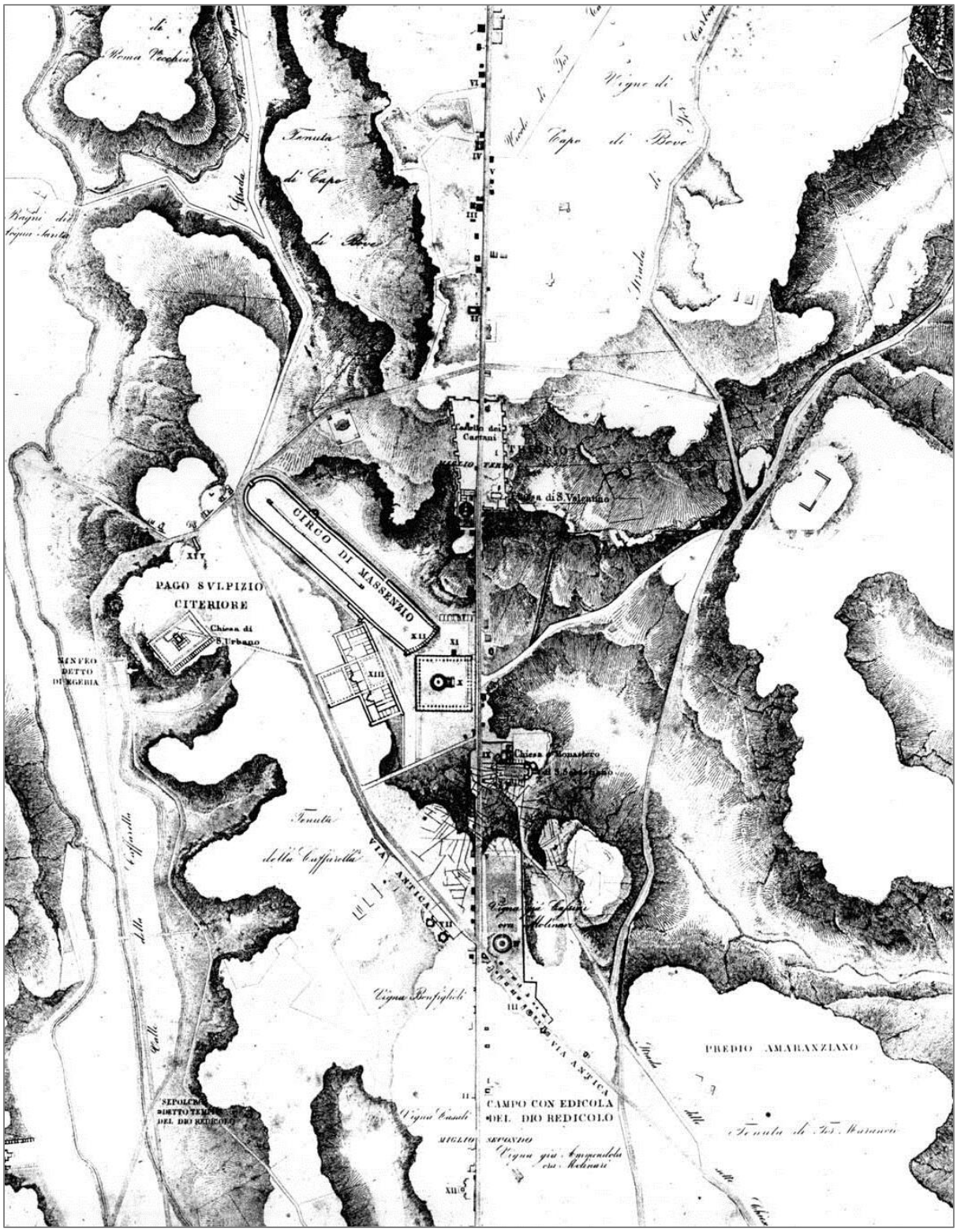

Fig. 8: P. Rosa, Table according to Via Appia: Vineyard previously called Ammedola, now Molinary, and of Capo di Bove, 1853/1854.

1.3 The vegetation

The Roman landscape and, especially that of the Appia Antica, has always been described by writers and painters as being full of vegetation. It is one of the most complex and interesting examples of respect for nature. The beauty of the sacred woods of the Dea Egeria and of the Muses, but also of many others remembered for the richness of the species that distinguished them was the recurring image that was imprinted in the hearts of travelers who followed and visited the shrines and tombs that were surrounded by lush trees.

The close relationship between the presence of special types of vegetation and of archaeological ruins was confirmed numerous times and it can therefore be considered an effective tool; both for the identification of artifacts and for the thematic development of the same. The morphological transformation of the Appia has influenced the transformations suffered by the vegetation: the original vegetation was characterized by the presence of woods of turkey, mixed oak forests and holm oak woods. In the damp areas of the ravines, there were alder and willow forests, whereas on the more hilly areas, the Mediterranean scrub was present. Today, vegetation as a whole is rather reduced.

From direct observation, specific issues tied to the area of study have emerged and also concern its surroundings: the first negative aspect concerns the level of degradation of the landscape of the Appia.

This degradation occurred over the years because of property speculation, but also because of poor land management and misuse. Indeed, this lack of attention to the protection of its nature led to an uncontrolled use of the land. Therefore, the original landscape is no longer visible.

The soil represents an essential resource for the territory, development and quality of the vegetation as it depends on it. Identifying and maintaining its original structure and quality can facilitate the requalification of the area; identifying the "vocation of the land" in order to strengthen the structure is essential. An investigation and accurate survey of the land and the existing vegetation can serve as the base of a sensitive and accurate project of requalification.

The area of the complex of Massenzio is occupied by cultivations that could be considered as being natural ecosystems that need to be maintained and developed. For this reason, very natural vegetation can be seen in the ruins of monuments, on the margins of hedges and along the natural irrigation systems. In these areas, the turf has very interesting features and aspects from a vegetation viewpoint, but also from a scientific and educational one. It represents a collection of important species from an ecological and evolutionary perspective.

An accurate survey and detailed cataloging may also determine the guidelines of the requalification process for the archaeological areas found within the Park of the Appia Antica.

The recomposition of the natural system can be conducted at the same time as the operation aimed to reconnect the archaeological system through timely, visual, historical and scientific dialog amongst the elements.

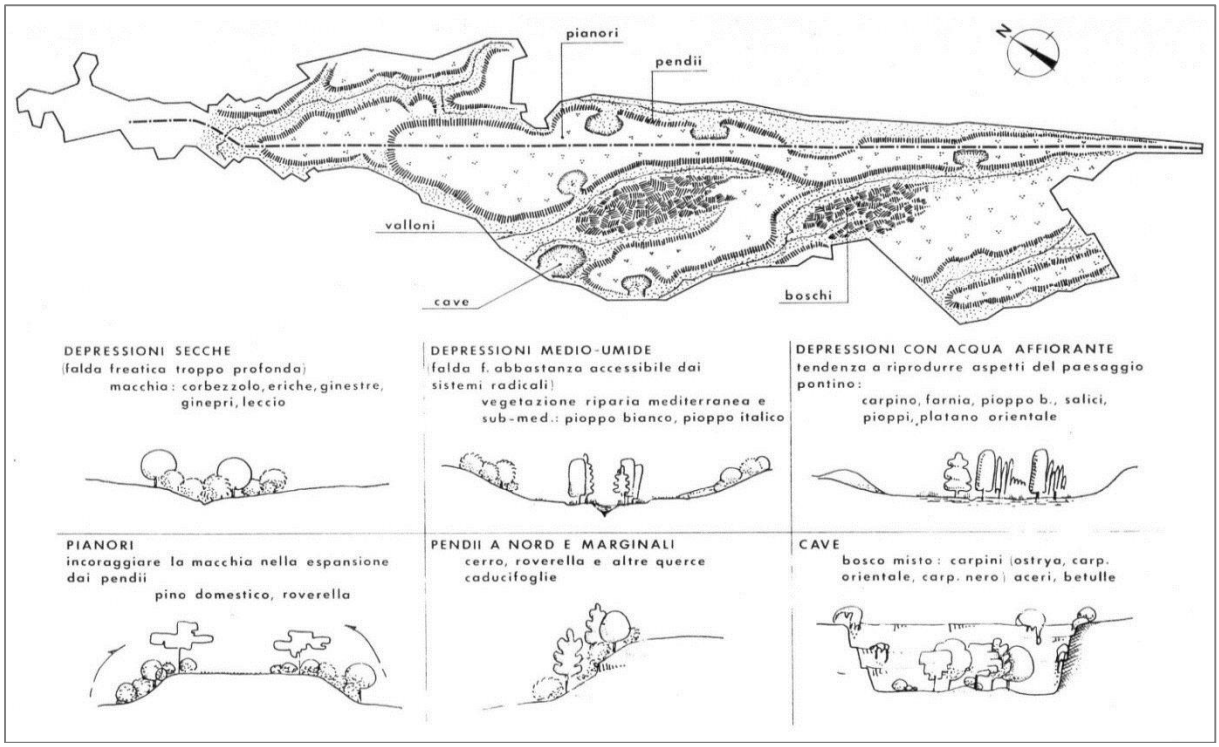

Fig. 9: Criteria for the reconstruction of the vegetation from the "Plan for the Park of Appia Antica".

2. The historical and archaeological development

Via Appia is almost entirely an artificial road that needs continuous and timely maintenance in order to keep its undoubted historical and environmental value. The complexity and diversification of the remains of the ancient structures draw attention towards more general issues linked to land management. Already Raffaello, Pirro Ligorio and other famous personalities of the Renaissance focused on the preservation and control of the Via Appia Antica by preventing vandalism.

Even in the eighteenth century, the abandoned and deserted street and its landscapes were described in a romantic manner through the poems of its visitors, who emphasized the charm of the ruins.

However, it is the most ancient one and also the most famous in terms of its history, the beauty of the surrounding landscapes, its evolution and the archaeological evidence it withholds. Its history is clearly divided into two very different realities. The two fronts are different from one another for their natural and archaeological aspects. This richness requires an accurate action of development. Its history must be understood through a timely path with stops to emphasize the value of the archaeological remains.

The tomb of Cecilia Metella has always been of main interest both for its grandeur and strategic location. Its history represents a simple tool of dissemination, which has often led others to forget about its surrounding areas, such as the complex of Massenzio. During the late ancient period, the complex of Massenzio ownership was passed down to the church. Since the street and surrounding artifacts fell into ruins, there is evidence of a description called "findus tertius" in a deed.

Throughout history, the circus, as well as a greater part of the complex, was named in a different manner on several occasions; in the map of Rome and of the Roman Countryside, the area was called "hippodromus" and the tomb of Cecilia Metella, "Capo di Bove", like in the map of Eufrosino della Volpaia in 1547.

In the second half of the 1500s, various excavations were conducted by the Matteis in 1550 and by the Ippolitos d'Este in 1560 in the Massenzio area. The important transformations and discoveries were documented and inscribed on the maps in various time periods.

For example, in 1825, Nibby excavated the spine of the Circus, which was then owned by the Torlonia family and the map of the area containing the Circus was called "the carousel".

A greater part of the archaeological and historical evolution can be deduced from the data recorded during the excavations and from the expropriations that were put into practice from time to time. Therefore, a comprehensive chronology of the historical events that occurred was recorded.

For example, after the expropriation of the papal monuments that were very close to the side of the street, the only monuments that were acquired as a public good - by the Municipality in 1940 - was the complex of the Tomb of Romulus and that of the Circus of Maxentius.

Highly valuable monuments are still to this date within private properties. Monuments such as the Casale della “Giostra” cannot be visited. Often, the "deformation" and boundaries of an area, such as the Massenzio one can no longer be included as a whole; therefore losing its identity and value.

2.1 The history of the artifacts

A source of the fourth century AD, the Chronograph of 354, lists the works that were carried out on the complex of Maxentius during his short reign (306 - 312 AD). This record reported that the emperor had had a “catecumbas” circus built to create tunnels within the caves to extract the pozzolana present in the area. This record was lost over time and the Appia circus, investigated and reproduced in the fifteenth century, was commonly attributed to the emperor Caracalla based on the news of its discovery. At the ruins, statues, portraits of that emperor and his mother Giulia Domna and an inscription dedicated to the young Romulus, son of the emperor Massenzio, were found during the excavations conducted by the Torlonia family and managed by the archaeologist Antonio Nibby in 1825. The layout of the circus and the imperial palace, already known in other tetrarch residences (Antioch, Milan, Trier) is enriched, like in the palace of Galerius in Salonica, by the presence of a dynastic mausoleum that becomes the central element of the entire complex.

The architectural forms turn into majestic and essential bodies that complete each other although interdependent at the same time. The elements are well-designed. The technique commonly used in the fourth century is the “opus vittatum”] that alternates ordered files of tuff blocks and bricks. The rest of the Massenzio constructions are configured as the last act of the transformation. Indeed, they concern the transformation of a rustic Republican villa (second century AD) built in a scenic location, on the slope of a hill facing the Alban Hills.

After a period dating back to the first empire, in the second century AD, the villa underwent a radical transformation under the supervision of Erode Attico, the Greek rhetorician to whom the property was given as a dowry by Annia Regilla. He transformed the entire area into a sanctuary called the "Pago Triopio" in memory of his wife after her tragic death. The three buildings were built to support, very wisely, the natural topography of the area as to avoid - as much as possible - big excavation and filling works while taking advantage of its characteristics.

Thus, the palace was built on the remains of the previous construction and the circus therefore stood towards the East and West, in the valley that gradually goes up towards the current Via Appia

Pignatelli from the Appia Antica. The lack of direct sources on the area from the late Middle Ages lets us assume that the factories were attached to the properties of Constantine and that they were passed to the church. Therefore, from the sixth century, they at least became part of the Appiae Patrimonium. Constantine made the same construction to build the first basilica with apsidal halls and aisles. It was later dedicated to San Sebastian.
The area concerning the memory "apostolonlm ad catacumbas" is often interpreted as a Christian contraposition against the monuments used to celebrate the figure of a pagan emperor.
A document from 850, which was preserved in the sublacense archive, reconfirms the ecclesiastical ownership of a land at the second mile of the Via Appia. In it, there are ancient structures in ruins called the "parrionis" that make it possible to recognize a locus qui dicitur girulus (the circus) and a curtis quae vocatur maruli (the area of the mausoleum). The land was defined as being arable and bordered with gardens and vineyards. It was irrigated by a major stream that flows through the area; like a sign of reunification with the Via Appia, an arcus maior iuxta silice publica is cited.
In 1081, a part of the circus was then owned by the Basilica of San Paolo f.l.m., while the area of the palace was given to the counts of Tusculum. In the first half of the twelfth century, these buildings - even if not attributed to Massenzio - were inserted in the Mirabilia Urbis for how majestic they were. In the following centuries, the information found on this area is extremely sketchy: in the fifteenth century, the circus was always referred to as girulus, while the estate of Capo Bove, owned by the Hospital San Salvatore ad Sancta Santorum, started to take shape. Later, it would also include these monuments, which got even more subdivided amongst different owners, making it very difficult to identify the heirs (Cenci, Mattei, Leni, Mutini, etc.).
While owned by Cenci, he had an access gate to the area built. This door consisted of two rooms on the ground floor for the guards and of an upper floor; today, this structure still houses the ticket office of the archaeological site. A chirograph dated 1648, states the pope Innocenzo X ordered the transfer of the obelisk of the circus which was still owned by Cenci. At this time, it was broken into multiple fragments to build the new fountain of Piazza Navona.
In the seventeenth century, the name "carousel" was used to refer to the structures of the circus. This name was therefore extended to the entire area North of the Via Appia Antica. At the beginning of the nineteenth century, the ownership was even more fragmented while the tomb of Romulus was now owned by Monsignor Fabio de Vecchis. The area of the "carousel" was owned by the Giorgi family and right after, the circus area and later the mausoleum were bought by the Torlonia Dukes of Bracciano.

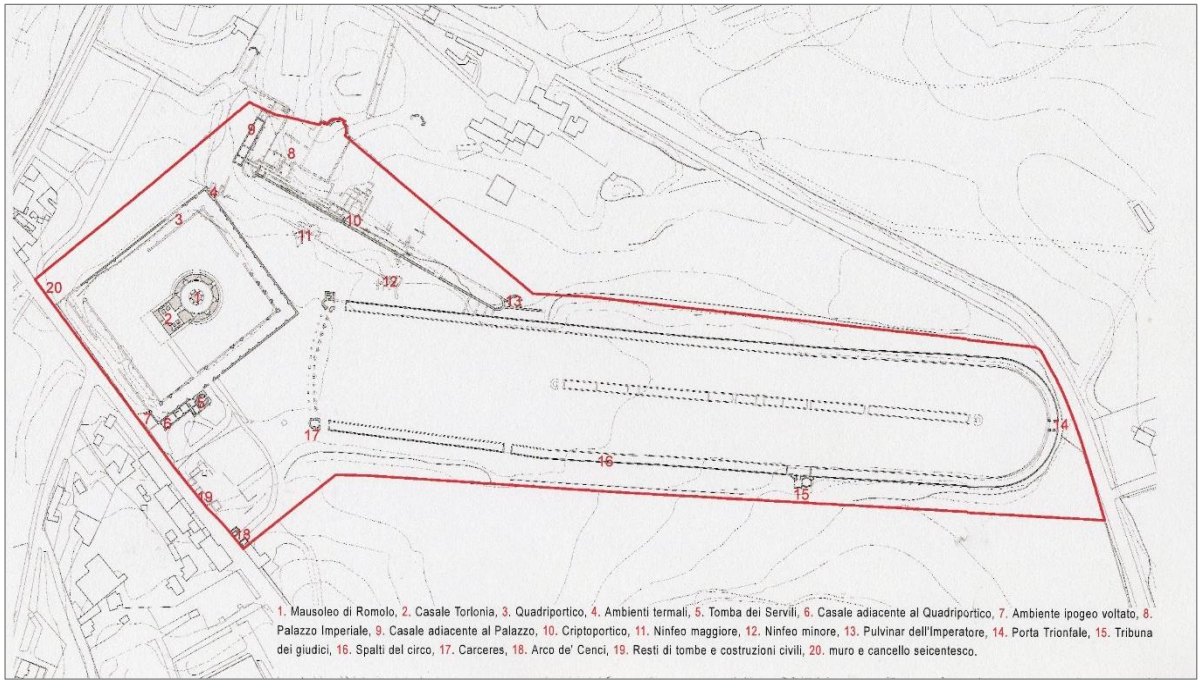

Fig. 10: Description of the existing building structures: floor plan of reference:
1 - Mausoleum of Romulus, 2 - Casale Torlonia, 3 - Quadrangle, 4 - Thermal Environments, 5 - Tomb of the Servili family, 6 – Farhouse next to the “quadriportico”; 7 - Vaulted underground environment, 8 - Imperial Palace; 9 - House adjacent to the Palace , 10 - Cryptoporticus; 11 - Larger nymphaeum; 12 - Smaller nymphaeum; 13- Pulvinar of the Emperor, 14 - Triumphal Gate, 15 - Forum of the judges; 16 - Stands of the circus; 17 – “Carceres”; 18 - Arch of the Cenci family, 19 - The remains of tombs and civil constructions; 20 - wall and gate from the seventeenth century.

2.2 Research project and archaeological excavations in the intervention area

The Municipal Superintendence already has projects of redevelopment and enhancement in progress for the archaeological area of the Villa of Massenzio.

Such projects concerned and still concern the mausoleum and circus buildings. Currently, the palace, erected on the Massenzio terrace North of the circus remains in a decentralized position with respect to the Tagliacarne Institute near the Via Appia Pignatelli. At this point, resuming research in the area of the palace, which was excavated in the 60s of the last century by the Division X and the Institute of Roman Studies thanks to the funds provided by the CNR, appears to be useful.

Such research made a unique contribution to the knowledge acquired on the evolution of the system of the suburban villa from the Republican and Imperial era; a real imperial palace of Tetrarch origin. Further research opportunities must now revolve around the definition of all the building components found on the main terrace and on the territorial boundaries lying North and East of the same palace.

As far as the circus is concerned, the supply of the tanks of the eutripus should be checked.

A systematic internal and external check of the hemicycle at the base of the triumphalis door should shed light on the entire system of water adduction that must be followed along the spine. While the work is being carried out, we should eventually decide whether or not to make an assessment of the North tower where there are traces of a water collection tank (G. loppolo).

Two subterranean rainwater collection system will be investigated in the area in front of the “carceres”. Near the pulvinar, we should also implement keys to study the ancient water drainage system in the area of the circus in view of a possible recovery. The location of these studies will be defined while work is in progress.

On the outside of the circus, we will implement the required tracks, or appropriate excavations to reduce the soil pressure on the ancient walls until reaching a flat surface along the entire parameter before proceeding to arrange the area in a natural manner.

Inside the circus, we will maintain the current dimensions of the system to make sure they correspond to the original surface of the track. We will however check the surface along the entire perimeter of the podium.

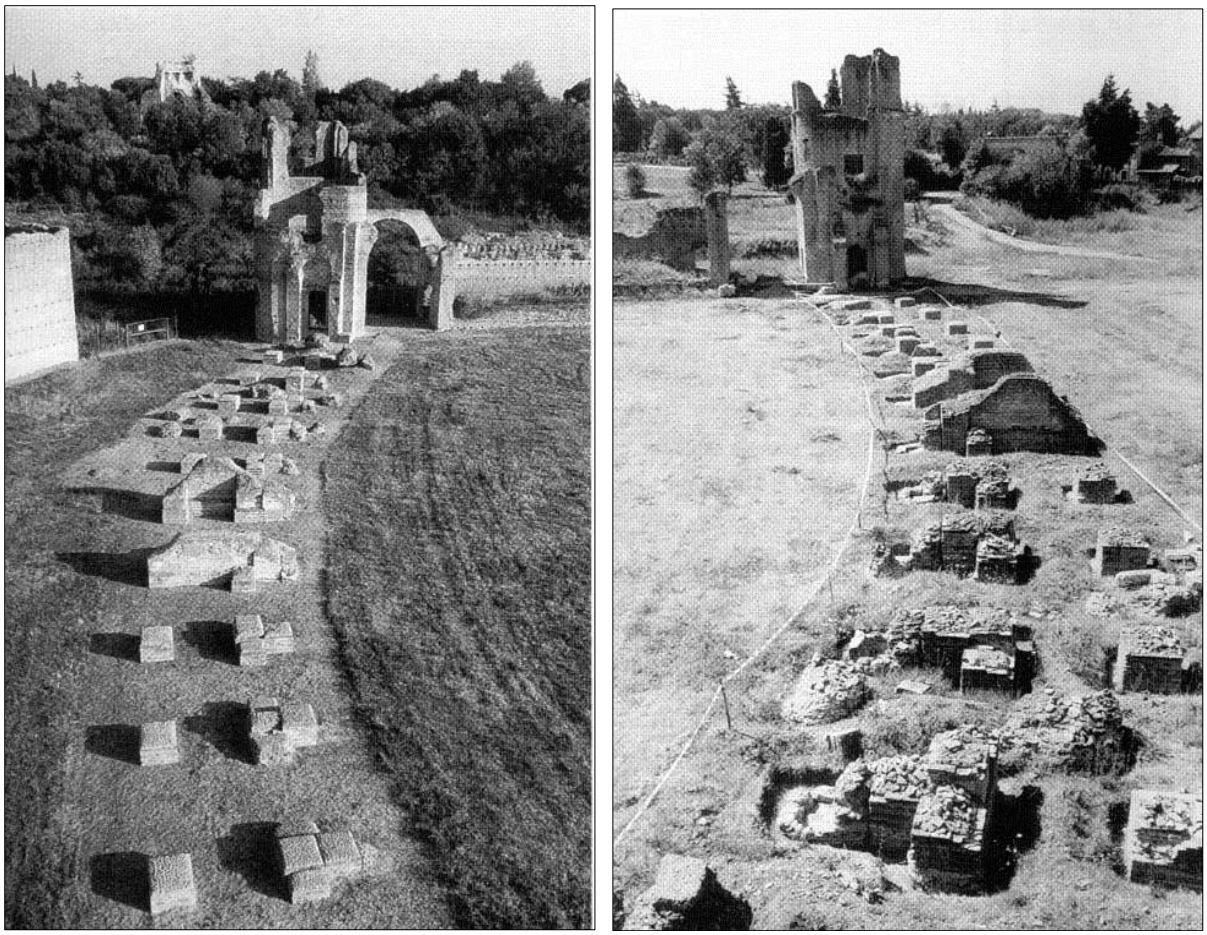

Fig. 11, 12: The remains of the pillars of the arches of the “carceres“ taken during the 1992 restorations - View from the South. The remains of the pillars of the arches of the “carceres” taken during the 1992 restorations - View from the North.

This preliminary environmental requalification project and the development of architectural enhancement is composed of many other in-depth studies that we cannot document here. The objective of the work was to define our knowledge of all the architectural components of this archaeological area, to highlight the relationships and the original plans and to proceed to a final system with appropriate itineraries for visits, but to also enhance the archaeological findings in consideration of the natural and environmental elements involved.

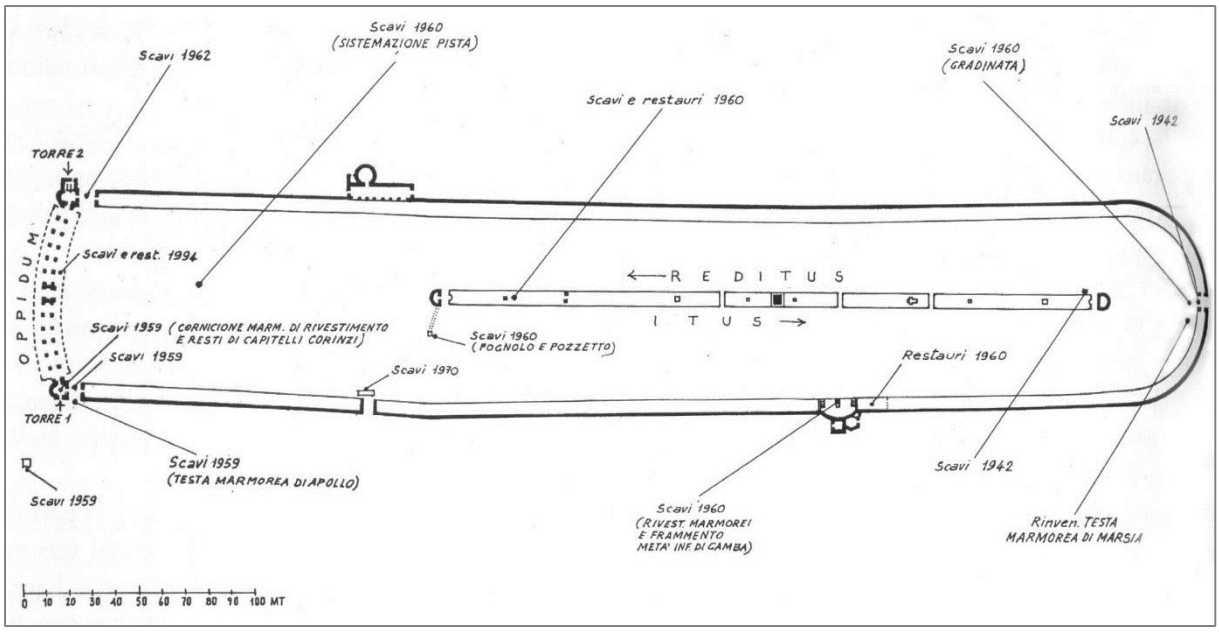

Fig. 13: Map of the excavations of the Circus. This map depicts the places and dates of every single excavation, 1940-1994.

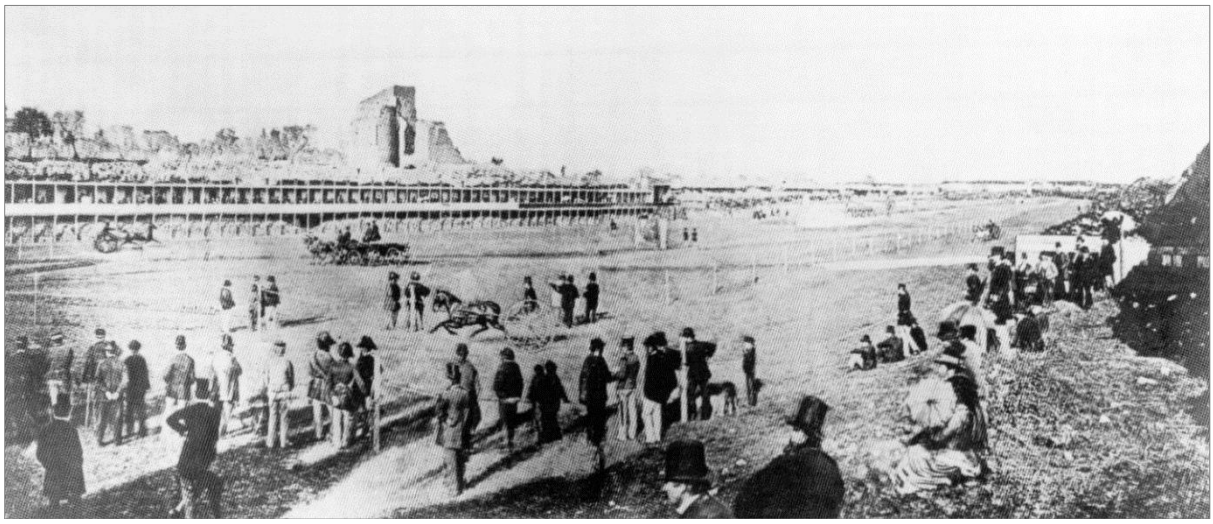

Fig. 14: The circus with the preparations for the sulky race, 1877.

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The matter of architecture: the medieval walls of Benevento

Luigi GUERRIERO[1], Luigi D'ORTA[2], Antonietta MANCO[3], Francesco MIRAGLIA[4]
(1) Second University of Naples, Department of Architecture and Industrial Design "L. Vanvitelli"
Via S. Lorenzo 3, 81031, Aversa (CE), Italy
luigi.guerriero@unina2.it
(2) luigidoradsl@libero.it
(3) antoniettamanco@libero.it
(4) francescomiraglia@gmail.com

Abstract
The material survey is a crucial component for the restoration and conservation of the architectural heritage, which can give information for the definition of the project.
The intention of restoring critically architectural reality, through the material survey, in fact, need graphic devices to highlight information not always visible by direct observation or photography.
Highlighting, for the walls, the marks of stone processing, the lithological nature of the materials, the construction discontinuities, the difference in construction techniques, it is possible to formulate the chronology of the structures, realizing that the artifact is an "architectural palimpsest", ie a set of complex layers.
This paper illustrates several material surveys regarding the walls of the city of Benevento, made with the aid of the direct survey and, subsequently, with drawing and graphic processing software.
With the aid of mensiochronological analysis it was possible to highlight the different materials used and the wall layers, distinguishing the stages of Longobardic Age from those of the Modern Age and the additions by the recent restoration works.
To establish, inter alia, an efficient tool for professional activity, the experience has given, due to its critical nature, a significant contribution to the knowledge of the walls of Benevento.

Keywords: conservation, mensiochronology, material survey, city of Benevento

1. Introduction
During the Course of Architectural Restoration held by Professor Luigi Guerriero – which is part of the Master of Science in "Architettura e Ingegneria Edile" of the Second University of Naples - the students carried out a material survey of the defensive walls of Benevento. Each student was assigned a wall segment and a tower and given study material consisting of a selection of the scientific literature on the topic and a topographic survey of the urban walls.
First, the students have carried out the survey of the segments and then they have used graphics editing software based on the principles of projective geometry. In this way they have developed material surveys in vector form, which allowed a critical analysis of the city walls. The stratigraphic analysis of the walls was mainly based on well-known research protocols, which allow the dating of the structures depending on their configuration. This approach revealed the materials used and their stratification and allowed the identification of various phases (Longobardic Age, Late Medieval Age, Modern Age and additions due to recent restorations), significantly increasing the knowledge of Benevento city walls, which are the product of a complex evolution.

2. Historic and urban overview
As is known [1], the defense system of Benevento - analysed in this paper - is mainly related to the gradual crisis of the Roman world in the Late Antique period. The settlement founded in the III century B.C. - which extended lengthwise along the NW-SE direction - was presumably situated between the bight of the river Calore, beyond the Cellarulo quarter (NW), and the area of the S. Sofia complex

(SE), following the orography of the site, characterized by natural terracing. The urban structure - typical of the Roman Age - was made up of NW-SE oriented *decumani* and *cardi*, which formed *insulae* about 35x70-100m large.
Signs of the urban structure dating back to the Roman Age can be found both inside and outside the city walls. Among the many *intra moenia* evidences, there are the theatre, in the south-western district, the Arco del Sacramento, a thermal complex found nearby the cathedral, the Arco di Traiano and the ruins of the aqueduct, incorporated in the Rocca dei Rettori (XIV century), on the eastern border of the city. Among the *extra moenia* evidences, there is a building nearby the river Calore - perhaps a cryptoporticus - in the Cellarulo quarter, and the ruins of the amphitheatre nearby the river Sabato.
During the Classical period, the main access to the city was on the Appian Way, whose urban route was subjected to slight modifications until the IV century A.D. In the final configuration, it led to the city through the Leproso bridge, which crossed the river Sabato and roughly followed the route of today's Corso Dante and Corso Garibaldi, up to the Rocca dei Rettori. During the Imperial period, the Via Traiana - which led to Benevento through the Arco di Traiano - was built alongside the above-mentioned path.
The crisis in the Late Antique period, caused the abandonment of a great part of the Roman settlement, which, at the time, was protected by smaller city walls, presumably built in the IV century. Fragmentary elements of such walls can be found nearby the Arco del Sacramento, together with the pentagonal salient made up of large reused limestone blocks, which was adjacent to the arch. The above-mentioned defensive perimeter - greatly damaged in the first half of the VI century, during the Gothic Wars - was rebuilt by the Longobards in the VI and VII centuries [5].
At an early stage, the Longobardic city was confined within restricted boundaries, with the city's western district corresponding to the current Cellarulo quarter - where the structures of the amphitheatre were cut in height for strategic reasons - remaining out of the defensive perimeter, together with the southern urban area - where the theatre was - which, nonetheless, kept its use, as evidenced by recent archaeological research [1]. It was after the fall of the *Langobardia Maior* at the hands of the Franks, that Benevento assumed a central role in the organization of the surviving Longobardic power in Italy, embodied in the figure of the Duke Arechi II. At the end of the VIII century, he gave birth to a great program of renovation and expansion of the city, which mainly regarded the south-western and north-eastern urban districts and improved the defense system in order to contrast the dreaded threat represented by the Franks. Such program was put into practice with the annexation of the *Civitas Nova* and the building of monumental complexes representing the city's power: the *Sacrum Palatium* on the Piano di Corte and the S. Sofia palatial church.
In the Late Middle Ages, after Benevento was reduced to the rank of pontifical enclave, isolated within the Kingdom of Sicily, the rectors' seat (Rocca dei Rettori) was built nearby the Porta Summa, and, until the XIX century, it represented the eastern border of the urban expansion and a cornerstone of urban defense structures [3]. Important works of reconstruction of the residential area and of the walls - which had been necessary due to war damages and damages caused by the several earthquakes that stroke the city - date back to this period.
In the Modern Age there have been devastating earthquakes in 1688 and 1702, which encouraged a further renovation of the buildings and extensive reconstructions of the city walls, supported by the archbishop V.M. Orsini and directed by the architect C. Buratti [2] [3] [4].
The main transformations of the Modern Age - recorded in the local topography, starting from Casselli's map of 1781 - regarded, among other things, the gradual occupation - especially in the northern district - of the areas close to the walls, which were incorporated in the houses, and the restoration and partial reconstruction of some greatly damaged sections of the fortification, especially on the southern side.
In the second half of the XIX century, significant alterations of Benevento's historical centre took place - according to the general city planning trends widespread in Europe at the time - with extensive demolitions of the city walls and buildings for the construction of new roads or the expansion of those already existing. At the same time, an *extra moenia* expansion took place outside of the demolished Porta Rufina, on the southern side, and around the new train station, on the northern side.
In the aftermath of World War I, the city plans encouraged the development of new roads to the detriment of the historic buildings, and the building of new residential areas east of the fortified centre and in the residual empty areas nearby the Torre della Catena. World War II and the following reconstruction caused enormous damage, altering the environmental context of the city walls. Further alterations have been caused by debatable interventions during the last twenty years.

3. Mensiochronological analysis

The material survey of large segments of the city walls - which can be observed in the images - and the mensiochronological analysis have showed significant differences in constructions and a stratigraphic complexity of the structures greater than observed by past studies.

Firstly, only some segments can be referred to the Longobardic Age. These are built with river pebbles and a great quantity of reused materials, such as limestone blocks of considerable size (*spolia* from Roman monuments in *opus pseudoisodomum*, like the theater or the amphitheater) and brick fragments extracted by breaking classic buildings. The structures of the Modern Age, instead - more numerous than the medieval ones - are usually built with “scapoli” of limestone and with “cantieri” of bricks, sometimes together with tuff of Campania and, finally, sandstone, an easily available material in Benevento.
Walls dating back to the early Middle Ages can be found in the north-eastern, western and south-western part of the defensive system, corresponding to the curtain walls C3, C6, C9-14; in other sections, only the basements - as in the curtain wall C5, in the towers T9 and T11 and in the segments C12a and C13 - can be referred to the Longobardic Age. In these areas, the stone – which appears disorderly assembled, with a sequence of pebbles and limestone blocks considered illogical by the recent historiography - was used in a way that allowed the optimization of the construction timing and the site organization. In fact, the urgent need to set up an effective defense, in fear of imminent attacks, determined, in the first Longobardic period, the organization of a complex building site which involved all the construction sites in the whole city.
For this reason, many builders, supported by teams of transport workers, manual laborers and scaffolders, had to build individual segments of the city walls, facing the random arrival of stone materials collected from the beds of the nearby rivers Sabato and Calore - which converged on the site of Benevento - from Roman monuments in ruin and, to a lesser extent, from the ground.
As a result, the materials were not subjected to preliminary sorting and storage processes, but were used (basically following horizontal alignments) as soon as they arrived on the building site. The building process often involved the superimposition of considerably large and heavy limestone blocks on walls made up of small pebbles, giving birth to a specific wall type.
As mentioned before, the segments of Longobardic walls not altered by later interventions are set up following a typology called “a cantieri”. The “cantieri” had non-uniform height and were made up of irregular materials arranged by placing larger “scapoli” at the bottom and small irregular stones at the top of the horizontal alignments, as it was usual in this kind of structure [6].
In the segments dating back to the Longobardic Age, the height of the “cantieri” is frequently adjusted by placing large recovered blocks of limestone, apparently randomly arranged, but actually placed as regulatory elements of the alignments, in spite of the constraints imposed by the need to place them as soon as they arrived on the site.
Similarly, fragments of bricks are mainly used to fill the spaces between the larger stones. Some towers show a different construction technique probably due to the fact that they had to withstand greater stress during attacks. Thus, the square salient T11 is almost entirely built with recovered limestone blocks and alignments adjusted in height by corner elements. The river pebbles - when not regulated by the recovered blocks - are set up “a cantieri” with heights in the range of 22-28 cm and 33-43 cm, often together with brick fragments and erratic “scapoli” of sandstone as in curtain walls C13 and C18 and in the tower T11.
The parts rebuilt after the earthquakes of 1688 and 1702, located in particular in the south-western area, display walls made up of river pebbles and “scapoli” of cleaved limestone with inserts of sandstone, and more rarely of yellow tuff, with alignments of single or double rows of bricks, laid in 53-63 cm high “cantieri”, as in curtain wall C14c [3].
In addition, modern and contemporary buildings that have incorporated parts of the medieval walls show typical alignments with rows of “bozzette” in gray tuff datable to the XVIII century (tower T9, curtain wall C12a), rows of “blocchetti” of the same ignimbrite, dating back to the XIX century, and, rarely, limestone “blocchetti” of the late XIX century, as in curtain wall C5 [2] [3].
It should be finally noted that the stratigraphic investigation of the historical material is particularly difficult due to recent work carried out on the city walls, with the filling of the mortar joints which erased many “cantieri” with obvious detriment of the visual and cultural values of the monument. In addition to that, integrations to the walls realized with “scapoli” of limestone have been carried out for the entire extension of the urban walls, in disregard of the structures and of the context in which they are situated.

4. Conclusions

The archaeology of the urban walls, based on material surveys, has resulted in a significant increase in knowledge about the history of construction of the city walls of Benevento. It has also highlighted the survival of few early medieval parts and the repeated reconstructions and repairs of building curtains and towers, documented by the different materials and different construction techniques used.

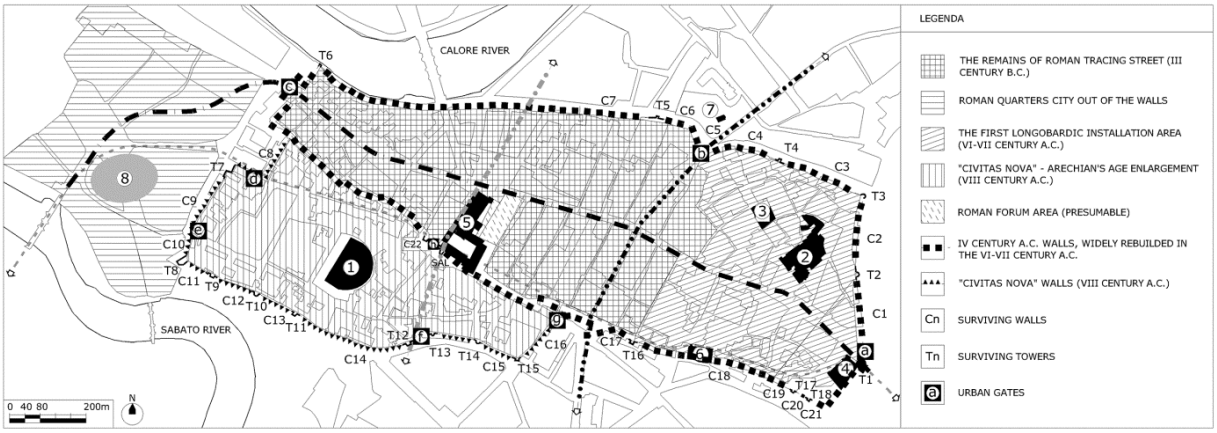

Fig. 1: Roman and Longobardic Age chronology development. Re-elaboration, courtesy of ROTILI, Marcello (2010).



Fig. 2: CASSELLI, Saverio. *Topografia della Pontificia Città di Benevento...*, 1781, courtesy of ROTILI, Marcello (1986). *Benevento romana e longobarda*.

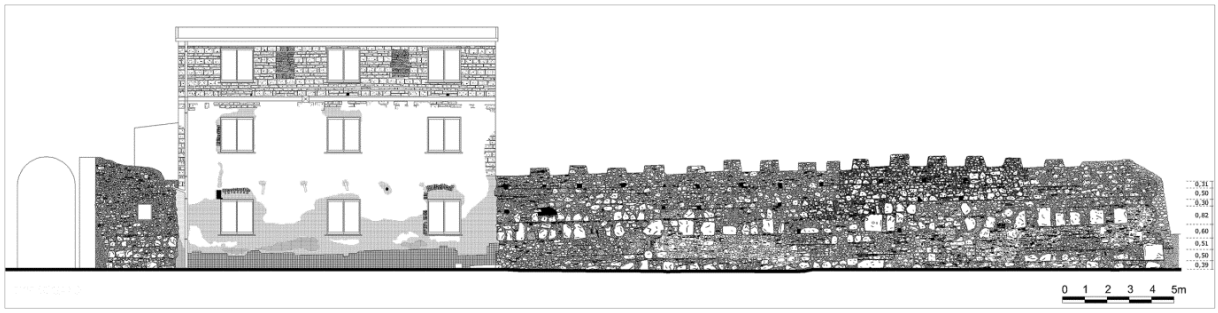

Fig. 3: Benevento, urban walls, curtain C10 (survey: G. Capasso).

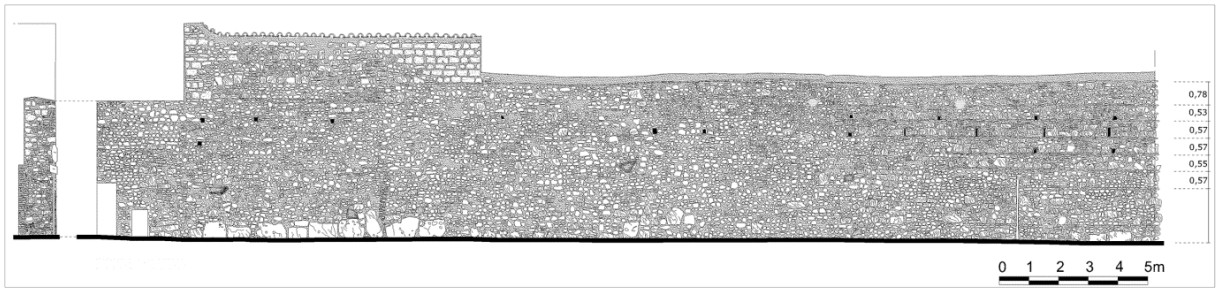

Fig. 4: Benevento, urban walls, curtain C14 (survey: D. Cinquegrana).

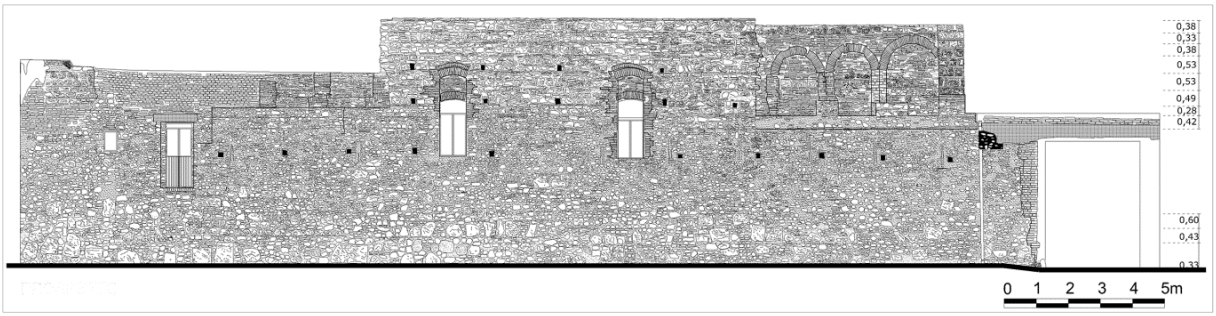

Fig. 5: Benevento, urban walls, curtain C13 (survey: M. Lombardi).

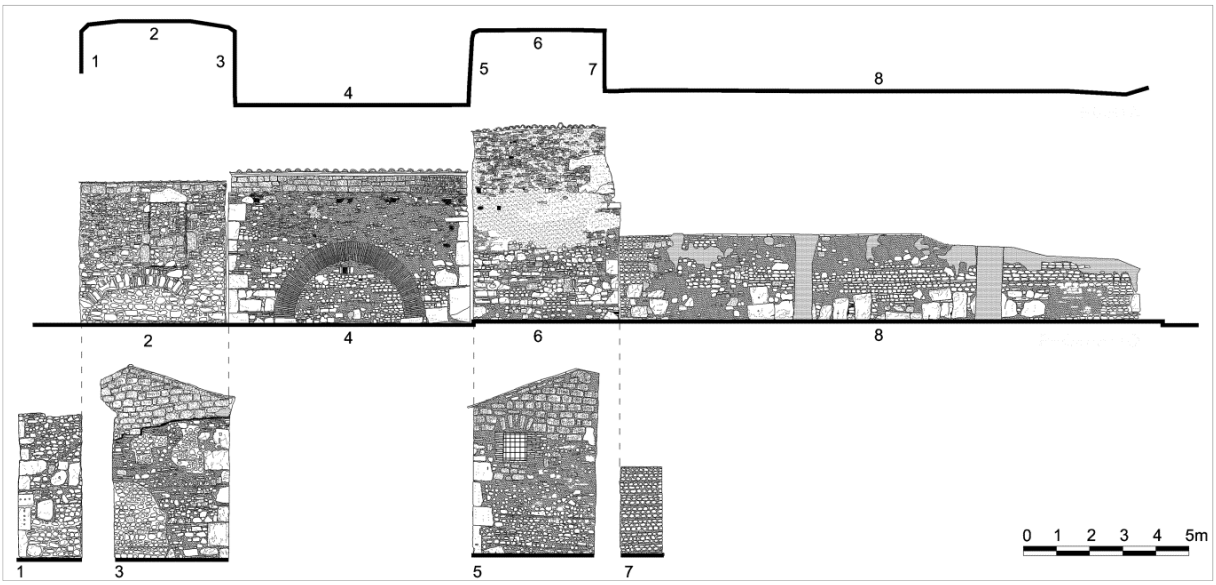

Fig. 6: Benevento, urban walls, tower T9, curtain C12a (survey: M. Iannone).

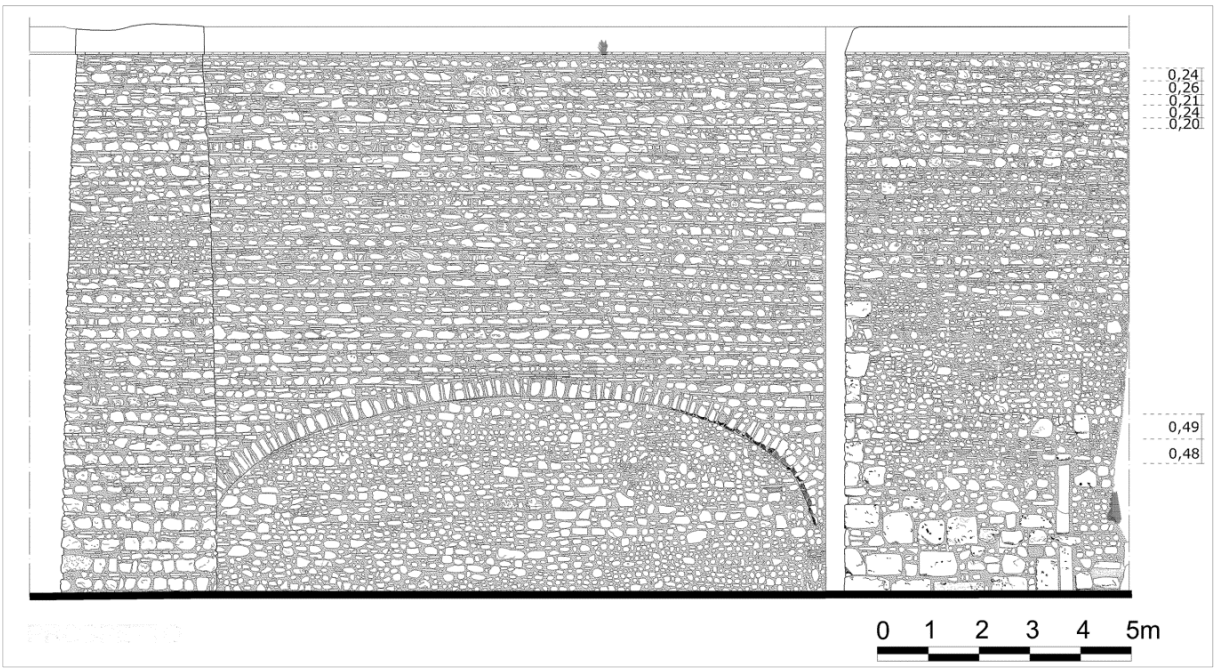

Fig. 7: Benevento, urban walls, tower T15, curtain C16 (survey: M.M. Palma).



Fig. 8: Benevento, urban walls, curtain C19 (survey: G. Borriello).

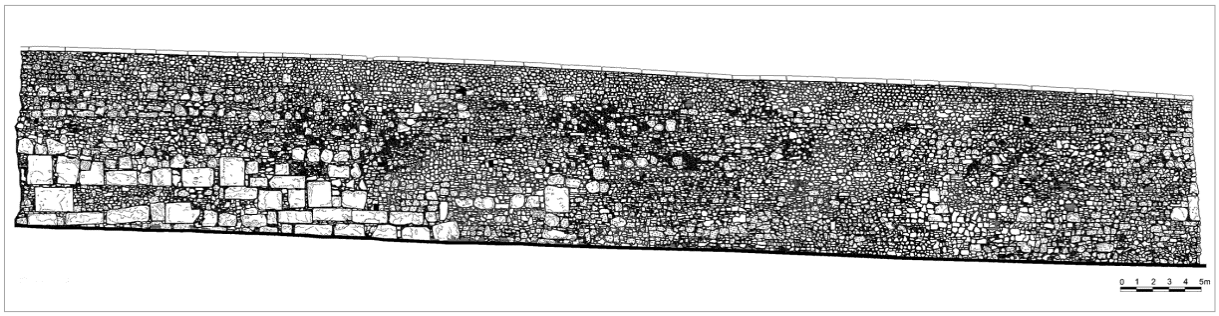

Fig. 9: Benevento, urban walls, curtain C7c (survey: E. Scarano).

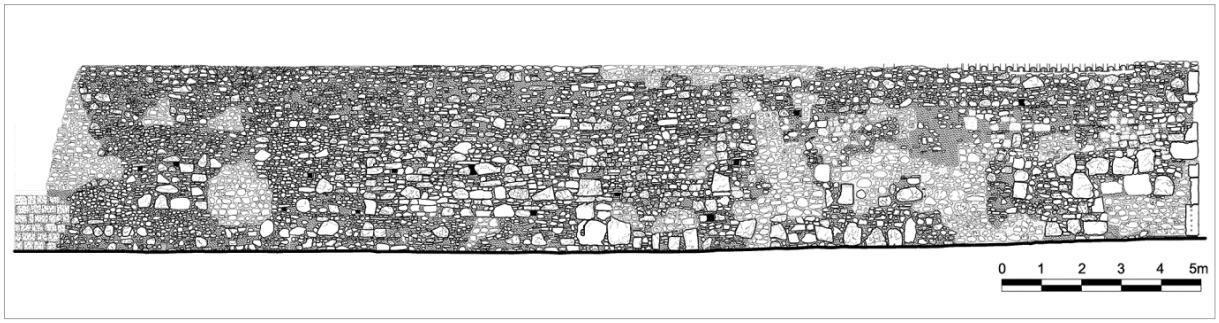

Fig. 10: Benevento, urban walls, curtain C11 (survey: L. Ambrosino).

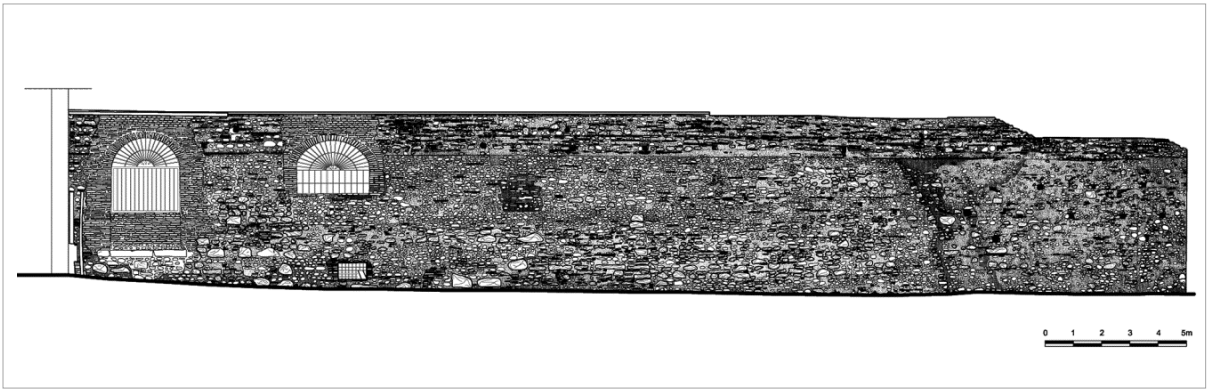

Fig. 11: Benevento, urban walls, curtain C3 (survey: A. De Francesco).

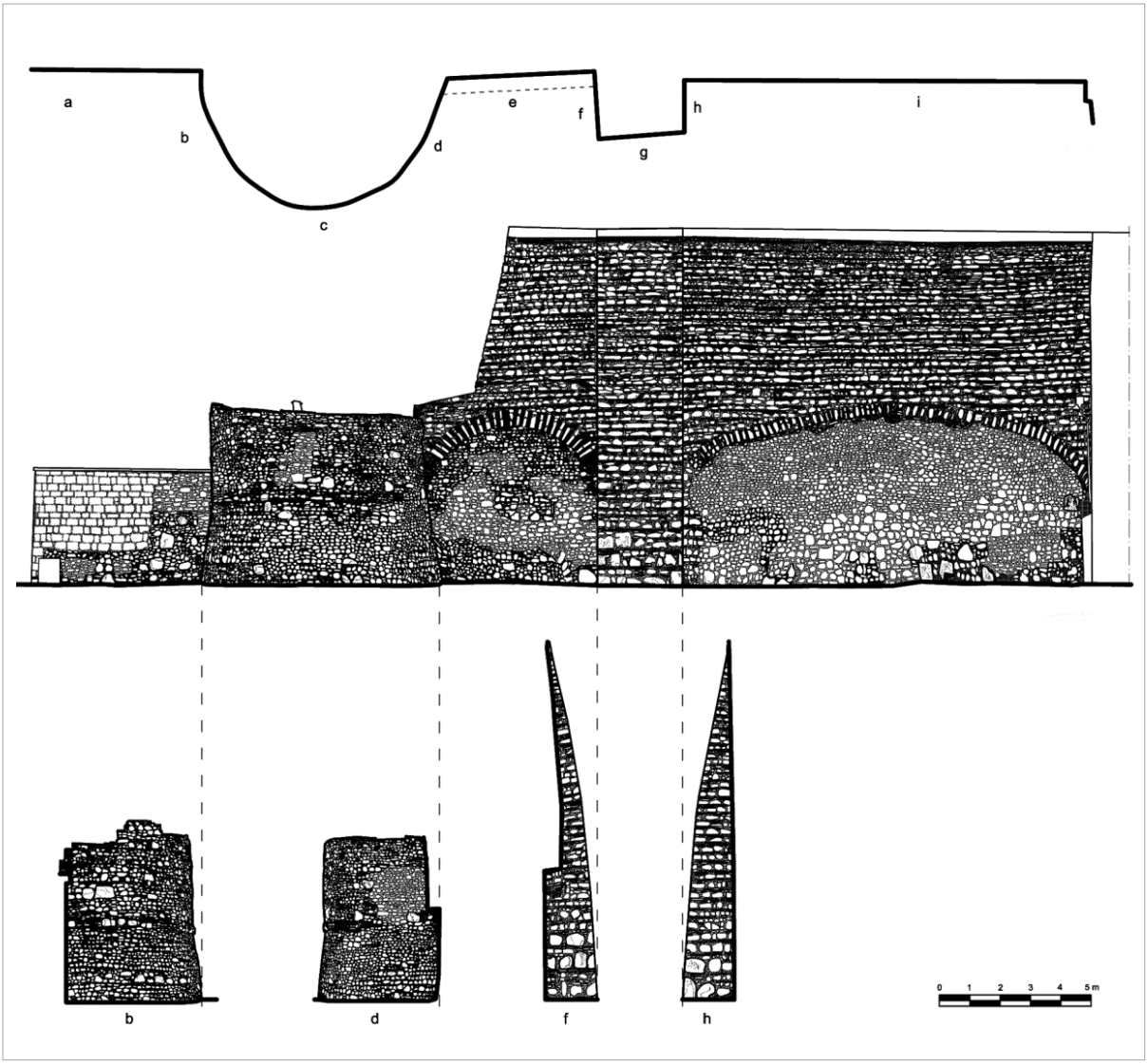

Fig. 12: Benevento, urban walls, tower T14, curtain C15 (survey: F. Alterio).

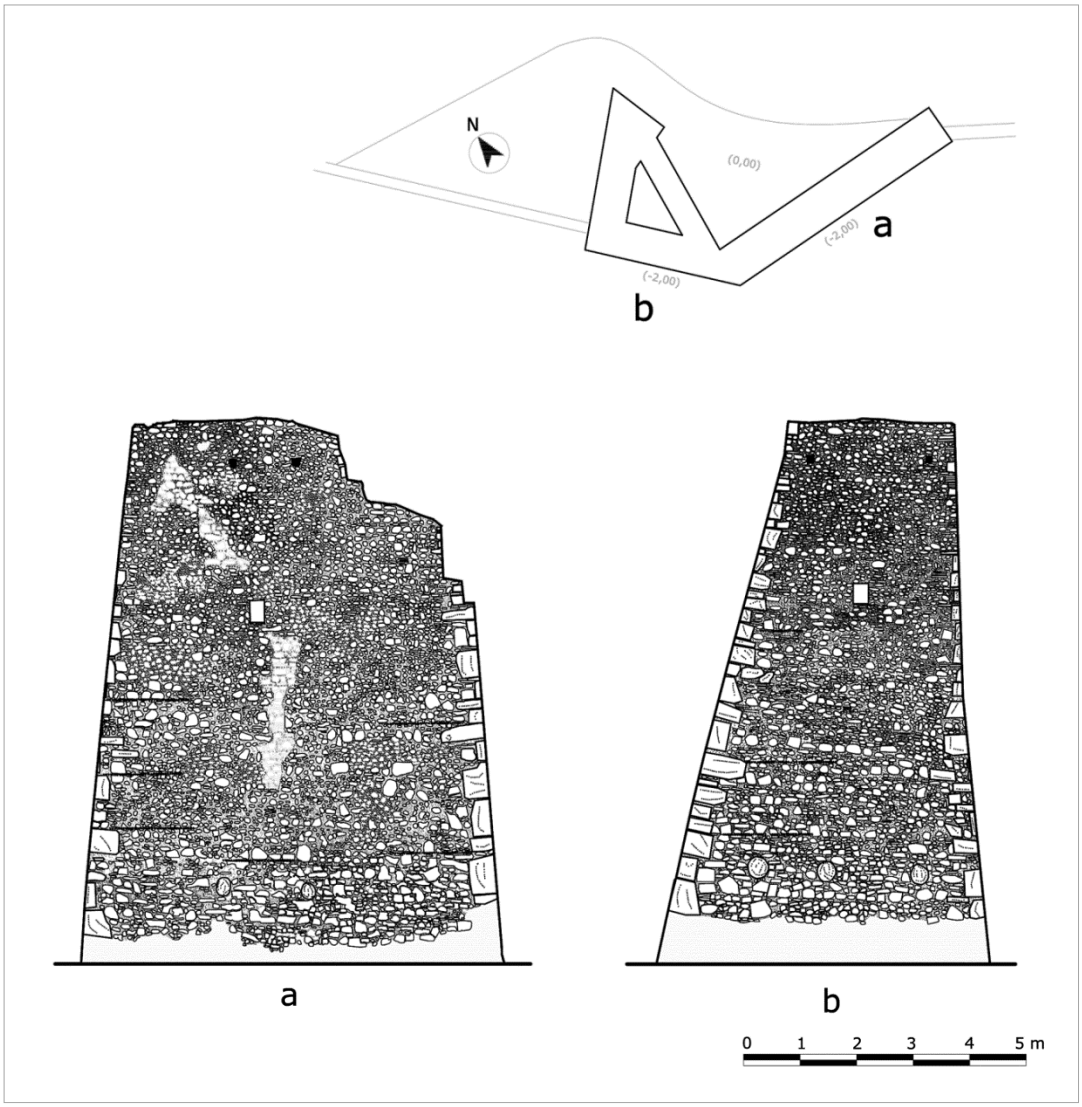

Fig. 13: Benevento, urban walls, tower T8 (survey: L. D'Alessandro).

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Dwelling on the past: Built heritage and urban development policies - The case of Vienna (Austria)

Barbara RIEF VERNAY
Ecole doctorale « Milieux, Cultures et Sociétés du passé et du présent », Université Paris Ouest Nanterre La Défense, France and Centre of Regional Science, University of Technology, Vienna, Austria
E-mail : riefvernay @yahoo.com

Abstract
European metropolises are more than ever concerned about the rehabilitation and the staging of their built heritage. Built heritage is no longer limited to serving as a cultural symbol. As a result of culture-oriented urban policies, designed against the backdrop of globalisation, built heritage is increasingly considered as a resource of both economic and urban development.
Vienna disposes of extensive historic built-up areas (baroque era and late 19th century), which have been rehabilitated over the last couple of decades. The renewal, however, has soon taken on its own dynamism: the facades of historic districts are not only showcased by architectural lighting but they also find themselves utilized as sceneries for cultural events and Christmas markets. As a recognizable identifying symbol and an image builder, the city's built heritage is even used for urban development strategies and city marketing concepts. Hence, the "Imperial Vienna" theme has become the most important brand module in the city's own touristic marketing.
This paper aims to highlight the role of Vienna's past and its built heritage when it comes to urban development policies. Major issues discussed in this analysis are the objectives of the use of heritage and the prevailing mechanisms to be observed.

Keywords: Vienna, built heritage, urban development policies, international competition of cities

1. Built heritage as a resource for urban development policies
Built heritage is no longer limited to its cultural, representative function. European municipalities have recognised the importance of architectural monuments and historic districts for urban economy and development. Hence, they have made intense efforts to renew and to showcase historic buildings, which often have been neglected over decades. In the global competition between cities, European towns increasingly want to stand out for their cultural potential and their built heritage. Today rehabilitated historic districts staging cultural or sports events are considered as pillars of identity and image. By virtue of these qualities they are used as an instrument in the cities' efforts to attract tourists, skilled workforce, major events, investments, establishment of new companies etc.
The growing importance of culture and cultural heritage in the context of urban policies is attributable to the changing framework of urban development as well as to the necessity to provide new economic resources. Deep structural changes such as the economic transition from industrial to service - oriented, the advanced degree of globalisation, or the emergence of new communication technologies have imposed new challenges on European cities. While the cities' governments' primary obligation has been to create the preconditions for safeguarding jobs and demographic stability through industrial growth and mass consumption [1], they increasingly look for entrepreneurial initiative. They opt for large-scale projects and search to adapt to globalisation and to market-driven processes, always with an eye on their international competition, and put great emphasis on specialized location marketing [2]. In such an entrepreneurial or "post fordist" conception, an economy based on knowledge , creativity and culture are preferential fields of action -The reassessment of the "ancient European city", its virtues and its history are part of this approach [3].
Vienna, the Austrian capital, also ventures on its cultural richness and on the attractiveness of its built heritage. "Urban actors" have recognised - here again – the economic and especially touristic potential associated to a renewed and staged historic city. However, Vienna's reputation as an outstanding cultural centre is nothing new. What is new is the extensive employment of culture and cultural heritage for development issues. In many other places, this may well be considered as a result of the above-mentioned global economic and cultural trends, but in the case of Vienna a number of specific conditions add to this phenomenon. First and foremost, the geopolitical changes in Central and Eastern Europe during the last two decades. The fall of the Iron Curtain and the subsequent gradual enlargement of the European Union concluded a long period of isolation for the city sitting at the boundaries of "Western Europe". As a matter of fact, Vienna and its region have shifted back to the centre of Europe. Since then, the Austrian capital has been keen on developing into a centre for international

organisations and establishing itself as an important hub for business between Eastern and Western Europe. On the downside, the city is exposed to international competition, in particular with other central European cities such as Prague and Budapest – a competition which is increasingly led on a cultural-based level. In response, the former Habsburg residence strives to position itself as a “European cultural metropolis”, pointing out its origins, its centuries-long tradition and in particular the imperial history and the corresponding heritage.
The following chapters will focus on the role of built heritage within the Viennese urban development policies. A short retrospective view on the two most significant historical phases of urban development shall provide an insight into the built heritage of the city and its later reception. Subsequently, the employment of built heritage within urban development planning, tourism advertising strategies and the organisation of cultural events will be discussed, including an examination of the objectives behind these policies.

2. Vienna’s built heritage

Vienna disposes of a vast historic building structure which mainly dates back to the baroque period as well as the late 19th century. In the following these two prosperous periods shall be discussed briefly.

2.1 The first wave: baroque period

The urban transformation of Vienna between 1680 and 1740 can be considered as a consequence of the countering of the Ottoman troops and the Counter-Revolution, both led successfully by the House of Habsburg [4]. The imperial residence’s newly gained power as well as the renewed strength of the Catholic Church turned Vienna into a major centre of information, communication and culture [5]. Such a role required new representative buildings and infrastructures.
Although the urban transformation was initiated by the 'monastic offensive' in the wake of the Counter-Reformation [6], the overall restructuration of Vienna into a baroque town was mainly initiated by the arrival of noble families, who were attracted by the radiance of the city. Many existing buildings inside the ramparts were transformed into palaces, and splendid garden palaces were erected outside the city [7]. The Habsburg Family itself did not issue guidelines on the baroque urbanism but nevertheless put a lot of attention on the transformation of their own residential buildings. Lavish palaces such as Schönbrunn and numerous churches were constructed in this spirit. This way, the Habsburgs strategically employed baroque architecture to express their claim to power and their glory. On top of that, Vienna as the capital and imperial residence has been home to the crown of the Holy Roman Empire of the German Nation since the 16th century, stipulating it as Rome’s natural inheritance and the symbolic concentrate of the Habsburg Empire. These ambitions are particularly obvious on the St. Charles Church built between 1715 und 1738 by J.B. Fischer von Erlach. The church’s facade (Fig.1) reveals During the following century baroque architecture was widely rejected as “overloaded”, “bizarre”, “eccentric” and “degenerated”[9].But it was only at the time of the urban transformations of the late 19th



Fig. 1: St. Charles’s Church as a landmark of absolutist imperial power (photo: author)

century which had resulted in the demolition of a major part of the baroque building stock of the inner city, that this style was seriously reconsidered. Baroque architecture became again popular at the Viennese court who, striving to regain political influence within Europe, was interested in a cultural demarcation from the German Empire. In this light, the feudal, absolutist and catholic coding of the baroque architecture, together with its association with the "golden age" of the Habsburg Empire played an important role [10]. Baroque and neo-baroque architecture was then even chosen as the "national architecture style" of Austria. The full rehabilitation of baroque architecture took place during the first half of the 20th century. In the interwar period as well as after 1945 it was used by the public administration as a projection surface for the national identity [11] of a strongly reduced and thus redefining Austria.

2.2 The second wave: late 19th century transformations

The second significant period of urban and architectural development in Vienna was that of the late 19th century. Industrialisation and population growth (the Viennese population rose from 900.000 up to 2 mn. between 1870 and1910) triggered an unprecedented modernisation of the old residence Vienna into a European metropolis [13]. From the 2nd half of the 19th century on, urban authorities launched significant infrastructural and pan-urban projects. The driving forces behind these undertakings were no longer the nobility or the church but the capitalist economy and an emerging bourgeois society [14]. At that time Vienna was not only the imperial residence but also a major administrative and economic centre and financial market place. Moreover, it was a main traffic junction within the Austro-Hungarian Monarchy [15]. All these evolutions were reflected in the new cityscape.

The old baroque city centre was replaced by a modern business district with multi-storey buildings designed in a historicist architectural style [16]. The building stock of the former suburbs was also demolished for the most part and replaced by higher tenement buildings. Just like in Haussmann's Paris or in Cerda's Barcelona, design and measures of the building complexes were subordinated to standardising technical and architectural guidelines.

The starting point of the so-called Viennese Master Plan of the late 19th century was a ring avenue (Fig.2) situated on the site of the former ramparts. The road was meant to join the city centre with the suburbs and to favour the extension of the overall road network. Along with its structuring function, this magnificent ring boulevard originally was to serve as a medium to express the sovereign status of the Habsburg dynasty. However, after its completion in the beginning of the 20th century, the Ringstrasse, hemmed by public institutions such as the University, the Parliament, the Stock Exchange but also bourgeois palaces, represented less an imperial gesture than a demonstration of the growing influence of a new liberal elite [17]. The only urban intervention from the already weakened imperial

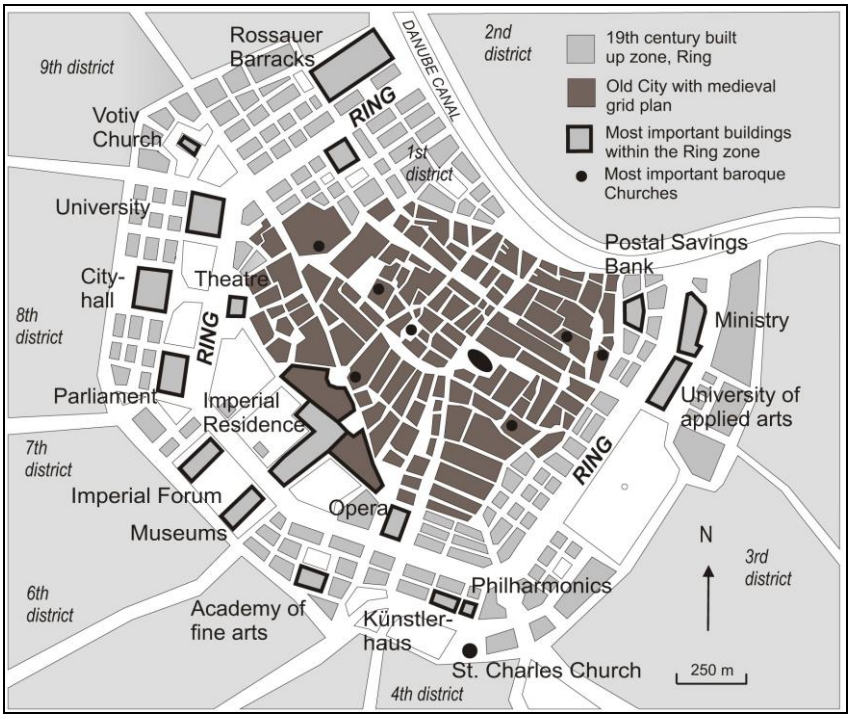

Fig. 2: Inner city of Vienna with the area around the Ring avenue with its mighty 19th century buildings (map: author)

court was the construction of the imperial forum (fig.2) which crosses the Ringstrasse at the level of the imperial residence. The forum whose architectural conception referred to the forums of the ancient Rome [18] was never completed and remains until now as torso-like entity.
As far as the later reception is concerned, the historicist built heritage of the late 19th century including the Ringstrasse were disliked by architects, art historians and a major part of the Viennese society until the 1970s. In the course of the post-war reconstructions the urban fabric of the late 19th century had to be restored, however, it was common practice to remove the ornamental facades in order to achieve plane and bare surfaces [21] according to the then predominant architectural functionalism. As in many western European cities, Viennese development policies gave then priority to the urban extension at the outskirts of the city. This tendency caused the decay of the inner city and a rise in vacancy rates [22]. Nevertheless, the rejection of the principles of the "functional city" in the advent of the cultural phenomenon of postmodernism at the end of the1970s turned the "old European city" into the new leading principle. This resulted in a comprehensive "return" to built-up areas of the 19th century and in an appreciation of its urban and aesthetic qualities. Today the Ringstrasse and its representative buildings are considered as a piece of art, as a place of collective memory and identity as well as an asset which contributes significantly to the force of attraction of Vienna [23]. Since 2002 the city centre and the area around Ringstrasse figure on the UNESCO World Heritage list.
The built heritage of both, the baroque era and the late 19th century, are now continuously rehabilitated as part of an overall renewal policy which has been effective since the late 1970s.

3. The contemporary use of built heritage in Viennese development policies

Evidently, both the baroque as well as the 19th century legacy became a recognized cultural heritage only after a long period of rejection and neglect. The sole rationale behind transforming it into cultural heritage were contemporary political needs. Clearly, cultural heritage is not something naturally given but constructed from the perspective of the present and always associated with the current needs. In the 18th and the 20th centuries these needs were of political and ideological nature, whereas today they are mainly economy-driven.

3.1 Built heritage as a pillar of identity and image in urban development planning

The most important documents of the Viennese urban development planning are the "*Urban Development Plan 2005",* also called „*STEP 2005"* [24], and the *„Strategic Plan for Vienna"* [25] from 2004. While the first one is meant to provide guidelines for the spatial dimension of the urban development in terms of economic, social, demographic, ecologic and cultural aspects, the latter aims at positioning Vienna in a national and international context and provides impetus through strategic projects. Both plans reflect the striving for transformation of Vienna into a modern metropolis; they reveal the ongoing structural changes, in particular concerning the tertiarisation of the economy and they take into account major infrastructural projects. Within the envisaged urban development policies, culture and cultural heritage gain in meaning as they constitute a strong element of the urban identity. Additionally, they are able to underpin a positive image of the city in the international context. As such, culture and heritage are considered to form a new basis for urban economy.
"Architecture and urban design" is one of the 9 fields of action within the „*STEP 05"* document (concepts of regional development and strategies, regional development model, housing, economy and employment, green and public spaces, spatial and temporal priorities of urban development, areas for major urban projects, spatial model of the urban development). Under this heading a special importance is ascribed to the built heritage of the city. Special emphasis is put on the densely built-up area of the late 19th century and the Ringstrasse, which are considered as the "most characterising and identity forming elements of the cityscape". Some former suburbs show baroque or early 19th century town-centres, which are also pointed out as "particularly attractive" features and "unexpected" elements contributing decisively to the uniqueness and the distinctiveness of Vienna. Moreover, the restored built heritage stands for the city's high living quality and adds to Vienna's attractiveness for inhabitants and tourists as well as for potential investors and skilled workforce to be recruited.
In addition to that, the 19th century areas are viewed as a potential field for new economic developments in continuation of existing activities and expansion possibilities. This is especially true for growth industries such as business and legal services, healthcare clusters and creative industries. The "specific, non reproducible locational advantages" of these areas are considered as a "unique selling position" in the international competition for new business establishments.
The *„STEP 05"* document repeatedly underlines Vienna's position as an "international cultural metropolis". The cultural aspect, in connection with its built heritage, is of utmost importance for the local tourism industry. The historic core, the Ring avenue zone as well as the Schönbrunn Palace are considered as the most important touristic assets of the city. The plan recommends protecting these areas, while at the same time avoiding their "musealisation".

Moreover, the Viennese historic urban environment is viewed as a location factor for business tourism, congresses- and trade fairs. For the further development of the different tourism segments *„STEP 05"* recommends to stage the historic architecture, to increase attractivity of the revitalised historic areas outside the city centre and to promote festivals and large-scale sports events [26].
In the *"Strategic Plan for Vienna"* built heritage is considered as a "symbolic location factor" and as an indispensable element in the context of Vienna's image as a "European cultural metropolis" and a "city of architecture".

3.2 Built heritage and tourism advertising: Vienna as an „imperial city"

The functionalisation of built heritage is even more obvious when it comes to tourism advertising. For this purpose, heritage becomes a "natural" resource that fosters the attractiveness and the uniqueness of the city. Tourism is the fastest growing economic sector of all in Vienna. It is linked with a large turnover of goods and services and it creates jobs. It is worth mentioning that the number of employees in the tourism sector doubled between 1990 and 2010. During the same period the number of overnight stays has increased by a similar account [27], and the number of beds provided by hotels and guest houses increased by 30%, leading to an increase in total revenues within the hotel industry at a similar scale. About 12% of the total number of overnight stays is attributable to congress tourism which traditionally has been a major economic factor [28].
Official tourism promotion is conducted by the *Vienna Tourist Board* [29]. The main tasks of this official body are the support of Vienna's touristic affairs by means of marketing activities, a continuous development of the Vienna destination and of the "Vienna" brand. In 2011 the budget for the tourism advertising amounted to 22.6 mn EUR [30].
The current „*Tourism Concept Vienna*" [31] was prepared in 2009 in cooperation with members of the city government and representatives from tourism, culture, traffic, marketing, media, etc. The overall goal of this concept was to achieve an increase in turnover by 100 mn EUR in the hotel sector (starting point: 487 Mio. € in the record year 2008) and rise in overnight stays by 1 mn (starting point: 10.2 mn in 2008) until 2015 [32]. The most important objective formulated in the „*Tourism Concept Vienna*" is to strengthen the international perception of Vienna as a tourism destination by "emotionalising image campaigns". A positive image shall also be embedded in the inhabitants' minds in order to mobilise them as "optimistic and charming hosts". A new branding strategy (2009) was meant to shape the envisaged image.
As part of this strategy, the "Vienna" brand focused on culture and cultural heritage. This topic had been the result of an international market analysis, with the purpose of identifying the basic essentials of Vienna's identity and differentiating them from less important elements. The results of this analysis were crafted into five major fields which constituted the five "brand modules" of the "Vienna" brand [33]:

1.	*Imperial heritage*	*29.90 %*
2.	*Profusion of music and culture*	*21.40%*
3.	*Savoir vivre*	*16.30%*
4.	*Functional efficiency*	*16.30%*
5.	*Balance of urban and green areas*	*16.10%*

„The imperial heritage and the associated sights are a mainstay of Vienna's image", says one of the official conclusions made by the *Vienna Tourist Board.* According to this assessment, sights like the baroque Schönbrunn Palace, the mainly baroque and neo-baroque Imperial Palace, the Ring avenue, Imperial Spanish Riding School and the gothic St. Stephen's Cathedral have been identified as the most important brand drivers. With the aim to distinguish Vienna from other destinations through an "imperial" or "royal" heritage, the *Tourist Board* positioned these main attractions as "must-sees", associating them "with their history (and their stories)" [34]. With this objective in mind, the advertising of the "must-see" sights follows the imperial narrative. Large sized pictures of the imperial sights kept in a slight golden tone are made up with socalled "communication squares" featuring slogans as: „*Vienna, now or never*" or „*At this moment the Emperor is granting an audience at the Vienna Hofburg. Don't keep him waiting*!" A distinctive word/image brand combination shall be created this way [35].



Fig. 3: The stage of the *„Vienna Festival*" in front of the neo-gothic City Hall (photo: Mike Ranz / Wiener Festwochen)

In 2011 the "Vienna" brand was ranked 9th among 50 cities worldwide as analysed by Anholt-GfK Roper City Brands Index [36].

3.3 Built heritage as a distinguishing attribute for major events

In Vienna cultural events do not only aim to maintain traditions and to serve the requirements of a bourgeois elite culture. The current proliferation of cultural events in the public space of the historic districts is an expression of urban strategic considerations. Built heritage forms the spatial frame for cultural events, Christmas markets, open-air cinemas etc. It even becomes a part of the event. On the other hand, built heritage gains attention through events and special illuminations. Indeed, cultural events and built heritage stage and upgrade each other mutually.

Cultural events are to serve the image of Vienna in an international perspective and they are to boast the city as a vivid and attractive tourism destination [37]. The distinctiveness of the Viennese events from similar events in other cities is a major factor in this context. The production of historical atmosphere by using the "scenery" of illuminated historic facades turns fairly common events to unique happenings, typical of Vienna. Two of the most prominent "event locations" shall be discussed briefly.

Doubtlessly, the most important location for cultural and leisure events is the square in front of the Vienna City Hall besides the Ringstrasse. For the "*Ice Dream*", scheduled at the beginning of each year, the square is transformed into a huge ice-skating rink (1,800 sqm). The average number of visitors every year is 130,000 visitors [38]. In spring, the Opening concert of the "*Vienna Festival"* follows, reaching a global audience thanks to the Europe-wide television broadcast by more than a dozen international TV stations (fig.3). In summer the square turns into an open-air cinema for the *"Music Film Festival"*. Operas and concerts are projected on an oversized canvas situated in front of the main façade of the neo-gothic City Hall. Framed by numerous food stands offering culinary delights, the cinema presentations attract 700,000 visitors a year [39]. During the weeks before Christmas the square hosts the Christmas market *"Vienna Magic of Advent",* which transforms the area into a "shining fairytale land" [40]. The market has been initiated in the middle of the 1980s by the City Council with the aim to attract more tourists in the months of November and December. In the meantime, this Christmas event has become a major economic factor which accounts for more than 3 mn visitors [42]. Every year, the City Council invests approximately 1 million Euros in this event [41].

Thanks to the above-mentioned highlights and numerous other events, the City Hall square is staged during the entire year.

Another prominent example for the citystaging its past and its heritage is the "*Summer Night Concert*" performed by the Vienna Philharmonic Orchestra in the gardens of the Schönbrunn Palace (fig.4). The concert is hosted by the City Council of Vienna, the Federal Government of Austria and sponsors as such as "Rolex" (since 2007). Labelled as "musical greetings from Vienna and Austria" [43], it is broadcast by the European Broadcasting Union and other international TV stations in more the 60 countries. The concert is frankly advertised in context of the historic ambiance of the location : the Vienna Philharmonic Orchestra "wishes to provide all Viennese, as well as visitors to the city, with a special musical experience in the impressive setting of Schönbrunn Palace and its beautiful baroque



Fig. 4: The "*Summer Night Concert*" inside the Schönbrunn gardens (photo: Richard Schuster © Wiener Philharmoniker)

gardens, a UNESCO World Cultural Heritage Site" [44]. The staging of the baroque palace is everything but a subtle hint to the imperial past of Vienna which can be actualised, at least symbolically, by events like this.

4. Built heritage as a major instrument of urban competition

The integration of built heritage into urban development plans, its use by the tourism promotion as well as the mutual staging of cultural events and built heritage show that local heritage has become a major resource of economic and urban development strategies. In the respective documents the Viennese built heritage is closely associated with the identity and the image of the city. In context with the international positioning of Vienna, a rehabilitated and staged heritage is viewed as a location advantage as it constitutes a strong means of differentiation and as it stands for a high quality of life. For touristic marketing of Vienna built heritage represents a major resource which is exploited in connection with the cultural but also with the symbolic economy.

The use of heritage as an image-building medium, as an instrument of differentiation but also - and especially – as a tool for city branding form part of the symbolic economy. The symbolic economy aims to intertwine cultural symbols with global economic capital [45]. The branding process combines the historical cityscape of Vienna with the narrative of the "imperial Vienna", which is ultimately condensed to visual images and transformed to the global cultural product "Vienna". It is the transformation from the local cultural asset into the consumable global product which makes the Viennese built heritage a strategic instrument within the competition for financial investments, skilled workforce, tourists, major events and for the revalorising of urban property. This reveals that the competition between cities based on culture is in essence a competition in the spheres of political and economic power [46].

Yet it is to underline that in the context of the contemporary applications mentioned above, the historic built environment of Vienna is not perceived as a heterogenic, multilayered legacy from the past with its complex context, its contradictions and its "dark sides". The past and its material inheritance are wrapped into a narrative: they are simplified and transformed into a new "imperial" past. – This simulacrum has become a popular replacement for a lost history and responds to the requirements of the present, namely competitiveness and marketability. The imperial topic is suitable as historical references correspond to the postmodern representation of the "old European city" and to the idealised version of urban culture.

On an international level, the strategic efforts in connection with culture and cultural heritage are successful. Although it is difficult to measure the efficiency of employing culture and cultural heritage for urban policies, there is evidence that the international perception of Vienna is particularly positive. Statistical data confirm the policies applied by Vienna - in particular the tourism advertising and the branding policy. The income from tourism amounted to 3.5 bn EUR in 2011. In the same year Vienna counted 11. 4 mn overnight stays, a number which exceeded the objectives set in 2009 (see above). Vienna occupies the 6th position among the top touristic destinations of Europe [47]. In the "Quality of

Living Survey 2012" carried out by the international Mercer Consulting Group, Vienna holds the leading position among 220 metropolises worldwide already for 4th time [48]. In the “Economist Intelligence Unit-City Ranking“ of 2011 Vienna occupies the 2nd place among 139 cities in the world [49]. The survey quantifies the cities’ liveability according to five broad categories. Culture is one of them.

However, the Viennese development policies are also to consider from a local viewpoint, beyond international positioning and competition. While the renewal policy of the 19th century zones and the highlighting of the historic structures as identity marks of the city can be valued positively, the use of heritage in connection with tourism advertising and the staging of the historic city by its “festivalisation” must be perceived critically. In the local context the city can obviously not be considered as a “product” or a “brand” but must be appreciated as a space of everyday life, of work and of informal social relations. Moreover, the city is closely associated to the concept of public space and to the related non-commercial activities, encounters and experiences. However, the use of heritage for touristic advertising and for the aesthetic framing of major events reduces certain urban spaces, in particular the historic inner city, to special nostalgic zones which stand out from the reality of the surrounding city. The touristic preparation, be it symbolic or material, and the constant “dramatisation” trough cultural events is often followed by a commodification which means a loss of traditional functions such as administration, retail, business and local supply in favour of touristic, catering, cultural and leisure functions. Scholars have already observed such a development by for the inner city of Vienna: The transformation of a former political and administrative centre of European significance into a “postmodern leisure and entertainment city” are carried out “behind the historic facades and detached from the real historic conditions” [50] states the Austrian geographer Gerhard Hatz. The built legacy of this former centre has no longer a representative function but used in the context of the cultural and the symbolic economies [51].
Furthermore, the relevance of the “Imperial Vienna” narrative as an identifying feature for today’s population has to be questioned. Focusing on the “imperial” image seems short-sighted in light of the multi-ethnic and multicultural reality of the city (already 44 % of the Viennese have an immigrant background [52]) and the aimed positioning as a modern European metropolis.
Instead, Vienna’s built heritage is vast and multi-faceted. In deference to its historical reality, such a legacy requires a differentiated perception. A less focused and less simplified approach to this cultural heritage which is not subject to image-building purposes would provide the possibility of various types of interpretation and identification. Moreover, it would allow for a broader scope in terms of urban development, be it cultural, social, architectural or economic.

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Turin for the French

Nadia FABRIS,
Dipartimento DAD, II Facoltà di Architettura, Politecnico di Torino, Italia
E-mail: Nadia.Fabris@polito.it, nad.fab@libero.it

The study started on deepening as travelers, through the diaries and travel guides, describing the city of Turin, Piedmont, Italy on which they focus attention emergencies, such judgments addressed the organization of the city and its urban fabric, which paths offer, and yet such cultural trends travelers express, what are the architectural presence, now disappeared, which testify to the existence and demonstrate the interest, which interventions and transformations taking place during a specific period annotate their texts .
Starting from the "Grand Tour", a kind of initiatory journey that during the eighteenth century port on the peninsula people like Goethe and Sir William Hamilton.
We present a guide written in French for the French, of 1909 that prepares to visit the city for the exhibitions of 1911, "Turin petit guide de la ville et des environs.
We can see pictures and a map of how the city was laid out, with the new architectural forms - cultural, streets, squares, churches and palaces, were analyzed as more elements are treated, what elements and monuments is channeled attention, such as judgments and criticisms are addressed to them. Was interesting to note that the direct routes and affect the interest of the city.
Important is the invitation to participate in the great exhibition in honor of 50 years of united Italian state," En 1911 la ville de Turin cèlèbrera dignement le cinquntieme anniversarire de la proclamation de l'Unitè d'itale ed de la proclamation de rome capitale du noveau royaume. Forte des prècèdentes, elle organise en 1911 une grande Exposition Iternationale des industries et du travail, que sa Majestè le Roi Victor Emanuel III a bien voulu honorer de son haut patronage. L'exposition se tindra dans le parc splendide et pittoresque du Valentino".
Very clear is the description of the city and its king are honored to celebrate the event with an exhibition in 1911, which will take place in the beautiful and picturesque Valentino Park.
The guide is well described, railway stations, the tunnel for the purchase of tickets to visit the exhibition. The hotels where to stay, and museums and collections including The Royal Armoury in Piazza Castello, which is still present, the Royal Picture Gallery, in sciences Academy, now the Egyptian Museum, the Natural History Museum, now lying in seat.
The museum of geology and paleontology, in Palazzo Carignano time with free admission now non-existent, the national museum of Italian independence at the Mole Antonelliana, now in the Renaissance Palazzo Carignano, the collection of the Albertina, at the time, free picture gallery of hours' Accademia Albertina. The Artillery Museum of the citadel still present, the Museum of alpine views to the Mount of the Capuchins, now a museum of the mountain.
Description particularly pleasant in enhancing the city with many museums still outstanding and many no longer be considered a list of the main buildings still exist, while the churches lists a small number, the Cathedral of S. Giovanni with the Chapel of the Sindone, the S. Lorenzo, the Sanctuary of the Consolata, S. Filippo Via Maria Vittoria, and the S.S. Martyrs of Via Garibaldi. While monuments are all listed as the many parks and public gardens.
Even the public toilets and refreshment facilities, still present il Cambio in Piazza Carignano, confetteria Baratti in the gallery Subalpina, the Bicerin in Piazza Consolata, while the only hotel that still exists is the Grand Hotel Europe in front of the Porta Nuova train station.
Fascinating description of pharmacy care with the British list of the hospitals, and post offices. A special analysis should be paid to the city map attached to the guide, where they are immediately eye services the tram network, marked with a red line, the rail network marked with a black line in the description, outlining the origins of the railway line main, France, Milan, Venice, Genoa, and the

streetcar tracks in the city. Are well described and illustrated the major parks in the city, which is still in place, squares and main courses.
While a simultaneous analysis we can see the limits of the construction period and the nodes of containment river with links bridges and the railway.
In these pages, we can see how the image of a city is given by the beliefs, feelings, impressions, ideas that people perceive that place through the combination of different ingredients, including climate and offer natural, products and services, the presence of businesses and the economic development through the great exposure.
In addition, institutions and systems of government regulations, international relations, the role of commercial, financial and political, the level of training and education of the people, the importance of historical, artistic and cultural heritage, there are also the anthropological aspects and folklore to tradition, the historical and social reality.
All these factors contribute to the formation of an identity of the city as was seen at the time. Surely, space should not be seen in his objectivity, but rather in its narrative component is a place to go, to explore, to discover, like a dream in the past. We must consider, however, that the tourist guides, as texts are an obvious example of the influence that communication policy can have on the perception of tourists, in the creation of their own personal idea of the destination, in creating the sense of place. The space is designed to be seen, so for a look, for an observer, the 'identity of which we speak now, however intangible, symbolic, is aesthetic, but also the result of precise communication strategies and cultural memory of a particular historical period .

Keywords: Travel, Tourism, Historical iconography.

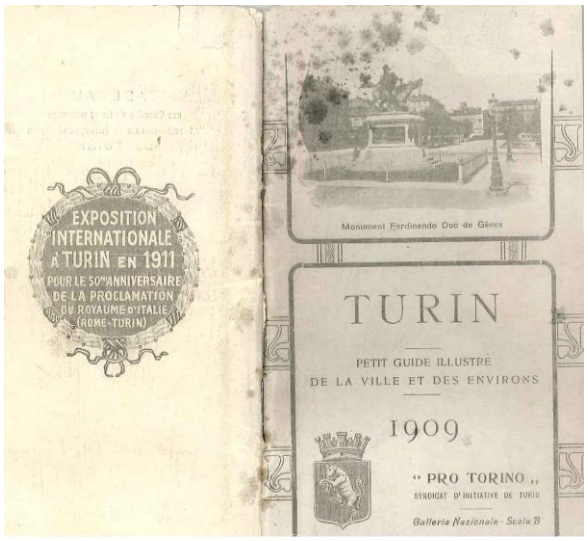


Fig. 1: a guide written in French for the French, of 1909

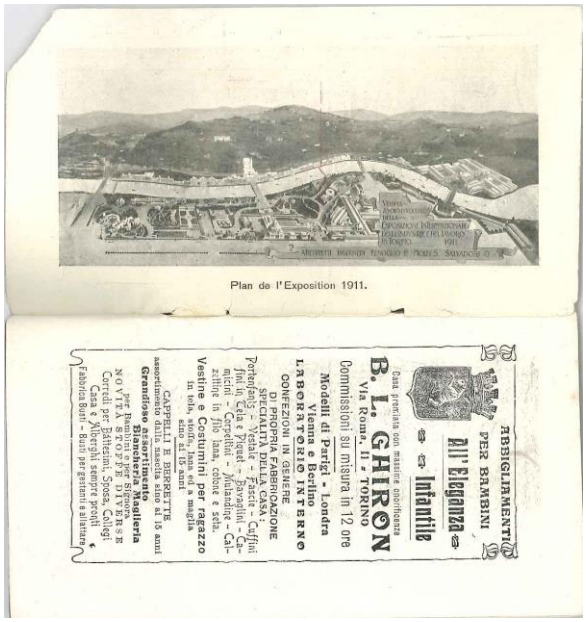
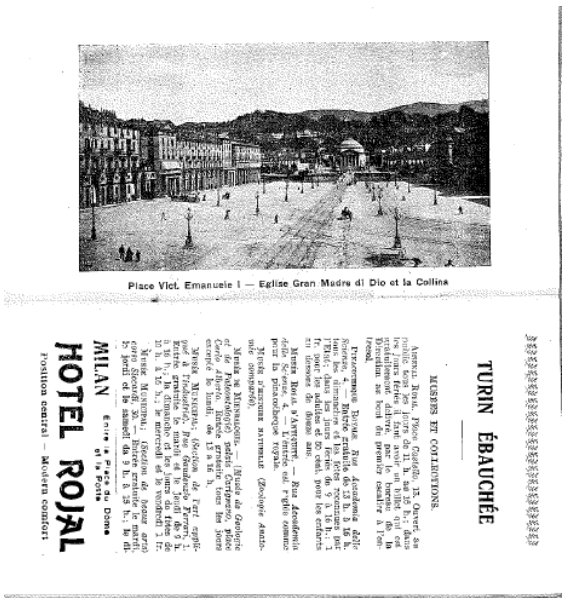


Fig. 2: a guide written in French for the French, of 1909



Place Vict. Emanuele I — Eglise Gran Madre di Dio et la Collina

TURIN ÉBAUCHÉE

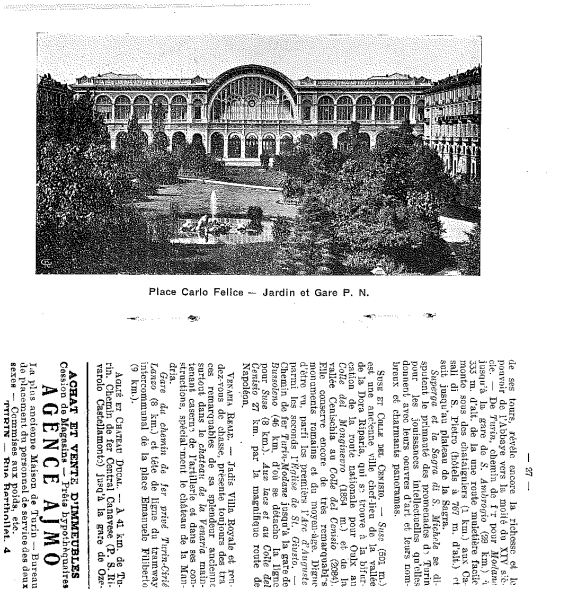
MUSÉES ET COLLECTIONS.

MILAN Entre la Place du Dôme et la Poste

HOTEL ROJAL

Position central — Modern comfort

Fig. 3: a guide written in French for the French, of 1909



Place Carlo Felice — Jardin et Gare P. N.

— 27 —

de ses tours, révèle encore la richesse et le pouvoir de l'Abbaye vers la moitié du XIV siècle. — De Turin, chemin de fer pour Moncalieri jusqu'à la gare de S. Ambrogio (28 km.) à 33 m. d'altitude, la ligne route maladieuse faisait monte sous des chataigniers (1 km.) aux Casali di S. Pietro (hôtels à 767 m. d'alt.) et suit jusqu'au plateau de la Sagra. Superga et la Sagra di S. Michele se disputent le primauté des promenades de Turin pour les jouissances pittoresques et les dominent avec leurs oeuvres d'art et leurs nombreux et charmants panoramas.

SUSE ET CHAUX DE CHAMBRE. — Suse (552 m.) est une ancienne ville chef-lieu de la vallée de la Dora Riparia, qui se trouve à la bifurcation de la route nationale pour Oulx au Colle del Monginevro (1854 m.) et de la vallée Cenischia au Colle del Cenisio (2084). Elle conserve encore de très remarquables monuments romains et du moyen-âge, digne d'être vu, parmi les premiers l'Arc d'Auguste, parmi les seconds l'Église de St. Giusto. — Chemin de fer Turin-Modane jusqu'à la gare de Bussoleno (46 km.) et de Bussoleno (7 km.) pour Suse (8 km.). Aux lacs et au Colle del Cenisio 27 km. par la magnifique route de Napoléon.

VENARIA REALE. — Jadis Villa Royale et rendez-vous de chasse, présente toujours des traces remarquables de sa splendeur ancienne surtout dans le château de la Venaria maintenant enseigne de l'artillerie et dans ses constructions, spécialement le château de la Mandria. Gare du chemin de fer privé Turin-Ciriè Lanzo (8 km.) et tête de ligne du tramway intercommunal de la place Emanuele Filiberto (9 km.).

AGAZ ET CHATEAU DUCAL. — A 41 km. de Turin. Chemin de fer Central Canavese P. S. Rivarolo Castellamonte) jusqu'à la gare de Ozegna.

ACHAT ET VENTE D'IMMEUBLES

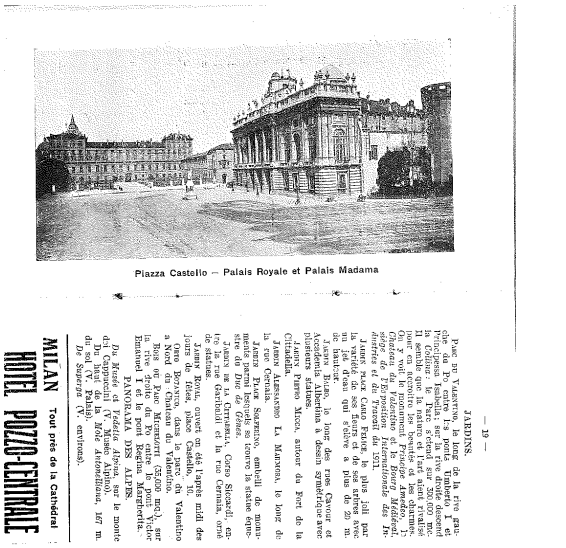
Cession de Magasins — Prêts hypothécaires

AGENCE AJMO

La plus ancienne Maison de Turin — Bureau de placement du personnel de service des deux sexes — Commises aux poids, etc.

TURIN — Rue Berthollet, 4

Fig.4: a guide written in French for the French, of 1909



Piazza Castello — Palais Royale et Palais Madama

— 19 —

JARDINS.

PARC DU VALENTINO. — Le long de la rive gauche du Po entre la ponte Umberto I et Principessa Isabella; sur la rive droite descend la Collina; le Parc s'étend sur 300.000 m. Il semble que la nature et l'art aient rivalisé pour en accroître les beautés et les charmes. On voit le monument Principe Amedeo, le Château du Valentino et le Bourg Médiéval, siège de l'Exposition Internationale des Industries et du Travail de 1911.

JARDIN PLAN CARLO FELICE. — Le plus joli parc de la ville, de ses fleurs et de ses arbres avec un jeu d'eau qui s'élève à plus de 20 m. de hauteur.

JARDIN RAZZA. — Le long des rues Cavour et Accademia Albertina à dessin symétrique avec plusieurs statues.

JARDIN PIETRO MICCA, autour du Fort de la Cittadella.

JARDIN ALESSANDRO LA MARMORA, le long de la rue Cernaia.

JARDIN PLAN SOLFERINO, embelli de monuments parmi lesquels se trouve la statue équestre de Duc de Gênes.

JARDIN DE LA CITTADELLA, Corso Siccardi, entre la rue Garibaldi et la rue Cernaia, orné de statues.

JARDIN ROYAL, ouvert en été l'après midi des jours de fêtes, place Castello, 10.

Gare Bonaventura, dans le parc du Valentino à Nord du Château du Valentino.

Bois du Parc Mirandoli (35.000 mq.), sur la rive droite du Po entre le pont Victor Emanuel I et le pont Regina Margherita.

PANORAMA DES ALPES.

Du Musée et Vedette Alpina, sur le monte Cappuccini (V. Museo Alpino).

Du haut de la Mole Antonelliana, 167 m. du sol (V. Palais).

De Superga (V. environs).

MILAN Tout près de la Cathédrale

HOTEL POZZO-CENTRALE

Fig. 5: a guide written in French for the French, of 1909



Fig. 6: a city map written in French for the French, of 1909

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Building a new landscape. Land reclamations and new rural towns during the Fascist Regime along the coast south of Salerno

Antonella MARCIANO
II Università di Napoli- Facoltà di Architettura Luigi Vanvitelli
a.marciano@unina.it

Abstract

The urban program developed by the Fascist Regime had a double direction, on one hand, regularize and make healthy the cities through disembowelments, straight streets and new settlements based on a cartesian logic, on the other hand the Regime aimed to subdue the wild nature, making the marshes fertile. With the "Ruralization Program", the Regime tried to persuade people to live in the countryside working the land, thus contributing to the construction of a well-defined social and economic model, in which the ideal fascist landscape perfectly reflected a determined idea of society. After the approval of the Law on National Program for Land Reclamation, in 1928, many areas were involved in the reclamation works. In the Gulf of Salerno, the reclamation of the marshes, which infested the Sele River coastal plain, was at the centre of a very intense work. Its aim was to tame the marshlands, turning the unfertile territory into a fertile landscape, dividing the land into plots and breaking the large estates. Within this new hospitable environment, new rural villages were founded, that in the intention of the Regime were to become the core attractors for a resettlement of the countryside, cornerstones for a new order and organization. This paper aims to analyze how the land reclamation program was connected to the process of constructing an ideal fascist landscape, what impact had this activity on the area, its results and finally the traces that can still be recognized.

Keywords: Land reclamations, rural towns, Fascism, Bay of Salerno

1. The Fascist ideology and the civilizing value assigned to reclamation works

During the Fascist Regime in Italy, particularly in the decade between 1932 and 1943, there was a period of considerable activity in the field of public works. With an action that has few precedents in Italian history, the Regime planned the radical renewal of urban centres, the creation of new neighborhoods and the establishment of new towns and villages. At the same time land drainage and reclamation works were carried out.

This activity will imply a total redesign of the landscape of many Italian regions, from north to south, deforestation, leveling, draining, geometrizations of roads and channels. These works continued until the 60s of the twentieth century remaining indelibly fixed in the memory of the places. Today it is possible to recognize this activity of redesigning in some places once characterized by wild and uncultivated land, flooded by secular marshes, then transformed by the furrows of channels, new cultivations and finally through the newly founded villages that had to constitute rural settlements designed to populate areas that were previously uninhabited [1].

This at least has happened in the Sele Plain, a wide area around the Sele river in the south of Salerno, an area identified in maps and historical chronicles as a place infested by swamps and marsh fever. The surrounding areas inhabitants went there typically in the winter months, then they abandoned it again in the summer months due to malaria, returning to their mountain villages not far away. In this paper we will see how this area appeared before reclamation activities and, through historical maps, we will estimate the entity of work carried out and the way the area appeared after the reclamation.

1.2 The ideological climate and the support of intellectuals

During the Fascist Regime the goal of increasing population of the peninsula and therefore the conquest of new territories was seen as one of the keys of the power and a reason of improvement of the offensive capacity of Italy. In the well-known speech of the Ascension in 1927, Mussolini enunciated the terms of its demographic concerns: «*Italy to count something must appear on the threshold of the second half of this century with a population of not less than 60 million inhabitants »,* and more*: «I assert that even if it seems not so crucial, the demographic power is an assumption preliminary to political, economic and moral power of the nations*».

The policies to populate the countryside already formulated in the liberal Italy and later during the fascist Regime were intended to encourage a stable and enduring establishment of family groups of rural origins, generally from the north of the peninsula. The appointed places were some areas of central and south Italy and african colonies. At the turn of XX century some governments were driven by nationalistic and imperialistic reasons to create new settlements in Eritrea, Libya and Ethiopia. At the same time Italy was trying to reclaim some territories from the marshlands. It was considered a priority to make available, at home and on african soil, the greatest possible quantity of land that would later be colonized by a growing rural population. There were many draft bills aimed at favouring the peopling of rural uninhabited areas, or not very fertile, long abandoned, malarial. In the beginning there was Baccarini's law, launched in 1882, which regulated, with prevailing hygienic purposes, the land reclamation (mainly the wetlands of Po Valley), without dealing specifically with the problem of development and agrarian transformation of the areas to be reclaimed.

Between 1852 and 1947, there were more than twenty legislative measures, but only during the fascism this goal from a purely hygienic question turned into a demographic and urban goal[2].

Today we can state that the organization of rural areas was one of the most characteristic expressions of the fascist period. Various ideological suggestions fueled the politics of peopling: the ruralism, intended as an antidote to the ills of modern society (urban and industrial), the 'myth' of abundance and fertility of waste lands, the idea of creating migration outlets for a superabundant population and without sufficient means to live at home. Above all, the attempt to stop the emigration to foreign countries and the consequent depopulation of certain areas of the South of Italy. Obstacles to this program were the productive backwardness and the hydraulic instability characterizing vast agricultural areas of central and southern Italy, the high levels of poverty, the unemployment and the social unrest recorded in several areas of the north, that were at the same time overpopulated and with a declining birth rate [3].

The intellectual world accompanied the Regime giving it force with studies and data. Even the contemporary journalism aimed to highlight the issue of poepling. The debate revolved around the terms *population's excess - new lands - emigration*, a trinomial that formed the ideological core of rural colonization projects. The laws in matter of colonization chiefly concerned areas of central and southern Italy- Roman Agro, Sardinia, Basilicata - characterized by very precarious environmental conditions, extensive agriculture and lack of local farm workers. At the end of the twenties, the program for the reclamation and poepling was accompanied by the Law on ruralization.

1.3 Integral reclamation and Law on ruralization

The law of July 6, 1939 n. 1092 "Measures against urbanization" was used to detain people in small rural towns. For example, the law provided that it would be granted the residence in cities with more than 25,000 inhabitants only to those who had been able to demonstrate that they have sufficient means of subsistence or a stable job in the city in which they intended to transfer their residence. Moreover, this law, at article 7, stated that farm workers who abandoned their land without good reason, could not be registered "*to employment agencies for work of a different category, even within the town where they had the residence*". This was a way to tie firmly and permanently the peasants to their land, a reminiscence of some medieval laws [4].

It was created the legal basis and ideological support for the program of internal colonization. Finally, it was through the laws on land reclamation (1928 and 1933) and on large estates in Sicily (1940) that this program saw the light materially. The basic law was Serpieri's law, no. 3256 of 30 December 1923, in which were founded land reclamation consortia managed and financed by the State[5]. These were used to provide funding to a wide range of hydraulic and agricultural rehabilitation works, on a national scale, whose aim was the "*integral land reclamation*", called *integral* because it meant the total transformation from the physical, social and hygienic points of view, and finally the repopulation of the less fertile or long been abandoned lands. The construction of thousands of new farmhouses in scarsely populated areas at first responded to the needs of agricultural development, it was planned to introduce large-scale farming of intensive cultivation in place of extensive agriculture. But it was also useful for the purposes of social control: thousands of tenant farmers were uprooted from their social ties and isolated in their farms. Especially in the north of Italy, peasants were day laborers and tended to come together in organizations that sympathized with the anti-fascist parties. The program of internal colonization was accomplished through public agencies which had almost exclusively public

funds. One of these was the 'National Opera Fighters" (ONC), an agency founded during the First World War which was envolved in the work of rehabilitation of war veterans, following the slogan "*land to the veterans*." Under the coordination of ONC, between 1932 and 1939 in the Roman and Pontine Marshes it was carried out the fractionation of cultivated or arable lands suitable for the *optimal cultivation*, for a total of 55,000 hectares of land and the construction of 5 new towns and 17 rural villages, the transfer of almost 3000 families mostly originating from the farms in Veneto and Emilia Romagna, and between these, families of Italian descent specially made returned from Romania, Yugoslavia, France. As for the South, other important works of colonization were carried out in Campania where it was started the reclamation of the Lower Volturno, Right Sele, and in Calabria, Sybaris and St. Euphemia [6].
Some initiatives were promoted by private companies who realized industrial villages who shared morphology and urban spirit of rural villages. Among them, we must remember the Arsa, *Anonima Società Carbonifera* (which financed the construction of *Arsia* together with the *Azienda Carboni Italiani*), the Ampelea (*Luigi Razza* village near Lagosta), the *Società Agricola Industriale Cellulosa Italiana* (*Torviscosa* and village Rome), the *Società Maccarese* (village of the same name), the SAIM who built the villages *Farinia* and *Cafasso*, the *Società Anonima Bonifiche Calabresi* (Sant' Eufemia, Lamezia, Sant' Eufemia del Golfo, San Pietro a Maida, Curinga), the *Società Anonima Bonifiche del Mezzogiorno* (Frassa, Thurio, Torre Cerchiara), the *Società Bonifiche Sarde* (Mussolinia).
The entry of Italy into the war, the political and military events of the early '40s, the many inadequacies in technical terms determined by excessive urgency with which the reform had been prepared, blocked the planned programs. Much of the works, the construction of more than 2000 farmhouses and dozens of rural villages, were carried out during the first year of implementation of the law. Many villages did not see any development, or were again abandoned at the end of the war. Instead, the big reclamation continued until the sixties of the twentieth century. Until 1943, the time of the landing of the allies, however, it resulted that dozens of villages, thousands of new houses and many kilometers of drainage roads and aqueducts were built.

2. Villages of new foundation _ common characteristics

Part of the reclamation, colonization and ruralization programs, was the foundation of new towns, expecially rural villages. Beside them, some settlements were founded in the course of the '30s, whose purposes were not subordinate to the ruralist experiment, but rather to the needs dictated from autarky, the much sought after economic self-sufficiency. Until the recent past, it was believed that the newly founded cities, more structured in terms of planning and of which there is an extensive coeval bibliography, were only twelve. Depending on the well-established historiographical tradition, seven were "*city of reclamation*" (Mussolinia, Fertilia, Latina, Terracina, Pontinia, Pomezia, Aprilia), cities created to populate previously swampy areas, five "*autarchic cities*" (Arsia, Pozzo Littorio, Torviscosa, Carbonia, Guidonia) connected to a particular industrial centre. Actually, the newly founded villages are far more numerous and scattered throughout Italy, especially in poorly known territories[7].
To the names already mentioned should be added the villages of new foundation in areas until now almost completely unexplored from this point of view, such as the rural villages around Rome and Foggia and most importantly, that is the object of this study,the villages in the south of Salerno, in the Sele Plain, where we find both the autarchic villages as Farinia, Cafasso, Scanno, both the rural villages as Corvinia, Valentinia, Cioffi. The characteristics that link together these villages and the newly founded cities, are the emphasis put on the demographic revival of a place uninhabited for years, the strict spatial organization of the territory, the creation of the new settlements based on a specific social and economic project. The rural villages were founded at the crossroads of major farm roads or at the main lines of communication, and intended to provide essential services to the population of farmhouses established in the countryside.
In the bigger centres were: the church, a school, the National Fascist Party seat, other organizations and trade unions, a post office and telegraph, a police station, the colonization office, small groceries and resale for different genres, workshops.The planning was based on a rational scheme. The whole took place around a small central square where there were the church, the house of the beam, the direction of the farm and a few houses for artisans and traders. The square had a regular geometric shape from which were radiated rectilinear roads. The houses were built on two levels and conformed to the main features of rationalist architecture: complete absence of ornament; simple geometric forms, flat roofs [8].
In the Sele Plain, some new buildings were associated with agricultural production. The traditional breeding of the buffalo was associated with cultures as tomato and tobacco. The new tobacco factories, and other agricultural activities attracted workers from neighboring countries. The tobacco was at that time one of the most profitable activities. Indeed, the first urban initiatives were carried on by SAIS (*Società Agricola Industriale Salernitana*), founded in 1918, initially engaged in a general processing of agricultural products, and then attracted by the tobacco industry. In 1933, the SAIS merged with the *Società Anonima Stabilimenti Riuniti Tabacchi Americani* giving life to the SAIM

(*Società Agricola Industriale Meridionale*), who built ten plants for the processing of tobacco's leafs including the drying and handling of leafs. In some relevant episodes, SAIM gave birth to newly founded villages connected to tobacco factories. Some model farms were founded by the SAIM, including one of the most renowned in the area of Scanno, where worked 800 people. The same was done in the estate of Gromola, to the south of the mouth of the Sele, where were erected buildings for executives, for permanent workers and sharecroppers. We can also remember the changes that occurred in the Verdesca and Picciola farm, where was located a SAIM factory; the Cioffi farm, the farm of the Rosale, Società Agricola Immobiliare[9].

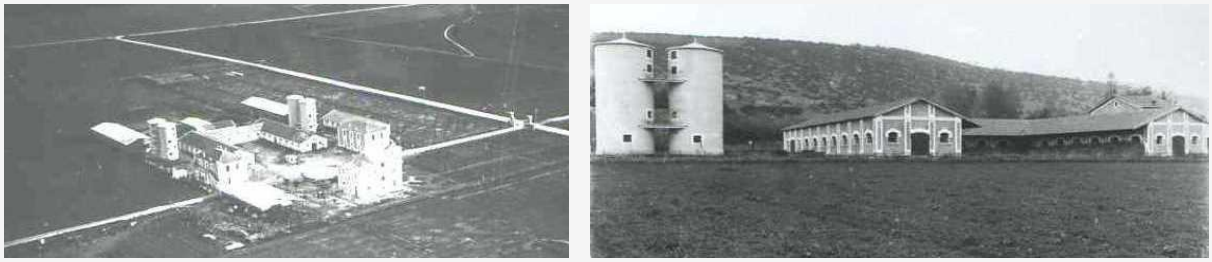

Fig. 1: Panoramic views of the village Valentinia, 1940

In the fascist vision, reclamation was completed with the establishment of new villages, new constructions able to cement and strengthen the relationship between man and earth. In 1923 the National Opera Fighters (ONC) bought the estates Cioffi, Scorziello and Macchione, all in the territory of Eboli and in the province of Salerno, in a scarsely populated plain area. These last two properties were soon divided into lots, and subsequently assigned to ex-combatants farmers, who have been obliged to improve and cultivate their lands. In this way, 128 farmers were given small lots of land oscillating from one to three acres, that is for example the case of the estate called the "Macchione", with vineyards and orchards. The estate Scorziello was expropriated to the Duchess Amalia Scorziello Colonna in Torlonia by order of ONC in February 1923 and measured 313 hectares. The estate Cioffi, expropriated to the Duchess Amalia Scorziello too, measured 480 hectares, had special conditions that induced ONC to a different intervention. The estate was in fact in the plain, towards the sea, 15 km far from Eboli, 13 from Battipaglia and 5 km from the nearest train station, in highly malarious area which needed a very expensive land reclamation, beyond the economic capacity of individuals owners. In the estate, divided into nine estates of 50 hectares, it was practiced the wild breeding especially of buffaloes. One of the most important villages was Farinia, connected to the tobacco factory SAIM in Pontecagnano, which had the clear mark of rationalism, showing a still legible fascist organization of small production units[10].



Fig. 2 S.A.I.M. Farinia. A view with the manufacturing plant on the left and the small town with a church on the right. Photo Attilio Majorana, 1938

The tobacco factory was founded by the SAIM held by Carmine De Martino between 1935-1936, in the area of *Picciola* in Pontecagnano, a town in the south of Salerno, a short distance from the sea. That territory was already made productive, thanks to the the efforts of the last owners, the family Lenza. Later on, the intervention of De Martino radically changed the facet of the estate *Picciola*, with the demolition of an old medieval tower, a church and a few buildings still existing on the site.
In their place, was built the largest factory that still can be seen and the rationalist village "*Farinia*", named after Fortunato Farina, well-deserving for the agriculture in Salerno. The inspiration and the architectural language of the manufacturing complex and the rural village were in harmony with the architectural vocabulary of the newly founded cities of the Agro pontine. And so it was defined in the contemporary chronicle: *"Farinia is the farming model village according to the great concept of Mussolini, with all the comforts and possibilities".*
Even today, the strong horizontality of the main building of the tobacco factory, is a counterpoint to the high tower adorned with lictors fasces and two clocks to the sides, that give the complex a monumental mark and an austere impact. The village, built between 1937 and 1938, can be regarded late compared to others, considering that Pontinia was founded between 1934 and 1935, Littoria in 1932, Sabaudia between 1933 and '34. The village was based on a rigid cartesian pattern in both design and functions. A central square surrounded by a few houses, and dominated by a brickwork church, with a single nave and a facade characterized by a high porch. The buildings around the sqaure are of modest size, two-story, in which were placed a kindergarten, some stores and the direction of the agricultural department. Only a small part of the buildings housed workers engaged in the adjacent tobacco factory, giving the village a strong symbolic value as an aggregation and rural organization centre, rather than the meaning of a primitive cell of a possible urban development, tied to an impossible peopling, since the workers of the nearby tobacco factory, continued to come from neighboring countries. And because it is confined in its original size, almost nailed at the time of its founding, the town is still so recognizable, as it was originally isolated from the urban context and immersed in the countryside, an outpost of the process of re-appropriation of the land, once swampy.
Instead, the village of Cafasso, at Paestum, linked to the SAIM tobacco factory, called "Razza", had known a larger development [11]. The complex of the tobacco factory was inaugurated on September 12, 1936, "*with an austere fascist rite"* and dedicated "*to the immortal and glorious name of Fascist Minister Luigi Razza",* who died *"in the ardent eve of the glorious exploits of the Fascist Italy*". The company SAIM could then boast of having already "*redeemed thousands of hectares of swamps and malarial lands, by implementing with great success the Mussolini's law for the reclamation of the land*," and besides built "*ten tobacco factories*", able to employ almost "*3,000 workers*"[12].
The tobacco factory "*Razza*" stood in a marshy area afflicted by malaria, that SAIM wanted to "*reclaim, making an highly humanitarian and fascist work*". The factory was built near the railway Battipaglia - Agropoli in the municipality of Capaccio, and included some residences intended for managers, offices, stores, and especially the large building for drying tobacco with reinforced concrete framed structure, closed by a solid brickwork, designed by the architect Luigi Guercio[13].
Among the newly founded villages we remember Matinella (in the town of Albanella) with post offices, shops and primary school; Baraccamenti, a temporary site for Serre's farmers. An agricultural colony in San Berniero in Eboli was designed, the village "Corvinia", consisting of 80 farmhouses, was founded on estates "Difesa Nuova", between Montecorvino Rovella and Pontecagnano. Corvinia, both rural village both village for airport employees, was reported on the military maps under the name of "airport Montecorvino". These initiatives, implemented by private capital, had to be the germinal seed for the reorganization of a territory dominated by spontaneity of scattered houses. The small village had in common with the village "*Farinia*" the strong horizontality of the architecture, the tipology of services, and the centrality of the small church, the shapes solved in deliberately classic way. The main street is wide enough to be a real square, a space that links together the small houses arranged around it, but that - as in "*Farinia*" - has turned to a centre, a measure and a order for the rural surrounding landscape. Valentinia, not far to Corvinia, was a farm which still exists today with its silos and its farmhouses, but it never became more than a very little group of buildings. Only Corvinia had a subsequent development and today is a small district of Pontecagnano.
In this territory the city of Battipaglia was becoming increasingly important, and even if it can not be considered an actual new city, it was reborn as an autonomous administration in march 1929. From an urban design point of view it was inspired by the newly founded cities, the *'new towns'* of "*redeemed agro*" (Littoria, Sabaudia and Pontinia). The "*new city*" with its new quarters, born under the ruralist politic of Mussolini, was built in a very short time and through the massive transfer of people from other regions. For these reasons, Battipaglia in the '30s represented a typical phenomenon of urbanization in the contemporary age. What in the origin was a village became a city mainly because of its geographic position and the fertility of the land.

3. Transformation of wild nature into productive nature

The landscape offered by this alluvial plain has changed significantly over time. For hundreds years the Sele Plain was considered an unhealthy and wild place [14]. Several antique maps depict wetlands or coastal lakes. To these cartographic evidence we can add the chronicles of the time travelers [15].

The abbot Domenico Romanelli, in his *Antica topografia istorica del Regno di Napoli,* thus describes the Plain: "*After crossing the river Sele, other six miles from here there appeared a large plain, where the famous city of Paestum was located. But what a show! ... an orrible stagnant marsh, a pile of mud, streams and water sources putrid and muddy, brambles and bushes, and piles of debris and stones cover today that blessed land where there was Posidonia*".

The cause of the stagnation of water was due the scarce drainage conditions related to the presence of the coastal dunes on one side, and in the inland, the depressed areas. In the plan of Domenico De Rossi (*1714, Provincia / del Principato Citra / già delineata dal Magini / e nuovamente ampliata secondo lo stato presente / Data in Luce da Domenico de Rossi, / e Dedicata / All'Ill.mo Sig.re / Il Sig.r Auocato Diego de Pace*), there is a large wooded area to the right of the Sele, dominated by a big lake "Lago Grande".



Fig.3: Excerpt from the map "*Province of Principato Citra already outlined by Magini and again extended in accordance with the present state*", 1714, Domenico de Rossi

Afterwards the landscape has seen the beginning of the human intervention, trough which were made limited reclamation activities, actually from Roman times until the '60s, with a peak of works performed during the Fascist period. In 1829, Carlo Carlo Afan de Rivera, engineering director of the Corps of Bridges and Roads, Water, Forestry and Hunting of the Kingdom of the Two Sicilies, ordered the reclamation of Sele by filling the depressed areas with the Sele's muds and by creating a system of canals to be used to irrigate the areas further away.

This project, soon abandoned, was resumed in 1855 according to Borboni's law which entrusted to the *Amministrazione Generale delle Bonifiche* the projects and enforcements of the reclamations. The *Amministrazione* started up with the reclaim of territory at the left of the Sele through new channels and by filling the depressed area at the right of the river. So, the main work carried out up to 1914 had been the filling of the depressed area called the "*Pantano della fonte*" through the muds of the river Tusciano, the construction of tanks, the opening of several channels. The First World War intervened to stop all these new works [16].



Fig.4: Jacob Philip Hackert (1737-1807), *Royal hunting lodge of Persano*, in Caserta, Royal palace

The IGM sheet no. 73 dated 1871 clearly summarizes the topography of the hinterland in the right bank of the Sele. Along the coast is the wooded area of Campolungo and at the left of the Sele that of Vignardo. Behind this strip characterized by green, we find the depressed areas of the marshes, the lakes formed by the continuing stagnation of the water. Unhealthy zones just interrupted by a few canals. In the island of land between the rivers Calore and Sele there is the Royal Casino of Persano, a pearl isolated in this inhospitable place, and the woods of Persano [17]. Finally, to the north, the towns of Eboli and Battipaglia shown before the urban development of the twentieth-century. In this map, the wild nature still shows the total control of the territory, the man lived in inland areas, confined in small estates or in the hill towns.



Fig. 5 Istituto geografico Militare, Sheet no. 73, Eboli, dated 1871

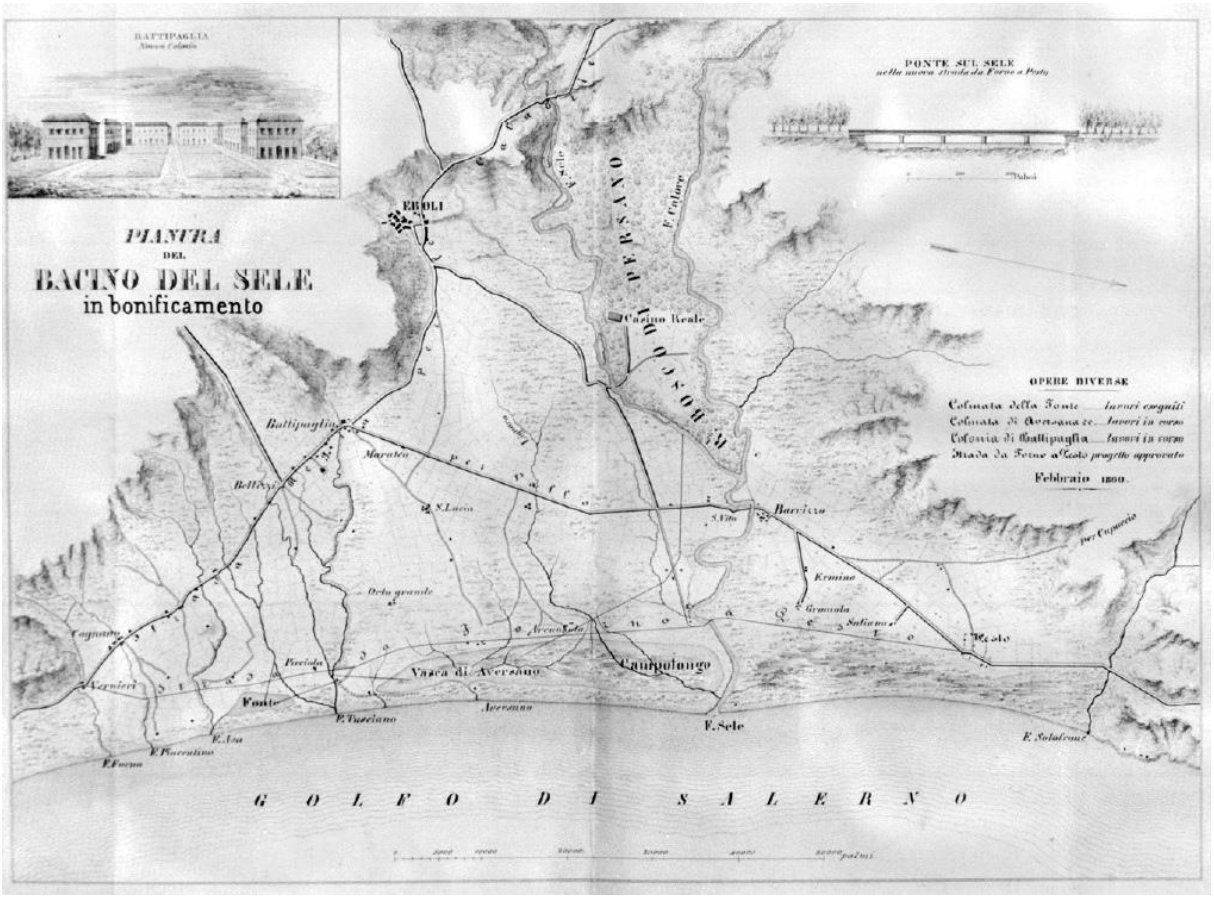

Fig.6 “Pianta del bacino di bonifica del Sele 1860”, Arch. Centr. di Stato di Roma, Bonifiche I ser., b. 23, F/16

In 1923, the company composed of Mattia Farina, a lawyer, and the engineer Antonio Valsecchi asked in concession the completion of the reclamation works on the basis of the project of Angiolo Omodeo and obtained the permission of deriving water for irrigation. At that time it was clear that by directing their efforts towards the natural drainage by filling the depressed areas could only bring slow and insufficient results. Then the Company Farina - Valsecchi was replaced by Società Anonima Bonifiche, the SAB, which since 1928 arranged a project of reclamation [18]. It was conceived a project for arranging new embankments of the Sele and Tusciano and the construction of the dam alongside the river Sele (1929-1934) at the level of Persano. The dam is 180 metres long and 9 metres high, is just upstream from the Roman bridge, and creates a restraining basin that feeds channels conveyance of water from the river to the fields. From the main channel, marked by bridges and tunnels, it branched the network of distribution channels that supplies water without using lifting plants [19].

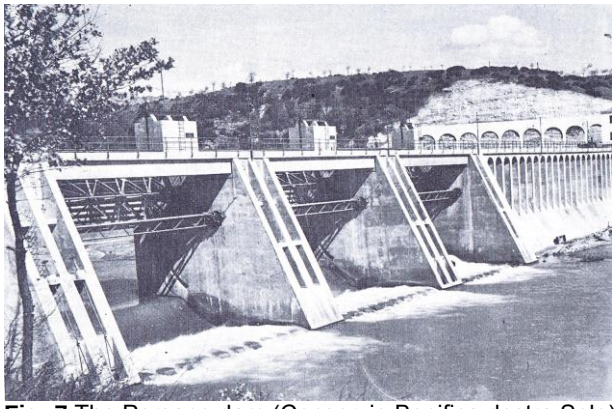

Fig. 7:The Persano dam (Consorzio Bonifica destra Sele)



Fig. 8: Drainage channel, Eboli, author’s photo

The Company also began the construction of buildings for groups of 12 families for "rational" breeding of buffaloes and horses, and 56 farms where to house 800 people. The address was to shape a sedentary agriculture, with the farmers who permanently reside on the place. It was planned to build farm roads, new power lines, pipes of drinking water and irrigation channels [20]. If reform efforts of the Regime, although imposed with a marked authoritarianism will clash elsewhere with the

landowners and the lack of cooperation between them, resulting ultimately a fragmented and ineffective action, in Battipaglia and Pontecagnano the land was slowly fractionated with the rise of the irrigue crops. It was implemented concretely and more effectively than in other areas, the "electro-irrigue" plan suggested by Arrigo Serpieri, then undersecretary of the Ministry of Agriculture, despite the limitations caused by the perhaps excessive extension of the areas object of the remediation program. At the same period, there is an important economic growth associated with the activities of agricultural products processing. It is here that the history of reclamation intersects with the growing spreading of the tobacco plantations, already traditionally cultivated in Salerno and object of attention around the thirties of the twentieth century. In close proximity to tobacco processing plants, rural villages arose together with the factories, becoming an element of both economic and social revolution. In this idea was condensed the fascist agrarian policy, whose key points and presuppositions were - in practice - the reclamations, the defense of the rural life and the cult of the family, understood as a demonstration of moral and physical vitality of the Italian people. Other important achievements were the installation of three idrovore plants at Asa, at Aversana and at Sele's estuary, but it is only in the 'post-war period that the reclamation of the whole plain could be considered an accomplished fact, thanks to the construction of country roads. Several road sections were made, straight roads with trend north - east and south - west parallel to the irrigation canals, which branch off from the main road linking Salerno to Battipaglia.

3.1 The new Landscape

This intense reclamation work mainly carried in the 30s of the twentieth century has left an indelible mark, significantly changing the perception of the landscape: here we have the best results of the reclamation between the two world wars, as it did for Emilia and Agro pontine [21]. After a stop at the turn of the second world war, even the postwar left a deep mark in this area. Some IGM plans detect precisely the transformations that took place in this period. In the fifties and sixties of the twentieth century the land reform causes the breakdown of large estates, and moreover, by building a network of irrigation canals and rural roads, by using DDT, the powerful insecticide introduced by the Americans and finally, by implementing new techniques for processing and marketing of agricultural products it was obtained a radical evolution in agriculture and a total change of Sele Plain's physiognomy [22]. The farming mainly based on subsistence and on landowners has been transformed into a modern and sophisticated system of agricultural production. Malaria was eradicated. Less success has been achieved in founding rural villages designed for the settlement of farmers in the reclaimed areas, as people preferred to move to more structured urban centres as Battipaglia, Eboli and Pontecagnano.



Fig. 9 Istituto geografico Militare, Sheet no. 198, Paestum. The grid formed by the drainage channels and plots of land facing towards the sea, appears prominently

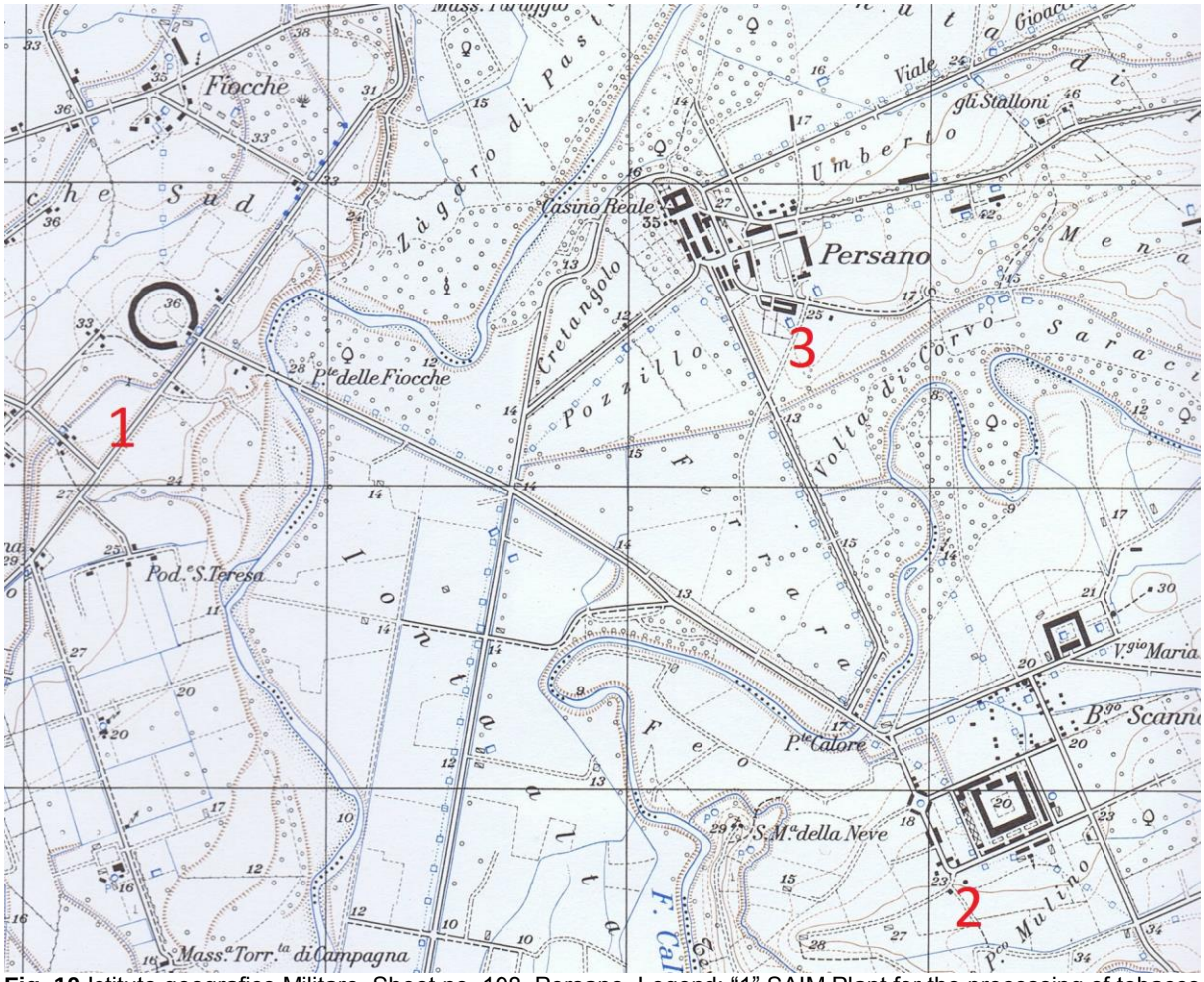

Fig. 10 Istituto geografico Militare, Sheet no. 198, Persano. Legend: "1" SAIM Plant for the processing of tobacco, Fiocche, Eboli, "2" SAIM plant, Scanno; "3" Royal hunting lodge of Persano. The two SAIM plants were connected with each other and with the casino Royal

Despite this, the small rural settlements were an important and tangible step towards an overall land redesign. In the described context, the rural villages of Piana del Sele - "Farinia," "Cafasso", "Corvinia" and "Valentinia" too - are evidence of an housing system of new conception, the result of a complex ideology that has become a structural framework for the social, economic and urbanistic history of the Plain. Visible signs in which is still recognizable the rationalist architecture, dotting the plain with its characteristic volumes, square and simple. The tangible evidence of human presence that has reclaimed the land, which is now marked by canals and straight roads, farms with modern silos, channels carrying stagnant waters into the sea. The system of canals of anthropogenic origin with its network has fixed the characteristics of the roads' planning and the drawing of the agricultural plots. The victory of man over nature is the true deep meaning that this landscape embodies, the modernity that defeats the wilderness giving it a purely fascist shape. A land bent to the needs of the man, who has been able to give a cartesian order to an incoherent and wild landscape, transforming it into a plain intensively cultivated with small but evocative built up areas of fascist origin.

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HERITAGE ARCHITECTURE LANDESIGN
focus on CONSERVATION REGENERATION INNOVATION
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SENSORY EXPERIENCE IN ARCHITECTURAL MEMORY: TRANSFORMATION OF INDUSTRIAL BUILDINGS

Mads Harder DANIELSEN
Faculty of Engineering and Science, Aalborg University, Denmark
mads@foodplusdesign.dk

Abstract
By focusing on the connection between memory and sensory experience within the themes of conservation, regeneration and innovation this paper addresses the transformation of industrial buildings for future development.
How can the tangible and intangible cultural heritage be articulated and contribute in this transformation?
The current cultural centre *Nordkraft* - a former power plant and an icon of the industry in the northern part of Denmark - is utilised to investigate the role of heritage in architectural regeneration with focus on authenticity and local identity.
Memory is described by Marcel Proust in his novel *In search of Lost Time*: Here the phenomenon of involuntary memory is described as the essence of the past, which cannot be contained in the conscious recall of memories. Proust enhances that the mental images of the involuntary memory are brought out by gestures of the physical realm – sensory experiences.
Sensory awareness resonates within a phenomenological tradition in areas of architectural theory: The Scandinavian theoretician Juhani Pallasmaa draws on the philosophy of the bodily by Maurice Merleau-Ponty as he inscribes memory in the experience of architecture. Pallasmaa connects memory to imagination and perception which he argues play significant roles in the way a place is experienced.
With this kept in mind: How can historical memory and characteristics of identity contribute in a contemporary activation of the potential of unique buildings of the past?

Keywords: Sensory experience, memory, industrial buildings, Pallasmaa, Proust

One the most urgent issues for the present western societies is the intermediate stage between economies based on industry and economies based on leisure. The technical developments connected to this transition have at once chanced the reality of local identities to a global matter leaving some of the most physical statements of local technology behind in limbo: Areas of the industry in cities are becoming superfluous and posing challenges for an industrial architecture, where functions to an extreme extend dictate the form – no redundancy, no compromise. The history of the industry has left behind a heritage of a distinctive architecture which contains use of material, scale and structural transparency unparallel to conventional building culture found in the living quarters of the city. The transition to leisure economy during the anterior decades has left numerous of these industrial areas and buildings with great potentials desolated in cities: As these areas of yesteryear have become encased in the dwellings of the city questions arise to the destiny of the industrial architecture in a further development of the city: Can conservation of the heritage of industrial architecture be implemented in a transformation not only focusing on progress, but also securing authenticity and local identity by the means of architectural regeneration?

Next to the streams of Limfjorden is just one of these industrial areas. For more than a lifetime a stretch of the southern bank of the fjord was dominated by the industry of Aalborg, the largest city of the northern part of Denmark: East of the city centre the smoke from chimneys of the factories would steadfastly rise throughout the hours, days and years of the twentieth century. During the passing time

the industry of Aalborg did not only shape the physical identity of the city – the industrial environment also made another impact on Aalborg. The architect Thomas Birket-Smith has expressed the influence of the massive areas of industrial production and concrete buildings:

When I recall my childhood in the Aalborg of the 1960s, the grey powdered neighbourhoods close to the cement factories stand vividly in recollection. The lampposts close to Aalborg Portland [factory red.] are still to this day covered by a layer of harden cement which has settled during the time of decades. In a similar way the consciousness of the home town's past as an industrial centre has settled in the minds of the residents of Aalborg and is therefore a significant part in the understanding of the identity of this city [1].

A half century later from the childhood memories Birket-Smith became a part of the conversion of the industrial areas of Aalborg where the flagship of the process became the former power plant Nordkraft. The building complex of the inactive power plant was transformed from a regional centre of energy production to a cultural centre providing Aalborg with a total of 30.500 square metres of cultural activities [2].
Nordkraft is on the eastern harbour front of Aalborg placed in the epicenter of the transformation that is currently unfolding in Aalborg: The regular, rhythmic sounds of the pile driving from the neighbour sites resonate as an ubiquitous admonition of the growing cityscape just here: This is where the industrial grounds are currently moving towards new use; and right in the middle of this process Nordkraft stands with its thirteen floors of concrete, steel and bricks.
The road that led to the transformation began in the 1990's when a political decision was made to expand a newer power plant built in the sixties (Vendsysselværket) in the northern part of Denmark. This was the beginning of the end for Nordkraft as a power plant; and the power production stopped in 2002 – the same year as the publication of the Danish author Jakob Ejersbo's breakthrough novel where the narrative is placed in Aalborg.
In his novel Ejersbo gathered a tripartite story of human propulsion and hope of change in the underground of Aalborg under a common title; and he chose a simple name for the book: *Nordkraft*. The power plant did not play any part in the novel and was barely mentioned - however the name of Nordkraft still encases the narrative of power, progress and promise…
The name Nordkraft can be translated to *power of the north*. This ambiguous name resonates with the roles of Nordkraft: The former use as power plant and the present use as cultural centre – a motive force of power and cultural life in the region. This however raises questions regarding authenticity, heritage and identity in the process of the transformation from energy centre to cultural centre.
Can the story of a city with two distinct shades of identity be contained within a single transformation? Significant changes has surely undergone the site of Nordkraft since the first power station was built at the banks of Limfjorden in 1895; Nordkraft has left the function as a power plant behind, but as Ejersbo's title indicates: The building of Nordkraft has not diminished as a symbol of the identity of Aalborg in the minds and memory of the inhabitant of the city. This memory serves as the point of departure in the investigation on how the tangible and intangible cultural heritage of Nordkraft are articulated and contributing in an act of regeneration [3].

Marcel Proust has exhaustively addressed the entangled relationship between memory and the existential experience of the world in his novel *In search of Lost Time.* Here the quest for absorption and appreciation of the past is sought through the impressions of the present. The translation of the French autobiographical novel was first published under the name *Remembrance of Things Past*; and the themes of remembrance and recollection is just the centre of rotation in Proust's narrative of the extensive tracks of memory followed and crossed in the process of remembering.
A recurrent shade of remembrance and recollection embraced and enhanced by Proust is the involuntary memory. This memory is introduced through the encounter with a pierce of Madeleine cake: On a cold winter day the protagonist of the story is offered hot tea by his mother to regain warmth; out of habit he first refuses, but an unusual experience occur as he accepts the tea served with a side of a small Madeleine cake: The flavour takes him far away from the coldness of winter and back to the summer Sunday mornings of Combray in childhood as he takes a spoonful of tea with a soaked morsel of cake to his lips:

As soon as I recognised the taste of the piece of madeleine soaked in her decoction of lime-blossom which my aunt used to give me . . . immediately the old grey house upon the street, where her room was, rose up like a stage set to attach itself to the little pavilion opening to the garden which had been built out behind it for my parents . . . and with the house the town, from morning to night and in all weathers, the Square where I used to run errands, the country roads we took when it was fine … in that moment all the flowers in our garden and in M. Swann's park, and the water-lilies on the Vivonne and the good folk of the village and their little dwellings and the parish church and the whole of

Combray and its surroundings, taking shape and solidity, sprang into being, town and gardens alike, from my cup of tea [4].

The mere sight of the cake which the protagonist has encountered several times has done nothing like this, but a journey is triggered as taste buds encounter the same sensation of tea and cake that his aunt would serve before mass on Sundays: The town and gardens of Combray bloom from the cup of tea in a recollection of the past different from any voluntary recollection of childhood Combray. The Madeleine cake is one of the everyday encounters of the story that evokes a recollection lively in a manner different from any conscious attempt to recall the past – and these encounters become vital for Proust in the identity of the past:

The truth that intelligence grasps directly in the open light of day have something less profound, less necessary about them than those that life has communicated to us in spite of ourselves *in an impression, a material impression because it has reached us through our senses, but whose spirit we can extract....I would have to try to interpret the sensations as the* signs *of so many laws and ideas, by attempting to think, that is, to bring out the darkness what I had felt, and convert it into a spiritual equivalent….Whether this was a matter of reminiscence of the kind that included the noise of the fork or the taste of the Madeleine, or of those truths written with the help of figures whose meaning I was trying to discover in my mind, where, like steeples or weeds, they composed a complicated and elaborate* herbal, *their first character was that* I was not free *to choose them, that they were given to me as they were. And I felt that this must be the mark of their authenticity* [5].

The authentic character Proust assigns to the reminiscence of the involuntary memory is connected to the unprejudiced identity as the reminiscence is not able to be chosen – it is given. It is an occurrence that takes place outside the consciousness – or at least outside a Cartesian conception of consciousness. Could this reminiscence sparked by a sensory experience of the present realm be applied in the articulation of the authenticity intrinsic in the architectural heritage of the past?
A memory of authentic character rising from sensory experience suggests a turn of focus towards the sensory of the bodily: In the search for an approach to the conservation of authenticity within architectural heritage focus could be turned towards sensory perception and experience. The French philosopher Maurice Merleau-Ponty has in his phenomenological thoughts addressed the relationship between body and world - and the connections of these to memory:

Existence always carry forward its past, whether it be by accepting or disclaiming it. We are, as Proust declared, perched on a pyramid of past life, and if we do not see this, it is because we are obsessed by objective thoughts. We believe that our past, for ourselves, is reducible to the express of memories which we are able to contemplate. We sever our existence from the past itself, and allow it to pick up only those threads of the past which are present. But how are these threads to be recognized as threads of the past unless we enjoy in some way a direct opening upon the past? [6]

This direct opening is in Merleau-Ponty's view closely linked to the encounter between body and world. Based on the work of Edmund Husserl Merleau-Ponty characterises phenomenology as a matter of describing and not explaining, analysing, constructing or forming. The encounter with the world is a direct experience - or to use the term of Husserl: A return to things in themselves. This means a return to the world which precedes knowledge – and Merleau-Ponty argues this happens through perception. The idea of the body as a mere tool or object for knowledge is abandoned in favour of the contrary view – it is through the body as a whole that knowledge, consciousness and existence are grounded [7]:

Truth does not 'inhabit' only 'the inner man', or more accurately, there is no inner man, man is in the world, and only in the world does he know himself [8].

The emphasis of the bodily intrinsic in the phenomenological approach of Merleau-Ponty resonates within areas of architectural theory: The Scandinavian theoretician Juhani Pallasmaa draws on the philosophy of the bodily as he inscribes the body at the centre of the experience of architecture:

Merleau-Ponty extends the idea of the processes of embodied thinking to include the entire body as he argues: 'The painter "takes his body with him" (says Paul Veléry). Indeed we cannot imagine how a mind could paint.' It is surely equally unthinkable that a mind could conceive architecture because of the irreplaceable role of the body in the very constitution of architecture. Buildings are not abstract, meaningless constructions, or aesthetic compositions, they are extensions and shelters of our bodies, memories, identities and minds. Consequently, architecture arises from existentially true

confrontations, experiences, recollections and aspirations [9].

In continuation of Merleau-Ponty's line of thought Pallasmaa argues that the existential nature of architecture makes it a multi-sensory experience; qualities of space are measured by eye, ear, nose, skin, tongue, skeleton and muscle in an equally and combined manner. As a result of this entangled character architecture can never be described as a mere visual phenomenon in an ocular realm. It is rather the strengthening of one's sense of being in a world were several realms of sensory experience interact with each other and fuse into each other [10].
Nevertheless, according to Pallasmaa a contrary tendency in the architecture of today is dominant: Modern consciousness and sensory reality has moved towards a biased sensory approach - hegemony of vision! Architecture has as a consequence of this become an art form of instant visual images without sensory invitations and discovery - without mystery and shadows. And thereby lost the existential roothold [11]. Pallasmaa states:

As buildings lose their plasticity, and their connection with the language and wisdom of the body, they become isolated in the cool and distant realm of vision. With the loss of tactility, measures and details crafted for the human body – and particularly for the hand – architectural structures become repulsively flat, sharp-edged, immaterial and unreal [12].

To secure the ability for architecture to embody confrontations, experiences, recollections and aspirations Pallasmaa proposes an emphasis of the visual on equal terms with the other senses; making architecture a multi-sensory experience where memory plays an important role. He states that all senses are interconnected - even the now dominant sense of sight collaborates with the other senses and this coherent sensory apparatus is according to Pallasmaa linked to memory:

Even visual perceptions are united and integrated into the haptic continuity of the self; my body remembers who I am and where I am placed in the world. In the opening chapter of Combray, Marcel Proust describes how the protagonist wakes up in his bed and gradually reconstructs his world on the basis of 'the memory of the sides, knees and shoulders' [13].

The conception of involuntary memory can be considered as a multisensory phenomenon in a continuation of the emphasis of the wholeness of the bodily by Merleau-Ponty and Pallasmaa. This however raises questions to the implementation in the transformation of industrial architectural: Is the approach to regeneration of architectural heritage hidden in an embracement of the full sensory palette? Can the memory of the body – of sides, knees and shoulders – facilitate an immeasurable and incomparable reminiscence of past and identity?

The first nineteen century power station of Aalborg was succeeded in 1909 by a new station built on the site of Nordkraft in red bricks with a double-pitched roof. This building would be preserved in the 1940's as expansion of the power plant began; and a century from its erection the brick house came to play a key role in the transformation of Nordkraft completed in 2010: When the transformation was completed the double-pitched roof would shelter one of the most characteristic spaces of the entire building complex - the Kettle Hall.
The transformation of Nordkraft was primarily concerned with two approaches: The utilisation of the excess load capacity in the concrete and steel structure, and the balance between preserving as much as possible with the requirements for extra square metres in the addition of new decks [14].
The latter balancing resulted in a clear differentiation in the transformation of the power plant's spaces – this is especially seen in the two largest spatialities of the building complex: The Boiler Hall and the Kettle Hall. In the former regards to the extra square metres resulted in the implementation of a hanging black box of three stories. This 650-ton architectural addition utilises the existing load capacity of the structure while serving as acoustic regulator in the space now housing sport facilities. The badminton fields, fitness facilities and climbing wall of the hall are all profiting from the acoustic conditions and the daylight entering through the windows of the façades kept free of contact with the black box by the suspension from the roof structure [15].



Fig. 1: The Kettle Hall of Nordkraft (picture by Patrick Ronge Winther)

The opposite approach was applied in the Kettle Hall where the consideration to the preservation of the existing is dominant: The room is named after the massive kettles that once were used in the power plant. The coal powered kettles are long gone and the enormous volume today houses temporary functions such as markeds, concerts, displays – and most important: It serves as the entrance to Nordkraft. The Kettle Hall is the link between city and building - the first encounter with the past. This is where the city steps inside and faces the grandeur of the industrial architecture. The kettles may be gone, but the transformation has preserved plenty of traces of the past as the room was left in the raw nature of its origin and no additional decks were added.
The scale of the hall is only met by the same extreme sense of materiality: An unveiled coarseness of concrete is dominant, the textures of the raw surfaces are let exposes in the direct light entering from the west facing façade composed by windows from floor to ceiling. Every tactile sense of materiality is amplified in the light of the Nordic sun; the light washing over the floor during the hours of day warms the surfaces and releases an immanent, faint scent of stone and dust…
Traces of the past use of the room are evident vast above the perpetual, ongoing interplay between the direct light and the deep shadows on the concrete floor: The massive coal funnels used to power the kettles still hang in a manner of stalactites. Before the encounter with the funnels the temperature of the unheated room has already served as a subdued sense of the spaciousness in the industrial architecture of the Kettle Hall. This sense is amplified as the ubiquitous connection to the past is sensed in a very direct manner under the hanging concrete coal funnels.
The weight of the massive construction almost yields a warning and adds a sense of vulnerability to the sensation of standing under the hanging, inclined sides of the funnels. The awareness of the human body's size is suddenly insidious surfacing…
This sensation of inferiority is only confirmed as the sounds of the Kettle Hall animates the entire room in the resonating and reflecting sounds on the hard concrete surfaces; the reverberation enhancing the sense of the voluminous spatiality.



Fig. 2: The coal funnels of the Kettle Hall (picture by Patrick Ronge Winther)

The transformation inevitable embodies the direct testimonies of the industrial architecture of Nordkraft by the conservation of the power plant's spatialities. This preservation of the physical and tangible heritage of Nordkraft is the fundamental capacity of the regeneration. But as an alone-standing gesture this approach contains the dormant peril of becoming an unilateral narrative as it is a one-sided story unfolded – the history of a single building.
However the emphasis of sensory experience in the transformation refuses this character to predominate as the links of the involuntary memory occur: The intangible connections to the past are made possible by the reminiscence – and thereby it is also possible for an indirect testimony to permeate the narrative of Nordkraft.
Through the reminiscence of the involuntary memory the present Nordkraft encompass not only the physical tangible heritage in the regeneration, but also the intangible traces and gestures to the past of Nordkraft. These tactile encounters linger in the spatial narrative, waiting in silence to open up the journeys of the reminiscence.

In the search of an approach to secure the heritage of industrial architecture it seems necessary to bring into focus the interventions applied in unfolding of the narrative in Nordkraft: If the involuntary memory is based upon the link of two sensory experiences - how is the reminiscences sparkled by the gestures of the Kettle Hall linked to sensory experiences in the past?
This question is essential in the understanding of how the story of Nordkraft is disclosed: If the flavour of the Madeleine cake and tea is linked to the smells, warmth and light of summer Combrey; what sensory experience is the coldness and timbre of the Kettle Hall linked to?

Because of the gestures of sensory experience the transformation has the possibility not only to house memories of the past activity within the walls of Nordkraft, but also to let a narrative of authenticity and identity be unfolded. The opportunity allows the transformation to abandon a unilateral approach and embrace a diversified story of larger scale.
Standing under the concrete funnels of the Kettle Hall and sensing the rough tactile industrial architecture vivid pictures are undoubtedly unfolded. Could the nature of these pictures abandon the state of present and past in isolation?
The Madeleine and Combray are not isolated in space and time: The first is enveloped in the second and the second in the first: The flavor of the cake no longer belongs to the cake alone and the color and temperature of summer do no longer belong to Combray alone; they have become internal in a concerted relation and the present is therefore no longer separable from the past.
It seems that the gestures of sensory experience in the transformation are not aimed at or limited to a specific memory of Nordkraft as the regeneration embraces a wider narrative: By the implementation of the possibility for reminiscences of an array of industrial architecture the story of Nordkraft is no longer an isolated story of a single power plant of the past, but rather the story of the identity of a city: As the sensory experience of the present Nordkraft is not limited to open up connections to the past of only Nordkraft – the reminiscence holds the possibility of vast different memories to be unfolded.
It is not only the self-contained story of the now long gone chimneys of this specific power plant - it is the story of the heavy smoke rising from the whole eastern part of Aalborg through decades. It is not only the story of the single worker handling the coal on the quay next to Nordkraft in the light of the rising sun – it is the story of generations of workers in the early hours of day on their way to the factories of the heavy industry in Aalborg. It is the possibility for reminiscence to engender the city's past as an industrial centre – and for this consciousness to settle as the city builds on this local identity in a further development through regeneration.
The story of Nordkraft and the identity of Aalborg are through reminiscence an ideal reality or virtuality; an essence incarnated in the involuntary memory. Or with the words of Proust: "*Real without being present, ideal without being abstract."* [16]

Pallasmaa has in his phenomenological writings addressed the connection between memory and the physical sensory experience of perception. He states that the connection of perception and memory plays a significant role in the way a place is experienced as humans have an innate capacity for remembering and imagining places. According to Pallasmaa this ability allows our perception to constantly interact with memory, and in this process fuse the domain of the presence into images of memory [17]. It is this ability of the human existence that allows the involuntary memory to create a realm of amalgamation which embraces past and present in a joined narrative of time and authenticity, or as Pallasmaa states: *Images of one sensory realm feed further imagery of in another modality. Images of presence give rise to images of memory, imagination and dream* [18].

For the architectural heritage of the industrial buildings to play an active role in the future cities it seems that the idea of a passive conservation could be abandoned in favour of regeneration through

emphasis on sensory experience. Authentic vocation is needed for the dissemination of the stories of the past not to linger in a state of hibernation, but to be vividly retold.
For the memory of the past to weave around the present a call for sensory experiences is needed: Intrinsic in the transformation and regeneration of the buildings of the past is the possibility to unfold the play between sensory experiences of the present and an effervescent stream of memory of the past. Regeneration of the tangible and intangible cultural heritage in industrial architecture is not a matter of inactive conservation – it is about releasing memories through an active transformation based on sensory experience.

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CHARACTERS OF THE RURAL HERITAGE IN THE VAR

Laura BLOTTO[1]

(1) Assistant Professor of Drawing and Representation, Politecnico di Torino Department of Architecture and Design - Turin, Italy

laura.blotto@polito.it

Abstract ID106
The study aims to analyze the architectural structures closely related to the agricultural world in the Var, with particular regard to all those accessories buildings in the service of land use. The landscape of Provence verte is composed of a mosaic of territories between them very different. Each of them has its own individuality which is determined by many factors and these include geographic configuration, culture, activities that take place there. But it can warrant recognize some recurring element that creates the unitary of the whole territory which identifies, for example, the organization of buildings for rural activities in the maintenance of agricultural land, forest and pasture with the use of materials found in site and using construction techniques of ancient memory that are handed down from generation to generation. It is noted that the work of man is always in harmonious relationship with the natural environment and respectful of its laws. Agricultural structures, abandoned or mutation of use, represent a point of reference for the evaluation of the characters and values of a territory. The analysis, aimed at the preservation of historical and cultural sites to allow us to acquire useful to identify strategies for upgrading a view to sustainability. The above also directs us towards the planning of possible tourist paths aimed at rediscovering the rural landscape understood as a laboratory of knowledge. A local project can only start from a new-found ability to read the territory as a whole, in the historical configuration, sacral, economic.

Keywords: heritage, rural, Provence.

1. Introduction

The human presence in the area, named only recently *Provence Verte*, is very old. In each age, physical, climatic and socio-economic factors have an impact on housing systems, ways of appropriating the space and adapt to the environment. The first traces of human presence dating back to the Neolithic period (sixth to third millennium BC). The remains that have come down to us are based on findings of the villages in the plain, of cavities inhabited placed on the slopes, of dolmen or burial caves, which are present on the hills in the heart of the massif of Moures. Larger agglomerations, which date back to the Iron Age, called oppida are sometimes the source of medieval castles or are the first groups of houses in the villages today. The historical events that have marked this area refer to the Gallo-Roman invasion of the Saracens in the tenth century until independence of Provence. During the period described so far, we passed by the oppida to fortified castrum, up to a profound change in the distribution of the rural population and no doubt of land tenure and land use in the Later Middle Ages. Nevertheless, we observe that in surveys conducted building materials are always the same: simply pushed together and used more carefully and taste. The roots of the housing systems in *Provence Verte* are derived from and directly connected also to the historical events that

led to choices of place, form and use. What we see now the built environment, grouped or scattered in the countryside, is roughly dated from the XVI - XIX century, everything is related to a set of oldest realization works that testify to the continuous use of the land, aim to global organization of areas: terraces, retaining walls, roads and paths, wells, religious sites, bridges. We observe that all the activities such as agriculture, herding, hunting, extraction of stone materials etc.., held for centuries on the same places. Even the traces of several roads have remained in the same time, also with slight modifications, from the time of the Romans, an example is the D7, ancient Via Aurelia which connected Italy to the south east of France.

2. The rural architecture

Running through the history of rural architecture there were two types of construction, the first consists of grouped habitat and the second habitat scattered on the ground, and it is on this that is given attention. These architectures arise during a relatively calm and prosperous, where the population settles in the plains and seek to acquire, including through deforestation, new territories to be used for agricultural use. As we have pointed out, this happens in the seventeenth and eighteenth century, the era in which the buildings line the essential characteristics that will result in the determination of an architectural style (the style of Provence). Several studies have been done to define the types of these rural architecture, including quote certainly the most important due to the Comte Lanery d'Arc. The author has conducted its own investigation with acute analysis by offering a very truthful about the existing situation.

The Encyclopédie départementale des Bouches-du-Rhone (1920 - 1924) contains the definition of some typical homes and refers to studies of previous author, but with significant additions. The study of M. Fernand Benoit in his book Provence et Le Comtat Venaissin (1949) gives us a reading on the structural development and way of living the Provencal house.

More recently still remember the work of R. Livet (1962) on the Lower Provence, which describes the main types of agricultural products.

The multiplicity of these buildings scattered throughout the area obliges me, for reasons of space, to restrict and limit exposure to some types that are identified in the "cabanons", the "pigeonniers" and "puits".

2.1 The *Cabanons*

In all ages the *cabanon* were an integral part of agricultural life. Often having to travel long distances to reach the fields, made it necessary to have a shelter in the workplace to be used for storage, temporary housing, place of storage of goods. Some are located on the edge of towns and cities, they still serve today as storage for farm implements. As of the end of the nineteenth century, they tend to become a place of secondary residence refuge on Sunday in search of coolness and tranquility. The examples concern *cabanon* in a single room, a square or rectangular plant, with small dimensions and when two rooms with mansard roof. The simplest type is composed by an elementary volume of the dimensions that are around 25 sqm. The orientation is generally south while the cover is in two flaps (even if they exist at a single, but are less frequent) (fig. 1).

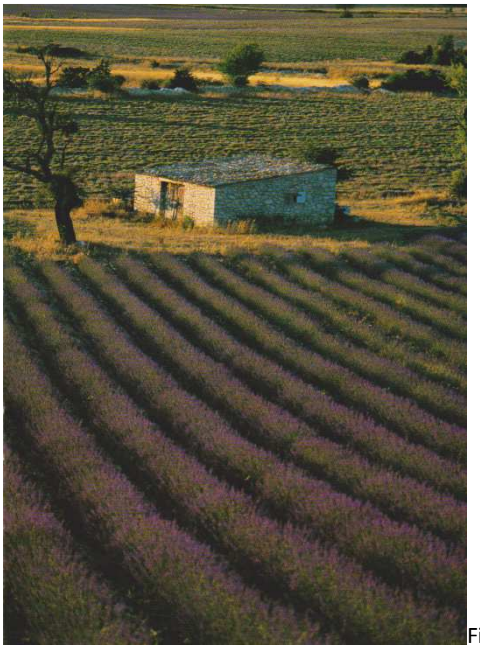

Fig. 1: Cabanon in Valensole.

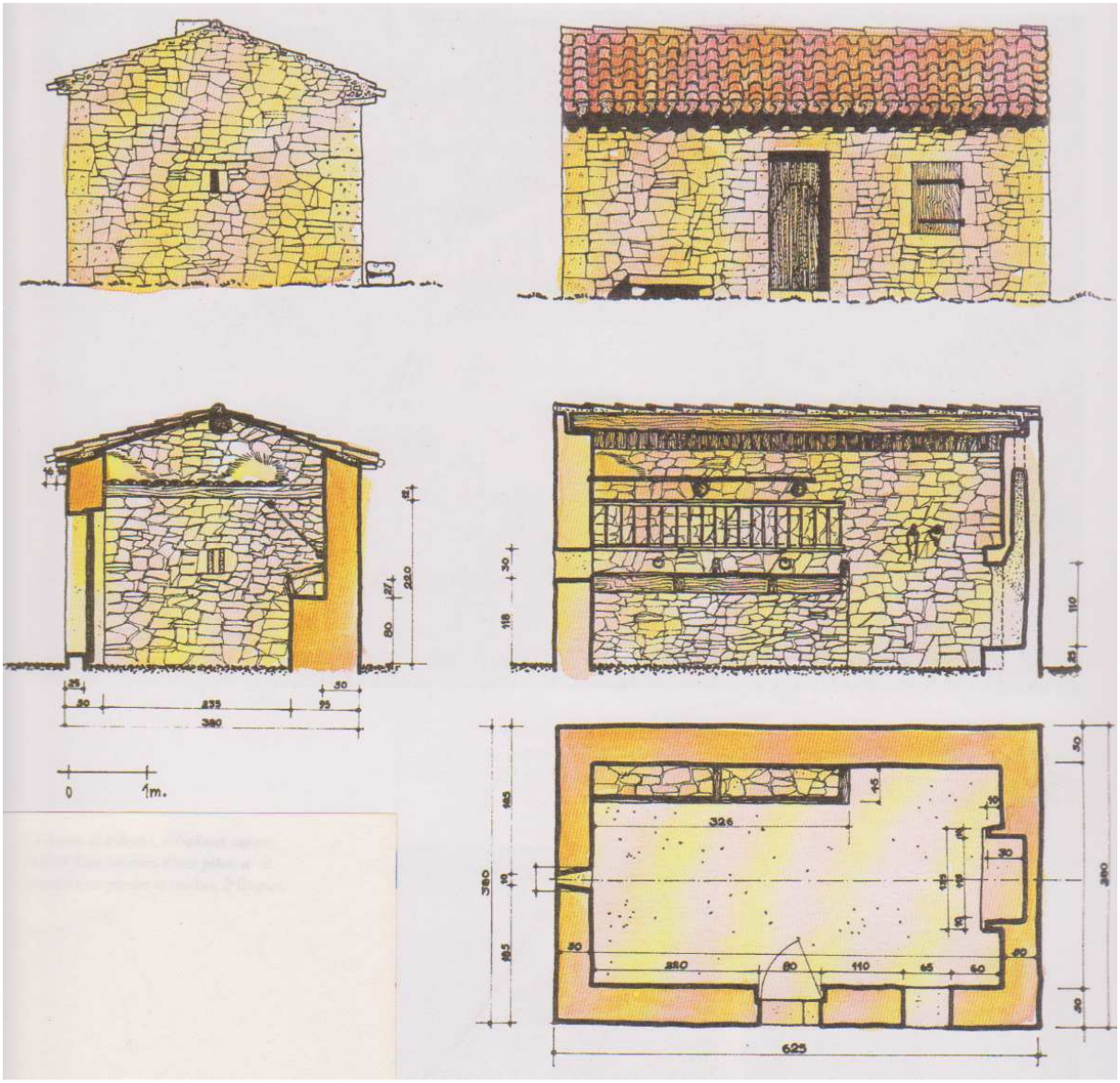

Fig. 2: Relief of one room Cabanon. (Design Claude Poulin)

The openings are present only on the south facade. The input port, to a single swing, leads to a single compartment and is accompanied by a small window. The presence of two doors generally indicates the existence of a deposit or a stable (Fig. 2).

To allow the temporary employment *cabanon* consists of two rooms, one of which is arranged to live with a table, fireplace, shelves for personal belongings and, at times, there is a small wooden staircase that leads to the room in the attic (Fig. 3).

Everything is organized as reduced-scale reproduction of the typical Provencal mas. You can find these buildings in the same building techniques of the main house, but with some simplifications due to lower volumes. They are made entirely of cut stone in the regions where there are quarries (can you say in almost the whole of Provence) and then include stonework, frameworks of doors and windows, etc.. The coverings are tiles and inside is lime plaster, plaster and whitewashing or painting lightly decorated.

The construction of a *cabanon* is closely linked to the presence of water in its vicinity: then springs, cisterns or wells sometimes more frequently integrated into the architectural mass.

The presence of a fireplace indicates the space inhabited by man, usually placed in a corner of the room and is sometimes combined with a stove that allows you to cook food. When in addition to being used as a store and also temporary habitation, externally is planted with essences can provide shade and coolness in the warm periods. Are also included pergolas with fruit trees and flowering - decorative such as wisteria. Often are located on terraces of dry stone connected to retaining walls of the hills, becoming an integral part of the landscape.

We see that these buildings are susceptible to internal changes and volume. Very often the tires are prolonged or undergo elevations. Evolutionary changes, which start from a simple volume basis, allow us to say that these modest buildings are responsible for housing complex (urbanistic laws permitting).

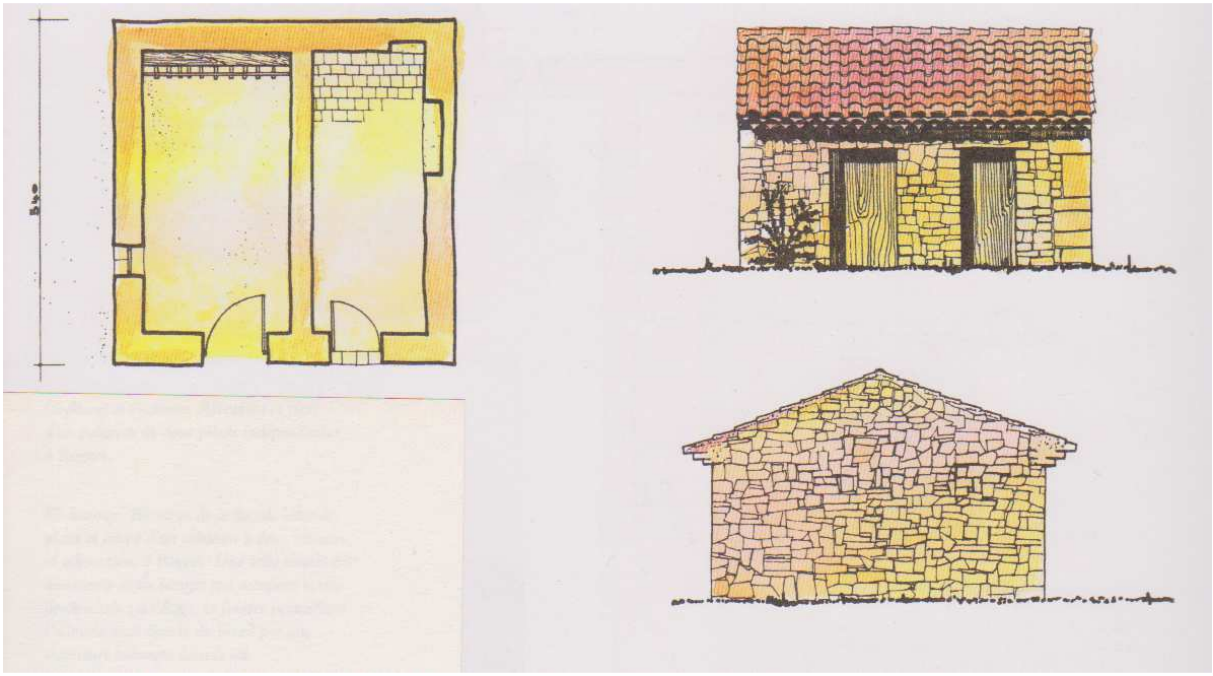

Fig. 3: Relief of two rooms Cabanon. (Design Claude Poulin)

The *cabanon* are particularly representative of the rural environment, Provence is dotted with plenty of both to the limits of vineyards planted that close to the woodlands or uncultivated. In addition to the aforementioned responsibilities to care for the tools, livestock and men, it is also a place of entertainment where you meet regularly families, friends or rendez-vous of hunting. Throughout the period of these historical artifacts ranging notions of work and fun. These two realities are tangent: the first means the daily work, the second leads us to a place that stands out from the obligations of everyday life. This duality to use leads us to a different interpretation of the spaces where the covered meets the needs of agricultural and became auxiliary to the convivial situations investing preferably outside.

2.2 The *Pigeonniers*

In Provence the pigeon lofts are an important element of rural architecture. There are very few farms that do not possess, and their presence, a variety of construction, floor pan give a certain personality and character to the building complex in which they appear. When they are located outside of the housing setting their structures rise majestically on the campaign featuring the perception of space (Fig.4 - 5).



Fig. 4: Pigeonnier of Boudin – Saint Croix (photo L. Blotto).



Fig. 5: Pigeonnier near Banon (photo L. Blotto).

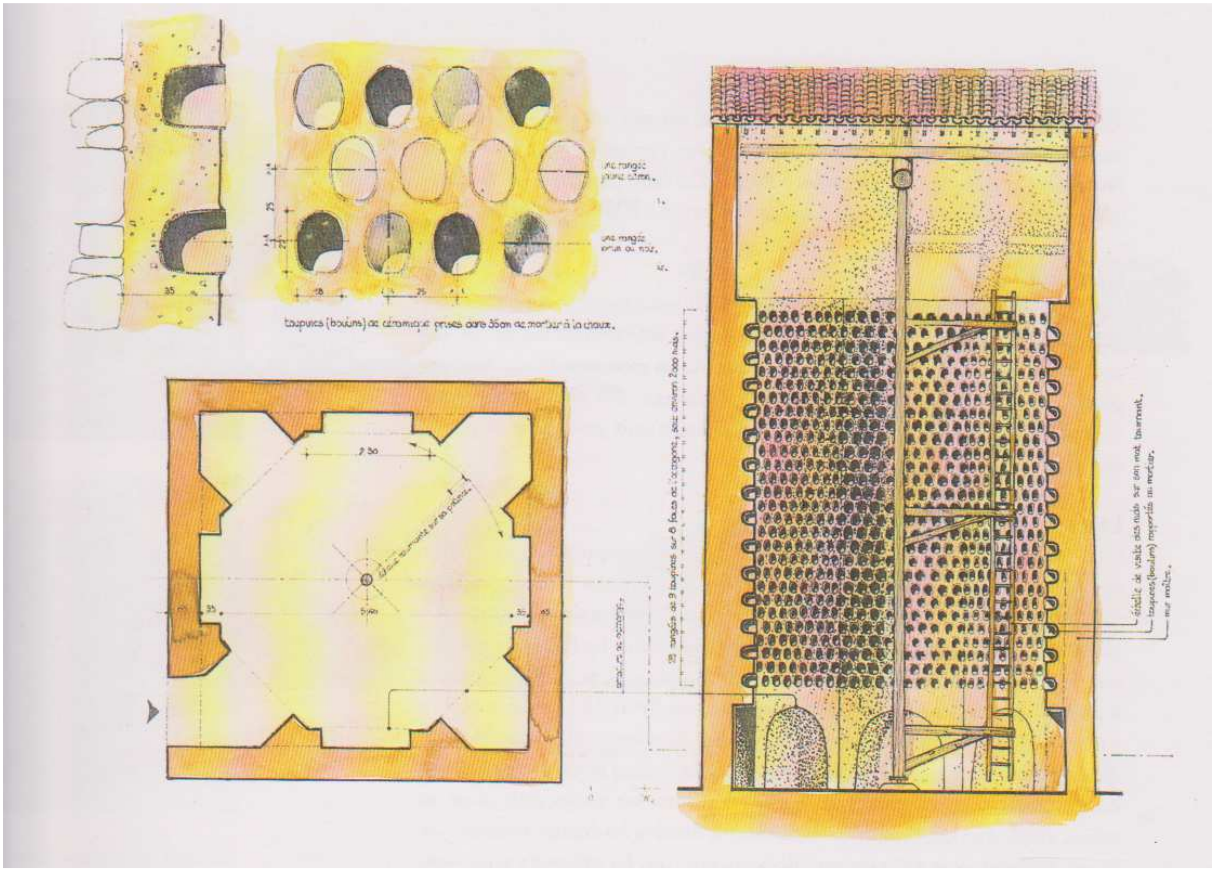

Fig. 6: Relief of pigeonnier - Puyvert. (Design Claude Poulin)

One wonders why their presence is a constant of the territory taken into consideration. Their usefulness lies in the fact that in ancient times was often difficult and, in the countryside, regularly obtain fresh meat (Fig. 6). The pigeon could fill this gap for most of the year, the pigeons also produce useful fertilizer for agricultural production. At present the reasons for this type of farming are practically ceased and the phenomenon has been drastically reduced.

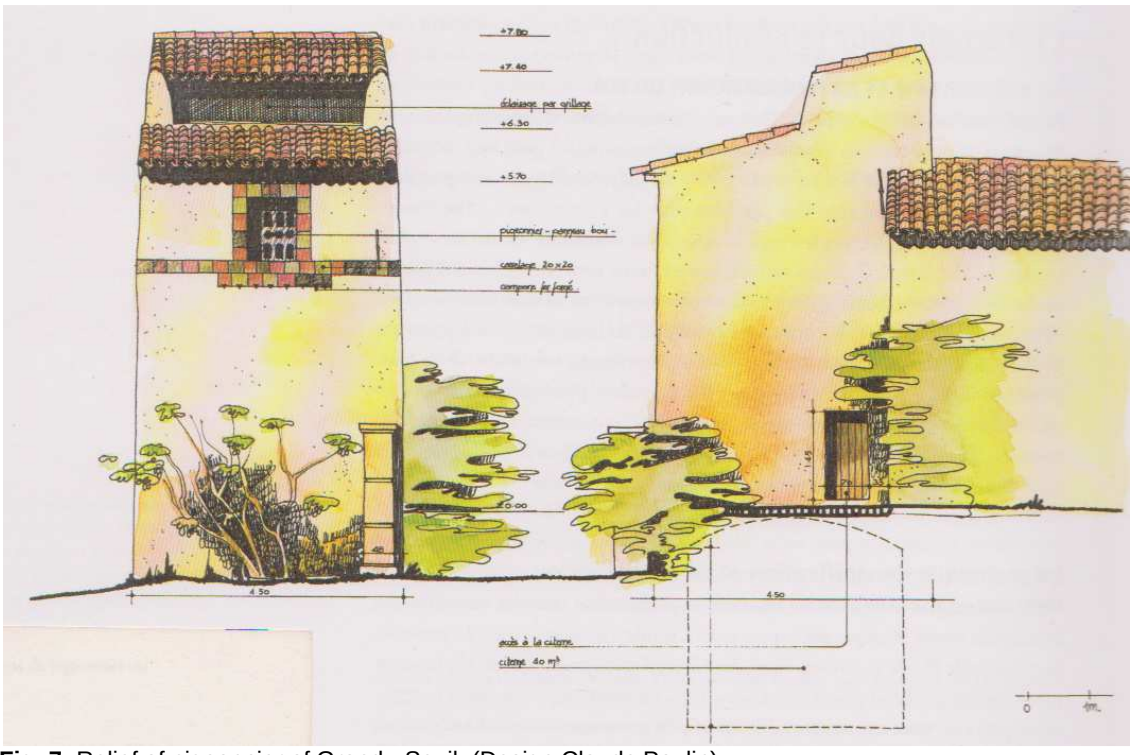

Fig. 7: Relief of pigeonnier of Grand - Seuil. (Design Claude Poulin)

Generally the pigeon houses are built in areas dominant and in places discovered in such a way as to facilitate the birds recognition of their home. The exposure of the openings is facing east at the first rays of the sun. The criteria are based on the construction and moisture protection from attack by predators. The first case is obvious building nests in not less than 1.50 meters from the ground level.
To protect against mice, martens, weasels, etc.. are applied to the devices to prevent the edge from both inside and outside. Inside doors with well-jointed, wooden ladders to reach the upper floors, plaster extremely shaved and smooth. Outside the openings can be protected with sheet metal, tiles protruding, smooth and glazed tiles on which animals do not have any grip (Fig. 7).
The pigeon isolated are generally developed on three floors: the ground floor can be used as a chicken coop, the second floor is reached by an external staircase and serves as a storage, the latter is occupied by the birds with their nests. They can be shaped square or round tower, their surface can be 15 - 30 sqm. and reach heights of 8 to 15 meters. They can accommodate a few dozen to a few hundred niches made up of small ceramic vessels attached to the wall. The dovecote of Brue Auriac is the most amazing area, its height is 23 meters, the diameter of 12.60 meters and is home to 4,000 nests. These buildings are become obsolete, in some cases, restored and civilized, but most vernacular heritage is a disused and abandoned to itself.

2.3 The *Puits*

Among the elements that visually emerge in the Var region are the wells. These structures can capture water directly from the water table and the depth of their cost on average around 10 meters, but there are also a depth of more than 20 to 30 meters. In areas highly springs, for example near Brignoles, Le Cannet, Le Luc and Vidauban just dig 4 or 5 meters. In cases where there is an undercurrent, the power is supplied by infiltration of rainwater or the load in excess of waterways bordering. The structures are then called "aiguier" and may be used only seasonally. The structure of the pit rises from the ground to about 1.50 - 2 meters in height and equally in diameter. The walls are made of stone or brick and mortar, topped by a small dome, sometimes covered by majolica glazed features bright colors, this is often a plaster curled. The opening frame is made of cut stone or bricks very similar to the doors of the villages or *cabanon* (Fig. 8 – 9). The wells without coverage are rare, appear to suggest a structure in ruins. Inside the bars are applied to suspend the pulley and there may have shelves or niches to support the bucket or to keep food cool. Often are located outside tanks for watering animals, to maintain coolness and shade trees are planted leafy. Well construction is entrusted to skilled workers who must ensure, with their skills and experience in the installation of stones, a good functioning.
On the use, we can say that a well generally belongs to one owner, at least this is the case for the majority of existing wells in nature. However, it is admitted that a a wanderer can draw water and respect the elementary rules which put in place the bucket and close the door in effect in private has a public function regulated by local customs and practices. When they are in common use can access all even if they are on private land, which is within the urban area, in the countryside or on the hills. In the villages, the wells are open to all under the control of the community. In the countryside or the hills are wells for the watering of livestock transhumance in particular. The wells of Saint Peyre in Camps-la-Source and Brusquet - Bras are two examples of places watering statute Community plain. The first is certainly the most mentioned in the archives of Camps, and Besse and Flassans since 1739.



Fig. 8 - 9: Two wells in Carces.

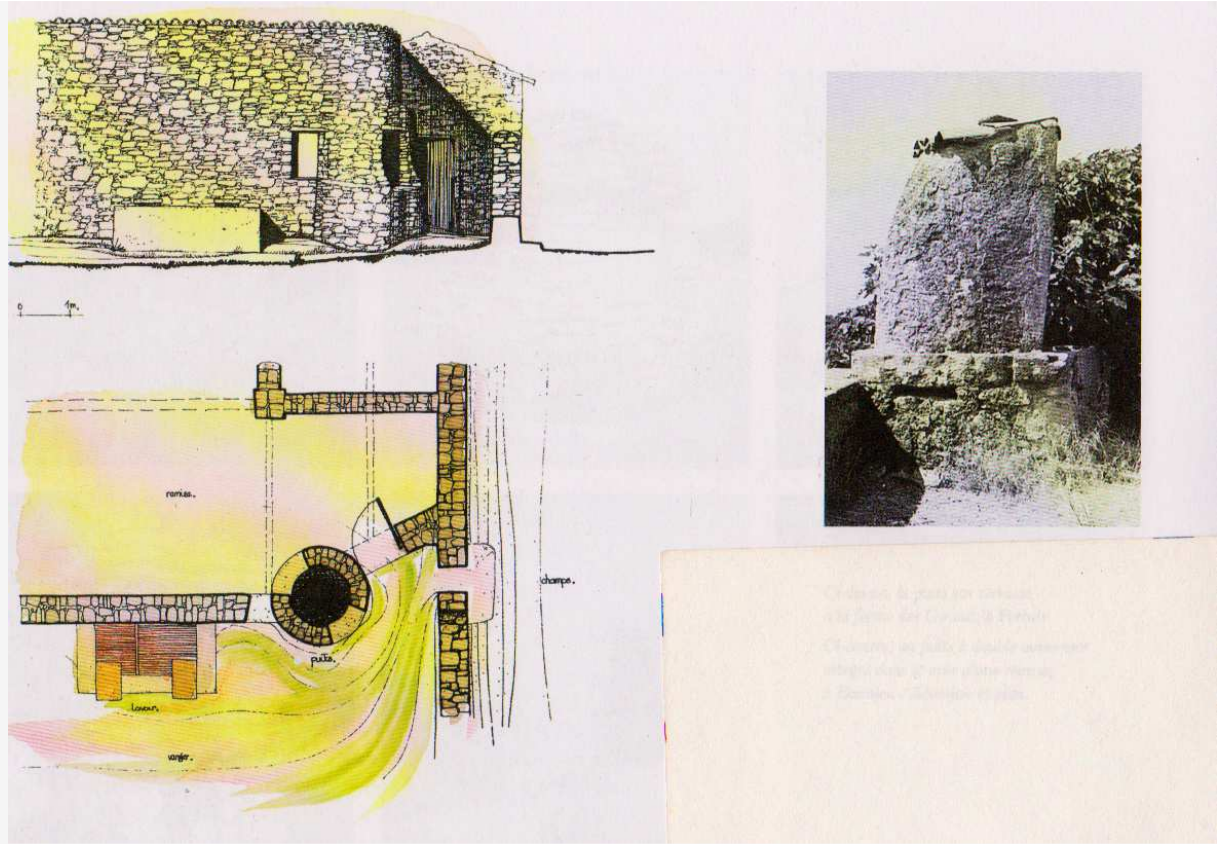

Fig. 10: Relief of a well on a terrace. (Design Claude Poulin)

The use of private or community is also applied to the water tanks. The general rule is that the water is free to use and that this accessibility is a normal corollary to the free movement of persons. Unfortunately, this accessibility is compromised by the poor state of the reserves, degradation and abandonment of wells and last but not least the acts of vandalism, the appropriation by individuals or local institutions (Fig. 10).



Fig. 11: Rural architecture in Provence. (Watercolor Remi Kerfridin)

3. Conclusion

Through the way done so far has emphasized the harmony that binds man to the environment in which they live. The bond is strengthened through architecture, built with materials found on site, which is covered by its values, culture, traditions, needs and experience of generations. Modern man occupies the same territory, but no longer has the same motivations, often constructed by inserting architectural elements in a Provencal style to be in tune with the place, but forgetting the culture and long history that determined the forms. The analyzed rural architectures are the most telling example of the integration of building in the habitat, it is characterized by simplicity and volumetric proportions that are always in relation to the human dimension (Fig.11). Looking to the future, in terms of sustainability and development and enhancement, for new construction projects in the territory of the Var is necessary to look at the European Union directives on the landscape. It stressed the strategic role of the citizens: "*the reinforcement of the relationship between citizens and the place where they live, they will be able to consolidate their own identity, that the local and regional diversity, in order to realize the personal point of view, social and cultural. This realization is the basis of sustainable development of any area under consideration, since the quality of the landscape is a key element for the success of economic and social initiatives, whether private or public."* A "local project" can only start from a new-found ability to read the territory as a whole, in the historical configuration, sacral, economic. We can say that it is the local memories to strengthen the sense of belonging and the study of existing rural buildings can be a stimulus, a useful means of an approach to design and operational objectives in the context of landscape and community.

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PERMANENCES AND MORPHOLOGIES OF HISTORICAL LANDSCAPES. THE HILL OF THE VOMERO IN NAPLES

Maria MARTONE
Dip. of History, Drawing and Restoration of the Architecture, University Sapienza of Rome
Rome, Italy
maria.martone@uniroma1.it

Abstract
The historical iconography of Naples until the end of the nineteenth century has reproduced the image of a seaside town surrounded by green hills in which they were built next to houses, villas and small rural centers, great architectures such as the Castel Sant'Elmo with the Certosa, the Palace of Capodimonte, the hermitage of Camaldoli. Subsequently, the landscape of the town has changed: it has intensified the building fabric until to endanger a cultural heritage of world renown.
The hill of the Vomero was the one that more has lived important changes that have led to a strong alteration of its original configuration.
The paper aims to identify, through a collation of historical views and topographic maps with cartography latest, several surviving elements of historical landscapes that no longer exist in an area that has over time changed its activity from agricultural to edificatoria.
Particular attention will be paid also to the identification of the ancient footpaths that connected the city to the hill of the Vomero, still present in the urban fabric as the ascent of Petraio and of S. Francis and the Pedamentina. These small streets, no longer having the original function being changed over time the road system of the town, tend to degrade more and more.
The objective of this paper is to expand and sustain the processes of knowledge of the cultural identity of a place to help to conserve memory and to safeguard the cultural heritage in danger of disappearing forever.

Keywords: landscape, town, territory, architecture, safeguard.

1. The hill of Vomero and its historical landscapes
The orographic configuration of the territory has greatly characterized the city landscape in the course of its history. Naples has developed reclining on a soil that had plains and hilly areas marked by watersheds, ridges, ridges and scree with a road system through which was passed in a small space a difference in height of about two hundred meters. From sea level you could climb up the hill through streets that reflected natural trails also beds of rivers that once flowed down the slopes of the hills. Not only roads, but also cupe, cavoni, strettole, vichi - that is narrow roads and uncomfortable embedded in the tuff, tuffaceous natural cavities - formed a mesh of paths that branched off on the hill linking the various countries present on the hills until it reaches the town plain. This network of connections road, partly survived to historical events, it is now difficult to read in the present fabric of the city, because overwhelmed by new roads and new buildings that over time have been made. In the landscape of the hill we read a layering of architectural and urban elements through which they could look back at some of the main stages of the history of a territory that was born in almost independently from the city below and, that over time, it has become part of the town. In this study, which is part of an ongoing research on the Vomero hill, the historical cartography and the iconography views play a particularly important role becoming an essential tool through which to recognize the signs that have survived to the transformations of the hill. These signs take today an added value witnessing to the persistence of historical landscapes [1].

1.1 The landscapes along the Roman road "per colles"

The range of hills that surrounded to the west the plain where stood the city of Neapolis, starting from Posillipo and including the Vomero and Antignano it was called in Greek age with the only name “Pausillipon”. In particular, as well as historical sources attest, was dedicated to Zeus the hill where the castle of the Elmo built later, while to Hera, the goddess of the woods, was dedicated the hermitage of Camaldoli that rose more inside aimed at the Campi Flegrei.

In Roman age the Vomero hill, indicated by the name of Paturcium from Patulcius, epithet of Janus, the god to which the hill was dedicated, was crossed by a road, already present in Greek age, that "per colles" connected Puteoli with Neapolis. This road, from Pozzuoli, flanked the Solfatara, followed the current provincial S. Gennaro and from Via Terracina continued towards the Canzanella and then along the ridge of the hill of Vomero with via Belvedere and, after reaching Antignano, it went in the via Salvator Rosa, once said the Infrascata. Hence following the Cavone arrived to the door Cumana, at St. Domenico Maggiore. Another road, always coming from Pozzuoli after passing the Posillipo hill, continued downstream of the range of hills toward the Riviera and proceeding in the direction of the valley of Chiaia reached the port. In the Augustan age the tuff ridge of the Posillipo hill was overcome with the realization of the Neapolitan Crypt, which linked Pozzuoli to the coast of Naples [2].

Along these roads developed an extra urban expansion phenomenon. Numerous archaeological findings witnessed a substantial residential development especially in imperial age, constituted by the presence of patrician villas in the area of Posillipo and Marechiaro. Rural houses, however, were found in the territories of Annianum (Agnano), Antinianum (Antignano) where itself developed the "praedia Roman" that is farms whose tree crops became an integral part of the agricultural landscape.

Ruins of a Roman Columbarium, formed by a structure in "opus reticulatum" with eleven niches for the ashes of the dead, are still visible in the last stretch of the via Pigna, at Soccavo, and unfortunately are in a complete state of neglect. Along the road "per colles", in the tract subsequently indicated in the historical cartography with the name "Infrascata", was found during the works of construction of the subway station hill a masonry structure with arches from the Roman era. Some scholars believe should belong to an aqueduct that carried water in the Flegrea area, while others say may constitute part of a viaduct of the old Roman road.

The road "per colles" was named Antiniana, around 100 AD and measured 10 miles. Along the way were also found certain milestones, then go lost, and only one, two meters high and ninety centimeters in diameter, is kept in the Archaeological Museum of Naples [3]. The way to “colles” became the main artery of a road system that began to develop in the area, even pushing inside to reach areas once uninhabited and uncultivated that stretched on the surface of the vast hilly plateau (fig. 1).

By the view of the city of Naples of the Flemish Stopendaal of 1653, drawn up on the basis engraving

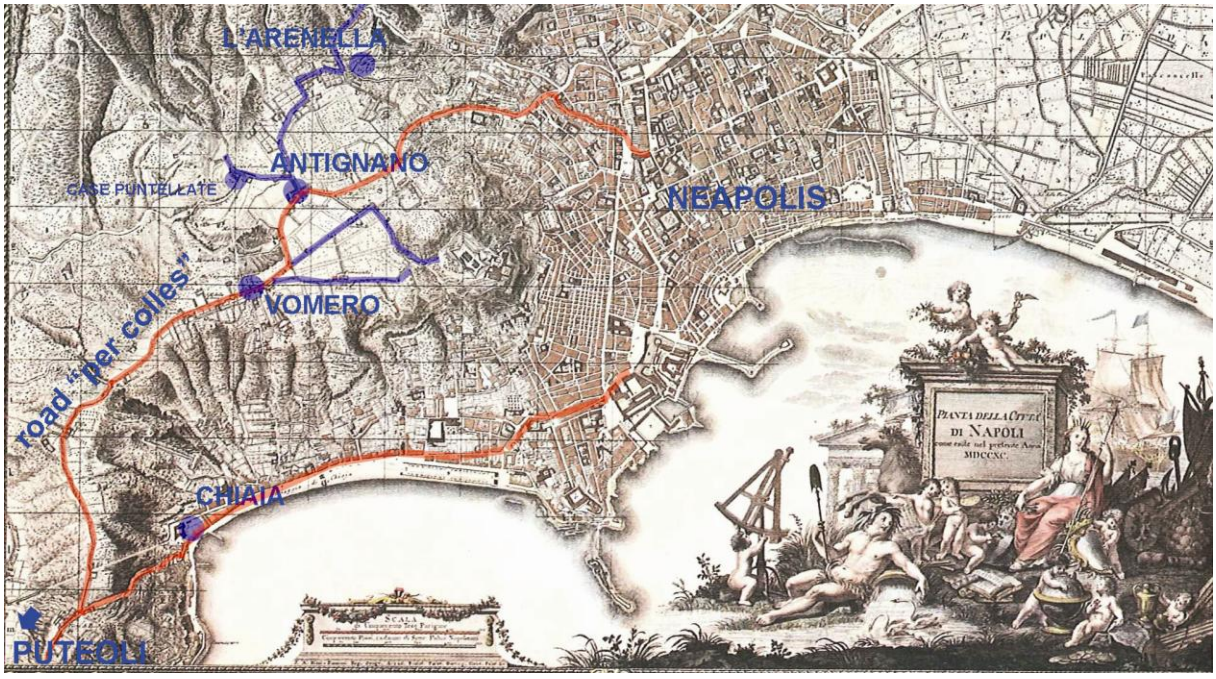

Fig. 1: *Plan of the city of Naples* (detail), G.A. Rizzi Zannoni, G. Guerra, 1790. In evidence the main villages and the roads “per colles” and to Chiaia.

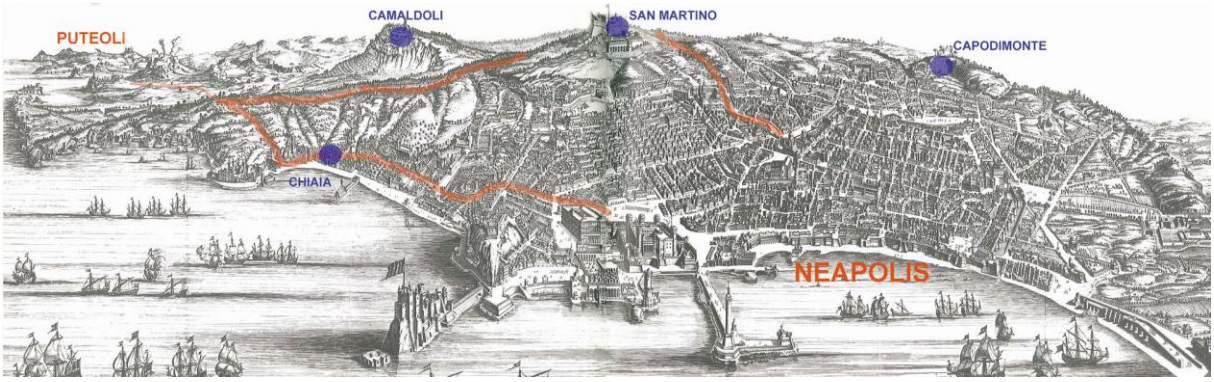

Fig. 2: *Napoli*, Bastiaen Stopendaal, 1653. In evidence the hill system of the city and the two roads connecting Neapolis with Puteoli.

Baratta, of a few years earlier, you can locate the system of hills crossed by the road "per colles" [4]. The town, drawn with its villages and its surroundings: from the coast of Pozzuoli to the bridge of the Magdalene, is shown in pseudo perspective with a view at the top of the sea with the intention of representing the city with the surrounding area. It is known, in fact, that with the topographical view of Alessandro Baratta, to which the Dutchman refers, itself consolidates this type of representation which shows the most typical and evocative sides of the landscape of the town (fig. 2).

1.2 From medieval rural landscapes to those of villas extra urban of the eighteenth century

The agricultural peoples who once lived scattered on the hill, located outside the city walls, in the medieval period, when there were frequent invasions of neighboring populations, gather, for reasons of defense, forming the first houses that are built around or to a religious complex, or a palace-castle or even along the road linking the city [5]. Those closest to the city center were called "state-owned" and depended directly by the king as opposed to those more distant called "feudal" who were subject to their own baron. The landscape of the hill remains, at this time, still mainly characterized by areas overgrown by wild wooded areas where you can already find some orchards and gardens for the direct cultivation of agricultural products to the supply also to the city, especially in the area above the current via Roma. The vine was cultivated very much and the farmers drew from it the greatest profit.

The slopes of the hill of Vomero begin a gradual transformation with the planned expansion of the town made by the Angioini and especially with the construction of the Carthusian cloister in 1325, built next to an existing tower lookout. Works were carried out for the construction of earth movings to build roads of and terraces, to drain and regulate the course of rainwater, creating thereby a new aspect to the morphology of the place. Then, the construction of the Angioino Castle of Belforte near the cloister represents the formation of what will be the distinguishing element of the landscape of Vomero hill in the following centuries until today. To allow the construction of the monastery were built some paths and climb including the "Pedamentina" whose very picturesque route has been preserved until today.

In the fifteenth century the Vomero hill is beginning to be seen and appreciated for its characteristics of healthy and pleasant place away from the chaotic environments of the town of the plain, from whose heights was possible to observe the gulf of Naples with its islands and the volcano of Vesuvius the mountain of Somma The beautiful scenery that can be perceived from the hill and the wealth of forested areas become attractive elements for the nobles of the town which build at Vomero residential villas surrounded by greenery in those places where you can also view the surrounding landscape. It’s the case, for example, of the villa of Giovanni Pontano, politician and humanist who worked at the court of Alfonso of Aragon, characterized by extensive gardens and orchards. Built in the Antignano village, the villa is now part of a curtain of houses that looks out on Via Annella di Massimo and the presence of a plaque on the main facade recalls his illustrious owner.

The function as a place of rest, leisure and holiday, that the system the Vomero hill began to take on, had grown stronger in subsequent periods when next to the ancient peasant farms were built residential villas on the slopes of Vomero hills by nobles as their second homes. In the early sixteenth century in the iconographic representations of the city appear, in fact, the first buildings that characterize a landscape up to that time of the whole rural.

We also recall another urban phenomenon which decreed an increase in the urban fabric of the hill. It is the plan of expansion of the town commissioned by the Spanish domination that lasted until the end of the sixteenth century when it was forbidden to build at Castel St. Elmo and on the slopes of the hill.

The plan of the Lafrery of 1566 brings us to the image of an agricultural landscape of hills formed by rows of trees placed along large areas of farmland. Thin dashed lines and parallel lines represent

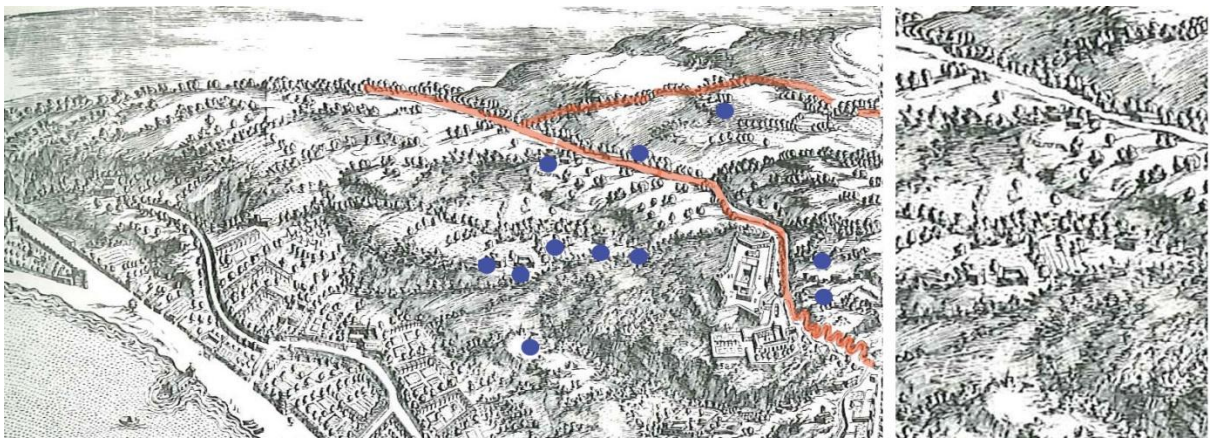

Fig. 3: *The city of Naples* (detail). E. Duperac, A. Lafrery. 1566. In evidence some of the farmhouses and villas on the hill of Vomero. Right: a detail of the design of the hill.

ordered crops, while in the case of maximum gradient we find dense groves. It is recognizable the stretch where the road "for colles" splits into two branches, one to Antignano and the other towards the hill of San Martino from where the path of Pedamentina is recognizable by its many bends. Scattered in the green slopes of the hill and also on the way to “colles” we recognize the drawing of small farms (fig. 3).
The landscape of the hilly area of Naples at the end of the sixteenth century was characterized by a great emergency architectural consisted by a monastic settlement dating back to the late Renaissance, linked to the monks of St. Romuald coming from a town in the countryside of Arezzo called Camaldoli. On the hills, which then took its name of Camaldoli, was built by the architect Fontana a hermitage, founded by John Avalos son of Alfonso of Aragon in the medieval village of Nazareth, as can be seen the landscape painting of the time.
The plague of 1656 led the nobles to move into their hillside villas and thereby to strengthen their presence becoming more stable since then. It was intensified the hilly road system and were opened up new avenues for the Vomero like that of the Infrascata, now Via Salvator Rosa. Made around 1560, the road followed the path of the ancient road "per colles".
At the Vomero settled celebrities of the intellectual class of the time and many noble families, as well as the Celano reported in the book "News of the beautiful, ancient and curious of the town of Naples." The author wrote: "the village of Vomero was once famous for the villas of famous writers and barons of Naples. Leaving the porticoes of the Panormita and Pontano, Pietro Giannone and Salvator Rosa will remember that in the sixteenth century our fathers marveled visiting the casino (as here called and call the holiday homes) of the Marquis of Ferdinand Vandeneynden ". The Celano continued in the description of the villa where the project was entrusted to Bonaventura Presti [6]. Recall that in 1688 after the death of the Flemish banker the palace, became Villa Carafa of Belvedere, turned into a magnificent villa with large terraces and balconies overlooking the Gulf of Naples. Many other nobles including the Donzellis, the Dukes of Regina, the Salves, the Count of Acerra, the Giordanos, the Ruffos di Sicilia, the Marquis De Mari, the Marinis of Genzano, the Cacciottolis and many others with their villas intensified the building fabric vomerese enriching with imposing architecture the hilly landscape in the eighteenth century (fig. 4). In addition to the suburban villas sprang up many religious complexes among which Santa Maria of the Libera in the sixteenth century in via Belvedere - around



Fig. 4: Naples. Some villas at the Vomero. From left: Villa Belvedere, Villa Salve and Villa Giordano.

which developed the first settlement of Vomero - and Santa Maria of the Soccorso at the Arenella of the seventeenth century which represented the first parish on the hill.
As is known, the "Topographic map of the city of Naples and its contours" drawn by Giovanni Carafa, Duke of Noja in 1750 and ended in 1775 after seven years of his death, represents in 35 tables, with minutia of the details and with the topographical precision, the territory of the city of Naples and its suburbs as it existed in the eighteenth century.

2. The road “leading to the Vomero” and the old villages of nineteenth century

In his routes of crossing of the city, Celano describes "the road called the Vomero" as "rich in monasteries and beautiful casini, to be salutary air having a look at the sea" and still defines the farmhouse Vommaro as "a place rich in fertile gardens and vineyards where you collect fruit in all goodness and delicate wines.”
As you know the name Vommaro, as well as the same Celano says, probably derived from an ancient game that the farmers in the hills of Naples were usual to make with the plow, called “vommaro”. It was customary to compete for reward those who managed to make straight furrows "having the view obstructed by a cloth attached to good sticks."
In the nineteenth century the main villages that consolidated their presence in the hilly system were those of the Vomero, Antignano and of the Arenella around which soon joined a number of smaller villages. The road system of crossing and connecting the hill to the city were mainly from the ancient Roman road that came from Pozzuoli and near S. Stephen took the name of "the road to the Vomero" as can be seen from the plan of the Duke of Noja. This road in the vicinity of "Casale said Vomero" was divided into two branches. The first towards north in turn was divided in other two branches leading respectively to "Casale said Antiniano today Antignano" through the road of Antignano (the current via Doria and via Annella of Massimo) and to the Castle through a road called still "road of Vomero" and then after changing the direction of 90 degrees took the name of "road leading to the castle." The second branch, which still retained the name "Road Vomero" led directly to the Castel St. Elmo along the current via Cimarosa. From the village Antignano branched three ways: "the road leading Arenella," "the road of the Puntellate Houses " and "the road of the Infrascata" that at the end of his long journey leading to the town of the plain.
By overlaying the ancient road network on a topographic map of the current city of Naples you can identify the ancient tracks of the road that, while retaining the original route, have lost as a result of urban transformations of the late nineteenth century and those still later, the territorial value of a time (fig. 5).

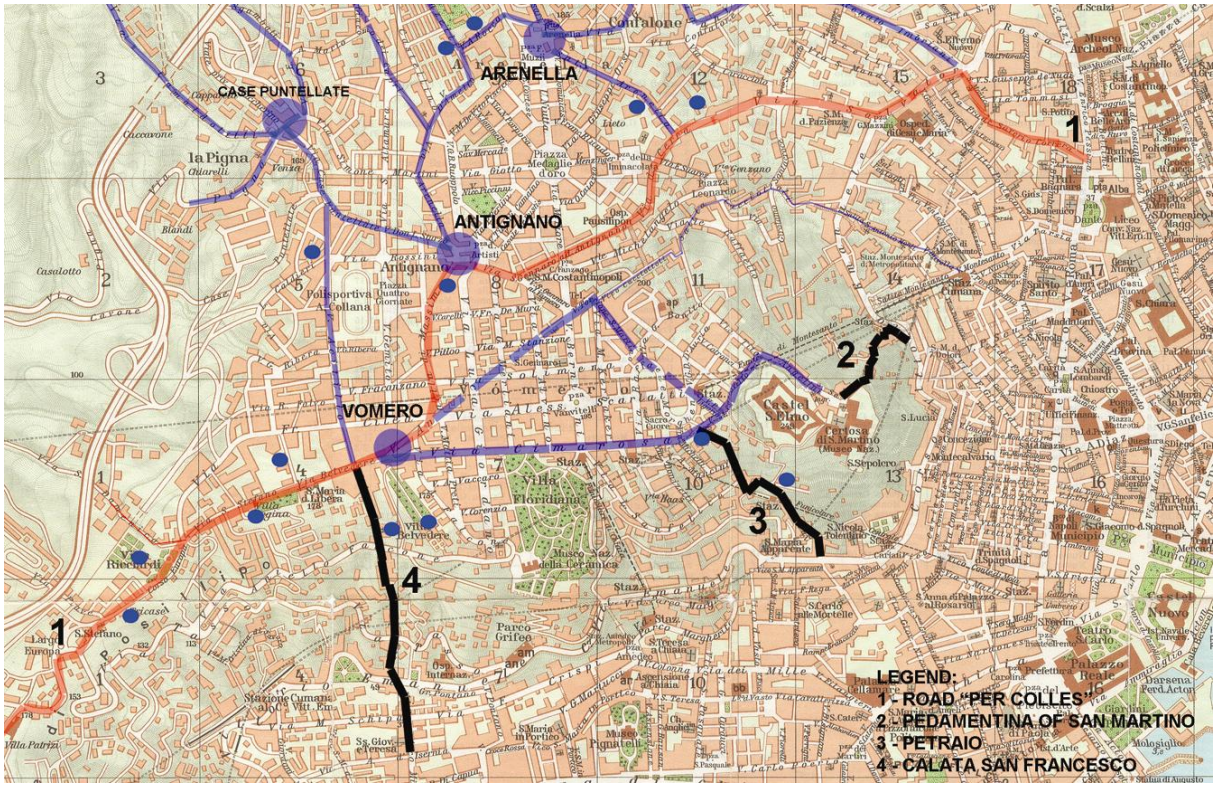

Fig. 5: *Plant Naples* of Turing Club Italy, Edition of 1975. Original scale 1:13.000 (detail). In evidence the major road network in the beginning of the nineteenth century in the Vomero hill with some of the main villas and farms.

2.1 The Village said Vomero

The village is located in the Vomero around the church of S. Maria della Libera, as can be seen from the map of Naples of the Duke of Noja and from that drawn by Rizzi Zanone 1790. Subsequently with the name Vomero pointed most of the hill that the Romans called Paturcium.
From S. Stefano square began "the road that leads to the Vomero" that, following the crest of the hill was a lookout over the city and towards the sea and towards the valley flegreo or rather the plain of Fuorigrotta bounded by the hermitage of Camaldoli. The route of the road is recognizable today in the last stretch of the course Europe and in via Belvedere that evokes only in place names the scenic location that had once the road. Before going any further into the interior of Vomero is opened a small and narrow road towards Soccavo, the current via of S. Domenico. Along course Europe are still recognizable in the urban landscape the villas Salve and Ricciardi that have retained the characteristics of their position and exposure in an area hard hit by a violent urban development. Villa Salve subsequently also called Winspeare villa, partly renovated, has retained its original eighteenth-century type with belvedere tower and large terraces that open on the side facing the sea on a terraced garden planted with vines. The Ricciardi Villa was built in the nineteenth century on a land that was part of the Hortus Camaldolensis that stretched from Camaldoli to Soccavo; now houses a school for the blind and is part of a park much smaller than the original one. Belonged to the large estate of Camaldoli also the farm of Miniero of which remains still visible the entrance on via Tilgher near the stadium Collana. Another farm that is still present and recognizable in the building fabric of the neighborhood is that once called "the Pagliarone" in which several structures are in a state of decay along Via Belvedere, road that is the heart of old Vomero. In front of the farm is the villa of the dukes of the Regina, built in 1579, now the site of a school. A high metal gate delimits the property. Continuing via Belvedere in a small square there is the sixteenth-century church of Santa Maria of the Libera, the village church, the parish auxiliary area of Santa Maria of the Soccorso at Arenella. Many villas were built along this road couching on the slope of the hill. Visible from the street was, in fact, the only entrance to the property which they then reached the villa through a long avenue. With this typology were built Villa Giordano, a time Duchaliot villa which was built where stood the convent of San Francesco di Paola in 1585 and the villa of Belvedere Carafa principles. This villa retains its plant of the seventeenth-century with a large exedra of access to the building in which is conclude the long driveway from the road, where it repeats a semicircular-shaped building (still preserved) made to allow the carriages coming from the villa to turn. From via Belvedere began two streets: one called vico Acitillo that connected the village of Vomero to road of Puntellate Houses that led to Soccavo and the other Calata St. Francis leading down to the sea.
The village of Vomero, that in the nineteenth century was enriched with villas and palaces built until the early twentieth century [7], has lost its aristocratic character after the Second World War when they were built popular houses too, following the expansion of the city "like wildfire." The road Belvedere, which is saw the sea, has turned into a straight and narrow road where few elements, such as the exedra in tuff at the entrance of the Villa Belvedere, remind us of a historical urban landscape that barely survives, risking of disappearing in a short time (fig. 6).

2.2 The Village said Antiniano

It already existing in Roman age under the name of "Antinianum" the village is the oldest of the hill and has always been an important urban node into which flowed roads in different directions in the area from which you reached the other villages sprung up in the hill. Important station for the Roman road that led from Pozzuoli to Naples town center, the village was in the nineteenth century an important point of duty Bourbonic, as can be seen also as a tombstone still preserved on the facade of a building in the main square of the village Antignano. The building still retains its characteristic front with two arches openings to each floor which form a large balcony, while on the ground floor the arch

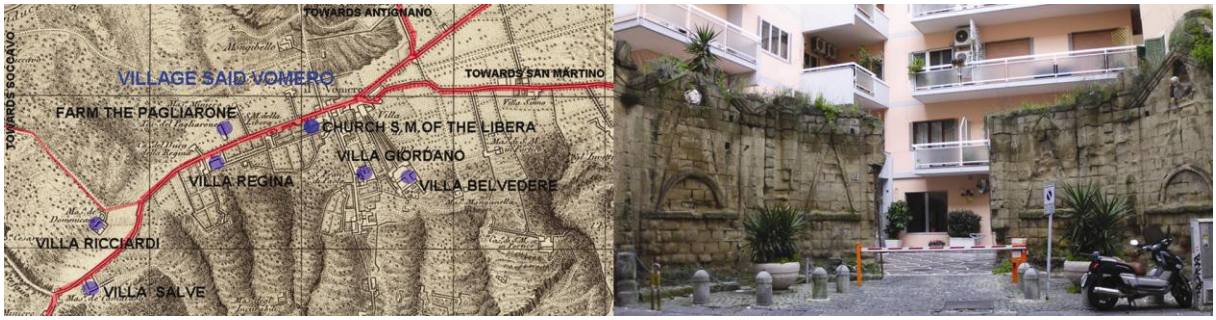

Fig: 6 *Plan of the city of Naples,* Rizzi Zannone, 1790, detail of the Vomero. In evidence the main roads and some ancient villas, a farm and the church S.Maria of the Libera. Right: the exedra in street Belvedere.



Fig: 7 *Plan of the city of Naples*, the Duke of Noja, 1775, detail of Antignano. In evidence the main roads, villa Pontano and the church S. Gennaro. Right: Largo Antignano, today.

delimits the entrances to shops (fig. 7). Since ancient times, the village of Antignano, always very crowded for the ancient presence of a rich market that still characterize the neighborhood, has been linked to the cult of St. Gennaro. Three churches dedicated to the saint were erected in this area. The oldest S. Gennariello dating from the twelfth century was built on the spot where it happened for the first time the miracle of San Gennaro.

2.3 The Village said Arenella

From Antignano started one of the oldest streets in the hill "Arenella the road" that led to the church of S. Maria of the Soccorso, coming to the valley of the hill of Monte Donzelli. The rural path on which looked farms and noble palaces currently corresponds to the streets: via Arenella, via D'Amelio, via Rocco and via Mazzoccolo, along which are still recognizable historical houses and old farmhouses renovated. In Via Rocco, for example, a beautiful portal in piperno, at number 44, still has at its top a coat of arms (fig. 8).

The village Arenella was connected with the town of the plain through the "Salita Arenella" that after passing a drop of about 20 meters reached the Infrascata, the stretch now called Count of Cerra, to get in the lower town. Along the route there were numerous villas and chapels. The route of the road has been preserved but few are the testimonies of the building fabric that over time has changed. We remember the Garzilli Villa built by the Duke of Polignano Lieto, of which today there are only a few visible remains within a private park. Along the route of the Via Conte of Cerra have recently come to light the remains of a Roman aqueduct and viaduct (subsection 1.2) the presence of which, while strongly contrasting with the modern architecture of the new metro station, helps to identify the urban complexity of the place and its historical stratification (fig. 9).

Salita Arenella continued towards the village Due Porte through "Salita Due Porte" today via Massari and via Presutti.

3. The ancient flights of steps that connected the Vomero to the lower town

The flights of steps, originally made in clay with edges in stones, were developed with paths and steep terrain and from the hill arrived to the lower town and to the sea linking the major monasteries and castles. These paths of ancient origins, the Pedamentina of San Martino, for example, dates back to



Fig: 8 Left: *Plan of the city of Naples,* Rizzi Zannone, 1790, detail of the Arenella. In evidence the main roads and some ancient villas and palaces. In the center: Via D'Amelio 75, today. Right: via Rocco 44, today.

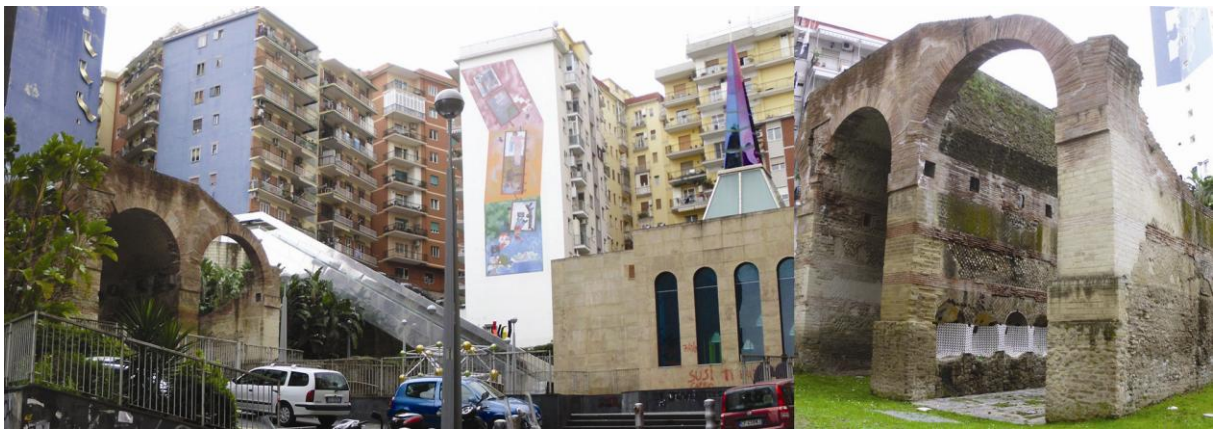

Fig: 9 Via Salvator Rosa (Infrascata way already), today: the subway station. Right: detail of the ruins of the Roman age.

medieval age (subsections 1.2 and 3.1), they were much used by both pedestrians that even the horses and donkeys for the transport of people and goods because growing almost perpendicular to the contour lines or rather along the lines of the hillside, in a short space and time allowed it to overcome a steep gradient reaching the lower town. Later, with the spread of the pietrarsa, was used this volcanic material of very dark gray for the paving of the steps, along which developed even small residential areas. The Pedamentina of San Martino, the Petraio and the Descent St. Francis are the pedamentine - a name used to indicate the roads that lead to the foot of the hill - the most important links to the Vomero. The streets bleachers, far from the main roads, became a meeting place and social relations, but also laundry and space for recreational activities, since there is no mediation between private and public space. Today, this relationship is mediated by small porches, shelters and planters that have partially altered the original appearance of these streets.
The “pietrarsa” of the flooring, the tuff of the walls of buildings, parapets, retaining walls, the wrought iron and the iron fences, the terracotta of the terraces, the green of the gardens and fruit trees, the blue of the sea in the distance were the elements that characterized the landscape along these sunny walking streets which opened expansive views of the gulf. Everything today is perceived with difficulty because it is not valued the importance that these pathways have had in the history of the town and may continue to have only if it is protected and safeguarded their existence.
Being very limited the activities and commercial craft, the "pedamentine" of Vomero are not very frequented if not by the locals to access their homes. Could be enhanced their use both on the part of citizens and tourists, for which could offer alternative routes through the town to perceive the different landscapes that the town offers.
Are unfortunately absent elements of street furniture with chairs or staging points in order to better observe the scenery of a city that develops towards the sea, nor there are services in order to make easier these streets so special and that could be very useful for a congested town traffic.

3.1 The Pedamentina of San Martino

From the Certosa di S. Martin starts the ancient route of Pedamentina arriving at Corso Vittorio Emanuele from here, through ramps Montesanto, you will reach the lower town. The street that develops on the eastern slope of the hill of Vomero was born as a real artery connecting without following a path of natural water courses, as was the case for many avenues of Vomero. The Pedamentina of St. Martin was in fact built with the purpose of transporting the building material for the construction of the Certosa whose work led by Tino di Camaino and Francesco De Vito began in 1325 (subsection 1.2 and section 3). With the Queen Giovanna I of Angiò there were numerous donations of land surrounding the monastery of the Carthusian monks to the royal families, thus favoring a first urbanization. The Carthusian monastery together with the Castle underwent considerable changes in the Aragonese period, age at which begins the process of building expansion on the hill with the construction of numerous villas and gardens nestled on small hillocks. At the beginning of its construction the Pedamentina, that followed the border of the gardens and orchards of the Charterhouse, was developed primarily with wide turns, as well as in the map of the Lafrery. Only later was constructed a system of stairs always with large steps as well as into the sole of the Duke of Noja. Currently in its path is opened wider perspective views on the ancient center of the city and meet up next to old buildings that are developed by exploiting the natural gradient, buildings housing more recently that, in some cases, are in contrast with the context that seems to preserve the appearance of a village (fig. 10).



Fig: 10 Pedamentina of San Martino. Left: view of the '700, Achilles Vianelli [8]. In the center: Pedamentina, today. Right: plan of the city of Naples (detail) with indication of the route of the flight of steps.

3.2 The Petraio

Originally called "Petraro" to indicate a place full of stones and pebbles, or even "Imbrecciata" , from "breccia" that in Neapolitan means pebble, the narrow steps of Petraio crossed with a very steep path up the hill on the western side starting from current via Annibbale Caccavello up to the Corso Vittorio Emanuele. Along the route, which follows the bed of an ancient stream that took away to the valley the water running off the hill, has developed an inhabited nucleus composed of an intense urban fabric of multi-storey houses, low houses, but also small plazas and terraces that overlook the sea. Along the Petraio in the background, between the houses and some of the green gardens, you can see constantly thin scenic views and only in the vicinity of pitches or widening, widening the field of view, we perceive a wide view of the gulf (fig. 11). Along the way there are detached ramps and other slopes that lead into the building fabric and many villas and palaces overlooking it next to buildings also popular. In view of the eighteenth century of T. Jones "The hill of San Martino" is represented the valley of Petraio and a monumental building that still today we find along the way [9].

3.3 Calata San Francesco

Shown on the plan of the Duke of Noja with the name "Street that comes down to Chiaia" the street linked the old Village of Vomero and the sea. Currently the street starts from Via Belvedere and ends on Corso Vittorio Emanuele, after crossing via Aniello Falcone, a time came to the sea continuing with the current "largo Mirelli". Named after "Descent St. Francis" to the presence of a church built in the eighteenth century and then probably incorporated into the villa Giordano, the street has retained its path some buildings that testify to the presence of an ancient urban fabric. In view of the eighteenth century of Giovan Battista Lusieri "Naples from the west" is recognized for its prospectus particular, marked by wide arches, a building that is still preserved along the path of “Calata St. Francis” [10]. Next, the higher is represented Villa Belvedere recognizable from its terrace and the small tower with loggia (fig. 12).

4. Conclusions

The hill of Vomero, once considered part of the surroundings of Naples, has been for more than a century belonging to the metropolitan territory. In this part of town are still present, although hidden, abandoned and not valued, some urban and architectural permanences that evidence the presence of



Fig: 11 Petraio. Left: view of 700 of T. Jones. In the center: panorama from Petraio, today. Right: plan of the city of Naples (detail) with indication of the route of the flight of steps and the palace in the view and the panorama.



Fig: 12 Calata San Francesco. Left: view of the '700, Giovan Battista Lusieri. In the center: Calata S. Francesco, today. Right: plan of the city of Naples (detail) with path of the walking street and the location of the two buildings shown in the view of the '700.

elements of historical landscapes through which they could recognize the signs and the morphologies of a territory which in time changed. Numerous are, scattered on the hill of Vomero and its plateau, the observation points of the city and the landscape where natural and artificial elements are integrated in an unusual harmony not more bucolic as a time but of a metropolitan effect. The landscape, which can be understood as a synthesis of an architectural, urban and territorial reality, testifies with its constituent elements the history of the culture of a people and as such must be protected and safeguarded. It therefore stresses the fundamental role of knowledge as a first level of protection of an asset, be it architectural, urban or landscape, so that we can ensure the preservation of historical memory documented of the civilization to which we belong.

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HERITAGE ARCHITECTURE LANDESIGN
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Aversa | Capri 13-14-15 June, 2013
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A landscape in transition or a landscape in danger? The olive groves' cultural landscape of Corfu.

Spyridoula Arathymou
Department of History and Archaeology, School of Humanities, University of Peloponnese, Kalamata, Greece
e-mail: pipiar@gmail.com

Abstract

Corfu is an island with approximately four million olive trees. The appearance of olive trees on the island has its origin in ancient times. Olive oil has been a wealth factor for its producers for centuries. Unfortunately over the last 30 years olive cultivation has been almost abandoned in Corfu due to a new source of wealth: tourism. But the olive groves still exist and they have formed a unique landscape of amazing beauty with its own ecosystem. The few ones who are still faithful to olive and the wealth it produces struggle for the survival of this landscape and its sustainable development. The trees are extremely high (from 10 until almost 30 meters tall) and they have to be partly and properly cut so as to become healthier. Some people have tried to do this but it is not easy as the specialized workers for this job do not exist anymore. Locals and generally Greeks do not want to work in the land and so only foreign workers are available for land work and they cannot do the proper pruning as they do not have the knowledge for this. On the same time, various illnesses of the olive take place quite often, the selling price of olive oil is very all ask for wood to keep warm during winter. This last fact gave birth to the uncontrolled cutting of woods all over Greece but especially Corfu is in immediate danger. Police patrols and a lot of arrests take place very often but they are not enough to stop the wood merchants who have a big opportunity to become rich from Corfiot olive wood.

Keywords: olive groves, cultural heritage, natural heritage, cultural landscape

1. Introduction

The facts which are described in this paper have been documented during fieldwork for the research project "The documentation of cultural information used as vehicle for regional sustainable development. The case of olive culture" [1]. A part of the research project is the documentation of the olive groves in Corfu and Messinia as cultural landscapes. Therefore, fieldwork takes place in the olive groves of these regions.

During fieldwork over the last year and before, the first impression was that the landscape of Corfu region is changing rapidly. The island of Corfu is a huge olive grove. It has more than four millions olive trees. The origin of olive tree in Corfu is lost back in time. The historical and archaeological facts show that it has been cultivated since ancient times until nowadays. There are at least two local olive varieties in the island: 1) "lianolia" (meaning thin olive) and "myrtada".



Fig.1 : “Lianolia”



Fig.2 “Myrtada”

Until the end of 80’s, olive cultivation was the main activity in the region of Corfu. Most of the region’s population was involved in activities related to olive as olive cultivators and olive oil producers, land workers and workers in the olive mills. Until that time, olive oil had a good selling price and it gave a good income to its producers. The olive crop collection method in the region is much different than in other regions. Nets are laid on the ground, covering the fields and the cultivators wait for the olives to start falling down so as to collect them. Of course, olives do not fall all together at once. So, the collection period usually lasts from late autumn until late spring or early summer, sometimes. Cultivators have to watch the olives every day and collect them every time they fall down. This old collection method can be justified. In most Greek regions, olive branches are hit with sticks so as to

make olives fall down and afterwards, these branches are cut so as the trees not to become sick. In order to do this, olive trees in other regions are kept to a certain height, no more than two meters. In the region of Corfu, that has probably the oldest continuous tradition in olive oil production in Greek territory, trees were kept high, to give a lot of crop, but they were always properly cut by specialized, trained workers. Corfu until the early 70's had more than one thousand olive oil mills. Every village had at least two mills in which most men used to work and women were collectors in the olive groves.
At the end of the 80's, the economy of Corfu changed orientation. The touristic invasion changed everything. People abandoned agriculture and industry and got involved only with tourism which gave them wealth. Also, the olive oil's selling price started to fall and that was also an excuse to abandon the olive groves.

1.1 Present Situation

Even before the outbreak of financial crisis in Greece, there was noticed a decrease of the income from touristic activities in Corfu. Financial crisis, over the last four years, brought to surface the region's forgotten olive groves.
The Corfiot natural landscape is unique and it has its own unique ecosystem. The hundreds of small villages which were built in and next to the island's olive groves lived and flourished from the olive's cultivation. The local culture is identified with olive culture. The abandonment of olive culture led to the decline of local culture. Now, the cultural landscape of Corfu is in immediate danger. The touristic activities resulted in the forsaking of villages which did not become touristic destinations. The architectural, pre- industrial and industrial heritage of these villages has started to vanish. The folklore cultural elements of rural Corfu are almost lost. The traditional olive's cultivation and production methods will be soon forgotten together with the elder who carry this knowledge. The huge olive trees are dying year by year. The abundant rain water is not enough when they are not fertilized, properly pruned and been taken care of. If collective and well-studied actions are not taken soon, the olive groves will extinct and every natural and cultural local element, as well.
The fact is that a few people never gave up their land during the touristic boom but it was and still is very difficult for them to make a profit from olive cultivation. Of course, the main reason for this is the low selling price of olive oil. In addition to this, there are not local land workers any more. There are only foreign workers available who have nothing to do with olive cultivation and they are not enough, as well. In older times that almost everybody was involved in olive cultivation and olive oil production, there was not a lack of workers and the cultivation and collection methods did not have to change as there were always working hands available. The olive oil mills, before the invasion of the centrifugal method of olive oil production, employed a lot of workers who worked very hard during the olive's collection period. The workers were mostly paid with olive oil instead of money. The profit was bigger for them. The abandonment of olive cultivation and the fall of olive oil's selling price made it very difficult for the few ones who wanted to keep the older types of olive mills open and soon they had to close them down. The olive trees' branches have not been pruned for almost twenty years as the specialized workers slowly extinct. Today, the people who want to continue the olive cultivation in Corfu cannot do it if they do not have a strong financial background from other activities.
Financial crisis urged people who had abandoned their land for decades to see how they can make profit from it. This is impossible without a collective and serious plan. A lot of land owners decided that they had to make their olive trees lower, so as to use the cultivation and collection methods which are applied in other Greek regions, and/or cut their trees down and sell the wood. Since 2011, an uncontrolled destruction of the Corfiot olive groves takes place. Foreign workers who do not know anything about olive trees are hired to cut the olive trees. In most cases, trees' branches are not pruned to make the trees lower but the whole trees are chopped down. A lot of people do not have money to pay the foreign workers or even they do not want to and as a result, the workers are paid with the wood they cut. Usually, they take all the wood and they sell it without giving any money to the land owners. During this last winter (2012-2013), the situation became extremely difficult. The sound of chain saws echoed all over the island. One of the excuses was the extremely high price of petrol for house heating. The fact is that now, most people cannot afford to buy petrol to heat their houses at the price it is, so, they try to find other means. The easiest is the wood. As a result, during this period, there was a huge ecological destruction all over Greece from the illegal and uncontrolled denudation of Greek woods. The Greek state took measures to stop and prevent it but without any substantial results. The wood merchants took advantage of the situation but the truth is that most of the wood is not sold for heating but is exported abroad for furniture. The Corfiot olive groves are protected by the law since the 20's [2] but law is not obeyed. Normally, there is a procedure for the pruning of olive trees in cooperation with the agricultural authorities of the prefecture but rarely one will follow it. There have been armed patrols from the authority responsible for the protection of woods as the foreign workers who cut the olive trees down are usually armed and dangerous. People, even if they want, they cannot report the illegal chopping as they are in danger from the "wood gangs". In some cases,

there have been arrests of olive grove owners and the workers they hired to chop the trees down. But, it is not enough.



Fig.3 An olive grove before illegal choping



Fig. 4 The same olive grove after its denudation

In this chaos, there is a ray of hope from people who want to protect the olive groves and make profit from them in a proper way. Until crisis, very few people struggled to keep their olive groves alive. The cooperatives split up and so they did not have any help. The Armageddon of financial crisis made people think of the options they have and now there is a tendency to return back to the origins of Corfiot economy, farming and industry. These people, if they do not have a good income from other activities cannot do much. The state has never been helpful and now it is completely absent. They can only rely on funds from European programs and on their creativity. But, all of these people have the same vision: to renovate and reuse the olive groves. There are two tendencies at the moment: the one suggests that the olive trees should be cut at the height of two meters, so as to be easily cultivated and collected and the other suggests that the olive trees should remain high- in order to produce more crops- but to be properly pruned as in older times. The first suggestion is easier than the second and many farmers have already applied it. The second one is much more difficult because it needs workers to prune the trees properly and collect the olives for many months, as soon as they fall. This suggestion can be moneymaking but for the ones who can afford it financially or have working hands available. The people who want to change the situation know that the region's oil used to be one of the world's best olive oils. They want to make their olive oil as good as it used to be. An obstacle to this wishful thinking is the lack, in the island, of modern olive mills – on professional, industrial level- which do not use centrifugal methods for the extraction of olive oil. But this can easily change. Eventually, when more people start using their olive groves properly, the market will adjust to their needs. These

visionaries have a long way ahead as high quality olive oil has been produced for quite a time in other Greek regions and exported, too. But Corfiot olive oil if produced by quality standards can beat a lot of if not all quality olive oils. If the people, who want to make again Corfiot olive oil a standard quality product, stick to it, succeed, this will save the olive groves, as profit is something that everybody wants and understands.

1.3 What can be saved?

Now, there is an emergency for the protection of the region's olive groves. Year by year, the ecological destruction is bigger. The state cannot protect the natural heritage but the citizens are responsible for this situation and so, they are the ones who can change it. A state institute responsible for the cultivation of olive in the region was shut down due to the financial crisis. It is quite improbable to open again and so, a new form of cooperatives has to be established so as to educate farmers and new cultivators and show them their options. The destruction of olive groves is not an option for anybody. Things show that if there are more and more people who want to reuse the olive groves, they will be in conflict with the others who chop them and sell the wood and with their workers, as well. It will not be an easy situation as financial crisis has damaged people's moral principles apart from their savings. To save the olive groves is not only a matter of natural beauty or a financial matter. Above all, it is about saving the cultural heritage of this region, which has been identified with olive culture since ever. The region of Corfu cannot exist without its olive groves.



Fig.5 : Preparations for a feast in the olive groves during summer time.

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HERITAGE ARCHITECTURE LANDESIGN
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Aversa | Capri 13-14-15 June, 2013
Le Vie dei Mercanti XI Forum Internazionale di Studi

Landscape as cultural heritage – the several dimensions of heritage management - Aljezur and the Vicentina Coast Portugal

Maria João PEREIRA NETO [1] ; Mário S. Ming KONG [2] ; Andreia GARCIA [3] ; Pedro JANUÁRIO,[2]

(1) Professor Assistant, Department of History, Faculty of Architecture, University of Lisbon (FA-UTL), Portugal Researcher and permanent member of the Centre of Cultural History FCSH -New University of Lisbon, Portugal, collaborator member CIAUD – Research Centre for Architecture,Urban Planning and Design FA UTL Faculty of Architecture
(2) PhD Architect, Professor Faculty of Architecture - Technical University Lisbon. Researchers and CIAUD-permanent member of the Research Centre for Architecture, Urban Planning and Design FA-UTL - Faculty of Architecture:
(3) Architecture Phd Student;
Mail address: mjoaopneto@gmail.com, mskong@fa.utl.pt, andreiasogarcia@gmail.com, arq.pedro.januario@gmail.com

Abstract

This paper is part of major interdisciplinary research project that promotes the wider dissemination of cultural heritage and sustainable development in Aljezur county that encompasses part of the Portuguese Natural Park of Southwest Alentejo and Costa Vicentina.
We seek to clarify and reinforce the strength and the knowledge about the several dimensions of landscape as heritage which must be continuously protected by law and preserved by men.
We pretend to emphasize and explore the synergies between cultural landscape representation –and landscape production – the physical and material changes wrought on the land, not always with the best results due to major touristic pressures, and the urgent necessity of its preservation as Natural and Cultural European Heritage.
We firmly believe in the need to promote the idea of preserving the landscape through political measures and also to promote sustainability through the opportunities of an ethical model of tourism which may include the use of new technologies to promote the memory of places. This paper, is based upon almost three decades of immersion on local culture that produced a continuous of published and public debated material, focused on the dynamics of cultural change problems that emerged with the local tourist demand and also by the needs of a planning process which promotes and preserves the several dimensions of heritage management and does not ignore men and its needs promoting a wider discussion about the intangible values derived from protect areas.

Keywords: Aljezur, Cultural Heritage, Memory, Tourism, Sustainability

Introduction

1-The Project:

This communication is an integral part of a project I&D **ALJEZUR, "between vision" of Place and Memory**, which aims to integrate diverse knowledge and expertise towards new ways to approach a tourism based on the preservation of cultural heritage in its various manifestations, contemplating and emphasizing the register of Memory.

The team includes researchers and experts from various fields, from Anthropology, Sociology, Geography, Economics, Arts and Visual Culture, Communication Design, Photography, Computer Graphics and Heritage and involves civil community organizations such as associations for the defence and protection of historical and archaeological heritage of the involved territories. Local authorities were invited to participate, but have not yet committed themselves accordingly.
In this sense, and based on an integrated analysis of the conceptual assessment of sustainable and ethically responsible tourism, we also intend to test a new approach to tourism based on the assumption of the value of the cultural heritage of the municipality of Aljezur and its territories of enormous scenographic wealth, which is protected by decree since 1988 for the specificity and beauty of its landscape and as Natural Park of Southwest Alentejo and Costa Vicentina, aka PNSACV since 1995, but still remains subject to various pressures for mass tourism based on a sun, beach and concrete product similar to the remainder of the Algarve.
Thus, with this our project, we aim to foster academic reflection about the relevance of the need for registration of the Memory and Cultural Identity of places as elements able to promote and develop a model that integrates the development of a cultural and ethically sustainable tourism: another possible tourism, in the context of post modernity and of an economic crisis on a global scale, strengthened by the use of new technologies and on the assumption of the appreciation of the local heritage by its inhabitants, its visitors and the political powers.



FIG.1:**The other Algarve Praia da Rocha** Source: http://1.bp.blogspot.com/-RFUX7ToYdS8/TDzWaT_w0I/AAAAAAAADp0/oVamUKhkePE/s1600/PTM.jpg

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Fig 2: Photo by Maria do Céu F. Rodrigues



Fig 3: Photo by Maria do Céu F. Rodrigues

The use of new technologies, based on augmented reality and immersive media, will allow, first, to decrease the environmental impact and ecological footprints and, secondly, to reach out to different audiences, offering specific and customizable means. Thus, the technological resources will be used to perpetuate the different records of the memory and to promote sustainability, using virtual travel between past, present and future.

In our project we also integrate the dimension of the "heritage park, also called eco museum" (Martins and Costa, 2009) that assumes, in turn, the cultural legacy of the landscape and reflects, in its design, the concerns of the investigations focused on transformations of the landscape and its ecological impacts linked to local heritage resources, due to the specificity of the territory largely inserted in the *Natural Park of Southwest Alentejo and Costa Vicentina*, created by law in 1995.

Thus, according to the authors, "the parks heritage by combining natural and artificial values, by rescuing traditional spaces and ancestral activities, by reuniting the balance between man and nature, take on the challenge made by many who defended the ecology of the landscape, seeking to transform the structures built on elements of recovery and continuation of the natural processes (Hough, 1995). This assessment of the concept of a heritage park is also a possible way for the assertion of the identity of a place and concurrently applicable to a territory with the specifics of our case study, integrating the museological dimension in line with the ideological propositions of the new museology (UNESCO, 1973).

Methodologically, the project **ALJEZUR, "between vision" of Place and Memory** that we have been presenting and promoting to civil society since the official Congress of the Centenary of Tourism in Portugal in May 2011, and in several international scientific seminars and conferences will be divided into five distinct phases that integrate the gathering and survey of the various registers of the Memory: from photographs to oral or written testimony associated with social, economic and scenic aspects of the county, its subsequent inventorying, cataloguing and classification according depending on its type and its theme; data analysis, integration of different museum estates or previously catalogued data, and finally the systematization of all collected information's on different means of information.

Our basic intention is to promote and foster the integration of the possibilities of accessing not only goods and products but especially the very spirit of the place, the genius loci according to the perspective articulated by Norberg-Schulz in 1980, and to preserve the heritage according to the statement of Quebec of ICOMOS October 2008 which manifests itself not only in location but also in their spatial configuration, and especially in his characterization of articulation between spectator and the place, enhancing the valences of a county located in the south-western region of Portugal and whose territory is mostly integrated in natural park or the Natura 2000 network, since 1999, [1] protected but not immune, to some atrocities that have disfigured and weakened mainly by the excesses of permissiveness enhanced by local political powers and sometimes by its contradictory.

2 - The Place



Fig 4: Vila Aljezur – overview, author : Pedro M.Pereira, photo courtesy ADPAHA



Fig. 5: Algarve region Source http://www.tintazul.com.pt/castelos/far/ajz/index.html

Located in the southwest of the Portuguese mainland, in the district of *Faro*, *Aljezur* municipality is bordered on the north by the municipality of *Beja*, to the east by the municipality of *Monchique* and to the south by the municipality of *Vila do Bispo*, a half hour away from *Lagos* and from the otherAlgarve, the beautiful and magical south, somewhat disfigured by the excesses of a tourism - based on a jaded model of sun, beach and golf, but still an extraordinary area that opens up to the Atlantic and to the influences of the Mediterranean.
Aljezur is in this second decade of this century a socially and economically fragile county, overly aged and depressed, reflecting not only a severe economic crisis affecting the country, but also the loss of much of his identity based on a lost rurality and the inability to regenerate itself thru the immense potential of the landscape and the cultural patrimony of its extensive and diverse territory.
Endowed with a beauty of a privileged and unique flora and fauna, the landscape of the coast called Vincentian in good time was safeguarded by Decree Law 241/88 of 7th of July, that created the protected landscape area of *Southwest Alentejo and Costa Vicentina* and later, in the year 1995, by Decree Law 26/95 of 21st of September, which stipulates and regulates the *Natural Park of Southwest Alentejo and Costa Vicentina*, which came in good time to avoid the total destruction of such a beautiful and coveted landscape.

3 – Sustainability

Conceptually the notion of sustainable development is based on three key pillars which should involve and develop harmoniously together. The environmental pillar should take into account the preservation and enhancement of the natural beauty of *Aljezur* and its territories, while the social pillar should reflect a strong respect for tradition and the resilient populations. Finally, the economic pillar should be managed. prudently to ensure the financial viability of the municipality and simultaneously generating new resources. Sustainability is a strategic approach to the integration of conservation and consistent development. It implies the maintenance of ecosystems, the preservation of genetic diversity and the sustainable use of resources. It implies a solidarity commitment with the future. Only in this way a development, able to meet the needs of the present without compromising the ability of future generations to meet their own needs, can be promoted.

Whereas the principles of sustainability are: [2] Prevention, Precaution, Cooperation; Ecological Integrity, Continuous Improvement; Intra-generational and inter-generational equity; Integration, Community Involvement, and Accountability, it is important to ensure the transfer of assets capable of satisfying the needs of balanced integration of the economic, environmental, socio-cultural and institutional aspects of Good Governance. Thus, the concept of Sustainable Development is usually seen as a development that seeks to meet the needs of the present generation without compromising those of future generations. It means to enable people, now and in the future, to reach a satisfactory level of development that integrates also the cultural dimension, making, at the same time, a reasonable use of land resources, preserving species and natural habitats.

4 - Sustainable Tourism

By sustainable and ethically responsible tourism we understand one that meets both the needs simultaneously: those of the tourists and of the receiving regions, protecting and expanding opportunities for the future. It is a tourism that should provide various resources so that economic, social and environmental needs can be fulfilled without contempt for the integrity of cultural identity and the maintenance of ecosystems determinants for ensuring the preservation of the natural environment.

It should be a tourism that takes in consideration the social component, the local environment and the tourists themselves. We believe that it should be a planned tourism in function of not only to meet the immediate needs of the potential spectator but also the protection of the environment; not just a tourism centred on economics and easy profit, but that respects and integrates the human being, the environment and its preservation - always assuming that man is an integral part of the ecosystems and can not be marginalized in this process.

The World Tourism Organization on 27 September 1999 adopted a code of ethics which states that it is necessary to "safeguard the environment to achieve healthy economic and sustainable growth "recognizing and advocating new forms of tourism. [3]

Thus, considering that culture and heritage are important sources of tourist attractiveness and especially factors for the assumption of cultural identity and shared memory of communities and their inhabitants, the option for sustainable tourism development, based on the defence of the landscape and its preservation should take, and reconcile the objectives of maintenance and preservation of cultural identity factors of *Aljezur*, a county that has been pushed for decades towards mass tourism and by the real estate market, but simultaneously is "too" protected by legislation which, in some cases, assumes aspects of castration of the ancestry practices.

Two years after the General Population Census of 2011 the excessive over-aging of the population of *Aljezur* is a potential threat to its own survival as a county, [4] that, according to the potential new autarchic design that is to be expected, could be, in a not too distant future, "annexated" by the nearby town of Lagos. Thus, it is urgent to captivate new populations, creating new services, in which the Touristic and Cultural aspects might constitute the future paradigm, thereby avoiding any territorial and administrative (re)arrangements that do not favour the county and its autonomy in anything and will be contributing more to its marginalization over the remaining Algarve and the centers of power



Fig. 6: : Foto by Maria do Céu F. Rodrigues

The prior announced possibility in regard to heritage parks may be a viable alternative for these territories and could lead to the assumption of the village of *Aljezur* as a structuring place for the appreciation and preservation of natural and cultural processes, as suggested by Hough (1995) and Martins and Costa (2009).
These parks are presented as lasting projects and as perfectly integrated approaches of sustainable local and regional development, enhancing the value of ecosystems and biodiversity but also of social cohesion.
The situations covered in this project, which should be enhanced and extended to other parts of the Portuguese territory, wish to take the reconciliation of the objectives of maintaining and preserving the factors of the identity of the county: its immaterial and intangible heritage (landscape, monuments, flora, fauna, gastronomy, local products, etc..), as well as the everyday use or enjoyment of some of its cultural assets, valuing and optimizing local identities always from a perspective of sustainability.
Thus, by promoting an alternative to conventional cultural tourism which assumes and involves travel, we encourage and rehearse innovative communication strategies and the preservation of intangible heritage through other forms of "Tours" trough the recorded memory of the past and also of the present, considering the future.
As mentioned, we have chosen symbolically the centennial celebration of tourism in Portugal for the presentation of (our) project. In this second decade of this century, now as then, we live similarly a particularly complex moment in our history, in the midst of an economic and social crisis that presently can be felt at a global level. However, we believe another form of tourism is possible, as reported by Sergio Molina. [5]
"The post tourism, or simply the tourism in post modernity would result from globalization that brings a more flexible and dynamic appearance and proposes new models of consumption favouring more customized forms at the expense of uniformity."
This is paraphrasing the same author, the new tourism that "goes beyond the Traveller", less linked to market issues, integrating a reflection on ethics and debates about the contexts of post modernity and its paradigms.
The post modern man has to take and integrate the cultural and environmental sustainability and to look for leveraging the experiences of his imagery and imagination which must be speculative, creative, enhanced and supported by the most diverse and complex technical challenges, based on culture and global visual communication which can also transpose the limits of tangibility and thus emerge in various areas in the field of virtuality and the domain of imagination.
We intend therefore to emphasize and exploit synergies between the current representation of the cultural landscape and the landscape as cultural production as well as all the consequent physical and cultural changes that have been causing profound changes in the territory that we have been analyzing, especially the areas nearest to the coastal zone, due to greed raised by its extraordinary beauty and the consequent pressures towards a growth oriented towards mass tourism and strongly based on concrete and lack of identity, promoting discussion about the potential for sustainable development that fosters memory and its patrimonialization.

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Becoming the Olympics: The Sound Proof series of exhibitions (2008-2012)

Monica BIAGIOLI
School of Design, London College of Communication, University of the Arts London, London, England
m.biagioli@lcc.arts.ac.uk

Abstract
The Sound Proof series of exhibitions (SP 2008-2012) emerged from an organic process to make artistic contributions in response to the Stratford site of the London 2012 Olympics. Planning for the series began in 2007—at the same time that the official Cultural Olympiad was starting up—and so the archive of yearly exhibitions reflects both changes to site and the evolving mood as the event neared.

The series has heritage concerns at its core—both the tangible cultural landscape and the intangible dimension of memory. Through its thematic funnel linking art practice, curation and legacy, SP created a unique container to address the cultural legacy concerns attached to Olympics sites while placing the focus firmly on the site of London 2012—providing an artistic record from its unique vantage point of independent artist-led activity.

The exhibition programme evolved over time, generating 28 new artworks by 21 artists in 5 exhibitions, 4 exhibition multiples and 1 publication. Exhibition themes were sound as cartography, sound as artefact, sound as text, sound as legacy, and sound as voice.

In its yearly iterations SP is like a memory track of how the Stratford site was building up towards 2012, reflecting a complex layering of moods and views through the filter of artistic responses. The works are part of the public record and contribute to the Olympics' legacy of artistic representations—expressing a wider spectrum of voices in the artistic record of London 2012.

Key words: sound, art, curation, memory, heritage, legacy

1. Distinguishing features of historical memory: An organic process
We punctuate our memories of events by recording them in some form that marks them down for remembrance. With landmark events such as London 2012, the official narrative was threaded through a combination of cultural programmes including invited artists and curators, open calls, and initiatives at the local level guided by the organisers of the Cultural Olympiad. There was a complex, multilayered approach to London 2012's Cultural Olympiad and by coincidence it started at the same time that we held our first Sound Proof exhibition in 2008.

From the start, we wanted to keep the Sound Proof exhibition series as an independent initiative. Later, when I decided to continue Sound Proof on my own as a five-year series to represent the five Olympic rings, it was my goal that we could respond to the Olympic preparations organically. The sequence of yearly exhibitions would not be pre-planned into a programme of activities that fit an overall vision. Instead, it would commemorate the ever-shifting landscape of the Stratford site, perhaps in a search to represent what Paul Claval refers to as the "spatial patterning of social life and the symbolic imprint of social groups in the landscape".[1] Sound Proof was an attempt to pin down in concrete, tangible terms the intangible memory of a site in transition.

The impetus for me was as well to maintain critical distance so as to achieve the even-handed perspective that I sought with this series. This approach echoed Nick Couldry's work on voice—creating "a sort of liminal space, alongside power but somehow normatively separate from it"[2] where the artists involved were encouraged to experiment and express their views freely. As Couldry states in an interview with Rafico Ruiz (published in the journal Seachange, 2012): "And I decided therefore to talk about voice as a value, which is the idea that not only do we have the potential for voice…we need to be in the middle of ways of organising things which value voice, which take voice into account."[3] Placing art as the main expression of that voice, Sound Proof fomented the idea of art as a social actor, expressing through its cycle of exhibitions John Dewey's understanding of communication as a medium for the sharing of meanings and his belief in the contribution of communication to democracy.

What became a series of yearly exhibitions of commissioned artworks with a focus on sound began in 2007 with a walk of the Stratford site of the 2012 Olympics. It was a tour of the site led by a member of the Ramblers Association who had recently moved out of the area to make way for the construction yet to come. He took us on paths, alongside the waterways, pointing out industrial and residential sites soon to be recommissioned for future works. It was like being in a space suspended in time; in a state of becoming. Not quite what it appeared to be, not yet the place envisioned.

Before each yearly exhibition, I would go on a walk of the site—in this way attempting to soak in the zeitgeist in the air that year, looking for visual signs of meaningful change in the landscape and observing the way the site integrated in its environs and how people interacted with it. Luckily for me, the Greenway—central artery cutting through the heart of the construction in Stratford—remained open to the public from the moment construction started, although for the first few years of construction, hardly anyone knew it and that made for site visits that were eerily quiet.

2. Distinguishing features of historical memory: Sound as cartography

Whoever maps the space gives that landscape and location its territorial characteristics: what is in, what is out, what is named, what goes unnamed or unmarked. It is a way to define the space via contour and specification.

When Colm Lally invited me to co-curate a sound art exhibition with him at E:vent Gallery in 2007, I had recently completed a walk of the designated Olympic area between Hackney Wick and Stratford in London. At the time of my walk I had wondered what would become of the space and whether any of its current landmark features would be retained. The memory of that experience stayed with me and helped shape the theme of sound as cartography for the first Sound Proof exhibition. Our aim was to capture sonic readings of the space at that time to retain a record of something that would disappear and re-shape into new forms when construction commenced.

We invited six commissions and asked the artists to create one-hour long sound pieces and visual maps based on artist's walks, with works by Brown Sierra, Angus Carlyle, Jem Finer, Sara Heitlinger and Franc Purg, Miller and McAfee Press (Andrew Miller and Duncan McAfee), and Vessna Perunovich in collaboration with Boja Vasic. This approach had as its model the rich history of artist walks by artists such as Janet Cardiff, Richard Long, Sophie Calle and Hamish Fulton.

At the time we were aware that official programmes were starting up and that our contribution would be considered within the bigger picture of the Cultural Olympiad, artistic programmes in London cultural centres, and other independent contributions from initiatives like ours. We made a decision to go ahead with an independent offering that would encourage different perspectives from the artists on the Olympic project and retain the focus on the artistic output. And so it is that Sound Proof crystallised as an idea and as a show. I retained that approach as I continued to develop Sound Proof as an exhibition series on my own.

The sequence of walks—organised and pre-planned for a curated exhibition—spoke implicitly about inside and outside space, inner and outer, both spatially and also in terms of the socio-political positioning of the project. This was the first exhibition, and as of yet, there were no others planned to follow it. So—in a way—out of all the exhibitions in the series, Sound Proof 1 was the most in-the-moment, the most authentic of the five. With nothing preceding it and nothing following, Sound Proof 1 expressed the sense of urgency at that time to memorialise a landscape that would be altered beyond recognition within a period of years. The six artists (and artist pairs) involved in the exhibition all seemed to recognise that we were part of a capturing of a moment in time, before the site inexorably pushed on to its Olympic destiny. In a way that period of a few months between January and April 2008—the time when the Sound Proof 1 commissioned artists were recording at the site—reminds me

of Lisa Saltzman's description of Pliny's tale about the Corinthian Maiden who drew an outline of her lover before he went off to war as "that mythic moment when imminent loss drives the impulse to record and remember"[4]. Saltzman's interest in the tale is "in its potentially paradigmatic status, the model it provides for isolating and interpreting the various visual techniques and technologies through which the work of memory is performed in contemporary artistic practice"[5] and "as a ritual of remembrance".[6] For Sound Proof, the techniques were sonic more than visual and so the discussion we extended was not just art's role in remembrance but also the loss of oral traditions as a means of commemorating and preserving our links to the past.

Oral traditions conveyed historical events and cultural narratives via direct imitation and observation and placed vernacular culture on the same (or greater) level of importance as official records.[7] This meant that history was passed down through direct contact, making the local interpretation of a space more important than the official one. With the development of the written word, distribution of culture, knowledge and history transferred from the local to the official having huge temporal and spatial consequences. Linking local narratives to those of distant places meant that perceived geographical and historical bonds could be cemented, making it possible to build great systems of power and political organisation. This led to the rise of nationhood as a concept encapsulating the social, historical and political characteristics of collective identities formerly differentiated through local affiliation.[8]

Sound Proof used sonic strategies to give a vernacular reading of the Stratford site at the same time that the official cultural programme was establishing its historic record. As a series of commissions the exhibition mobilised vernacular aesthetic inheritances to, as Saltzman says, make memory 'matter'. And so, the oral elements of the works give the past a place in the present.[9] Our approach stood alongside other initiatives to conserve elements of the cultural landscape being transformed. Two years after the first Sound Proof exhibition, Hackney Museum initiated an oral history archive of local residents and businesses, preserving their perceptions of the changes taking place during the build up to London 2012. The project was called Mapping the Change and invited initiatives like Sound Proof to be part of the archive of works. In this way Mapping the Change amassed a comprehensive local record of cultural activity that is preserved for public use at the museum and forms part of the official record. This type of approach mirrors work in the field of landscape studies, where place meaning is enacted through both vernacular and official channels, considering local populations and visitors as much as the functional category ascribed to the site officially.[10]

As Claval states with great urgency: "The contemporary crisis of identities is responsible for the renewed interest in landscapes by geographers, and indeed for the spatial turn generally across the social sciences." He reinforces a belief in the importance of place in identity formation stressing "the complex relations which exist between social groups and spatial forms".[11] Niamh Moore more specifically zeroes in on the role of the city in identity formation, noting that cities that rely on change to survive will confer a more fluid and dynamic place identity upon its inhabitants.[12] London being a prime example of this, the Stratford site's designation as Olympic made it particularly vulnerable to 'forgetting'—the idea that a new identity could be imprinted on it—and so it is that a surge of localised projects emerged during the key period of 2007-2008 as a means of offsetting what was going to be the 'imminent loss' that Saltzman speaks of in relation to Pliny's Corinthian Maiden. The brownfield land between Hackney Wick and Stratford fit Moore's description of a landscape that is 'particularly unique, legible and imageable within a particular city' [13], making it a prime site of contestation during the huge surge of economic and physical restructuring in the area after London was announced as Olympic Host City post 2005.

Anthony Giddens also cautions against seeing cities simply as 'blank canvases' to be filled with new narratives and emphasises the intimate links to the past that remain and should be conserved as part of their spatial identity. Going further still, he stresses that spatial cultural memory is preserved by the inhabitants and visitors most closely and strongly associated with it. By extension, he also highlights that the loss of those specific members to the local landscape signifies a cultural loss as well, unless something is done to preserve their memories and their contributions to space creation. Giddens sums it up by stating: "In a world characterised as runaway and constantly in flux, memory is critical in the formation of both personal and place identity but it is also crucial in shaping discourses on preservation, development, and how heritage is defined and represented."[14]

Giddens conceptualises globalisation as, not only pulling upwards (from national economies), but also —and importantly—pushing downwards, having direct influence on local decision-making. As national governments increasingly lose autonomy in the face of international competition and demands, they put increasing pressure on their landmark cities to provide a sense of national pride and a sense of



Fig. 1: Stratford site, London. 2008.

heritage. Thus the current fierce competition for Olympic status and the heritage rewards it promises. For nations caught in the middle of what Giddens describes as problems both too large and too small for nations to solve, Olympic status can help reinforce national pride—something precious and difficult to summon in the face of a highly interconnected and interdependent global economy.[15]

Economic restructuring has impacted on urban planning on a global scale, leading to an entrepreneurial approach towards heritage that often leaves those for whom the memory of a place remains the strongest feeling the most out of place.[16] This creates direct conflict between the idea of heritage as a shared public resource and the construct of heritage to reinvigorate urban areas.[17] It puts in danger the ability of the cityscape to operate as 'psychic anchor' for its inhabitants and visitors, and it undermines the ability of its spatial framework to provide a sense of history from which to embrace the shifts and changes of time.[18]

Certainly there was a 'psychic anchoring' taking place through the sound commission recordings for Sound Proof 1—something historic in a vernacular way as artists explored and documented the space before traces of its existing essence would be dug out into piles of dirt. Jem Finer's performance at the Stratford site in the depths of winter provided for me that 'mythic moment' that Saltzman references. He invited me to come along for his performance at the site in early February 2008 and the first thing that struck me was the massive blue wall that had been erected since my last visit in 2007. It surrounded the entire area, with the distinctive blue paint used to mark out even bridges and access points, announcing the site's state of becoming Olympic. I had not known about it and was totally unprepared for it. It was truly an incredible sight. Within a period of a few months, the landscape had been transformed from overgrown weeds and decrepit buildings alongside working factories and living accommodations (designated as brownfield land) to a cordoned off area surrounded by fencing and wire mesh, all painted in a memorable blue. Just as Yves had his International Klein Blue, so London 2012 had its blue to designate the area as Olympic. It was to that panorama that Finer introduced a troupe of musicians to trumpet down the wall. They played along paths leading to the wall, marched alongside it, and reached the midpoint of the Greenway—the public pathway that acted as central artery to the epicentre of the construction. Workers at the site waved and cheered as the musicians performed their finale facing the wall.

Pliny's Corinthian Maiden tracing the contours of her lover's shadow became for the artists in Sound Proof 1, the tracing of the contours of the perimeter of the Stratford site. We had asked for permission to do recordings inside the site, but were instead granted a bus tour of the site with no stops, no access to the outside, and no recordings allowed during the journey. Having had the experience of travelling inside the site, but then only being able to document its perimeter—now cordoned off by an imposing blue wall—the artists were of course positioned on the outside looking in; or drawing the contour of the shadowy world that the construction site became after the wall was erected.

3. Distinguishing features of historical memory: Sound as artefact

"History studies the past through old documents, and in the case of landscape, is essentially a documentary study of maps and documents related to landscape. Archaeology studies the past more directly, through material remains in the present."[19]

For Sound Proof 2, the theme was sound as archaeology, with an emphasis on the artefact—reflecting the key question for me in 2009: what could constitute material fact for a site in a state of becoming? I commissioned four artists—Isha Bøhling, Daniel Jackson, Sheena Macrae, and John Wynne—to create object-based installations with sound for the exhibition. Brian Reed and I produced a vinyl record multiple in an edition of 300 for Sound Proof 2—the record being a sound artefact from previous decades as few would have turntables to actually hear the sound recordings on the multiple.

In a departure from the first exhibition, my main curatorial direction for this exhibition was to allow sound works to co-exist in one space with all works playing simultaneously (no headphone works)—allowing the sound elements to breathe and interplay with each other. Like the previous year, I invited artists to explore around and through the Olympic site to gather materials and inspiration for their commissions. I expected a range of responses and these would form part of the Sound Proof record—like a yearly litmus test reading.

In a site still in development, what would constitute artefact?

For John Wynne and Daniel Jackson, the artefact in 2009 was extracted, not from the physical site, but from public consciousness. John Wynne investigated meaning in the visual form of the Olympic logo and through that uncovered an alternate reading to that supported in the popular media. Subversions of the Olympic symbol manifested in graffiti, stickers, banners and blogs. Legislation enacted to bottle up voices of protest. Battles waged for right of use and ownership of lands. As Wynne stated, "the starting point for this piece is visual rather than sonic", and through that approach he created a sound work that built a sense of expectation and anticipation, much like the projection of the five rings onto collective consciousness. For Daniel Jackson's conceptual sound work, the physical site existed in terms of its statistical data and numerical reference points. The bone structure—invisible but holding the whole project together—was the physical site in Stratford. The visual manifestation was a play on the word represented through the five rings—olympics.

For Isha Bøhling and Sheena Macrae the archaeology was personal. In 'Prize', Isha Bøhling excavated a family history to evoke both the historic and individual sense of loss that accompanies an Olympic competition. Sheena Macrae had a personal history sited at the centre of the future Olympics complex, as she lived in the Pudding Mill Lane area for some years. Working with composer Paul Robinson, Macrae examined her personal sonic signposts—like ruins from a former time—by compressing and intertwining sequences from Robinson's compositions to convey a folding over, multiplying and layering of time and change in her own personal narrative. As she stated at the time, "soon my studio will be floating somewhere above seat 64 in the stadium".

There was a real, physical site in existence in 2009 in Stratford, London—one populated by bulldozers, cranes, metal, trucks, and a lot of dirt. It was a transitory space, waiting to be filled and completed by an event yet to take place. The search for material fact at that point took place in our minds—through our understanding of what came before the site was designated Olympic and in our ability to foresee what was yet to come.

4. Distinguishing features of historical memory: Sound as text

Returning to the site in early 2010, there were developments on the way—cranes dotting the skyline, stadium structure dominating the epicentre of the site, signage designating the space Olympic, and a cafe, exhibition space and viewing area to make the works in progress accessible to the public. With the site's identity emerging, it seemed an appropriate time to open up the conversation and involve other sites around England also involved in Olympic competition.

Sound Proof 3 became a dialogue between two sites of the future Olympics: Weymouth and Portland in Dorset—where the sailing was to take place—and Stratford, London. I co-curated the exhibition with Julie Penfold (LabCulture, Dorset) and we selected two artists based in London and two based in Dorset to create responses from their own site-specific perspective: Claire Burke and Joe Stevens from Dorset and Sheena Calvert and Denna Jones from London.

The theme for Sound Proof 3 was sound as text: the vernacular (phonetic) represented in its textual form (written). We linked the artists and sites via the means of conversation, starting the project in



Fig. 2: *Overtime* installation. Barbara Held, Yapci Ramos et al. Sound Proof 4. Canterbury Court, London. 2011.

September 2010 as part of the B-side Multimedia Arts Festival in Dorset. One of the key texts that emerged from Sound Proof 3 was Sheena Calvert's visual deconstruction of Iain Sinclair's conceptualisation of the term 'edgeland'. Through formal compositions on the two-dimensional plane, Calvert explored the liminal spaces of paper "which elude exact definition, yet which are constantly being [in]formed"[20]—the edges and folds of paper as key conveyors of information. For Claire Burke, the focus was on written text's ability to align itself more closely with its phonetic, vernacular form: "Open breath open view open sea. Open ears open eyes open future. The ground: open. Open past open heart open masts open art. Open window open web open world."[21]

5. Distinguishing features of historical memory: sound as legacy

One year before London 2012, Sound Proof amplified its reach and extended the dialogue to Barcelona, site of the Olympics in 1992. I wanted to explore the potential links between the two cities, as—with a 20 year difference—there was an interesting reflection on Olympic and artistic legacy that could take place.

In preparation for the Sound Proof 4 exhibition, I did a residency at the Barcelona Museum of Contemporary Art (MACBA) at their Study Center in early 2011 and accessed documentation, exploring both the historical references to the 1992 Cultural Olympiad and the urban legacy the Games imprinted on the city. My work also involved exploring the sites of the 1992 Olympics with a special focus on the Poblenou area, earmarked as a key area of regeneration for Barcelona 1992. What of Poblenou now and its Olympic legacy?

The 1992 Games once again reconnected Barcelona to the sea as the old industrial area of Poble Nou —flanked on the seafront by railroad tracks and populated by factories no longer in use—was renovated as part of the plan to site the Olympic Village there. As Lluís Millet explains in *Barcelona: La ciutat i el 92*, the renovation had as one of its main objectives to transform the area of Poblenou from its obsolete industrial use to one more urban and residential, with the aim being to recover the entire line of the sea from Barceloneta to the Bèsos river as an integral part of the city.[22] In fact, the handling of Poble Nou and of the Stratford site are quite similar in terms of the problematic they

presented and the aspirations attached to both sites. Both areas were considered marginalised from the city in some form, with considerable areas of brownfield designation, limited transport links and low residential use. Both landscapes had industrial function imprinted on them, much of it no longer in use. Both had a low profile in terms of image, which meant they could be reshaped and reformed as new areas post Olympics.

After consulting the written texts providing historical references of Poblenou, I embarked on a series of site visits, including a walk from the north centre of the city to its northeast edge, cutting through the heart of neighbourhood. From what I had read from a distance, Poblenou was an artistic hub poised to transform into a centre of technology. My walks did evidence areas of transformation and development and areas that still needed work—at least from the residents' perspective.

On the recommendation of Pilar Ortega of the Miró Foundation in Palma de Mallorca, I began by accessing documentation of Glòria Moure's commissions for the 1992 Olympics. The commissions are a fixture of the city to this day, with Rebecca Horn's installation at the beach in Barceloneta a key landmark of that area, although few people would recognise it as an emblem of Barcelona's Olympic legacy. This became a very interesting point for me in relation to the approach I wanted to develop for Sound Proof 4—to expand on Moure's idea that the commissions did not have to make specific reference to the Olympics.

In his discussion on the framing of heritage Paul Claval distinguishes between vernacular and official forms of establishing cultural allegiance through ties to the past. The vernacular form meant that a sense of continuity between past, present and future was established from local environments and transmitted by its inhabitants, conferring the power of heritage transmission to local populations rather than relying on official interpretations. Any historical reference beyond the lifespan of living inhabitants could be relegated to the area of myth, so that a person's sense of identity and their sense of place "was directly experienced as a living reality".[23] With the arrival of the written word, cultural elements could be transferred to younger generations beyond the memory of living inhabitants and could be linked to other geographical locations beyond the experienced landscape. This allowed for the expansion and transmission of knowledge and experience across time and space, but it also made it possible to harness a sense of heritage and belonging into more centralised power structures.

This distinction between vernacular and official heritage transmission is directly relevant to an understanding of the Sound Proof series of exhibitions in relation to the official Cultural Olympiad. It is not a question of better or worse, but of adding texture and understanding to cultural activities happening in relation to London 2012. What Sound Proof sought to establish was a platform for independent voices from the artistic community—organised in a more ad hoc framework to allow for reaction in time and in space to events happening within the city in preparation for the Olympics. It was not a case of us vs. them, but an opportunity to showcase the importance of the vernacular in bringing into focus what might be lost in the official.

The core activator for me in the construction of both Sound Proof 3 and Sound Proof 4 was the mechanism of the conversation. In the case of Sound Proof 3 the conversation between artists happened through the Twitter mechanism. In Sound Proof 4 the conversation happened at the exhibition space, with all four installations co-existing in one large warehouse space—ambient sounds intermingling freely. Expanding on the approach of Sound Proof 3, I invited two commissions from Barcelona and two from London to create a conversation between works by the artists from the two cities. Exhibited in Canterbury Court in November 2011—site of Sound Proof 2 in 2009—the installations of Sound Proof 4 formed a type of environmental sculpture, projecting the voices and thinking of the participating artists and allowing the works to speak to each other in the context of the exhibition.

Leigh Clarke's commission for Sound Proof 4 entitled *Squash*—a celebration of his passion for art and his frustration with sport—expressed a view that might not be so easy to posit through official channels, yet expressed what many in the population felt. John Fawcett exhibited *Radiance*—a filmic document of the creation of a huge energy network throughout London. Roc Jiménez de Cisneros' *Continuum, expanded* was an unstated commentary on the use of cultural activity to support official versions of legacy and heritage—the lack of statement being central to the work. Barbara Held's collaborative *Overtime* was a real time transmission of a memory held from the Olympics in Barcelona 20 years earlier—allowing for new interpretations and various iterations through five different expressions of one score. This was the most truly vernacular of all the works presented during Sound Proof 4, as one of the responses to the score was created during a live transmission on Resonance FM days after the exhibition opened. The links celebrated in *Overtime* were not between individual and

nation, as is often the case in Olympic events, but between individuals who had a shared history and set of interests—people who knew each other personally and celebrated together a moment in time.

Perhaps it is the case that the experienced has lost its currency. Through digitised global interactions with others, we have come to rely less and less on what we know and experience in our immediate environs. As Giddens puts it, "When the image of Nelson Mandela is more familiar to us than the face of our next door neighbour, something has changed in the nature of our everyday experience."[24] It comes back to an art of observation and to being in the moment and experiencing it as a time and a space. This is becoming increasingly difficult to do as our every experience has the potential to be networked, indexed and distributed as it is being felt and experienced, with the emphasis being more on passing it on and less on the experience itself.

This need to index and punctuate through historical links is what Giddens emphasises when he writes "It is a myth to think of traditions as impervious to change. Traditions evolve over time, but also can be quite suddenly altered or transformed. If I can put it this way, they are invented and reinvented."[25] For him the transition from tradition to heritage marks a disconnect between the experienced event and its shell rituals, leading towards a celebration of ceremony. This is quite effective in the transmission of power structures to a society's population, but it is the shared experience of the tradition that links individuals to their sense of time and place, and this—Giddens asserts—is most fruitfully accomplished via democratic structures and processes that require direct participation from individuals in the population in order to activate the mechanisms of power.

6. Distinguishing features of historical memory: Sound as voice

In her study of urban heritage, Moore expresses the critical role that memory plays in both personal and place identity and how this plays out in the repositioning of areas marked for regeneration —'landscapes that are particularly unique, legible and imageable'. This was certainly the case when the Stratford site was announced as main site of London 2012. By the time the first Sound Proof exhibition was in the planning stages, there were projects taking place to debate the actual costs and benefits to the communities affected by the transformation of the area. Many of these debates focused on displacement of well-established communities for the sake of monetary gain by outside forces. And so it was fitting that for the fifth and final Sound Proof exhibition (which took place during London 2012) we invited the We Sell Boxes We Buy Gold collective to present their archive of interviews, photographs and sound works produced five years earlier, at the time that our own exhibition series coincidentally started.

We Sell Boxes We Buy Gold—a project initiated by Lucia Farinati, Richard Crow, Alberto Duman, Jude Rosen, and Louise Garrett—had examined the social, physical and psychological implications of the Olympic project in the areas within and surrounding the designated area through a series of artist walks that also represent “that mythic moment" that Saltzman references in relation to Pliny's Corinthian Maiden. The archive of interviews, recordings, and photographs produced in 2008 was exhibited for the first time at Carter Presents Gallery in 2012 as part of Sound Proof 5, bringing the Sound Proof project full circle from beginning to end.

A force once seen mainly for the good, regeneration has now shown its many faces and has demonstrated the complex effects it has on the vibrancy of the communities undergoing the changes. I touch on regeneration in this paper quite lightly as it was not the main concern of the exhibition series. But for those artists involved in Sound Proof not buoyed by the Olympic spirit, regeneration concerns were central to their critique, in particular Jem Finer (SP1), John Wynne (SP2), Sheena Calvert (SP3), Leigh Clarke (SP4), and We Sell Boxes We Buy Gold (SP5). It comes back to the point made by Moore about heritage as cultural resource or as financial asset.[26] It is in the spirit of heritage as cultural resource that Sound Proof engaged in a more ad hoc and organic manner with a site and an event punctuated by official quotation marks, allowing more vernacular forms and expressions to represent the event as cultural artefact.

Sound Proof 5 also showcased the work of Jonathan Munro who looked beyond the immediate area of the host city and featured responses to the international event by children living in the city of Hull—a location in the north of England not touched by Olympic gold dust but seriously affected by the economic turmoil of recent years. Their hopes for the future on the eve of London 2012—in spite of the complicated backdrop of their immediate communities—lined up quite well with their nation’s wider ambitions for the Olympic project.

In the work of Marcus Leadley, the idea of within and without was expressed through a focus on sound art. His breaking apart of inside/outside acoustic aspects of diverse environments fractured the



Fig. 3: *Outside In* installation. Marcus Leadley. Sound Proof 5. Carter Presents Gallery, London. 2012.

everyday experience into its constituent parts. The result was a disorienting interplay between what is seen and what is heard to arrive at a clearer understanding of sound's pervasive relationship to a complex network of personal experiences and associations that colours our experience of place.

Through the experienced installation, Leadley achieved an integration between vernacular and official form intermingling sound with visual and sensed environment. In this work he spoke about inside and outside space, much as the Sound Proof 1 artists had done five years back. Whereas for the artists in Sound Proof 1 there was a sense of imminent loss, Leadley's installation is full of open interpretation and possibility—a porous liminal space that allows for the crossing of unspoken boundaries in time and space—at that key juncture in time when London 2012 was taking place. The past and the future were not the focus for once, just the present.

7. Conclusion

In his exploration of an evolving conception of heritage, Claval finds "new values and meanings are now being ascribed to particular landscapes, many of which previously were not considered of particular significance."[27] This is one of the elements linked to the regeneration efforts of Olympic cities and London responded to this in a knowing multi-layered, multi-faceted approach, by building opportunities for vernacular responses within the aegis of the official programme and through the many initiatives by cultural centres in the city. Sound Proof, in its yearly iterations, became a memory track of how the Stratford site was building up towards 2012, reflecting a complex layering of moods and views through the filter of artistic responses. This ad hoc, organic approach allowed for multiple voices to contribute to the cultural legacy of London 2012, celebrating the values and meanings of the location through vernacular forms and channels.

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The rural landscape in Campania. The role of the graphic representation in the documentation and valorization process

Stefano CHIARENZA
Department of Civil, Construction and Environmental Engineering , University of Naples "Federico II", Naples, Italy
E-mail: stefano.chiarenza@unina.it

Abstract
The rural landscapes, as a result of action and interaction of anthropic and natural factors, constituting an essential component of the common cultural and natural heritage, are the identity foundation of a site. They have been often investigated in terms of their historical and civil value, as well as economic and social dimension, but they're also a visible sign of landscape shaping by human activities. In that sense the scenic value of the agricultural landscapes is increasingly seen as an element to be preserved, as evidenced by the closer attention in the current European policies to protect, manage and plan agri-ecosystem resources, biodiversity and traditional elements of landscape.
The research proposed in the present paper, based on the latest studies in that field and recent European experience of landscape assessment, try to highlight the possibilities offered by the graphic representation in the process of knowledge and documentation of this particular heritage, focusing on a series of demonstrative applications on a valuable agricultural landscape such as that of Campania. From the interpretation of historical maps to the realization of infographic models and mapping, will be proposed cataloging hypothesis of some exemplar agricultural landscapes.

Keywords: representation, rural landscape, mapping, inphographic models, ichonography

1. The importance of the rural landscape in the cultural identity of a site
The agricultural landscape, or «the form that man, in the course and for the ends of its agricultural productive activities, consciously and systematically impresses on the natural landscape» [1] reflects the age-old human interaction with the environment. In its blend of natural and anthropogenic component it is characterized by a strong cultural identity represented not only by the material elements related to its structure, but also by his essence of artifact. Indeed the agricultural landscape collects a set of meanings and values that on the one hand are associated with the physical morphology of the territory; on the other, heavily depend on the forms impressed on it by the human activity. The social, political and settlement dynamics frequently have led to significant changes, leaving indelible marks on landscape.
The rural landscape is therefore a living and dynamic construction, always in progress, and, as expression of cultural values and intangible traits, should be considered a significant component of the cultural heritage. In other words, it must be read as an organism made up of different characters, temporally distinct, though irregularly stratified, and not as a pure synthesis of visible items. In fact, as diachronic structure, does not lend itself to interpretations based on its apparent organization: such readings, linked to a specific time and to a particular socio-economic or functional aspect, would remain abstracted from its evolution over time.
As stratification of the modifications the rural landscape thus assumes a fundamental role and an active part in the society and the economy. By its articulated beauty, that is the result of adaptations built up over thousands of years, it represents an unparalleled sign of identity. At the same time, offering itself as a field for the development of more diversified cultivation techniques, it becomes a valuable economic resource, but also cultural and environmental. These considerations let us identify the rural landscapes as real cultural landscapes, « combined works of nature and man » (UNESCO

1972) through which it is possible to understand the evolution of human society over time and the ability to adapt according to the influence of the physical constraints and the opportunities provided by the natural, social, economic and cultural forces.
In this sense, it should be noted, the landscape takes on the character of rational structure which expands the meaning of sensitive geographical landscape, contemplating articulated relationships with human settlement structures, rural society and the agri cultural economy. Humanized landscapes characterized by «complex combination of objects and phenomena related to each other by mutual functional relationships so as to constitute an organic unity»[2].
The growing interest in Europe for rural landscapes shows the importance that they are acquiring not only in terms of aesthetics, but also as fundamental resources in the definition of territorial development models. Hence the need to safeguard the incipient threat of exploitation linked to unsustainable farming practices or erosion associated with rapid changes in socio-economic or inappropriate policies that determine the neglect and the gradual abandonment.
In this direction, since several years, seem to be moving European policies for the protection of agricultural contexts – with the enactment of measures of biodiversity management and conservation of typical elements – as well as numerous studies aimed at identifying and classifying historical landscapes.
There are also many Italian research aimed at the definition of inventories of rural landscapes throughout the country, in order to establish an effective management tool as part of the same agricultural policies.
On the basis of the importance of rural landscapes in defining cultural identity of places [3], this research focuses on traditional agricultural landscapes in Campania, analyzing the evolution of the landscape, examined from the point of view of its forms rather than on its ecological and naturalistic aspects or its scenic values. Through the analysis of case studies, this research thus opens up new possibilities for documentation of rural landscapes through the graphical representation, taking into account the ways in which historically they have been represented (often in an indirect way) and the new possibilities of representation in the process of documentation and enhancement.

2. The agricultural landscape in Campania: historical developments and elements of identity

The richness and variety of Campania territory offer to the study a unique combination of natural diversity and a great number of processes originating from an intense history of different cultures. So, with regard to the reading of the historical evolution, from the point of view of landscape representation, it constitutes a particularly significant case. The historical interpretation of the complex phenomenology existing in the territory makes it possible to trace the matrices of the current organizational structure of agricultural landscapes, marked, of course, in addition to the natural topography and climate variability, even by a strong stratification of the signs that many civilizations have marked in over the centuries.
In this direction, it is possible highlight an historical synthesis of the landscape developments, structured on a narrative that individuals and colleagues a series of significant moments throughout the history of the region.
The concept of agricultural landscape is related to the conscious and systematic transformations of the natural environment, so that the oldest outlines in Campania are put in relation to the development of permanent cultivation, by the cultures of indigenous peoples in the area. However, considering that the framework of the evolutionary development of these civilizations isn't well-defined, it is not possible to infer, beyond theoretical considerations stereotypes, which were the structures related to the landscape.
A decisive role, however, had the first Greek colonization which traced the first tangible forms of agricultural landscape. The impact on the environment of different and consolidated socio-political and religious organizations, together with the development of new agricultural techniques, suggest the definition of well-defined paths whose signs, on a par with those of their urban conformations, may still be traceable.
The region, then as now, was divided by Mount Somma-Vesuvius in two parts, connected by the vast plain of Nola. To the north, the rivers Volturno and Clanio flow through the plains around Capua; to the south, there's the Valley of the Sarno, which opens to the gulf; the Phlegraean area, with the island of Ischia, and the Apennine mountain spine of the Sorrentine Peninsula, with the island of Capri, conclude the *sinus Cumanus*. All these places had the characteristic of being well protected and extraordinarily fertile soils rich. The city of Cuma, Naples, Posidonia, are exemplary expressions of Greek culture in Campania. The colonial cities that were settled enjoyed large areas of arable land that were planned in a manner closely related to the organization of geometric urban tracks. The *strigae*, parcels of land long and narrow that were distributed to settlers for farming, are still readable in the plans of Naples and Posidonia. In the principles of the Hippodamian system, the urban area and the countryside were closely related to each other, in a chessboard in which the areas were divided according to a functional distinction between residential areas and public or agricultural use areas. Such kind of planning influenced and characterized the agricultural landscape unequivocally. But to contribute greatly to its forms, as well as the influence of geographical, were the development of new

criteria for allocation of land in relation to the categories of the owners [4], classification of land and crops [5] and at the same time the use of agricultural systems such as crop rotation. However, beside a rural landscape that is stated in regular geometric shapes as clear expression of the will of planning, it is possible to find random and arbitrary elements, result of individual improvisation. In particular, in areas near the sea, on lands in slope or near the villages, you will have a natural mosaic of land plots, often enclosed by stone walls to save them from the pastures, which determine the shape of the typical 'Mediterranean garden' featuring cultivation of grapevines or olive trees.
Better defined appear the signs of Roman culture on which we can find certainly elements of the Etruscan, Italic and Greek culture. The main economic activity of the oldest Roman civilization was primarily agricultural and pastoral. When the expansion of Rome spread throughout Campania (IV-III century BC.) the agricultural landscape bent to a real plan of colonization. The conquered lands were the subject of a careful planning as well as of new legal relations. It was created the *limitatio* – the division of land through *limites* – or the *centuriatio*, – that is, the division in *centuriae* – particularly used in the colonies where the land was assigned and thus formed groups of small landowners. It is in this type of organization that expresses new forms of social aggregation. In Campania, however, there is the prevalence of slave estates, less cohesive and not always able to provide an organic relationship between town and country. The forms of the Roman agricultural landscape are therefore dominated by strict rules of division and distribution. On part of the territory are still visible the remains of Roman centuriation and in some areas have preserved the use of roads and trails, where most, correspond to the *limites* of the ancient *centuriatio*. Such structures, together with the creation of an organic plan of roads and a hydraulic system of soil, are evidence of what was once an effective control of the physical space that allowed the Roman agricultural and administrative system, a widespread.

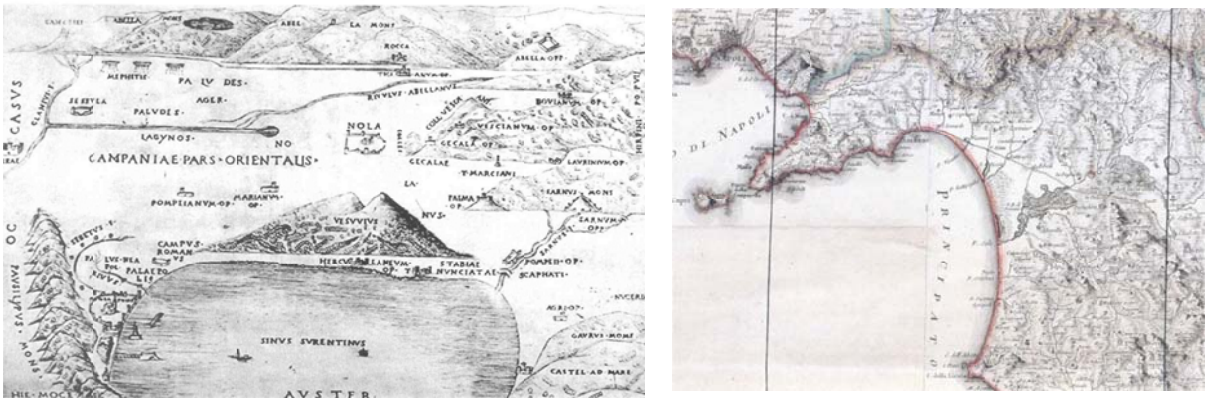

Fig. 1: On the left: A. Leone, *De Nola opusculum*, 1514. On the right: G.A. Rizzi Zannoni, Carta Geografica della Sicilia prima, 1771 (a detail of Campania)

Since the second century, the vaste estate or the villa are replacing the enclosed fields – cultivated by families that excluded their mixed use; the slave labor is substituting the free farmer, and the specialized crops of the vineyard and the olive are replacing the crops of cereals, imported more cheaply from the provinces. These crops are very different from the shape of the small family plot and take the form of plantations. It's taking shape the organization of the *villa rustica*, a large farm of industrial crops [1], which brings together, in an ideal closed system, even the garden. The villa is emerging as a place of pleasure, idleness and refinement. *Utilitas* and *venustas* are lumping in agriculture and this gives rise to forms aesthetically significant. Evidence of the *villae rusticae* are scattered on the northern slopes of Mount Vesuvius, on those mountains Lattari (at Gragnano and Castellammare) near Scafati and near the present Boscoreale. Intensive cultivations of vineyards and shrubby become an integral part of the agricultural landscape. But the fertility of the soil also favored crops of wheat, spelled and legumes often sown among rows of vines and olive trees, in order to get better returns. Typical, in flat fields, was also the planting of the vineyard joined to the poplars or elms, due to the need to keep the grapes away from the swampy or wet ground. There are numerous testimonies of planted olive trees that formed a dense cover of soil especially in the region around Gragnano. The agriculture in the plain of the Sarno also had large importance: here small and large estates proliferated fragmenting the soil in plots fairly regular. But the garden of Italy was the plain near Capua where agriculture was the main occupation at all times, especially for production of cereals. It is from this time that structures of large farms are disintegrating itself to the benefit of the pasture and the redefinition of small farms. From the fifth century the agriculture starts instead towards forms that characterize the autarkic medieval landscape. During the Middle Ages in Campania we are witnessing to a landscaping configuration different than other parts of Italy and Europe where the feudal economic structure gave rise to a model based on an agricultural production centralized on small lots around large properties, and wide areas were left instead to erosion and neglect. The so-called *curtes* in Campania there were ever. The agrarian structure, although based on the owner's residence, is more similar to large

estates and to the Roman villa. More precisely, both in coastal areas than inland, the settlement structures adopted were two: those of the open villages, consisting of a series of plots (called *mansi*) enclosed by hedges or low dry-stone walls, in each of which there was a small farmhouse; and those of *curtes* or houses, consisting of a central core made from a set of buildings bounded by a fence. Inside the *curtes* there were the owners' houses, huts for slaves and then barns warehouses, mills, stables. Nearby there was often the vegetable garden, the mill and a small garden.
From the sixth century the process of rural exodus leads to the formation of *castra*, concentrations of inhabitants that were closed for security reasons, often located in the hills within protective walls and close to a seigniorial castle. Many lands are abandoned, becoming places of nomadic pastoralism or poor crops. The flatter areas or that one near the coast undergo phenomena of waterlogging. We can find the forms of an organized agricultural landscape now near the cities, merged into a homogeneous structure with the built.
Between the tenth and twelfth centuries there is a political prevalence of the countryside. In this period lordships develop around castles that are settled in the place of old Byzantine or Longobards forts or instead of old *villae* variously scattered throughout the region. But even more than the castles, to give shape to spatial planning were the prevailing religious foundations – in particular Benedictine – that, in an attempt to repopulate and tilling the countryside, conceded spaces on which to cultivate and graze giving rise to the formation of open towns and hamlets. The entire side of the Amalfi Coast and the Valley of Cava de' Tirreni begin to become a place of settlement thanks to religious organizations that attract groups of farmers from surrounding areas, with donations concession on agricultural land parcels. Similar dynamics also occur in the Cilento where non-religious associations are receiving concessions by the public authority to use large plots of land on which are build several farmhouses. The soils are generally divided into small plots which ill accorded with specialized crops rather than food self-sufficiency. However, in the Amalfi Coast, many areas are destined to specialized crops and this is due – at least in part – to the presence of extensive trade with distant lands. So if in the beginning of twelfth century there is a prevalence of the vineyard at the end of it there will be instead prevalence of chestnut and of the more valuable crops of citrus and rose gardens. The fields are populated by different varieties of trees which correspond to an entirely new land improvement: terracing, drainage, retaining walls etc. The introduction of the cultivation of citrus fruits and the use of irrigation systems of Arab origin will lead these places to define an agricultural landscape distinctive and lasting for centuries.

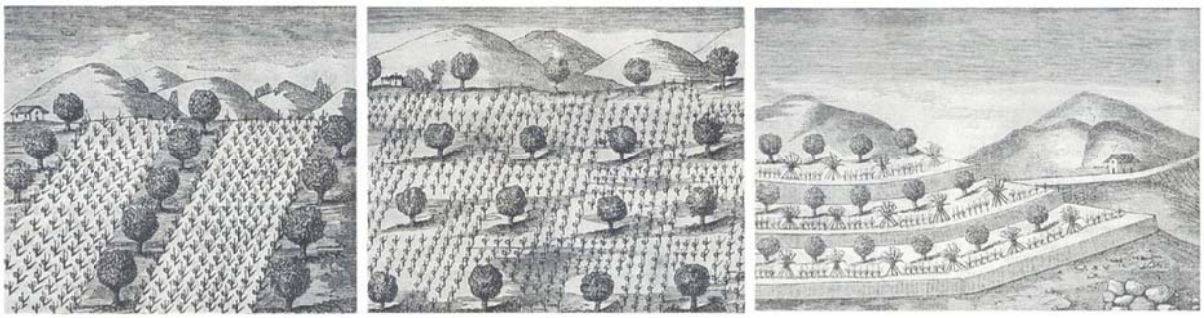

Fig. 2: Three types of agricultural land arrangement. From the *Enciclopedia Agraria italiana,* 1882

In the Middle Ages, the Norman politics first and the Swabian then constitute one of the main elements of differentiation of the agricultural landscape of southern Italy. Indeed, while the birth of Municipalities brings in the north of the peninsula to the affirmation of new landscape structures, in Campania, as in the whole south of Italy, the landscape is still influenced by authoritarian political attitudes Nevertheless, the trade policy of Frederico II gave to the agricultural economy of Campania an imprint of colonial type promoting both businesses and agriculture. It was in fact favored the creation of farms (*regiae masseriae*) who had the task of developing the crops that fed the major currents of traffic. The fields are covered with grain, chestnut groves and vineyards, all products that attracted the most foreign markets. Consequently, the landscape, especially on the Amalfi Coast and in Irpinia changes considerably as a result of the production choices of the great lordship. With Anjou in Campania was set up an archaic and backward feudalism that damaged the agricultural economy and consequently the shape of the landscape that was characterized by an enlargement of fields to grass for grazing and the increasing of deforested areas. The changes of the landscape are then marked by a general impoverishment of the countryside but an increase in peri-urban agricultural areas, armed with new hydraulic works and roads. Many terraces are created, in Naples, on the slopes of the hills areas and orchards and gardens pertaining to the religious structures spread, giving, this time, a new and more luxuriant appearance to the urban landscape.

But the forms of the agricultural landscape are convoluted for a few more centuries. The state of agriculture, especially in the great plains of Sarno and Sele was to appear, still in the fifteenth century, rather primitive. The waterlogging needed costly land reclamation works, arrangements and ductwork that the landlords refused to deal with. The more characterized forms of the landscape were in the hilly areas, where concentrated the works of clearing and arrangement. But the irregular morphology of the Campania hills did not favor rational and geometric processing of funds so that the landscape seemed marked by distributions of crops (mainly olive and fruit trees) according to irregular and sinuous lines that are often adapted to the shape of the ground. On the mountain reliefs there are instead woodlands constantly eroded by the works of deforestation. The practice of farming in the sixteenth century led to the determination of vast fenced areas mixed to cultivated fields. This characteristic had to give a new image of the landscape. These forms, however, were destined to a fast degeneration linked to the constant increase in the pastures at the expense of crops. Articulated political, economic and commercial dynamics led in the '600 to a general decline of the agriculture in Campania. This decline will determine the inferiority of southern agriculture in the centuries to follow. The rural landscapes present significant forms only in the suburban areas where the Mediterranean garden and the farms spread like typical shapes, result of the individual initiative of the middle class members, urban or rural, or of the feudal lords and clergy.
During the last decades of the seventeenth and early eighteenth century can be glimpsed in the agricultural landscape some signs of renewal. Despite the strong conditioning of the feudal order marked signs of innovation in agriculture are introduced with the importation of new species of plants that enrich the flora and crops. Appear in fact the potato, maize, tomato, tobacco, sweet orange and tangerine as well, including ornamental plants, agaves, prickly pear, eucalyptus. But the development of new landscape forms occurs only later, towards the end of the eighteenth century with the transformations of cropping systems, capital investment in rural areas and the development of farms mansions. With the Napoleonic laws that subvert the feudal system begins a new chapter in the rural history of Campania. Much of the countryside was marked by the installation of tree plantations on which the olive tree ruled unopposed among all [6] and reshaped the original structure of the Mediterranean maquis, often accompanied by restructuring operations of the landscape. The olive tree, widely used in the Salerno area and tuffaceous terraces of the Sorrentine Peninsula and more narrowly in the middle valley of the Volturno, gave a new aspect to all the countryside. In the same historical period also the citrus tree cultivation proliferates greatly than in the past and this also because of its exchange value. The places where this tree is concentrated are those of the Sorrentine Peninsula and the Amalfi Coast (where several terraces of citrus still persist), the Agro Nocerino, the Sele plain, and the Phlegraean area and the plane lands between Caserta and Maddaloni. The Mediterranean garden loses its variety and its symbolic and ornamental characteristics and, conforming to the most obvious economic purposes, has intensive plantations.
Even the gardens of vegetables, legumes and fruit trees begin to assume major importance in the nineteenth century, proliferating around the perimeters of the cities where it now is possible to see a dense network of family gardens. The inclusion of agriculture in the great circuit of the market will dictate the logic of the profound changes of landscapes with forms that are increasingly and inseparably linked with the economic and political factors that always have influenced their developments.



Fig. 3: Cassiano da Silva, a view of Amalfi, 1695-1705

3. The role of representation in the documentation and enhancement process

The comprehension of the landscape forms' evolution can not be separated from the visual interpretation of the shape that they presently take, or that over time have taken[7].
Although the studies based on the written documentation or on the descriptions have a significant value in the reconstruction of rural areas, it is not possible, purely on the basis of these sources, to

imagine the visual appearance of the various elements that compose it. Along with fixed and objective data, like those more strictly geographical, there is a class of non-static elements, but characterized by mutability's phenomena, including – as is evident – are also those introduced by man. And it is not only question of sizes and positions, but also of functional relationships. In this sense, the use of images is essential to understand the landscape's structure, like what happens with the architecture. No architectural history is possible without the use of the object's visual definition – whether it is performed through finds or images. No history of the landscape is significant without a tangible reading of the space's conformation. The history of the agrarian economy and aggregation's policies are, then, only an aid, essential but not exhaustive, as well as political-social events support the history of architecture, making people understand some formal evolutions.
Then, the iconographic representations become essential items of study. In them, often in an indirect way, are found evidence of the ephemeral appearance of a landscape: « … as historically happened to the architecture, even for the landscape have therefore emerged specific representation's forms: the 'beautiful nature', in fact, has primarily been represented, in modernity, through pictorial codes and cartographic data. These have come to the contemporary, becoming bearers of ways of seeing, or consider the landscape, in a 'picturesque' way the first, in an objective and quantitative, the latter» [8].
If, then, for reconstructing the history of a landscape are important, together with the tools of *landscape archeology*, also visual documents produced over time, even though they often are not directly aimed at the annotation of specific data, we understand how significant is today the representation's role in the process of landscape's documentation.
Representing the landscape it does not mean only transfer the objective physical space – or the geographical one – on a two-dimensional paper: real space must be graphically represented also those peculiar properties, independent of the projections.
The drawing's task is, therefore, to define a landscape's mapping, by appealing to an accurate semiotics. In this sense, the expressive codes must take into account the perception's laws, ensuring for the signs both the relevancy with the meanings, and a proper expressive capability with respect to users, so providing them the space's experience, through conceptual logic operations. Unlike the photography, which often has been assigned the task of capturing the landscapes' state – intended as sensitive landscapes, as showy forms – the maps, with their own systems of signs, must have the ability to abstract and to mean, not only providing information on shapes and quality, but also on the cultivation's types, on territorial organizations to them correlated, on mode of cultivation, on the aspects and aesthetic values (colours, provisions etc.). Aspects that are essential landscaped data, able to restore the spatial and visual experience of these. In modern cartography is possible to identify some significant representations, to that effect, even if not directly oriented to the landscape.
Instead, what this research aims, in the light of new media and infographic representation's technologies, is the definition of a renovated relationship between drawing and knowledge, so opening up the possibility of combining the use of different resources from various fields.
This is a currently underway research, of which are shown, by way of example, the results of an emblematic case study.



Fig. 4: Two examples of terraced lemon orchards of the Amalfi Coast

3.1 A case study: terraced lemon orchards of the Amalfi Coast

In order to explain the possibilities and the specific values of the graphical representation in the processes of analysis and documentation of the rural landscapes have been taken into consideration different typologies of landscape located in the coastal area and inland, and belonging either to hills and plains contexts.

In this paper it is presented the types of terraced lemon orchards that represent a fundamental part of the agricultural structure of the Amalfi and Sorrento Coast. It is a meaningful case study, full of historical and cultural components of perception. For this typology of landscape appears therefore necessary to pay great attention to the preservation not only of historical and economic-productive elements that influenced its evolution but also those related to the perception. This anthropic landscape is able also to express visually the identity of social groups that determined it. The case exposed in fact provides a landscape typology that, throughout its evolution, has maintained a certain integrity in terms of characterizing and structuring elements, be they geomorphological, structural, infrastructural or cultural [9]. Furthermore it is possible to draw upon a relevant documentation which allows drawing attention on the development of signs and modes of representation able to return and make recognizable its characteristics of identity.

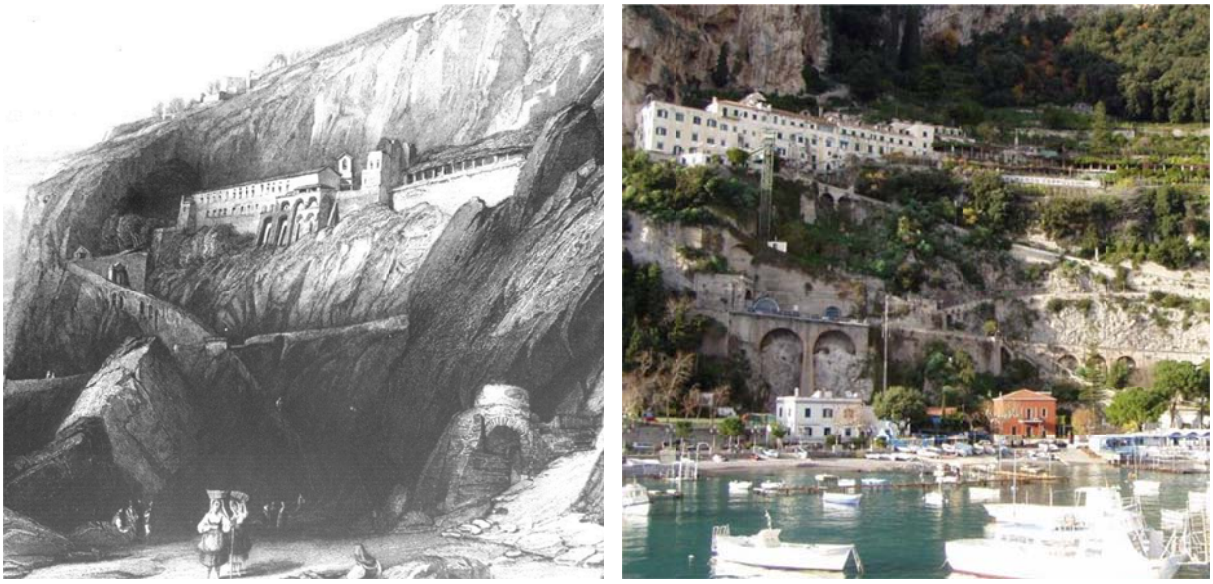

Fig. 5: On the left: J. D. Harding. view of Amalfi and its Capuchin monastery hung on the sides of the mountain. On the right: an image of Amalfi from the sea.

In the process of analysis and evaluation – even graphics – of this kind of landscape is important to study on one hand the features that allow us to identify the type (i.e. biophysicall structure, vegetation and land use)[10], on the other the value that is derived directly from the functions that the landscape is able to perform in terms of satisfaction of needs, materials or just of perception. In the Amalfi Coast area, the agricultural space coincide, since ancient times, with terraced systems that have transformed land disposed on coastal slopes and dolomitic limestone, steep and rugged, originated on deposits fall of pumice and ash, in those ‘gardens of paradise’ often celebrated by travelers of the past. While they were a source of wealth for the agricultural trade of precious varieties, they have defined also the basic track on which is founded urbanization. The structure of the terraces appears different because of the slope, but generally all are supported by dry stone walls to prevent the precious soil, taken from the rock through ingenious and laborious work of clearing, being washed away by rainwater. If in other places of the region the process of human settlement, over the centuries, has largely reduced the domain of crops on terraces, on the Amalfi and Sorrento Coast terraces are so far the only cultivated areas, and here are still prevalent the citrus and olive trees. The patterns of the "walled gardens" that integrate with the buildings, typical of the steeper slope of the Sorrento Coast, oppose to the terracing of the Amalfi Coast characterized by "hanging gardens" where are prevailing lemon trees. As written by Laureano «the whole Amalfi Coast is a chisel of terraced fields that ascend the landscape, surround the coasts and mark the headlands. The rugged terrain makes the terrace the true protagonist of the whole spatial organization: the hanging garden, the design of the wooden buttresses, the plots that structure the same town plan» [11]. The crops on the terraces have had, throughout history, various changes but their exploitation has always been intensive allowing both the cultivation of trees and vineyards with grapevines, trained onto chestnut-pole pergolas, and horticultural species in order to create a self-sufficiency production. However, the commercial opportunities stimulated the cultures of profitable and valuable species such as citrus fruits, especially lemon. «The technique of cultivation of this precious

fruit, known since ancient times, is encouraged by the experience of the medieval Maritime Republic of Amalfi with the introduction of agricultural and hydraulic knowledge, result of the relationships that the area has with the North African and Arabic world [...] The organization of the system of terraces allowed the use by gravity of the waters that were intercepted on the height of the mountains and routed through the stairs and the collection tanks to the successive terraces. Each terrace was connected to an intricate system of irrigation canals fed by streams, springs and cisterns of rainfall. The collection and distribution of water was ensured by a dense network of natural waterways and canals that brought the waters 'by gravity' and came in the terraces and large stone tanks called *'peschiere'*» [11]. On this system was based also the organization of the settlements realized on terraces and connected with the crops by access stairs or streets called 'lavinare' built along the lines of the water. «The urban centers of the Amalfi Coast as Positano, Amalfi, Ravello and Maiori are structured along vertical lines on embankments, overhanging on the mountain eyelashes: they are hanging garden cities. The neighborhoods are connected by countless stairways and alleys leaned to the steep slopes that form the only possible ways of communication. The houses following the plot of the water flows are developed in successive spirals on the sides of the mountain are located according to the position of the cultivated terraces and are themselves terraces and garden. They are assembled on one another and the terrace-garden is always an integral part of the house itself, covering an essential function for everyday life: it's a place of work, communication, aggregation» [11]. The terraced cultivation systems appear still sufficiently intact, although the urban expansion has led to the abandonment of many agricultural areas. «The reasons are structural and all ultimately stem from insufficient yields depending on the high costs of traditional management systems and terrace maintenance for which it is now hard to find qualified workers» [12].

3.2 From historical cartographic reading to infographic modelling; from mapping to a hypotesis of cataloguing

The great landscape importance of the Amalfi Coast's agricultural areas significantly highlights the problem of its preservation. In fact, if on the one hand the crops represent an economic resource of the area, on the other the same landscape structure, in the symbiotic integration between built and natural space, is firmly anchored in the terracing works, that have characterized the anthropization's mode and the town planning of an impracticable landscape, very difficult to colonize. In the documentation and enhancement process of this ambit, through an oriented research on graphic transposition and on computerization, it is intended to hypotize a coding of symbols and signs, able to collect a plurality of knowledge from different fields. All received information should pass in an integrated and, as possible, standardized system, so as to foster collaborative research for the interdisciplinary study of changes and developments in agricultural landscapes.

To this end, a specific research on historical and iconographic representations, over several centuries, was initially conducted. If this analysis is a 'classic' in the historical research, it should be clarified that in this case the objective was twofold: on the one hand to define the landscape's character through some representations (particularly drawings of travelers), on the other – especially on cartography – to interpret the relationships not so much in terms of scientific accuracy, but also in terms of achievement of specific objectives related to the rural landscapes' representation, for example by highlighting the

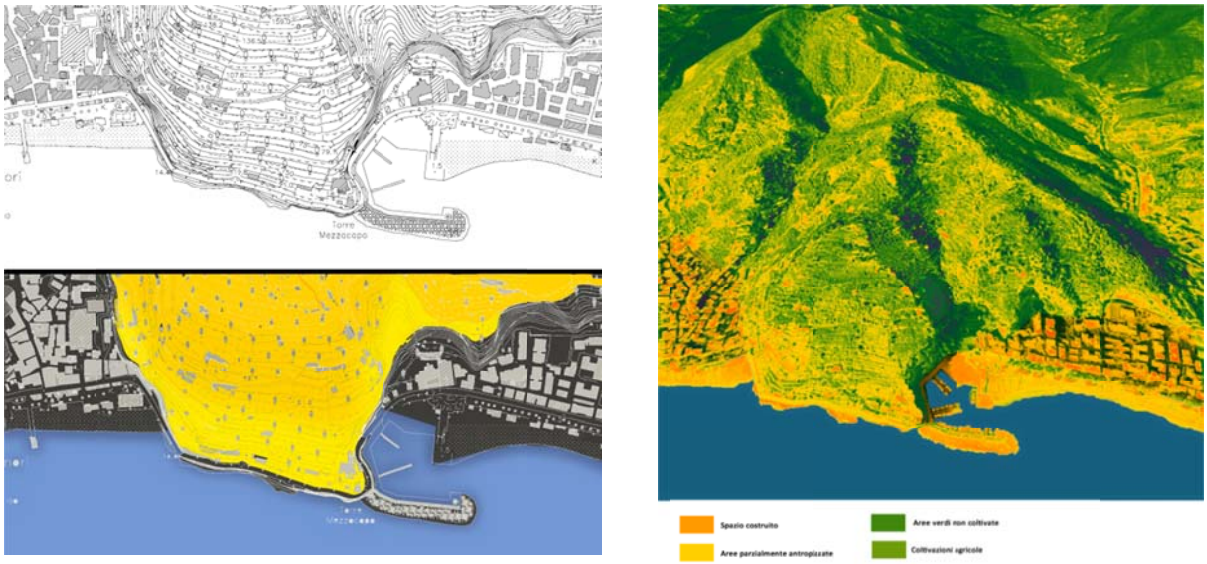

Fig. 6: Some steps of the research's method. On the left: photogrammetric map whit symbolic indication of cultivations and a composite thematic map. On the right: infographic representation of the analyzed soil, using a satellite image.

unique aspects of some specific contexts. In this analysis, it was essential to avoid common «tendency to confuse the representation with what is represented» [13] , a trend that «applies to both perspective drawing and the map because both derive from surveying. The map„ and the perspective drawing, often appear to present a precise representation of a segment of territory outside the window, but it does so by subtly inscribing the topology of our rounded, curvilinear world within a flat, static, Euclidian gridded space» [13].
In this way it was possible to consider some significant characters in graphics syntesis that have formed a basis for some reworkings of signs. Then the research has moved on provision of computer

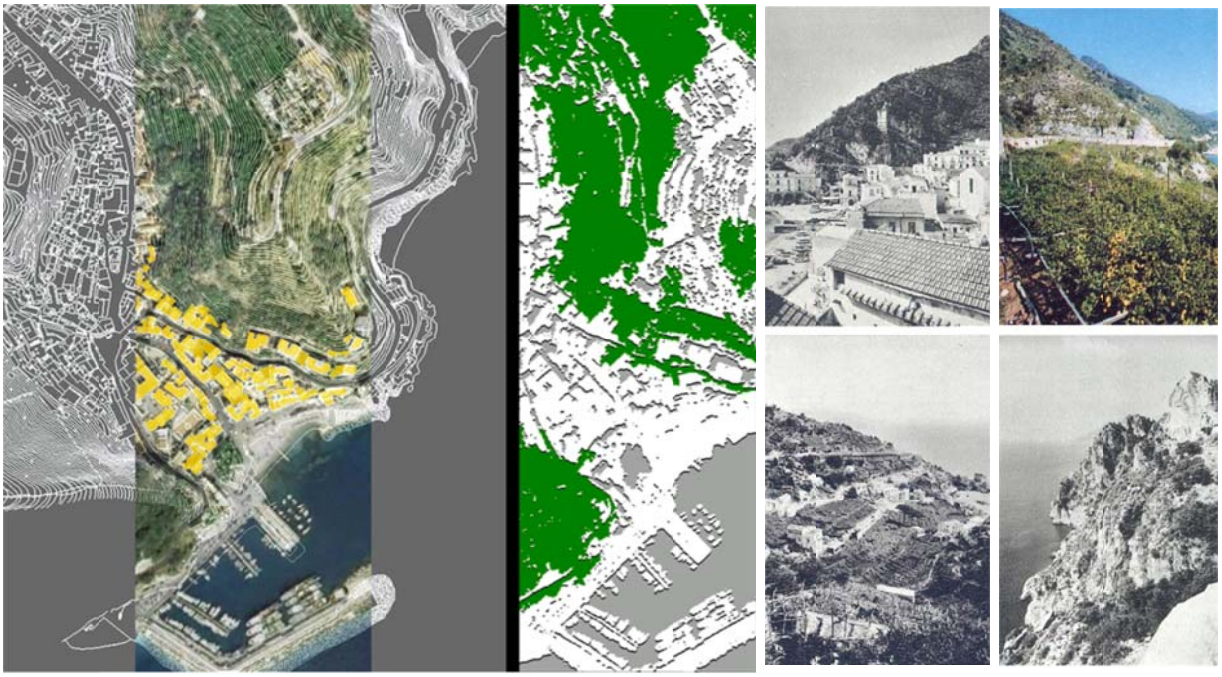

Fig. 7: Cetara. Multi-layer analysis of rural landscape

graphics models of the territory, with the intention of creating mappings able to lead the viewer to think landscape represented, granting it a structure, an order and a meaning.
In relation to the representation scales were then highlighted the patterns of vegetation, the type of land-use, the systems of crops, and the anthropogenic works of reclamation of the soils. However, greater attention has been paid, in the present case study, on the representation in urban scale, capable of highlighting the specific characteristics of the soils and its integrations with built spaces. The possibilities offered by three-dimensional modeling have allowed the realization of the representations able to point out some landscape features, and above all to read in a broader way the system of relationships between natural and built space. As written by Rossella Salerno « a 3d representation can help us for example to see better the relation among open spaces and built areas; so visual simulation of urban landscapes too. We consider these devices as instruments to a better comprehension of landscape context as in order to plan as to communicate their feature to people» The integrated use of aerophotogrammetric surveys and overlaps for layers with other documents, and the use of sketches in any case have been an essential support to the work.
Downstream of a mapping hypothesis of some significant fragments of the rural landscape also examined on the basis of the most recent experiences of landscape assessment, then we tried to define a cataloguing hypothesis able to collect and integrate a set of information about the landscape: in this case were considered not only geomorphological, natural or perceptual-aesthetic information – already validly considered and indexed in a number of research studies or cataloging works related to protection policies – but also those whose proper formal connotations arise from specific crops and from the use of the ground. for that purpose An attempt was made to overcome the abstract typological classifications or a generic corology. The data in the catalogation sheets were then structured according to the logic of the database, with links to specialistic sub-sheets (geo-morphological characterizations, environmental, regulations etc.). The phases study preparatory to such catalogation can be divided into a preliminar one, characterized by a consultation of computerized cartography and a recognition of the territory with a photographic survey compared with aerophotogrammetric data; and an operational one, based on the geographical identification, mapping and subsequent cataloguing. The basic objective of the study is the realization of a cataloguing system to be included in a database, user-friendly but also capable of an effective visual graphics that can be communicative to an audience of non-specialists, but also a valuable support to interdisciplinary research.

4. Conclusions

In the interpretative rea ding a nd realization of agri cultural land scape map s, the gra phical representation assume s a role of para mount impo rtance. In the first ca se the image stimu lates a hermeneutical activity that, as the se miotics i n lin guistic, offers the po ssibility of understandi ng, through the readin g of fo rm an d content, meani ng and im plications of a symbolic comm unication, highlighting cultural and social processes implicit in the definition of rural landscapes. In the creation of landscape's maps, i nstead, the re search h ave sh own that the representation, throu gh in tegrated computer g raphics mod els – two-dime nsional and t hree-dimensional – be come a valuabl e tool to highlight the formal ch aracteristics of the agricultural lan dscape and its relationship with the mo re complex dyn amics of urban settlem ents. Fu rthermore, throug h a ca reful sign s en coding, the representation become a foundational element of effective communication even when addressed to a non-specialist audience and, at the same time, a valuable support to interdisciplinary research.

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Milan-Turin: a bundle of infrastructures to access a network of places, between cultural heritage and landscape

Andrea ROLANDO,[1] Alessandro SCANDIFFIO [2]
(1) Dipartimento di Architettura e Studi Urbani, Scuola di Architettura e Società, Politecnico di Milano, Milano, Italy.
andrea.rolando@polimi.it
(2) Dipartimento di ingegneria strutturale ed ile e geotecnica, Scuola di Dottorato in Beni Culturali, Politecnico di Torino, Torino, Italy.
alessandro.scandiffio@polito.it

Abstract
The current research aims at investigating the relationships between mobility infrastructures and cultural heritage analyzing the case of the territories located along Turin – Milan axis. The territories in between these cities are a region where the two the main centers located at the edges are fastly connected by high speed railway and highway and at the same time still interlaced with several smaller centers of the in-between territories. The presence of a network of infrastructures - belonging to the so-called long/fast and short/slow networks - could represent a relevant opportunity to discover the richness of the territories in between the main centers. In this sense it is interesting to investigate the accessibility from the main infrastructural bundle (motorway, high speed railways, historical railways, waterways) to the territories, in order to establish a better connection to and among them. Relationships should be understood as a possibility to connect two or more places, identified as cultural places, to be reached from the infrastructures (stations on railways or service areas on motorways) with different systems of transport, enhancing intermodality such as that between train or car and bicycle. Therefore, the aim is to give at the same time accessibility to tourists and better mobility opportunities for the inhabitants that could benefit from their territorial values. The research is based on two main points: the first one concerns with the identification of a methodology for the investigation of the relationships between infrastructure and cultural heritage in terms of accessibility. The analysis includes also the use of tracking tecnologies based on gps systems to represent the network of cultural routes for the fruition and the development of the places. The second one deals with the visual representation and particularly with the identification of a mapping system that can contribute to effectively represent the multiscale structure of such a complex landscape.

Keywords: territorial relationships, mapping, visual representation, cultural landscape, mobility infrastructure.

1. Introduction
This paper aims at inquiring the possibility to establish connections between mobility infrastructure and heritage sites, in order to create a network of cultural places along Turin-Milan axis, that could enhance the role of the territories *in between*, as part of this mega region. The research focuses on the territories between Turin and Milan that could be considered as the real framework of the whole landscape crossed by the infrastructural axis (Fig.1). This work starts from the assumption that the bundle of mobility infrastructure cannot be considered as a *corridor*, but it needs to be represented as a *network*, able to connect the territory in different ways [1]. The challenge concerns with the possibilities to make *relationships*, between mobility infrastructure, cultural heritage and landscape, in terms of accessibility and fruition of the places. In this sense, the research aims at investigating some strategies that could be useful for a better understanding of the territory and for the fruition of cultural heritage. The research methodology is based on the exploration of places, that are located all around the infrastructural system, with an inductive method, that arises from particular to general, trying to

make evident the relationships both at local and at territorial scale. The presence of *long/fast* and *short/slow* infrastructures, represent a real opportunity for local development and the starting point to establish relationships at different scales. The increase of links with cultural heritage sites, could be relevant in terms of touristic improvement of the area, but also considering the growing of existing relationships between Turin and Milan. In the last few years a lot of actions, related to this topic, have been developed, in terms of research activities at Politecnico di Torino [2] and Politecnico di Milano [3], innovation projects at Alta Scuola Politecnica [4], seminar, congress and meeting with different stakeholders that are involved in this problem [5]. The current research aims at improving the research studies presented at SAVE heritage 2011, that concerned with landscape pattern and historical structure of the territory in between Turin and Milan [6].

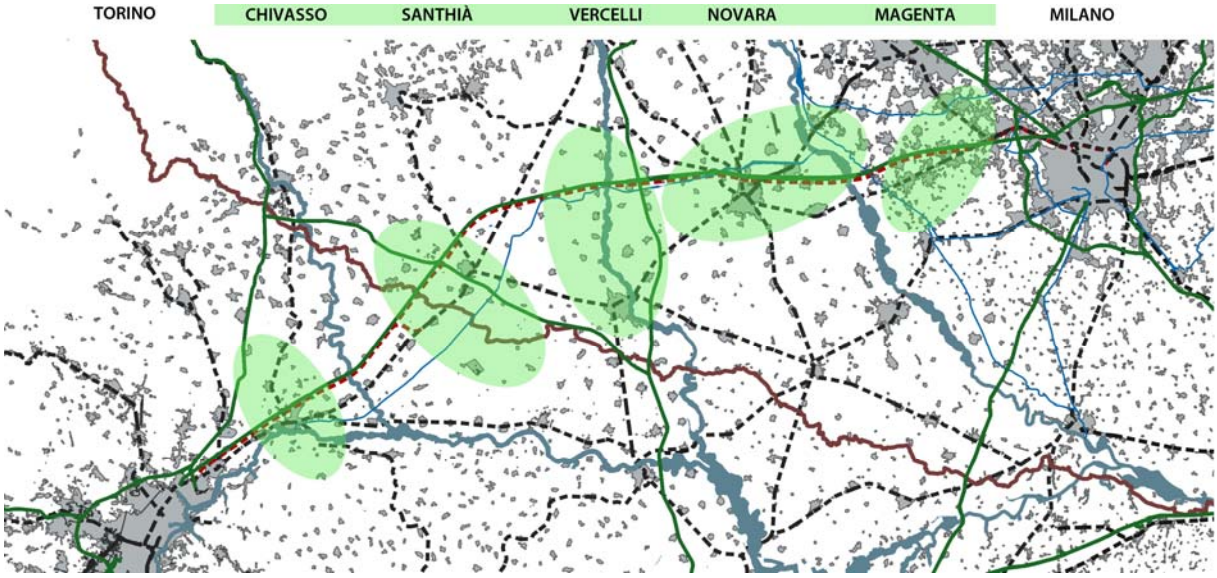

Fig. 1: The territory in between Turin and Milan with the main areas related to the infrastructural network

2. Milano-Torino *in between* territories as a network of cultural places

It can be clearly assumed that in last decades the space related to infrastructure has become an hyper frequented place in our territory, in consequence of diffused changes in terms of mobility needs and behaviors. The experience related to a journey has to be considered o relevant value, also because it keeps us in touch with landscape and with spatial framework of territories, that are crossed by the infrastructural network [7]. Though, it would be necessary a new consciousness for the territories that are along the infrastructural tracks, so that they could actively belong to mobility space. The current research aims at considering all the places localized in the surrounding space of the mobility infrastructure, that are relevant in terms of heritage and that could be connected to each other, starting from infrastructural nodes (motorway exits, service areas, railways stations). These places could be considered crucial for their importance in the infrastructural system, able to open to the territory and make it accessible. In order to have a better understanding of the issue, it could be useful analyze the territory as the result of an overlapping of different layers at different scale: a research strategy that allows to understand the real complex structure of territory. Turin-Milan axis has a really interesting structure, because of its agricultural landscape related to intensive agricultural uses (rice farming, but also orchards and wineyards), the importance of waterways system and canals for irrigation, the various cities that be long to the territories *in-between* and theirs cultural heritage, the mobility infrastructures that make possible the connections between different places (Fig.2).

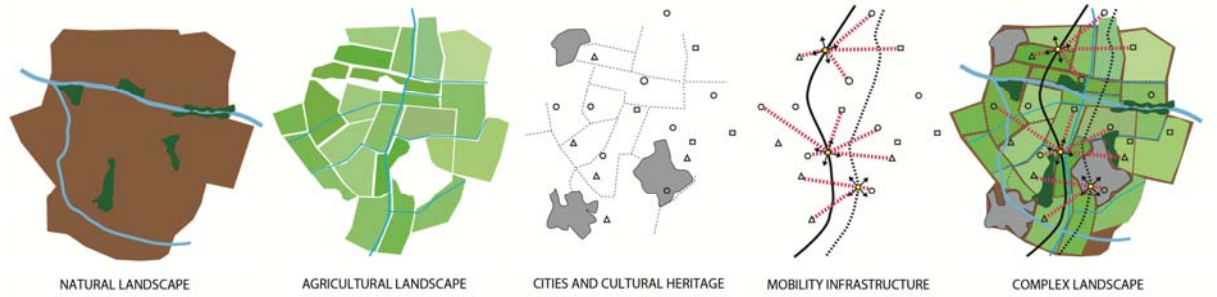

Fig. 2: Multilayer structure of the territories in between Turin and Milan

2.1 Mobility infrastructures along Turin – Milan axis

In this sense, the infrastructural system should be understood as one of the most important layer in the territory, related to accessibility and connections of the places. The existing infrastructure along Turin and Milan should be intended as a network where different territories and sites are hooked one to each other. In this perspective, it is possible considering the presence of *high/fast* railways that connect the main cities of Turin and Milan within 40 minutes, without any stops in the territories in between. This type of infrastructure, that is the most recent one, is really essential for long trips but also to bring near the main polarities of the whole region, the cities of Turin and Milan. It is possible to consider the high speed railway as a "line/corridor" that cut out the intermediate territories. In different way, the network of local railways (realized soon after the mid of 19th century) is really important in the territory, because represent the short/slow infrastructural system that allow the connections in the territories in between the main cities with stops in small cities, and represents an important system for tourism development. In different words, the historical railways system has the real structure of a "network", for its capability to make possible the connections between small cities and territories, that are crossed from this important infrastructural corridor.

The A4 motorway represents another relevant layer of infrastructure along Turin – Milan axis because of its characteristic to be, at the same time, a long/fast infrastructure that can also connect the territories in between, through motorway exits. As well as the historical railways, the motorway has several in/out points along its track (service areas, motorway exits), that could be developed in order to improve the accessibility and the connections with surrounding landscape. This research aims at identifying all the potential points on the motorway, that can be relevant for the fruition of cultural heritage and landscape.

In addition to the previously mentioned layers, the waterways and canals are very important in the territory, being the bearing structure of the agricultural system, but at the same time as a network that could connect Turin and Milan in a slow way. The presence of the historical canals (among which *Canale Cavour, Naviglio di Ivrea, Naviglio Grande*) and their interaction in a network that is still perfectly maintained and working, represent an important resource for the agricultural system and for its richly integrated landscape [8]. All waterways are a very potential infrastructure, if we consider them as the base for develop a network of cycling paths that could be designed in order to increase the accessibility in the territory. Nowadays there are a lot of existing routes that could be used in order to redesign a slow infrastructure between Turin and Milan trough high spatial quality sites. In Fig.3 it is possible to see the different mobility infrastructures that allow connections between the territories in between and site of Expo, but also the possibility to use the nodes along the existing infrastructure, as points for develop new local cultural routes.

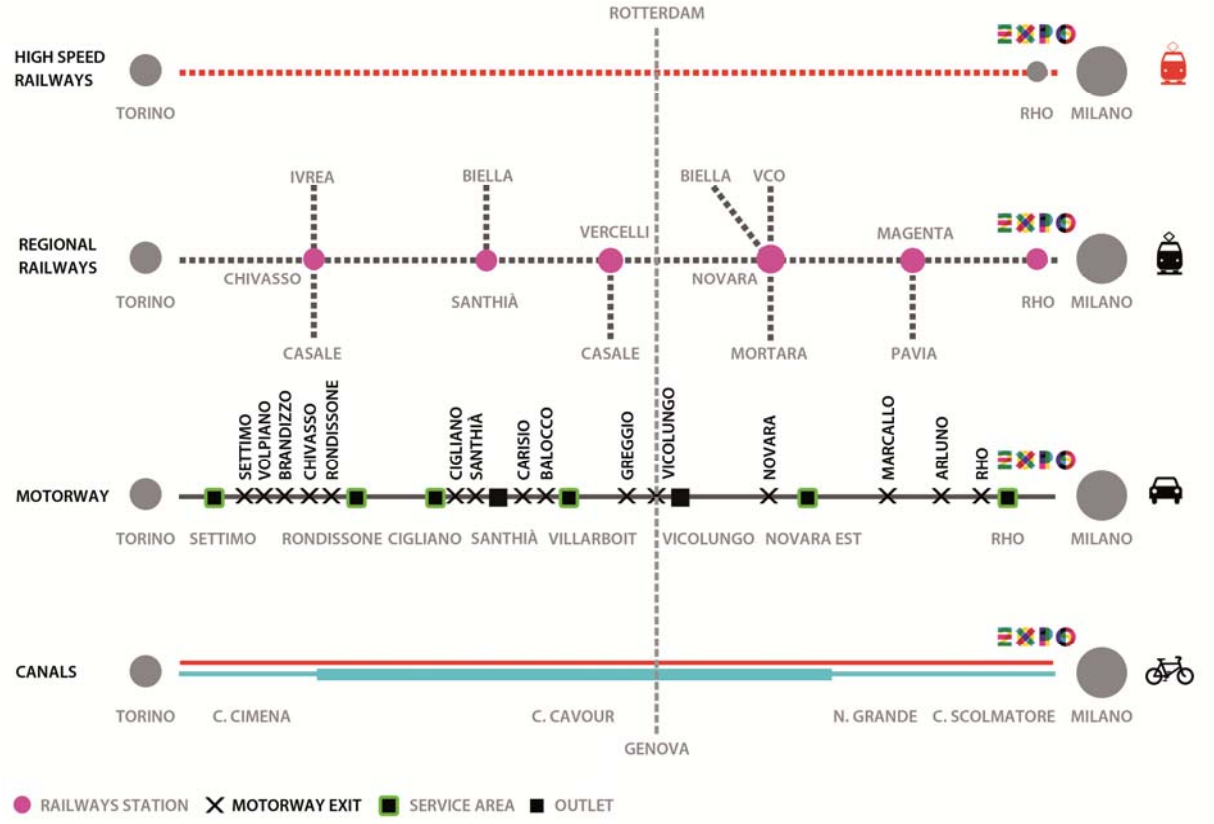

Fig. 3: Schematic representation of the infrastructural bundle connecting Turin and Milan.

2.2 The system of cultural heritage and landscape around infrastructure

The infrastructural system along Turin and Milan has been so far analyzed as network able to connect existing pl aces, inte nded as c ultural heritage s ites in la ndscape, that are loc ated a ll ar ound the infrastructural ax is. T he m otorway a nd r ailways c ross a ter ritory tha t has a wide r ange of c ultural heritage elements: rural architecture, farmhouses, small villages, historical roads, castles, abbeys; but also natural r eserves, c anals f or agr icultural s ystem an d m any others. As t he r esearch aim s at pointing o ut a network of c ultural p laces tha t c an be c onsidered as *attraction points* f or v isitors, accessible f rom inf rastructural no des, a r ange of t ypical des tination has been l isted an d ana lyzed. From Turin to Milan: La Mandria historical building, Lucedio abbey, the hydrometric station in Santhià, the rural complex of Vettignè, Casalbetrame agriculture museum, Proh castle, San Ma iolo farmhouse and village of Castelletto. These places could be r eached by different means from the inf rastructures and c ould r epresent c atalyst points f or ter ritorial d evelopment, als o r epresenting a s election of different typologies of cultural heritage in this region, which are distributed in a large variety of cases, that tes tify of the c ultural history in th is r egion a nd s trongly c haracterize t he l andscape of the whole area. F armhouses r epresent t he r elationships be tween the a gricultural l andscape and r ural architecture. The hydrometric station of Santhià symbolizes the complex system of canals for irrigation and its relationships with landscape. There are the old places of power, that are symbolized by castles and c hurches, t hat are l ocated in th e s mall vi llage or in the r ural c omplex. A ll thes e p laces c ould become the attr action p oints f or peopl e who is tr avelling in the m ain infrastructural s ystem, but also the r eference p oints f or l ocal inhabitants th at would l ike to discover t he r ichness of ter ritory. In particular, s uch pl aces c ould b e the f inal des tination of the Ex po vis itors, as the y em body t he tr ue experience of Ex po them es. Eac h one c ould attr act peop le f rom the inf rastructure and es tablish connections with other cultural places that are localized in the same area (Fig.4).



Fig. 4: Selection of cultural heritage sites along the Turin – Milan infrastructural axis.

2.3 Infrastructural nodes as gates to enter the territory

The presence of nodes along the infrastructural network is really important because they represent the intermodal intersection between different kind of flows. The importance of nodes is strategic for their capability to canalize large amount of information in the direction of the territory to which the same nodes belong. These places should be imagined as sort of concentration points, where data flow become accessible to the people. The concept related to a single node, as point in a network at which pathways intersect, can be extended to the concept of more nodes in a network that could be extended to the whole territory [9]. This idea becomes even more relevant if it can be applied to all nodes along the infrastructural system in order to transform the infrastructure into the backbone of a complex landscape. (Fig.5).

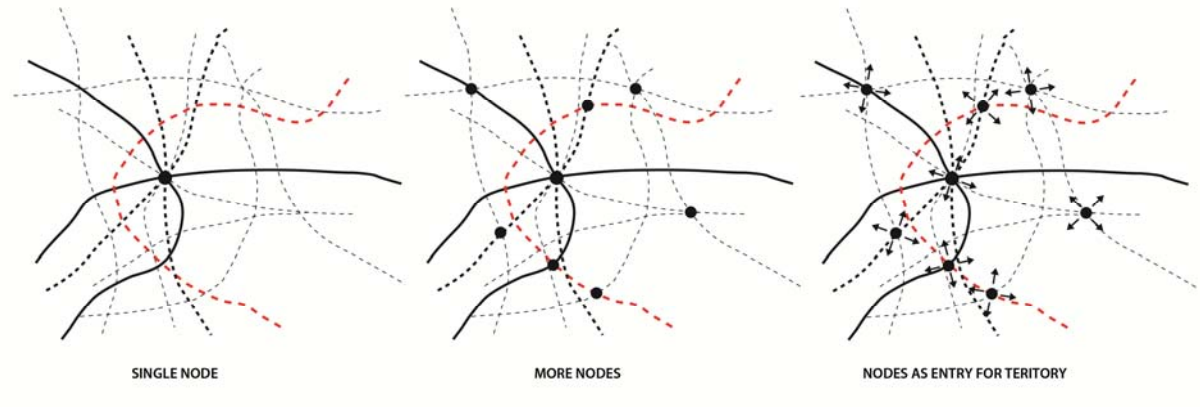

Fig. 5: From the concept of single node to multiple nodes as gates to enter the territory.

The current research is based on the analysis of various infrastructural networks, already mentioned in the previous section, and aims to indentify which nodes could be relevant for the accessibility to cultural heritage. The investigation shows the real possibility to connect infrastructure to cultural heritage trough infrastructural nodes. Different means of transport (train, car, bus, bicycle) could be used in the same trip, in order to explore the territory. Different combinations are available between means of transportation, in order to improve the accessibility to the territory. It is possible to consider relevant nodes along the infrastructure: motorway exit, services area, railways station. Each one of them has the characteristic to be a sort of "entrance" for the territory but also an "interchange point". Railways station, located in the small cities, could represent the intermodal place where you can leave the train, rent a bicycle and start a small trip in the surrounding countryside, discovering cultural heritage, landscape, local food and so on. At the same time the exit on the motorway and service area could be considered for the same goal. In this sense, all the nodes along the infrastructure can be considered as interface between infrastructure and cultural heritage (Fig.6). These places represent the space in-between the mobility infrastructure and the rich system of cultural heritage sites. Each one of them embodies, at the same time, the territories crossed by infrastructure, but also the surrounding landscape and cultural heritage. The potentiality of these places, corresponds exactly to their own essence of places crossed by flows, where the travelling experience of tourists is integrated with the landscape and where the same landscape with its inhabitants could open a new positive relationship with the infrastructures.

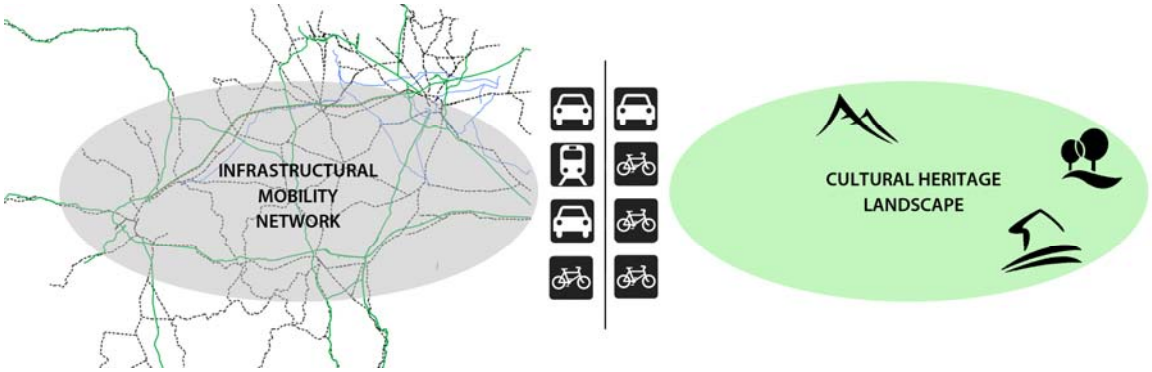

Fig. 6: infrastructural nodes as *interface* between infrastructure and cultural heritage.

3. Method and Techniques

Different methods and techniques are currently available for research studies in the field of collection and management of geographical data. In particular, starting from the consideration that GPS (Global Position System) devices can be very useful for collecting geo-referenced data. Urban and territorial studies based on GPS data flows allow to achieve new territorial and urban analysis, revealing a need for specific spatially oriented approach in order to visualize information correctly. The method used in this research, starts from the exploration of each single place, with the aim to analyze in details the multiscalar, local and territorial accessibility of its cultural heritage. The strategy of the research focuses the attention on the exploration of the territory through GPS devices available on personal communication terminals, collecting data and producing maps able to effectively select the relationships between linear elements (the infrastructures) and the complex topological structure of the cultural heritage, made by set of points, interconnected by local networks of roads and paths. The use of GPS is producing interesting results if we consider the possibility to collect a large amount of data in terms of space and time, with aim to visualize them in a interactive map generated by mean of a geographic information system software. GPS device allow to record points and tracks, but also to show the duration of a journey and the type of means of transport. Satellite send the signal to GPS that is able to receive this signal and send again data with other external protocols [10]. Further developments of this research, will explore the role of mapping tools and the integration of other sources of information available through Smartphone and their applications in the field of tourism also related to social networks.

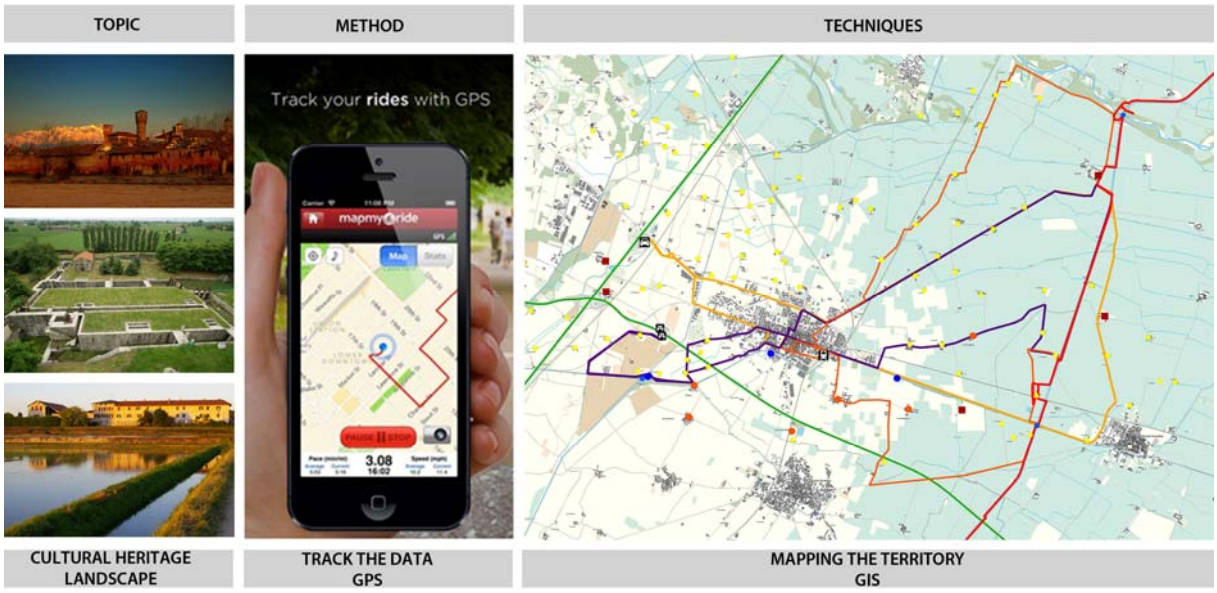

Fig. 7: Tracking technologies allow to collect geographical data that could be managed with GIS.

Most recent applications for Smartphone are based on GPS. They can be used to record routes and transfer information in a GIS system for data management. In the current research the working flow is based on different steps: exploration of the sites by car or bicycle; collection of data with GPS based on Smartphone; management of data in GIS; visualization of the results in thematic maps that represent cultural routes from infrastructural nodes to cultural heritage. GIS offer to users many features and work possibilities related to map scale, layering, queries, spatial attributes database, visualizing spatial contents [11]. All of the tracks are geo-referenced and they can be insert in the geographical system in order to study the interactions with other territorial elements. The combination of GPS and GIS technologies represent a very useful platform for managing territorial data and map spatial contents correctly. The combined use of GPS and GIS show how these technologies can be useful at two levels; the first one (GPS) is related to the field of investigation and collection of territorial data, and in a general way to the field of survey. The second one (GIS) concerns with the possibility to make analysis in a scientific way for a better understanding of interactions between territorial elements also by experimenting innovative and effective mapping tools and interfaces between users and personal devices. In the current research, the use of GPS and GIS is not related to the urban scale but to territorial scale. The investigation field is much larger than urban one and it needs to be more deeply explored. The analysis based on GPS data can be used to understand tourist behavior and movement in a defined territory. The large amount of data could be useful to determine new tourism flows and territorial marketing strategies, to manage the impacts of tourism (social, cultural,

environmental) in a particular area, the relationships between cultural heritage, landscape and infrastructure, also by encouraging and enhancing potential new behaviors of insider and outsider users of the territory [12].

4. Relationships: cultural routes as vector for accessibility

In the current research, the relationships between infrastructure and cultural heritage should be intended as a possibility to make different typology of cultural routes, starting from nodes localized along the infrastructure. The analysis of places show the possibility to make cultural routes both at territorial scale both at local scale. The nodes along the infrastructure can be used as starting point for discovering the territory but also as intermediate point in a longer trip. First of all, the research shows the real possibility to increase the level of accessibility of cultural heritage that are localized in the territories crossed by relevant infrastructures. Secondly the research demonstrates how the places surrounding and distributed along the main infrastructure, could enhance their territorial role, encouraging their accessibility by different mobility modes and, thus, a better relationship from and to the infrastructural nodes. Thirdly the research shows as the application of modern technologies can be used to collect data and to map them in a most effective way. The presence of infrastructure should be considered in a positive way according to major accessibility of places and tourism development. To conclude the method of inquiry reveals that some areas, that could seem apparently out of the bundle of infrastructure, instead they could be connected to the infrastructure and represent a very potential areas for tourism development. Making a network of cultural routes, starting from the nodes along the infrastructure, could be considered a great opportunity for discovering the territory in between Turin and Milan, in order to make accessible the richness of existing cultural heritage and landscape from the perspective of infrastructure. In this perspective, having pointed out that the infrastructural network of the region between Torino and Milano is so strictly related to the agricultural landscape, the Expo event that will take place in Milano in 2015 could act as a catalyst of territorial innovation, contributing to promote the accessibility of the territories and their better use as an important legacy of the event.

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Water and its forms. Natural elements semantic icons in Turin.

Maria Paola MARABOTTO
Scuola ,di Architettura e Società, Politecnico di Milano, Milano, Italy.
E-mail: maria.marabotto@polimi.it; mp.marabotto@gmail.com

Abstract
This study arises from an interest in the urban landscape and the places in which we operate. It's inspired by G.C. Argan that says “in places, frequencies, paths, sites and objects of the city is defined its symbolic and mythical value”.
The fountains, the statues, the columns, the obelisks, the triumphal arches, the parks and the ordinary architectural structures - that are in public spaces - are the important themes of the 'pretty face' of the city.
The fountain in the urban scene, when enjoyed in everyday life, manifests its fantastic ability and reveals itself as a key to the civil context. It is a fascinating witness that evokes a strong emotional impact because it represents the interaction between the urban landscape and man; so the fountain can also be considered the soul of a historical period. It is architecture, not only an architectural element, thanks to its expressive and formal determination of the built environment.
In Turin, the fountains have an added value for the aggregation of citizens and the feelings and emotions revealed: two allegorical themes such as the time (existence, memory) represented by months, seasons, work and the nature (life, joy) shown with moving water, provide insight into the urban environment in different ways and different levels: from the physical to the symbolic.
The research aims to demonstrate the value that the fountains have in the urban landscape as an active element, through sketches, geometrical surveys and historical research.
The documentation is also aimed to highlight the feelings and emotions that identify the city quality, to discover the pleasure and the "atmosphere" of places in Savoy capital.

Keywords: fountains, water, urban environment, the shape of water.

1. Premise
The interest in the urban landscape and the environment in which we operate, cultural heritage indwelling in the places, the respect for the values and architectural signs present in the town has motivated the present study. In this regard, G. C. Argan says "in places, frequencies, paths, sites and objects of the city is defined its the symbolic and mythical value."
The fountains, the statues, the columns, the obelisks, the triumphal arches, the parks and the ordinary architectural structures - that are in public spaces - are the important themes of the 'pretty face' of the city. They are signs aimed at identifying a symbolic environment.
The fountain in the urban environment is manifested in all it’s fantastic ability and proves as interpretative key the civil context. It’s a fascinating witness that evokes a strong emotional impact because it is reason of interaction with the environment and man. The fountain does not tell only the space, but it’s the soul of an era; it’s an architectural organism for the expression and formative determination of the built environment. The space defined by water in motion is real and virtual at the same time because the form is not marked by stone, it’s a dynamic configuration, a mixture of water, light and shadow, it is an unusual volume, a mobile and lively geometry that does not have a container.
In Turin, the fountains have an added value for the aggregation of citizens and the feelings and emotions revealed: two allegorical themes such as the time (existence, memory) represented by months, seasons, work and the nature (life, joy) shown with moving water, provide insight into the

urban environment in different ways and different levels: from the physical to the symbolic.

2. Water and its form

The water, the primary element in human life, has changed over time as the most different symbolism and the source has always been synonymous with the birth and life: water as the lifeblood of the world, water as energy, as a force of nature, as music and sound.
Next to the tree of life in paradise, according to the Bible, was also a source of life and youth, in every ancient mythology, from Indian to Greek, pours a fountain. All the literature popular in Europe tells the theme of miraculous waters that return the youth and vigor, tells the search for the refreshing fountain outside of paradise.
Marcello Fagiolo has investigated the meaning of water: water as the soul of the world, as life, as moral exhortation, as proof of the order of the mysterious divine plan, which obeys the perpetual cycle of water. In this regard, he writes, "the study of the Villa d'Este and other gardens of the sixteenth century could derive an actual phenomenology of water. Time to time in the fountains or ponds or waterways or in games or in the artifices we are faced with an endless series of characterizations: idyllic water, virginal water, malicious or sadistic water, erotic water, heroic water (architecture, drawings, sculptures aquatic evocations, disappearances, transformations, creative mimesis as an allegory of natural creation). Anguished water, dangerous water, deadly water, waterfall, ocean, flood."
The phenomenology of water is very large both in terms of symbolic in terms of technology since there are north and south, rich countries and poor countries of water who have learned to use sparingly the little water available to them.

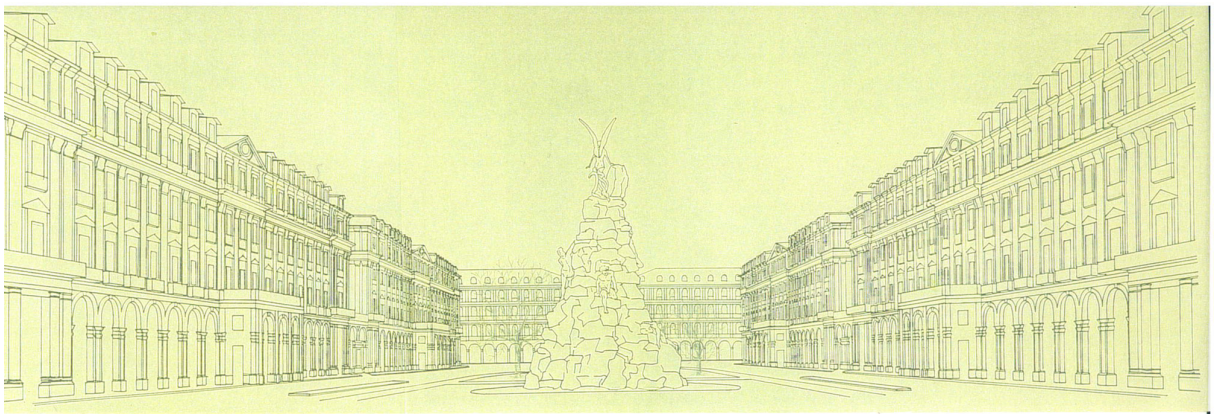

Fig. 1: The fountain of Frejus focal point of the square

The water system has three purposes: the visual, the vital and dynamic as that energy.
The *visual phenomenon* is influenced by the mass of water, that is by the flow rate into play but, in this case, it comes to consider water as a building material and as such shape it. Bernini, for example, is a master at playing the blades of water, that is the water to become an iridescent surface and bring up a mass much greater than it is in reality, as in the fountain in Piazza Navona. The water can be used as a small mass in the form of thin gush and multiplication gush can lead to forms of nebulization depending on the pressure in the game and then to type rainbow and iridescence phenomena. The water then acquires color or, on the contrary, can be played dropwise scanned on the musicality of the dripping.
The visuality water is linked to the *vitality* that it expresses, positive vitality that serves to irrigation or to spare parts of the fish ponds, then vitality concentrated in large masses or diluted, branched in a system of capillaries.
Water is also *energy*. With the action of water creating music and harmonies, but it also gives movement to statues, doors, animals: water is sound, it is music.
The music of the waters belonging to the phenomenon of nature, replacing the art. The beauty of nature is replaced by the artistic beauty, relegating the nature of water to pure occult force of the hydraulic machine, as in the mill. The water that is used for nourishment is also the "food" of art.
Is it useless to speak of a type of fountains, their myriad forms, their ability fantastic, the most famous cases in the Baroque Rome or iconography regarding Versailles.
Always fountains, energetic and blessed forces of nature, a symbol of life, a sign of civilization, a place of fantasy, games, dreams, with their song accompanied the man, giving him the most precious gift in the world. They have captured the water hidden under the ground and they have distributed providing

it to the public, and private sectors. With humility fountains have played many functions becoming troughs, sinks, tanks.



Fig. 2: The fountain of Months in the Park of Valentine.

Over the centuries, the simple source of classical antiquity has covered beauty, utilitarian function has added that aesthetics and turned into jewelry for decoration and beautification of urban centers integrating with the built environment and becoming a center of places of socialization. In art forms free and fantastic the fountain cheered squares, gardens, parks and villas.
The fountains become architectural organisms, have imitated the wealth of monuments, but the presence of water has lightened and these incomparable architectural compositions have reached the original and eloquent results.
These decorative buildings, ancient Greek and Roman times to the Middle Ages, from the Renaissance to the Baroque to the present day, have provided valuable examples in vivacity and variety of aspects, combining always, along with the coolness, their grace.
The fountain is an expression of harmony and grace. Whether you prevail bas-reliefs and statues, whether in urban or natural environment of a garden, modest or grand, it is treasure trove of beauty even when it finds its meaning in its essence, the water itself.



Fig. 3: The statues of the months as a corollary of the fountain of Months.
s
The fountains are the mark of distinction of a city. Here, the water that flows with force and shatters into jets turned on by sunlight and reflections at night, is a pretext and opportunity to highlight statues and statuary groups that reflect their image in vast stretches of water, which will abandon the game streams with waterfalls that roar and gushes gushing sudden. And watching them offer the viewer a stage, where the statues are the actors and the architecture is the background.
When the fountains are detached from the city life, they move away from the streets and squares and are placed in tight spaces or in the gardens, they renounce, in part, the effect and the monumentality and become naturalistic. They are inserted on lawns interspersed with blooming flowerbeds, among shady trees and avenues that recreate a reinvented, rich and stimulating nature.

The garden changes the image of the urban landscape and revives with its splashes of color, the gray of the city, awakening the memory of Eden where the water, source of life, is the most important factor. In this disputed the fountain loses its decorative aspect and focuses its expression in the human-nature relationship. Now the protagonist is water, is the main character in the mirror, where the jet breaks out bubbly and rises strongly, but it is also in a succession of superimposed basins where slips, slides, jumps and cascades producing a murmur, a sound pleasant it communicates with the surrounding nature.



Fig. 4: The fountain Angelica and its water games.

3. Fountains of Turin

The report describes the important aspect of the urban landscape formed by pieces of context, small identity full of life where the fountain is active element. The documentation collected with data and details is targeted to capture feelings and emotions that identify the quality of a living tissue to discover the pleasure and the *"atmosphere"* of places.

In Turin urban fountains located in the central area and built over three hundred years are ten and were designed and carried out using two allegorical themes. The time (existence, memory) represented by months, seasons, work. The nature (life, joy) shown with moving water.

The journey of exploration, which in this report will present five fountains, starts from the garden of the square Statute where stands the austere *Fountain of Frejus* (1871), a pyramid of blocks of gray stone punctuated by expressive white marble of the Titans defeated the work of man. Here the water flowing between the rocks, jumps and cascades in the large circular pool. The monument is dedicated to the realization of the Frejus tunnel, that is "the science that won the brute force" built for the Exposition of Turin of 1871 to celebrate the virtues of progress and the term of the work. The idea of the construction was of Count Marcello Panissera Veglio, president of the Albertina Academy of Fine Arts, who commissioned the construction of the sculptor Luigi Belli. It was certainly surprising to the citizens of Turin being in front of a living organism and original that broke the traditional figuration, more formal and rigid which tended only to emphasize the subject of the event. In this work is introduced a strong aesthetic dimension, with a big natural scenery in which it is combined lightness with gravity. The white and elegant lines of the Titans contrast with the dark and compact pyramid of square blocks on top of which stands a bronze winged figure: the Genius of Progress. The concept behind the science that won the conservatism results in the winged genius who writes in large letters the names of the authors of the project - Sommeiller, Grattoni, Grandis - and hovers on the mountain which is damaged by a lightning strike that overwhelms a group of Titans.The mythological symbolism connects to the historical event and is accompanied by water coming down from the rocks in small waterfalls and

marks the advance of knowledge in science. In the picturesque setting of Piazza Statute the fountain becomes the focal point of the new face of the urban landscape.

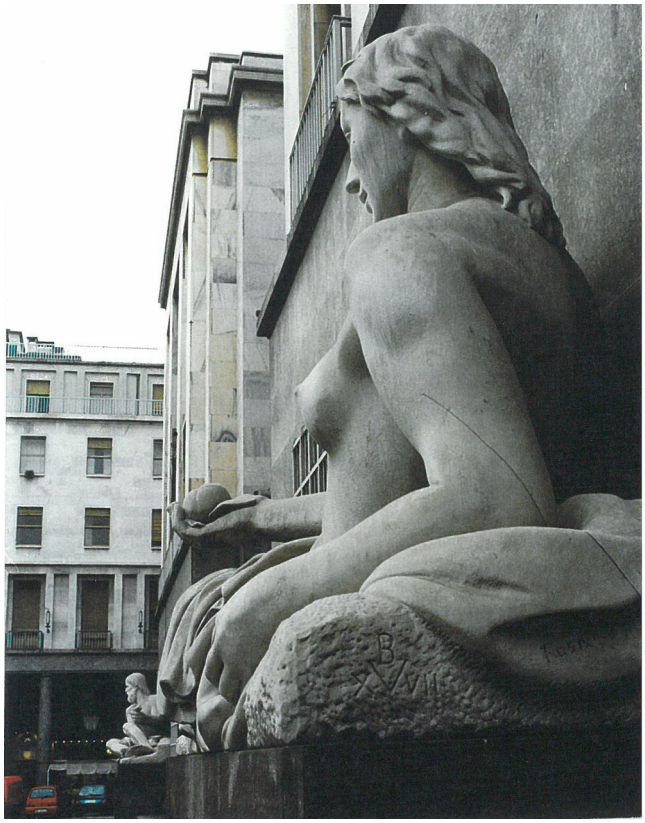

Fig. 5: The fountain of the rivers Po and Dora.

In the vast Valentino Park located along the Po river, surrounded by hills and the compact design of the buildings, was built for the National Exhibition of 1898, the *Fountain of Months*, with statues and statuary groups that are reflected in the tub. The fountain, built to a design by Carlo Ceppi during the celebrations for the fiftieth anniversary of the Albertine Statute, is one of the few works created for an exhibition and then exceptionally preserved. In neo-baroque style, the fountain is located on the border of the park, arranged in a semicircle on a gentle grassy slope; the statues are built around two tubs placed one above the other. The water falls from the upper vessel and form a cascade which feeds the lower tank. The statues of the twelve months are placed over the two lateral balustrades curves side. On the perimeter of the upper basin are arranged complex of statues representing the four waterways of the province of Turin: Po, Dora, the three Sture and Sangone. These groups look toward the great basin below decorated with shells and niches. The water flows, falls from the shells, gushing by the hidden fountains and by boulders that rise from the lower basin, bursting with two jets of water falling high with thousands of revelers iridescence. The concept of set, namely the representation of Piedmont rivers alludes to the Fountain of the Four Rivers by Bernini in Piazza Navona in Rome. The secondary idea of months harmonizes well with the first so that the twelve statues are arranged in a semicircle and on these dominate the four main figures.
The harmonious square Solferino includes simple tree-lined garden in which stands the impressive *Angelic Fountain* built in 1930. In the large tank reverberate the imposing statuary groups on the season enlivened by the musicality of moving water originated from seventy jets. The square, rectangular in shape, is characterized by the presence of the double masting in two rows which starts from the top of the square. The volumetric shape and capacity of the square is articulated on relations of width and length of ¼ and the width and height of 2/1 that determine a sense of unity of the whole. The fountain was built to locate a point of centrality of urban space, a meeting point for people who enjoy the square. The work was done by Giovanni Riva, who created a magnificent work that amplifies the scenic effect and becomes the bottom, where the water goes on stage. The geometric virtual scheme of the fountain is trapezoidal shape and supports the construction formed by sculptural blocks whose height increases progressively from outside towards the center, thus forming a pyramid in the center of the jet. The allegorical theme is dedicated to the life cycle and winds through the three tubs of water with a round shape placed at different levels. The statuary groups, divided into male and

female figures, are accompanied by the repertoire of flowers and fruits that symbolize the passing of the seasons and the periods in which they split the man's life. The fountain is, on the whole, a vision of beauty and harmonious living. The water games in their different design and in their natural musicality, give the work a soul and a voice.



Fig. 6: The fountain of Venus in the architectural context.

In Via Roma rebuilt to a design by Piacentini (1937) in Piazza CLN, behind the two baroque churches overlooking Piazza San Carlo, were placed two fountains named after *the river Po and Dora*. According to the tank raised, the location and the small size, the fountains are an opportunity to highlight the regular appearance of the architectural composition of the new square and animate the symmetric and rigorous space. The plasticity of the two fountains creates a point of interest that attracts attention and highlights, with the sound of water that is released into the air and resonates, the harmony lean and severe of prospectuses. The problem of solving the urban node behind the two churches overlooking Piazza San Carlo was one of the most difficult tasks had to face Piacentini in the redesign of Via Roma. The two sides were formed by high walls, completely devoid of ornament and aesthetically ugly. Piacentini placed against the walls two symmetrical fountains with a theme closely linked to the city: the Po and Dora, the two rivers that run through the city of Turin. The fountains are made of a linear and geometric marble base, in style with the architecture that dominates the entire street where there are two important marble sculptures representing the river Po and Dora. From a slit of the crankcase flows, as a source, the water that is collected by a rectangular tank with slightly rounded corners. Both fountains, rich in monuments, fit perfectly in the space of square and very well solve the aesthetic problem of the background of the first section of the new route Rome.
The path along the via Arcivescovado welcomed, near the Palace of Toro Assicurazioni, the fountain inspired by the *Birth of Venus*, built in 1948. The fountain is located in the courtyard of a building, against a wall of polished stone, and consists of a rectangular tank topped by three sculptural elements representing Venus, a naiad and a triton. The main element is the statue of Venus at the center of the fountain; at its foot is placed a marine animal from whose nostrils flow water jets. Its position in relation to the complex statuary, gives full supremacy in the center of the scene.

4. Final synthesis

The fountains of Turin object of study summarize many different aspects to their historical and cultural, iconic and formal value; pleasure and utility come together in the collective sensibility of memory. They are usually placed in public spaces, that is, meeting and involvement places, places where you develop the communication; also they do not show signs of monumental and are not architectural fragments, detached environment around them
The study took into account the urban environment perceived in different ways and on different levels: from the physical to the simboli. The exploration of the fountains have identified the mechanism of the scenario of the interrelationship between the art object and the living environment. The usual classification distinguishes the types of fountains in the form I thought was limiting and does not accord with the nature of the fountains that I have analyzed so summed up: be, appear, disappear. I then expanded the horizon of the investigation by creating a link between the traditional analysis and

what is believed closer to the iconic character of object that highlights the excitement, the sense of involvement with the urban landscape.
The thematic content of the classification is divided into two parts:
- the impact on the environment in which is a fountain;
- the architectural structure of the fountain, whose identity has been taken by the selection and combination of the various components of which it consists.
The first part is illustrated the urban space in which the individual lives and acts with the fountain. The location is intended as a point of reference and in relation to the distance from surrounding structures. The configuration of the fountain interested the elements and ornamentation of the tub and interpreted by groups of statues and encumbrance volumetric. The second part concerns the symbolism of architecture, the concrete part of the representation formed by the "body" that is, the solid material which support touch of the "spirit" that is, the water in the dynamics of jets, sprays, waterfalls.
The fountain in the collective imagination continues over time to be a prominent and reference element of the urban landscape. It is an effigy able to create a center of reference for the calls to the joy and connection with nature. It helps orientation in the urban space, joins the surroundings and the contrast between the built and the movement of water creates different images. It is the result of the optimization of a set itself, but combined with the environment that surrounds it.
These architectural artifacts deserve careful consideration for the implications they have on urban morphology. The space that they generate in urban volume produces an interrelationship between urban form, content and the surrounding that is strong urban connotation. The fountain is a precious object, a distinctive element of urban space, is the historical memory of the face of a place.

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Historic gardens as part of the National Cultural Heritage – a short view on a garden history in Bratislava, the Slovak Republic

Tamara REHÁČKOVÁ

Department of Landscape and Garden architecture, Faculty of Architecture Slovak, University of Technology in Bratislava, Bratislava, Slovak Republic
rehackova@fa.stuba.sk

Abstract

Historic parks represent specific monuments of cultural heritage. The Florence Charter specifies their distinctiveness in more detail. The document defines a historic garden as "an architectural composition whose constituents are primarily vegetal and therefore living, which means that they are perishable and renewable". Currently, there are 400 sites of historic parks and gardens in Slovakia recorded as national cultural monuments. The most historic gardens are situated in Bratislava, the capital city of Slovakia. In the current urban structure of Bratislava, historic parks and gardens have been preserved in two basic ways. The first category is represented by green areas which have been preserved during the expansion of urban structure, later they become protected as historic gardens and parks and have preserved their original size up to present. On the other side, there are areas which have been preserved in part and are only fragments of other anonymous sites. This paper presents the results of research which focuses at the historic parks and gardens development in Bratislava since the beginning of 13th century up to present, and summarizes basic knowledge and suggested measures to be taken in the selected historic gardens and parks.

Keywords: historic, garden, park, Bratislava

1. Introduction and overview of the issues

Historic parks and gardens represent an important part of the national cultural heritage in Slovakia. Despite this, we can say that currently their condition is not in ideal, and many gardens and parks are neglected and deteriorating. What is worse, some of them have already vanished due to unfavourable development in society. It was caused by development in the society after World War II in Slovakia; during the time, historic sites had been quite often used inappropriately and many buildings, as well as natural features, were destroyed. In many cases, the historic parks and gardens were integrated into cities and very often have served recreational purposes. Local residents therefore started incorporating in parks their requirements on functions and amenities, e.g. children's playgrounds, which is not always in concord with historic character of an area. Some historic parks are a matter of interest of the nature and landscape protection bodies and their approach to the preservation clashes the heritage protection in some cases.

Historic park and garden sites in the Slovak Republic are divided into three categories according to legal protection:

- protected sites governed by the Act No. 49/2002 on Cultural Heritage Protection as national cultural heritage sites
- protected sites governed by the Act No. 543/2002 on Nature and Landscape Protection as protected areas
- sites with no legal protection.

Based on the data from The Monuments Board of the Slovak Republic, there are 389 objects of historic parks and gardens – national cultural sites – in Slovakia to 1st January 2012 [1]. According to

the information of the National List of Significantly Protected Landscapes of the Slovak Republic [2], there are 44 historic parks governed by the Act No. 543/2002 on the Nature and Landscape Protection in the category of ´protected area´. The law above defines the protected area as *´an area, usually up to a 1,000 ha large, with existence of natural habitats of European importance or a natural habitat of national importance, or containing a species natural habitat of European importance or a species natural habitat of national importance, and where favourable condition of such natural habitats depends on human cultivation or an area with permanent existence of protected animal species, plants, minerals and fossils, areas for natural research and cultural and educational purposes, including natural areas designed by human activity´* [3] . Historic parks can be understood as "areas of nature partly designed by human cultivation" even though many of them become also "areas with permanent existence of protected species", either plants or animals.

From methodology point of view, it can be difficult to align the nature protection interests with the preservation of architectural composition of historical gardens or parks, which contains (as it is stated in the Article 4 of the Florence Charter) the following: plans and topography; vegetation, including its species, proportions, colour schemes, spacing and respective heights of individual species; structural and decorative features; running and still water reflecting the sky [4].

The article surveys the development of historic gardens in Bratislava in the context of historical development in Slovakia. It presents the research results focusing on the identification and evaluation of historic parks and gardens within the city, and suggests measures which need to be taken to improve their condition.

2. The development of garden design in Bratislava

The first attempts of garden design in Bratislava dates back to the 13th century, when the first monastery estate with gardens were built. During the 700 years, many gardens and parks were established and in varied forms have become inseparable part of the city's image which influences the colour schemes and texture of the landscape and conditions their changeability during individual seasons in the year.

Gardens have been established and declined, and have altered in current trends. Alike many other historic sites, gardens very often contain various layers which represent individual stages of development. Therefore historic gardens and other historic parks and landscape are being paid a lot of attention not only by the public but also by the professionals. As Tomaško [5] noted, thanks to geographical conditions and political importance of Bratislava in the past, the historic parks and gardens in Bratislava rank among the best in Slovakia.

Bratislava was established on one of the most important geographic and strategic sites on the central flow of the Danube. In the 9th century, fortified castle with a market settlement below started to be built. The original status of the town started in 1291 when the king Ondrej III. (Andrew III of Hungary) granted Bratislava town privileges which commenced its administration, law courts, economic power and architectural development [6]. During the second half of the 13th century, the town grew substantially and present-day Hlavné námestie (Main square) become the city centre. Moreover, medieval towns used to be protected by fortification walls which did not allow much space for large scale gardens. For five hundred years, the town walls, which started to be built in 1297 by the order of Ondrej III, prevented urban development.

Majority of houses in Bratislava were made of wood or were half-timbered up to the 15th century. The streets were not enclosed; town houses were detached structures situated near agricultural buildings with gardens. A free standing development changed into a row-building system and wooden houses were replaced by brickwork structures. Larger gardens belonged to monastery estates, town palaces, and privileged citizens' houses, e.g. the gardens at the back of canonic houses. [6] [7] [8]

Bratislava become the capital of the Kingdom Of Hungary in 1536, and seven years later it become also an archbishop seat. Many nobility and influential personalities, who started building their mansions, moved to Bratislava to seek hideaway from the threat of Turkish (Ottoman) raids. Following the style of palaces and garden design in Vienna, Bratislava soon had some extraordinary gardens. Original borders of the medieval core of the city remained untouched and the centre slowly started developing to the east and northeast.

A considerable building development started as late as in the 18th century when the empress Maria Theresa initiated the demolition of town walls in 1775. It allowed for new development of the city. As Vodrážka notes [9], during the Baroque period, summer residences with gardens and park landscaping were built. It created a contrast between dense structure of urban development inside the palisade defence system and the newly built countryside residences. Many extensive landscape schemes were also established behind the city borders during this period.

The development of garden design in Bratislava (as well as at the whole territory of Slovakia) is specific in some respect. It is closely connected with political situation in the county during its historical development. During the 16th and 17th centuries, the era of Turkish rule over a large part of the present-day Slovakia – formerly a part of Hungary (the Austro-Hungarian Monarchy) – lasted for 150 years. After the Kingdom of Hungary had been divided into three parts, the part of present-day Slovakia and the west of Hungary, The Kingdom of Hungary, was taken over by Ferdinand I of Habsburg. When Bratislava become the capital and crowning town, it gained bigger political influence on one hand, but on the other the expenses connected with the protection against the Turkish attacks were very high and not much money was left for town development. After the Turkish attacks had finished (after 1699), the town experienced an immediate development. However the town lost its position as the capital city of Kingdom of Hungary in 1784 and the development slowed down again. These events influenced also the garden design development because at the time it took longer new ideas and development to come to the Slovak territories, in comparison with other countries.

Historic parks and gardens were preserved in two basic forms in the urban structure of Bratislava. The first is represented by landscape areas which have retained in the development of urban structure and have been preserved as historic gardens and parks while retaining their original size up to present. The other kind is represented by sites where only fragments of original gardens have been preserved and are only the anonymous parts of other sites.

3. Methodology and research methods

A combination of several methodical approaches was used in the research of historic parks and gardens in Bratislava. The early stage included a review of existing literary evidence which could provide information on historic parks and gardens. Despite a high number of historic gardens on the territory of Bratislava, literary documents do not contain much information, especially those of period origin. Even contemporary bibliography is scarce, the research of historical landscape is not really systematic and the data is rather fragmented. Based on the research materials, it is necessary to mention the most interesting at the least.

The oldest written work on gardens at the Bratislava territory is considered to be a document by J. Lippay called *Possoni Kert* (Bratislava's Garden), which was published in 1664. The work provides general information on gardening as well as factual data on layouts and species division in one of the most important gardens within the Kingdom of Hungary, so called the Lippay Garden. Precious period information on gardens in Bratislava is also part of the work of Matej Bell (24th March 1684, Očová-29th August 1749, Bratislava) *Notitia Hungariae novae histrico geogaphica* (Historical and geographical information on contemporary Hungary). The work contains descriptions of the Upper Hungary provinces. The first and one half of the second volumes, published in Vienna in 1736, deal with the Bratislava province. Similar work dates back to the same period – the descriptions of Bratislava's gardens preserved in the work of Gottfried von Rotenstein, a traveller and explorer, the author of travel book *Reisen durch einen Theil des Königreichs Ungarn im Jahr 1763 und folgenden Jahren*. Some descriptions of gardens, containing plan of the city and its surroundings, can also be found in the work of Ján Matej Korabinský (23rd February 1745, Prešov – 23rd Jun 1811, Bratislava) called *Beschreibung der königlich ungarischen Haupt-, Frey- und Krönungstadt Pressburg* (Description of royal Hungarian capital free and crowning town of Bratislava/Pressburg).

Csákos [10] was also a devotee of the history of gardening in Bratislava. He described development of ornamental gardens, which were inspired by aristocratic gardens in Vienna, in the context of historical events. More information on some historic gardens can be found also in the publications of Faust [11] [12]. Complete works on gardens are included in the publication of Raymund Rapaics called *Magyar kertek: A kertművészet Magyarországon* (Hungarian parks, gardening art in Hungary) [13]. It was published in 1940 and also contains descriptions of the most important gardens in Bratislava.

The most significant and elaborative selection of materials which were used during the research were maps dating back to the 18th and 19th centuries. Based on the study of map data, which were very detailed, it was possible to identify layouts of gardens and trace their development (figure 1 and 2 show examples). The research sources included maps which depicted the whole area of Bratislava in line with the current artistic practice: the E. Fritsch map of 1753; the M. Marquart map of 1764; the J. L. Neyder map of 1820 and its variant by A. Lanz from 1820; the F. Koffer map of 1787 and cadastral maps from 1894 to 1895.

Further materials include map fragments, e.g. a section of a Bratislava plan by unknown author from 1780, a map by A. von Krey from 1760, a map of the Danube mapping of 1823-1845, a map of the Austro-Hungarian borderline by Walter and Cronister from 1754, a garden plan of Bratislava castle from 1770, a plan of former Heindl garden by E. Fritsch from 1768, the original layout of the Park of Janko Kráľ (Sad Janka Kráľa) from 1776 and the map of the Park of Janko Kráľ from 1832.

Very valuable research sources were also various illustrations, especially historic vedute (cityscape paintings/prints). Vedute show a view of a landscape or a town in a wide scope. By researching the veduete, a lot of valuable information on historic gardens and their artistic depiction has been gathered because veduete's artistic expression is topographically exact.

From the point of view of gathering of information, the following belong among the most important copper engravings: The View on Bratislava during the coronation of Maximilian II from 1563 (wood panel by H. Mayer); Bratislava from the south from 1593 (copper engraving by F. Hogenberg); Bratislava from the north from 1663 (copper engraving by L. Schnitzer after J. Ledent); the Church and monastery of Brothers of Mercy from 1735 (copper engraving by M. Engelbrecht after F. B. Werner); the Garden on the grounds of the summer archbishop palace from 1735 (copper engraving by M. Engelbrecht after F. B. Werner); Bratislava from the north from 1735 (copper engraving by A. Kaltschmieda after S. Mikovíny); Bratislava from the north from the 1740s (copper engraving by F. B. Werner, Th. Scheffler and J. G. Pintz); Bratislava from the north from about 1750 (copper engraving by J. P. Wolf after F. B. Werner); Braunecker's mansion from about 1790 (etching and copper engraving by I. Müller and G. Prixner). The more modern illustrations used in the research include mainly historic photographs and postcards, the oldest one dating from 1880.
The on-site research mainly focused on evaluation of existing sites and on identification of nonexistent sites of historic parks and gardens and on compilation of photographs.

Based on the comparison of current state of sites and their historic development, the historic gardens and parks were divided into categories according their current condition:

1. preserved site of historic parks and gardens in original historic style – a site whose historic state has been preserved; it also contains sites which had been restored in various styles but later have been rebuilt back to the original state
2. a preserved historic parks and gardens site of the original size – a site which still takes up its original area but its current shape does not relate to the original
3. preserved fragment of a historic parks and gardens site – a site has not been preserved as a whole, but some fragments have been preserved, either small or larger green areas
4. lost historic parks and gardens site – a site which has not been preserved, or only partly but without greenery.

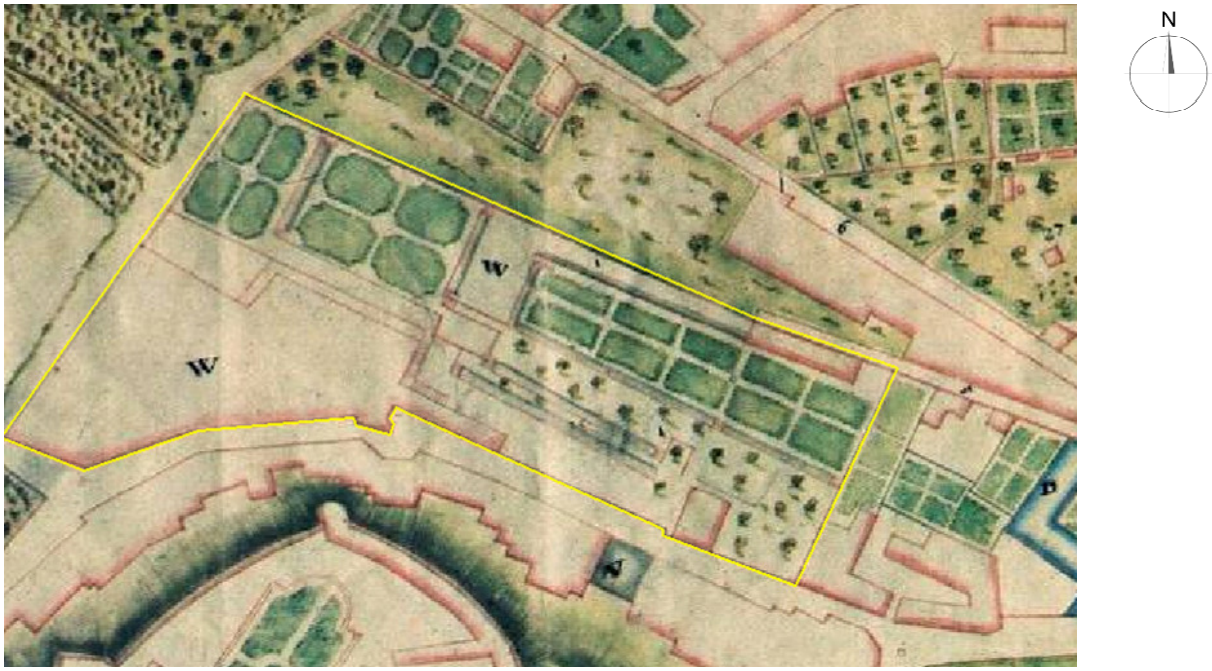

Fig. 1: The Pálffy Garden on the map by M. Marquart from 1765. The garden had a complex system of terraces as its site was rather steep. The height difference in the garden itself was as much as 30 meters. Four terraces linked with staircases were formed on the south-east and three of the terraces were planted as ornamental gardens. The fourth one was a connecting space linking the two perpendicular terrace systems. Five terraces which were landscaped as a fruit tree orchard were situated on the north of the palace.

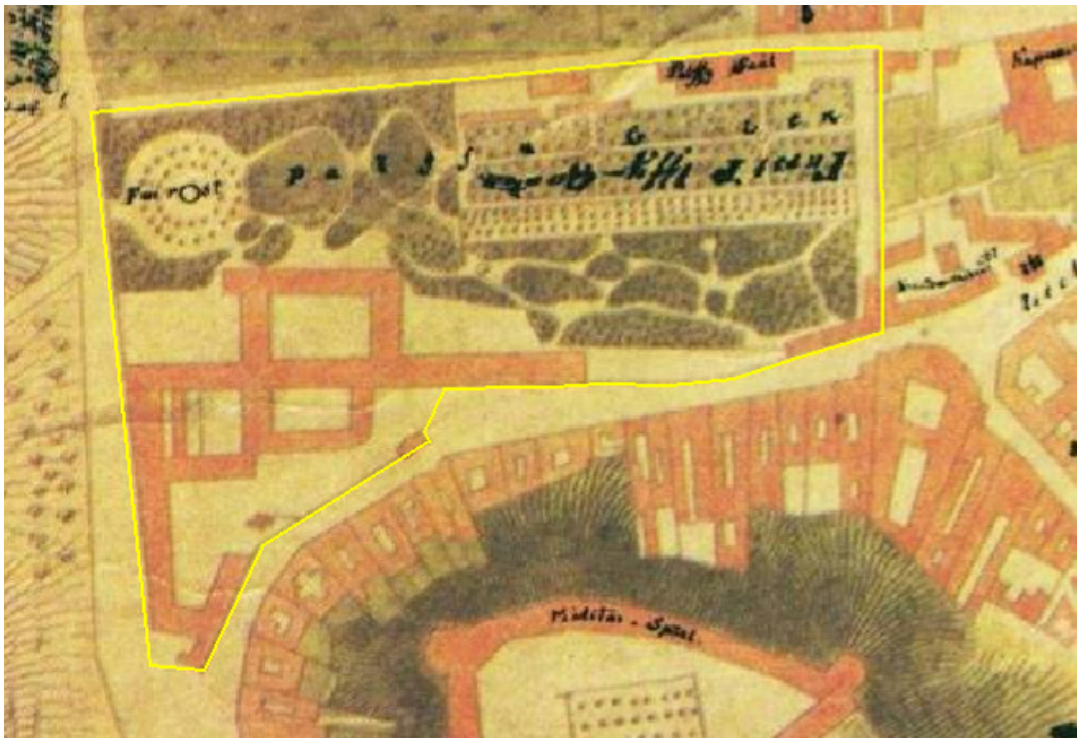

Fig. 2: The Pálffy Garden on the map by L. Neyder from 1820. In comparison with the map of 1765, the axial layout of the garden has been preserved, but the original third lowest terrace was altered in a regular and most probably baroque style. The arrangement of the rest of the site – an open space – was influenced by romantic influences: no lines can be seen on the layout plan. The garden is accessible by paths only. They wind up in soft lines from the lowest point in the south-east corner up to the highest part of the garden on the west edge.

It was impossible to follow a standard classification of gardens according to chronological order of individual styles due to specific historic development and changes in the society. To make the classification clearer, a typology which respects individual development and thus makes it special in comparison with the others is as follows:

- Medieval gardens
- Monastery gardens
- Castle gardens
- Extensive palaces gardens
- Smaller Renaissance and Baroque gardens
- English landscape parks (gardens)
- Designed landscapes.

As part of the final part of the research, an overall evaluation of research results on historic parks and gardens was carried out.

4. Integrity evaluation of historic parks and gardens sites

As the authors Šubr, Šubrová [14] stated, existing historic parks can be divided in two categories of origin:

- original parks and gardens of monarchs, aristocracy, townhouses, monasteries and cemeteries (open to the public) which were part of the urban plan at various periods and from various reasons
- public urban parks built for recreational purposes in the 18th, and more often in the 19th centuries.

During the research, focusing on the sites of historic parks and gardens in Bratislava, thirty sites have been identified and evaluated; two of them can be classified as urban public parks established during the 18th and/or 19th centuries. Twenty four sites are gardens of monarchs, aristocracy, townhouses and monasteries, and four sites are extensive designed landscapes.

Majority of the twenty four evaluated historic gardens are located in the central part of the town – the Old Town city district (Staré Mesto). One English landscape garden is also situated there – the Horský (The Wood) Park, which used to be the north-west border of the town. The other six sites are located in other six Bratislava districts.

Importance of some garden arrangements in the urban structure is fostered by the fact that they got legislative protection under the Act No 49/2002 on Cultural Heritage Protection (listed as national cultural monument), and/or under the Act No 543/2002 on Nature and Landscape protection, they were listed as protected areas.

Table 1 shows the list of surveyed sites, their condition and suggested measures. The years indicate the first written record (if existent), or refer to the year when a map show a site for the first time. In case of monastery gardens, the year of origin relates to the year when a monastery estate was established. Legislative protection is labelled as "§ NCM" in case it is a national cultural monument; if a site is protected area it is labelled as "§ PA".

Table 1: Surveyed sites of the historic parks and gardens in Bratislava, their current condition and suggested measures

Name of site	Year of foundation	Current condition	Suggested measures
Medieval gardens			
Prepoštská Garden (Garden around Provost house)	1311	extant fragment of the historic parks and gardens site	partial restoration in historizing style
Kráľovská Garden (Royal garden)	1388	lost site of historic parks and gardens	no restoration possible
Monastery gardens			
Garden of Order of Friars Minor	1271	extant fragment of the historic parks and gardens site after a historizing reconstruction	maintenance; or a restoration respecting historic character of the site
Garden of the Order of Saint Clare	1297	extant historic parks and gardens site in a historizing style of an original size	maintenance; or a restoration respecting historic character of the site
Monastery Garden of the Order of St. Ursula	1676	lost site of historic parks and gardens	restoration possible in a historizing style
Monastery Garden of the Brothers of Mercy	1669	extant fragment of a historic parks and gardens site after a historizing reconstruction	maintenance; or a restoration respecting historic character of the site
Garden of the Order of Capuchin Friars Minor	1711	extant fragment of historic parks and gardens site	a restoration respecting historic character of the site
Monastery Garden of the Order of the Sisters of St Elizabeth	1742	extant fragment of historic parks and gardens site	maintenance; or a restoration respecting historic character of the site
Monastery Garden of the Sisters of Notre Dame de Namur	1754	lost site of historic parks and gardens	restoration impossible
Castle gardens			
Veľká (Big) Garden	first half of the 15th cent.	an extant historic parks and gardens site of an original size	a baroque style reconstruction
Malá (Small) Garden	first half of the 15th cent.	an extant historic parks and gardens site of an original size	a restoration respecting historic character of the site
Južná (South) Garden	first half of the 15th cent.	a extant historic parks and gardens site of an original size	a restoration respecting historic character of the site
Large palace gardens			
The Pállfy Garden	1660 - 1663	extant fragment of historic parks and gardens site	§ NCM (the garden wing of the palace) restoration impossible
The Lippay Garden	1553 - 1568	extant fragment of historic parks and gardens site	§ NCM a restoration respecting

Name of site	Year of foundation	Current condition	Suggested measures
			historic character of the site
The Wesselény Garden	1650s	extant fragment of historic parks and gardens site	restoration impossible
The Grassalkovich Garden	1756-1760	extant fragment of historic parks and gardens site after a reconstruction	§ NCM maintenance, or a partial reconstruction
Medická [Medic] Garden	1770	extant fragment of historic parks and gardens site after a reconstruction	§ NCM maintenance, or a partial reconstruction
The Erdödy Garden	1720-1730	extant fragment of historic parks and gardens site	§ NCM a restoration respecting historic character of the site
Smaller renaissance and baroque gardens			
The Purkicher Garden	second half of the 16th cent.	lost site of historic parks and gardens	restoration impossible
The Heindl Garden (The Slubek Garden)	1650	extant fragment of historic parks and gardens site	a restoration respecting historic character of the site
The Rayger Garden	1670	lost site of historic parks and gardens	restoration impossible
The Palace de Pauli Garden	1775-1776	a extant historic parks and gardens site of an original size	maintenance
Garden by the Illésházy Palace	1640s	extant fragment of historic parks and gardens site – part of other site	maintenance, or partial reconstruction
Garden by the Braunecker Mansion	1780	lost site of historic parks and gardens	restoration impossible
English landscape parks (gardens)			
The Janko Kráľ Park	1776	an extant historic parks and gardens site of an original size	§ NCM maintenance or partial reconstruction
Rusovce Mansion Garden	1782-1784	an extant historic parks and gardens site of an original size	§ NCM maintenance or partial reconstruction
Horský (The Wood) Park	1870	an extant historic parks and gardens site of an original size	§ PA maintenance or partial reconstruction
Designed landscapes			
Bažantnica Park (Pheasant hunting ground) in Jarovce	1st half of the 18th cent.	an extant historic parks and gardens site of an original size	§ NCM, § PA maintenance or partial reconstruction
The Pálffy game preserve in Vlčie hrdlo	1782-1784	lost site of historic parks and gardens	§ PA (part) restoration impossible
The Archbishop game preserve in Podunajské Biskupice	1782-1784	lost site of historic parks and gardens	§ PA (part) restoration impossible
Železná studnička Park	1821	an extant historic parks and gardens site of an original size	maintenance

The plan of the historic parks and gardens sites in the central city zone of Bratislava is pictured in figure 3, which depicts individual gardens according the above listed categories; they are compared to the maps dating back to the 2nd half of the 18th century.

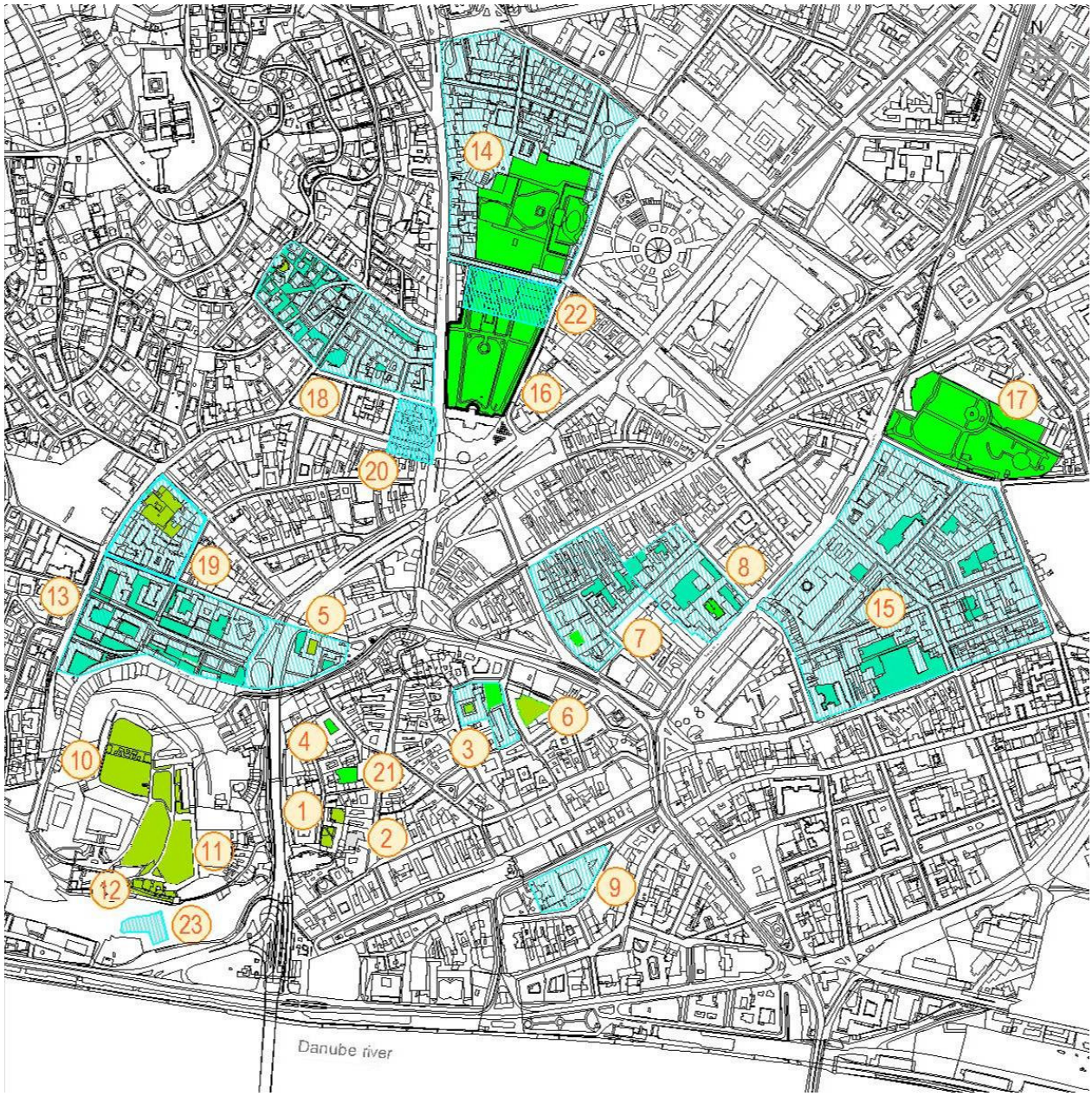

Fig. 3: Location of the surveyed historic gardens and parks sites in the central zone of the town.

preserved site of historic parks and gardens in original historic style

preserved historic parks and gardens site of the original size

preserved fragment of a historic parks and gardens site

lost historic parks and gardens site

projection of the object according to the state in the mid-18th century

12 number of the object

1 Garden around Provost House; **2** Royal garden; **3** Garden of Order of Friars Minor; **4** Garden of the Order of Saint Clare; **5** Garden of the Order of Capuchin Friars Minor; **6** Monastery Garden of the Order of St. Ursula; **7** Monastery Garden of the Brothers of Mercy; **8** Monastery Garden of the Order of the Sisters of St Elizabeth; **9** Monastery Garden of the Sisters of Notre Dame de Namur; **10** Big Castle Garden; **11** Small Castle Garden; **12** South Castle Garden; **13** The Pállfy Garden; **14** The Lippay Garden; **15** The Wesselény Garden; **16** The Grassalkovich Garden; **17** Medic Garden; **18** The Erdödy Garden; **19** The Heindl Garden (The Slubek Garden); **20** The Rayger Garden; **21** The Palace de Pauli Garden; **22** Garden by the Illésházy Palace; **23** Garden by the Braunecker Mansion

5. Some issues on restoration and management of historic parks and gardens in Bratislava

Among the most significant historic parks and gardens sites in Bratislava belong the Medic Garden and The Grassalkovich Garden. Both were established at the end of the 18th century as a display of baroque palace gardens. During the centuries, they have been changing as well as their owners have been varying. By the end of the 1980s, both gardens had been devastated and had no historic value. The Medic Garden was reconstructed between 1985 and 1988 with its historic layout being partly preserved. The lawn of the central parterre is bordered by low hedges; two lime trees alleys lead along the principal garden axis. The part of the garden, which is in line with the palace, is separated by a support wall with a metal fence. Some new garden features were added as part of the reconstruction: a new fountain, flower vases, lighting and playground for children. Restoration of the Medic Garden improved the quality of the garden and made an important change to the garden when compared to the condition before reconstruction. However, when looking back, it is necessary to mention that the reconstruction also proved some failings.

The layout plan has axial division with the main axis starting at the central point of the palace and respecting the original symmetry of the parterre, which was bounded by a semi-arched tree alley. The restoration did not solve the problem of the principal axis (280m long) – when looking at the palace form the garden, the visual connection is interrupted by the overgrown yew trees, which inappropriately block out almost the majority of the Aspremont palace. The view from the palace towards the garden is not focused; it disappears in the lime trees branches thus concealing the quite large size of the garden.

The upper terrace of the garden, which is directly linked with the palace, has not been altered; it contains a clump of overgrown yew trees and a modern fountain set in an original baroque basin. The ornamental feature of the central parterre, as well as the garden outer borders is in a derelict condition. During the reconstruction, new features, which are not authentic, were added; they include: children's playground, the garden furniture, and garden artefacts such as the domineering Swan Fountain placed on the principal composition axis – the top of parterre bend. Currently, The Medic Garden is not in good condition and it requires a partial restoration. Some features are in derelict condition, especially the walks and garden furniture. The most important drawbacks of the layout plan, the beginning and the ending of the main composition axis of the garden, needs to be solved. The eastern part also requires a new arrangement – individual features lack mutual interaction not only among themselves but also with the historic context of the space.

In 1998, The Grassakovich Garden was reconstructed in the 1780 form. Among others, an oval parterre lawn was restored; it was bordered by walks and flower beds along with ceramic vases. After establishing the Slovak Republic in 1993, the garden became a part of the president palace complex, originally the Grassalkovich Palace. The garden remained public except a 50 metre wide band adjacent to the palace, which is separated from the rest of the garden by a glass wall.

Currently the garden is in a fairy good condition and belongs among the most well maintained green spaces in Bratislava. Still, from the restoration point of view, there are some drawbacks or problems. From the compositional point of view, the main axis (230 metres long) does not have a visual focus. In the original plan, the central space was separated by a two line alley form the rest of the space, and the view from the palace focused at the alley and the adjacent Archbishop's garden. Today the view from the palaces ends on a wall which borders the garden and Spojná Street. A fountain which had been built there before the restoration happened to be also on the principal compositional axis. At the time the garden was being reconstructed, there was a debate over the suitability of the fountain in a baroque garden; in the end, the fountain remained set in the garden.

Some controversy arises also from the restoration of a fruit tree orchard as a reminiscent of the garden's history. During reconstruction, five kinds of alternating species of decorative apple trees were planted. The bedding of the tree trunks was inappropriate therefore the trees grew to lean, and were supported only by untreated wooden beams. As very inappropriate are considered the wooden playground elements for children, which have been installed there in the past years. The garden's administrator, the Old Town of Bratislava City District, is obviously trying to compensate for a lack of children's playgrounds in the city centre.

In 2010 the Garden of the Order of Capuchin Friars Minor was opened to the town's visitors and residents, with limited opening hours. The garden is laid out on the roof of and underground parking garage, where the garden of Franciscan monastery had been before. The garden belongs to the oldest gardens in Bratislava. At the end of the 1990s, underground parking was built and the above ground park was renovated, partly following the authentic plans. The most recent layout divides the area in four parts separated by perpendicular walks (oriented north – south and east – west); in the centre they form a circular space.

The fountain/well which should most probably represent a fountain with “refreshing mountain spring water” as was referred to in some historic documents is set in a rather eccentric position. The current layout had to take into account technical equipment of the underground garage which extends above ground level as high as 2 metres. The symmetry of the original layout was preserved but the symmetry of spatial expression has been destroyed. Planting solution is simple – the perimeter is lined by maple trees with compact spherical tree crowns. The parterre is grassed but the hedges are inappropriate and the yew trees are too big for such a small and intimate space.

6. Conclusion

Historic parks and gardens are a significant testimony of the time when they were established. In their maintenance and reconstruction, as Tomaško and Hrubík [15] pointed out, the fact that their original style had been lost should not be misused – their maintenance should try to follow their original style. We should perceive them in the historic context of events and in accordance with the Florence Charter and respect their architectural composition: plans and topography; vegetation, including its species, proportions, colour schemes, spacing and respective heights of individual species; structural and decorative features; running and still water as well as greenery which contains a variety of plants, proportions, colouring, layout and mutual proportion of individual tree species. Historic parks and gardens sites deserve our attention; besides others, they need a special care also because they are highly vulnerable.

Preservation and restoration of historic parks and gardens in the urban structure of a town is a great challenge and brings also high hopes, which, very often remain unfulfilled or their accomplishment is complicated by diverse interests and by the understanding of their function and role of the historic parks and gardens. It is necessary to further develop the positive sides, to be critical to the drawbacks and continuously start overcoming them.

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HERITAGE ARCHITECTURE LANDESIGN
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THE ORIGIN OF THE CONSERVATION OF THE 20TH CENTURY ARCHITECTURE IN FRANCE: THE ACTION OF ANDRE MALRAUX IN FAVOUR OF LE CORBUSIER'S WORK

Antonella VERSACI,[1] Alessio CARDACI[2]
(1) Faculty of Engineering, Architecture and Motor Sciences, University KORE of Enna, E-mail antonella.versaci@unikore.it
(2) Department of Engineering, University of Bergamo, E-mail alessio.cardaci@unibg.it

Abstract
The protection of 20th century architecture in France is a relatively recent activity. Apart from one exception, the first safeguarding actions on buildings built in the 1900's, date back to the late fifties of last century. Actually, it is only when the general de Gaulle came to power and a Ministry of Cultural Affairs in 1959 was created for André Malraux, that a series of measures in favour of cultural heritage were taken and the notion of monument widened to less restrictive and more modern formulations. In 1964, the Minister Malraux also created the General inventory of monuments and art treasures of France. At its express request, the selection criteria and especially the time range of the monuments susceptible to be included in the list was extended. However, when Malraux asked the responsible committee, to proceed with the *classement* of several important works of modern architecture, only few of them were accepted. The action of Malraux was, nevertheless, most effective, though certainly not without difficulties, for what concerned Le Corbusier's work. In particular, Villa Savoye's inclusion among the historical monuments of the country in 1965 preserved this exceptional building from demolition, contributing to the overall recognition of its author's work. Focusing on this case study, this paper will examine the issue of the conservation of modern architecture in France.

Keywords: Modern Architecture, conservation, Le Corbusier, André Malraux, France

1. Introduction
The process of recognition of 20th century architecture as a heritage is still a highly controversial and debated issue, both from the point of view of theoretical orientations and of the operational practices. Despite the many actions carried out by public entities and private associations and the increasing attention devoted to the issue by intellectuals, the preservation of modern architecture - referring with this term not only to the Modern Movement but more broadly "*to all architectures that use innovative construction materials instead of traditional or that produces and uses traditional materials in an innovative way*" [1] - still seems to remain distant from social concerns. On the other hand, it is far from the professionals' understanding, perhaps not properly trained to be able to work on architectures too far away to be classified as "current production" but too new to be considered as cultural heritage.
The undeniable state of decay, neglect and/or alteration affecting much of this multifaceted cultural heritage of a "recent past" is the tangible evidence of the lack of a consensus on the topic and invites us to reflect further to the real appreciation of these architectural works, recalling in an imperious way the need arising from building a wealth of knowledge. A process that goes through the work of cataloguing and inventorying. It is not a case if the statement of Eindhoven (1990), with which the Do.Co.Mo.Mo. International established its objectives, devotes four of its six points just for that purpose.
Beside to a clear problem related to the deciphering of symbolic characters and values of which this *spokesman* is built, there are objective difficulties determined by the weakness of many modern architectural works, often born on assumptions of renewability and/or in any case not intended to be handed down. The fact of not being part of a monumental category of the architecture created without

an explicit memorial intention has resulted in a relative neglect of their fate by the social society. In addition, that Modern Architecture also possesses other intrinsic fragilities of typological, ideological and technological nature, that have not been sufficiently deepened by a culture of the *restoration of the modern* - or of the new as opposed to the old [2] - which is far from being consolidated.
In spite of the vast amount of documents that, unlike classical architecture, is often available in relation to the elements of modern architecture, the knowledge of this latter is often superficial, due to the lack of in-depth analysis carried out over the years by the scientists, as result of reflections and awareness. Graphic documentation is often inaccurate, based on design drawings that can differ substantially from the work carried out. The same use of the survey as the basic element for the understanding of architectural work - an instrument which cannot be disregarded in the approach to the comprehension of a historic building - is often omitted in the case of modern architecture that mix the " building familiarity" up with its real knowledge.
Unlike historic heritage, the modern one has a few problems and specific characteristics that affect substantially the intervention procedures. Its degradation is frequently related both to constructive and performance problems; the reasons for his decay often widespread and premature are generally to be found in the use of materials and techniques not sufficiently tested, in the lack of consistency between spatial features and new functions or even in an absence of flexibility in the actions dictated by the necessary technology adjustment.
Here's how, in the restoration of such architecture, it is necessary to take account of specific modes of operation, subtracting them to the application of the "*methodological criteria applied to the restoration of monuments, as well as they have been coded in the last two centuries*" that would lead this heritage to "*certain death*" [3]; implementing, on the contrary, an in-depth knowledge of technical, construction and material aspects, also in relation to their durability, reactivating, or rather re-composing a dialogue, which has become rare in recent times - but yet essential - between both designers and restorers and "*architectural conservation and transformation of contemporary contexts* "[4].
Finally, the conservation and restoration of modern architecture have inevitably to confront with the question of "quantity", i.e. the amplitude (in numerical terms) of such heritage of buildings. Unlike the "old" ones came down to us after having already been selected by the action of weather, natural disasters and wars, demolitions and replacements carried out by their owners, the "modern" buildings are numerous, both because they were made in large numbers and/or serially and they not have already been scored or destroyed by the factors described above. This raises issues related both to the amount of maintenance interventions and to the question of operating a "selection" finalized to the safeguarding, not devoid of complexity of theoretical nature (such as the establishment of evaluation criteria) and limited by the regulations. A legislation that in Italy appears to be somewhat disturbing to the city's architecture, considering that the verification of the so-called "cultural" value is based on two elements: the buildings have to be the work of the author no longer living and their execution date back to over seventy years. This is a boundary that is dissimilar from the rest of Europe, where perhaps the most striking case concerns the Weissenhof Siedlung in Stuttgart, symbolic element of modernity built for the exhibition of the Deutscher Werkbund in 1927 and put into a regional Denkmalliste in 1958 [5].
Recent publications have sparked the debate on these issues, focusing on the criticality of the law and on possible changes of the legal instruments [6], obliging us to turn our gaze to the laws of other European and non-European countries. All that, in the awareness of the international dimension that today have taken the issues of the protection and management of the territory, considered not only as an economic good but also a powerful icon of identity [7].
In this context, it is of some interest to analyze French reality, taking special attention to one of the main and emblematic cases in the safeguard of Modern Architecture: the one linked to the *affaire* of villa Savoye.

2. André Malraux and the origin of modern heritage protection in France

In France, the first actions in favour of the monuments of the 20th century, begin to take place in the '20s as part of a process of sacralization of the sites of the First World War and of places subject to major fighting (that French wanted to keep symbolically in the state of devastation caused by enemy fire) or even of memorial monuments set to honor fallen soldiers. The derogatory application of the law of 31 December 1913 on the historical monuments that did not allow the *classement* of recent objects was so motivated by the desire to perpetuate the memory of the "crimes" committed against the country. This desire for protection was confirmed after World War II when other icons of the national martyrdom, such as the Natzweiler-Struthof concentration camp or the village of Oradour-sur-Glane were subjected to safeguard procedures [8, 9]. Ruins were regarded as "national monument" to be kept in the "*best possible state of destruction*" to show to the world and over time, the damages suffered by France during several years of oppression and violence.
Before that date, some buildings had already received, however, the privilege of protection. The villa built in 1913 in Bellevue Mont Saint-Michel in neo-Gothic style, was classified by decree of September

12, 1931. In 1955, the Parisian apartment of Georges Clemenceau (transformed in 1931 into a museum) was protected thanks to the prestige enjoyed by its owner. However, the first real protection activities grow later, in the late '50s, and then in a more systematic way (following a clear political will) in the course of the '60s. On 11 December 1957, the theatre of the Champs Elysées in Paris by Auguste Perret, built between 1911 and 1913 was listed under the law of 1913 on historical monuments. The death of its author, which occurred in 1954, broken the unspoken rule of historical monuments commission based on the prohibition to protect the works of authors who were born less than a hundred years. It thus ensured a recognition that it was claimed (it would seem) for several years [10] and that for the first time was motivated by the formal characteristics of the work and by the role it played in the history of architecture [11].
At the same time, similar reflections were carried out within the French administration. A preliminary list of 150 modern buildings considered worthy of protection was prepared by the inspector general of historical monuments Albert Chauvel in September 1957. This list, although limited to the city of Paris and the Seine Departament, contained a number of examples belonging to the early 19th century that could be "*protégés au titres des monuments historiques*". In April 1959, a second list of sixty buildings to be protected was established [12]. Only partially inspired by the previous example, it included only monuments after 1848 spread throughout the French territory: the Sorbonne nouvelle of Henri-Paul Nénot (1882-1901), but also the buildings of Robert Mallet-Stevens, numerous churches and even the department stores Le Printemps (1865) and the Samaritaine (1869), as well as other works such as the iron bridge Garabit built between 1880 and 1884 and designed by Gustave Eiffel, the Viaduct Viaur (1895-1902), the aqueduct of Roquefavour (1841-1847).
André Malraux, from January 1959 leading the Ministry of Cultural Affairs, however, could not only participate in the formulation of such theories, resulting from administrative logics for him no longer shareable [13]. Man of word but also of action, he felt the need to express themselves through concrete actions: those "*whims by honest person*" that will characterize his personality and all his work [14]. The repeated complaints by André Chastel in the newspaper *Le Monde* had already attracted the attention of the Minister on the fate of French modern architecture [15]. That's why in 1961, he decided to take action in favour of the protection of certain prestigious buildings of the 20th century, so launching a campaign for the protection of "recent and contemporary" buildings. The large number of buildings to safeguard requested the enrollment on the *Inventaire supplémentaire des Monuments Historiques* (ISMH) but the article 2 of the law of 1913 disposed, in a very restrictive manner, that only to those having an "archaeological interest" could benefit from this measure. To this end, he will change the rules for historical monuments by the decree of 18 April 1961.
From that moment on, two years of unexplained inactivity followed until April 1963, when an *ad hoc* committee for the modern monuments was created. This committee will define a new list consisting of one hundred exemplary buildings of their age, according to a chronological breakdown that from the Second Empire was concentrated in the early years of the '900 and ended in the period 1925-1940. The criteria for selection resided in the representativeness of large recognized masters, in the majority architects and some still living. Among others: Hector Guimard (recently rehabilitated by Nikolaus Pevsner on the occasion of the exhibition *Les sources du XXe siècle: les arts en Europe de 1884 à 1914* [16]), Tony Garnier, Auguste Perret, Henri Sauvage, Eugène Beaudouin and Marcel Lods, Jean Prouvé, Le Corbusier. Technical innovation will be another of the criteria on which the selection will rest. The list included, for example, the first reinforced concrete building built in 1892 by François Hennebique at n° 1 of rue Danton in Paris on the plans prepared by the Lyonnais architect Edouard Arnaud.
In addition, in 1964 by the decree n° 64-203, the Minister Malraux created the *General inventory of movable and immovable heritage of the country*. Malraux hoped that this instrument "*at the same time it complements our knowledge, it will suggest a new revolutionary approach to the values on which this knowledge is based*" [17]. The official report of his speech shows that the national commission charged with this task "*will resume all consecrated ideas as postulates (...) and will probably lead to a deep revision of basic concepts on the evolution of art in France and to a real indictment of the system of values up here admitted"* which will turn later in a famous *révolution culturelle*.
At his express request, indeed, the selection criteria and especially the time range on the monuments that could be included in the list was greatly extended, no longer limited to the works prior to 1830 and only to the churches and castles, but also to the works of the Modern Movement. Despite these efforts (France will be the first European country to engage in the defense -including regulations- of its modern architecture), the recognition of the value of XXth century architecture was still far from being universally acquired. When Malraux requested to the committee responsible, the *classement* of the Eiffel Tower, the synagogue and the castle Beranger designed by Hector Guimard, a building of René Lalique, the theater of the Grevin museum, the Brasserie Lipp, UNESCO headquarters, a garage built by Auguste Perret, and even the Dutch Pavilion at the *Cité Universitaire*, the opinion was favorable only for the first 5 buildings in the list. The action of Malraux, however, will prove to be most effective, though certainly not without difficulties, with regard to the work of Le Corbusier, and in particular in the

case of villa Savoye, whose inclusion among the historical monuments of the country, carried out in 1965, saved this exceptional building from destruction, contributing to the overall recognition of the work of its author.

3. The emblematic case of Villa Savoye

Closely related to the rapport of esteem, respect and friendship between André Malraux and Le Corbusier is the case of the *in extremis* rescue of villa Savoye. A subject often approached by international scientific literature but never analyzed in a systematic and comprehensive way, especially from the point of view of conservation practice adopted. The archives of the *Fondation Le Corbusier* are full of documentation on this topic, but from documents stored in the archives, it's not possible to take criteria on which the various campaigns of restoration (or repair?) were undertaken over the last fifty years: the one carried out during the years 1963-67 under the direction of Jean Dubuisson, that undertaken between 1983 and 1985 by the architect Yvan Gury, the work directed during 1985-1993 under the supervision of the architect Jean-Louis Véret, etc. [18, 19]

Only recently, new interesting documents came to light from the folders owned by the villa Savoye administration, whose examination will be the object of a next contribution. The issue of the restoration of villa Savoye remains, however, one of the priorities of the Foundation. In this regard, new restoration activities will be shortly undertaken. So, because the causes of degradation phenomena of villa Savoye have unexplainably never been solved. Even more inexplicably is the fact that all conservation projects carried out have been based on the original plans of the author: it would seem that a complete survey of the work has never been realized.

3.1 Villa Savoye: birth and decline of a key work of the Modern Movement

Designed by Le Corbusier and Pierre Jeanneret, the villa, called *Les heures claires*, was built between April 1929 and July 1930 as a summer residence for Pierre Savoye - administrator of an insurance company - and his wife Eugénie. Additional works were carried out until 1931 in order to fix problems and make some changes, in particular relating to the colours of paintings. Situated at Poissy in Yvelines, thirty kilometers away from Paris, the house was conceived as a box suspended on top of a hill. Devoid of face and open to the four horizons, its main body was imagined as limited by four similar walls, drilled along the length of the perimeter from a single window [20]. The basic idea corresponded essentially to two criteria -movement and lightness- that in villa Savoye melted to positively respond to the long course of study and research of its proponent, in order to create the perfect *machine for living*. A path that led from confusion to the clarity of geometry: "*simplicity does not mean poverty but it represents a choice, a discrimination, a crystallization that have the effect of purity itself. Simplicity is a concentration*" [21].

Conceived as a country residence in response to a desire of *Madame Savoye* - the true interlocutor of Le Corbusier and of the workers - the house was for the Savoye a tool for self-representation in high Parisian society but also a place where to live their family life in a modern and comfortable way. A place where they could receive and rest, commissioned to be *functional* and in which a prominent role was entrusted to the car.

The wealthy Savoye charged Le Corbusier with the design of the villa Savoye, perhaps without devoting much care to the "style" but soon they had to deal with exorbitant budgets that forced them to ask several times the architects to review their projects (even five).

The estimate overruns (at the end of the villa will cost twice as much as expected), but also the many problems that affected the house, in an economic unhappy context (even in the affairs of Monsieur Savoye), made the relationships between customers and the *agence* of Le Corbusier very complicated.

This is maybe the reason for the growing discontent expressed in numerous letters written by Eugénie Savoye to a Le Corbusier (at least) initially annoyed and reticent, about numerous infiltration of rainwater in most parts of the house: "*Il pleut dans l'entrée, il pleut dans la rampe et le mur du garage est absolument trempé. D'autre part, il pleut toujours dans ma salle de bains qui est inondée à chaque pluie*"(letter dated September 7, 1936, FLC H1-12-157). The high level of humidity exacerbated the couple even more due to the fact that their son Roger suffered from tuberculosis and was supposed to spend in the house the necessary period of convalescence. This might be understandable, given the nature of the building, especially because of the materials and techniques of that time, but is certainly strange, given the proverbial care adopted by Le Corbusier for the construction details, often innovative, especially focusing on window frames and on stormwater discharges from hanging terraces. Many failures, however, would have been easy to solve, if only Le Corbusier had responded to the requests of the couple with the same diligence with which preceded the visit of many visitors or even if he had supplied them with the ever delivered "*plans de la maison*" (letter of 4 November 1939, FLC H1-12-156). Pierre Savoye complained, moreover, the inadequacy of the boiler and radiators: he declared "*we are freezing*" in a house where it was impossible to reach a reasonable temperature. Actually, in the article published in 1930 on the *Architecture d'Aujourd'hui*, Posener already wondered

if the house was not too big in spaces and however difficult both to clean and to heat; "*perfect*" but certainly not from the economic point of view [22].
The advent of war obliged the Savoye to settle for a certain period in the house in order to avoid the consequences of eventual bombardments on the capital. Occupied by the Germans and then following the *Liberation* by the Americans that will damage it considerably (*portes arrachées et meubles emportés* wrote Le Corbusier [23]) the future of the house will then be strongly affected by the large-scale operation conducted by Ford in 1937 which established in Poissy a large factory car. After the war, the factory was taken over by Simca, a motor manufacturer famous in France for its economy cars, which extended it further, increasing also the annexed worker's village. in Beauregard. Built by Charles-Gustave Stoskopf, this *grand ensemble* included a church, the hospital, primary schools and supermarkets. The only think it lacked was a high school that the Ministry of Education decided, in accordance with the municipal authorities of Poissy, to build right on the ground of villa Savoye so condemning it to the demolition.
It followed the actions taken by Eugénie Savoye (in the meantime became a widow) and by his son Roger to get the right compensation, as well as that of Le Corbusier in order to save his work. The Savoye did not oppose, in fact, to the expropriation whereas the villa in their ten years of stay did not offer them the peace and comfort they would like and that would justify the investment of large sums of money to make it habitable again [24]. After many negotiations and legal procedures, in 1959, the court set a compensation considered acceptable both for the town of Poissy and the Savoye (1,271,875 new francs). The villa would be demolished to make place for the new high school in Poissy.

3.2 From the international mobilization to the role of André Malraux

At the same time, a strong resistance is carried out by Le Corbusier who, alerted by the upcoming demolition of villa Savoye, decided to inform all his connections - first of all André Malraux - about this pressing danger.
The two had become friends after a journey that the minister had made in India and his discovery of the construction site of Chandigarh, by him perceived as a revelation from symbolic, spiritual and material points of view (fig. 1). An architecture, the one designed for the new capital of Punjab, able to go beyond the assignment and to plenty situate itself, in the field of monumental architecture [24]. The fascination exerted by Le Corbusier became even stronger during the journey of the minister in Brasilia, where the insistence of the local authorities for entrusting the architect with the future project of the French Embassy, attracted the attention of Malraux on the international prestige of which Le Corbusier benefited. An admiration which he manifested in a number of occasions, even more personal, such as the one linked to the 100th birthday of the mother of Le Corbusier (the telegram of congratulations sent by the Minister will make history).
Since his appointment as Minister of the Information in 1958 and again later when he will assume the role of Minister of Culture, André Malraux's help will be repeatedly called by Le Corbusier, in order to solve problems related to its studies or ongoing projects, as well as to get new assignments (fig. 2 and 3). Since 1959, the issue of the protection of his works will become to Le Corbusier a matter of primary importance: from this date, its relationship with André Malraux will then focus on this subject.
The news of the beginning of expropriation procedure concerning Villa Savoye, had purged Le Corbusier to contact in the Unites States. Siegfried Giedion, a very famous architectural historian and professor at Harvard, informing him that an association, the *Cercle d'Etudes Architecturales de Paris*, through its president Pierre Sonrel, had requested the intervention of the Minister Malraux in favour of villa Savoye. Although UNESCO was solicited to proceed with the purchase of the property, lack of funds had been forced to give up (letter of 25 February 1959, FLC H1-12-182).
He then asked Giedion to bring into play all his relationships both with UNESCO and the United States to save Villa Savoye. Giedion began as an international mobilization that in a few days was expressed through numerous articles in the British and then in the French press (fig. 4), as well as in appeals to the Minister Malraux such as that of the E.T.H. Zurich whose rector A. Roth will specify that villa Savoye was "*not only one of Le Corbusier's universally known masterpieces, but moreover a monument to 20th century architecture, recognised as such in professional circles worldwide*" (letter of 9 March 1959, FLC H1-12-191).
Nevertheless, anything was really changing and Le Corbusier wrote again to Giedion informing him that the Savoye property could be purchased for 100 million Swiss francs. He also expressed his intention to create a foundation, the *Fondation Le Corbusie*r which will become his one and only inheritor. The foundation headquarters will be *villa La Roche*. Focusing on the future of Villa Savoye, Le Corbusier also affirmed that one of its main goals would be that of serving as a point of departure in the Western hemisphere for an alternative means of research (other than academic) into architectural development from ancient times to modern day (FLC H1-12-188). In this regard, it has been observed by Jacques Sbriglio that this touching letter, apart from announcing almost ten years in advance the real establishment of the foundation revealed that Le Corbusier "*did not have a very clear idea at that*




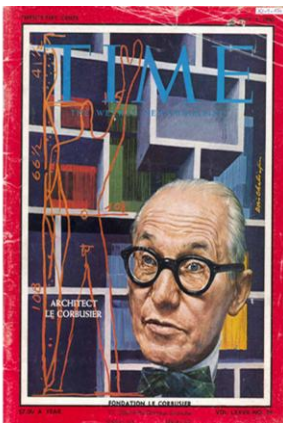

Fig. 1,2 and 3. Le Corbusier and André Malraux in Chandigarh and Paris (FLC L4-14-95 and 96). Fig. 4. The cover of *Time*, May 1961 (FLC X2-1-150).

time as to the future role of the rehabilitated Villa Savoye" [25].
Perhaps Le Corbusier was as little aware of the role that the State could play in favour of Villa Savoye. On 8 June 1959 he wrote to the Minister Malraux to let him know that this international mobilization had been developed behind is back, even pretending that at the time when all the commotion concerning the villa Savoye broke out, he was in the Indies. If on one hand he seemed to apologize for the pressures produced (a mere pittance compared to what he will do after for this and other affaires!) on the other hand, with great cunning he tried to instill in the Minister the awareness that villa Savoye could find its very *raison d'être* only in the uncontaminated place in which it had been conceived.
Supported by a *Comité de sauvegarde de la Villa Savoye à Poissy* created in April 1959, André Malraux recognizing the value of that work, started to concretely take action in his favour. There were, nevertheless, some obstacles to overcome. Conscious of the fact that the commission for historic monuments was not sufficiently "mature" to express a favourable opinion for the protection of this architectural work, he decided to work around the problem *hors du champ de la protection des monuments historiques*. In a very unusual way, he created the conditions for the acquirement of villa Savoye by the State and, thanks to an agreement signed October 23, 1961 with the Ministry of National Education, this latter, once having become the owner of the land for the future high school, would transfer the building to the Ministry of Culture to there harbor an international foundation.
According to the same rule of *détournement*, also the site on which the chapel of Notre-Dame-du-Haut at Ronchamp had been built, thanks to André Malraux, and despite the strong opposition of his administration, was protected on 11 March 1960.

3.3 From the Villa Savoye's protection to a policy in favour of modern monuments

Moving back to the case of villa Savoye, the years that will bring to its protection were eventful and far from being simple. Years in which Le Corbusier intensified his personal commitment in the battle in favour of Villa Savoye. Determined not to be pushed aside in the matter, he strengthened its offensive first of all to prevent the construction of high school, then to get the job on the restoration project, and finally, to maintain a healthy weight in the choice of new eventual functions for the house.
In the early '60s, he was invited to take part in a meeting convened by the *Section Spéciale des Bâtiments d'Enseignement du Conseil des Bâtiments de France* about the new high school construction project in Poissy, modified following the protest campaign raised following the proposed demolition of the villa. Le Corbusier called to express his opinion, was in favour of the new principle of construction of the high school while stressing the need to preserve Villa Savoye's perspective, so implying, as a consequence, the relocation of the gymnasium near the high school. He also took a stand on the function which could be assigned to the villa, proposing that it could be the headquarters of CIAM, showing himself ready to elaborate the project of restoration and to supervise the work. (FLC H1-12-249). This last question is of fundamental importance for him, so that after a typo in the minutes of the meeting, he reiterated in a note to the Ministry of Culture that "*it is out of the question that any architect other than myself be in charge of this work*" (FLC H1-12-248).
Worried of not being in total control of the situation, he decided to send some sketches to the Minister Malraux showing the degraded state of the villa: the building of a wall near the ramp leading to the terrace and in front of the large window lounge, a changing in the colour paintings particularly strong, the lack of any type of vegetation on the roof, an improper replacement of some windows, etc. (fig. 5 and 6).
Working tirelessly to achieve its objectives, Le Corbusier even tried to act on the mayor of Poissy, Mr Touhladjian to which in 15 July 1960 he sent the second volume of his Complete Works, where the

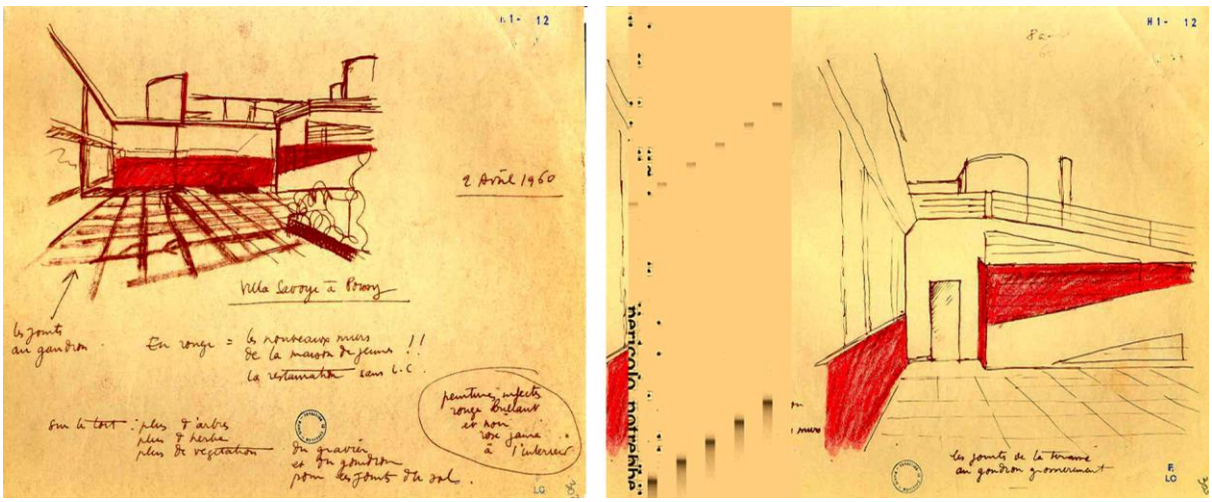

Fig. 5 and 6. Sketches addressed by Le Corbusier to the Minister Malraux showing the degraded state of the villa, 2 April1960, FLC H1-12-301).

Villa Savoye appeared on p. 23-31 adding a dedication: "*we seal a pact trust-based on the occasion of the Villa Savoye and I will try to deserve your approval and that of your citizens. Here is the villa Savoye, born in 1929. It was clear, bright and cheerful. Me too. Thirty years have passed, heavy of dangerous fights*"(FLC H1-12-264).

Perhaps for an insane optimism, absurd euphoria or just as a provocative act, Le Corbusier from 1962 multiplied its communications to the Ministry of Culture. Taking for granted that he will be entrusted with the restoration work, it asked for preparation of budgets, alerted his colleagues and his most trusted companies, including Bertocchi's enterprise. Therefore, he also involved the former Minister Eugène Claudius Petit informing him that the future *Fondation Le Corbusier* will sit in villa Savoye, specifying moreover that he was also making plans for the transformation of the villa in *musée Corbu* and adding, probably making a mistake, that the heating and electric systems would be completely redone and windows considerably changed. This intention of modifying some original characters of the villa will have a considerable influence on subsequent events concerning its restoration.

In September 1962, the Minister Malraux officially informed Le Corbusier of the progress of the Villa Savoye's dossier: the transfer of the property of the Ministry of Education had become effective from February 22, 1962. He then reassured him about the possibility that he would be in charge of all the repair work and alterations to the interior fitting. To this end it was necessary, however, that he would be appointed as architect of *bâtiments civils et palais nationaux* and that he was entrusted with the case. An appointment was still possible, in spite of his advanced age, as he was the author of the building. Le Corbusier, heartened by this almost designation drafted some notes accompanied by sketches through which he configured the improvements and changes to be made to the villa: some modifications in the colour scheme (different colours but only on the ceilings), the wall to be used for mural photomontages, painting in white of the structural elements (porticos and columns). Other alterations were also foreseen on the lighting system, which he intended to be indirect. He also added some other technical specification, such as those related to the reparation of waterproofing system or the establishment of a bathroom on the ground floor (FLC H1-12-461, fig. 7). But the process was slow and to Le Corbusier did not remain that supplications: "*let me fix this villa before it's too late (...) I already told you that I will work for free*" he wrote to the Ministry of Culture in September 1963 (FLC H1-12-444).

A few months later, however, the task was entrusted by the Ministry of Culture to Jean Dubuisson, architect of *bâtiments civils et palais nationaux* (at the beginning in a provisional, then in an official way, following the decree of 7 December 1964 that listed Villa Savoye among the *bâtiments civils et palais nationaux*). Le Corbusier leaned that decision and sent the project drawings, inviting him at immediately taking action.

Actually, from that moment on, Le Corbusier was divested of all *maîtrise d'œuvre* and its field of action limited to an informal role of counsellor and supervisor (fig. 8). This had been certainly due to the slowness of bureaucratic machine but perhaps also to avoid him to do a "Le Corbusier 1963" not in line with the consolidated praxis of Historical Monuments administration. He did not give up and continued to urge persistently Dubuisson that Malraux so that the work would start as soon as possible, "*the years go by, the house collapses*" (FLC H1-12-418, fig. 9).

Later, he accused of inertia Dubuisson, reproached him his silences, then he gave him tips for getting the financing necessary for the commencement of work. Determined to keep somehow the control, Le Corbusier expressed in a note to Max Querrien, the Director of Architecture at the Ministry of Culture,

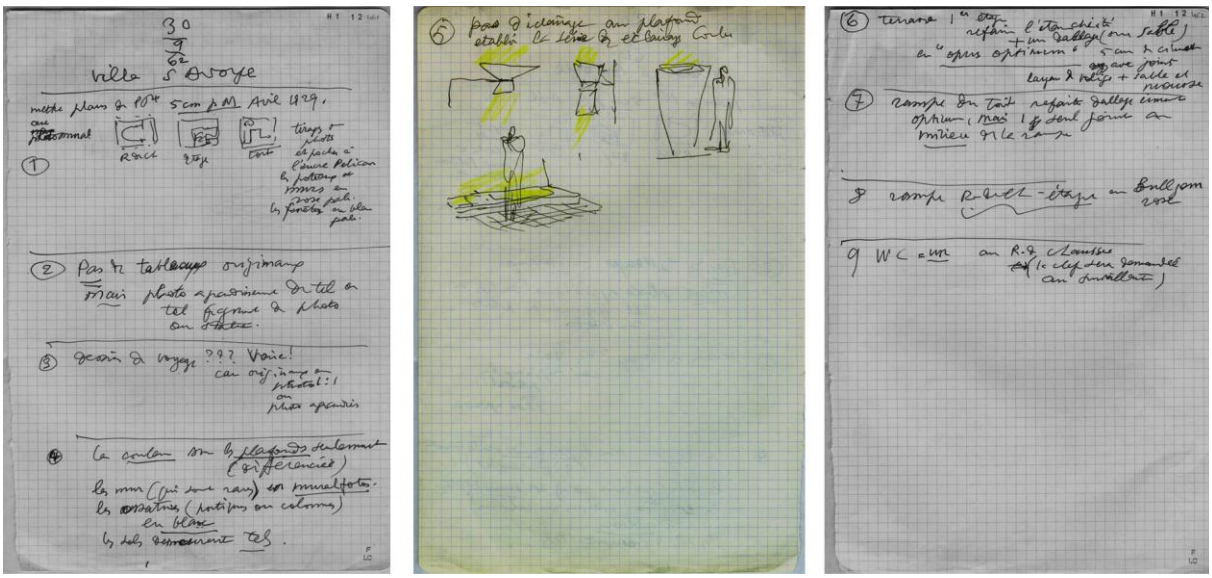

Fig. 7. Sketches addressed by Le Corbusier to the Minister Malraux showing the improvements and changes to be made to villa Savoye (30 September 1962, FLC. H1-12-461).

his willingness to do the work that would follow "fairly the truth," so reconstituting, in an exact way, the construction at his primitive state (letter of 10 November 1964, FLC H1-12-290). In this regard, it is telling the report produced by François Gardien, one of le Corbusier's collaborators about the architect's point of view on the work to be performed on the villa [27]. In particular, with regard to certain repairs such as the removing of the walls in front of the glass window of the hall and up the ramp, the planting of trees around the building to re-create an environment suitable; the restoration of polychromy. All points to which inevitably corresponded as much architectural principles of the Villa Savoye - the architectural promenade, the relationship between building and nature, the relationship with colors - which had been altered over time and according to Le Corbusier would have to be restored (FLC H1- 12-312).

Again, in a note dated May 12, 1965 Le Corbusier relied on its priorities for action: "*lend colour, create a fresco with photographs of the text and the cover of L'Esprit nouveaux, redo the planters, the hanging garden and the artificial mountain* (FLC H1-12-293). Against the persistent silence from Dubuisson, Le Corbusier, tired and discouraged sent a letter to Malraux protesting for the last time the lack of operational activities at Villa Savoye. A few months later he died and an elaborate funeral was given, directed and produced by André Malraux. The Villa Savoye was declared a Monument Historique on the 16th December of the same year and opened to the public twenty two years later.

A few months earlier, on 10 October 1964, the Cité radieuse had been integrated by the Minister Malraux in the first round of the protection of the modern monuments. After the death of Le Corbusier, from September to December 1965, seven buildings were inscribed on the additional inventory of historic monuments: the Swiss Hostel and the Brazilian Pavilion at University City in Paris, the chapel Notre-Dame-du-Haut at Ronchamp, the villas Roche and Savoye. In 1966, the *maisons* Jaoul and the villa Jeanneret completed the protection of works of the "*mâitre*" (as it was called Le Corbusier by André Malraux) thanks to the intervention of his friend, the minister.

4. Conclusions

From the era of André Malraux many things have changed. In 1974, a new campaign was launched by Bruno Foucart, technical advisor to the Minister of Culture, Michel Guy. This time, the services of historical monuments were involved at both central and regional level and invited to submit lists of buildings from the 19th and 20th centuries eligible for protection. The acute shortage of documentation and the poor awareness of these architectural entities meant that not only the most important or spectacular ones were included but all those of which nothing was known, or almost. The number of protected buildings, so increased fourfold, although they were substantially located in Paris or in other urban areas. An opinion mouvement for the recognition of Modern Architetcure was, however, initiated and will continue to produce knowledge in the next decade, despite the strong opposition of some art historians and the misunderstanding of a large part of civil society. Since the mid-'80s the lists became thematic: first, it privileged railways, hospitals, swimming pools, boutiques, industrial heritage; then, in the '90s it focused on individual and collective housing: from the prefabricated of the '40s to the *grands ensembles* of '50s-'60s. In 1987, a conference on the *Enjeux du Patrimoine architectural du XXe siècle* took place in Éveux: the need to bridge the deficit in the protection procedures through the development of systematic inventories was highlighted. The selection of buildings to protect could be

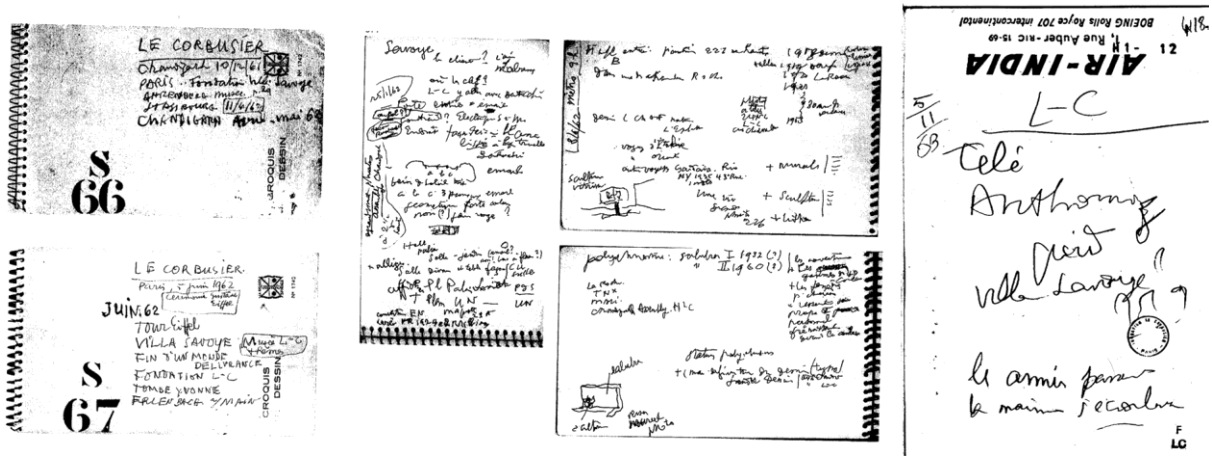

Fig. 8. Covers and pages from The *Carnet de Dessins* S66 (started on 10 December 1961) and S67 (started on 5 June 1962) regarding villa Savoye. Fig. 9. Note drafted by Le Corbusier of 5 November 2011 (FLC H1-12-418).

rigorously based on the criteria of originality, exemplarity, technical innovation, or related to their significance to the community recognition as well as to a meaningful mass production from the historical, sociological, economic and cultural points of view. The law of 1913 on the historic monuments was considered insufficient to ensure the protection; it appeared therefore necessary to use other tools such as the law on the establishment of the *zones de protection du patrimoine architectural et urbain* and that for the protection of sites. These three instruments are now in France the normative apparatus regulating the protection of modern architecture. In 1996, one thousand buildings from the 20th century were protected by the law. Today, the knowledge, conservation and valorisation of the 20th century's cultural heritage is one of the main challenges of French administration. However, it represents only the 4% of protected heritage (43 000 buildings and sites in total). Significant work remains to be undertaken in this area.
Recently, the Ministry of Culture and Communication has created the "Heritage of the 20th century" label. Devoid of juridical effect, the label is now applied to about 2,300 buildings or urban complexes (one-third between them is not protected under the law of 1913). The main idea of this tool results from the awareness of the limits of protection. Indeed, what is really useful is not to improve or extend the number of protection tools or the subsidies, but to activate the social recognition of the value of this heritage. To protect and transmit to future generations the 20th century heritage, it should be first of all identified and inventoried, then monitored and/or restored. But what appears really important is to develop actions aimed at enhancing the public awareness and understanding of this heritage, in order to re-appropriate and re-inscribe it as a siginificant component of our society.

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Understanding Location Preferences of Entrepreneurs and Innovators in Historic Maritime Cities

Laurie ZAPALAC
Department of Urban Studies and Planning, Massachusetts Institute of Technology, Cambridge, USA
lzapalac@mit.edu

Abstract
Many important factors shape why some urban environments are becoming new locations for entrepreneurship and innovation, but generally, one has been overlooked: quality of place and its relationship to production. This leads to an important research question: *do the qualities of historic urban environments matter to skilled workers in 21st century industries? If so, why?* In my related dissertation research, I analyze firm attribute data and location data about a subset of skilled workers, those participating in information and communication technology (ICT) and the creative industries (CI) and in three historic maritime cities: Venice, Amsterdam and Boston. Data collected through interviews of workers and other knowledge holders provides invaluable insight about work practices and perceptions of the value of the built environment.

In this paper, I identify six location typologies in relationship to the characteristics of observed firms. Importantly, these typologies incorporate not only distinctions among qualitative attributes of the built environment, but also address how these qualities (at the district and building levels) are perceived by firm representatives to impact their productivity. This leads to constructive ways to describe these emergent "ecosystems" not only as spatial locations, but also as distinct places with specific knowledge attributes and important interrelationships.

Keywords: *historic environments, place knowledge, location choice, and productivity*

1. Introduction

Many scholars are engaged in explaining why some places have become new locations for entrepreneurship and innovation. Economic geography and management scholars utilizing cluster and network analysis often focus on the competitiveness of particular regions or companies within industries, by considering the importance of proximity to other firms, to research institutions, and/or to venture capital in the emergence of new creative and innovative "ecosystems." Debate among urban scholars has tended to center on the ideas of cities as environments that attract high skilled workers through jobs, consumption or lifestyle opportunities. Recent scholarship on entrepreneurship looks to the roles of incubator, accelerator, and "startup" programs, and their ability to foster community and to assemble quickly the skillset necessary for new entrepreneurs to launch successful companies. Within these investigations, one factor has been largely overlooked: the importance of quality of place and its relationship to new forms of production.

1.1 Background and Key Definitions
Innovation has come to be a highly popular buzzword in product descriptions, policy statements and even advertising. Often, however, there is gap between the implied associations (novelty, ingenuity) and a more critical understanding of the spectrum of activity required to realize innovation. *Innovation* is the development of new products and services and their successful delivery to the marketplace. While innovation is closely linked to the idea of invention and application of new technologies, innovation scholars point out that this is not the whole picture. "Even in the sectors that embed the

most effervescent technologies, innovation is mostly driven by competitive considerations. Moreover, most of the technological progress occurs over long periods after inventors' initial breakthroughs" [1]. Maryann Feldman elaborates: "Commercially viable product innovations combine scientific and technical knowledge with knowledge of the market. A new product introduction reflects the successful organization and synthesis of these diverse types of knowledge" [2]. The prolonged period of time required for the electric vehicle to be accepted by U.S. market is an excellent example of the more complete story of innovation.

Entrepreneurship, the practice of being an entrepreneur, refers to the taking on of risk in order to launch a new, potentially profitable endeavor, including an innovative product or service. Brad Feld emphasizes that what distinguishes an entrepreneur from a small businessperson is the intentionality to launch a high-growth business that will serve a broad market, not just a local one. (Feld also points out that many programs and policies designed to promote the growth of small businesses, such as those directed by the Small Business Administration, are not, in fact, very helpful to entrepreneurs because of the difference in knowledge and resources required [3]. In considering such mechanisms, important differences between the "culture of entrepreneurship" and in the United States and Europe begin to emerge. These differences, in turn, raise questions about whether focusing on entrepreneurs is in fact good economic development (generally) and what the actual direct economic, social and environment impacts are for the city and community hosting this activity.

Responding directly to intentions to promote economic growth within a region or city through cluster development, Feldman advocates that it is necessary to study what she articulates as three stages of cluster formation, not merely the end result of the process [4]. She emphasizes that entrepreneurs play a special role in cluster formation and that local conditions matter: "The local environment, in terms of the types and quality of resources and the networks and institutions that provide support and further business interests, ultimately affects the sustainability of the startups, although not necessarily their initial establishment" [5] Importantly, she also emphasizes the relationship between production potential and location-specific knowledge: "Although not all locations can develop glamorous high-tech clusters, each location has a unique industrial heritage that provides some expertise and resources that might constitute the basis for innovation, technical advance, and sustainable competitive advantage. [6] Hence, Feldman's approach emphasizes that cluster formation is about translating latent potential and being cognizant of conditions that support entrepreneurship. It argues against offering financial incentives to established companies to relocate to the location being promoted. It is here where heritage comes into play – both when considered as a physical and social framework for activity and because knowledge itself is an intangible form of heritage.

1.2 New Industries

Since the 1960s, entirely new economic activities have emerged, facilitated by and facilitating the incorporation of digital technology into myriad aspects of work and life. These included broad groups of activity that encompass Information and Communication Technology (ICT) as well as the Creative Industries (CI), which in many cases manifest a fusion of existing forms of expression with new forms of technology, and as such rely upon both creative and technical skills. Recent studies debate which activities actually constitute these industries and how they should be conceptualized; because these are new and rapidly developing fields, some activities are poorly accounted for in existing industry code classification systems. Still, the use of classification codes is helpful, particularly as a starting point for evaluation and comparative analysis across cities.

ICT and CI industries serve as representatives of knowledge-intensive work. Workers in these industries are bringing many new products and services to market including hybrid concepts, such as social media services, for which there is no distinct precedent in any one industry. The market capitalization of these industries as a percentage of the total economy is expanding; in some cases, what were once thought of as niche or "cottage" industries now out produce (in monetary terms) other previously important sectors in the economy. There is a high level of entrepreneurship in these industries, as well as high participation of contingent workers.

Although both ICT and CI have emerged as powerful sectors, one element that is remarkable is the bottom up development of both sectors (though often predicated upon long or significant investments in research and development in related activities). In 2011 the Netherlands, identified the Creative Industries as one of its nine top sector. ICT was also represented, but in a cross sector approach – represented as part of the Logistics sector and to a degree, the High Tech Material and Systems sector (and embedded as support activities in other sectors as well. The Creative Industries, as currently defined, along with Logistics, are among the *least* R&D intensive sectors, in comparison to the resulting revenue output generated when measured as a percentage of GNP [7].

An Amsterdam developer I interviewed echoes Richard Florida in saying "When you are able to capture the creative people, they will do the rest to make the city an interesting and inspiring place for the mainstream" [8]. Certainly, the manifestation of human creativity is an essential role that cities play. Cities are our common platform. But it should be recognized that as technical work is increasingly dependent upon creative skills and creative work increasingly relies on sophisticated technology for design, production, management and distribution, the distinction between creative and technical work is becoming more blurred. Rather than emphasize the distinction among these endeavors, perhaps from an economic development policy and place cultivation standpoint, it may be more beneficial to examine conditions in which diverse activities are successfully interwoven. This in turn places emphasis on considering how the inherent qualities of a city best match to a certain profile of activities and meet the real demands of its actual constituency, rather than a stylized set of conditions associated with entrepreneurship and innovation that few cities possess, or have the capacity to construct in full.

1.3 Research Questions and Research Design

In my forthcoming dissertation (2013), I use GIS to map and analyze firm attribute data and qualitative location data about workers participating in the information and communication technology (ICT) and the creative industries (CI) in three historic maritime cities: Venice, Amsterdam and Boston. Data collected through interviews of firm representatives and other knowledge holders provides invaluable insight about work practices and perceptions of the value of the built environment.

I consider, specifically: *Do the qualities of historic urban environments matter to skilled workers in 21st century industries? If so, why?* My hypothesis is that historic urban environments are important because they readily possess a set of qualities that makes them *place knowledge* intensive and that provides the necessary conditions for workers to self-optimize. This is predicated on the idea that cities play three timeless and interrelated roles: as repositories of knowledge, as frameworks for creative thinking and new knowledge production, and as settings for the construction of robust social relationships through which information and knowledge are transmitted effectively.

I investigate this by considering: 1) what types of firms (and workers) are locating within historic urban environments 2) whether it possible to observe evidence that *certain types of firms (ICT* and *CI)* are disproportionately choosing these environments 3) what qualities of the built environment are most important as reflected in location choice 4) how these qualities are perceived by firm representatives to impact their productivity and 5) constructive ways to describe these environments not only as spatial locations, but also as distinct places with specific knowledge-related performance attributes. This paper focuses on findings from Amsterdam in relationship to the later three questions.

2. Preliminary Findings

Below, I report on some preliminary findings from my initial fieldwork in Amsterdam that has been corroborated to a limited degree with fieldwork in Venice and Boston. As I continue to analyze data, these findings will be revised and/or refined as needed.

2.1 Preferences for Certain Qualities

By analyzing data obtained from initial interviews undertaken in Amsterdam (2012 - present) and triangulating this data with data obtained from documents (firm web sites, as well as other planning and real estate market documents) and formal databases, I have constructed a picture of qualities most important to workers interviewed as well a set of location typologies in relationship to the characteristics of observed firms. These describe worker-environment relationships. I will expand upon these and incorporate specific examples as I continue to formally code interview data.

References to quality of place at the scale of the workplace location or building scale include:

Natural light. Workers referenced natural light with great consistency when describing why they chose a specific location. Interior office configurations I observed usually directly reflect preferences for working in areas with natural light. It is perhaps no surprise that this was a near universally mentioned condition, but it is important to emphasize that it is one that many (though not all) Modern buildings do not consistently provide. (Natural ventilation also mentioned.) As such, this is an important differentiation to consider in analysis of building by typology and era and it suggests specific alterations / strategies for adaptive use if buildings are to be retrofitted in ways that will be appealing to these workers (see Figure 1).



Fig. 1: People's Playground is bathed in natural light and takes advantage of the raw, but warm character of the space it occupies.

Raw / soul / texture / warm. Many workers expressed that they like that the buildings they occupy possess a raw quality, lending a sense of informality as well evidence of the past use of the building and the structural materiality of the building. This was often described in contrast to "slick" or "cold" corporate office environments. An Amsterdam-based real estate developer provided this insight:

> Appreciation of the "raw" is not just a trend in this market; it is basically a counter trend of the overkill in design in the past years.... Nowadays, people tend to appreciate more straight forward, simplicity, re-use of materials, and authenticity. This need has been reflected in new style in architecture and design, more raw…. Some creative people prefer to be in raw places, other creative people tend to stay in more designed places, as long as they are authentic. Creative people hate fake and superficial [9].

References to quality of place at the building or district (and sometimes the city) include:

Inspiration. Many workers interviewed made references to the importance of environment in providing inspiration for new ideas or solutions to a particular problem. This suggests a high level of environmental sensitivity and sensory engagement (sight, sounds, smell, touch, taste). Often when the importance of beauty (in architecture or the cityscape at large) was mentioned, it was in the context of inspiration, as a launching point for ideas. The value of beauty in this context is linked to production rather than consumption (see Figure 2).

Dynamic. Workers often stated that they like to be located in an environment that conveys a sense of change. They made reference not just to cyclical activities in urban environments, especially those that support a mix of uses, but also to ideas of contrast, juxtaposition and continuity, such as when a new business opens in a very old building. Others also mentioned liking to be among different people, or "a different combination" of people in the urban landscape.

Convenient. Convenience was usually described as the relationship between the home and the workplace, and often, close proximity between a work location and a childcare location; being close to shops and services was mentioned as well. Both travel time and modes of travel were referenced in this context. Workers also talked about the importance of access to parks and water for activities of repose, exercise, socialization, and contact with nature.

The heritage of these cities is an important part of what makes them inspiring, and heritage is also a major factor in their being dynamic places from a development standpoint (and here it is important to point out that heritage management policy differs significantly among the three cities in this study). "Convenience" offered by historic urban environments within maritime cities is often highly linked to centrality; more often than note the historic environment is the "historic center," from which the city grew overtime. Pre-modern maritime cities are dense, mixed-use and multi-modal in nature (relying on both water-base and land-based forms of transit, often still favoring the pedestrian over the

automobile). All three cities in this study retain such form to a large degree, even as some buildings and subdistricts have been changed over time.



Fig. 2: Qualities at the district level include an inspiring environment in which to work, a sense of dynamism (especially the juxtaposition of old and new) and convenience.

Questions do arise about convenience as it relates to live-work proximity (affordable housing). Additionally, for some entrepreneurs, proximity not only to childcare, but also to schools is critical. Convenience reflects both preferences in lifestyle as well as needs associated with particular life stages. Hence, it is important to examine the demographics of each city and to consider the degree to which each is successful at optimizing the productivity of young skilled workers (more flexible in location choices, but often with less income), mid-stage skilled workers (child rearing age, with more specific needs) and mature skilled workers (who more income, but often less willingness to be flexible). What makes a city well suited to young skilled works is not the same set of conditions that enables them to retain workers at each life stage, and yet much of the prevailing narratives about innovation focus on the early stage entrepreneurs and skilled workers [10]. Given the importance of multi-generational connections to the integrity of entrepreneurial communities (where mentors foster up and comers, for instance), it is exceedingly important that cities do what they can set the stage for optimization (and worker retention) at each life stage.

2.2 Location Typologies

Several variations of location preference trends appear to be emerging, based upon not only the type of work (as interpreted by industry code) but also size of firm, age of firm, and age of the individual workers interviewed, all of which impact location choice and how firms rely upon the built environment. As a descriptive strategy, I have developed six typologies of the firm-location, or worker-location relationship. I see these as components of the larger knowledge ecosystem. Drawing literally upon the metaphor of an oceanic ecosystem, I assigned a descriptor to each typology:

Type 1: For truly mobile workers, the entire city is their workplace, but they can often be found attached to high quality interior environments (offering free power sources and free wifi) where they pay no rent. Thus, they are like *remora (suckerfish)* (see Figure 3). These are the workers who camp out at the Starbucks flagship location in Amsterdam, Two for Joy Coffee or the state of the art Amsterdam Public Library. Although they pay no rent, they do buy expensive coffee and seem to be willing to pay more in housing costs to be proximate to these locations. They may even have an office, but choose not to work there or to do a certain amount of work from these “third places” [11]. One day I was working from Two for Joy Coffee and watched and listened as an English-speaking art director conducted an interview with a potential employee, checked her email, met with colleagues, and then held a conference call via skype, all while her dachshund sat at her feet. This may not be the most efficient way to work (there is no guarantee of a table and there is nowhere to store your stuff), but at least some of the time, those are conditions that these workers are willing to tolerate.

These mobile workers play an important role in emergent innovation ecosystems: their fluid locations aids in the transfer of tacit knowledge within their community of practice; they give a “face” to the community of ICT and CI workers affirming their presence to others; they also interface with the

broader community of residents and visitors, activating the urban landscape while creating a consistent demand for local services.



Fig. 3: In Amsterdam, locations such as Coffee Company and Starbucks serve as "third places" that have become preferred workplaces for freelance workers and others fitting the *remora* typology.

Type 2: Firms that can be described as *hermit crabs* rely on small, formerly discarded shells of buildings or undervalued portions of buildings (see Figure 4). These are the firms willing to fill the nooks and crannies of centrally located real estate that may be substandard in some way (such as basement level locations) while offering other advantages, conveniences and qualities when observed at the building and district scale. While firms might make improvements to these spaces, they usually maintain a raw character; this seems to reflect both what it is that firms do as well as the life stage of the company. When hermit crabs outgrow their current space, they often relocate to a larger space within the same general district. As such, they may play an important role by maximizing the productive value of existing real estate.



Fig. 4: Ebuilders, a web-design firm located in a former print shop in the Amsterdam Centrum fits the *hermit crab* typology.

The next three typologies reflect the emergence of new real estate service models:

Type 3: The third group of firms can be described as *coral fish* drawn to an artificial coral reef (see Figure 5). This analogy is based upon the practice of sinking decommissioned ships to encourage the growth of new coral reefs (for diving sites, etc.). Like coral fish, firms attracted to such sites take

advantage of a programmatic amenity not previously available in the larger environment. In the case of Amsterdam, a number of centrally located large historic buildings (often early 20th century office buildings) have been minimally adapted (the addition of transparent partitions, high speed internet capacity and a beer brewer in the basement) to attract and accommodate firms, sometimes intentionally within one industry and sometimes intentionally heterogeneous. These may be conceived as accelerators or simply as co-working spaces. Firms occupy fixed space based upon short-term rents (often month to month); sometimes tenants may be allowed to share or sublet their space. The architecture of these buildings usually offers notable street presence, sound structure and some shared amenities (such as a roof deck or event room). The firms seeking these spaces are often looking to be a part of a startup community; in some cases venture capital firms operate, support or reside within these locations.



Fig. 5: Smart.pr epitomizes the *coral fish* typology. They rents space on a month-to-month basis at 75 Rokin, a multi-tenant site on one Amsterdam's most well known streets. It has been retrofitted by removal of most interior finishes.

Type 4: *Sharks* are aggressive startup firms for which task-oriented workspace (but not appearance) is paramount (see Figure 6). These are often exit plan-oriented firms; environments they choose are meant to be temporary because these firms see themselves as constantly in motion. They may inhabit the same space as *coral fish*, or other locations available for short-term lease. *Sharks* value the qualities of their district environments sometimes far more than their primary work space, especially as these districts provide the common meeting places where industry knowledge is shared and professional relationships, including access to venture capital ("food"), are forged.



Fig. 6: Wercker, is a venture capital funded startup that enables cloud-based code sharing and testing; it illustrates the *shark* typology. It is one of many firms renting on a short-term basis in the Duintjers CS site, a late

modernist (1973) former bank building in the Centrum, converted to a co-working site in the mid 2000s. Success in accommodating small firms has led to redevelopment interest; soon this "innovation ecosystem" will be disbanded so that redevelopment of the building can take place, illustrating a potential conflict between innovation policy and real estate development objectives.

Type 5: *Sea Turtles* are similar to the firms described as coral fish, with the noted difference that they possess strong preferences for high quality (high design) interior environments in iconic buildings at notable street addresses (see Figure 7). Sea Turtles are long-living and to a degree, slower moving. The model that makes this typology possible is based upon a real estate development and management strategy that provides a mix of high quality on-demand task-oriented workplaces and the services to support them. Established, global companies (such as Google) that desire to have a presence in Amsterdam rent limited fixed space on an annual or monthly basis and pay on a user or member basis to gain access to specific resources. This shared-resource model bears some similarity to new models of car sharing and bike sharing. Another variant of *sea turtles* is the contingent worker who chooses these high quality environments as a permanent home, even as he/she changes companies or consulting jobs, and startups (such as public relations firms) for which prestige factor is particularly valued.



Fig. 7: Strategy Plus (formerly DEGW and acquired by the AECOM) uses the co-working site, Spaces, as their Amsterdam outpost. While not a startup by definition, it typifies the *sea turtle* typology, having chosen deliberately to locate on a long term basis within a co-working environment offering a spectrum of task-based programmatic amenities and high quality, warm and light filled interior architecture.

Type 6: *Whales* are large, successful firms (and sometimes, not-for-profits), some of which may have started as hermit crabs, which occupy an entire architecturally notable building (or a large portion of it) at a prestige address (see Figure 8). Locations include major sites within Amsterdam's Canal Ring, Venice's Grand Canal or Boston's Waterfront/Financial District. Often firms (or the real estate development team with whom they closely work) preserve or restore key architectural features while adapting interior configuration to support high programmatic flexibility and/or task-based workspaces. This results in an architectural program that is often far less hierarchical than the original programmatic use of these buildings.

This type of adaptive use affirms the firm's rise to prominence and their contribution to the urban narrative. Examples in Amsterdam include Guerilla Games, Booking.com and Tommy Hilfiger, and in the non-profit sector, Amnesty International. When demand for space exceeds their current space; *Whales* often choose to acquire additional buildings (satellite locations) in close proximity to the flagship building rather than relocating. As a result these locations can be described as particularly *sticky* [12].



Fig. 8. Guerilla Games, an Amsterdam-based gaming company that now operates as a subsidiary of Sony, occupies part of a redeveloped building in the Canal Ring. Employing more than 120 persons, the firm epitomizes the *whale* typology; it was deliberate in its choice of a central location and a highly adaptable landmark building.

2.3 Relationships among typologies

First, not surprisingly, among these typologies it is possible to observe generally an inverse relationship between the size of firm and permanence of location. Second, it is possible to observe clear symbiotic relationships between certain typologies, and possible, among all typologies. For instance, remora (and particularly the freelance worker element of this typology) not only move between locations, but also between projects and companies. As such they contribute greatly to the recombinant quality of the innovation ecosystem. They are a natural complement to both the whale and the shark typologies. Within the numerous co-working sites found in Amsterdam, it is often possible to observe a range of typologies; it may in fact hold true that diversity (both in typology) as well as within industry focus may in fact be one indicator of robustness. Third, firms vary in their degree of vulnerability to location displacement. Firms (including sole proprietors/freelancers) that can be described as “Remora” are knowingly vulnerable and prepared to move, but they easily latch on to other sites, whereas whales, and to some degree, sea turtles, have secured their position by demonstrating willingness to pay for critical resources. The perceived and likely very real advantage of many co-working sites – the option to rent month to month – appears to be most attractive to three of the six identified typologies – coral fish, turtles and sharks. As such, it is the firms that fit these typologies that are also most vulnerable in a “hot” real estate development cycle, with the paradox being that a key driver of development interest – emergent innovative firms – may find themselves soon priced out of the market.

Relative programmatic diversity is an important differentiator among these typologies and the building, district and city scales are all implicated. *Remora* can be considered spatially “a programmatic” in that they do not possess inherent programmatic qualities, though they show themselves to prefer what are classically defined as “third places” as mentioned above. The work spaces created by *hermit crabs* is often very programmatically limited. Offices rarely include formal reception spaces and may include only nominal support functions (such as a coffee bar); hermit crabs, too, rely greatly on “third places” of the city and in doing so, fortify the weak but important ties within their social networks [13]. Firms found in co-working sites, including coral fish, sea turtles and sharks typologies, are often attracted to such sites due in part to the spectrum of task-oriented workspaces (and support services) they offer. These communal assets are a key driver of knowledge sharing and collaboration that takes places *within* such locations, but importantly, co-working sites tend to be highly permeable. As such, they may be particularly effect in promoting knowledge transfer both within and outside their walls. Finally, whales tend to develop as the most internally programmatic complex sites, providing a range of amenities (task oriented work spaces, catered and self-catered kitchens, gyms, theaters, gardens, and massage rooms, to name a few examples) that bears some resemblances to closed campus models of headquarters found in suburban settings. Such investments are intended to attract and retain workers, and importantly, to enhance the productivity of workers – both in individual and group work. In offering such sophisticated internal programming, they set the stage for very different relationships between their workers and activities taking place at the district level. As such, whales risk creating a situation where they are proximate to knowledge flows but not directly involved in them.

3. Conclusions

In this paper, I introduce a new method for considering the value of cultural heritage and the historic built environment in relationship to productivity in the 21st century. Findings reframe conceptual understanding of adaptive use, producing new implications for urban policy and regeneration strategies, both in the cities being studied and in the broader context of urban development. They shed some light on what is actually taking place in the process of adaptive use, one of the most resource-efficient strategies for city making from both upfront capital cost and long term strategic investment perspectives.

While it is too early in the research process to determine precise implications, these preliminary findings raise important questions about how existing knowledge is transferred and new knowledge is generated and they suggest that the quality of place, informed by physical attributes, communicative value and social function, plays a substantial role. Rather than focusing merely on physical conservation, this suggests that sustaining cultural heritage is a matter of understanding timeless human needs in a rapidly changing context.

The development of specific location typologies argues for more holistic approaches to urban sustainability, in which cultural, economic and environmental issues are seen as interrelated. In particular, this research demonstrates the specific role of culture in generating conditions as well as behavioral mechanisms that influence location choice. These choices are important, not only because they impact the use and value of the built environment, but also as the building blocks of capacity for individuals to engage creatively and innovatively in the solving of complex problems.

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'The Fragile Ecosystems of Memory': Literary House Museums in New Zealand

Elizabeth AITKEN ROSE
School of Architecture and Planning , National Institute of Cr eative Arts and Indust ries, The University of Auckland, Auckland, New Zealand
e.aitken-rose@auckland.ac.nz

Abstract
Literary heritage has m any facets, with texts and wr iters at its core. M ore generally i t i ncludes the infrastructure preserving texts and sites associated with writers. This paper focuses on literary house museums and the role of physical artifacts and com munity networks play in nurturing cultural memory. Appreciation of literary houses as si gnificant cultural and econom ic assets expanded internationall y in the twenti eth century. Today t here are agencies protecting and prom oting sit es with associated scholarship. Literary houses have idiosyncrasies, but also com monalities with other form s of tangible heritage and wider debates around rele vance, preservation and touris m. The m ajor issues are investigated through case studi es of New Zealand's l eading literary house m useums. These explore the creati on, conservati on and val ue of l iterary houses; and thei r pri vate, publ ic and l egal support. They highlight the complications of heritage, evolving webs of significance and its material and political vulnerability. While writers m ight prefer to be rem embered for their lit erature, their hous es perpetuate reputations and provi de a condui t to new audi ences. Houses, often perverse and pecul iar, offer narratives of personalities, place an d history. All of New Zealand's literary houses have led to the preservation of unexceptional sites, but values revise over tim e. They now offer insights into 'ordinary' architectural history and urban development, becoming inadvertent catalysts for broader reflections on evolving social history, cultural identity and heritage values.

Keywords: New Zealand; Literary House Museums.

1. Introduction

New Zealand novelist Peter W ells[1] observes that in his country "The fragile ecosystem of m emory vibrates like a cobweb trembling during a downpour". This poetic allusion to the complexity of the past and its intense vulnerability in the present and future is the subject of this paper . It em phasises the literary house museum as a medi um for expl oring heritage and, in parti cular, the socio-econom ic processes and networks that nurture i t. The 'softer' di mensions of heri tage are often i gnored in New Zealand heritage policy discourse, where public authorit ies privilege the regist ration, regulation and professional conservation of the physical artefact. Yet the sustai nability of the com munities of interest supporting built heritage m aybe the m ost im portant factor in securing its longevity. These issues are investigated through case studies of three of New Zeal and's leading literary house m useums: the Frank Sargeson H ouse (Auckland), t he Katherine M ansfield Birthplace (Wellington), the N gaio M arsh House (Christchurch) and the Janet Fram e House (O amaru). They draw critically on archival materials, policies and plans com plemented by qua litative interviews with stakeholders. The paper begins with an exploration of literary heritage and its museums internationally.

2. Literary Heritage, Tourism and Houses

Literary heritage is m ultifaceted. Texts and writers are its heartl and. Beyond, i t i ncludes the infrastructure supporting, prom oting and preserving texts (publishi ng houses, libraries, archives, and literary canons) and the sites associat ed with writers (houses, workpl aces, graves and m emorials). It has its own cultural landscapes (p laces and topographi es inspiring l iterature or ani mated by i t) and

includes trails and events celebrating literary works and personalities. In principle literary heritage, like art, is underpinned by intrinsic values. In practice it often requires paying visitors to ensure its survival.

Literary tourism - journeys inspired by writers' lives or work – often makes literary heritage viable and is increasingly packaged as a collection of destinations or 'branded' landscapes by local authorities, tourist boards and entrepreneurs. It began with the Greeks, but is usually traced back to the aristocratic Grand Tours around Western Europe in the eighteenth century, developing commercially in nineteenth century Britain and America with the growth of literacy and improvements in transport. It accelerated in the twentieth century with globalisation, growth of travel writing and screen adaptations of classic and popular works. The literature-tourism relationship becomes more complex in the late twentieth century. The original text diminishes in relevance as non-readers and tourists encounter literature through film, merchandise, festivals, theme parks, tours and museums[2]. Film, in particular, contributes new meanings, metaphors and fantasies, turning space into place, and travellers (often unacquainted with the literature itself) have become more interested film locations than fictive settings.

Literary houses, with some exceptions, focus on an individual writer. Appreciation of them as significant cultural and tourism assets expanded in Europe, North America and Russia during the twentieth century and today there are a number of agencies protecting and promoting sites, scholarship and networking[3]. There are more than 200 houses in France – many in public ownership (usually the municipality), unlike Britain and America where most are privately owned, generally by non-profit trusts and societies. Given there were 145 places dedicated to memorialising writers in all of Europe in 1972 France alone indicates significant expansion[4].

They are curiosities. A writer surely would wish to be remembered for literature. Yet books alone seem insufficient. Readers, writers, tourists and citizens are "randy for relics" [5], even those of dubious authenticity. Shakespeare's birthplace, for instance, whilst there is evidence his father owned it and daughter inherited it, the Bard's connection remains speculative. Nonetheless, in 1900 it attracted 30,000 visitors and over 300,000 in 2005 [6]. According to Robinson and Andersen [7] literary houses are the most important literary tourism resource, appealing to a range of markets "as focal destinations […] (providing) tangible connections between the created and the creator, allowing tourists to engage in a variety of emotional experiences and activities." The house (and sometimes its environs) becomes another form of text to be read by the visitor – with elements selected, ordered and interpreted to tell a particular story about an author and sometimes other stories about the author's milieu, legacy, or literature and heritage generally. These stories alter over time, responding to new audiences, museum practices, owners' tastes and evolving cultural contexts [8]. Likewise the houses evolve, physical integrity eroded by routine maintenance, conservation and curatorial practices.

The writer's imprint varies – some were created and decorated by the occupant and can be read as another form of creative expression alternative to the texts, or as a material biographical expression of social status, aspiration or gendered stances; others are shaped by cultural processes after the writer's death. Hendrix[9] explores the evolution of a writer's house from individual to collective memory through European cases studies. He observes that the writer's reputation is critical in the development and survival of the house. The special appeal of literary house, beyond other forms of personality related heritage, lies in the fusion of fact and fiction. Visitors communicate with writers through their most intimate spaces and objects, and engage their own creativity. Houses become springboards for new imaginings and remembrances in ways not roused by elite heritage possessing high architectural values. Hendrix and Watson[10] attribute the growing popularity of literary houses in the nineteenth century to a number of factors: the yen for a physical connection with history, rise in romanticism, preoccupation with genius and emerging cultural nationalism.

The fusing of fact and fiction is multidimensional. When the house becomes a museum and part of collective cultural memory new stories evolve. There is considerable variation in the preservation and staging of literary homes. Robinson and Andersen[11] observe that fashions in presentation have shifted from formalized display cases to stage-managed ambiences – suggesting the writer has merely stepped out for a moment. An illusion as the writer is usually dead – a prerequisite for memorialisation and conducive to expanding the tourism offer. The 'genius loci' of genius and the objects associated with creative practice fascinate. The writer's desk has special significance, as do books, typewriters and pens.

Lavishly illustrated coffee table texts on writers' houses usually promote them as mediums for communing with authors [12]. In Marsh's[13] more substantial work she values the knowledge writers' houses add to understanding a writer in their environmental and historical contexts and observes that while some might survive for their architectural values or magnificent gardens, most of the ordinary places would not have endured or be publically accessible but for their literary inhabitants. Literary

houses perpetuate fragments of townscape and records of social, technological and urban change that might otherwise have been overlooked in portfolios privileging aesthetics.

Literary houses are peculiar, ambiguous and often inconvenient. Literature, not architecture or location, make the place and inhabitant important. Here built heritage comes alive within a broader cultural ambience, yet it is often heritage of a quotidian nature. Writers are usually poor and their residences are not always located in beguiling neighbourhoods or on popular tourist circuits.

3. Management of Literary Houses

Research on the management of literary heritage properties is limited. Smith[14] focussed on the role and motivations of volunteers in UK literary museums. Volunteers are critical to their operation and engage for a variety of reasons: they have the time; enjoy social interaction; gain skills and experience; and/or have a particular interest in the property, author, local history, architecture or literature. This appears to be true of British museums in general, although the significance of volunteering is largely unappreciated or well researched. Museums are almost invariably founded by volunteers who continue to play an important, if not essential role in their operation and longevity – with subject interest and social relationships being the key motivations[15]. Orr notes that volunteers undertake governance, management and various tasks including conservation, research, documentation, exhibitions, interpretation, security, marketing, fundraising and administration: "Without volunteers many museums would struggle to function or, in the case of those dependent entirely on volunteers, would cease to operate altogether" [16]. Britain's *National Trust* operated with the support of 55,000 volunteers in 2009, contributing an estimated 3.1 million hours, valued at £25 million[17].

The institutionally fragmented governance and management of literary house museums in the USA contrasts with apparent stability afforded by umbrella organisations such the UK's *National Trust*. The *Literary Landmarks Association* (formed in 1986) dedicates sites and supplies plaques for a fee, but its mission is advocacy, not material support. Most are under the care of private foundations and perennially challenged by maintenance and development costs, particularly given variable visitor numbers. High profile sites, notably the Mark Twain and Edith Wharton houses, have faced foreclosure. House museums, per se, are popular in the USA, but highly problematic unless well valued by their communities and managed by skilful and strategic boards[18]. They are products of the cultural, social and political circumstances in which they are founded, often by people with limited understanding of the realities of actually running them and survive only if they receive substantial funding and remain relevant in the evolving present. Harris [19] makes a case for the 'de-museumification' of those most at risk, arguing that buildings stand a better chance of long term preservation if they shift back into individual ownership with appropriate conservation safeguards; or reprogrammed for other uses, such as study; or merged or co-operatively run with other likeminded institutions.

4. New Zealand's Literary House Museums and Heritage Framework

New Zealand's literary heritage is comparatively young and its house museums a small but expanding niche. All have been local private initiatives, where the motivation has been to celebrate New Zealand literature and cultural identity. In this respect they echo arguments elsewhere that heritage is a cultural process[20] and for local people "a social process rather than the physical object to be preserved"[21].

New Zealand literary house scholarship is modest and emphasises literary and marketing perspectives. McLachlan[22] investigates how they operate beyond and outside fictional texts, although these remain the only genuine and inherently meaningful artefacts left by their absent writers. He argues these sites are created by 'sociable readers', for whom literary texts are of secondary importance; and like Hendrix contends that they essentially reflect the communities creating them and not the individual they honour. Thyne et al.[23] focus on visitor experiences. Although different in disciplinary orientation, this research also supports the sociability of such sites – where subjects, objects, and mythologies kindle visitors'



Fig. 1: Locations of New Zealand's Literary Houses

emotional engagement with writers and wider literary community. They may contribute little to visitors' understanding and interpretation of writers' texts, but visitor interviews indicate they promote interest in the writer's work – as well as New Zealand literature and heritage generally. Collectively this work illustrates the intricacies of heritage sites, particularly those memorialising an individual – in this case individuals who are not just writers but figures embedded in dense cultural tissue, mediated by the time-frozen spaces they once inhabited and the successive communities attending them – who ascribe (and receive) their own multifarious meanings.

The following explores the instigators and guardians of New Zealand's leading literary house museums. Before turning to these it is useful to have a brief understanding of the country's statutory heritage framework. The New Zealand Historic Places Trust (NZHPT) (established in the 1950s) is an 'arms length' Crown Entity maintaining a national system of registration of historic places and sites. Its property portfolio is minimal and funding compromised; its role is primarily advocacy and advice. Territorial authorities deliver heritage regulation under the mandate of the Resource Management Act 1991 (RMA). Local councils maintain independent heritage schedules. The focus of the professional heritage management authorities is on the physical artifact and its preservation. Criteria for registration are predefined and traditionally grounded in architectural and/or historical significance, although other values such as social, cultural and technological are now taken into account. Funding for heritage is limited – the NZHPT, national Lotteries Commission, community trusts and some councils provide heritage grants. Councils may also offer property tax remissions etc.

4.1 The Frank Sargeson House

Frank Sargeson (1903-1982) was recognised as New Zealand's leading literary nationalist in the 1940s and later admired as a literary mentor. His house on Auckland's North Shore is possibly the only "fibrolite literary memorial in the world"[24]. Moving to the area in 1929 after a humiliating conviction for homosexuality, he lived initially in a decaying family bach (seaside weekend cottage) until the local council ordered its demolition Plans for a new bach drawn up by a friend (and noted vernacular architect) proved too expensive and another friend, a Hungarian émigré builder, constructed a pared-down version at cost. In 1948 Sargeson moved into the simple three-roomed house, living there until his death in 1982, supported by vegetables he grew in his garden, various pensions and sporadic royalties. The Council granted him permission to erect an old army hut on the back of the section solely for storage. It housed his friends and protégées until it was invaded by rats and demolished in the 1960s. Using a legacy, Sargeson added another room and verandah to the bach for long-time friend Harry Doyle in 1967. The North Shore morphed into bungaloid suburbia following the construction of the Auckland Harbour Bridge (1959). Sargeson's unsealed cul-de-sac became a main route to the Bridge, increasing traffic volume destroying his tranquillity and the arts bohemian community attracted to the Shore by cheap rents, and quirky informality. Sargeson's health deteriorated towards the end of his life and the famed vegetable patch turned into wilderness.



Fig. 2: The Frank Sargeson House, Auckland. E. Aitken Rose

When he died neighbours called for the bach to be razed, but his heir and literary executor, Christine Cole Catley, gathered the friends who had relished his hospitality to form a trust and preserve it as a literary museum. Set up in 1983, with pro bono legal assistance, the Frank Sargeson Trust initially had five trustees: prominent writers, journalists and an architect. Cole Catley transferred his modest savings, royalties, house and quarter- acre section to the Trust. 'Friends of the Sargeson House' (an ephemeral ensemble of writers, academics, teachers and local citizens) tidied the site, re-roofed the house and sorted through his voluminous books. The house was arranged with "judicious fakery" to resemble its mid-sixties state when Sargeson was deemed to be at the height of his powers [25]. The vegetable patch was not restored, but the garden cleared to "assume the appearance of a carefully structured wilderness" and fenced with the help of periodic detention labour[26]. Trustees sprinkled

Sargeson's ashes in his front garden without religious ceremony, as he instructed. His most valuable books and papers were sold, but much memorabilia remained in the house. The house is often referred to as a 'shrine', albeit 'improbable', curious, depressing, and even perverse [27]. Sanctity was sacrificed with the sale of the back garden and progressive widening of the street. The subdivision was necessary to raise funds to attract government subsidies essential to launch the residential fellowship establish in a central Auckland heritage building.

Sargeson continued to have a hostile relationship with the local council after his death. Neighbours protested that the bach was a monstrosity at the subdivision hearings and full rates remission commensurate with its museum status was hard won. Its heritage value was officially acknowledged when the house was listed in Council's District Plan (land use plan) 1998 and given the highest classification recognising its significance beyond the locality and protecting the exterior, interior and site. The City Planner made it clear that this was not for its architectural value. Road-widening threatened to shear five metres off Sargeson's front garden in 2001 and over several years the Trust negotiated with Council engineers to reduce this - elaborating on its original 'significance' story at the designation hearing to embrace its spiritual and social history dimensions, along with tourist potential[28]. Independent Commissioners subsequently upheld the site's 'high cultural significance' and only a metre of the site was conceded.

Although approached, the NZHPT showed no interest in scheduling the house at the time of Sargeson's death. This position conspicuously reversed in 2004, following an application by architects working on a voluntary basis, when it was given the highest status (Category 1[29]) and registered as "a key asset in New Zealand's cultural identity"[30]. Many of the factors identified by the Trust in unflagging advocacy over the years were recognised in the NZHPT's significance analysis. Although the first of New Zealand's literary house museums and arguably its most authentic, it is, along with the Marsh House, the least professionally and developed. Upkeep of the house has been supplied through voluntary effort. The Trust secured grants for a conservation plan in 2007 and a substantial grant in 2009 from the Council was used to undertake critical maintenance and upgrade fire protection and security.

Considerable voluntary time and effort has gone into meeting the challenging demands of grant writing and reporting. Heritage grants generally cover partial costs – either involving stitching together a raft of applications, or a call on the Trust's reserves. Heritage status, while improving grant credibility, imposes potential costs on owners. Anything more than routine maintenance may require a resource consent (some local councils offer remission) and a building consent. The Sargeson Trust, for instance, had to pay for a building consent for the installation of a fire protection system – considered the highest priority in the conservation plan and endorsed by the Council and NZHPT.

Funding for a curator and/or administrator to assist with planning, fundraising and making the house more publically accessible has yet to be secured. Of even greater importance is the need for on going conservation expertise, which cannot be addressed through well-meaning voluntary effort. Conservation is a process not amenable to periodic project funding. If the Sargeson house is to survive it requires consistent professional oversight and continuous implementation of a maintenance schedule, along with regular monitoring. This is particularly acute with respect to the chattels. A 2010 survey[31] commissioned by the Trust indicated 14% of the artefacts had deteriorated beyond repair, with a further 14% requiring urgent attention. While visitors enjoy the closeness and immediacy offered, relics are susceptible to deterioration through human contact and theft.

There is also an inherent conflict in its use as a "lively meeting place" and museum reflective of a particular period. For trustees who knew Sargeson it remains 'Frank's place' and the disciplines of conservation complicate their attachment to his 'atmosphere'. As most are writers (and heritage amateurs at best) they find it difficult to comprehend the need for conservation plans – and some bitterly observing that professional heritage services cost more than they earn in a year, or Sargeson over a lifetime. As Sargeson's trustee friends' age, the need for a more professional approach to running the house becomes paramount – if it is to be appropriately interpreted when they are no longer available to bring it to life.

Apart from grants, the house is supported from the Trust's small capital base, an itinerant Friends network, limited sponsorship and donations. Its parallel commitment to residential writing fellowships, including the operation of another heritage property further stretches resources. Unless the Trust receives significant public funding or philanthropy, it will never be able to retrieve the back section, yet its loss has de-contextualised the house, which no longer affords the sequestered productive verdure that was much part of Sargeson's mental and practical topography. Lack of space also restricts tourist development. The house is too small to provide proper facilities for administration, education and

merchandising – and Sargeson's poverty is hard to sell. The house is open by appointment and during heritage weeks, and relies on strong linkages with the local Library. Formal statistics are not kept, but visitors are estimated to be around 400 a year. There is no entry fee, nor merchandising. Much of its charm lies in the absence of roped-off spaces and formal displays – offering the visitor intimate communion with Sargeson's meagre relics. Interpretation is still supplied by his friends and knowledgeable librarians.

It is as much a monument to those who create cultural memory in New Zealand, as it is to a writer and era. As is often the case in New Zealand, local government and NZHPT played a reactive role, responding to the passion and fidelity of local idealists by eventually conferring the legitimacy of statutory protection. Particularly compelling in this case is the shift in attitude and values across the decades, where a building treasured by a few evolves into a site of national significance with multiple meanings. The Sargeson House's survival still relies on volunteers and their capacity to navigate bureaucratic process to achieve competitive, often parsimonious, conservation grants, let alone safeguard its structure and contents.

4.2 The Katherine Mansfield Birthplace

Katherine Mansfield (1888 - 1923) was New Zealand's first internationally acclaimed writer and a pioneer of modern writing. She lived in Europe in her adulthood, but her most celebrated fiction drew on childhood memory. Her birthplace in Thorndon, Wellington was the least pretentious residence in a series of grander properties owned by her upwardly mobile father, but bourgeois compared to Sargeson's. Her family moved into two-storeyed weatherboard five-bedroomed house in the year of her birth and she lived there for five years. It had many subsequent owners, was converted into flats in the 1960s and the fern-filled gully beyond the back garden was dramatically reconfigured with a motorway in the 1970s. Many of the houses Mansfield lived in before her exile abroad succumbed to urban change and the Birthplace was assumed demolished until an accident in street numbering was discovered by Oroya Day, then on the board of the NZHPT. Unlike the Sargeson House, where writers who had personally known the author were instrumental in its preservation, the other houses under consideration were saved by those engaged in some capacity with the NZHPT. Day, an art historian, hastily ensured the Birthplace was registered Category 1 by NZHPT (1986), but the Trust refused to buy it because of the operating costs.



Fig 3: The Katherine Mansfield Birthplace, Wellington. E. Aitken Rose

Like Cole Catley, Day had the vision and strength of character to take on the project herself. She had spent time in Britain and appreciated its tourism potential, but primarily wished to symbolically reclaim Mansfield for New Zealand against competing claims from France and Britain. Adamant that it should not be a shrine, she hoped it would eventually become part of a worldwide network of writers' houses. Day formed the charitable Katherine Mansfield Birthplace Society in 1987 to acquire and preserve the property for the benefit of all New Zealanders, foster an appreciation of Mansfield's works, advance New Zealand literature generally and provide an educational resource and tourist amenity. With NZ$100,000 apiece from the Ministers of Tourism and Internal Affairs, Department of Tourism and Publicity and Stout Trust, plus a contribution from her own family, the house was purchased later that year. A twelve-member board charged with the following values governs the Society: professionalism, accessibility, community involvement, education (Mansfield and NZ literature), and co-operation (with heritage and cultural tourism agencies)[32].

Professionalism has been an abiding ethos from the outset and today it is by far the most sophisticated of the literary museums. This has been underpinned by a pragmatic understanding of the importance of tourism in sustaining this. Initially the Society thought to restore it as a writers' research centre. After an NZHPT archaeological survey uncovered vestiges of the original décor, the

Society decided to refurbish the house reflective of Mansfield's era, based on excavated artefacts, photographs and her literature, in accordance with ICOMOS conservation standards. This decision cost the Society twice as much as the original proposal, despite all the professional assistance being volunteered. Chattels relevant to the period were donated or lent – solicited from the community through a wish list. Volunteers created a 'heritage garden', referencing Mansfield's writing and colonial seed stocks; prisoners constructed the fence. The house opened a century after Mansfield's birth and is a fastidiously restored example of late Victoriana. It contains none of her personal possessions. Those owned by the Society now so frangible and valuable they are stored offsite for security and conservation. The house is staged and non-interactive, with exhibits carefully arranged to suggest real life – minus the occupants – and roped-off from visitors.

Fundraising for the restoration as arduous – with many hours expended on the carefully composed and targeted applications necessary to achieve the many grants required, as most were small[33]. Thirteen years into the project with numerous conservation and tourism awards, insufficient revenue remained an issues, even though the Council contributed to operating costs, partially covering the employment of a fulltime administrative director. The Society is acutely aware of the museum's vulnerability to shifts in political priorities (and sensitive to potential equity claims from less favoured cultural and civic institutions). It constantly works towards a diversity of robust revenue streams, but acknowledges the support it has received from the Council has been invaluable in its development and essential to its survival, given that New Zealand does not have a culture of philanthropy and limited central government support for local cultural institutions. Local government is restricted by its traditional property-servicing ethos and ratepayer conservatism. Grant writing continues, limited by the amount of time staff and trustees can devote to it - that these are entailed to capital projects and not running expenses frustrates the Society as much as it does the Sargeson Trust. Additional revenue comes from entry and tour fees, merchandise, Society subscriptions and special project grants. Although not on the central city tourism circuit, the house is accessible to tourists relative to the other literary museums. While every effort is made to maximise visitor attendance, this is ultimately constrained by an ICOMOS recommended maximum of 12,000 (to protect the building's fabric). Insurance is the largest single cost. Using seed capital provided through sales of a popular exhibition it set up The Katherine Mansfield Birthplace Endowment Trust in 2008 to attract bequests.

A lawyer currently chairs the Society's board of ten members (maximum twelve). Shoulder tapping is used to secure particular skill sets and trustees work "in a hands-on manner" on specific projects in addition to governance. Part-time curators and rigorously trained volunteers assist the full-time director. A group of 'honorary advisors' contribute specialist skills and expertise. The house is well networked into the greater cultural tourism offering of Wellington City and is a focus for educational tours on social, historical and technological subjects relating to colonial life. In contrast to the other houses, it maintains a comprehensive and updated website, regular newsletter and educational resources supporting school curricula.

The Birthplace again illustrates how places initially valued by a few can over time, be appreciated by a wider public for richer complexes of significance; and of voluntary effort required to ensure its survival. Leadership is crucial – the founder was adroit at constructing networks of goodwill, expertise and political favour. When she retired the project shifted into another phase. Although professionalised it is still reliant on considerable voluntary effort, much of it highly skilled. It remains vulnerable to shifts in political and economic circumstances and its development is contingent on the quality of its governance. It is hoped that it will eventually be covenanted by the NZHPT to protect it being captured by a 'rogue board'; with its constitution, conservation plan and endowment programme securing it against those who might "highjack the spirit of the place" [34]. Those who govern and manage the Birthplace see themselves as custodians of the past. The writer "anchors memory"[35], with the house retaining historical fragments evolving new meanings and audiences.

4.3 The Ngaio Marsh House

Dame Ngaio Marsh (1895-1982) was both patriot and expatriate, dividing her adult life between England and New Zealand. Internationally acclaimed as a detective fiction writer, she is considered one of the 'Queens of Crime', equal in stature to Agatha Christie. She was New Zealand's first blockbuster novelist, widely translated and is still read today. Her reputation as a writer is stronger abroad than in her native country, where she is better remembered as a theatre director and part of a constellation of Canterbury-based artists credited with the emergence of a national culture. Like Sargeson, she was a generous mentor, especially in the theatre.

When New Zealand Marsh lived in Marton Cottage, Cashmere, Christchurch from the age of ten until her death. Samuel Hurst Seager, a leading Christchurch architect and a relative, designed the original house. A modest dwelling of four rooms, semi-circular open verandah and panelled timber interior of English Arts and Crafts influence, it remained the heart of the building as it was added to over the years. Although not an architectural tour de force, inter alia, it tells the commonplace New Zealand narrative of pragmatic extension. The 0.3hectare property, originally bare hillside, was slowly converted into terraced gardens. Secluded and peaceful, it lies at the end of steep and narrow bush clad street and driveway.



Fig 4: The Ngaio Marsh House, Christchurch. E. Aitken Rose

Marsh bequeathed the house to a Sydney-based relative, who decided to sell it in 1992. The NZHPT registered the house Category 1 in 1985 and was approached to buy it, but lacked the funds. A group affiliated with the local branch set up The Ngaio Marsh House and Heritage Trust in 1995 to purchase and preserve it. The constitution provides for seven trustees, six appointed by the Board itself and a custodial trustee appointed by the Perpetual Trust. This model, which varies from the governance structures adopted by the other houses, and is intended to ensure enduring succession, provide public accountability and financial probity. A retired lawyer has chaired the Marsh Trust since inception, his interest in the house part of a wider engagement in Christchurch heritage. Over the years the Trust has benefitted greatly through the dedicated energies of retired professionals, along with academics and a local architect. The Trust's constitution states that its purpose is further appreciation and study of Marsh's literary and dramatic accomplishments, but essentially the house is intended to be a symbolic springboard for wide-ranging conversations promoting the region's contribution to national cultural heritage - "valuing and capturing an artistic icon in a country that is mad about sport" [36]. The house was bought by the Trust with bank loan and second mortgage from the Christchurch City Council. The Council eventually wrote-off this off, but provided little additional support other than partial rates remission and help with landscaping. The mortgage has been increased from time to time to provide for necessary maintenance.

The Marsh House opened to the public in 1996, following protracted negotiations over neighbours' objections to increased traffic. Open only by appointment, it receives around 200 visitors a year, one-third from overseas and mostly women. Revenue comes largely from entry fees, grants, donations and tenanted flat at the rear of the property. A Society of Friends (formed in 1996) fundraises. A small basket of Marsh's crime fiction, audio books and postcards is the extent of the merchandising. The Trust struggles to make ends meet, servicing the loan being the biggest issue, although the Perpetual Trust's administration charges are also considerable. Limited funds restrict publicity: brochures, rudimentary website and networking. Security is provided through an alarm system and the tenanted flat. Essential fire protection has yet to be afforded. The conservation plan was prepared in 1993 by an architect trustee on a voluntary basis. The trustees, many now over eighty years, do the administration, promotion and the garden. They are also the guides, providing interpretation through storytelling. Only one of the current trustees knew Marsh personally and took photos of the house when she died. These were used to reassemble her memorabilia, much of it leased to the Trust on a peppercorn rental by Marsh's relative, to suggest she had just stepped out. Seclusion adds to the House's charm, but its suburban location, restricted easy public transport, precipitous access, fractious neighbours, meagre publicity and entry by appointment limit visitor numbers. Given minimal public assistance, outstanding debt and the costs of maintaining (let alone professionally securing and conserving) an aging property makes financial viability problematic long-term.

Although diversely skilled professionals, the trustees are keenly aware they are merely "amateurs doing their best" [37]. The leased chattels are a vulnerable to the whim of their owner, now in his

seventies. Trustee succession is pressing issue as those asso ciated w ith M arsh and her m ilieu diminish. It rem ains to be seen w hether newcomers will replenish this trust w ith the necessary vision, acumen, time and energy to sustai n her house in the future. There is a palpable sense of exh austion and disillusion expressed by som e of the trustees , particularly w ith public bodies responsible for heritage - NZHPT consi dered excessi vely bureaucrati c, but offeri ng l ittle substanti ve hel p. Another complication is the current lack of recognition given to Marsh's literature in New Zealand.

5. Conclusion

Undoubtedly most writers would wish to be rem embered for their w ords and not the ancillary leavings of their lives. One can only s peculate on whether M ansfield, Sargeson and M arsh would have appreciated their private domains opening to the public gaze. The Sargeson Trust has been assiduous in keeping its writer's memory alive (and fomenting his mythology) through books, films, his house and a writer's fellowship. Notwithst anding the 'j udicious fakery ' i nvolved i n i ts restorati on, the house (although stri pped of i ts context) undoubtedl y offers the m ost authenti c envi ronment. Its scal e, accessibility and lack of com mercialism give it a c oherence, intimacy and ap pearance of sincerity not fully achieved in the other houses, which dedicate spac e to administration, education and, in the case of the M ansfield Birthplace, m erchandising. While such functions assist in the su stainability of these houses (and add to the offerings) they inevitably interfere with the pretence that the writer has slipped away momentarily. The Sargeson House's authenticity is also a reflection of its rudimentary transition into a m useum. If it is to endure trustees w ill need to find a w ay of m aking it m ore publically accessible, tap new revenue streams, and provide interpretation not reliant on trustees or the goodwill of the local library, along with intr oducing conservation practices to pr eserve its fragile collection. Of the three houses, Marsh's is perhaps the most immediately vulnerable, reliant on its aging trustees for most of its support and operati on, while waiting for a resurgence in national interest in her literature. Mansfield continues to have a power ful critical reception, and is well ensconced in educational curricula in New Zealand and abroad. Every opportunity to reference her work is evident in the Birthplace, although di rect connections are m eagre. Great pr ide has been taken in its fastid ious restoration. Apart from Mansfield's enduring fame and relevance, the Birthplace has been blessed with political support and finance assist ing it to operate professionally and creatively, backed by good promotion. It is relatively well positioned as a tourist and educational asset, in a highly literate and prosperous civic setting pr oviding em pathetic univers ity and national cultural institutional networks. Ironically, however, for al l the attenti on to hi storical detail, it is less genuinely the pl ace of the wri ter than the Marsh and Sargeson Houses.

The audi ence for hi ghbrow l iterature i s probabl y rel ati vely rarefi ed uni versally and the New Zeal and market is sm all. Trends in book selling, w ith the rapid circulation of titles, does not favour those published m onths ago, let historicis ed fiction. W riters' houses, al though them selves appealing to a niche m arket, can keep nam es alive and provide a pat hway towards the words that m atter m ost to writers. They offer narrati ves – of personalities, place and history. None of New Zealand's literary houses are architecturally excepti onal – but values shift over tim e and now they com ment on social, cultural and urban hist ory. H ow future visitors (and readers) w ill respond to them is im possible to predict – intellectual, literary and heritage fashions change, but withou t the indefatigable efforts of individuals in the present the possibility of any response w ould be removed. Such individuals w ork, in the m ain, vol untarily through chari table organi sations, i n an envi ronment where sustai ned publ ic and philanthropic support is m odest, va riable and highly contestable, even when sites are accorded supreme heritage status. Cult ural tourism m ay be a life line, but developm ent is inhibited by factors such as fragility, scale and inconvenient location, issues troubling liter ary houses elsew here. Consistent funding for professi onal conservation, m anagement and pr omotion is essential if New Zealand's literary houses are to survive for others to craft new meanings.

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HERITAGE ARCHITECTURE LANDESIGN
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Representation and Continuity. The regeneration of the area, the city and the architecture.

Paolo GIORDANO
Dipartimento di Architettura e Disegno Industriale "Luigi Vanvitelli", Seconda Università degli Studi di Napoli, Italia
E-mail: paolo.giordano@unina2.it

Abstract
The continuity between what was, what is, what will be, is the prelude to any problem that arises, as its goal, the critical representation of a natural or artificial place. The urban sites represent sedimentation and accumulation of continuity transformative - obvious or hidden, present or missing - which, over time, helped to configure the characters identity. The comparison with the specificity of the places, the knowledge of the different sedimentary layers, the recognition of the values of witnesses, the distinction between relevant and irrelevant - to be implemented through the survey and the drawing in a perspective of logical connection between parts missing, existing realities and assumptions modificative - represent the conceptual assumptions for the construction of a new design of continuity. In this sense, a cognitive approach to graphics-based, research-based continuity, it is essential to identify those intonations architectural measures to redefine the lost harmony of the place raped by the consumer society. The town of Acerra, north of Naples, is an urban exemplum of great interest to test the responsiveness of the design with respect to the issue of continuity is due to the characteristics of its Urbis shape - of Roman origin - and because of the presence of an architectural monument, the Castello Baronale, able to enclose itself, evokes, the history of the city of belonging.

Keywords: relief, knowledge, modification

1. Reflections: city and continuity
The continuity between what was, what is and what will be, is the prelude, the necessary introductory reflection of any problem that arises, as its goal, the critical representation of a natural or artificial place. The urban sites, for example, represent the most of sedimentation and accumulation of those transformative continuity - obvious or hidden, present or missing - which, over time and as a whole, helped to configure the relevant characters of identity. The comparison with the character of specific places, the knowledge of the different sedimentary layers, the recognition of the values of witnesses, the distinction between relevant and irrelevant - to be implemented through the relief and redrawing it in a perspective of logical connection between parts missing, existing realities and modifying hypotheses - represent, as a whole, the conceptual assumptions for the construction of a new design of continuity. In this sense, a cognitive approach to graphics based, research based continuity, it is essential to identify those intonations architectural measures to redefine the lost harmony of the natural and man raped by the consumer society. A redefinition to be pursued through the conservation, regeneration and the quality of the architectural heritage of innovation and infrastructure of cultural landscapes and contemporary urban reality. Too many enclaves environment - rural and industrial, metropolitan cities and small towns, urban neighborhoods central and peripheral - are broken, or detached from any continuity between the parts and the whole that includes and features. The loss of continuity represents and symbolizes the decline of Western society in the failure palingenesis the new millennium. The twenty first century is presented, in fact, with a network of crisis offering an "immediate present" chaotic, messy, contradictory and conflictual both from a general point

of view, political and social, and from the particular cultural and disciplinary afferent the discourse on government land in its specific relationship between city and architecture. In this perspective, there can be no action for the protection of cultural heritage outside of a renewed ability to program a new idea of society more sensitive to issues of shared ethics and aesthetics of an undivided. The rigid self-knowledge and knowledge, not the sharing of disciplines, the lack of continuity between the various precincts of human thought are considered to be among the main causes of the drift qualitative afflicting the contemporary territory, needy, on the contrary, a science multicriteria shared. The ability to plunge more disciplinary information on a single theme can be a path of research fertile and productive in order to avoid the discontinuity of the shares dissolutive - tangible and intangible - that have contributed to degrade the cultural heritage and natural resources of our territories. Territories, especially the Italian's one, marked by the presence of driven millennial tracks, infrastructure networks, urban settlements and architectural monuments inherited from tradition and constructive founding of Roman antiquity: a culture that, with the exception of Rome city, based his work through a breakdown set of natural spaces (web centuratio chromatic) and artificial ones (the orthogonal grid of the castrum and the colony). Division of soils and construction of the works and civic infrastructure based on a rational logic able, however, to produce architectural and urban models always different from each other: a conceptual approval that did not prevent, within a perspective of continuity shared a wide case studies of different solutions from each other. Diversity in continuity: this was the main theme that has characterized amending, for nearly two millennia, the construction of urban and rural landscape of the Italian peninsula. Unfortunately that primitive rational order, produced by Roman urban culture and developed continuously until the first half of the last century, it was suddenly transformed in the last fifty years, a continuity of diversity that have undermined the equilibrium landscape of the "Bel Paese" . Natural areas marked by uncontrolled development savage urban peripheries heterogeneous and fragmented, towns attacked by building interventions inconsistent with the existing built, abandoned and derelict old centers: these are the main damage done by a consumer society unable to keep, if anything, regenerating, the significant cultural heritage that the remote past and next had bequeathed to the recent past and the contemporary. Reflect, through drawing on the different phases - and then evolutionary regressive - that have characterized the long period of construction - ordered and disordered then - the rural and urban landscape of the Italian peninsula, it means to ask a question regarding the possibility, or not, of continue to consume or, conversely, preserve and regenerate what has come to us in terms of tangible and intangible cultural heritages.

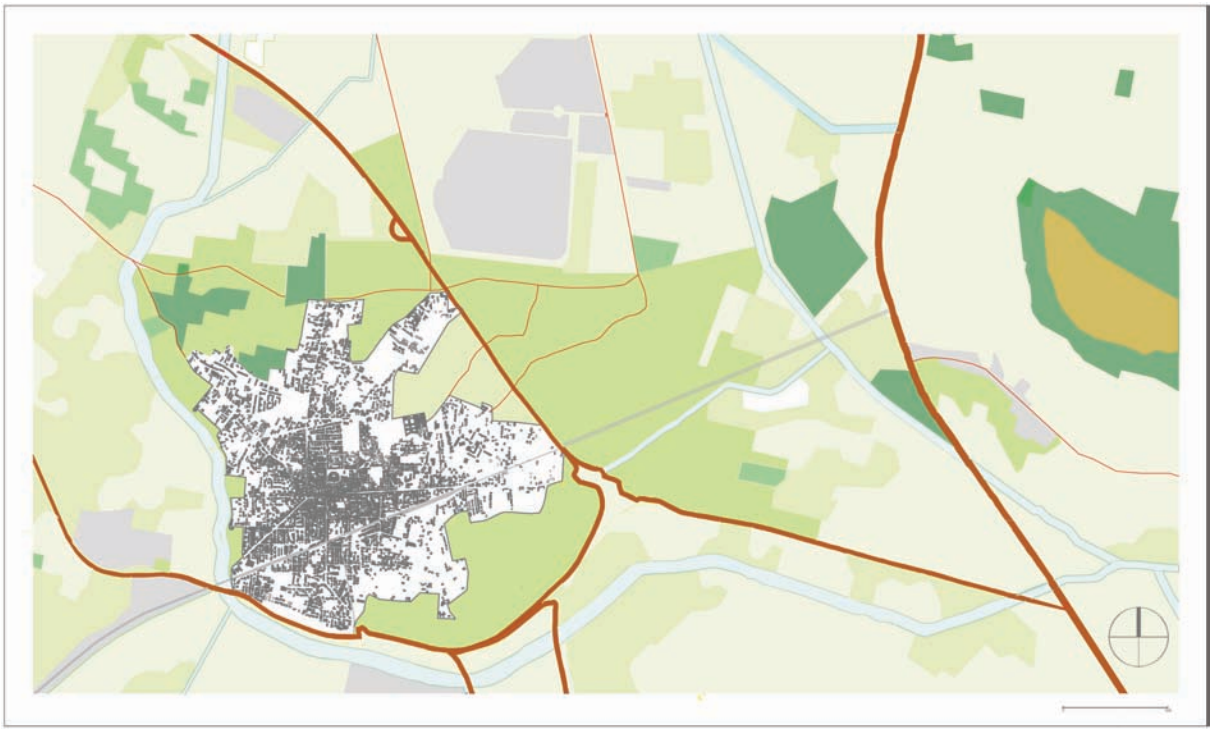

Fig. 1: Redesign of the City of Acerra, 2013.

2. Descriptions: cities and recognition

The town of Acerra, north of Naples, is an urban exemplum of great interest to test the responsiveness of the architecture design for the theme of continuity: both for the characteristics of its urban form primitive - of Oscan origin and, subsequently, Roman - and for the presence of an imposing architectural monument, the Castello Baronale, able to enclose itself, the history of the city where it is located. An examination of the relationship between the shape Urbis original Acerra and his contemporary deformitas Urbis - produced, the latter, from indistinct consumption of land peripheral and central - is addressed, in this study, not only through the analysis of the different phases historical growth of the city but also through the study of complex graphical changes made to its architecture is more representative. The dual reading concerning the knowledge of the fact urban and architectural object, it tends to make sure, first of all, if you can identify a consistent quality of the territory and the quality of architecture in certain historical periods, if, in addition, presence of an environmental decay there is a similar deterioration of the building fabric, if finally established a relationship of interdependence between the processes of evolution or involution regarding the large territorial scale and medium-scale architecture, the latter is able to produce, in regular operations of regeneration and reconfiguration mechanisms, environmental restoration, large or small. In this sense, the ability to exist, persist and resist demonstrated by a monumental complex - albeit abandoned and degraded - as the Castello Baronale of Acerra is the best answer - in terms of continuity - that widespread loss of recognition of the characters of identity territorial and urban places. The working hypothesis addressed in this study is based on the certainty that the cornerstones typological monumental - especially those who hold the historical memory of the places to which they belong - may represent the nodes of a network sheet material spread on the territory from which to tackle the most the great theme of environmental restoration and landscaping.

3. Setup: Tracks and specificity

If it is true that the signs of the territory, both natural and artificial ones, have the ability to detect the main characteristics and evoke the history of human settlements, then it is equally true that, between the centers of the middle Campanian plain, the city and the 'agro environmental exemplum of Acerra represent a quite unique and problematic. Unique to the presence of a rational urban layout, strongly geometrically placed in its historical core, conversely, in a rural setting that is characterized by the irregular pattern of agricultural land. Further problematic for the widespread presence of riverbeds, canals and marshy areas who, with their tortuous development or heterogeneous location end up further fragment an area that in the past has frequently been forced to rebuild their characters identity due to fragile ecotopo, so strongly vulnerable. Uniqueness and problems of agro Acerra (ancient liburia) characteristics are historically consolidated and form a specificity not irrelevant in the process of transformation suffered by the Campania Felix from the age of copper. Of Oscan origin, Akeru (of which Acerrae is the Latin name) was stabilized as the control center to the Campania and Puglia, giving rise to a small but vital community devoted to agriculture and pastoralism. Activities developed precisely because of the geographical complexity of the membership site full of vegetation, wildlife, courses and lakes. Fertility and specificity are considered the two main characteristics dell'Akeru Oscan which allowed the primitive riverside village to develop within the Osco / Etruscan[1] Campania in a small town, most likely, due to the current urban district located at noon compared to the size of the walled and fortified Baronial Castle. Then the experience of living in the structure Oscan Akeru, in 332 BC, he received first, in the Roman provinces, the civitas sine suffrage, ie the Roman citizenship without the right to vote, becoming, in fact in Acerrae Roman colony important bounded by walls regular and irregular able to incorporate the primitive settlement Osco. As pointed out by Paolo Zanker "A similar situation is also true for many of the ancient Roman cities of Lazio, Campania and Etruria with their archaic structures, often built on land conditions. In the case of nearly all these ancient cities we are dealing with elements incorporated later in the Roman state, where modern public buildings had to be inserted in a city that already existing. [...] Above all the cities in Campania and Etruria, before being "Romanized", showed the imprint of their own cultural traditions."[2]

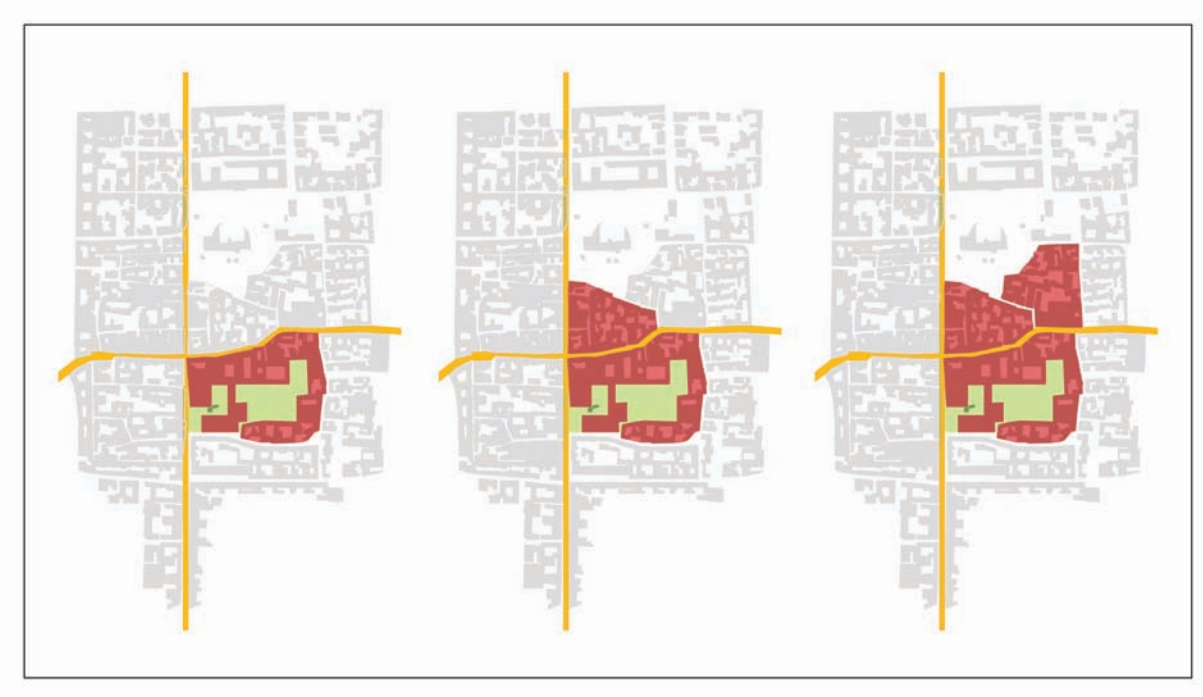

Fig. 2: Typological schemes of pre-Roman village.

4. Overlays: network and rationality

As regards the design of the historic territory Acerra in the last two centuries BC , Acerrae and agro Acerra were located geographically outside dall'Ager Campanus or from the wide extent of country - fairly urbanized and marked by the division of the orthogonal Roman centuratio - located north of Neapolis and going up to the south bank of the Volturno, is also included, from west to east, including the Domitian coast and the mountain ranges of the chain.[3] The lack of centuratio in his home territory did not prevent, however, the Roman Acerrae to acquire a plant in orthogonal grid able to incorporate the irregular Osco village. From the historical point of view the Roman Acerrae remained loyal to Rome during the Second Punic War and was besieged in 216 BC that partially destroyed by Annibale. It was rebuilt in 211 BC with the help of the Romans, during the social war was again besieged by Papio Mutilo, but was defended by the consul Lucio Giulio Cesare. In this specific period, most likely, Acerra changed its urban plan by acquiring a wall of square shape - a rectangle elongated in a north/ south measuring approximately 360 x 450 meters - structured through a decumanus maximus and cardo maximus. The overall design drew its form from the Roman castrum evolving, in fact, also through the incorporation of the village Osco, in a real colony based on an orthogonal grid. Specifically, it became, first, Municipium and, subsequently, in 22 BC under the Emperor Augustus, a colony for veterans. Some inscriptions have received attest to the existence of cults and temples dedicated to Iside, Serapide and Eracle. In addition, the presence of the ruins of the theater, dating from the second century BC, under the Castello Baronale, demonstrates the importance of the urban structure Acerrae acquired in the Roman period between the second century BC and the second century A.D. The idea of redesigning dell'Acerrae Roman presented in this study takes shape from those faint traces historical and, above all, a reflection on the system of the ancient city urban as it appears today in the quadrant between the area of the Castello Baronale north, along the axis of Via Magnolia e Via San Gioacchino, Via Calzolaio and Corso della Resistenza and Via Soriano in the South, certainly resistance to the west and to the east, along the routes of Via Ferraiolo and Via Cuomo. A dial divided into four urban areas separated by the system decumano and thistle materialize, from west to east, from the roadway of Via Roma and Via Pennino and by peremptory north-south configured by the current Via Leonardo da Vinci and Via Duomo. As with similar settlements in Rome, "[...] had to create a basic model that could be used in a versatile, a model that then found application in the form of the first coloniae romanae implanted for a few hundred Roman citizens. All these first civilian settlements are structured according to the same scheme extremely simple. This pattern was characterized only by the network of streets strictly axial and symmetrical with the corresponding blocks of houses, also by two new substantial peculiarities: these foundations not only lie on a street of big communication, but one of their axes more directly coincides with it. The new type of model allowed in fact a versatile use, but later with the increase in spacious buildings such as the theater, the amphitheater and the baths, suffer great difficulties to wrap them in the system of lattice often too tight. In addition, this urban scheme, rigorous in its simplicity and consistency, was

eminently suitable for a quite flat terrain."[4] In the same way, the four-part urban Acerrae presents, first, a series of rectangular islet oriented in the direction west - east, located on the Course bordering the western side of the Resistance, in addition, the large size of the semicircular Castello Baronale (former Roman theater) with the front and irregular neighborhood Gravina, and finally, the area of the cathedral that has, near its apse a configuration 'broad green glade rectangular in shape, real urban void, which could bear witness to the ancient presence of a hole inhabited by the above mentioned temples dedicated to Isis, Serapis and Eracle.[5] The compact and rational morphology of the ancient center of Acerrae tells the story of a city fortified, aware of its strategic positioning within the Campanian plain, on the road leading from Naples to Benevento and next to Popilia or the Roman road, from Suessula, pushed south of Salerno. This positioning, so the condition of the city - fortress, on the one hand Acerra forced into a lasting work of rebuilding of its urban fabric, on several occasions destroyed by the attacks and sieges suffered in the course of two thousand years, it has also produced a strong stability of the closed path in the Roman curtain wall.

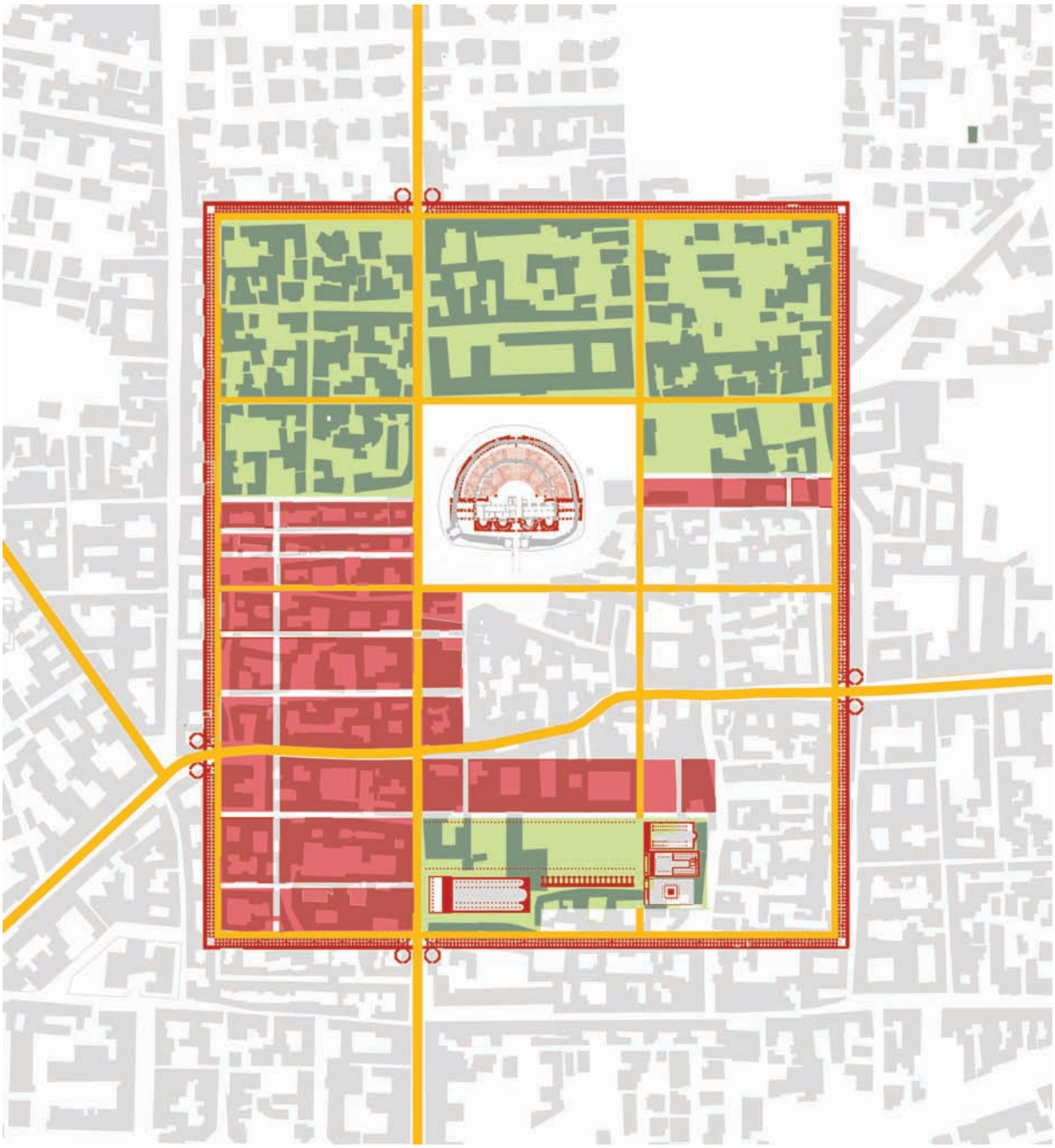

Fig. 3: Hypothetical reconstruction of Roman Acerra.

5. Reinterpretations: city and territoriality

In the post-imperial, in the fifth century AD, Acerra was first aggregate in Naples, and later dominated by the Lombards, who built a tower on the site where the present Castle (826). Attacked and partially destroyed by the Saracens in 881, it becomes Norman County. At this time, under the guidance of the various Goffredo, Ruggiero, Roberto e Riccardo di Medania, have to be traced back to the first extensions of the fortified structure of the Castle, situated to the east of Lombard tower, with a factory in parallelepiped shape characterized by inlaid decorative geometric shapes made of tuff yellow and gray. In the Swabian period, the feudal lord most important was Tommaso D'Aquino, linked to the Emperor Frederick II. During the Angevin and Aragonese ruled the city, household accounts and Origlia and Balzo Orsini and the Count Frederick of Aragon, the future king of the Two Sicilies. From 1496 until 1812, when it was abolished feudalism, Acerra was led by the family De Cardenas. Between the late sixteenth and early seventeenth century, the territory was affected by substantial agro Acerra reclamation of marshy land located north of the town who meanwhile was expanding beyond the perimeter of the first urban - corresponding to the current neighborhoods of Old Town (Maddalena, S. Giorgio, S. Cuono, Annunziata and Sott'o Muro) - with the addition of new houses built along the main roads. The reclamation of its land of origin are documented in historical cartography since the seventeenth century through the map of the *"Campaniae Felicis typus"* prepared by Alessandro Baratta and attached to the Panegyricus Garcia Barrionuevo in 1616. In such a design is clearly visible the complex system of the catchment area of agro Acerra completely surrounded by the two arms characterized by a dense wooded area on both sides of the northern branch that is fed by the headwaters of the Calabricito and Mefito. A portion of this map will be repeated in 1860 by Gaetano Caporale in the *"PIANTA COROGRAFICA dell'agro acerrano e contorni nel XVI secolo"* printed by lithography Richter & C. of the document graph is of great importance because it specifies, in its focus the focus on agro Acerra, all those names associated with urban places, in rural places, to road layouts, paths to river linear spatial infrastructures such as bridges or point like the mill. In the redesign, as well as in its original iconographic source or that of Barrionuevo, are not present rectangular of agricultural funds still present today in the design of the territory north of Acerra and appear designed for the first time in the "TOPOGRAFIA DELL'AGRO NAPOLETANO" of G. A. Rizzi Zannoni - G. Guerra of 1793. This map is documented increased reclamation agro Acerra after the one desired by Don Pedro de Toledo in 1592, or in full viceroy period, and described graphically in the redesign of the Barrionuevo of Caporale with the phrase "Lagno nuovo": in fact, Alfonso de Cardenas in 1722 "reclaimed the Pantano with the construction of a network of canals, the planting of twenty thousand poplars along their banks, and put under cultivation 1,773 bushels of land".[6] Specifically, the map Rizzi Zannoni - Guerra highlights the complex structure of the saltus Acerra compared to the homogeneity Ager Campanus: first in the northern part of the ancient swamp is represented the new system of channeling secondary punctuated by long rows of poplars and large conforming agricultural funds rectangular sent for grazing and, at noon, on the one area destined to agricultural crops in close connection with the town of Acerra. A connection that becomes organic to the city through a dense network primary and secondary road well documented in the *"Pianta Corografica Dell'agro Acerrano - Del Dottor Gaetano Caporale"* in 1859. The structure of agro Acerra even though it follows the allocations identified in principle the map Rizzi Zannoni - Guerra of 1793 presents an extensive fragmentation of the soils due to the abolition of feudalism and the subsequent division, targeting the less affluent citizens of Acerra, of the earth agricultural[7]. From reading the *Pianta Corografica* is that the southern part of agro Acerra undergoes a greater subdivision of land, highly fragmented, and tends to structure of a complex plot and irregular secondary road connected on four core to Naples, Benevento, for Pomigliano and Sannereto - which, starting from Acerra, radiate in the surrounding area. In addition, the agro Acerra is crossed in the north east, south west of the new railway line Naples Caserta that touches the town in the southern part of its urban fabric. In 1859, the urbanization of the countryside is now well established through the widespread construction of new farms in addition to those ancient huts, called "pagliare", built after the reclamation viceregal for the shelter of buffalo. After the "Pianta corografica dell'agro acerrano", published in the volume of Gaetano Caporale, the successive transformations of the territory are documented through a rereading of cards Military Geographical Institute.

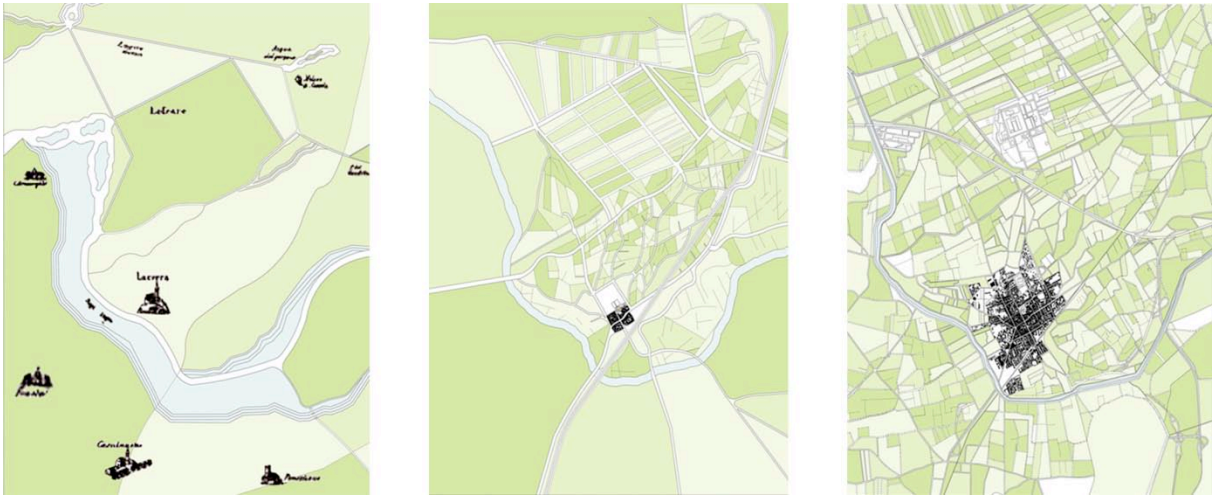

Fig. 4: Drawings synthesis of the tracks leading agro Acerra taken from the table of Barionuevo (1616), the "Topography of agro Neapolitan" Rizzi Zannoni and Guerra (1793) and the "Plan of the town of Acerra" by G. Caporale (1859) put back together using a graphical I.G.M.

6. Leaks: city and atopic

The paper I.G.M. most recently recorded three major transformation of agro contemporary Acerra: first, the presence of a large industrial area including the new incinerator in the ancient quagmire; also growing like wildfire in the city of Acerra beyond its historic core quadripartite and finally the presence of complex highway system of the median axis and the axis of support with their infrastructural hooks represented by two major junctions in the southern part of agro and a large hub in the northern sector. New signs that overlap with those tracked genetic however still present on the ground and, with their history, represent stays indelible able to make visible the main characteristics of recognizability, agro Acerra. What, at present, is more compromised in the agro Acerra is the original differentiation between the tracks irregular "saltus" and the clear, rational, Urbis form of Acerra, now heavily compromised by urban sprawl implemented over the past three decades, but already started in the nineteenth century as a result of the demolition of the walls. Curtain wall that in the "Pianta della Città di Acerra" designed by Gaetano Caporale is already completely disappeared except for a few vestiges incorporated into the urban fabric of the city as, for example, the fragment with cement bag still visible during the excavations conducted by Amedeo Maiuri.[8] With the disappearance of the city walls you start that process of growth "like wildfire" of the city that will lead to peripheralization general building fabric around the outside of the old town no longer subject to the mandatory rules of the design and measures of urban lots present inside the walls. The Castello Baronale, in this context, is an element of permanence and stability in the building fabric inner witness to the historical center: an element from which to start to reverse the process of degradation and dissolution of urban quality suffered from Acerra in the last four decades.

7. Regeneration: Monument and identity

The Castello Baronale expresses this attitude of witnesses from both the urban point of view - for the pivotal role that the monument takes its place himself between the homogeneous city of ancient plant and the heterogeneous, with recent expansion - both from the architectural point of view for its ability to represent, through complex layers typological and morphological, about two thousand years of the history of art of building. The Castello Baronale, in fact, follows its typical floor plan in the shape of a semicircle, an ancient pre-existence of the Roman: a theater building with semicircular “cavea” whose archaeological remains are visible in the basement of the east wing of the "noble palace ". The original layout of the Roman era, through architectural additions and subtractions, it is built from the Middle Ages until the eighteenth century, a fortified complex real schedule of witnesses not only of the architectural history of Acerra but also of its social history. First, a medieval tower which is coupled to a building of the Norman period, then a Renaissance building defended on the back entrance portal which also functions as the guard, and finally a “granile” century: four different buildings connected together and surrounded by a continuous high bulwark semicircular characterized, on the south by an elegant Renaissance portal opposite there Piazza Castello connected by a bridge with three arches a

wide moat. The analysis of the different stages of growth, from ancient to contemporary times, which have reported to the theater before, and the Castle, later, to the relative phases of urban growth of Acerra is a kind of pictorial evidence of the inevitable reciprocity agreement exists between continuity as order and discontinuity understood as disorder. In this sense, it is true that for nearly two thousand years, the relationship between order and continuity has produced a consistent growth between the monument and the city is equally true that in recent decades the crisis of this report has involved the degradation of Castello baronale and the disintegration of Urban recognizability of Acerra. Retrace the different stages of growth, the city and the monument, meant regain a culture critic capable graphics to emphasize the contemporary urban and architectural process of dissolution of Acerra. In this sense, the recent reconfiguration of the Castello Baronale and the neighboring urban areas, could represent a first turnaround virtuous having as objective a gradual process of regeneration and urban innovation albeit in continuity[9] with the past.

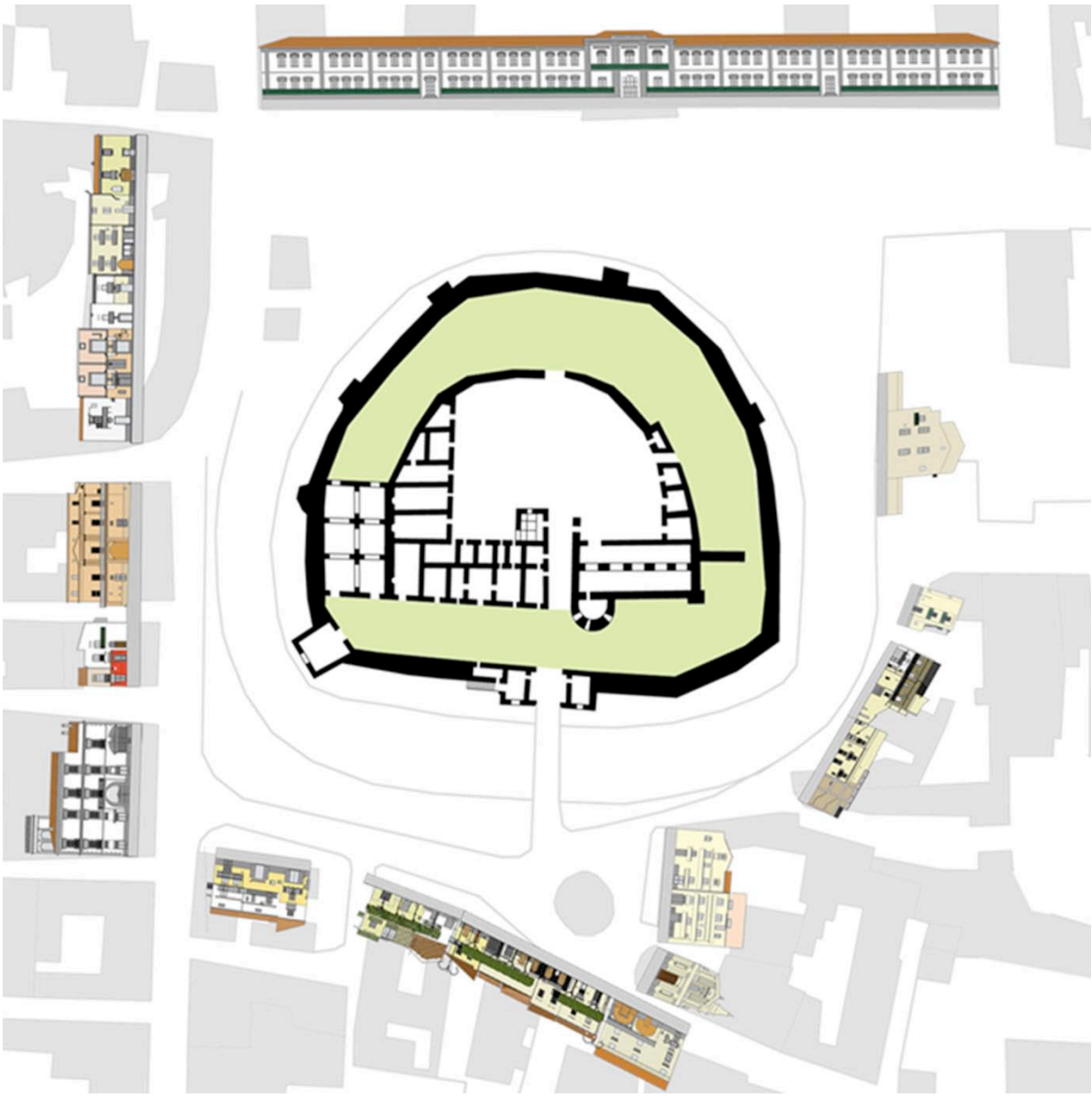

Fig. 5: Scenes building of urban fronts looking the Castello Baronale of Acerra.

Note

[1] Formed in the north - western part of the Campania region around the sixth century BC the Oscan included, in addition Akeru, also the towns of Atella, Calatia, Cales, Compulteria, Casilinum, Laticula, Liternum Suessula, Trebula, Volturnum and Capua, which, in its own name "caput", contains and emphasizes its role of capital compared to the other eleven centers.

2 P. ZANKER, *La struttura delle città romane e i loro edifici pubblici in Italia*, in *Storia dell'architettura italiana_ Architettura romana_ Le città in Italia*, H. von Hesberg e P. Zanker, Electa, Milano 2012, pp. 19-20.

3 And it is on this side of the Roman chromatic that bordered the agro Acerra in turn characterized, at noon, the semi circular perimeter of the great bend of the Clanio that, because of frequent overflows, contributed, for long periods, waterlogging of land Acerra. Overflows that, on the one hand, have imposed a continuous soil remediation implemented through a capillary shallow water, drain the countryside, and most rural landscape. "The agricultural landscape was fore made up of a wooded area, with rich community pastures and cultivated land, that is, it was the ancient landscape of the "saltus, "of which he speaks Sereni. The diversity of agro Acerra - the "saltus" - compared to regular landscape in closed lots may be one of the reasons for the absence of the Roman centuratio, which disappears at precisely the course of the Regi Lagni."

4 ZANKER, The structure of the city cit., P. 21.

5 Hypothesis, the latter was not supported by any type of archaeological find, but based on an analytical reading of contemporary urban design dell'Acerra, its paths, its elements primary and secondary ones as well as urban cases similar as those found in the volume and von HESBERG ZANKER [edited by] History of Italian cit ..

6 Marinella Pomarici in *Acerra*. *Storia di un insediamento campano*, Napoli 1986, pag. 9.

7 "Both the institutional reorganization with the establishment of the provinces that the breach of the relationship with the noble revolutionary laws of feudalism were in fact made in the French decade (1806-15), not only that, but the new laws began to become operantiper hand Murat. Feudal by the Commission, which was established precisely by the French Government, were therefore, in 1810, declared state land the feud of the barge Pontone, Candelaro, Candelaricello, Gaudiello, Parmiano, Ciminola, Calabricito, Fangone, and were left in the property of the Countess de Carderms Sexolae Pantano. The state-owned land were divided Acerra Trai poor citizens to the extent of three bushels each, (Marinella Pomarici, op. cit., pag 88/89) The text of the judgment can be read in G. Caporale, *Memorie storico - diplomatiche della città di Acerra*, cit., pp. 536-538.

8 A. Maiuri, first delination topography of the town of Acerra, in " Rendiconti della Reale Accademia di Archeologia Lettere e Arti', Naples 1936.

9 Continuity s. f. [From lat. *continuĭtas - atis*]. Quality of being continuous, uninterrupted extension in time or in space: a continuity of attitude; practice that continuation character; continuity of thought, uninterrupted succession of a tradition of thought from one historical period to another; speech , or written representation that expresses continuity, logical connection between the various parts.

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The Conservation of Jerusalem's City Walls

Avi MASHIAH
Israel Antiquities Authority - Conservation Department.
E-mail: Avimashi@gmail.com

Abstract
The Old City walls are one of the most important cultural heritage assets of Jerusalem. They are without a doubt the most prominent monument in the city's urban landscape and their influence on the development of the modern city has been decisive.
In 2005 several of the stones from the Old City walls became detached and fell into the schoolyard of the Collège des Frères. Consequently the Israel Antiquities Authority Conservation Department undertook a survey for the purpose of gathering data about the physical condition of the walls. The results of the survey pointed to a variety of physical problems along the entire length of the city walls, and in 2006 the Prime Minister's Office decided on a project the purpose of which was to conserve and rehabilitate Jerusalem's city walls. The project was directed on behalf of the Jerusalem Development Company and the Israel Antiquities Authority Conservation Department was entrusted with its planning and implementation. Work began in the field in January 2007 and continued until 2012.
The Wall reflects the city's colorful history. During our work on the different sections of the wall we tried to ensure a balance between the original architectural values of the monument and its urban and national values.

Keywords: Intervention principles, conservation dilemma, national-historic value, architectural value, urban element.

1. Introduction
Jerusalem's Old City walls of are the largest and most impressive monument in the city's urban landscape and one of its most important cultural heritage assets (Fig. 1). They are approximately four kilometers long, with seven portals set in them: the four original main gates that point in the four cardinal directions and three secondary or later gates. The city walls that we are currently familiar with were erected during the Ottoman period at the initiative of the sultan, Suleiman the Magnificent. These walls are the latest in a series of fortifications that enclosed Jerusalem throughout history. The more ancient walls have been exposed and studied and some of them are even exhibited to the public. Some of the ancient walls are incorporated in the construction of the Ottoman fortifications and can be seen in certain segments. The Ottoman period city walls are preserved in their entirety, with the exception of a few changes that were done to relatively small sections of them.

Jerusalem's walls were erected in order to defend the city and its residents. Over the years, as security improved and people moved outside the city walls, the original purpose of the walls became irrelevant. The city walls today define the region of the Old City and its cultural and historic characteristics.
The condition of the city's walls, which are exposed to constant destructive processes and damage, has deteriorated over time. The reasons for this are varied and stem from human factors, as well as environmental and climatic causes. The Jerusalem City Wall Conservation Project was begun in 2007 after a number of stones fell into the Collège des Frère courtyard, which is adjacent to the walls.
This extensive project was implemented by the Israel Antiquities Authority Conservation Department. Work on such a large scale had not been carried out on the city walls since the rehabilitation work that was conducted at the time of the British Mandate during the 1920's.



Fig. 1: View to the western parts of the Old City wall.

2. The Preparatory Work

The main goal of the project was to conserve the walls. But in the meantime it was important to stabilize the walls from an engineering standpoint and thereby eliminate any immediate danger in those places where the physical condition was undermined. In addition, elements that were representative of the wall's architectural, urban and historic values were restored, all of this while maintaining the diverse cultural impressions that are apparent in it. There are many aspects to the city walls, and in line with this, comprehensive preparatory work was carried out prior to commencing the conservation and rehabilitation work. First of all digital-spatial measurements were made of the walls for the purpose of mapping and preparing plans. Afterwards, we documented the walls and surveyed them from a historic, urban and physical aspect and also performed a natural resource survey to document the fauna and flora that exists on them. Later we divided the walls into fourteen work segments (Fig. 2). Each of the segments was surveyed from a historic and physical standpoint and was documented with photographs and drawings. Only after we completed the analysis of each segment did we consolidate the detailed plan.

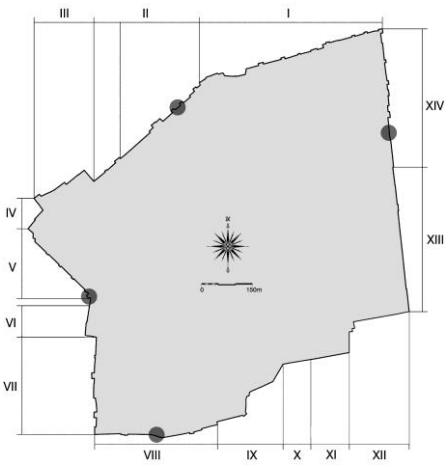

Fig. 2: A map of the walls divided into fourteen work segments.

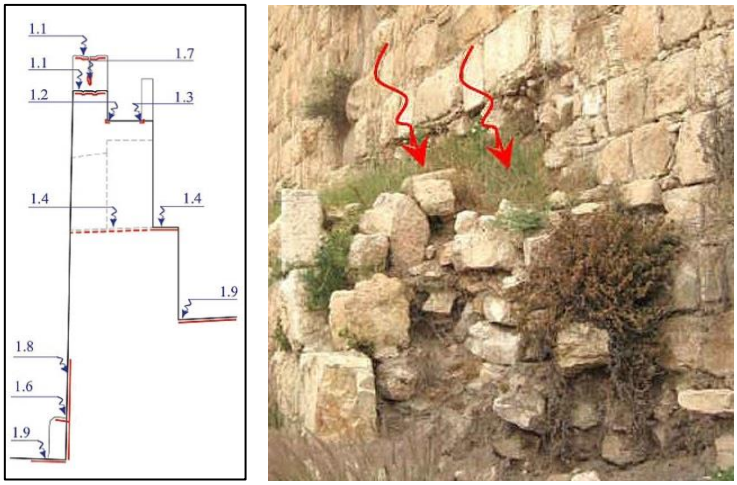

Fig. 3: The seepage points of water into the wall and its further results.

The main conclusion of the preliminary physical engineering survey was that water seepage was chiefly responsible for the deteriorating processes that were at work in the wall. Most of the problems - stone deterioration, the disintegration of mortar, vegetation taking root, the rusting of steel parts etc - stemmed from water percolating into the wall. Moreover, the problems that were created in the wake of the seepage further exacerbated the percolation and brought with it a new cycle of deterioration (Fig. 3).
Thus the aim of the conservation action was to remove any hazards in the sections of the wall which were in a physically unstable state. It included: completing any missing stone work and replacing it where necessary; filling in missing mortar and sealing the top of the wall in order to prevent water from penetrating into the core of the wall and washing away the mortar. Other aims of the conservation included restoring the building elements so as to present the urban and architectural values of the monument, and treating the decorations and inscriptions in order to protect them and present them to the public in as befitting a manner as possible.
The intervention principles regarding the preservation of Jerusalem's city wall were drawn up in order to ensure a professional and controlled conservation process. The principles directed the intervention measures which were meant to conserve the historic, aesthetic and technological values of the monument, in accordance with the Israel Antiquities Authority policy for the conservation of built heritage.

3. Conservation Issues

Since their construction at the time of Sultan Suleiman the walls have undergone numerous changes, which reflect historic events that have influenced their appearance. The current intervention in conserving the walls was another one of those events that left its mark on them. Some of the changes have an added value that contributed to the original architectural value of the walls. Many of the changes in the walls occurred in the latter part of the twentieth century when the area became a war zone. When it came time to treat the damaged parts of the walls we were faced with a complicated dilemma: whether to commemorate the events that are of national value by preserving the battle damage in the walls or to preserve the original architectural value of the walls by restoring the damaged condition to its previous state.
This dilemma will be demonstrated below on two of the gates of the city.

4. Conservation of Zion Gate

A good example of dealing with this sort of quandary is illustrated by how the conservation work was done in Zion Gate. More than anything Zion Gate symbolizes the struggle for the Old City. The treatment of the gate was carefully done taking into account its national significance. Besides the gate's historic values, other values were also manifested during the conservation planning of the monument:

4.1. Historic Values.

The gate was built by Suleiman the Magnificent. For the past 470 years or so it has been part of Jerusalem's city wall. Its construction was the topic of considerable disagreement from the day it was erected because Mount Zion was left outside the city limits. The gatehouse is associated with the Jewish Quarter and is even referred to in historical sources as the 'Gate of the Jews'.
The most significant historic event since the construction of the gate is the attempt that was made to breach it in May 1948. Then, as in the Six Day War of 1967, it was part of the border and where much of the fighting took place. The gate bears the physical evidence of the effort to break through to the Jewish Quarter and has therefore come to symbolize the capitulation of the quarter (1948) and the unification of Jerusalem (1967). Its national-historic value is derived from this. Today the gate serves as an entry point to the Old City for groups of students and tourists and it is a focal point where discussions are held about national heritage and the battle heritage of Jerusalem (Fig. 4).



Fig. 4: The Zion Gate façade throughout history, including the conservation work carried out in 2007.

4.2. Architectural Values

The gate's façade is adorned with impressive decorations. Decorated stones are scattered across the façade, around the opening of the gate, around the arrow loops and in the upper sentry post. The standard of the architectural design and the decorations of the gate do not fall short of those of Jaffa Gate and Lions' Gate. The flat arch of the opening resembles the form of the arch in Damascus Gate. Inside the gate there is a guardroom and an ascent to the roof of the structure. Zion Gate was preserved in its entirety as an "angled" gate, even though it functions as a passage for modern transportation.

4.3. Physical Problems

Zion Gate was damaged during an attempt to breach it in 1948 and the stones in the gate suffered considerable destruction. It is apparent on many of the stones that the damage to them has accelerated the deterioration processes. Many of the stones were loose and they presented a hazard to pedestrians that passed through the gate.

Caper bushes took root in the joints between the damaged stones and a microbiological layer covered parts of the damaged stone; this obscured the gate's decorations and even hastened the destructive process (Fig. 5). Vehicles passing through the gate caused mechanical damage to the gate's pillars and walls. A layer of calcite encrustations and soot covered most of the stones inside the gate. This was mostly caused by the exhaust of vehicles that pass through it. This layer "encased" the stone beneath it, a fact that hindered its removal and weakened the stone.



Fig. 5: Stone deterioration and vegetation that took root in an arrow loop, before and after the conservation work.

4.4. Conservation Principles

The discussion concerning the conservation of Zion Gate is different than the discussion about the rest of the parts of the wall. For the most part it is possible to map the string of historic events that shaped the different sections of the city's wall and logically select the type of treatment based on the values embodied in them; however, in the case of Zion Gate we were confronted with a planning dilemma. As previously mentioned, two events shaped the appearance of the gate: its construction by Suleiman and the attempt to breach it in 1948, which resulted in damage to the façade and turned it into a symbol for the Jewish people. When asked to conserve the gate we could not ignore the dichotomy between the architectural value and the national-historic value. That being the case, we were asked to decide whether to emphasize the architectural value and rehabilitate the considerable battle damage in the gate structure, or conversely, stress the national-historic value and preserve the battle damage.

When we first embarked on conserving the Zion Gate's façade it was clear to us that the attempt to breach the structure in 1948 left its mark on the gate's façade more than any other event since its construction. Therefore, we thought it proper to make every effort to preserve the scars of the event. Nonetheless, as a gate whose architectural and design quality are preserved in its plan, we also

wanted to stress the original aesthetic value of the gate structure. To this end we sought to achieve the delicate balance between restoring architectural elements and preserving the damage in the stone. In all of the proposed planning alternatives, preserving the physical effects of the breach from 1948 was of the utmost importance and the architectural values were emphasized differently.
The alternative that was selected is the one that preserves the national-historic values in the gate's façade, namely, the bullet marks, which are a kind of diagram of the battle on the façade, by stabilizing the stones that were severely deteriorating as a result of the damage from the fighting. The intervention preserved the architectural values. It focused on the region of the poorly preserved arch and dedicatory inscription that cites the gate's builder – Sultan Suleiman – and its date of construction – 1540 (Fig. 6).
Many historical photographs of the gate were collected and they facilitated an in-depth examination of alternatives for the conservation of the inscription and the decorations.

4.5. The Conservation work

During November 2007-June 2008 conservation measures were carried out on Zion Gate.
The stones in the gate were mapped and ranked according to three levels of deterioration: stones that were in immediate danger, stones that were severely deteriorated and stones that were slightly weathered. The extent of the conservation intervention that was required for each stone was determined accordingly.
In order to stabilize the stone we first treated the microbiology that had developed in the damaged places and which had accelerated the deterioration of the stone. Afterwards the stone was stabilized in the areas that had been damaged during the hostilities and the joints were pointed up with mortar. The conservation work on the stone included replacing missing stonework with stone and lime-based mortar and reinforcing the stone by means of stainless steel pins.
Bearing in mind the value of the original material and its contribution to the authenticity of the monument, only those stones that had lost their load bearing capacity due to the deterioration processes and destruction were replaced. The replacement of stone and completion of stonework were done utilizing stone that is indigenous to Jerusalem and its environs, of the kind that was commonly used in the stone "mosaic' in the wall.
The Gate Arch and Inscription. During the intervention the existing condition was cleaned and documented; later additions were removed; the field of the arch structure was documented and analyzed; a uniform hue was restored to each stone and a homogenous appearance was created for the inscription; the remains of the letters in the inscription were highlighted to increase its legibility, without obscuring the traces of damage from the gunfire and mortars on the surface of the gate.
(Figs. 7).



Fig. 6: The gate arch and dedicatory inscription in Zion Gate, prior to the commencement of work and after it.



Fig. 7: The dedicatory inscription before and after the conservation work.

5. Conservation of Damascus Gate

Damascus Gate is the principal gate in the city's northern wall and serves as the main entrance for pedestrians to the Moslem and Christian Quarters.

Damascus Gate has served as the northern entrance to the city since the Roman period. At that time the city's longitudinal roads also began to follow the route that currently exists today. An urban square from this period was exposed beneath the Ottoman gate and it is open to the public in the Roman square museum. The transition from the Roman building technology that is evident at the base of the gate to the Ottoman building technology can be seen on the gate's façade. The central location of the gate and its function turned it into a commercial center. Both then and now the height of the gate towers afforded one a good view of the surroundings.

Damascus Gate is the most magnificent and monumental of all of the city's Ottoman gates. The structure is characterized by its symmetry and a system of ornamentation which add to its monumental appearance and emphasizes its symmetrical design. The decorative elements in the form of stone torches positioned above all of the gate's crenellations distinguish Damascus Gate from the other gates of the city.

Damascus Gate was well preserved; however, the ravages of time and previous interventions were clearly apparent (Fig. 8, 9). The weathering and destructive processes were mainly evident in the broken and missing crenellation decorations and in the stained stone of the gate's facades. In addition, there were encrustations in the gate's interior and the plaster was crumbling as a result of dampness.



Fig. 8: The gate's façade prior to the conservation. 2010



Fig. 9: The gate's façade after the conservation. 2011

5.1. The Issue of Conserving Damascus Gate

Damascus Gate is characterized by its decorative richness. In pictures, paintings and historical drawings the gate can be seen in all its glory, whereby the dominant component in its design is the crenellation that is topped with stone torches. Along with its splendor, the different weathering processes were evident in the gate's facades and interior. An extensive portion of the façade's surface, particularly the upper half of the gate, was covered with dark stains that have had a profound impact on the appearance of the gate already in the mid-nineteenth century. The ravages of time have also left their mark on the decorations, some of which have not survived or were found to have suffered significant weathering.

The chief concern we faced when considering the conservation of the gate was whether to emphasize the structure's architectural value or its historical value of the structure. Completely returning the architectural value of the gate meant totally restoring the missing decorations and cleaning the structure's facades. On the other hand, conserving the historical value would have meant focusing on stabilizing the existing decorations and cleaning only some of the stains in order to preserve the element of time and aging of the stone. An intermediate alternative – that is restoring the decorations and cleaning only parts of the facades – would create a significant visual difference between the new stone and the old.

5.2. Conservation Principles

Since it is the most monumental and magnificent of the gates in the city wall, it was decided in the planning phase to emphasize its architectural value, its size and the richness of its decorations (Fig. 10). We now faced a new dilemma regarding the nature of the restoration. Although at first glance the ornaments on the gate appeared to be more or less homogenous in shape, after a careful examination of them we discerned considerable variation in the proportions of their components. The historical survey revealed that during the British Mandate the gate underwent extensive rehabilitation that included: removing all commercial activity from the gate plaza, preparing an open plaza, rehabilitating

the gate and restoring decorations. This meant that in order to implement the restoration we needed to relate not only to the Ottoman decorative typology but also to the characteristics of the Mandatory restoration. A detailed examination of all of the decorative details in historical photographs from the mid-nineteenth century until the end of the Mandatory period allowed us to formulate a plan regarding the individual treatment of them. The center firing slit was the only detail we found that had undergone disproportionate change in the 1967 war. The decoration at the top of it was completely destroyed and the firing slit itself was damaged. The arrow loop was rehabilitated after the war, but the decoration was not restored. An examination of the decorations also revealed that the symmetric axis of the gate was emphasized in the Ottoman period. This was reflected by the height of the decorations in the corners of the towers and the symmetrical placement of various ornaments. The torch ornaments were completed together with the rehabilitation of the gate at the time of the Mandate; however, the proportions of the restored components were not uniform. Furthermore, errors were discovered in the restoration measures that were implemented. An example of this was the location of a pair of decorations on the western tower's crenellation which were switched. This study led us to the decision that each decoration would be restored according to the proportions of the original Ottoman decoration, as they appeared in historical pictures. On the crenellations where there was no decoration or suitable documentation, the decoration was restored based on the proportions of the decoration symmetric to it on the gate.

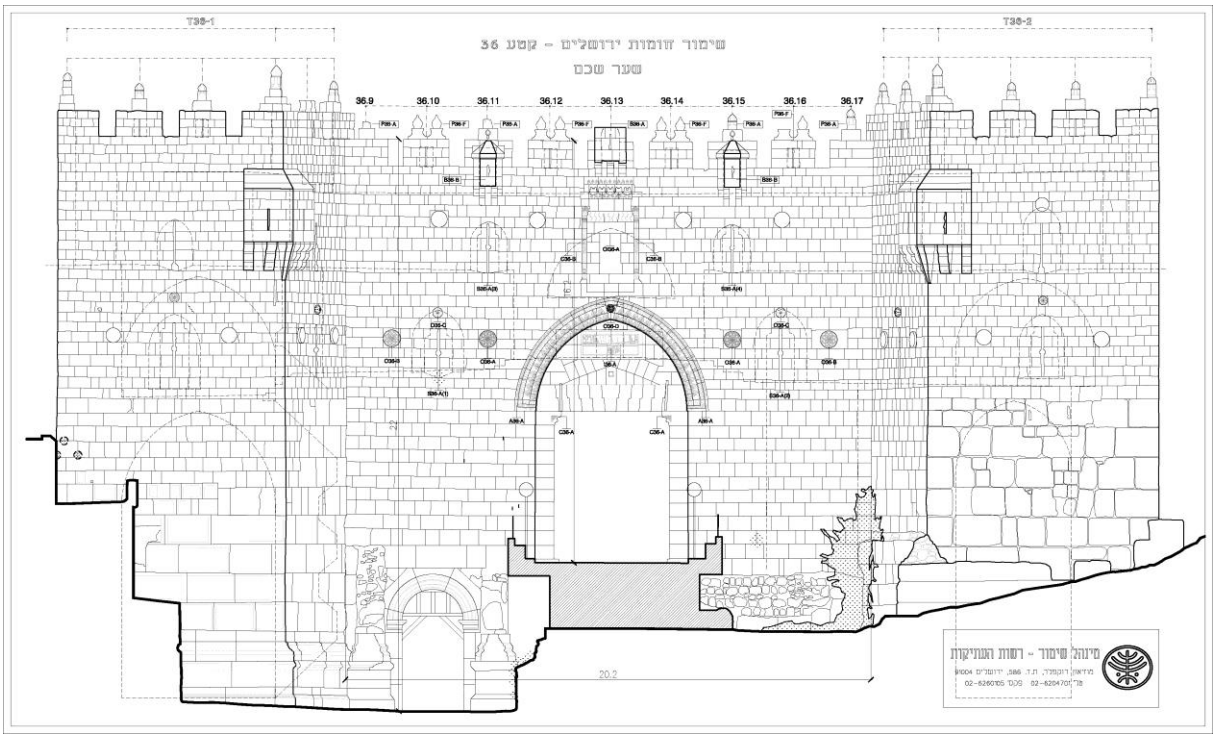

Fig. 10: General plan – Damascus Gate façade.

5.3. The Conservation Work

Conservation of the arrow loop and its restoration necessitated stabilizing the loop from a constructive standpoint which was achieved by means of stainless steel pins. The decoration at the top of the loop was restored based on historical pictures. In addition to the decoration on the arrow loop seven other decorations were restored (Fig. 11).

In conserving this gate we tried to find the balance between the ongoing bustling commercial activity of the environs and conserving the architectural values of the gate which were sometimes damaged by commercial use. We held some meetings with the shop owners and the residents in order to coordinate the work, its schedule and results. The gate was dirty and covered with old signs and old infrastructure. Despite the difficulty of the of work schedules we all had a common goal to improve its condition.

The microbiological stains and encrustation on the surface of the stone was steam-cleaned. A very thorough level of cleaning made it possible to match the color of the original stone and that of the restored stone (Fig. 12).

The gate's interior also suffered from massive stains on the facades (Fig. 13). Prior to commencing conservation work on the gate it was agreed upon with the owners of the shops that located inside the gate that the work would be done without interrupting the daily commerce there; thus we sought ways of treating the stains which could be simultaneously implemented with the commercial activity.

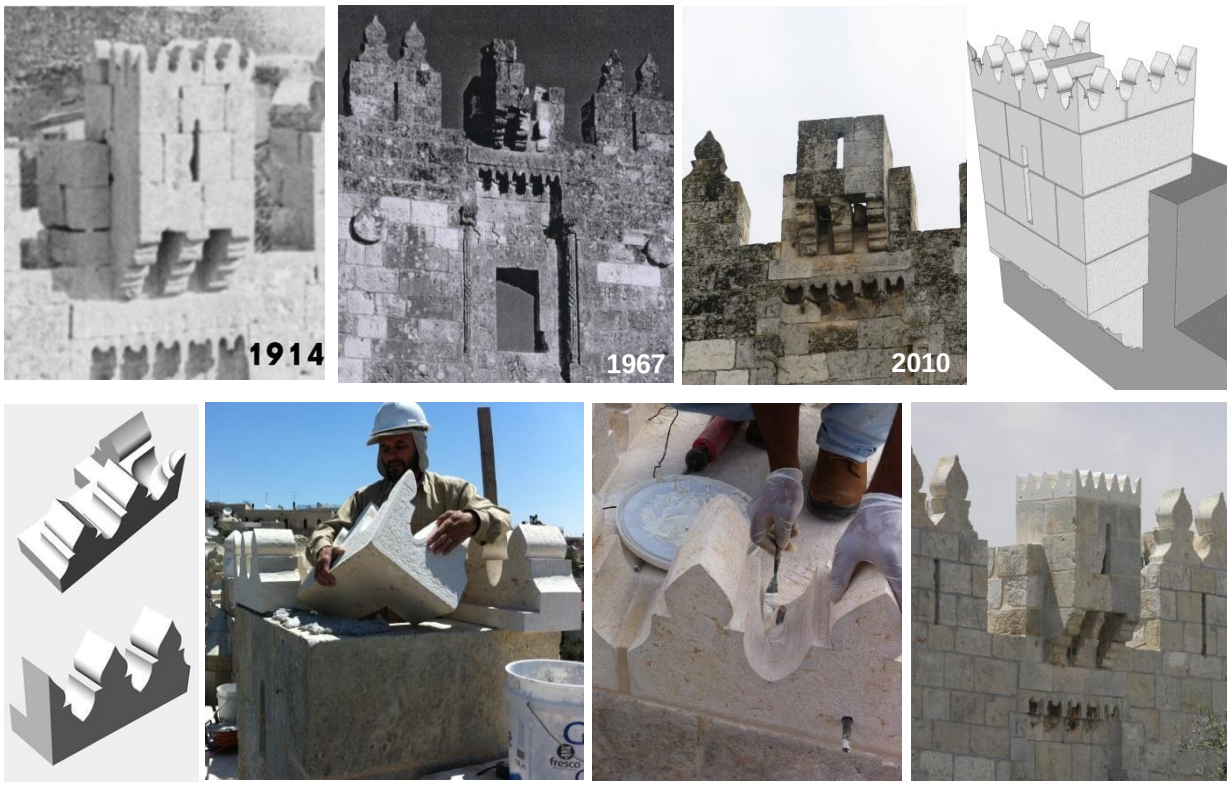

Fig. 11: The arrow loop in historical pictures, planning illustrations and during its conservation and restoration.



Fig. 12: The inscription field during and after the conservation. 2010



Fig. 13: The gate's interior before and during the conservation. 2011

6. Conclusion

During the course of the project we realized the extremely sensitive nature of any intervention connected with this monument. The rehabilitation policy regarding the Old City's walls not only favored conserving the walls as an architectural monument which history has left its mark on, but also preserving them as a living urban element in their environment. For this reason an effort was made to promote projects that could complement the conservation of the walls, such as developing exhibition spaces inside the cavities of the impressive guardrooms that are scattered the length of the walls and rehabilitating the paths along the remains of the ancient walls that are at the base of the Ottoman wall. Signage was posted along these paths, in cooperation with the municipal department of education, in order to enhance the residents' connection to the monument (Fig. 14). It was our hope that the Jerusalem City Wall Conservation Project would serve as a stimulus to rehabilitate the walls' surroundings and to sustain a high level of maintenance of the monument in its environment, as an open urban area that has unique historic and landscape values.

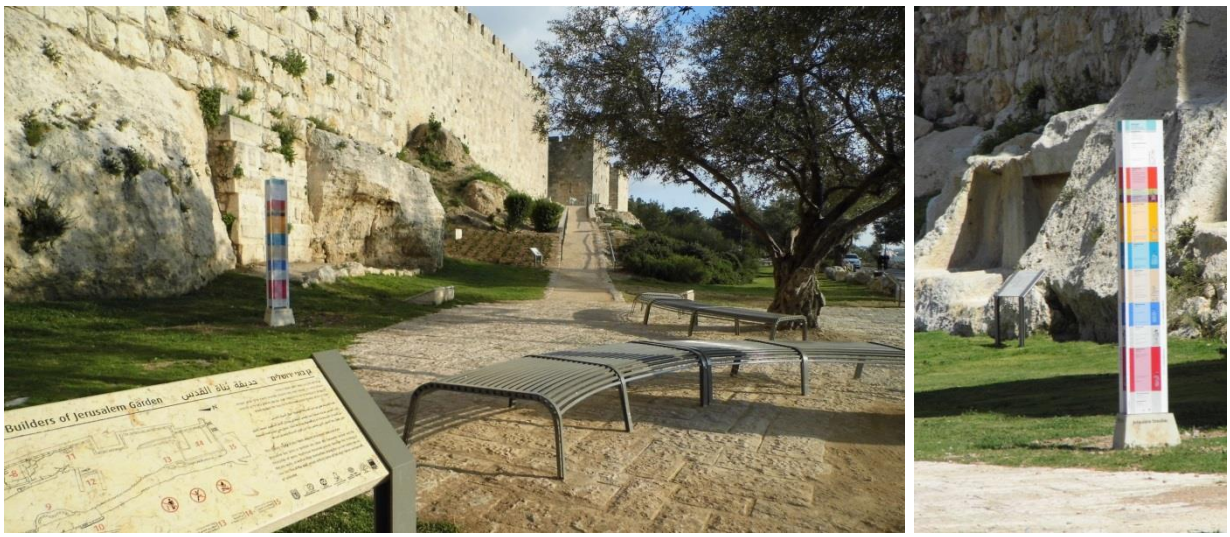

Fig. 14: The Wall Builders Garden – A Garden at the foot of the wall that was inaugurated this year**.**

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Two Different Approaches of Urban Renewals of Historical Districts: The Comparison of Bordeaux, France And Cincinnati, United States

Ana Gisele Ozaki[1]
(1) DAAP - College of Design, Architecture, Art and Planning, School of Architecture Interior Design, School of Planning, University of Cincinnati, Cincinnati, Unites States of America
ozakiag@mail.uc.edu

Abstract

The purpose of this paper is to compare two case of revitalization of historic districts: Bordeaux, France and Cincinnati, United States of America. In both cases it is quite evident that both cities were successful in their endeavors in transforming their historic cores into attraction points. Therefore, the focus of this study is how both of these cities managed to implement their revitalization processes.

The city of Bordeaux represents a mainly top-down approach concerning historic preservation. The city renovated its historic district in 2000, which was closely coordinated by the local government. This culminated into Bordeaux's inscription in the World Heritage List of UNESCO in 2007.

On the other hand, Cincinnati represents how an American city revitalized one of its historic districts, through mostly private actions. The city experienced an abrupt decline within its core, despite having one of the largest collections of 19th Century Italianate Architecture of any American city.

The concentration of power is fundamental in both case studies, but each city carried its own hierarchy and relationship amongst the stakeholders involved. This comparison aims to provide insight into the best practices concerning the process of revitalizing historic districts. This should lead to a further study on how to balance top-down and bottom-up approaches in historic districts in urban settings.

Keywords: historic districts, urban cores, historic cities, revitalization process

1. Revitalization of Urban Historic Districts

In most cities, urban renewal represents opportunities to change economic hierarchies and functions within the urban region, creating new jobs, and strengthening the city's position in the urban division of labor. [1] According to Anthony Downs, a Senior Fellow at the Brookings Institution in Washington, D.C., every downtown has three important functions: to provide jobs and income for local and regional residents, to provide a net tax revenue surplus that supports local government services received by other parts of the municipality, and to act as the focal point for the entire community. Adding to Down's perspective, central areas are also usually the oldest part of a city and contain many structures of local importance, in terms of architecture and history. These are areas of substantial capital investment (both public and private) in buildings, streets, utilities and other structures and services. Finally, they are also the representation of a community's pride and identity. By investing in these areas, communities have better chances to prosper as a whole and maintain a healthy economic and social base. However, downtown areas have reduced their ability to remain competitive. This is due, in part, to the movement of people from the city to the suburbs, competition from chain stores and shopping malls with local businesses, and especially, the increased use of automobiles. [2]

This paper will address the actions taken by major stakeholders in Bordeaux and Cincinnati: InCité, and 3CDC, respectively. Even though they both represent similar tools of performing the revitalization processes, they follow different structures and power contexts. While France relies on a

centralized and top-down approach to preserve its urban heritage, Cincinnati utilizes its historic assets as a way to achieve economic development.

1.1 Bordeaux

Bordeaux, France, has preserved its urban core in the new light of Alain Juppé's renovation plan of 2000 and the city's inscription in the World Heritage List of UNESCO in 2007. The city's originality in historic preservation relies not only in buildings and their preserved façades but especially in the preservation of the urban fabric, responsible for the city's identity.

From 1965 to 2005, the population kept declining in the historic urban core of the city. Many of the subsidized social housing had deteriorated, almost 12% of them were inhabitable state and almost 20% were vacant. In addition, there were not many housing options, 85% of which were rental, and 66% efficiencies which were not suitable for families. These conditions created a significant turnover of residents and were detrimental to the neighborhood life and urban vibrancy.[3]

Since Alain Juppé's vision in 1996, with a global approach of planning and redevelopment, Bordeaux has managed to satisfy two urban forces: on one hand, the strict national and local historic preservation requirements and constraints, and, on the other hand, its urgency to re-adapt itself to contemporary needs and uses. The main actors in implementing these policies of rehabilitation were the City of Bordeaux and the Regional Planning Commission, the CUB (*Communauté Urbaine de Bordeaux*).

The city was founded during the Roman Empire, and its historic center is an outstanding urban and architectural ensemble of the 18th Century. It retained its generally Medieval design until the 18th Century, when, during the Enlightenment, the city's unique identity and urban design emerged and was consolidated. Bordeaux is the second largest urban district protected by the highest level of historic preservation in France (*Secteurs de Sauvegardés*). The policies of the *Secteur de Sauvegardé* are applied by the municipality in the local level and supervised by a strict commission from the national level. Punctuated by classical monuments, the *Secteur de Sauvegardé* encompasses the boundaries of the walled city of the 14th - 18th Centuries, the neighborhoods of the Medieval Quarter, the architectural and urban ensembles of the 18th and 19th Centuries, and the especially distinctive system of articulated places and 18th Century façades along the quays.[4]

In light of a new discourse, from 1996 to 2007, the city went through a transformation process that incorporated new criteria of preservation. The city administration performed a top-down approach to the revitalization of its historic district, having learned that the urban heritage is an important economic asset, but also a human and social product that requires the land use, urban fabric, and ways of life in the historic district to be preserved.

As many other French cities, Bordeaux relied on a new tramway system for the revitalization of iconic public spaces, and on the encouragement of public and private partnerships to help attract new inhabitants back into the city center. The city center prior to the renovation had a high vacancy rate. This new development in addition to bringing new residents into the urban core it preserved the historic city's identity. In order to brand the city and make up for "lost time" in the competition with other mid-tier European cities, such as Bilbao, Nantes, and Toulouse [5], Bordeaux also envisioned, since the beginning of this process the UNESCO.

Since 1996 and the definition of the big axes of the urban project, it was clear that the revitalization of the historic center represented one of the main elements in the new development strategies and that a new dynamic of project was being imposed to reunite the central neighborhoods, which could, finally, be called historic center. There were three reasons for this redevelopment:

- The reinforcement of the historic center is a strong issue for the agglomeration as a whole due to sprawling and its effects in the public finances.
- The second reason concerns the economic role that takes place at the urban core of Bordeaux, which is one the main centers of employment and services of the region, by strengthening the existing economy and bringing new businesses.
- And evidently, since the façades of the quays and the historic district are of great heritage value, that has created the city's identity, they should be enhanced and protected in order to permit new uses and activities not only related to visitation.
- Along with the revitalization of the center the urban operation included:
- The implementation of the tramway system that aims to reorganize the urban exchanges and displacement in the center of the city, and provides a better sharing of free spaces in releasing the streets of the huge automobile presence.
- The redevelopment of the quays allows Bordeaux to return to the river and reclaim little by little the quays as a place for leisure and festivities.

- And the project of rehabilitation of the ancient neighborhoods, which has been possible through a partnership between the State, ANAH, Fund of Deposits and Consignations and the Urban Community (CUB).

The main questions guiding the operation were:

- How to provide these different actions that enable older neighborhoods to be reinvested by locals and visitors and ensure that they are available to all?
- How to find the perfect balance between economic activity, tourism, habitat and the everyday life? [6]

This global approach also required more legibility of legal and administrative constraints, simplification of financial arrangements, both for the public and private spheres. On January 2002, the City of Bordeaux engaged with the *Communauté Urbaine de Bordeaux* (Urban Community of Bordeaux), the State, the *Caisse des Dépôts et Consignations* (Fund of Deposits and Consignations) and the *Agence Nationale pour l'Amélioration de l'Habitat* (ANAH – National Agency for Housing Improvement), a discussion about a vast territory between the Garonne River and its courses.[7]

The city of Bordeaux released in 2002 a plan for general actions concerning the revitalization of the historic central district of the city, transforming it into an active and inhabited center. The focused area consisted of 501 acres and extends from within the courses (Arnozan to the Marne) to the Garonne River including the area between the Course de la Somme and the Rue de Bègles. The action plan aimed to improve the quality of life and residential comfort of the local population (current and future). The plan also sought to strengthen the social diversity (age, marital status and household composition), to diversify the residential offer and stop the progressive decline of the center. [3]

Concerning the historic district, the urban project included the cleaning of façades, the regeneration of the Garonne's riverbanks, and the commissioning of the tramway system that runs on a ground-level power supply. During this process, more than 350 buildings were listed on the inventory of the *Monuments Historiques* (French National Trust), a protection structure established in the country in the 19th Century. The UNESCO nomination process involved rigorous and exacting criteria of integrity and authenticity, and the seal came as the final outcome. [4]

In 2002, the City of Bordeaux and other public partners (the State, the *Communauté Urbaine de Bordeaux*, *Agence Nationale pour l'Amérlioration de l'Habitat* and others) fixed tasks and means of InCité, which was previously called SBUC (Mixed Association of Construction and Planning of Bordeaux), in charge of what the State had established as public interest, meaning the habitat component, through a convention of Public Land for a period of 8 years, extended until 2014. The company took the name of InCité to "better communicate its new missions of urban renewal" and to promote the public good. [3]

InCité is an institution of mixed economy dedicated to the missions of construction, real estate management, redevelopment, planning of complex transactions, land purchase, marketing, housing, and social support. In July 1957, the municipal council of Bordeaux decided to create a mixed economy company, the SBUC with the mission of opening the new areas of Bordeaux to the urbanization process, when the city was going through a housing crisis. The Board of Directors was then chaired by Jacques Chaban-Delmas, the mayor of Bordeaux of that time. It began then a period devoted to the development of new neighborhoods and the construction and management of nearly 4,000 homes and local businesses within the districts of Grand-Parc, Bordeaux Lac, Benauge, Chartrons, Meriadeck and others. The institution works with almost 50 other partners within the public and private spheres and local residents, and remains a key player in the housing and urban development in the city of Bordeaux. [3]

This institution, under the municipality's designation, directed all the actions performed by the private developers in order to prevent gentrification and guarantee equitable conditions. Work within the previously neglected historic district had to be carried out under new, updated urban policies and incentives and needed to accommodate specific guidelines, incorporating not only the protection of the historic urban landscape, but also the social use of the buildings. By the beginning of its work, the city presented 230,000 inhabitants and 114,000 of residential units, the historic district, 27,700 people and only 23,5000 residential units, while the National government required 20% to be social housing, the existing was limited to 14.7% and 70% was rented and 12% was vacant. By 1999, the urban core of the city was mostly vacant, populated by poor and minorities groups and lacking of social diversity. [7]

Since 2002, 1,876 units have been renewed only within the historic district, 83% of which are social housing untis. The institution acted following the premises of: favoring the quality of urban life, reaffirming the economic and cultural role of the historic center, offering a contemporary habitat within a renewed historic heritage and, finally, reassuring its social diversity. In order to favor the goals of improving the quality of the urban life, the proximity services, the increasing transportation alternatives, reordering public spaces and improving the environment were envisioned and planed. Concerning the contemporary habitats within the renewed historic heritage, the goal is to rehabilitate 2,400 units from which 30% should be of social housing, create 53,820 square feet of commercial use and 330 new parking spots till 2014. [3]

The effective actions of InCité is due to the central control performed by this mostly public institution in directing the actions performed by the private developers, abolishing inadequate and safe risk buildings, and increasing affordable and social housing through the revitalization of the urban core. The scope of its work was defined by at least five different plans concerning the same area:

- Plan of Development - SCOT 2000: that envisioned a population growth of 33% for the regional conurbation;
- Local Housing Program - PLT 2002-2006: that aimed to diversify the housing offer, renew the ancient neighborhoods and offer social housing;
- Urban Displacement Plan – PDU: that wanted to protect the center from the traffic and develop an efficient public transportation mode;
- Local Urbanism Plan – 2005;
- Preservation and Enhancement Plan.[7]

The institution's initiatives have become reality through tools including tax incentives, oversight features and power to buy and sell properties, restructuring whole blocks in more healthy and livable manners, such as:

- Programmed Operation for Housing Improvement (OPAH): this tax incentive aims to assist the rehabilitation of housing in ancient buildings and offers subsidized rental in private properties within a specific perimeter. OPAH offers the possibility for owners to benefit from tax incentives, free technical and administrative consulting in exchange for a cap on rent or other income conditions. [3]
- Tax incentives from the Malraux Law: intended to protect the architectural heritage of the *Secteurs de Sauvegardé.* The building that will be renovated must be a rental unit (to be rented for 6 years) in an ancient building. The incentive discounts from the owner's income tax the total amount invested in the construction and rehabilitation of the building.
- Property Restoration Perimeter (PRI): intended to initiate the process of restoration of buildings in bad conditions of housing, to trigger the intervention from private owners in unsafe and unhealthy conditions, to avoid poor quality rehabilitation leading that could lead to subdivisions and small dwellings, and to enable the complete restructuring of an established perimeter in a certain given time.
- Relocation: InCité can relocate temporarily or permanently former tenants of buildings targeted for redevelopment. They could either be placed in a private rental unit subsidized by OPAH, buildings or units acquired by InCité, property of social housing administrators, or a hotel if the case is of a short-term relocation. The relocation process is also provided with social accompaniment, considering the economic fragility of each tenor.
- Declaration of Public Utility (DUP): once the PRI is defined, studies are addressed to areas of most priority, considering the DUP. These studies focus on sanitation, security, livability and enhancement of the heritage. Once the City Hall and Town Council define the priorities and deadlines, InCité must notify the owners of the properties and the work required in order to get them rehabilitated. In case of non-completion of the work, an investigation could lead to a piecemeal expropriation procedure.
- Land tenure monitoring for friendly purchase: for the purpose of demolition (ventilating the middle of dense blocks and creating inner gardens) or sale to enhance home ownership, social rents, restructuring by private renters (in larger units and/or with rental diversity of units).
- Right of urban preemption: from over 21,000 declarations of alienation intention, 0.6% has been preempted, since 2003. [7]

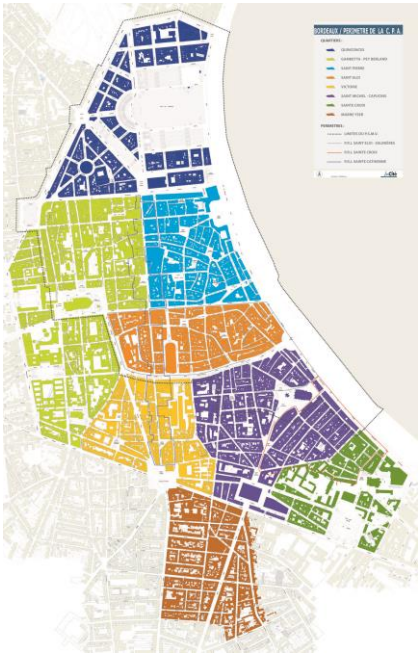

Fig. 1: Perimeter of InCité's interventions (Convention Publique d'Aménagement)



Fig. 2: Bordeaux's Historic District and the tramway system

1.2 Cincinnati

The city of Cincinnati represents one of the richest historic districts in the United States with one of the largest collections of Italianate architecture of the 19th Century. Its historic district of Over-the-Rhine experienced an abrupt decline of its core but has managed to accommodate an urban renovation through bottom-up actions, as not being from the governmental.

Cincinnati is located in the Midwest region of the United States, in the State of Ohio, and borders with the states Kentucky and Indiana. Just as Bordeaux, it has also a river crossing the regional conurbation, called the Ohio River and the Ohio-Kentucky-Indiana (OKI) region, respectively.

In Cincinnati, specifically in the neighborhood of Over-the-Rhine, as a result of social and economic forces, for decade's people and businesses ended up leaving downtown resulting in continuous deterioration. Unlike Bordeaux, the revitalization of the Over-the-Rhine district was driven mostly by the private sector and the City of Cincinnati signed up as a partner, who provides tax incremental financing. The result of this partnership was the foundation of an institution called 3CDC (Cincinnati Center City Development Corporation). [8]

3CDC was responsible for two neighborhoods: the downtown Central Business District (CBD) and Over-the-Rhine. The historic district of Over-the-Rhine is located on the northern edge of Cincinnati's Central Business District and comprehends 100 blocks (362 acres) and is one of the largest and most intact 19th Century urban historic districts in the United States. Throughout its dense streetscapes full of tenements, churches, theatres, storefronts and social halls it is still possible to sense the almost unchanged landscaped molded by the first immigrants, mostly German, in the 1800s. Unlike other American historic districts, the originality of the neighborhood relies not on an impressive collection of mansions or unique architecture but on the fact that most of its architecture and landscape represents a diversity socio-economic classes mixed uses of its history. [9]

Over-the-Rhine was once one of the most densely occupied neighborhoods in America. Although the neighborhood was extremely diverse, there were an outstanding number of Germanic immigrants. Its magnificent public tenement stock, its rich brewing heritage and its important role in German-American history and nineteenth century immigration all make the neighborhood of national significance. [9] However, various factors at the beginning of the 20th Century contributed to the neighborhood's decline, and by the 1960's, it had become a poor, predominantly black and vacant area. From a population of 44,475 in the 1900 fell gradually to about 30,000 by the 1960s and a decade later it even shrank to half of it, composed by 5,380 African Americans, a newly significant minority in the neighborhood. [12] By 1990, the demographics had switched to a majority of 71% of 9,752 people being African Americans and more than a quarter of the area's apartments had become vacant and the rest was mostly occupied by low-income tenants, way below the city's economic figure. Crimes, street fights and prostitution were proliferated in this neglected area. [11]

One other feature of originality of this historic district is the evolving process of demolition of neglected buildings throughout the 20th century, as a standardized and reactionary approach. Unlike many other historic cities, Cincinnati has not capitalized on its historic assets. Since 1930, approximately half of the building stock has been removed, most of it by city-sponsored demolition. Between 2001 and 2006, over 50 historic buildings were demolished for being considered public threats. Today, many building stay vacant and in great need of repair, yet some building owners remain unwilling to bring their properties up to code. Once buildings reach a critical stage of dilapidation, they are deemed a danger to the public and are slated for "emergency demolition" by the city. [9]

The neighborhood was added to the National Register of Historic Places in 1983, with 943 contributing buildings. [10] In 2006, due to the national significance of the architecture and its threat of destruction, the neighborhood was placed on the National Trust of Historic Preservation's list of the "Eleven Most Endangered Historic Places in America". [9]



Fig. 3: Urban fabric of the Cincinnati's Historic District of Over-the-Rhine in 1930



Fig. 4: Demolished building of the Cincinnati's Historic District of Over-the-Rhine since 1930

The central and historic neighborhood of Over-the-Rhine experienced years of inner city decay, poverty, white flight, increased crime, population decline, lack of traditional employment opportunities and a shrinking tax base, since the 1960's, after much of the older urban housing stock downtown was replaced by subsidized housing projects as well as by the construction of a interstate. The central and historic neighborhood was neglected over the decades till the 1990's, when it started to show signs of life as many artists and entrepreneurs embraced the bohemian lifestyle emerging. However, in 2001 the killing of an unarmed black teenager by a white police officer and ensuing race riots abruptly interrupted the renovation that was on transit, which represented more than 600 people being arrested in less than a week, a total cost estimated at $13.7 million and a number of business were unable to reopen for weeks and months afterwards. [11]

In 2000, the city began a comprehensive master neighborhood plan for Over-the-Rhine that advocated mixed-income housing, entrepreneurship, and preservation/rehabilitation of prominent civic institutions to return the area to productive use. Two thousand housing units were proposed, including a combination of rehab projects and new construction on 300 vacant lots. All stakeholders – residents, business owners, CDCs (Community Development Corporation), and faith based and social service organization – in the neighborhood have been invited to participate in this planning process. Most recently, the Urban Living Loan Fund was established for new housing in Over-the-Rhine and downtown Cincinnati. Seven area banks, the city of Cincinnati, and local foundations have contributed to the fund, which provides loans for rental projects, condominiums, and new home construction. [13]

In 2002, the Center City Plan conceived by consultants as a report to the city's Economic Development Task Force, laying out a vision and a way forward for the city to begin restoring the vitality of its largest economic center. The task force made 23 recommendations, including the creation of a one-stop permit shop, establishment of the Port Authority as an economic development agency, and the formation of the Cincinnati Center City development Corporation (3CDC). [13]

The catalyst for change came in 2003 when 3CDC - a private, nonprofit development group – was formed. Funded mostly by corporate contributions, it has the exclusive reigns to spearhead the development of both areas. 3CDC was formed by a former mayor of Cincinnati and other corporate community members as a result of a recommendation by the City of Cincinnati Economic

Development Task Force. Since its implementation, there has been an expansion of development and the crime rates have significantly decreased.

In 2004, 3CDC accepted responsibility for overseeing Cincinnati New Markets Fund and Cincinnati Equity Fund. Working together with the City of Cincinnati, the State of Ohio and members of Cincinnati's corporate community, 3CDC is committed to redeveloping and investing in Cincinnati's urban core. Amongst their main goals are: to create great civic spaces, high density/mixed-use development, diverse, mixed-income neighborhoods supported by local businesses and to preserve historic structures and improve streetscapes. [8]

The institution comprehends the functions of a master developer in targeted redevelopments, providing strategic and long-range planning, and of a lender/fund manager, acting like a bank and managing private funds to developers. 3CDC has undertaken the construction of 200 condominiums, 70 rental units and 100,000 square feet of commercial space as part of a public-private effort to revitalize the oldest neighborhood of the city. According to its Chief Executive Officer Stephen G. Leeper, the entrepreneur is viable through substantial corporate support, not limited to operating funds but also for capital funding. [13]

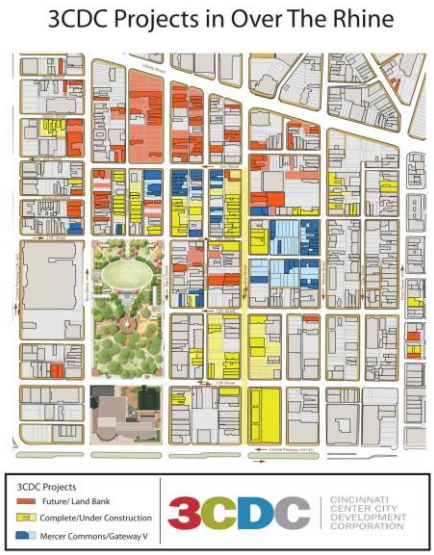

Fig. 5: 3CDC's boundary of action in the Historic District of Over-the-Rhine



Fig. 6: Cincinnati's Historic District of Over-the-Rhine

City officials and 3CDC were tasked with making the goals laid out in the Center City Plan a reality. The plan detailed four initiatives aimed at restoring vitality in particular: [13]

- Redevelopment of Fountain Square: The plan recommended that the city, "transform Fountain Square into the city's retail, cultural and civic heart".

- Revitalization of Over-the-Rhine: With regards to Over-the-Rhine the plan said, ***"Without intensive focus on Over-the-Rhine, efforts in the center city will be wasted."*** Starting with a focus on the Vine Street corridor as the primary retail corridor, the plan envisioned a catalytic development agency spurring redevelopment along Vine Street in the historic neighborhood. The plan was to start at Central Parkway and work north towards Liberty Street.

- Restoration of Washington Park in Over-the-Rhine: It is the main focal point of the neighborhood. It was recommended that the city, "Implement a comprehensive development strategy to make Washington Park a civic treasurer." The park is now retorared and 3CDC still manages this park and the Fountain Square, promoting events and regular activities to attract people and keep the money rotating in the area. [13]

In general terms, the main actors involved in the revitalization of historic district areas can be classified as: downtown property owners and merchants, local government leaders, lenders, professionals, community groups, residents and the media. [2] In the case of Cincinnati, the first and the ongoing impulse came from private sector, reuniting corporation that have great interest in the area, such as the headquarters of P&G, Macy's and Kroeger, but it also find strength in less financial powerful institutions and grassroots movements. The big range of existing nonprofit organizations in

the neighborhood also contributes to the revitalization of Over-the-Rhine. It seems that after so many past mistakes and attempts to promote equality and preserve the built environment of Over-the-Rhine, Cincinnati's residents and advocates decided to take it by their own hands. Even though the resurgence of the neighborhood's vitality is not as bottom-up as during the 1990s grassroots movements (just before the riots of 2001), some nonprofits are following the premise that if you want to be done you need to "do it yourself".

Following is listed some of the main nonprofits and organizations acting in the redevelopment of Over-the-Rhine:

- Over-the-Rhine Foundation: works with the public awareness and education of the importance of historic preservation and why to preserve the neighborhood, actual preservation and redevelopment strategies along with the public realm and community's partners, protective actions through oversight of properties, and promotion of events and attractiveness to the area. [9]
- Over-the-Rhine Chamber of Commerce: representing the main businesses of the neighborhood.
- Over-the-Rhine Community Housing: formed in 2006 by the merger of two organizations supporting affordable housing.
- Drop Inn Center and Mercy Health Saint John: a homeless shelter which offers chemical dependency treatment and an agency that offers comprehensive social service, respectively.
- Brewery District Community Urban Redevelopment Corporation: works to develop the northern half of the neighborhood, emphasizing on Over-the-Rhine's brewing heritage and the mixed-use neighborhood created by use of the nineteenth-century brewery building stock.
- Over-the-Rhine Community Council: since 1970, it has represented the interests of residents and partnered with other organizations in service to the neighborhood. [13]



Fig. 7: Washington Park in the Cincinnati's Historic District of Over-the-Rhine



Fig. 8: Fountain Square in Cincinnati, first redevelopment project of 3CDC

1.3 Conclusions

In both cases is quite evident the success of each of the endeavors so the focus is in how each one of these two cities has managed to accommodate the revitalization and modernization processes. Even though they differ in their priorities, both of the cases prove the point that highly focused leaderships and capital can solve most of the problems.

Tracing the paths of both institutions, in practical terms, InCité and 3CDC have many similarities in how they have accomplished the successful initiatives of implementing change and revitalization of the focused historic districts. The two cities also share similarities in their past of deterioration of the historic urban cores and in the time frame that the redevelopment processes were placed. However, the contexts these two institutions are embedded in, such as the structures of government and power, the demographic dynamics and the priority of the different goals are so different that is even hard to define a comparable matrix in order to provide precise conclusions.

Both institutions and approaches share similar goals for the improvement of the conditions of these two historic districts, especially in providing vibrancy and vitality in their domains. Nevertheless, the priority of each one these goals and the nature of the funding to implement these goals seem to be determining in defining what it is of the most public interest. Both entities have been victims of great local criticism due to the new social dynamics that have taken place in the historic districts. Due to market forces, the institutions have been accused of being responsible for the gentrification of the two areas (concept used here as the displacement of original low-income residents due to market value aggregation).

By history, the concept of public interest in France is very strong, and the State provides plenty of tools in order to apply what they define as common good and of the most priority in long-terms. For this reason, private properties are subjected to public interventions, especially if they do not achieve their social purpose. This is also true concerning the historic preservation in France. There is already a consolidated culture and conscious of the importance of a city's heritage that comes with plenty of tools and urban policies concerning the issue. At the same time, there seems to be a lack of community input and participation or even spontaneity, due to the residents reliance on the consolidated and strong central power. Even though public audiences and the community participation are under InCité's scope of action, comparing to Cincinnati, advocacy manifestations are less notable.

On the other hand, Cincinnati still struggles in finding its path to an effective historic preservation policy and way of action in the consolidated culture of the private property. Some of the non-profits institutions acting in Over-the-Rhine invest most of their initiatives in education and public awareness (of the population and even of the local power) concerning the neighborhood's built environment relevance in the city's history and identity and why it should be preserved. However, the local power's weakness in efficiently implementing itself the preservation and modernization of its built heritage gives great opportunities to grassroots movements and greater mediation from the market and real estate dynamics. In addition, the lack of a central guidance with a long-term visions allows that parking garage buildings, for example, to be still possible in historic districts like Over-the-Rhine.

Bordeaux dealt with more defined issue: vacancy, insalubrious housing conditions, deterioration of historic buildings, unattractiveness of its core and low-income housing in unlivable conditions. The social dynamics behind the issues within its historic district were primordially related to the population's income. On the other hand, in Cincinnati, the scenario includes the income inequality of the space distribution and conditions, but also racial segregation. The past decisions of allocation of resources and people, and the difficulty in matching the criteria of public grants concerning social and public housing, seem to be still on the way of Cincinnati's path to equitable urban spaces.

Taking in consideration the best-practices of both cases, it is evident that, instead of choosing one approach over the other, a balanced model of governance should be envisioned. On the one hand, top-down approaches provide the long-term vision and tools to make sure the collective good is being considered in each endeavor. On the other hand, private sector initiatives, grassroots movements and community's inputs are sometimes more efficient and everlasting than imposed initiatives. However, without the balanced combination of the elements of the community's input and a global approach, also controlling the market place to ensure that all residents and actors co-inhabit historic districts in equitable terms, individual efforts can pass by without being noticed.

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HERITAGE ARCHITECTURE LANDESIGN
focus on CONSERVATION REGENERATION INNOVATION
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Le Vie dei Mercanti XI Forum Internazionale di Studi

Palazzo Marziani in Furnari. Project of restoration and reuse

Alessandra MANIACI, Caterina GULLO
Università Mediterranea di Reggio Calabria. Reggio Calabria, Italy
Alessandra.maniaci@unirc.it; gullo.caterina@virgilio.it

Abstract
The apartment block of Martian' s family that is dated 1961, construction work began on the principles, that in 1838 it will give to Mr. Natale Jannelli, since the building had a succession of owners, who neglected, and after the earthquake of 1978 left it completely. The palace is a longitudinal plan with the main entrance in the north side and the secondary at south: it consists in a double building, which extends for 42 meters on the way of the offices and for 14 mt on the present Piazza Garibaldi. The building has three levels, the underground floor used like store house, and covered with vaults of stone and earthenware, the others two floors with wooden roof vaulted made by "cannuciati", all the wall is in brick and stone with a size of 12- 50 cm. The three floors are connected by a system of stone steps covered with barrel vaults made of thin bricks of 25 cm long at Roman style, arranged in longitudinal rows and with cross vaults made by the same bricks The pitched roof is composed of trusses with Monaco, with warping related at the Lombard period. In the three prospects of our building there is no sign of any symmetry: the main facade is subdivided vertically into two parts which demonstrate the begin of a renovation work, that is never completed, confirmed by the different types of eaves and balconies. The frames are carved in stone of Syracuse (MELILLI) and were transported by a ship landed on the beach of Tonnarella, while the main portal is made by tuff. The secondary facade, is finished with frame of brick, being at a higher level than the main facade, it has only two floors. The project of restoration and reuse concern in the construction of a shelter for battered women. The objective of the halfway house is to overcome the trauma and the construction of new possibilities of life, the rediscovery of its resources and capabilities. In the houses are greeted with the mother even minor children, of the women that had suffered the violence, both the children having witnessed the violence both who had suffered it directly.

Furnari
The origin of the name, derives from the Latin Furnaris arx or rather Fortitude of Furnari (last name of Sicilian origin). The name of the family Furnari derives in turn from the Greek Phournares baker. The Commune of Furnari extends him on a surface of 1.300 hectares, with a density of 269 inhabitants for square kilometer.
It rises on a hilly zone from the "Mountain the Crosses" (247 ms s.l.m.), doing part of the mountainous chain of the Peloritanis, reaching the Tyrrhenian Sea. It confines to east with Mazzarrà Sant'Andrea, to west with Falcon, southeast with Tripi, and southwest with Thermal baths Vigliatore.The town territory is suddivisibile in Furnari "hill" or "center" and Furnari "harbor." Furnari "harbor", ago head to the bathing fraction of Tonnarella, to Portorosa and the Region of Bazia, of Saiatine and of Strong Tower.
On the origins of Furnari the news is uncertain and controversial. The most shared version from historians and reporters is that of a Genoese merchant, some Phillip Furnari, that, come to the succession of Fred II° (directed to pick up the inheritance of the kingdom of Sicily), you/he/she had had, in reward of the lent services, the title of Baron and the possession of a quadrilateral of ground of 1279 hectares, today bordering with the communes of Thermal baths Vigliatore, Mazzarrà S. To. , Tripi, Falcon and the sea. Phillip Furnari was built the castle on a rock to the limit of a precipice; nearby to it, and then downward, poor houses of farmers rose: a suburb that taken the name de feudatario: Furnari.



Fig.1: Sees panning of Furnari (Me)

In the castle (on whose ruins you/he/she was built in the sec. XVI L' actual Church Matrix) King Pietro I° of Aragon sojourned you: Furnari in fact it was from the part of the Aragonese ones after having lifted against the Angiolinis in the war of the Evening. For such motive, after the victory on French, King Pietro Di Aragon recognized the barony to the family Furnari and reinstated her the whole possession of the territory, that was kept for over four centuries. In such weary of time the reported news to the country is thin if those are accented of general character concerning the whole zone in Messina: certainly it is that the barons Furnaris knew how to manage with the politics if, in the billows of the epoch, you/they could preserve their feud.
In 1538 the country as others of the province in Messina, were destroyed at the Spanish mercenaries of Charles V°, which, being himself/herself/itself mutineers for no to have received the pay, threw him to the conquest of the countries of the band tirrenica putting them to iron and fire. the inhabited area of Furnari that then it counted 138 families and 691 inhabitants, it was in a lot of part destroyed, ransacking and depriving of well 400 corpses of wheat guarded in the houses. It owed tarscorrere one century because the inhabited center could restore to health the wounds and in 1600 it already counted 229 houses and 845 inhabitants and, at the same time, the barony of the family Furnari turned him into dukedom. In 1691 the Furnari sold the earth to Joseph Marziani whose brother Anthony, succeeded later him the year, you/he/she had from king Carlo II° the title of Prince and the recognition of the possession that the family preserved up to 1813 when the Sicilian parliament abolished the feudal rights and Furnari it began its life of commune.



Fig.2: Stemma Principi Marziani

Building Martian to Furnari (Me)

The Building of residence of the Principles Martian it constituted the terminal part of a compartment built in 1961 by the principles.
This was formed from the convent of the Carmelitani, the church of S. Antonio di Padova, from the theater and from the residence of the Principles themselves. The zone destined to the Convent by what remains

from the few preserved documents he/she introduced a separated prospectus on two levels abandoned on a plinth in stone. To plain earth there was a portico with arcs to everything sixth that sustained a gallery on which you/they opened windows corresponding to the center of every arc. The church that was magnified in 1817, the saint in Padua is devoted to for the devotion of the family Martian and introduces a' only aisle with trusses coverage and in prospectus a graven portal in stone Melilli. Proceeding toward south we find the theater, that was boast of the whole country the construction it goes up again as that some whole compartment at the end of the 1700. From the tradition it is learned that the principles turned one store of theirs into the theater, equipping him/it with 600 places around.



Fig.3: Planimentria of Furnari (Me)

1) Palazzo Marziani
2) Chiesa della Madonna del Carmine
3) Teatro Comunale
4) Chiesa di Sant'Antonio
5) Chiesa Madre
6) Chiesa Gesù e Maria





1)Building Marziani





2) Chiesa della Madonna del Carmine

The Carmelitani for ancient tradition built his/her own convents in of the high ground to recall the Carmelo Mountain and in the tall hilly zone of Furnari, for the interest of the Family Furnari, they built the Convent, in a zone, already consecrate to the Mystery of the incarnation; in fact since the year 1000-1100 there were a chapel in Arabic style with real time, where a representing table was revered the Virgo Annunziata and seems, has been to Furnari the first place of cult devoted to the Madonna, that watched over on the small inhabited center from the hill. This chapel, still existing, it is found among the church and the bell tower. The actual church and the convent (today Town Building) were built to depart of the 1547. The monks brought the devotion to Furnari to the Madonna of the Carmelo. In 1930 the Genoese pastor got from the Italian State the trust of the church to the Arcipretura and some attached rooms to the church and the Madonna of the Carmelo, you/he/she returned to in procession to be brought for the streets of the country. The inside preserve works of art of great interest as: a cloth on the greatest altar devoted to the Madonna and the devotion of the Carmelo, to form of trittico, of the school of Thomas De Eve, of the second halves 1500.







3)Teatro comunal e

4) Chiesa di Sant'Antonio

You was built in the XVII century from the Principles Mariziani, that turned into the theater a spacious adjoining store to their building. Widened and embellished in the XVIII century, the theater has a capacity of 500 places, with two files of stages in wood, gallery, stage and ample stage.
In the place where the church currently rises, around 1400 a small chapel was built then turned into the church at the end of the 1500. In the chapel a representing shovel the Saint preserved him, replaced in 1500 with a statue in wood of ulivo, what time it preserves him in the Mother Church. The church is to an only aisle; on the greatest altar a wooden statue of the Saint of good invoice towers, with conventual Franciscan suit, elegant in the features and in the gait. The work is attributed to a certain "De Matteo from Well of Mug" of the 1836. It is also his/her work the statue of the Madonna of the Carmelo.



5) Chiesa Madre



6)Chiesa Gesù e Maria



In 1375 the castle was built under the barony of Biagio Furnari. Inside the castle (where subsequently the actual bell tower was built), there was a small chapel in Arabic style devoted Caterina in Alexandria to Saint. Toward the end of 1500 in the part of the castle destroyed by the Saracens a greater church you/he/she was built. Among the present works of art in the church they are to remember: a statue of the Ecce Homo, work of "Frà Innocenzo from Pietralia"; a cloth of St. Francis of very alike Paola to the portrait of the preserved Saint to Paola; a representing cloth "You Pity" with the Souls of the Purgatory, positioned on an altar; a cloth of the Madonna of the Rosary, work of Rosalia Novelli, in which the Virgo softly sits on a roseto holding in arm Jesus Bambino and the Crown of the rosary that it gives to St. Domenico surrounded by St. Thomas of Aquino, Saint Rosalia from Palermo and Sant'Antonio from Padova; a wooden statue of Sant'Antonio from Padua, going up again to the beginnings of the '400, that it is the first statue of Sant'Antonio revered to Furnari, and later replaced with the actual one in 1836; a reeds organ, going up again to the 1637 of good invoice; and finally a shovel of the Madonna of the Help.

The apartment block of Martian' s family that is dated 1961, construction work began on the principles, that in 1838 it will give to Mr. Natale Jannelli, since the building had a succession of owners, who neglected, and after the earthquake of 1978 left it completely. The palace is a longitudinal plan with the main entrance in the north side and the secondary at south: it consists in a double building, which extends for 42 meters on the way of the offices and for 14 mt on the present Piazza Garibaldi. The building has three levels, the underground floor used like store house, and covered with vaults of stone and earthenware, the others two floors with wooden roof vaulted made by "cannuciati", all the wall is in brick and stone with a size of 12- 50 cm. The three floors are connected by a system of stone steps covered with barrel vaults made of thin bricks of 25 cm long at Roman style, arranged in longitudinal rows and with cross vaults made by the same bricks

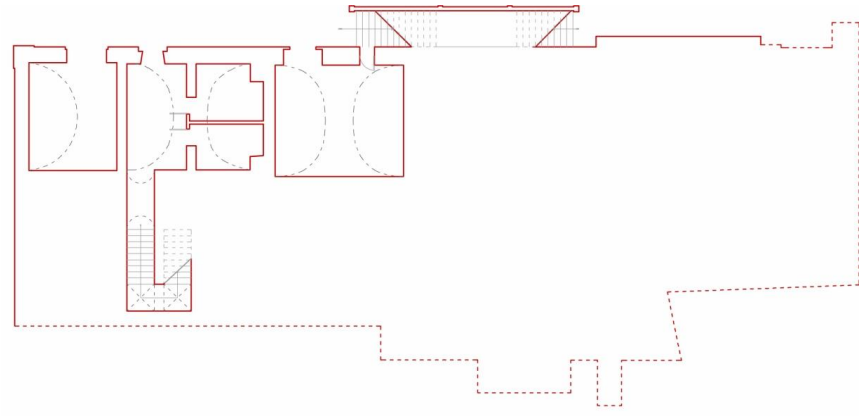

Fig.4: Piano seminterrato

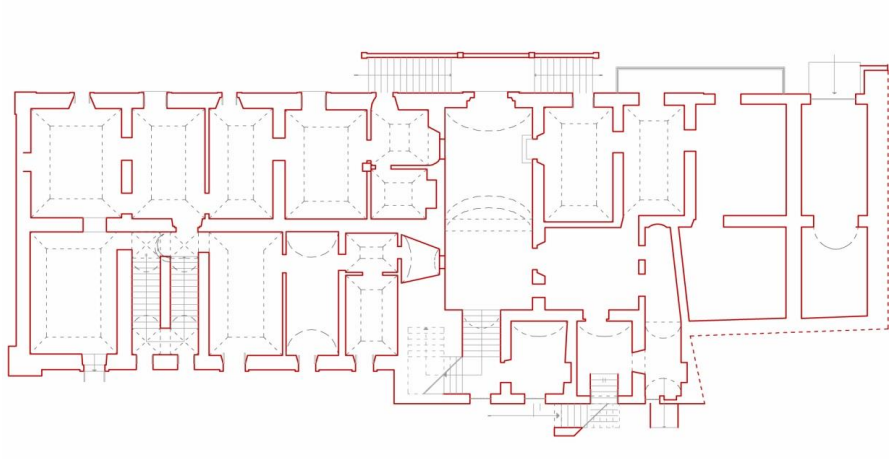

Fig.5: Piano terra

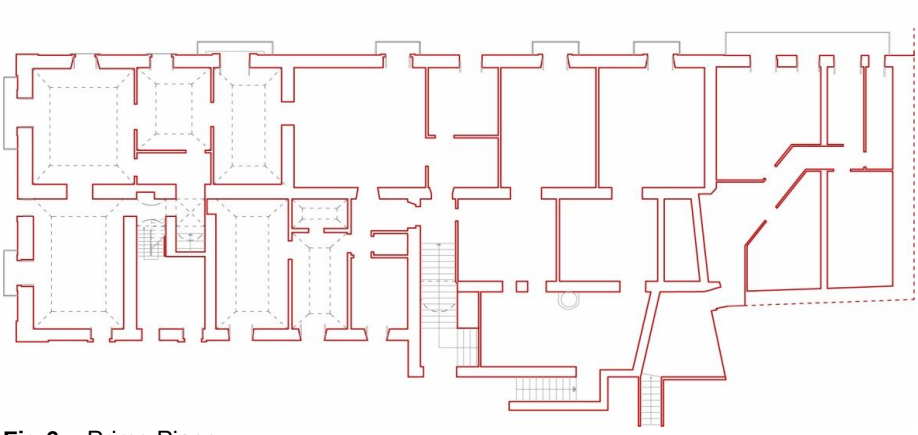

Fig.6: Primo Piano

The pitched roof is composed of trusses with Monaco, with warping related at the Lombard period. In the three prospects of our building there is no sign of any symmetry: the main facade is subdivided vertically into two parts which demonstrate the begin of a renovation work, that is never completed, confirmed by the different tipes of eaves and balconies. The frames are carved in stone of Syracuse (MELILLI) and were transported by a ship landed on the beach of Tonnarella, while the main portal is made by tuff. The secondary facade, is finished with frame of brick, being at a higher level than the main facade, it has only two floors.



Fig.7: Prospetto Principale

The objective of the house of reception immediately is the overcoming of the trauma and the construction of new possibilities of life, the rediscovery of his/her own resources and ability.In the houses you/they are also welcomed with their mother the smaller children, the kind involved to them it turns in the situation of maltrattatamento, both to have assisted to the assisted violence both to directly have suffered her.

The offered services are:
• houses of temporary hospitality to secret address for the women in emergency and their smaller children
• legal consultation
• I compare with the resources of the territory, social services and courts
• psychological support for the women entertains
• educational support for the / his/her children / and guests
• orientation and support for the search of the job and the house
• editing of a newspaper on the problem list of the violence of the women

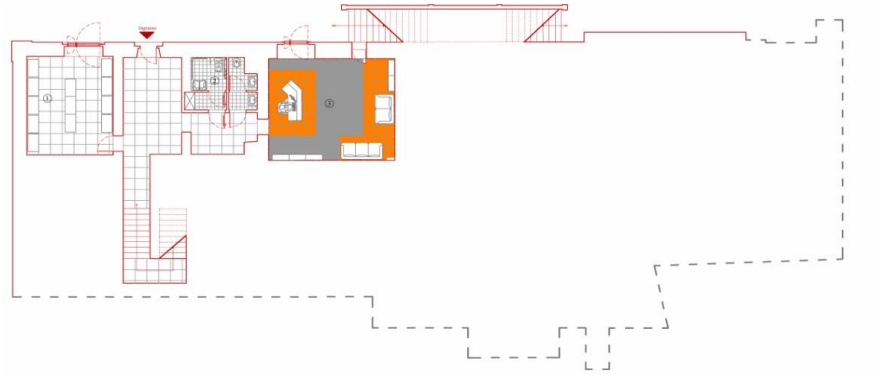

Fig.8: Piano seminterrato

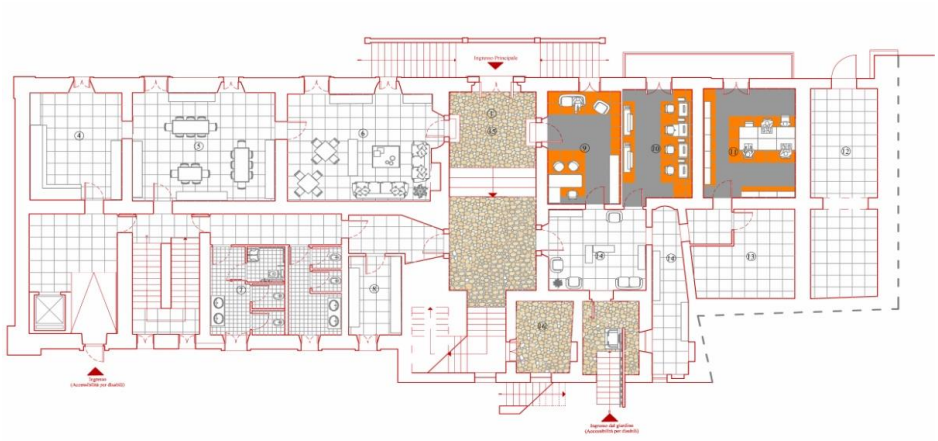

Fig.9: Piano terra

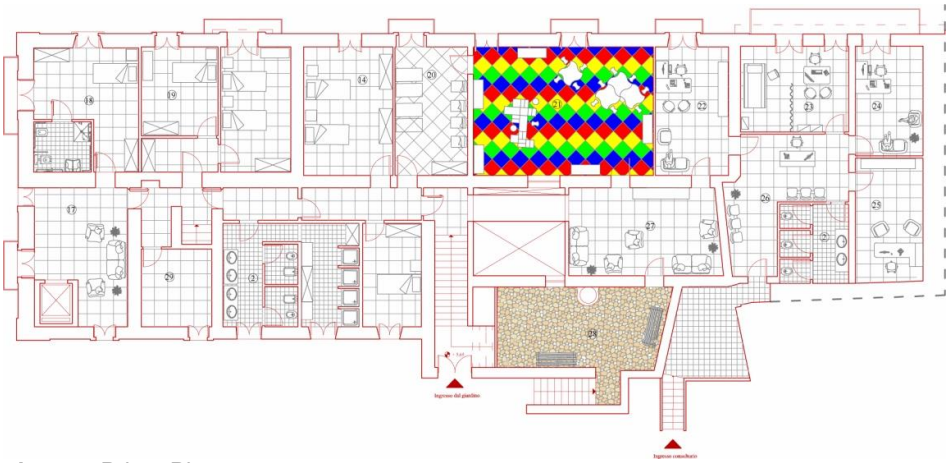

Fig.10: Primo Piano

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HERITAGE ARCHITECTURE LANDESIGN
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GREATER AMMAN: METROPOLITAIN GROWTH AND SCENARIOS FOR SUSTAINABLE URBAN DEVELOPMENT

Ahmed ABU AL HAIJA [1], Rob POTTER [2]
[1] Deanship of Educational Services – Taibah University
[2] Human and Environmental Sciences, University of Reading
E-mail: alhaija2@gmail.com r.b.potter@reading.ac.uk

Abstract

This paper reviews the development of Greater Amman, Jordan noting that the vast urban expansion that has occurred over the last fifty years has led to the desertification of rare fertile lands, following the fragmented and scattered territorial expansion of the city. The future scenario for planning in Greater Amman is analyzed in respect of proposals outlined in the *Metropolitan Growth Plan* of 2008, which assumes a rapid population growth from 2,200,000 persons in 2006, to approximately 6,500,000 by 2025. The concentration of more than 39 per cent of the national population of Jordan in Greater Amman threatens the transformation of former distinct settlement pattern into a distinctive continuous urban zone, aggravating problems of infrastructural provision, water needs, agricultural lands, and leaving unresolved problems of land inflation, poor urban standards and housing shortages. In conclusion, the environmental implications of the *Amman Metropolitan Growth Plan* are analysed, and it is suggested that an alternative approach is needed, based on clear principles of sustainable urban development.

Keywords: Amman, Urban Growth, Agricultural Lands, Potable Water, Public Standards, Site and Services

Introduction

No one can deny that architecture is generally influenced by the environmental context from which it is derived, including climatic, social, cultural and economic factors. In Arab history, the urban and architectural output was often a mirror of environmental exigencies. Nevertheless, it has given rise to both modest and complicated structures. The introduction of innovative urban and building systems followed by industrial development was essential for the birth of the Functional Schools in the 19th century, followed by the Modern Architectural movement. It also spread in Arab cities such as Amman, Jordan, where the conceptual focus was more on functional and economic issues rather than environmental and traditional ones.

This paper focuses on the phenomenal urban expansion of Amman over the last century, covering the various waves of urban development in relation to international political events. In fact, in its short modern history, Jordan has played an important role in the Middle East region, accommodating millions of Arab refugees, mainly Palestinians in the last century and Iraqis since 2003. Important 'modern' cities such as Amman and Zarka were settled in less than 70 years in the north of the country, and now these cities account for more than 50 per cent of the total Jordanian population, with fast approaching 3,000,000 residents (Statistical Department of Jordan, 2009). The shortage of natural resources in Jordan, compared to some other oil regions, encourages the central government to implement macro-economic programs, inviting private and international investors to contribute to the development of the local economy. The political stability of Jordan has been a fundamental factor of Arab investment attractions, especially in the industrial and tourism sectors. Tourism contributes US$ 14,190 million to Jordan's economy and accounted for 14.7 per cent (compared with only 10 per cent in 2004) of the country's gross domestic product (GDP) in 2008 (Statistical Department of Jordan, 2009). The capital of Jordan's infrastructure is gradually developing to be competitive with the regional countries, with the expansion of Queen Alia International Airport and improving the transit links, network connections and main services for trade and tourism purposes.

Until 2005, urban planning in Amman adopted a pattern of urban expansion based on low-density urban sprawl, permitting a maximum height of four residential floors, with site coverage less than 50 per cent (GIS, 2010). The presence of refugee camps, high-density residential zones and some slum quarters located mainly in the southern and eastern parts of the city has contributed to the division the city into two vast zones as previously mentioned: western Amman and Eastern Amman. The process of rapid horizontal expansion of the city has increased the surfaces of the prime infrastructural intervention amplifying land costs, and causing environmental impacts at the biophysical scale. Therefore, there is a danger that losses to biodiversity resulting from these activities could reduce the resilience of ecosystems to withstand climatic variations and their pollution damage (United Nations, 1992). In fact, the diminution of precipitation in Amman in the last 25 years has been recorded at more than 10 per cent (Salameh, 2008).

On the other hand, Amman has experienced a regime of water rationing since 1987, with households receiving water once or twice a week for various durations: "this reflects the fact that Jordan is one of the ten most water-scarce on earth and has long suffered from a structural crisis in the water sector" (Potter and Darmame, 2010: 116). The water supply depends on availability within an area of hundreds of kilometers around Amman, causing an impact at the biophysical scale. In fact: "Amman's use of the Azraq wetland as a ready resource of potable water has destroyed over 90 percent of the nation's most biologically diverse wetland ecosystem" (Greater Amman Municipality, 2008: 53). Therefore, the vast spatial extension of Greater Amman has led to many problems, mainly at the infrastructural and environmental levels.

Approach

Unfortunately, to date there has been a shortage of relevant research on issues relating to principles of sustainable development in respect of Greater Amman. Critical aspects such as the basic infrastructure of the city, public transportation, local resources, urban densities and housing requirements need to be carefully examined and evaluated. The present paper investigates the impact of urban expansion on the environment, employing available data supplied by a number of Jordanian Public Departments, plus data collected personally with the collaboration of some technical staff working in the Greater Amman Municipality. Most of the updated urban analyses were available in the Greater Amman Municipality, as elaborated in the *Metropolitan Growth Plan of 2008*. Therefore, the authors faced problems of data availability regarding particularly traffic analyses between the various zones (origin – destination traffic, for example), the ownership of lands, the surface of lands organized

(built up and new areas) according to the various residential classification in order to evaluate the existing building capacity.

The first section of the paper examines the urban development process over the last 50 years, highlighting particularly the urban expansion adopted by the recent Metropolitan Growth Plan of Amman, which involves an unconventional approach to planning; it elaborates simultaneously a framework of three hierarchal scales: Metropolitan, Planning area and Community-neighborhood. The first section also analyses the process of urban expansion, which has occurred mainly in the northern and southern parts of the city, highlighting the housing needs, building capacity, natural heritage and water needs.

In the second section, reviewing the integrative approach of the *Metropolitan Growth Plan of Amman*, which is in continuous development until 2025, this research evaluates the possible consequences of the planning process, concerning some economic and political obstacles. Therefore, the purpose of this study is to suggest an alternative approach to planning in controlling the infrastructural costs, housing needs, agricultural land conservation and water management, taking into consideration community exigencies and public services. In the words of Moughtin (2005:1): "Any discussion of city planning and urban design, which does not address environmental issues, has little meaning at a time of increasing population pressures on a declining natural resources base, widespread ecological destruction, increasing pollution, ozone layer depletion and climate change…. The long-term survival of the planet as a vehicle for sustained human occupation in anything other than a degraded lifestyle is in some doubt: in these circumstances any discussion of the aesthetic of the city planning in a pure or abstract form unrelated to the environmental concerns could be described as superficial"

The Historical Development of Amman

The recent modern history of Amman started at the end of the 19th century by the settlement of around 2,000 Circassian people (Ziadeen, 2004) escaping from Russia due to socio-political problems. This agricultural community established the historic core, benefiting from the rich soil and water, at the confluence of valleys around the Roman Archeological site in the valley of Ras El Ein (about 600 meters in altitude). Neighborhoods were established on separate hills where new arterial roads connect the urban fabric, following its natural topography (valleys toward hilltops). These neighborhoods have expanded occupying seven hills around Ras el Ein (between 600 and 1,100 in altitude).

The population began to increase gradually after the completion of the Ottoman Hijaz Railway in 1902 (which passes close to Amman's old center and connects Damascus and Medina in Saudi Arabia) and after the foundation of the Municipality of Amman in 1921. In 1946 Amman occupied an area of 31 square kilometers and had a population of 60,000 persons. Several waves of refugees, mostly Palestinians, settled in Amman in the years 1948 and 1967. By 1959, the boundary of the Municipality had expanded to include 50 square kilometers and the population had increased to 246,475 persons (Greater Amman Municipality, 1986). Since that time, several boundary expansions have continued following waves of refugees, as well as asylum-seekers from the wars in Lebanon and Iraq, reflecting the fact that Jordan plays a moderating role in Middle Eastern affairs.

A policy of centralization has been accentuated since 1987 within the creation of the Greater Amman Municipality (GAM), governed by a Mayor nominated directly by the King of Jordan. The new Metropolitan area encompasses 532 square kilometers. Subsequent boundary expansions in 2000, 2001, and 2005 increased the total GAM land area to approximately 680 square kilometers, and the population of Greater Amman had grown to approximately 2,200,000 persons by 2004. In 2006 GAM's geographic boundary increased from 680 to 1,662 square kilometers, thereby annexing the former municipalities of Sahab, Al Mouwaqer, Al Jeeza, Marj Al Hamam and Na'our. In this way, an additional 190,000 residents were absorbed into the city (Greater Amman Municipality, 2008: 47).

Legislation and Urban Planning for Greater Amman

The most important *Master Plan of Amman* was funded by USAID (the United States Agency for International Development) and was largely produced with the involvement of English Planning Consultants. A *Greater Amman Comprehensive Development Plan* (GACDP) *1988-2005* enlarged the border of the municipality to include small agglomerations around Amman with a total surface of 532km². The main objective of this plan was essentially to control urban growth in terms of land speculation managed by land owners and the local councils which increased the urbanized areas in agricultural lands, in order to increase profits derived from the cost of lands and urbanization. The

Plan established the norm of a maximum of four stories in residential areas, which is a reasonable maximum building height because on this basis most activities can be accommodated without the need to provide a lift.

The Plan suggested that urban expansion, especially of residential areas, should occur toward the desert east, where the population density is at its highest, as this zone includes slum areas to a greater degree than any other place in the city. Several residential areas in the eastern zone suffer also a shortage of open spaces except within some scattered vacant private lots. But in practice, development followed the opposite directions towards the agricultural lands (see figure 1) (Abu Al Haija, 1995). In fact, a report on the *Growth Plan* (Greater Amman Municipality, 2008: 144) states: "The plan of 1988 included several green areas such as parks, forests, recreation areas and agricultural land within an overall system, unfortunately, the Plan was not implemented and the creation and protection of such a system did not occur".

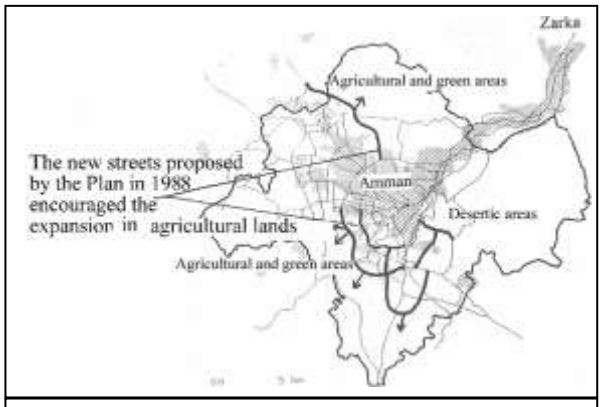

Figure 1. Ring Roads Plan of 1988

Thus, the Plan failed to limit sprawl and to preserve prime agricultural lands: instead, the urbanized areas increased to meet housing needs, permitting expansion in almost all the agricultural lands located to the west and south of Amman. The contradiction of this plan, was that while proposing residential land use in the east, it designated and implemented new primary and ring roads in the north and south-west of the city, encouraging residential expansion in these directions, where the areas were mostly used as agricultural lands. The main report of the *Amman Growth Plan* evaluates the 1988 plan, stating that the Plan was indeed comprehensive, being based on over four years of detailed research and analyses. Therefore, it remains a significant resource for the ongoing planning of the city and its surroundings: "However, little attention was paid to either the political acceptance of its enactment and, as a result, it was never formally adopted. Consequently, planning in Amman has continued to be governed by the city's outdated zoning bylaws, overlaid on its emerging ring and radial road network" (Greater Amman Municipality, 2008: 46)

From 2006 a largely neo-liberal approach to planning in Amman was increasingly adopted. This has been based on intensifying the building density in some old built-up zones, and attracting international funds, partly by taking advantage of Jordan's reputation for safety within the region. The Al Abdali Urban Regeneration Project in Amman is an example of the outcome of the new approach to planning, as the central government gave the private real estate developers the right to be in charge of implementing macro-scale projects within the city. This project will provide a new center for finance and commerce within the city, consisting of hotels, markets, offices, entertainment services and residences. The total area is 350,000 m², which will contain a built-up zone of approximately 1,000,000 m² in a site previously used as the General Quarter of the Armed Forces, about 1,500m away from the old center. The policy of privatizing public areas inside Amman is similar to the experience of *Solider* private society in the reconstruction of the old center of Beirut, from an organizational point of view. *Solider* was established after the destruction of the historic center of Beirut in 1982. The Lebanese Government decided to transform the properties into shares, where the private sector control the process of reconstruction and management according to a neo-liberal agenda of privatization (Daher, 2007: 49)

But several important reflections exist concerning high-rise buildings in view of the existing capacity of infrastructure, and the adaptability of these buildings to local climatic conditions. Issues also exist regarding the local culture of the people with particular attention to matters of privacy, and how these buildings respond to the principles of energy saving and water needs, and how they can be made consistent with the environment assessment law *Number 37* of 2005, which in theory forces architects and engineers to develop environmental studies and analysis for the evaluation of the impacts of projects.

As part of the International Conference organized by the Engineering Association of Jordan in 2008, under the title the *High-Rise Building in Amman*, a planner in charge at the office of Planning of the Amman Municipality recognized during the concluding debate that the Al Abdali Plan was oriented

mainly by political and economic choices, and that several problems are difficult to resolve by adopting technical solutions, such as the realization of towers in already high-trafficked areas. The high-rise building policy assumes importance, especially in the built-up zones. Therefore, since 2000 structures of more than 90 meters in height began to appear in Amman. In 2005 the Twin Towers project began in a high-density urban zone, each building reaching about 150 meters in height, covered completely by glass cladding systems, and occupying some 28,500m² of land.

The recent propensity to place high-rise buildings in chaotic and highly dense zones provokes other infrastructural and environmental problems, which evidences a serious crisis among decision-makers, in adopting a clear future vision of urban development and planning. Problems of traffic and congestion are becoming serious in all parts of Amman, particularly the shortage of pedestrian areas, with the motor car playing a dominant role in the context of the lack of overall an effective public transportation system.

The *Environmental Law Number 52* of 2006, and the norms of environmental assessment have together established general indications in the conservation of natural resources and in respect of the environmental context in project elaboration and implementation. According to these criteria, mainly concerning the traffic implications, high-rise buildings like those in the Al Abdali zone and other similar mixed areas, would find difficulties in being approved. The first concrete result of this law has been the enlargement of the Amman Municipality in the year 2006 to 680km², expanding the borders to protect mainly the agricultural lands. A new *Metropolitan Growth Plan* (MGP) was elaborated in 2008, which is the focus of the detailed case study that follows.

The Amman Metropolitan Growth Plan (MGP): a case study

The Planning Approach to Territorial Extension

The absence of an adopted and implemented Master Urban Plan for several years and the rapid growth of population called out for a rapid and well-articulated response. The classic procedures associated with the preparation of Master Plans normally requires a long period of technical elaboration and administrative measures for final approval, while the city is quickly expanding. The *Metropolitan Growth Plan* (MPG) for Amman has been presented as a response to these requirements. It is structured at several scales simultaneously in order to guide the planning process for an anticipated population growth of Greater Amman to 6,500,000 persons in 2025. The plan illustrates the location of existing areas accommodating residential and employment uses within the overall Metropolitan Area, as well as the preferred locations for the future expansion of settlement. It also details the projected future locations of new roads, public transit corridors, major natural heritage sites, and areas for more intensive mixed-use development. The plan has been developed according to different layers throughout its duration. Thus, the approval of this Plan also follows the ongoing development of these layers (Greater Amman Municipality, 2008). This “work in progress” plan is divided into three hierarchal scales:

- The Metropolitan scale: relating to 1,662-sqaure-kilometere planning area (Figure 2)
- The Planning Area scale: the Metropolitan zone is divided into eight planning areas to provide a finer scale of planning. Area Plans, when completed, will be based on the Metropolitan Growth Plan and will include elements such as land use and major road alignments.
- The Community scale: this occurs at the level of the 228 existing neighborhoods, and will cover details of zoning and the road network.

The *Master Plan* is being developed in seven planning phases that define a range of Plan Components. These components are: the Plan for tall Buildings, the Corridor Intensification Strategy, the Industrial Lands Policy, the Outlying Settlements Policy, the Airport Corridor Plan, the Metropolitan Growth Plan, Area Plans and Planning Initiatives. The following paragraphs mainly deal with the Metropolitan Growth Plan and related issues of planning densities.

The Approach to Urban Expansion

The Plan establishes the areas designated for future settlement growth, including the intensification of settlements within existing built-up areas and the overall expansion of settlements. Based on data from the Statistical Department of 2007, the Metropolitan Growth Plan (MGP) considers the minimum number of new dwelling units needed by 2025 to be approximately 1,300,000. This figures, of course, relates directly to the population growth which is projected to increase from 2,200,000 to 6,500,000 persons by 2052.

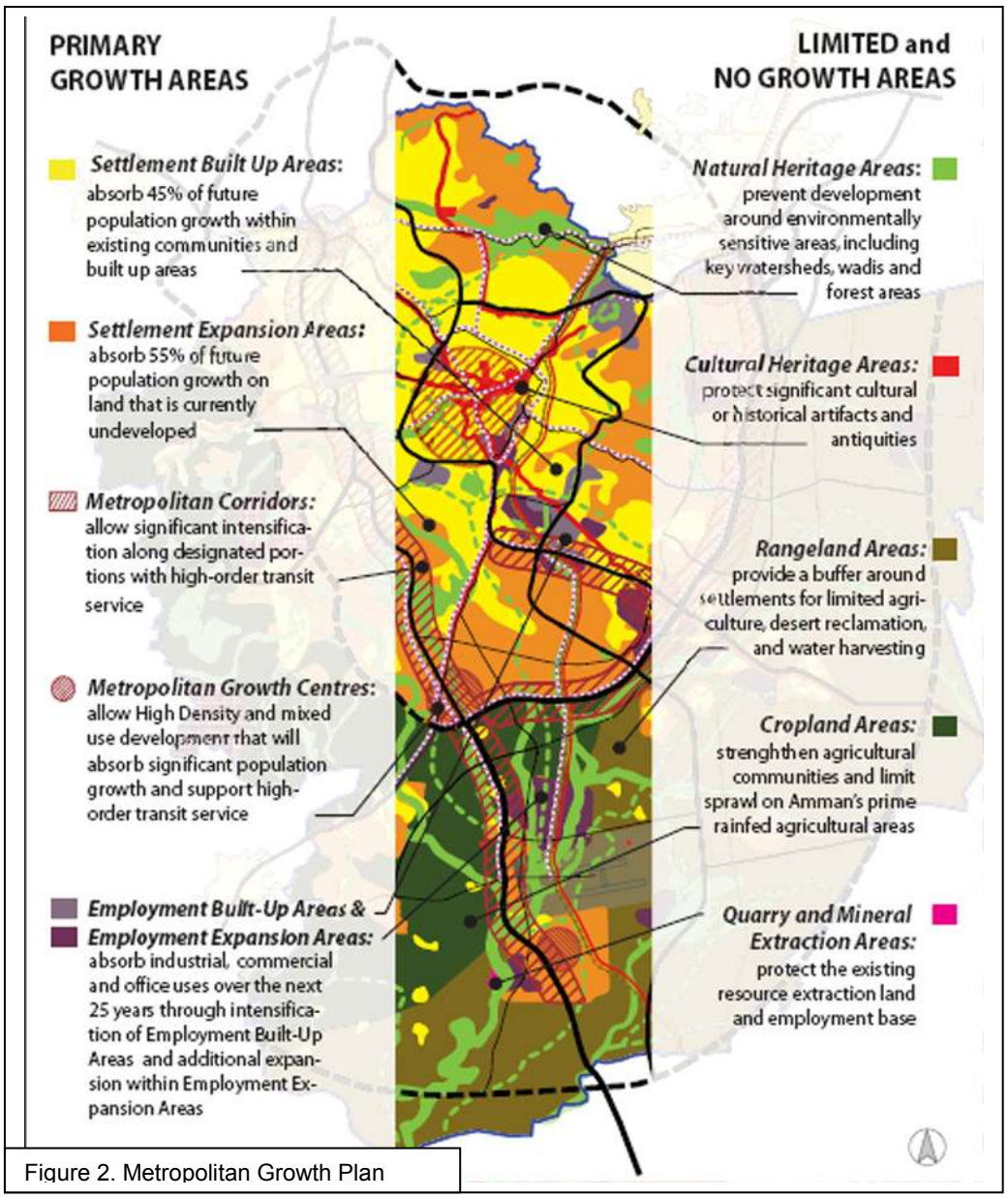

Figure 2. Metropolitan Growth Plan

The growth framework proposed in order to meet the demand for land and housing is based on the following components:

The Designation of Built-up Areas:
Tacking into consideration the fact that up to 40 per cent of lands within Amman's built-up area are vacant (according to the Greater Amman Survey, 2008) the MGP proposes growth through both intensification and densification. The plan proposes to accommodate 55 per cent of new housing units within the built-up area, which it calls the "Urban Envelope".

The Designation of Settlement Expansion Areas and the Urban Envelope
Areas for settlement expansion are mainly located within the so-called "Urban Envelope". Only low-density housing development is allowed for future growth outside the Urban Envelop, estimated at some 700,000 additional residents.

The Application of Growth Modelling from the Neighborhood to the Metropolitan scales
The MGP analyzed twenty sample neighborhoods in order to model neighborhood growth patterns before applying this to Amman's full array of 228 neighborhoods.

Density of Areas
These densities were varied among the built-up areas making-up the Urban Envelope, increasing the building capacity as part of the densification and intensification approach. Lower densities were encouraged outside of the Urban Envelop, especially in the main agricultural lands. Planning area A, for example, has a density target of 6.5 units/per net dunum, accommodating upwards of 1,300,000 residents, for a net density of 26.5 persons/dunum. Area H has a density target of 1.2 units/net dunum, accommodating upwards of 170,000 residents, for a net density of 5.5 persons/dunum.

The new densities established by the Plan are generalized by broad areas in order not to detail urban expansion at the macro-scale. Therefore, compared to the existing density in the north of Amman it is clear that a substantial reduction is required in some areas where the density is presently very high. Existing residential densities are classified into four main categories: A, B, C, D. The maximum built-up area that can be occupied is respectively 39 per cent, 45 percent, 51 percent and 55 percent of the lot's surface, with a maximum of 4 floors (15m height) (Urban Regulation, 2005, art. 29). Residential zones A and B are generally located in the north and west of Amman and the residential zones C and D are located in the east and south of the city.

In areas designated as residential (A) the lot's surface should be at least 1,000m². The building index is around 3.7 mc/mq considering the dunum surface plus 25 per cent of internal streets. This theoretical index is flexible according to the topography of land; the maximum 15 m height indicated by the norms are computed starting from the ground flour which stands on the level of the street. All the stories below this level are authorized but not calculated as part of the urban density, while, due to the topographic nature of Amman, the major part of residential buildings are more than 6 stories. In A areas the number of dwelling units per dunum can be approximately 12, considering the average surface of unit 120 m² and the average of person/family in Jordan is 5.4. In zone (D) the lot's surface should be at least 300m². The building index is about 5 mc/mq considering the dunum surface plus 25% of internal streets. The dwelling units per dunum in this area is approximately 17 considering the average surface of unit 120 m². In this case, the expansion areas should diminish more than 50 per cent.

Discussion: Observations on the Approach of the MGP to Expansion

The Loss of Fertile Lands
Three important issues continue to cause the diminution of fertile lands in Amman, and the first is the low density of building. About the 50 per cent of the proposed urban expansion is set to occur on fertile lands, mainly in the north, west and south of the city. Thus, the low-density pattern of building permits urban sprawl. The second issue concerns subdivision plans in rural areas. Residential development is set to continue expanding outside the built-up areas. In fact, new residential quarters can officially be approved outside the urbanized areas according to these Plans, which could be proposed even on prime agricultural areas. The third concerns the minimum parcel size of agricultural land. The Growth Plan recognizes that current residential subdivisions are negatively affecting agricultural productivity as they fragment the agricultural land base, and it mentioned the necessity to elaborate an Agricultural Plan which restrict residential growth in agricultural areas, by establishing regulations for minimum parcel sizes, and by establishing hard boundaries for settlement expansion in agricultural areas (Greater Amman Municipality, 2008, p. 92).

More than 55 per cent of the urbanized areas of Amman are vacant because the owners have left their lands abandoned (GIS, 2010). These are generally fertile lands, and the owners are waiting major offers from developers. The country's legislation continues to permit rural areas to be divided into smaller parcels – a minimum of 4000 m² of land property. This in turn causes limitations in adopting national agricultural policies in terms of production and marketing. Lands also continue to be divided into small portions because of the inheritance law and its consequences.

It is hard not to reach the conclusion that the Growth Plan should urgently prevent additional urban development on prime agricultural lands, possibly using the implementable agricultural belt in the northern and western parts of the city, and freezing the subdivision plans outside of the urbanized areas. The fertile lands of Amman represent an active part of conversion. According to studies conducted by Jordanian specialists in remote sensing and Geographic Information System, the urban areas of Amman have increased in the last 80 years by 509 times the original urban area, while the fertile lands decreased by 86 km², which represents an overall 23 per cent loss. Research concludes that fertile lands will disappear by the middle of the century if urban expansion continues at this rate in

Amman (Al Rawashdeh and Saleh, 2006: 215). For example, presently, the urban area comprises 91.4 per cent of the province of Amman (Statistical Department of Jordan, 2009).

With about three years having elapsed since the adoption of the MGP, it is interesting to return to a sentence cited in the main Report of the Plan (Greater Amman Municipality, 2008: 90), which states: "… the 1988 Plan was never implemented and urban growth occurred in … agricultural areas". Therefore, the substantial problem of Amman's development concerns the inflation of land prices and the economic possibility of the municipality funding the expropriation of lands for public utilities. Consequently, the development policy should mainly take into consideration these problems in order to avoid other failed experiences, as the implementation success of these plans depends on how and where the new expansion is proposed.

According to agricultural land analyses conducted by the Municipality, approximately one in six households in both high and low-income areas grow their own fruit, vegetables and herbs. On average, these residents occupy up to 15 per cent of their land for urban agriculture, generating approximately JD 1,900,000 annually. Due to the high cost of vacant residential land in the urbanized areas of Amman (for example, the cost of a residential dunum in the north of Amman is about 250,000 - 500,000 JD), the Plan faces a real difficulty of the private owners changing these lands into urban agricultural areas, taking into consideration the limited resources of the municipality in supporting these owners to maintain or run their agricultural lands inside the city. Prioritizing agricultural use in vacant areas inside the city could be unfair, without taking into consideration holistic land policies.

The Standard of Public Services

In light of the shortage of analyses concerning the availability of public services in the city, the Metropolitan Growth Plan does not established specific technical norms for urban standards in the built-up area and the new expansion zones. Therefore all the areas of Amman are being urbanized without limitation of public standard services in relation to extant building densities or the number of residents. Therefore, primary schools, public gardens, sports areas, parking, social and religious buildings are distributed almost casually within the city, depending on public land ownership availability or private donations. The total land area for public service use in Amman is 6,655,086 m² (GIS Department, unpublished data - Greater Amman Municipality, 2010), which is only approximately 3 square meters for each resident.

Most of the land ownership in Amman is private (in fact, about 99 per cent according to the non-published database of the GIS Department in Greater Amman Municipality, 2010), therefore there is a shortage of public open spaces in general, except for some scattered vacant lots. Increasing the open spaces in the built-up areas of Amman or in the new development areas has become one of the biggest challenges facing the MGP.

Water Needs and Network Problems

Recent studies have shown that Amman has a drastic shortage of local aquifers to satisfy its demand for potable water. It receives around 50 per cent of its water supplies from the Jordan Valley, pumping from –225m in the Jordan Valley to the north-west of the city at an altitude of (1035m) (Potter *et al*, 2007). The remaining water demand is met from other aquifers, generally some 50-70km distant from Amman. Because of Amman's growing demand for potable water, and the Government's avowed intention to provide for the basic needs of the population as a priority, in 2009 the Government authorized the Turkish GAMA Energy Company to implement a project to transport 100 million cubic meters per year for the next 10 years of non-renewable water to the city from the Disi aquifer. This aquifer is located in the south of Jordan, and the project will involve the construction of a 325 km pipeline from Disi to Amman.

Most experts consider countries with a per capita water production below 1,000 cubic meters per year to be water-poor. Meanwhile, Jordan's per capita water for the year 2005 was only 146 m³ compared with 846 m³ for the rest of the Arab world (Hashemite Kingdome of Jordan, 2006: see also: UNESCO, 2006; Darmame and Potter, 2008). Accordingly, for most parts of the city, especially its southern areas, water is supplied only one day a week, while other residential quarters in the western area receive water two days a week. Residents store water in tanks or cisterns located mainly on the roofs of buildings. The urban expansion of Amman has, of course, increased the surface of the operational network and has added to the need for control and maintenance. Given the steps that are currently being taken in order to supply the extant population of just over 2 millions with water on the basis of a formal system of rationing, it is difficult to see how a population of some 6.5 millions as envisaged in the Plan could be kept adequately supplied with water at an acceptable cost by the year 2025.

An Alternative More Sustainable Scenario for the Future Development of Amman

The phenomenon of unlimited and largely uncontrolled urban expansion for over fifty years has characterized Greater Amman, which is consequently facing a range of problems relating to infrastructure and environmental sustainability. In short, the city of Amman is not in balance with its regional area and it can be argued that it is not in synergy with its local ecosystem and the natural environment.

Some key concepts of sustainable development need pressingly to be considered, such as citizen participation in relation of regional- and local-forms of governance, public transportation policies, site and services schemes, appropriate land use provision, urban densities, building orientation and form (see Elkin, 1991). The Jordanian Master Plans are principally concerned with the physical aspects of development, rather than with issues of metropolitan governance and local community participation. This is a characteristic that could well affect the sustainability of future urban development. The direct democratic election of Local Government representing Ammani citizens, thereby creating concrete instruments of citizen involvement in the planning process, could be a suitable approach leading to effective community participation. The local political coalition have to clarify the physical, economical and social programs with transparency, evidencing concrete actions of public participation. This would mean that "Human development (w)ould take account of nature and natural process" (Ettouny, 1987; see also Potter, 2010).

The urban planning system is still working at a restrictive local level using detailed plans not necessarily controlled by a comprehensive strategy. This urges that the MGP should have already the instruments to control urban development, in order to prevent the creation of any illegal buildings outside the urbanized lands or the approval of Subdivision Plans also on agricultural lands (due to the relatively low cost of land compared to the urbanized areas). This could also avoid the high-cost infrastructural networks due to rehabilitation programs in slum quarters that are continually developing in the periphery of Amman (Abu Al Haija, 2001).

Future urban expansion will occur mainly in the southern parts of the metropolitan area and will be fully contained within the designated Amman Development Corridor. This scenario confirms the tendency of urban expansion towards the agricultural lands, where the comfortable climate and panoramic natural views encourage settlement compared to the desert lands located to the east of Amman. The present paper suggests the efficacy of an alternative scenario with the main goal of alleviating environmental damage, especially in the fertile lands of Amman west, north and south, by orienting future urban growth mainly into the semi-desert zones of Amman east. This scenario has the following advantages associated with it:

- saving the fertile lands located in north, west and south Amman
- facilitating different policies and approaches to urban zoning, considering that vast land areas are not yet subdivided
- controlling urban densities in order to reduce the ecological footprint of the city
- reducing the cost of infrastructure (due to the topography)
- reducing the cost of building (due to the low cost of these lands compared to other zones in Amman (the average cost per dunum in the semi-desert zones is about 10000 – 100000 JD)
- reducing traffic densities in the western and northern parts of the city
- savings in energy by reducing the distances between programmed facilities and pubic transportation, so encouraging walking and cycling
- connecting the new growth area with the city of Zarka, through the existing highway, without passing through the dense areas of Amman

- permitting the maximum solar gain and energy efficiency, organizing roads and buildings according to prevailing climatic conditions, within appropriate orientation according to the path of the sun

- permitting the local community to take responsibility for initiatives, thereby increasing public participation in the planning process

The site and services approach has much to recommended it in the context of metropolitan Greater Amman, in order to assist with the improvement of low-income housing in Amman east. This approach can be dovetailed with the opening up of new peripheral urban lands as part of the overall approach to planning. Meanwhile in Amman north and Amman west there is currently a surplus of some 30,000 vacant residential apartments. This gap between housing needs and demand on the 'two sides' of Amman is essentially due to the social and economic standing of residents. For the majority who live in Amman east, with the average Ammani family earning only JD 576 per month, life is hard (Statistical Department of Jordan, 2009). And it is clear that the growth in incomes is not anywhere near keeping pace with current levels of inflation.

In the case of Egypt, new cities have been established in the last 30 years in the desert areas. These include Sadat City, Sitta October City and Al Asher Ramadan City, which are located between 25 to 100km from Cairo. These new towns have succeeded in reducing the pressure of urban growth on surrounding agricultural lands adjacent to the Nile, especially in the Cairo Metropolitan area. This policy has other advantages in planning and programming the future expansion taking into consideration relatively low-cost land, and the integration of residential, industrial and commercial land use zones (see Ettouney and Abdelkader, 1987).

The problems of urban planning in Amman continue to be critical in scale due the pattern of land ownership and the interests of private developers in shaping land development and land policies. Other substantial problems concern the cost of land, the pressing housing needs of low-income families, the various slum quarters scattered in several zones, the shortage of potable water, the dearth of public services and healthy apartments. In particular, within Amman there needs to be the realistic control of land costs. However, this is difficult to achieve within the framework provided by the present Metropolitan Growth Plan. In reality both the public and private sectors have to be involved in developing new autonomous and sustainable settlements, based on site and services approaches, the provision of good standards of primary public services and sustainable patterns of natural resource consumption in relation to future development directions and building densities.

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The Challenge of Urban Sustainability in Seaside Cities Between Unlimited Growth and Serene Degrowth

Massimo CLEMENTE[1], Daniele DEMARCO[2], Eleonora GIOVENE DI GIRASOLE[3]
Institute for Service Industry Research (IRAT)-National Research Council of Italy (CNR), Naples, Italy
(1) m.clemente@irat.cnr.it
(2) d.demarco@irat.cnr.it
(3) e.giovenedigirasole@irat.cnr.it

Abstract
Seaside cities are a privileged laboratory to wonder about the fate of the modern metropolis and identify innovate development models. The crisis of the capitalistic system raises the question: Should we accept the system's constitutional limits and indulge its degrowth, as suggested by Serge Latouche, or try to face these limits to seek new end markets for an economy which seems to be literally plodding towards the post-industrial era? In an interdisciplinary approach which uses urban and philosophical contributions, the paper proposes to go back looking at the sea as a horizon still full of opportunities and considering the big cities rising on the coast as a possible epicentre of an innovative renewal movement. Traditionally, after all, seaside cities have always played a leading role in civilization's advancement. Let us consider cities like Athens, Venice, Amsterdam, New York. Nevertheless, despite acknowledging that the sea is an undeniable growth vector, philosophy urged us to look at it with a sort of circumspection, since the very development that it ensures hides degeneration elements. Taking into account such a problematic and complex perspective, we want to analyse urban development models which, initially applied to seaside neighbourhood, are able to spread to the rest of the city and that, even considering the current growth demand, are also able not to satisfy the risk factors by it implied.

Keywords: Seasaide City, Growth *vs* Degrowth, Sustainability Redevelopment

1. Seaside city as a laboratory to experiment innovative sustainable approaches to urban development[1]

«Despina can be reached in two ways: by ship or
by camel. The city is different to those who come
from the land and those from the sea»
(Italo Calvino, Le città Invisibili)

The city is the place where all the contradictions of the contemporary age converge: overcrowding and depopulation, congestion and disuse, wealth and poverty, crisis and development, growth and degrowth. Especially in seaside cities, the shore line represents a kind of catalyzing agent, which get phenomena stronger and make them more visible and effective. Urban coastal areas are a privileged observatory. Looking at the city from the sea gives a chance to better understand the past. It gives more knowledge perspectives and may improve the future of our cities. This "maritime approach"

[1] This paper is an outcome of the research project of "Urban strategies for contemporary city: multiculturalism, identity, recovery and valorization" coordinated by Massimo Clemente. Within the unitary work of the research group, the following contribution can be individuated in the paper: the first section, has been carried out by Massimo Clemente, the second by Daniele Demarco and the third by Eleonora Giovene di Girasole. English Citations have been translated by the authors and the conclusions are shared by them all.

allows to combine different cultures and cognitive paths, especially the urban and philosophical ones. The sea is a recurring element in philosophy, from Plato to Aristotle, from Hegel to Schmitt. According to Aldo Rossi, the sea is the main urban element. It is both an idea and a dream. This case study approach arises from CNR's activities, which concern seaside cities as historically multicultural and multi-connected places. Looking at the seaside city "from" the sea, in other words, through the filter of maritime culture, is the basis of our research. Throughout history, maritime routes have connected cities all over the world, fostering the encounter-clash between different peoples and cultures. Seaside cities became, thus, cultural melting pots, the backdrop to different life stories, different individuals, expressed and reflected in the materiality and spatiality of architectures and urban spaces.
A kaleidoscopic reality, perfectly highlighted by the richness of the multiculturalism which characterizes the coastal areas. The city is a succession of events in space and time, but, by the sea, something extraordinary happens. Events are deeply influenced by the maritime identity. Seaside cities' identity derives from the historic relationship between the urban community and the water element. Seaside cities' common memory tells stories of ships, sailors, sailings, routes, maritime trades, cultural blending [1]. The in-depth analysis of the urban spaces along the coastal areas points out the multiplicity of the main elements merging and interacting in these places: the water, the sea and coastal habitats, the shore line, the architectures. In this perspective, architectures and urban spaces in coastal cities appear as an expression of the collective memory of one great sea community. At the same time, they seem to be the materialisation of specific local identities and different urban cultures. Indeed, the common maritime culture is a common heritage, the historical, cultural and economic substrate which connects the sea communities and is reflected in the city, in forms and functions. It is the unifying factor in space and time, in different lands all over the world. Once shifted to the contemporary world, past observations and reflections on water cities could be quite helpful. This kind of recollection offers the needed background to realise high quality architectures and urban places, whose identifying characteristics must be sought in the relationship with the sea. The sea represents a fundamental factor, which gives the city a powerful and strong identity. Nevertheless, in the past two centuries, industrial and military facilities occupied significant areas of the city, triggering processes of unbalanced growth and turning often into barriers. Since the 50's, the evolution of ships, navigation, trade and ports has allowed to empty large port areas, leading to requalification processes and changes which strongly affected the urban coastal zones. Waterfront requalification is one of the emerging issues of seaside cities' urban policies. Cities persistently launch into requalification projects and get closer to the sea and its surrounding areas. These areas go back to the city and get in touch with its community. Particularly interesting appear interventions affecting not only the shore line, but also the "hinge areas": dismissed areas, outskirts, which might have a leading role in development and urban requalification strategies. This kind of approach can be clearly exemplified by New York city, which, in the last years, has been recovering its historical relationship with the sea. In considering the critical current scenario, we can affirm that looking at the sea as a development vehicle for cities can become the basis for a debate still full of implications. Urban identity is a fundamental aspect of building strategies, which pursue the sustainable development of the city. In cities by the sea, the maritime culture and the urban one merge into an identity synthesis. This perspective at the base of our study approach is a fertile field of investigation to reflect on the city, the architecture and the urban places by the sea. It gives rise to new opportunities for development in terms of urban planning and architectural design. In order to make the city development possible, it takes to look back at the sea and start from it through the filter of maritime culture.

2. "Large spaces" and the challenge of local development: philosophic implications of an old-time debate

«There is nothing more epic than the sea»
(Walter Benjamin, Angelus Novus)

The sea surrounds our habitat, embracing it on each side. Especially for those who live in great coastal cities, its presence has turned out to be so redundant as to go almost unnoticed. Thus, the coast quite often happens to become only a holiday or Sunday leisure time destination or, at best, a sort of city's post card. Sometimes, this kind of misunderstanding may also arise in the urban-architectural debate, when considering the relationship between the sea and urban fabric a matter only related to waterfronts. Indeed, the sea is a development element, affecting hinterland and people's imaginary as well. The aim of this work is to make an in-depth analysis over the relation between the city and sea. Particular attention will be drawn to questions, as to how the sea has represented (and, with the right proportions, still represents) a resource, and not only the extreme limit to the ambitions of "civilization". The origin of the word (lat. "cīvis", citizen) attests how civilization is the outcome of the urban dimension. But then, it's not a coincidence that the French synonym "urbanité" is quite often used to qualify a well-defined subject's life-style. A self-aware person, who is totally committed to logic and dialogue, who partakes in political changes of his time and, above all,

feels confident in innate practical potentialities in science and technique's progresses. In other words: the typical European citizen. Nevertheless, if it was the city to give form and spirit to this human type, on the other hand you could also argue that, without the tantalizing perspective of new horizons, it would stifle it. Wild, unbuilt and non-anthropized spaces (mountains, forests, deserts, seas, oceans) have become, then, the extreme reserve of a resistance which has taken its form exactly in the city [2]. If forests have welcomed rebels, exiled and persecuted by the establishment, and mountains, instead, partisans struggling for freedom, the sea has become proscenium of explorers, adventurers and pirates out for new frontiers. The sea is not, however, an univocal dimension. Indeed, there are many oceans, as well as exist many different Mediterranean seas [3]. If the ancient world (especially the Greek one) was allured by the charm of one of the many mediterraneans, the modern one (the Anglo-Saxon, in particular), on the other hand, stoutly turned to ocean. This huge horizon provided a large amount of incitements to modernity in its great revolutions. Without taking into account how, through Cook and Forster's explorations, the ideas of Southern Seas peoples influenced the outcome of the French Revolution [4] just think of the almost uninterrupted flow of valuables (gold, silver, gem stones and new materials, such as natural rubber, oil and uranium) conveyed from the New World to the Old Europe. However, if you consider the capitalist curves of development, you will notice how they (partly) parallel the logistic ones of urbanization rate [5]. Consequently, it's quite clear that, related though they may be, the two phenomena are not perfectly synchronic. This slight difference is the result of an urbanization process, which, rather than abiding by well-defined plans, has seized opportunities and junctures of the time. More precisely, it mainly had an offsetting function to economy. Once each cyclical phase of the economic stagnation has been culminated, according to Keynesian economics, the urbanization process tended to grasp the surplus excess spawned from market saturation. That is what we expect, at least until other outlets have not entered the horizon of our system, channeling the surplus of labor and product to different channels. Thus, the opening of new ocean routes has certainly been a safety valve for system contradictions. At the same time, it has yet attracted new resources, giving rise to less and less well-planned urbanization processes. Far from showing the system welfare, this trend, rather, highlights its *impasse*. If cities are reshaped only according to economic needs, how new projects could deal with the needs arising from the very bottom of society? And, above all, could "a free public space" for the citizens of the modern city exist? This is the disheartening question afflicting those who wonder if the modern economic system is just a coercing mechanism. Among those who bitterly criticized this kind of system, the French economist Serge Latouche is the one who most stoutly expressed his own disagreement. Starting off with an in-depth examination of Western imaginary, Latouche pointed out how the several tensions featuring our system are, ultimately, addressed to growth. Since this sort of development is supposed to be unlimited, the perspective to achieve it, actually, turned out to be quite an obsession. In addition, there is a second paradox arising: the habitat supposed to embrace these limitless growth aspirations, i.e. the world, is a close system itself. You may thus argue: how could it contain the "Unlimited" without collapsing? So, Latouche gathers that, if valid, this contradiction makes the perspective of a system downfall effectively real, forcing us to scale back our expectations of development. This is the degrowth strategy. Essentially, the Latouche-option contemplates a conscious reduction in consumption, followed by a progressive sector contraction. Appropriate security measures, taken in order to hold back the turmoil of capitalism, which resolved to crash into the limits of the planet [6]. As for the aspects of urban planning, the degrowth strategy would debase the importance of arterial roads, which still have a leading role in great distribution strategies. The function of mechanized transport system would thus be scaled down, while, consequently, urban village would be exalted: a more comfortable environment to live in and rediscover the pleasure of cycling, celebrated by Ivan Illich. Nevertheless, many risks would act as a counterpart. First of all: the isolation and the disconnection of the city from the international trade and its progressive mooring to neo-rural life forms. That would put the city before Asiatic capital invasion, triggering processes of reverse colonisation . On one hand, this kind of processes would state the end of western primacy, but, on the other hand, it would not guarantee to get out of the perverse dynamics of the capitalist economy. However, if Latouche's degrowth turns out to be fallacious and not bereft of contradictions, what should we do then? Was Heidegger right in saying "Only a God may save us?" Actually, the situation appears less tough than it may seem. The growth (with all its contradictions) still allows us to have a certain freedom of action. If anything, retrieving it would be very important. But there's a question arising: How to do that? In order to answer this very demanding question, we must do some serious genealogical reflections on the origin and the evolution of our system. It is quite worth noting that Latouche's teories evoke considerations already made by Plato. Already between the 5th and the 4th century BC, the philosopher of the Academy expressed an exception on the overall plan of Athenian development, which, like the European one between the 16th and the 19th century, arose under the banner of vessel traffic. Curiously, in Plato's reflection, moral and political issues were linked to considerations of urban order. That happened not only because Athens was a city-state, unlike the modern nation-state, but because Socrates' pupil well understood how urban structures may definitely

influence city's internal balance. That is the reason why in his work, Gorgias, pretending that it was Socrates speaking, Plato harshly railed against the «illustrious statesmen» of his time, guilty of having filled the city with «ports» and «walls», without leaving any room for justice and temperance (519 b). Plato's invective was addressed to Themistocles and Pericles. Before them, the Attic capital was nothing more than an inland town of scanty trades. Afterwards, Athens would have become a sea power, whose imperial ambition was to conquer the whole Mediterranean basin: the same ambition that would have led up to a fatal breakdown. The two strategists mainly aimed at strengthening ports, walls and piers. Themistocles firstly provided the city with a powerful fleet, in order to make the exchange between city and the sea easier and safer. Furthermore, he linked Athens to the Piraeus Port (originally, a freestanding administrative department located 12 km from Athens city centre) by means of enormous city walls (the so-called "long walls"). Pericles availed himself of those tools to usher in a brilliant trade and military policy. In order to obtain political legitimacy, he relied on masses, which didn't benefit from land rents and favourably looked at the booming of commercial and shipbuilding sector (whose focus is the sea). To captivate humble people's approval, Pericles promoted a «shameless building policy» [7]. By commissioning great public works, the Athenian strategist obtained, indeed, the possibility to guarantee the expected salaries, gaining political legitimacy in return. Completely absorbed by the net of public works, the city sprawled more and more chaotically. The progressive overcrowding of urban spaces did not combine with any adaptations to hygiene system. This kind of carelessness led to a fatal and memorable outcome: the plague of the 430 BC. This overwhelming event deeply shocked Plato. He considered this sort of sea-seeking phenomenon a quite dangerous neglect of ancient values, which used to underline the importance of tiny and apparently mediocre things. Aristotle completely shared Plato's point of view. He firmly believed that the city should have been limited, since a too vast and crowded "πόλις" barely could have been the expression of a good «Constitution» (*Polit*., VIII, 1326 b).

For this reason, wondering about the conditions required for the foundation of the ideal city, Plato firstly suggested to erect it not less than 15 km from the coast, that is to say, more than twice the distance which separated Athens from the Piraeus port (*Leg*., 705, c 1-7). Fifteen kilometers would have been enough to stop the rise of all the guilds profiting from the sea and by it influenced. In so doing, each ambition would have been limited to the unassailable rhythms of substance agriculture economy. In making this kind of proposal, however, Plato did not consider man's natural instinct for evolution. An irrepressible instinct which, according to Lewis Mumford, perfectly aligns with the search for freedom of movement [8]. But what guaranteed, at least until the mid-nineteenth century, this kind of freedom? The answer is: navigation techniques. Like other means of transport, the ship represent a technical device. But, unlike the others, it has got ample scope of movement in a space which is generally precluded, since man is a terrestrial being, or rather, is a being, who walks the earth [9].The sea would remain a barrier to humans if technique did not intervene to make its surface accessible. If this barrier collapses, new worlds will open up beyond their horizons. New worlds, new continents, new existence dimensions, not simply new cities. Beyond the sea limits, something completely different is hidden — a promise. Navigation is exposed to eternal shipwreck risks, as well as each promise implies risk margins. Athenian experience, thus, becomes for us a kind of paradigm, even more if you consider that, just like Athens' development in the 5th century BC, the European one seems to have taken its original resources from vessel traffics. This is what Hegel pointed out, on the very year of continental search for progress (1821, in the midst of early industrialization), by stating that the sea is the only element able to incite Industry and souls into moving outwards [10]. But then, how can you imagine scientific and technological progress of western countries without taking into account their expensive explorations along the oceanic routs, or their trade network with the New World? Copernicus had already pointed out how astronomical observations, made during the first ocean crossings of the modern age, helped disprove the Aristotelian theory on the connections between the Elements Spheres. Afterwards, for want of Bacon, on the title page of "Instauratio Magna" was published the depiction of a vessel about to go beyond the Pillars of Hercules. Below the image, a motto by Daniele stands out: «Multi petransibunt et augebitur scientia» (Many will come in succession and science will progress) [11]. In 1942, the German jurist Carl Schmitt highlighted the importance of naval explorations for the purpose of the so-called "Raumrevolution", which namely is a radical transfiguration of the conception of space, which is seen as the backdrop to any other political, economic and social upheaval. «Whenever new lands and seas enter the horizon of collective consciousness, the spaces of the historical existence change too. There are, thus, new parameters and new dimensions of historical-political activity arising. There are new sciences and sets of rules taking form, there is a new life blossoming for peoples who may be new or may seem born again. This expansion is so surprising as to cause a change which affects not only measures, parameters and men's external horizon, but also the framework and the concept of space itself» [12]. How could all that not affect local and civic aspects of citizen's life organization? Let's take Great Britain by way of example. In the 16th century, Britain was the first European country to be interested in the sea. In English cities, far more than in the mainland ones, the liveliness of economic trade triggered

unstoppable motions of urban regeneration. Indeed, the need to earn an agricultural surplus so as to supply new colonies, totally revolutionized the surrounding countryside. Little and middle-sized landholdings were merged into huge estates, where, for the first time, production was rationalized according to scientific methods (Phenomenon of the "enclosures"). Small farmers, bereft of soil, moved in crowds to cities, where the new labour, in turn, was designed for industry. Consequently: the urban area sprawled; new and crawling working-class neighborhoods rose up around modern factories; streets crowded with lots of people; old paths were leveled to clear the way for the stream of mechanised traffic; times and spaces of existence changed. In other words: the modern metropolis was taking form.

3. Models for a sustainable urban development and the best practice of New York City

«You may degenerate into the inferior beings, the brutes; You may regenerate yourself, according to your decision, into the superior ones, the divine»
(Pico della Mirandola, Oratio de hominis dignitate)

The urban sprawl may thus become an increasingly unsustainable phenomenon. Its impact, in terms of ecology and human concentration, greatly affects the overall environmental balance and that is particularly evident along the shore line, which appears the most anthropized area. The hypotheses on sustainable development call for a development aimed at achieving goals of environmental, economic and social improvement. The aim is to satisfy the needs of the present generations, without compromising those of the future ones (Brundtland Report) [13]. On the other hand, one of the emerging issues in the debate over the theme of the city is linked to the degrowth one. That draws the attention on the need to understand the reasons of city crisis and possible pathways to get out of it, maybe by considering the crisis itself a chance to build a different future. New paradigm shifts are needed, compared to the pattern of growth and unlimited accumulation of goods. A controlled, selective and voluntary reduction of economic and consumption production has to be reached with the aim of establishing eco-friendly relationships between man and nature, as well as equity among human beings. But, what is meant by "degrowth of a city"? Is it really desirable or possible? Are the two processes really so far apart or are they the expression of a common feeling, which openly struggles for change, according to socially, economically, environmentally correct requests? Perhaps, one possible way is making cities develop according to a sustainable development, by recovering their own identity and turning it into a resource. Cities first have to understand what they want to be like, or rather, define long-term scenarios and features of their own transformations. All that can be done by triggering the transformation processes needed, identifying specific urban scopes, building new infrastructures and attraction places. Designed though they are for development, these processes often occur chaotically. Our aim is to find the balance between the need for city epochal changes and the necessity of sustainability arising from the bowels of society. There is no city like Zora: «Forced to stand still and equal to itself to be better remembered, Zora languished, unravelled and vanished. The Earth has forgotten it» [14]. In this sense, seaside towns have always played, historically, a leading role in the progress of civilization, as from the sea and in the sea itself, they have found an undeniable vector of economic, social and cultural growth, which has been followed by continuous physical transformations. Even today, cities which develop along the coastal regions and rediscover their waterfront may represent a privileged laboratory to wonder about the fate of the modern metropolis. Such a reflection is possible by identifying innovative development models, revaluating the sea and considering it a horizon full of opportunities, the epicentre of an innovative renewal movement, which, starting from the shore line, covers the whole city. Waterfront transformations affecting great coastal cities imply accurate reflections on the anthropization of these places and the importance of sea trades. Often, though, the presence of disused industrial lands and the interests of private and public operators interested in developing ports and reusing the surrounding areas make projects contrast with the city. In water cities most of investments and interests converge. This kind of investment represents an economic reality deeply affecting the territories they focus on. Nevertheless, when it comes to considering the transformations these investments require, quite often, in response to urban sprawl needs, projects turn from great opportunities into critical contrasts with the urban fabric. Quite often, indeed, local realities fail to adequately assess the capacity of absorption and management of interventions, and do not consider cities' peculiarities and historical [15]. Thus, whatever their direction may appear, be it port growth or the so-called "great events", projects have not to be stuck in the routine of predefined processes, but walk new paths in agreement with the city. The aim should not be to realise abstract cities, whose stunning architecture is the only thing remaining, but a city planned according to society's nature and material and immaterial needs. Strategies need to be identified in order to give ports and waterfronts a new frame and offer chances of long-lasting development and requalification to the whole city. Consequently, we should not build only along the shoreline, but

consider territories behind it too. Areas between port and city represent “hinge territories”: quite often barriers, dismissed areas, outskirts. They may play a leading role in development and requalification strategies concerning the whole city. Interventions, supported by appropriate urban development policies, may have economic, social and cultural repercussions, not only physically transforming border line areas, but also giving the chance to realise concrete enhancement programmes. These changes affect the surrounding territories and are able to trigger important requalification processes. The urban renewal occurring along the shore line is likely to create new public spaces, both looking at horizons and far away ports and becoming a sort of *plateau*, which fosters new relationships and connection functions with the urban context. Aimed at recovering a relationship with the sea, many seaside cities launched into processes of urban-port reconversion and waterfront transformation projects, through different approaches, policies, plans, characters and resources. The most interesting results come from those cities where the question “what to become?” is followed by an integrated logic, rather than a sector one. By recovering their “maritime background”, cities plunged into many transformations, considerably changing the territory. Cities may, thus, devolve their identity upon the sea, through the comparison between urban and maritime culture, innovation and tradition and through a new conception of the city itself, which puts degrowth into question. In other words, the city turns into a place where a new urban development model is tested: a model for a neither unlimited nor regressing growth. New York is a historical seaside city (four of the five New York districts are islands, while the fifth is a peninsula), which has always linked the Ocean to the inland waters in commercial trades. For years, New York has been reconsidering the city-water relationship through the requalification of the ports, the waterfront and the areas behind it [16]. The water is considered the “Sixth Borough”. Waterfront requalification processes in New York city are continuously evolving. In 2011, in continuity with the 1992 City Planning, the “Waterfront Vision and Enhancement Strategy” was approved: a plan of action designed to achieve the sustainable redevelopment of 520 miles of the New York waterfront. The plan is divided into two parts. In the first, “New York Waterfront Comprehensive Plan”, are listed all the long-term objectives for the decade to come, with some recommendations about each of the waterfront sections belonging in the five districts. In the second, “New York Agenda Waterfront City Action” we are shown 130 overriding projects to be realised in the next 3 years: the projects contemplate integrated interventions, which concern the waterfront and its surrounding areas and focus on the requalification of public space [17].
«The eight main objectives of the plan:

- Expand public access to the waterfront and waterways on public and private property for all New Yorkers and visitors alike.
- Enliven the waterfront with a range of attractive uses integrated with adjacent upland communities.
- Support economic development activity on the working waterfront.
- Improve water quality through measures that benefit natural habitats, support public recreation, and enhance waterfront and upland communities.
- Restore degraded natural waterfront areas and protect wetlands and shorefront habitats.
- Enhance the public experience of the waterways that surround New York—our Blue Network.
- Improve governmental regulation, coordination and oversight of the waterfront and waterways.
- Identify and pursue strategies to increase the city's resilience to climate change and sea level rise» [18].

New York is, so, reshaping its urban frame, by starting from its memorable relationship with the sea and by projecting the sea towards the city. Precisely, new projects concerning the border line areas and the huge surrounding territories are launched, so as to lead up to transformations which strongly affect the city balance.

4. Conclusions

The question arising at the end of this paper is: if the sea triggered this set of processes, may it still serve as an attraction for the development of our cities in crisis? The answer is not so obvious. Without giving rise to misunderstandings, we must admit that, nowadays, the sea no longer appears the promising uncertainty it used to be in the past. Explored along its entire surface, it seems not to be giving anymore any kind of secret, hope, resource or opportunity. Nevertheless a reflection, metaphorically at least, on the spirit which animated the first great explorers of our time, could turn out to be an exercise full of implications. This kind of reflection aims at identifying other spaces (maybe in the sky) and other ships (maybe space ships) able to realise the disillusioned utopias of a civilization, which seems to be literally plodding in the adversities of the industrial era. Stopping or slowing down the growth is not our real challenge. Actually, we aim at pursuing it in a sustainable perspective, able to combine development reasons (the same as science) with the typical aspects of philosophy: order, justice and proportion. As in the past, seaside cities planning and development could once again bring to political legitimacy, if the administrators were oriented to a direction quite consistent with sustainability principles. In other words, governments which are less and less sovereign, should go

back to hold the reins of the city, limiting the authority of the great economic powers. That should be done in order to share spaces and economies, which find, in maritime culture, the basis for transformation processes. A shared planning is required, in order to offer opportunities for great public works and new economies for the generations to come. The sustainable or unsustainable evolution of the city will depend on the course that new spaces, interest distribution and rules defining are going to abide by. What we are focusing on is a transformation process, characterized by a productive "unlimited growth". A growth whose transformations and benefits affect the whole territory and citizenry. The objective is to reach a fair growth, shared and integrated, which could consider the sea its starting point and determine a new urban frame positively affecting the internal balance of the city. The actions needed do not have to focus only on their concrete and immediate aims. Rather, they should help develop the awareness to belong in the city. In order to properly spread this kind of awareness, city transformations firstly have to align with clear and shared rules. Secondly, administrators have to hold in check soil use or reuse, in order to take advantage of the rising property values. The rise of property values, which is the outcome of common decisions and investments, plays a leading role in city planning, leading to the realization and the operation of infrastructures designed for public use.

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Port Cities, Peoples and Cultures: Waterfront Regeneration and "Glocal" Identity

Gabriella ESPOSITO DE VITA[1], Stefania OPPIDO[1], Stefania RAGOZINO[1]
(1) IRAT-CNR, Napoli, Italia
g.esposito@irat.cnr.it, s.oppido@irat.cnr.it, s.ragozino@irat.cnr.it

Abstract
Among the many issues that concern the regeneration and shape of public spaces within the waterfront areas, the way in which these spaces respond to the multifaceted influences resulting from globalization, multiculturalism as well as maritime traditions has been chosen for this study. The key issue is the material and immaterial way port cities traditionally combines influences from elsewhere with local identity, in order to define urban design tools oriented to deal with the social and cultural fractures of contemporary urban areas.
The main purpose of this research is to develop a methodological approach that targets enhancement of multiple roles of waterfronts in order to favour social inclusion and cultural interactions. The interpretation of multifaceted social needs is aimed at defining strategies in order to improve processes for producing inclusive public spaces. To explore this scenario, case studies have been focused on waterfront regeneration projects in Belfast, Marseille and New York, in order to develop applications for other multicultural heritage.
These case studies have been oriented at identifying the characters of those public places that lie on the borderline between land and water, peoples and cultures, port and city. These contexts have been chosen in order to address policies of waterfront regeneration consistent with the role of public spaces in interpreting the intensity of cultural diversity in terms of integrations and interactions.

Keywords: cultural identity, port city, Belfast, Marseille, New York

1. Introduction

The genesis of the city on the water is strictly connected with the idea of crossroad, melting pot as well as bridge amid diversities [1]. The ideas of dynamicity, globalization, and multiculturalism rest on the nature of the cities that were born as crossroads of flows of peoples, cultures and goods [2]. These historical water-cities have been able to enhance the added values of being multifaceted and resilient as well as to develop the antibodies to protect the organism against the negative effects of their specificity [3]. Understanding the nature of these antibodies, developing and subsequently inoculating it in other urban context could be an important contribution to dealing with the major issues of the contemporary cities.
This research aims at developing a complex approach in order to understand the capacity of public spaces in waterfront areas to assimilate and metabolize the multicultural dynamics building a new inclusive local identity. The specific topic is to define a methodological approach oriented to identifying morphological and functional characters of public space in order to implementing inclusive tools for urban design [4].
This paper seeks to unveil the nexus between urban regeneration processes and multicultural issues, by investigating the added value of "glocal" identity of cities by the water [5]. At this purpose, it first discusses what values have dominated in the waterfront regeneration theory and practice throughout the last decades, advocating the recasting of local development issues within a more identitarian oriented conceptual frame. Secondly, it explores the role played by maritime tradition in governing urban transformation oriented to enhance the multicultural and resilient features of public places. The

research methodology has been developed through three purposely selected case studies: Belfast (a river city characterized by a troubled past of sectarian conflicts), Marseille (the symbol of the Mediterranean culture and of the maritime osmosis) and New York (the global-city on the bay) – by applying a qualitative research methodology.
A case-study approach has been chosen [6] in order to better address the idea of plurality underlying the cities by the water, focusing on relationships between urban elements and cultural aspects, social equity and conflicts, environmental vulnerability and resilience [7]. To explore this scenario, case studies have been focused on waterfront regeneration projects in Belfast, Marseille and New York, in order to develop applications for other multicultural heritage [8]. These case studies have been oriented at identifying the characters of those public places that lie on the borderline between land and water, peoples and cultures, port and city [9]. These contexts have been chosen in order to address policies of waterfront regeneration consistent with the role of public spaces in interpreting the intensity of cultural diversity in terms of integrations and interactions [8].
Findings and conclusions can support the larger planners and policy makers international community in better appreciating the role of the osmosis between “maritimity” and “glocal” identity in urban regeneration initiatives. The next step should be focused on the development of an interdisciplinary approach oriented to define priorities for intervening on the contemporary city enhancing cultural interactions, social equity, local development as well as environmental sustainability.

2. Cities by the water and multicultural ethos: toward a complex approach to urban regeneration processes

The cities of water, despite the multiplicity of aspects and vocations, historical conditions and stress factors, morphological configurations and social characteristics, retain some common characteristics on the one hand and outline a strong and dynamic identity on the other [10]. The ability of changing – adapting itself to the transformations of an increasingly global society – of implementing technological innovation – accepting the evolution of port technologies and transport modes – of including the diverse cultures that come from far away – mixing them to create a new identity – are all peculiarity of this typology of urban centers. This *flexibility* in accepting, implementing and reinterpreting the consequences of the migration dynamics as well as valorising the mutual exchange between cultures can be considered the first of the highlighted keywords [11].
This feature present in all the studied contexts is one of the strengths of the process of building public spaces in urban waterfronts and is combined with the second keyword inferred: the concept of *cultural richness* that the city by the sea interprets in a plural sense [12]. This inclusive cultural dimension helps to define precisely the concept of identity that can not (and should not) appear stuck in a time and a place but need to be the fluid expression of a dynamic and vibrant city. The third element of the checklist is the role of *catalyst* expressed by the borderline between city and sea in the processes of urban regeneration [13].
We should not forget the relevant aspect of the *social role* played by the strong identity of the waterfront that encourages cultural interaction and social cohesion by providing a context of dialogue in which we can recognize the different societal components [14]. Through the interpretation of the case studies using the four key concepts highlighted, a checklist to support a process of urban regeneration in maritime key could be developed, in order to grasp the vital energy of frontier between land and water [15].
The development of the case studies allows testing the key concepts mentioned that, bringing together the different contexts (both in positive and negative way), should be considered the guide for the definition of a resilient and identitarian approach to urban regeneration processes [16]. Each case study presents the coexistence of topics exemplified by the four key concepts, but some of them seems to be the paradigmatic expression of a specific topic-keyword.
The key concepts highlight the cultural dimension - interpreted in a plural sense by city by the sea - the social dimension - that encourages the shifts of social conflicts - and the economic dimension - expressed as a key to the feasibility of the transformation processes [17].
The first key concept is the *cultural richness* of the city-port, which are at once crossroads, bridges and portals. In some organizations surveyed, multiculturalism has become the banner of policies and design strategies. Marseille is the epitome of this approach, both for the role historically played and for the recent redevelopment projects that have been oriented to make it the main euro-Mediterranean city and the bridge between the two continents. The case study of Marseille is emblematic because the maritime tradition, multiculturalism and architectural innovation have permeated massively the redevelopment project in progress, aimed at came across the Mediterranean cultures.
Overseas, New York, the city symbol of American cultural melting pot, can be seen as a metropolitan area whose center of gravity is an aquatic bay intensely lived and interconnected by maritime routes. The success factors of this model can be summarized as follows: a capillary structure projected into

the historic port with picturesque piers – a testimony of a cosmopolitanism that "comes from the waters" – and the dialectic between the architectural verticality of Manhattan and their profile which is reflected in the water. The continuous action of redevelopment of the waterfront and of the abandoned historical port areas as well as the enhancement of public transport on water supplemented by other transport modes provide the enhancement of the centrality of this multicultural city.
The social role of the waterfront is developed in the complex context of Belfast, a conflicting society in which a space of neutral encounter and interaction can be found on the river waterfront. The Belfast scenario is extremely complex and atypical in the European scene. In spite of the tradition of the port-city open and inclusive, the main city in Northern Ireland has been the scene of a bloody conflict that produced political and religious isolation from the outside and internal divisions. The river that runs through it can be qualified as an element of social and physical reconnection of a fragmented and divided city. In this scenario, the river route generates a waterfront punctuated by catalyst elements integrated in a systemic approach. These elements of the urban form consist of important projects of urban regeneration that have been started in order to support the peace process through the development of productive activities and the refurbishment of abandoned areas and brownfield.
As we will demonstrate, within these three emblematic case studies the pivotal elements of an identitarian and resilient regeneration process will emerge.

3. Case studies: three cities for an identitarian regeneration process

The common thread running through all the examples collected here is the added value and impact of the waterways on the cities that were born on the edge between water and land [18].
Mediterranean cities have drawn from the Mare Nostrum their location, cultural diversity, economic development and incomparable architectural solutions for the defence, the port organization and the main places of worship. The Oceanic cities tell a story of great distances and adventures. The cities overseas appear vassal of the Old Continent first and then the bearers of new identities. The river cities form merchant poles, lying between the bends of their tutelary deity: the river. In each of these contexts it is possible to extrapolate strong design elements that are stratified over time, contributing at defining the character of urban identity, in the direct or indirect relationship with the water [19].
Focusing on Belfast we can recognize that each redevelopment project studied can be considered a block of a complex urban taxonomy oriented to reconnect a fragmented urban tissues [20]. Along the last decade, after the starting of the Peace process, the city centre has been transformed involving abandoned manufacturing areas and brownfields from the rich industrial past. This process is part of a programme for re-branding the image of the city after the bloody “troubles”. The insularity of this first phase of projects could be solved enhancing the role of connector played by the waterfront. The river Lagan can be considered the common thread running through the city centre reconnecting the project of regeneration and redevelopment such as Titanic quarter, the Gasworks, the Lanyon Place, favouring the encounter and interaction between a divided society.
The role of Marseille in our case study approach is focused on the effect of the huge investment of the central government oriented to the redevelopment of the waterfront area through architectures by the star system of the architectural firms and some traditional reproductions of local architectures. The Euro-Mediterranean model adopted could be defined – provocatively – a sort of merchandising of the traditional brand of the old port and its history and story telling. The strong genius loci of the Vieux Port is the counterpoint to the new tower by Zaha Hadid and to the other concept buildings that have been designed by the most famous international architects.
Concerning New York, the “big apple” is part of the Western collective memory and the node of the maritime relationships between Europe and the USA. Despite this exceptional character, New York City can be considered a paradigmatic example of urban development based on the strategic dynamics of the bay area and of their uses (i.e. transport, leisure, heritage, property, blueprint).
The case studies have been examined as follows.

3.1 Marseille: hub of the Mediterranean cultures

The case study of Marseille is emblematic both for the relevance of maritime dimension in the historical urban development and for its role as urban and architectural laboratory – confirmed in the Forties by Le Corbusier with the Unité d’Habitation, realized in the South of the city and considered the manifesto of Rationalist architecture. This tradition between maritime activities and architectural innovation is reflected in the dynamism of ongoing changes oriented, on one hand, to enhance the waterfront as pivot of development of euro-Mediterranean relationship and, on the other hand, to revitalize internal areas defaced by industrial abandonment and by social housing estates [21].
The city of Marseille is the first French port for size, it is the second city for number of inhabitant, being capital of the Provence-Alps-Cote d’Azur region; the city is administratively divided in 16 *arrondissements* that include 111 neighborhoods. Since 2000, Marseille and its 18 neighbouring

municipalities were administratively recognized as urban community: the *Communauté urbaine Marseille Provence Métropole* and the "*Grande Marseille*" [22].
In the coastal area the human settlement has an ancient history and nowadays it is extended on 57 kilometres surrounded by the hills of the Calanchi Massif. The city is developed around the core of the ancient port coincident with the foundation area (600 BC) near the Lacydon.
The urban origins and development are strongly connected with the maritime tradition: the *forma Urbis* is the mirror of this mutual relations and the main symbolic urban spaces are directly or indirectly related to the maritime activities. The historical commercial vocation of the port area characterized the urban growth, enriching the city with religious and civil buildings during the centuries and defining the current urban layout, resulting by the relocation of the port to the Joliette (up to 1842) and by the production of Haussmannian arteries and monumental architectures [23].
More recently, maritime tradition, multiculturalism and architectural innovation are the focal points of an urban redevelopment process aimed at making Marseille the bridge-city among Mediterranean cultures. In a geopolitical phase expected to reshape the balance between North and South, the Mediterranean Sea is recovering its centrality in the European policies: the French Government bets on Marseille – also Capital of Culture in 2013 – to turn it in a hub of the Mediterranean culture, combining cultural overseas ties with economic issues. Nowadays the planning activity hangs in the balance between the re-interpretation of original role of Marseille as port-door in the Mediterranean area and the global version of the seaside city [24].
The urban regeneration programme is aimed at social, economic and cultural goals, as well as environmental renewal, through the transformation of 480 acres of industrial areas and buildings, from the nineteenth docks of Joliette, north of Vieux Port, up to the Belle de Mai. The keyword is the Mediterranean culture, expressed through the development of local maritime transports, the waterfront project enriched with international functions and everyday-life spaces, new buildings inspired to the new maritime city dimension, by enhancing memory places where the community has been in contact with people arrived from overseas lands [25].
Joliette is the first building block in the coastal area, in a strategic location between port and urban center, with a high level of accessibility thanks to the near airport, the train station TGV, flyovers and train and metropolitan lines. From 1992 to 2002 the buildings of the Docks have been recovered and in 1998 *la Place de la Joliette* has been inaugurate with around the business district and the downtown worker housing.
Near the *Gare Saint Charles* intermodal hub, the *Belle de Mai* in an example of industrial sheds reused for digital and multimedia industry and culture, including museum and archive cluster, media center that is the core of *Incubateur national multimedia Belle de Mai*, big thematic village which contains private and public relevant media production.
The *Euromediterranée* urban planning project drives a process of transformation and urban adaptation based on reuse of existing heritage and new architectures: new residential districts and offices built or under construction, located in the industrial and abandoned port areas, in the future supported by the tram line. The five main poles are the following: the *Pole Belle de Mai*, creativity and socializing place which includes spaces for shows, expositions, art events, housing, municipal archives, multimedia pole, National Institute of Audiovisual archive and also the CICRP (*Centre Interrégional de Conservation et de Restauration du Patrimoine*); the *Pole Saint-Charles - Porte d'Aix*, which accommodates institutional, academic and commercial activities also transport industry; the *Pole d'Arenc* is the core of economic development real estate; the *Pole de la Joliette* in which are localized economic activities and housing; the Pole Saint-Jean which contains the MuCEM (*Musée des civilisations de l'Europe et de la Méditerranée*).
The *Rue de la Republique* redevelopment project is aimed at enhancing urban life quality and physical renovation of a central residential and commercial road. The project includes: the haussmannian facades renovation, the adaptation of 5200 housing units as OPAH (Housing Improvement Program), new parking areas, facilities, retails, sidewalks, 200 planted trees and the opening of *Blanarde-Euroméditerranée Gloves* tram line.
The *Cité de la Méditerranée* represents the waterfront revitalizing project, three-miles long, located between Arenc and Fort Saint Jean in the Vieux Port, aimed at bringing together these two symbol places of the city, reconnecting the city to the sea and reconfiguring the interface area with the port. A new terminal ferry near the Major and cultural, recreational and service facilities define the new skyline, contributing to build a pole for economic and cultural exchanges between Europe and Mediterranean cities. The project is integrated with the development of the *Mole F4* and the Fort S. Jean's foundation.
Other projects started in 2007 – as the Sainte-Marthe eco-neighborhood and the 15-ha Aygalades Park – have been obtained the EcoCité brand about sustainable development [26].



Fig. 1: Marseille, the view of the Docks (by Dionigia Barbareschi).

The goal of this regeneration process is to make competitive the city of Marseille through the doubling business district, in order to improve prestigious and low impact activities and urban life quality, through housing achievements, public spaces, accessibility and urban transports. The three column of cultural, political and planning project are: arts to valorize the Mediterranean identity, euro Mediterranean international relationships and local traditions.

Euromediterranée is a big project, considering the physical extensions and the financial resources invested, aimed at "returning" the sea to Marseilles. This ideological manifesto is an attempt to enhance a city in deep crisis for a geopolitical relocation in the Mediterranean area. Huge investments, creativity and technology have created futuristic glass palaces, one fashion city, the docks turned into a long walk hanging, the highway going to disappear underground. In this scenario, in 2007 Zaha Hadid designed the CMA CGM for the offices of the shipping company: the sinuous 148-meters high tower redraws a new urban skyline and it competes against the thirteenth Madonna of Guardia, a gold sculpture traditionally defended all ethnic and religion sailors.

Many other famous designers have filled the urban development such as the project for the new waterfront, the Euromed Center by Massimiliano Fuksas and the Tower by Jean Nouvel, new symbols of Marseille, without to dissolve the fascinating Vieux Port. The last but not the least is the MuCEM, Museum of Civilization in Europe and Mediterranean designed by the Algerian-born French architect Rudy Ricciotti.

As demonstrated by the projects briefly described, the waterfront has been chosen to characterized the urban regeneration of Marseille, enhancing its maritime tradition. The case of Marseille highlights how starting from the evocative power of water, naturally heralding of transformation, it is possible to check the key to renovate and revitalize the city, adapting it to the mutation of new urban community answer. However in this ongoing process of transformation, the approach pursued is more stereotypic than innovative. The model pursued could provocatively define a franchising, a global brand that is juxtapose on fascinating forms of an historic city ordained by changing wave. So the peculiarities of Marseillaise *genius loci* are likely to be lost, on one side, in the plastic forms of extraordinary design experiments – that do not evocate any identity of place – and, on the other side, in action of maquillage on existing buildings and functional reorganization according to standard models.

3.2 Belfast: conflicting city and waterfront regeneration

Belfast is the capital and also the largest city of Northern Ireland (for inhabitants, function and economic system); administratively Belfast is part of United Kingdom with a specific discipline of governance. The character of the settlement has been determined, since its origins, by the peculiarity of water system of this offshoot located on north-east side of the ancient region of Ulster; Belfast overlooks on the Lagan outfall and it is located along the Belfast Lough [27].

The relevance of the Belfast case study is mainly related to the role that the waterfront is playing in the reconnection of urban areas, in the past divided by the effects of the long time of "Troubles". The conflict determined a sequence of discontinuity on physical and functional urban organization, a fragmentation of land use that is the mirror of a divided society. In spite of activist and institutional action toward peace process, these divisions remain, configuring an auto-segregation de facto [28].

Recent research demonstrate that the 80% of population still lives in segregating street and residential complex [29].This is not the place to address an extremely complex issue, with many cultural, social, political and economic implications thoroughly investigated from different points of view, from different disciplinary skills and different artistic expressions. An expensive literature can be consulted at the Linen Hall Library in Belfast, entirely dedicated to the historical reconstruction of the tragic events [30].
During the 19th century the port expanded with new manufacturing activities related to the sea and navigation, also if the key industry was represented by shipbuilding. Since 1914 the Harland & Wolff company represented the main source of occupation and it was the biggest shipyard of the Europe and one of the largest in the world [31].
In postwar period, the crisis of European industrial town particularly affected Belfast, adding to the religious conflicts and making the Northern Ireland economy unable to compete with the economic vitality of the nearby Dublin. In these dark decades the city has been petrified by fear and suffering - coinciding also with the divestment of industry peak and economic crisis – leaving relevant marks in the social, economic and urban system [32].
From the urban planning point of view, it is registered a strong tendency toward the suburbanization, mainly related to protestant middle-class, encouraged by the scenario of violence and urban decay and by the planning choices, starting from the Regional Plan for Northern Ireland (1964) [33].
The planning activity, almost restarted during the years of the violence, finds a new rush at the beginning of the peace process at the end of Nineties, especially through:

- requalification of public housing (Northern Ireland Housing Executive);
- infrastructure for mobility, energy and telecommunication;
- regeneration of port (Belfast Harbour Commissioners) and Lagan riverside;
- regeneration of city centre.

In order to accelerate the process of physical and social regeneration cities, the form of public-private partnership has been adopted through the Urban Development Corporations (UDC). This regeneration phase has been assigned to 'Making Belfast Work' program (1988) and Belfast Urban Area Plan (Department of the Environment, 1990) [34].
Several and relevant projects of regeneration and development are oriented to create a new imagine of peace and wellness able to remove the collective memory of tragic events of civil conflict. The two main regeneration projects, started when the armed conflict was still in place, are the *Laganside redevelopment* and the city center regeneration, both directed towards ensuring the achievement of "neutral areas" able to break the wall between community.
The Leganside area includes about 140 acres of riversides, coincident with an abandoned and contaminated industrial site and surrounding by degraded neighborhoods characterized by an high index of social deprivation (deprivation indexes, NINIS). In the 1989 this area has been chosen for a regeneration pilot project in order to demonstrate the “potential of the property market to recover the city from economic decline and political turmoil” [35]. Referring to the model of waterfront regeneration of Baltimore (USA) and London Docks, a mixed public-private society (Urban Development Corporation UDC) has been created, called *The Laganside Corporation*, mainly supported by British government funds.



Fig. 2: Belfast, Pedestrian bridge in the Laganside area (by Gabriella Esposito De Vita)

The public subjects involved are the Belfast City Council, the Northern Ireland Housing Executive (NIHE), the Belfast Harbour Commissioners and relevant government departments. The project has been completed in 2007 and new initiatives have been started along the river, like Lanyon Place, Donegall Quay, Clarendon Dock and the Odyssey Complex.
Another project along the waterfront concerns the *Gasworks* rehabilitation. Starting from 1822 and during 150 years, the energetic provision of Belfast has been guaranteed by the Gasworks. The abandonment of this area left volumes of industrial archeology, reused by an initiatives of the City Council oriented to build an industrial incubator, with accommodation facilities (Radisson Hotel) and advanced industry. The area includes also the project of public spaces, with exposition of artworks and accessibility to pedestrian and cycle path along the Lagan river.
The work in progress *Titanic Quarter* project represents one of the most ambitious initiative of urban regeneration ongoing in UK [36]. This brownfield site covers an area of 75 acres in the Harland & Wolff shipyards, located in the Queen's peninsula on the North-East of city center and linked to Donegall Quay by a bridge. Nodaways, the company which built the Titanic continues to work in a small area of the original site and it gives the name to this complex district (www.titanicquarter.com). The development plan provides many functions: a mix of shopping, training and research activities, various size and using target of housing [36]. The economic plan provides investments for 2.500 new residential units, 50.000 square meters of productive areas, 10.000 square meters of structure for leisure, two hotels, 7.000 square meters of shopping center and a building for a college could be innovative from energetic point of view. Two public-private companies created *ad hoc* manage the rehabilitation plan of the area that is property of Belfast Harbour Commission. The plan is also aimed at producing an indirect positive effect toward working-class neighborhoods of East area, damaged from the abandonment of shipyard. This last aspect seems a challenge because of the typology of provided activities and elitist dimension of distributed services will have high influence on these areas.
The projects described represents an important piece of the urban revitalization process, that assume strong connotation if we consider the peculiarity of the context and its framework of tension. In just over a decade, the city center has worked a "normalization" result unthinkable in the Nineties. The heritage of the industrial past have been renewed, starting a "branding" process more than a territorial marketing, to create a new imagine able to cancel blood traces.

3.3 New York: a water metropolitan city

The case study of New York highlights some key points to re-interpreter the relationship between city and sea, not in terms of transports or aesthetic issues but for enhancing urban maritime identity. The city can be seen like a water metropolitan area whose centre is the Upper Bay on South Manhattan [37]. This characterization born with the historic role of New York Harbour as crossroads between ocean and internal water flows and nowadays it is strengthened by a continuous rehabilitation of the waterfront and abandoned historic port areas, developing a collective sea transport integrated with the other vehicles.
New York City is part of the State of New York and it is articulated in five big areas (defined administratively "boroughs") linked by the water that is the core: Bronx, Brooklyn, Manhattan, Queens and Staten Island. It is the most densely populated metropolitan area of USA. The bay is the focal point of a settlement system of metropolitan level that is developed from Long Island to New Jersey, using the water like cohesion factor for a diffuse historic port structure projected in the water with suggestive piers, influencing the life quality and local economy [38] [39].
The port activities dominated after the born of the Union, enhancing the role of crossroads of commodity and people flows, until demographic explosion of the 19th century [40]. The geopolitical events lead the city to be the access of immigration and exchange pole with Europe, determining the actual role of cosmopolitan metropolis.
Through the first American dry-dock on the East River (1824), openness of Erie canal (1825) and the internal and external "waters wedding", New York became the most important port of North American transhipping and finally interchange for the transoceanic commodity. At the end of 19th century it was necessary to discipline the development of port waterfront with the achievement of appropriate organism: the Department of Docks (1870) [41].
Over the Centuries the city have represented the access door from Europe, the starting point for transport to East Coast and internal transhipping and, today, a redeveloped and re-functionalized waterfront, destination of tourists and qualifying factor of urban life [42]. This set of factors has determined a particular attention to the waterfront, not like the boundary between two worlds, but like the window on the "fluid" part of the city, link between the urban monuments, sociality, renewal of historic memory.
Manhattan borough is the main place of the metropolitan system that is stoked up through water ways. The long-sightedness of decision makers and stakeholders has led the city to exceed the crisis like the Big Depression of 1929, the crisis of port and economic activities in Seventies and the terrorist attack.



Fig. 3: New York, the East River and Manhattan (by Gabriella Esposito De Vita)

Saskia Sassen in her most important work (1991) defines New York, with London and Tokyo, a "Global City" [43]. This expression evokes the complexity of the functional relation, the interconnection of economic-financial dynamics, the multicultural stratification, the role of catalyst of material and immaterial resources with a global skyline that identify the most populous United States metropolis. The “Big Apple” shares with London (and Toronto) also the title of capital of cosmopolitanism [44].
In the contemporary city, abandoned areas and infrastructures localized in a quality places, like the riverside, allow actions aimed at valorizing the character of existing city interconnecting the pre-existences and projecting them toward the sea. The waterfront rehabilitation started in Seventies is being completing with the progressive empowerment of maritime dimension from inhabitants, visitors and city users [45].
The New York coastal line is articulated and extended: the waterfront is 1000 km long and includes more than 11 ports: Manhattan, Brooklyn, Queens, the Bronx, Staten Island, Perth Amboy, Elizabeth, Bayonne, Newark, Jersey City, Hoboken, Weehawken, Edgewater. The first wharf on the Manhattan dock dates back to 1648 and it is made by Stuyvesant in the lower East river (Schreyers Hook Dock).
The river landscape enhances the skyline perception from different points of view and the water ways offers a capillary increasing accessibility, highlighting the strategic role of the coastal line for improving urban quality. In this urban system, the waterfront represents the “red line” that links all the present and future interventions, also by some thematic nodes: renewal of land-sea relationship, valorization of abandoned port areas, environmental compatibility and more inclusionary housing [46].
The South Street Seaport is the physical and temporal starting point of the waterfront regeneration: restored in 1983, it includes a museum located in the ancient Fulton Fish Market, a traditional market, restaurant, a panoramic path and a shopping center on the Pier 17.
An important element of interconnection is the Manhattan Waterfront Greenway (MWG), an example of urban transformations able to preserve the ecological dimension of spaces organization, without neglecting the economic sustainability. The MGW is a 32-mile-path around the Manhattan Island, built by transforming a degraded waterfront in a green attraction for leisure and commuting uses. It also permits an alternative access to most congested areas of the city, including interventions on the existing road sections through the Battery, the reconversion of the industrial port of the West Village and Chelsea Hudson River Park and the transformation of the inaccessible Harlem River Speedway in a promenade. In this way, new interventions are connected in the Lower West Side – from

Meatpacking District, TriBeCa, Chinatown and Greenwich, until Battery City Park – with renewal and reconstruction actions of the area of Financial District overwhelmed by 2001 events.
Chinatown and TriBeCa (Triangle Below Canal Street) due their recovery to the Washington Market Urban Renewal Project of Sixties. Today TriBeCa is a busy place of Film Festival, characterized by art galleries and restaurants, integrated with the valorization of Meatpacking District, where is the notable intervention of High Line, paradigm of an approach aimed at combining infrastructural renewal, ecological dimension and development of collective spaces. Today, the elevated road – symbol of an industrial past connected to the transoceanic trade – is a green promenade and an important element for the revitalization of 19th century borough, enhancing collective memory about the maritime history of the city.
The series of interventions along the Hudson River systematizes the area and opens it toward the sea, as well as it happens on the other side, the East River waterfront, by projects involving the boroughs of Manhattan, Brooklyn and Queens. In Manhattan, particularly, the South Street Seaport project is the meeting of history with contemporary innovation. The entire project is characterized by community spaces, promenade along river and shopping and leisure center that can develop the usability level in the area.
On the other side of Brooklyn bridge, the rezoning plan for Greenpoint-Williamsburg area includes the creation of 50-acre-park that is integrated in the waterfront Access Plan. The plan represents a community asset, developing in cooperation with local community, investor and stakeholders. It is connected with the East River Park and the other areas of riverfront recovery in the whole city. In 2009 this integrated system gained the international award “Excellence on the Waterfront” by the “Waterfront Center”.

4. Conclusions

The theme of the city by the sea leads to deal with the concept of the border, the theme of the limit which has always been a challenge for those who are involved in designing urban transformations. According to the approach chosen, in fact, the boundaries could be interpreted as separation and denial but also as a transition to something else [47]. The frontier between the two worlds is nourished by the tensions towards the exploration and fear of the unknown and owes its shape to the way in which the civilizations that face these tensions live.
The fears and tensions between land and sea have created marvellous pages of literature - such as the explorations underwater of the Nautilus and the epic battles between the old man and the sea or to relentlessly hunting of the white whale - that testify the intensity of man's relationship with the aquatic border. This relationship is strengthened in inspiration than in all the artistic movements was taken from the flowing of water within or on the edge of the city. In architecture, the same tensions have led to the creation of cities reaching out into the waters or defensively behind the trenches from which the ships were leaving toward new adventures [10].
As pointed out across the case studies, the evolution of space-functional organization of the coastal cities has always been influenced by the aquatic element for inclusion or denial: it is the element that connects, facilitating exchanges and produces wealth but it is also the enemy to be resisted. The water is a constraint to overcome, giving rise to incredible architectural virtuosity, or to cancel, creating an urban space interconnected but lacking the beauty that could be produced in designing the relationship between architecture and water [48].
The evocative power of Marseille helps to understand that starting from the fluidity of water, by their nature harbingers of change, you can search for the key to renew and revitalize the city, adapting to the changing demand of urban communities as well as it always has been for the navigation. The difficult challenge that is experiencing Belfast in an attempt to recover social harmony through a process of urban renewal is actually based on the waterfront and trails along the river. Even New York has risen several times by focusing on its role as a bridge between worlds and hubs and concentrating the regeneration process around and through the upper bay, called the sixth borough of the city.
The criterion for choosing and the procedures for developing the case studies highlight some central elements in a process of formation of the design choices. In an era in which the globalization of economic phenomena, the fluidity of social change and the dynamism of the concept of cultural identity make it difficult the recognition of places and architectures [49], the examples show a reality in countertendency. The presence of the water is not a source of identity per se, but it contributes to the development of urban and architectural solutions: bridges to reconnect parts of cities, fortresses to protect, waterfront equipped to increase the areas of public spaces and to restore the environmental balance, platforms logistics to adapt dynamically to the demand for services and symbols that unite different cultures. Human ingenuity in taming nature respecting the balance is the basis of longevity of such city-port systems. Interesting prospects for further interdisciplinary research will open up as well,

helping to define priority actions to be put in the field to act on the contemporary city in a key cultural interaction, social equity, economic development and environmental enhancement [50].

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BIOCLIMATIC STRUCTURES DESIGN FOR THE ARCHAEOLOGICAL PARK OF NOLA

Antonella VIOLANO,[1] Lucia MELCHIORRE[2]
(1) Department of Architecture and Industrial Design "L. Vanvitelli"- Second University of Naples Aversa (CE), Italy
Email: antonella.violano@unina2.it
(2) Email: lucia.melchiorre@unina2.it

Abstract
The uniqueness of the archaeological findings in the area of Croce del Papa in Nola suggested to the Archaeological Heritage Superintendence of Naples and Caserta designing an "Archaeological Park of Prehistory". This paper illustrates a proposed project for the PAN (in italian: Parco Archeologico di Nola) which involves the construction of a built system finalized to a compatible fruition, in according to the needs of conservation and protection of the archaeological heritage, but, at the same time, disseminating the knowledge of historical and social character of this extremely important site. So, the support to fruition structures were designed with integrated approach both from the point of view of the size that the environmental impact, in line with the idea of "Diffused Museum", that we believed to be the most suitable solution to organize in balance a so rich in value site. The services and activities of the PAN will be carried out within specific temporary structures, made with a few natural materials such as wood, brushed aluminum and glass. These structures have the same generating matrix, suitably varied depending to the different use: museum, laboratories, info-point, ticket office, bookshop and restoration area. These are sustainable structures, designed in according to some of the main bioclimatic rules: orientation, natural ventilation, use of natural materials and sources, renewable energy, recycling of rainwater. Through these design measures, the technological solutions increase the eco-friendliness of an "architectural object".

Keywords: Technological Design, Energy Efficiency, Sustainable Use, Ecofriendly Behaviour

1. To experiment preserving[1]
"*Any technique always refers to a transformation of a subject, object, knowledge and feature. It is evident that techniques differ according to instruments used to achieve these transformations, but even more depending on the choice of transformed object*" [2]
The cultural heritage, exposed to continuous risks of decay, it is frequently preserved with techniques that must not transform the heritage, but can only transform how man can use it and benefit.
To experiment a compatible way of enjoying cultural heritage, without harming their intrinsic values, requires creativity and audacity, but also awareness and sensitivity. [4]
If we consider technological design as "action research" in order to give an environmentally friendly solution to the problems of conservation and enhancement of the archaeological heritage, it allows making decisions through a creative act that leads to formulating a variety of design solutions. These can be particularly sensitive to the needs (conservation and enhancement) and adapted to the environmental characteristics of the archaeological site.
The need to restoration above all comes from the state of degradation of many Italian archaeological sites, especially in the Mediterranean area. The loss of interest of direct users for the archaeological heritage is founded on various reasons, and many of them are related to its obsolete fruition methods. In fact, the rules of use have changed.



Fig. 1: The archaeological area and its context.

The aware management of the cognitive process-oriented fruition needs a new form of planning where technological experimentation, coupled with the creative act of design, enhances the identity of places and contemplates integration to architecture of the historical, cultural and social characteristics.
Therefore, an illuminated designer can introduce, in the composing process, the understanding of the intrinsic value of the archaeological site on which it is exercising its design action. Preserving matter is essential so that the cultural heritage could be object of a valorization design.
The iter starts from the knowledge and leads to the conservation and enhancement of the archaeological site.
The contribution of Architectural Technology orients definition of requirements for use of structures, choice of the most efficient technological solutions and explicit standards of comfort and performance that design wants offering to users.
So, design can follow different approaches respecting to the characteristics of the archaeological heritage (presence / absence of the excavation), methods of preservation, methods of protection (ie use of roofing systems performing the functional point of view but also energy and bioclimatic).
The types of use to the public of the findings (by the procedures of lining out up to the most advanced technologies of virtual archeology).
Actually, they must respond to different needs, but above all we must understand that the "Cultural Heritage" must be increasingly aimed at communication skills, using a "language of the market" so as to extend the product within reach of an increasing number of consumers-users, naturally preserving its safety.
This experimental design on the archaeological site of the Early Bronze Age Village of Nola, aims to test the validity of the design methodology integrated technologies of the Information Society for the realization of archaeological museums "open-air", which provide for, among other things, reconstruction efforts with educational and training purposes.
For the peculiarities of the site and the current conditions of partial flooding due to the rise of the aquifer, the technique of preservation of the adoptable is the practice of backfilling: a choice only seems defeatist that offers stimulating insights from the reasons given both institutional design and technology.
The issue has been addressed from different points of view, in order to put in evidence opportunities in terms of experimentation related to this conservative approach, with a particular interest in the contribution of multimedia and virtual technologies. It is founded on a methodological apparatus using user needs and requirements of information tools.
This proposed design has been carried out taking in account those objectives, and both integration of innovative technologies and attention to the bioclimatic factors have provided the benefit that has characterized the design choices.
The design's main objective is to experiment first at all solutions encouraging conservation and enhancement of heritage; the adoption of technological innovation and process is essential to a sustainable management of the cultural heritage in our country.
However, the design also demonstrate that the combined application of technological innovation and process represents one of the tools to improve the quality of conservation processes.

2. The technological design[2]

The Early Bronze Age settlement in the locality Cross of the Pope is located at a depth of about 6 meters below the current campaign level, but the aquifer of Nola's agro is submerging it. [1]
The uniqueness and originality of the finds has engaged the technicians of the Superintendence for Archaeological Heritage of Naples and Caserta not only searching new methods of excavation, but also experimenting complex and innovative techniques of detection and safety.
Actually, the excavated area is about 1500 square meters.
The design has as a primary need to protect the archaeological heritage that, if left in the same actual condition, runs the risk of being consumed both by groundwater, despite the constant and expensive pumping action, both by weather agents that affect heavily on the coverage that volcanic mud has preserved for thousands of years.
Therefore, the urgent measures are:
- backfilling of the excavate, which actually is flooded with groundwater water and could be destroyed;
- designing of suitable fruition system, with a museum, equipment and protective services and access;
- ensuring the dissemination of knowledge about the historical and anthropological values of this site.
This design converts the park into a large container of functions and connections. In fact, it is divided into four areas, organized according to different purposes of educational, recreational and fruition, and different categories of users: groups or general tourists, specialists and children. [9]

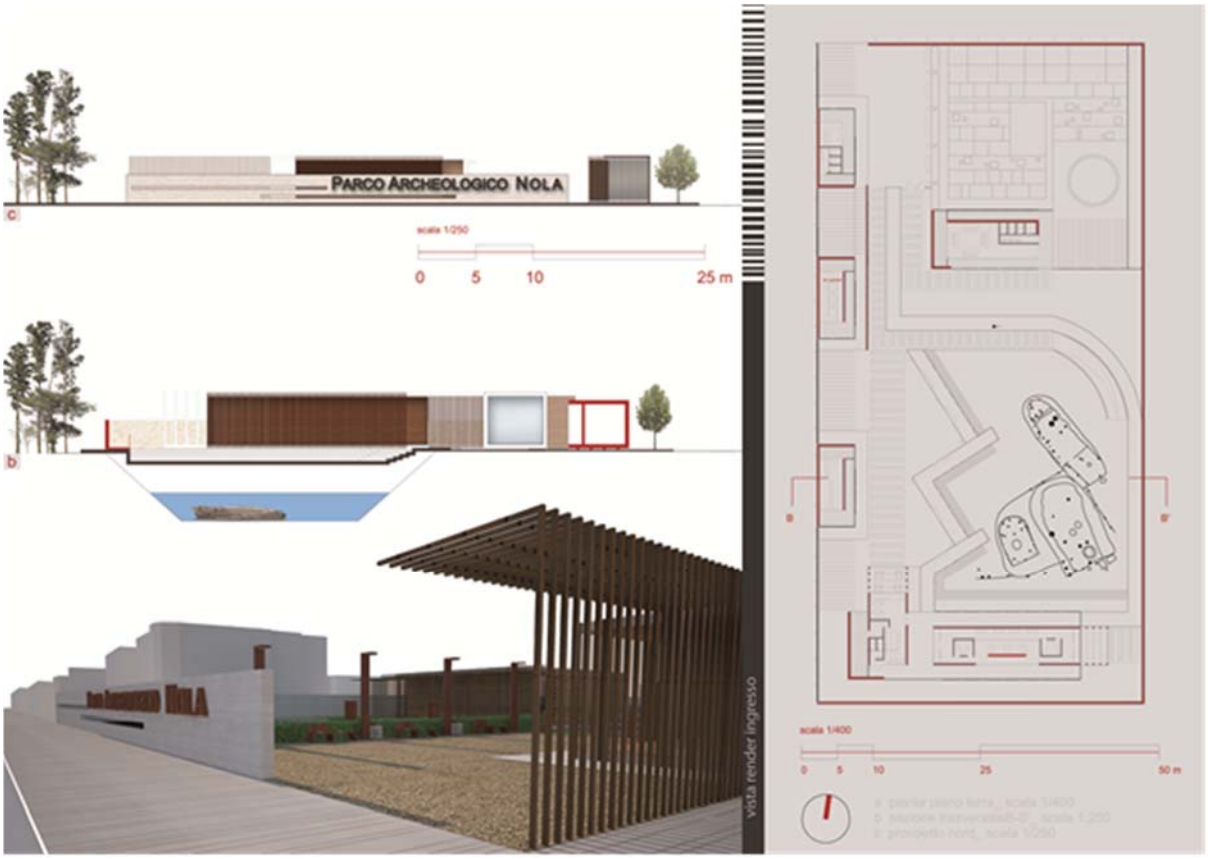

Fig. 2: The Archaeological Park of Nola: plan and fronts.

The design of fruition structures follows the bioclimatic criteria, starting from the preliminary analysis of the climatic conditions (daylight, natural ventilation, rainfall) and the topography of the site.
These environmental characteristic, in the next project phase, become resources for the appropriate arrangement of the interior and exterior spaces.
The model implements the bioclimatic architecture principles, reducing the demand for energy, improving comfort and integrating the se structures in the archaeological site, without being too invasive.
These structures optimize energy relations with the surrounding environment, constructive choices and structural properties of the materials used and the size and orientation of glazed surfaces.
So, they guarantee environmental conditions of indoor comfort, based on their morphological characteristics, distribution, size and material.
The main "rules" of the technological design of the various units placed in the site are:
- typology: lightweight and minimally invasive structures;
- location, orientation and shape of the building: the structures are located so that it can be exploited to better direct solar radiation in winter, with large windows, oriented to South, equipped with selective screening systems to protect the glass surfaces in the summer season, and closed and insulated walls, oriented to North;
- natural cross ventilation;
- use of eco-friendly materials (natural and unsophisticated);
- use of renewable energy sources: energy supply is ensured by photovoltaic systems. In particular, the roof is a photovoltaic totally integrated system, consisting of photovoltaic modules waterproof, which use solar cells in thin film of amorphous silicon, which produces energy even at low levels of irradiation, when irradiation is not direct but diffuse;
- reuse of rainwater for irrigation of green areas and for wc.

3. The PAN: temporary structures for fruition[3]

Starting from the entrance area, a re generated two main itinerary that lead to all the equipment connected to them, at first info-point/ticket office and bookshop. The focus of the system is constituted by an "Open Museum", that is the re-proposition of the casts of the Ancient Village of Bronze, around which articulates the main visitor itinerary.

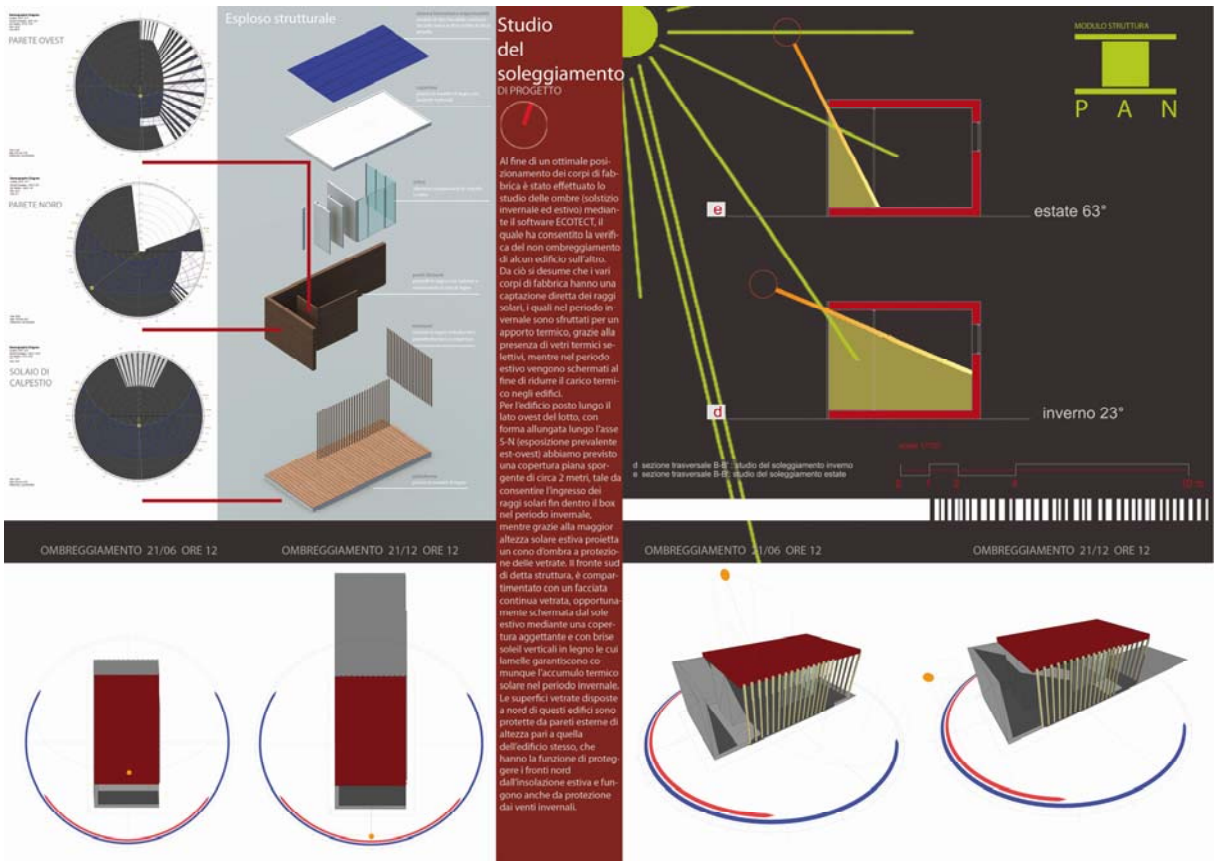

Fig. 3: Design of ticket structure.

The main o bjective of the proje ct for the Archae ological Pa rk of Nola (PAN) is to create a fruition system a nd various su pport stru ctures integrat ed i nto the land scape a nd h istorical-environmental context of the site [3], always in accordance with the principles of sustainability and energy saving. We will have to a void having to the sup port structures of the park a predomin ant role respect to reality of the site, both in terms of extension and in terms of impact.
All this to better c omply with the idea of "diffu sed museum", th at we believe is th e mo st suitable solution to organize in a balanced way a "place" so rich in values.
In brief, with the proje ct of the PAN we want to create a sy stem perfe ctly correlated bet ween the "ancient" site and the future structure of the area, through essential tools such as visitor routes, "open air" museum, virtual muse um and lab oratories for t eaching a nd sci entific re search; all architectural elements conceived and designed in according to the basic principles of eco-sustainability.
Architectural desi gn is based on the pri nciples of fl exibility in the light of t he context in progress of research, reversibility of the process, recognition of the work, absolutely not mimetic (imitative).
The se rvices and activitie s that will take place in t he Archa eological P ark will be lo cated in small buildings, called "cubes" and designed in wood, brushed aluminum and structural glass.
These "cubes" have the same generating frame, suitably changed in according to the needs of use of the vario us a ctivities that here take pl ace: a rcheology and ceramic la bs, i nfo-point an d ticket office, bookshop, laboratories for specialist research, dining area and museum.
All the ab ove-described units and the systems (plants) adopted for them are linked to d esign choices of distributive and archite ctural nature. In particular, each de sign choice derives from the respect of a few simple "rules" of sustainable building.
The case st udy has been develop ed keepi ng in mind what h as ju st bee n said. In fact, after a preliminary analysis of the site, it was established the orientation (positioning) and all technical works aimed to energy self-sufficiency of buildings.
For an optimal positioning of the buildi ngs h as been realized the sha dow study (winter and summer solstice) by using ECOTECT software, which has allowed to control the no-shading of any building on the other.
So, it follows that all build ings benefit from a direct catchment of the sol ar rays, which in winter a re exploited for a heat input, thanks to the use of selective thermal glass, while in summer are shielded in order to reduce the thermal load in buildings.
For the solar shields have been provided for two distinct types.
For the blocks allocated along the west side of th e site, with elongated shape along the south-north axis (exposure is mainly east west) has been provided a flat roof protruding about 2 meters.

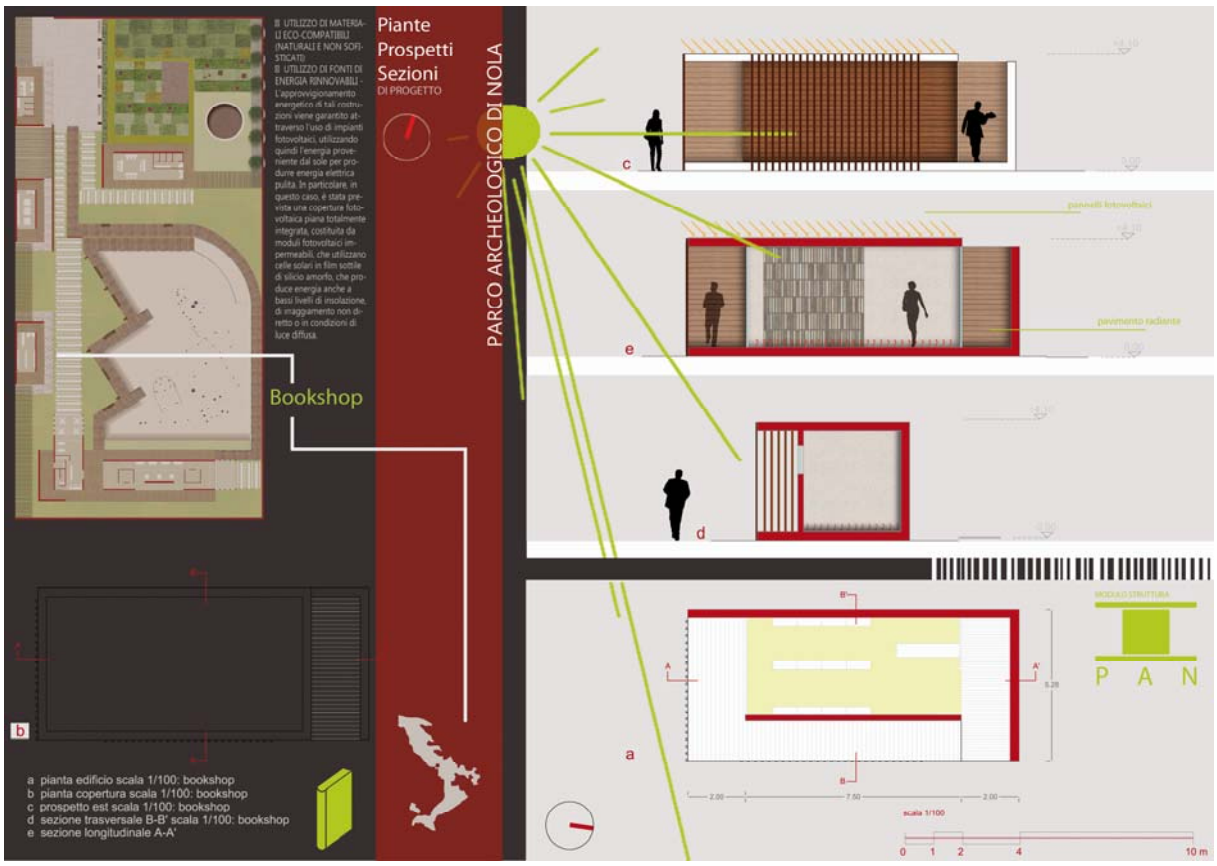

Fig. 4: Design of bookshop structure.

To allow the input of solar rays during the winter, while in summer, thanks to the greater solar height, it projects a shadow to protect the windows. The south facade of these structures (to be allocated to info-point, bookshop and research), is composed of a glass curtain wall, properly screen from the summer sun by an overhanging roof and brise-soleil with vertical wooden slats which guarantee however the solar thermal storage in winter.
The surfaces exposed to the north of these buildings are protected by external walls of the same height as of the building itself, which have the function to protect them from the cold and wet prevailing winds in winter.
With regard to the multipurpose area and the experimental laboratory. These were designed with arrangement of the modules of elongated shape along the East-West axis, with closed walls to the north, glass walls the south, which allow the penetration of solar radiation in winter, and they are screened in the summer thanks to the roof that protrudes about 2 m by creating shadow zone on the windows.
Regarding natural ventilation, it appeared that winter prevailing winds come from the North and Northeast. Essentially, it is cold and wet winds, adequately shielded by a windbreak made with a double row of evergreen trees (winds are screened by the foliage) and a hedge (that prevents the passage of the wind in the lower part).
The prevailing winds in summer, however, have been exploited for cooling and dehumidification, as can be seen from the graphs of the buildings. Moreover with ECOTECT Software were analyzed the frequencies of the prevailing winds that effect on each block, in relation to the winter and summer season.
For photovoltaic, it was assumed an integrated system that is well suited to the flat roof of the blocks of the whole area of the park. It was chosen a photovoltaic panel with excellent performance and technologically "innovative". It is a fully integrated photovoltaic system, suitable for every type of roof. The PV module is composed by a photovoltaic laminate combined with an impermeable membrane, industrially or in the site.
The modules of the flexible type, consisting of solar cells in thin film of amorphous silicon, are capable of producing energy even at low levels of insolation, indirect irradiation or in diffuse light conditions. Moreover, the system has a lower waste of efficiency with the increase of temperature of the cell.
In order to reduce energy consumption, a particular attention has been focused on the design of the envelope of the structure, inside which, using appropriate materials, it is tried to achieve values of thermal transmittance contained within the maximum transmittance values as provided by Decree No. 311/2006. To obtain this result the partitions were examined individually.



Fig. 5: The Archaeological Park of Nola: layout.

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[1] This section is due to Antonella Violano

[2] This section is due to Antonella Violano

[3] This section is due to Lucia Melchiorre

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The missing "Fan vineyard" in San Leucio (Caserta, Italy). An "*agri+cultural*" heritage of "Two Sicilies" Borbone House.

Andrea BUONDONNO[1], Gian Franco CAPRA[2], Eleonora GRILLI[1], Rosaria PARENTE[1], Nicola PISACANE[1], Pierclaudio ODIERNA[1], Sergio VACCA[2]
(1) Dipartimento di Architettura e Disegno Industriale "Luigi Vanvitelli", Seconda Università degli Studi di Napoli, Abazia San Lorenzo ad Septimum, Borgo San Lorenzo, 81031 Aversa (CE), Italy.
andrea.buondonno@unina2.it; nicola.pisacane@unina2.it.
(2) Dipartimento di Scienze della Natura e del Territorio, Università degli Studi di Sassari, Via Colombo n° 1, 08100 Nuoro, Italy.
pedolnu@uniss.it

Abstract
An interdisciplinary pedology and architecture research started aiming at identifying, restoring and repaying dignity and value to those we call "***agri+cultural***" Borbone sites. This investigation deals with the so-called "Fan vineyard", once at the mountainside of San Leucio (Caserta). Through advanced GIS–based interpretation of original maps and bibliography sources, the "Fan vineyard" has been redrawn in its initial topography, and its running pedo-agronomic and microclimatic features have been gathered. The redrawing of the "Fan vineyard" has been possible thanks to the comparison of historical and actual maps and through the identification of traces still visible in the actual landscape design. The "Fan vineyard" was a paradigm of a cultured and rational view of landscape architecture that, as hinted by its appellation, projected the natural site geomorphology on the emblematic "*cult*" object of the baroque aristocratic elegance. The "Fan vineyard" also was highly productive, since it flawlessly fitted a hill hollow with volcanic fertile soils (Humic Haploxerands). The "Fan vineyard" plan replicated a fully open fan with 11 ribs, whose pivot overlooked south-east. The optimal combination of soil features with a beneficial microclimate created the prerequisites for a satisfactory grapevine cropping, growing 10000 vines belonging to 10 different varieties.

Keywords: "Fan vineyard", Borbone House, agri+cultural heritage, applied pedology, LIS-GIS

1. Introduction
The Tifatini Hills are a small calcareous pre-Apennines chain, bordering to NE the Campania Plain within the jurisdiction of Caserta province. It spans about 15 km from Capua (NW) to Maddaloni (SE) behind Caserta town (Fig. 1), the natural backcloth of the celebrated Royal House.
The Tifatini Hills guards one of the most diversified and original environmental and cultural Italian heritage. It represents the valuable legacy of various people and dynasties which, from Oscan to Borbone House, determined the structure and configured the evolution of the inner Campania Felix.
In actual fact, the word "Tifatini" reminds the old Oscan name of the oak, while, of all, Borbone House unquestionably exerted the foremost influence on the socio-economic and cultural development of land. They enriched the Caserta surroundings landscape not only with the well-known gems of architecture, but also through a smart and technically advanced reorganization of the agricultural assets, implementing an extraordinarily happy marriage of art and science, with particular reference to pedo-agronomic and architectural sciences.

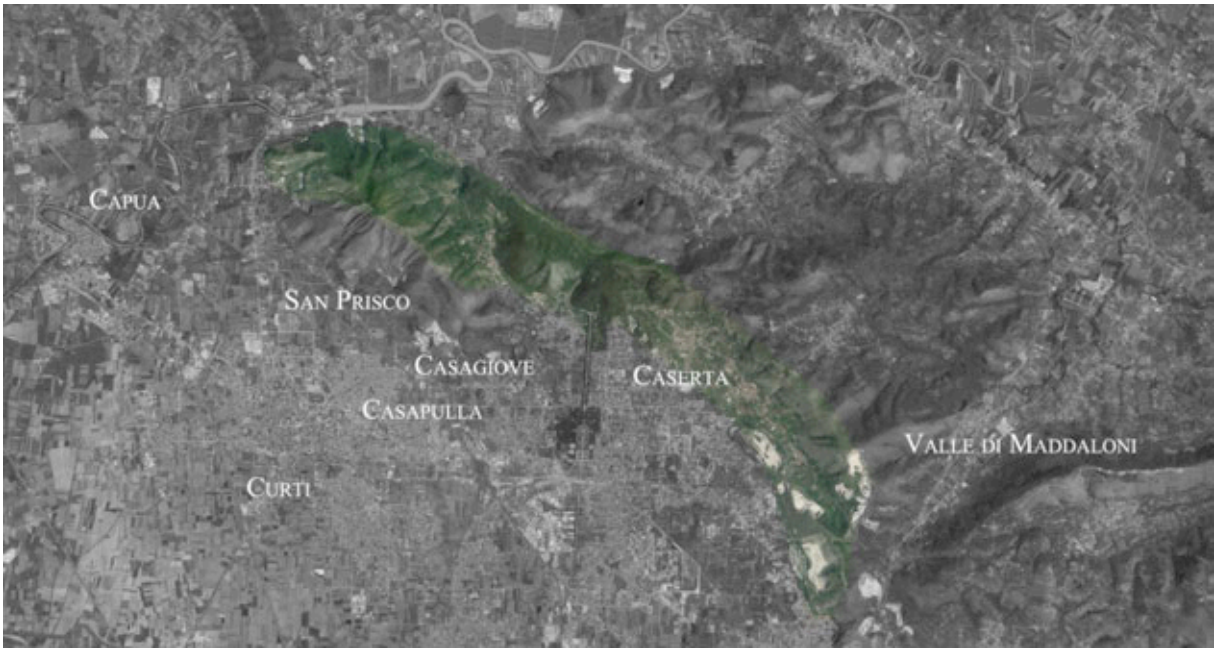

Fig. 1: The Tifatini Hills from Capua (NW) to Valle di Maddaloni (SE).

The Borbone sites arise as the result of a careful and farsighted policy, which pursued several objectives, the most important from the socio-economic point of view, was the creation of development centers extended to the whole Kingdom of Naples. With the widespread dissemination originate in all the kingdom, Borbone Houses sites are all great architectural projects that contribute all at an even greater social and territorial project. They are all realities that surpass the concept sixteenth and seventeenth-century residences exclusively dedicated to , becoming at the same time production realities not only of goods but of a renewed conception of culture and society.
Careful, in-depth information on Borbone House Royal Sites, and on their role on the socio-economic progress and on the transformation of rural landscape is found in the bibliography [1, 2, 3].
To sum up, Borbone House established that we call “agri+culture” by managing their rural goods under the aegis of the “beautiful and useful”. A foremost, superb model of such a concept is San Leucio, the small “Royal delights” suburb, located about in the middle of Tifatini chain, overlooking the Royal House, of which is the natural prolongation.
San Leucio was the old Castle of Acquaviva Prince, surrounded by wood, vineyards, olive groves, orchards and gardens. It was purchased by King Charles as an amusement site, and progressed by Ferdinando IV, which organized the manufacturing industry, built the village for factory workers, and structured the whole hilly land system including San Leucio, Montebriano and Montemajulo as a farm complex, managed with a surprising modernity and a commendable long-sightedness.

1.1 Aims

Unfortunately and deplorably, at present times most of those we call “agri+cultural” Borbone places are fully ignored even by Caserta Royal House visitors. Several sites still languish for forgetfulness or negligence, and others are definitively missing; concurrently, the pleasantly imposing Tifatini massif, once flourishing and hospitable, suffer nowadays severe degradation.
From such considerations, we planned an interdisciplinary research among pedologists and architects, aiming at identifying, restoring and repaying dignity and value, in the present or in the memory, to the “agri+cultural” Borbone sites. This investigation deals with a very interesting record: the so-called “Fan vineyard”, a missing unique paradigm of the attention of Borbone House for both productive and artistic management of soil resources and landscape features.



Fig. 2: The map of D. Rossi (first-half 19thC) (top) as compared to the present topography (down). San Leucio and the past location of " Fan vineyard" are shown, together with " Casino di San Silvestro" and " Fontana di Atteone" (right).

2. Re-drawing and re-locating the “Fan vineyard” by LIS-GIS

The original location of the “Fan vineyard”, and its pedo-agronomic features, are testified by few but trustworthy and precise iconographic and bibliographic sources referred to San Leucio estate: a map painted during the first-half 19thC by D. Rossi [6] (Fig. 2), and the “Platea”, an index of royal goods compiled by A. Sancio (1826) [7] (Fig. 3).

Through advanced LIS-GIS–based interpretation of original maps and bibliography sources, the “Fan vineyard” has been re-drawn in its initial topography, and its pedo-agronomic and microclimatic features time have been gathered.

The vineyard has been re-drawn and re-located thanks to the comparison of historical and present maps and through the identification of traces still visible in the present-day landscape design (Figgs. 5a, b, and 6). This was achieved through a software procedure (by Quantum GIS - Open Source Geographic Information System version 1.7) which consists in positioning, by means known coordinate points (control points), the spatial data in their respective positions in the present, real territory, according to a map projection system (*i.e.* UTM 33) and a coordinate reference system (*i.e.* WGS 84).

Using GIS as a tool for graphic comparison of geographic data is fundamental to reconstructing past places. Historical maps often hold information retained by no other written source, such as place-names, boundaries, and physical features that have been modified or erased by modern development. Historical maps capture the attitudes of those who made them and represent worldviews of their time.

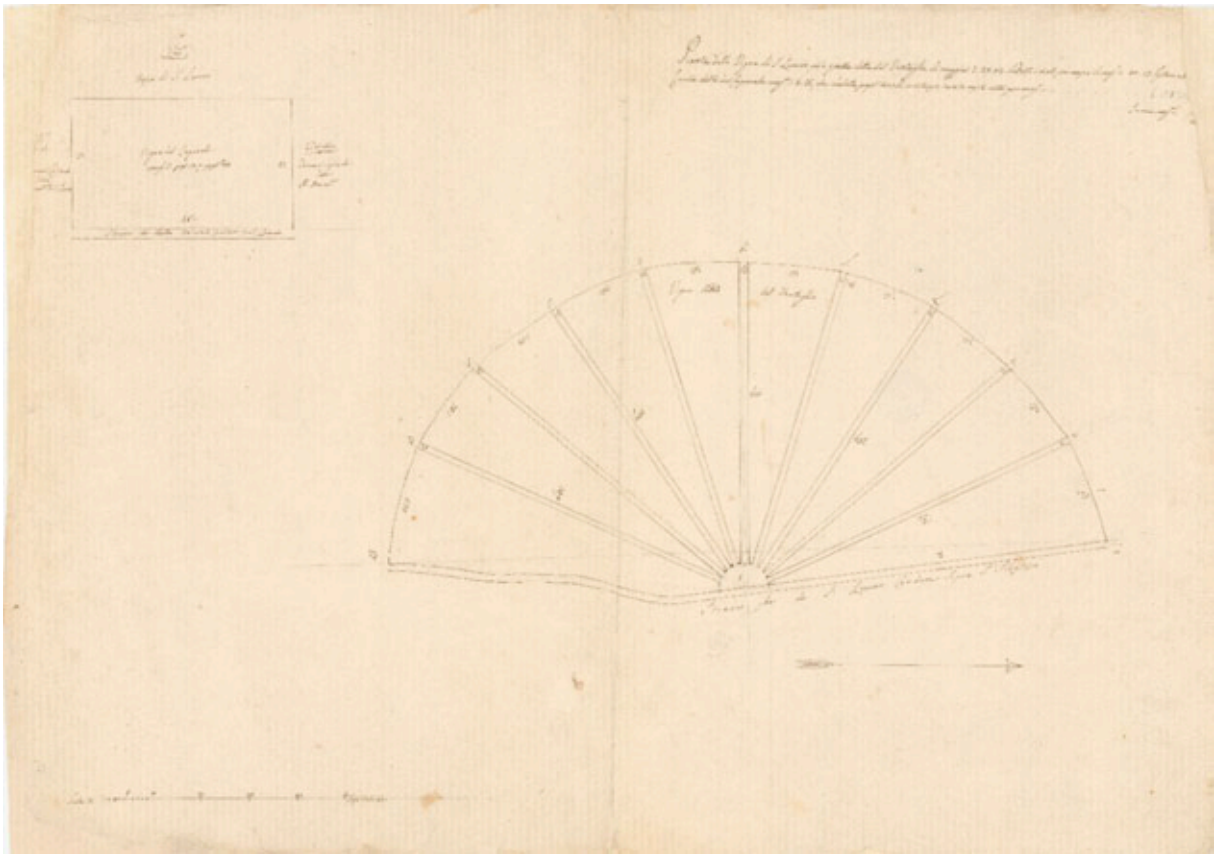

Fig. 3: The map of “Fan vineyard” from “*Platea*…” by A. Sancio (1826).



Fig. 4: "*La Vaccheria di San Silvestro con personaggi*" by A. Veronese (1818). A part of the "Fan vineyard" is visible at San Leucio mountainside (near the center).

Specifically, we geo-referred three control points, *i.e.* "San Leucio" hill, "Casino di San Silvestro", and "Fontana di Atteone", existing and clearly recognizable in both Rossi map and current orthoimage. By casting and aligning such reference marks from the historical to the present images, we accommodated the Rossi map in its true location according to modern coordinates (Fig. 6).
The result was surprising, since the Rossi map almost perfectly overlaid on the present topography. Indeed, it is highly detailed, and it allows to identify and to re-locate, with noticeable precision, the old limits, roots, buildings and pertaining lands of the Borbone site on the current orthoimages. Therefore, it has been possible to make a real comparison between past and present traces (Figgs. 5a, b, and 6).
On the historical map, using GIS, has been simulate topography more vividly by using *digital elevation models,* which are raster surfaces composed of longitude (x), latitude (y), and elevation (z) coordinates. We already saw how draping the D. Rossi map over a digital elevation model enhanced the historical map's depiction of the landscape and morphology on which "fan vineyard" was located. (Fig. 6) Historical maps have a great deal to offer GIS, and GIS brings new techniques to the analysis and display of historical maps.
Through this comparison we can see that the configuration of the mountain on which appears the "Fan vineyard" is the real one, and how some visible traces in the Rossi map are presently missed . As a matter of fact, the outline of the "Fan vineyard" has been lost during time, while the layout of the "Vigna di San Silvestro" and other small paths still retain.
It is finally noteworthy to consider that the work of Rossi concomitantly shows the elegance of "vedutismo" paintings and the accuracy of a modern topographic chart.



Fig. 5a: The map of D. Rossi overlaid as a transparency to present topography.

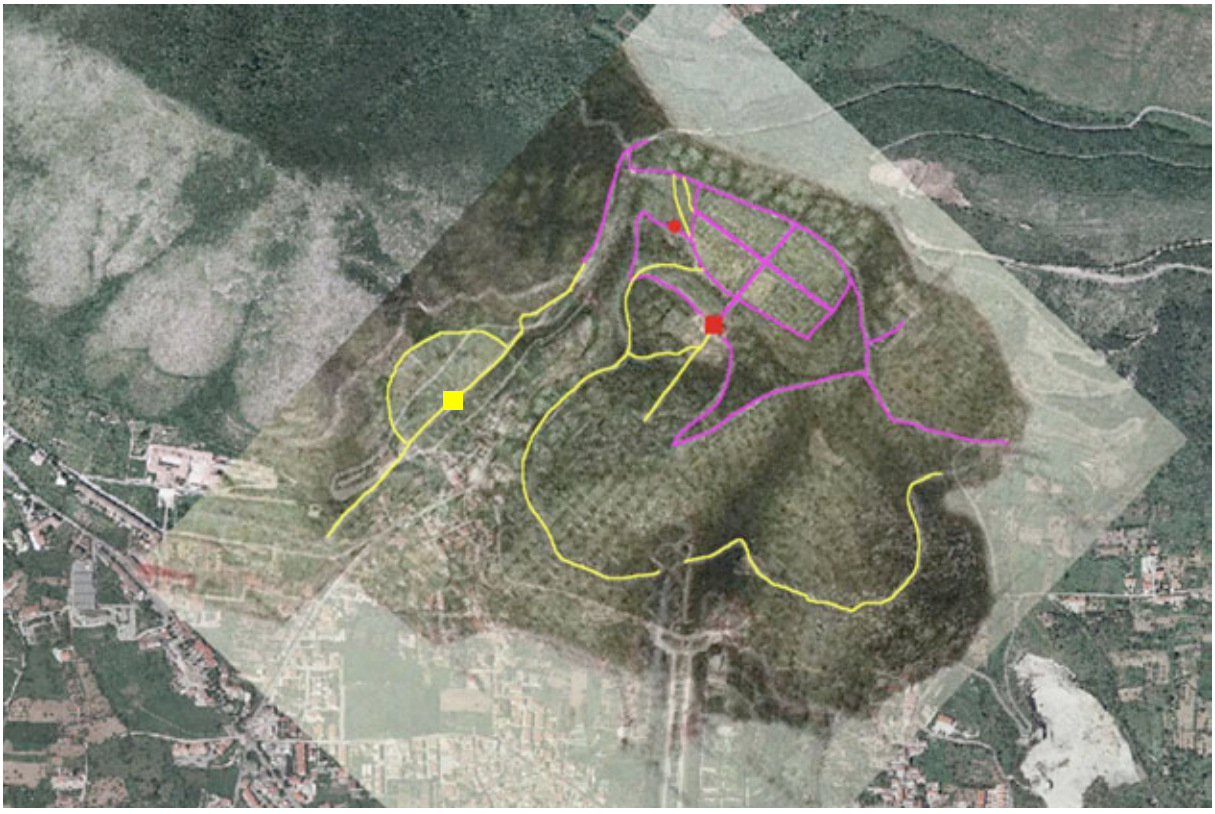

Fig. 5b: Old (yellow) and present (purple) traces of “Fan vineyard” (yellow square locates the old fan pivot) and San Leucio estate with “Casino di San Silvestro” (red square) and its guest room (red dot).

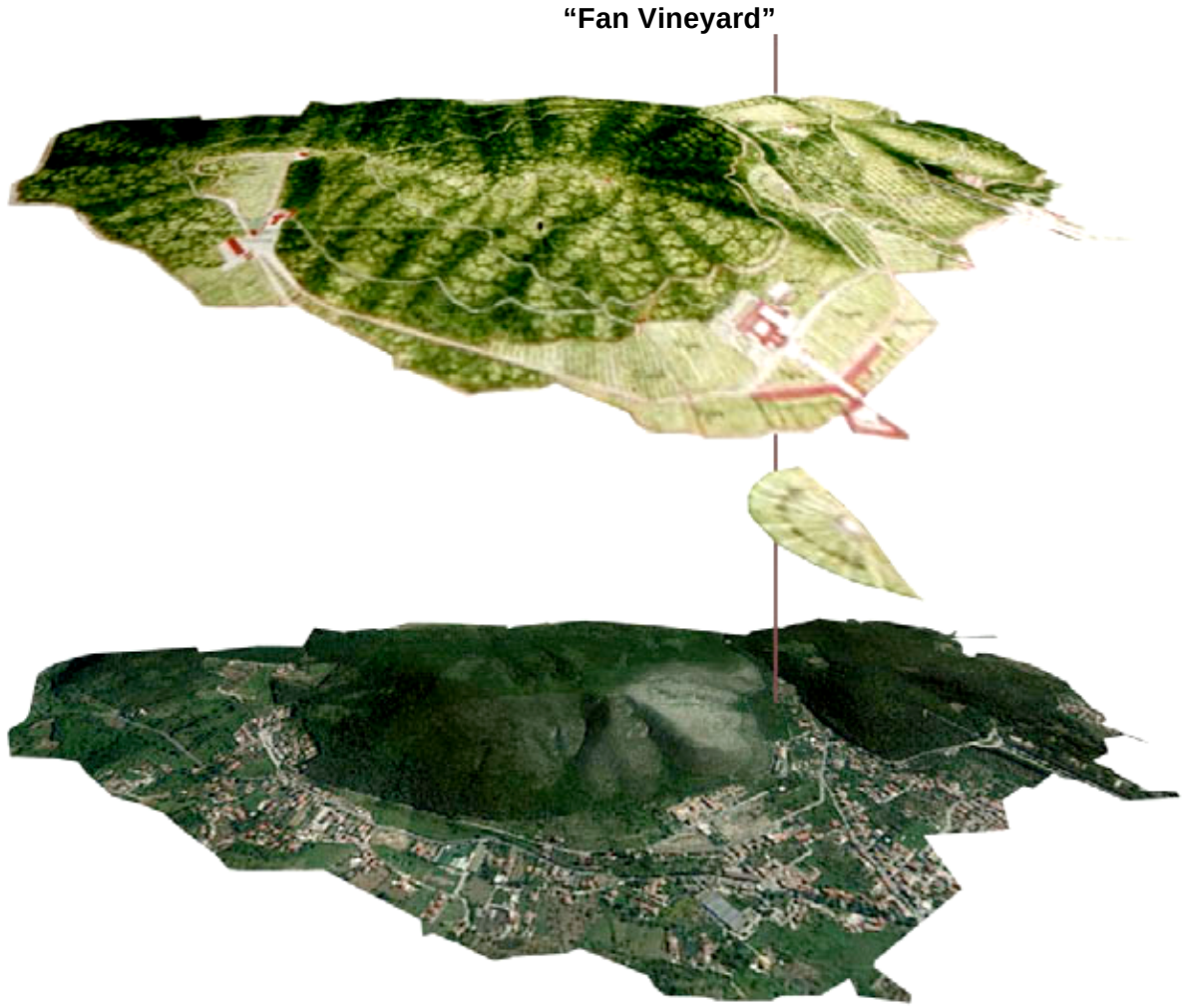

Fig. 6: Re-drawing and re-location of “Fan vineyard” from Rossi map to the present topography.

3. Pedo-agronomic features of the “Fan vineyard”

The “Fan vineyard” flawlessly fitted a calcareous hollow, filled by the Campanian Ignimbrite, a sturdy pyroclastic fall (cinder, pumices, and scoriae) erupted during the 1st from Phlegraean Period about 39 ky b.p. From such a substrate, volcanic soils as Andisols developed. In particular, Andisols occurring in the study-area are classified, according to (USDA-NRCS 2010), as Humic Haploxerands. Andisols have a high potential for agricultural production, since they are intrinsically fertile, easy to cultivate, and with good rootability and large water storage properties. Therefore, Andisols are planted to a wide variety of crops, including grapevine.

The “Fan vineyard” plan replicated a fully open fan with 11 ribs, whose pivot overlooked south-east (Figgs. 5a, b). This was an excellent location, determining a favorable local microclimate, since grapevines were lighted and heated during the bulk of daylight, and shielded behind, by San Leucio hill, from cold, injurers north and north-westerly winds (Figgs. 2 and 5a, b). The optimal combination of a high soil capability and suitability with a beneficial microclimate created the prerequisites for a satisfactory grapevine cropping.

As referred by Sancio [7], the 11 ribs subdivided the vineyard into 10 sectors, each with a different grape variety: from NE to SW, Red Lipari, White Delfino, Procopio, Red Piedimonte, White Piedimonte, White Lipari, White Siracusa, Red Terranova, Red Corigliano, Red Siracusa. The name of each grapevine was carved onto a Bellona travertine stone.

Interesting formation on cropping system, agrotechniques and yielding ability are also available [7]: each sector hosted 1000 vines, amounting in all to 10000, pruned “Italian-style”, *i.e.*, short, as a small tree. Neither other trees, nor other crops coexisted with vines, thus allowing to devote all farmers

energies and cares to vineyard; soil was tilled three times a year, and supplied with horse-bean green manure as fertilizer.
The estate spread 7 “*moggia*”, 29 “*passi*” and 2 “*passitelli*”. The “*moggio*” (“*moggia*” in the plural) was the old surface measure unit utilized, whose dimension varied from township to township. In Caserta, it matched up 3387.36 sq. m, subdivided into 30 “*passi*” (*step*), each further subdivided into 30 “*passitelli*” (*small step*). Therefore, the vineyard extension was about 2.7 ha.
Indeed, the map scale of the “Fan vineyard” reported by Sancio [7] (Fig. 3) reveals an interesting, surprising oddity: the bars of the linear scale are measured in “*passitelli*”, instead of “*passi di terra*” (*ground step*), which was the old official length unit utilized in Napoli, capital of Borbone realm, nowadays corresponding to about 1.94 m.
Indeed, we found that such an oddity just is seeming. As a matter of fact, we conceived that the linearized “*passitelli*” measure should be the square root of the homonymous surface unit. A simple calculation validated our hypothesis: a surface “*passitello*” stretches about 3.76 sq.m., whose square root is 1.94 m. In other words, it appears that “*passitello*” could be also a linear measure unit, as a synonymous of “*passo di terra*”, of which besides has the same length. Such a finding is quite original, and it is worthy of particular attention, since it plugs a noticeable gap in the knowledge of the metrology adopted during Borbone House reign.
The wine production was 80 barrels, corresponding to about 2640 liters. Taking into account that it refers to a production of nearly two centuries ago, and that the vine short pruning increases the quality, but decreases the yield, such a wine amount can be easily judged adequate, also when compared to modern production. Indeed, it was even overabundant the requirements of the royal court, so it was partly advantageously sold.

4. Conclusions

The “Fan vineyard” was an exclusive, sophisticated example of a cultured and rational view of landscape architecture that, as hinted by its appellation, projected the natural site geomorphology on the emblematic “*cult*” object of the baroque aristocratic elegance. However, the “Fan vineyard” not only exerted a landscape function, but it was also highly productive, bearing witness to the fact that Borbone House had noticeable skill in managing their agricultural estates. Nowadays, the “Fan vineyard” is long gone, and just a few Bellona stones are left as a memorial of its past *grandeur*.
Our work has been also intended to strongly support the need of a functional/aesthetic (two sides of the same coin) recovery and restoration of the “agri+cultural” Borbone House’s sites.

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" Capri style", a debate over a century. Architecture, environment and preservation in the island of "the Sirens" since the Convention on the Landscape of 1922

Elena MANZO
Associate Professor, PhD
Department of Architecture and Industrial Design Luigi Vanvitelli – Second University of Naples
Naples, Italy
elemanzo@libero.it

Abstract
The focus of the paper is the critical reading of the cultural and architectonical events that accompanied and followed the petition promoted in Capri by the Mayor Edwin Cerio in 1920 and signed by many prestigious Italian intellectuals, professionals and politicians.
With the petition, he asked and achieved that the whole island's territory was put under the direct control of the legislation on landscape preservation.
In Italy, it was a period in which the debate on the environmental protection was very lively and it took an official aspect as a result of the famous speech of Benedetto Croce, Public Education Minister, given on 25 September of that year. The effects were immediate and, while the Secretary of the Ministry of Art, Giovanni Rosadi, supported by eminent intellectuals and politician, was working to change the n. 364/1909 law, extending the safeguarding action to the natural beauty, even in Capri public initiatives were promoted to face the neglect and demean in which was the island and to preserve the typical characteristics, colours and unique houses of the places.
These include the prestigious international convention on the landscape preservation, from 8th to 10th July 1922. It aimed to discuss the need that each Municipality adopted regulations to protect the artistic heritage as well as promote the cultural revaluation of Capri.
However, in spite of the expectations, the habit to build without any respect of the so called "Capri style" continued and only in 1939, at the dawn of the important Laws n. 1098 and n. 1497, the landscape plane was drawn up.
Made by a Committee whose President was Gustavo Giovannoni, it is considered to be of the first plans in Italy and has governed the island's architecture until the end of the Second World War, when in order to overcome the exasperatedly closed position, a new more articulated debate, extended for over thirty years, solicited interesting proposals for planning, yet unpublished.

Keywords: Capri, Landscape plan, Landscape heritage, Gustavo Giovannoni, Edwin Cerio,

Section

The apparent conflict in the dualism “preservation/transformation”, over the last twenty years, has renewed national interest in environmental issues. The common goal of the ongoing debate and numerous initiatives is the Territorial management in order to monitor and prevent a process of wild anthropization of those areas not yet attacked by building speculation. This is what came out from most of the Landscape conventions, organized in Italy from the one held in Capri in 1993, to the Seminary days “City-Map-Contest-Conference”, resulting in the “Charter of Megaride 1994” and moreover, from the “First National Conference for landscape”, held in Rome in October 1999.
However, we are still far from innovative principles being expressed, by both the European Landscape Convention in 2000[1] and by the interpretation of the conservative intervention as a product of a complex social value, obtained from the meeting of heritage landscape preservation with urban planning, led in parallel with the development forecasts and a correct policy of touristic incentive. Certainly, new methodological and operational criteria have been passed by the Regione Campania[2], as well as by other Italian regions, as a result of the different disciplinary approaches recently adopted.
Analyzing the environmental protection action of strongly characterized historical contexts from a historical point of view, two important cultural references have to be considered: the “Conference in Capri”, organized in 1922 and the Capri’s City Plan, drafted in 1939 by a Committee chaired by Gustavo Giovannoni, which are associated with complex events in the contemporary national environmental field[3].

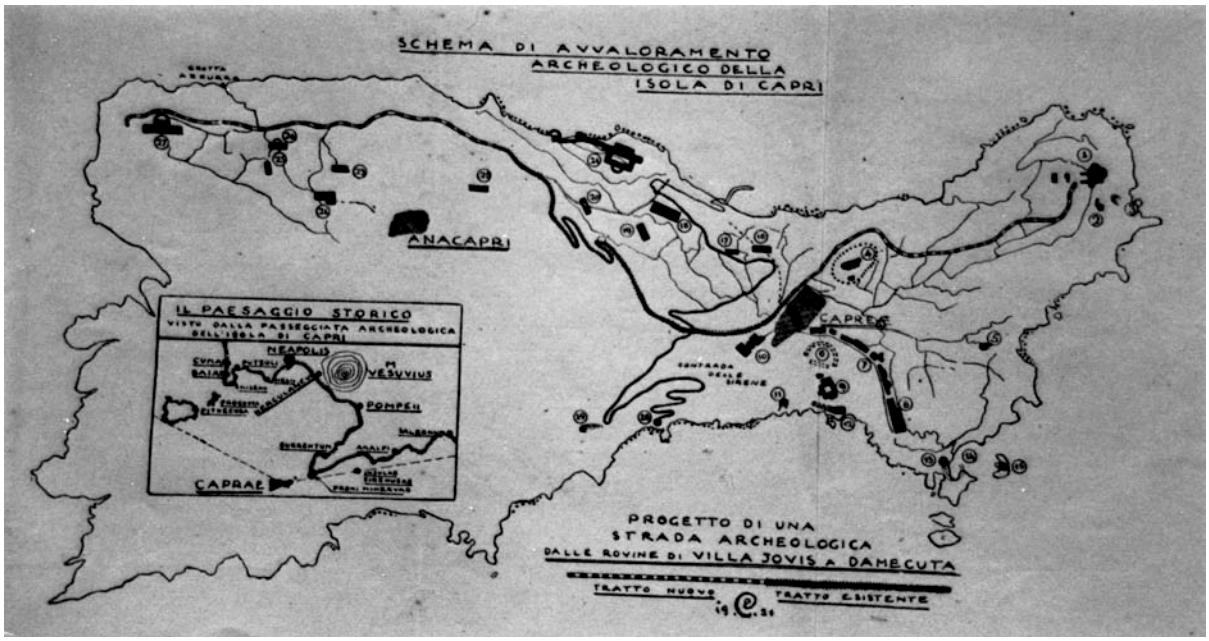

Fig. 1: E. Cerio, *Schema di avvaloramento archeologico per l’isola di Capri. Progetto di una strada archeologica delle rovine di villa Jovis a Damecuta* (in CERIO Ediwin, *L’avvaloramento archeologico per l’isola di Capri*, Capri: Le pagine dell’isola, 1921, p. 45). Cerio wrote the essay to found that Capri is not only the island of landscape attractions, but has an important artistic, cultural and archeological heritage.
The plan shows the most important ruins and archeological monuments in Capri and the details of a project for road network between the major scenic charming views and the archeological places.

The two significant events have accompanied and followed the petition promoted in Capri by the Mayor Edwin Cerio in 1920 and signed by many prestigious Italian intellectuals, professionals and politicians. With the petition, the Mayor asked and achieved that the whole territory of the island be put under the direct control of the legislation on landscape preservation.
In Italy, it is a period in which the debate on e environmental protection is very lively and it takes an official aspect as a result of the famous speech, given on September 25th of that year by Benedetto Croce, Public Education Minister. The results were immediate and, while Giovanni Rosadi, the Undersecretary for the “Cultural Heritage”, was working to change Law n. 364/1909, extending the safeguarding action to the natural beauty, in the meantime, in Capri, public initiatives were being

promoted to face the neglect and demean in which the island was as well as preserve the typical characteristics, colours and unique houses of the place.
Although the critical reappraisal of that time, brought forward with the right historical perspective, allows us today to single out indisputably private interests, the action to preserve Capri's territorial integrity, promoted by Mayor Edwin Cerio, is able to sensitize public opinion as well as the Government towards the promotion of public interventions. Thus, many Neapolitan intellectuals, professionals, technicians, politicians, along with the inhabitants of the island[4], sign the petition to point out the intense building, that has followed the Second World War, which was slowly destroying «il colore locale e le costruzioni paesane»[5].
In fact, Capri, following the temporary depreciation of properties, not only was the object of serious and continuous building speculation, but was quickly invaded by tourism, whose economic values were irreparably impairing the cultural, ethnical and artistic meaning.



Fig. 2: Landscape plan of the island of Capri, dated 1939.

The petition, addressed to Giovanni Rosadi, Undersecretary for the "Cultural heritage" at the Public Instruction Ministry, has a large echo and the consequences are immediate: in the spring of 1921, the Certosa is entrusted to Government protection and, in February 1922, the "Soprintendenza ai Monumenti", in respect of a draft law to make a national list of natural wonders to protect, urges the Honorary Inspector of "Monumenti e oggetti d'arte" of Capri and Anacapri to file "indicative" files to report and catalogue the major places of landscape interest, because, as Luigi Parpagliolo writes, Government control is possible only: «su quegli immobili i cui proprietari han ricevuto l'avvertimento ufficiale del notevole interesse pubblico di essi a causa della loro bellezza naturale e della loro relazione con la storia civile e letteraria. Basta ciò per comprendere l'assoluta necessità che si compia nel breve tempo possibile l'inchiesta già in corso mediante la *scheda indicativa*»[6].
Moreover, in that same year, the prestigious International Conference on landscape preservation, is organized from 8th to 10th July. It is the first initiative for "Aesthetic program" of the Capri's Municipality, which has an international eco. The aim is to discuss the adoption of a rule that will protect artistic heritage and promote the island's culture.



Fig. 2: Landscape plan of the island of Capri, dated 1939.

"Il Mattino", one of the main Neapolitan newspapers, since the early days, understands the importance of the Congress and, sensing the future developments, stressed that it was not «[...] uno dei soliti. Niente vaniloqui astratti e vaghi o chiuso e opaco esibizionismo di politicanti e mestatori elettorali ma una concreta e aperta visione e impressione di bellezze naturali, d'incanti mitici entro il respiro storico dei venti secoli di vita mediterranea. [...] Stimolare e illuminare la *tutela* è certo lo scopo principe [...] e, speriamo, non sarà annullato o negletto dalle lentezze e dalla inconcludenza di quella nostra burocrazia [...]. È *tutela* da estendere a tutta la *regione* e, [...] da far valere anche un po' in Napoli»[7].
The results of the initiative promoted by Cerio are immediate and proceed in parallel with the adoption of the draft law "*per la tutela delle Bellezze naturali e degli immobili di particolare interesse Storico"*, proposed by Benedetto Croce[8].
However, the limit of the Conference is the defence of a transcendental landscape, almost fake, completely denied from a social and political context, seen from an idealistic perspective, which lack ties with a reality private initiative and public interests where clashed. In later years, in fact, in the name of a "redesign" of the island and in respect of the so-called "Capri style", construction will continue with Cerio's implicit consent[9]. Therefore, the structural premise of the Conference, merging in useful methodological proposals, asserts the usefulness to catalogue the artistic and natural heritages, the need for a landscape plan and, in particular, point out how the issue of "protection", have to involve private initiatives as well as the local community, in order to be solved.
Thus, when in 1939, Law n. 1497 is enacted, in accordance with article n. 5 of the new rules for the protection of natural and artistic heritage, a Commission, headed by Gustavo Giovannoni, is immediately appointed to produce one of the first landscape plans in Italy[10].
This episode is an exceptional event with innovative meaning, because the need for environmental protection is not felt as a result of the devastating and chaotic phenomena of urbanization, but as a preventive action to protect a landscape still largely intact. The project has given a value of Plan and together with that of zoning and building regulations proposed by Edwin Cerio in 1922, they govern the island's architecture until the beginning of the 1950's[11].
Notwithstanding, Capri suffers «una disseminazione dei fabbricati senza alcun legame figurativo» that will significantly damage the island's appearance[12].



Fig. 3: A. De Angelis, Project for a zoning plan of the island of Capri,1:10.000. July 12th, 1947

In addition, the regulation promoted by Cerio and Giovannoni's plan of 1939, several decades long, will demonstrate at least with regard to economic operators and local tourist, to be too binding and restricting for territorial development. In fact, considerably reducing the index of manufacturability, the plan will significantly increase the cost of housing and building land and indirectly encourage speculation[13].

In an attempt to preserve "Capri", as the building regulations prescribed, typological differences in relation to the various areas or differences are not established. The constructions of house, that covered the "view" to those which were lower, was not forbidden. Moreover, the buildings so called "terrace houses", such as Villa Malaparte, were hardly ever designed, although unrelated to local taste, they certainly respected the natural image of Capri's coast without ruining the landscape visual[14].

The project of 1939 had planned the ultimate building thickening in the central part of the island and decreasing indicators of construction towards the borders, up to a "respect zone", which prohibited construction all along the coastline. This is a full protection plan, which does not foresee the development of a road network and new constructions in relation to population growth and social transformation.

After about ten years, there is a need for a more modern city plan to organize a global and organic project where the road works, infrastructures, new constructions and renovations find a correct spatial connection.

In 1947, a team of professionals – called "Ingegneri e Architetti Capresi" – composed of Roberto Adinolfi, Angelo de Angelis, Mario di Iorio, Manfredi Franco, Mario Gallozzi, Orlando Gargiulo e Costanzo Lembo, proposes a number of planning studies carried out by each of them to the Municipality of Capri. Among this, two were pointed out to be particularly valid: the project of engineer Mario Gabby - only for the Town of Capri - and that of the engineer Angelo de Angelis, for the whole territory of the island (like a Regional Plan).



Fig. 4: M. Gallozzi, Project for a zoning plan of the island of Capri,1:10.000. November 7th, 1947.

Both provide, essentially, two types of construction for Capri's houses: «l'architettura delle Costruzioni estensive che debbono essere intonacate con il colore naturale del paesaggio (rocce e vegetazioni). L'architettura delle costruzioni intensive od urbane, che possono avere prospetti a tinte chiare o bianche», because «l'adattamento dell'architettura al paesaggio è soprattutto un problema di colore. Il colore è elemento assai più importante della forma, in quanto che a Capri le costruzioni si vedono a grande distanza [...] e mentre la forma in distanza perde rilievo, il colore predomina e si impone all'occhio»[15].
The idea of environmental protection still exists in various proposals, but, after overcoming the exasperated zoning restrictions of the plan projected by Gustavo Giovannoni, thus translates into a more modern concept of "camouflage" of all suburban buildings.
Some years later, with the Ministerial Decree issued on August 20th, 1952, a new Commission to examine the Landscape territorial plan of 1939 and draw up the draft of a new one that had value of General Regulator Plan is formed. The working group consisted of highly qualified people, chosen from the environment of the urban national culture: the architect Roberto Pane, Professor at the Faculty of Architecture of the University of Naples, the Engineer, Cesare Valle, President of the VI Section of the Superior Council of "Lavori Pubblici"; Felice Mario Campoli, head of Division in the Central Administration of the Ministry of Education, Giovanni Pansini, head of the Division of the General Direction for "Pesca e Demanio Marittimo" of the Ministry of Merchant Marine, Roberto La Francesca, Member of the Presidency of the Council of Ministers. Alberto Nicoletti, head of a section in the Central Administration of the Ministry of Public Instruction was appointed as the Commission's Secretary, while Professor Alberto Calza Bini was appointed President.
This shows how the commitment of a few had managed to arouse the interest of the Government as well as create a concrete and purposeful debate which effects have protected with profit for over thirty years.

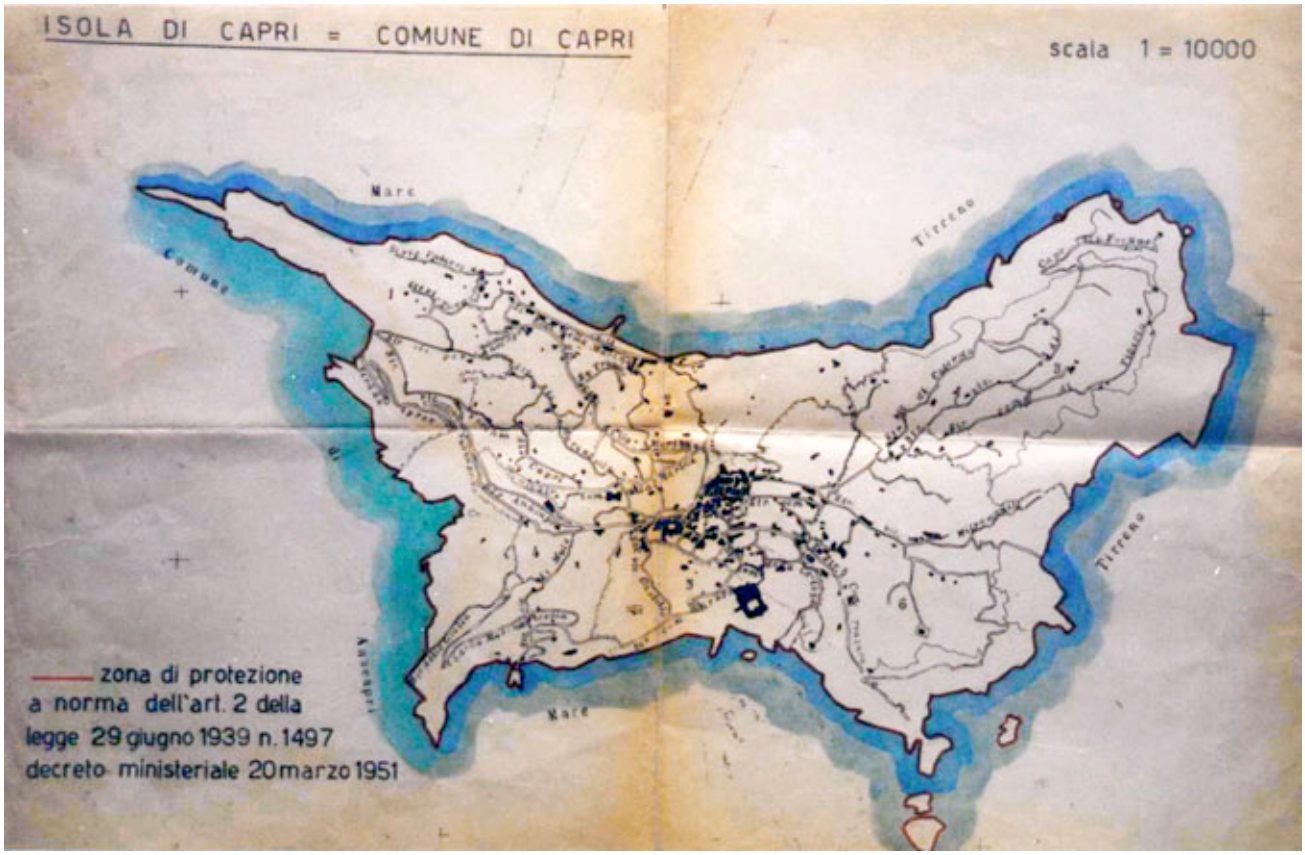

Fig. 5: Municipality of Capri, Plan for the protection areas in 1967, regulated by Law n. 1497/1939 and Ministerial Decree issued March 20th, 1951.

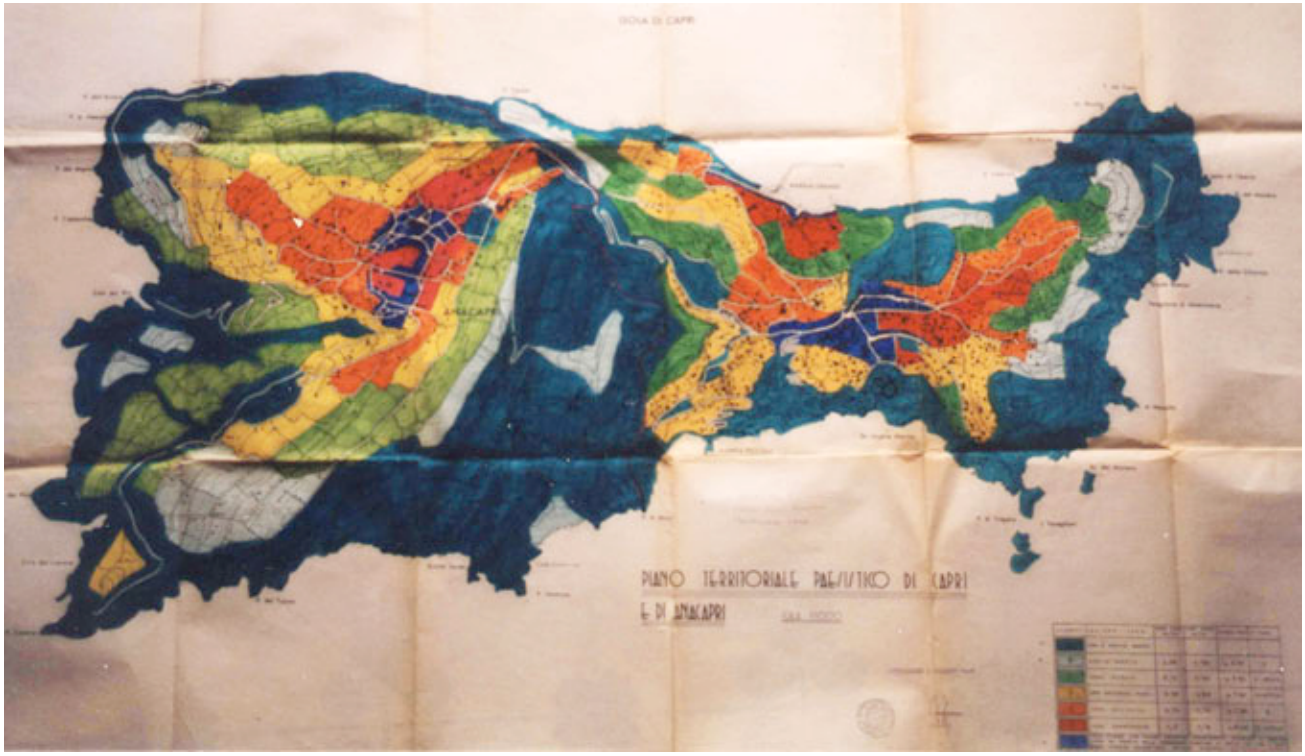

Fig. 6: Municipality of Capri, Landscape plan for the Municipalities of Capri and Anacapri (1965). 1:5.000.

Notes

[1] *Relazione esplicativa della Convenzione europea del paesaggio*, Consiglio d'Europa, 2000. See also PRIORE Riccardo, *La Convenzione europea del paesaggio: matrici politico-culturali e itinerari applicativi*, in CARTEI Gian Franco, *Convenzione europea del paesaggio e governo del territorio*, Il Mulino, Collana "Percorsi", Bologna: Il Mulino, 2007; IDEM, *No people no landscape: la Convenzione europea del paesaggio: luci e ombre nel processo di attuazione in Italia***,** Milano: FrancoAngeli, 2009

[2] *Linee guida per il paesaggio in Campania*, Regione Campania, 2007

[3] This essay is a critical reworking of a chapter of my Doctoral thesis: *Napoli e il Regime. La città storica tra rasformazione e conservazione*, 1995.

[4] The document was edited by Edwin Cerio in COMUNE DI CAPRI, *Il Paesaggio di Capri e la sua tutela legislativa*, Napoli: Gaspare Casella 1922, pp. 9-10.

[5] CANTONE Gaetana, FIORENTINO Buno, SARNELLA Giovanna, *Capri. La città e la terra*, Napoli: ESI 1982.

[6] PARPAGLIOLO Luigi, *Prefazione*, in COMUNE DI CAPRI, *Il paesaggio di Capri e la sua tutela legislativa*, Napoli: Gaspare Casella, 1922, p.8. Luigi Parpagliolo, Vicedirector at Ministery of "Belle Arti", was the author of many essays on landscape preservation, among these: *Protezione del paesaggio*, in "Fanfulla della Domenica", 1905, XXVII, n. 36-37; *Per le bellezze naturali d'Italia*, in "Nuova Antologia", November 16th, 1911; *Per una legge che tuteli le bellezze naturali d'Italia*, in "Nuova Antologia", April 1th,1914; *Per la difesa del paesaggio*, in "Marzocco", XXV, n. 6; *Il Parco Nazionale degli Abbruzzi*, in "Nuova Antologia", May 18th, 1918; *I parchi nazionali*, in "Marzocco", XXVI, n. 3. Parpagliolo, besides, was one of the major promoters of the filing of the "natural beauty" and he collaborated on drafting the law of protection, proposed by Giovanni Rosadi and approved by the Chamber of Deputies on May 10th,1922.
On Edwin Cerio's essays see: CERIO Edwin, *L'avvaloramento archeologico di Capri*, Capri 1921; IDEM, *L'Architettura minima nella Contrada delle Sirene*, in "Architettura e Arti Decorative", 1922-'23, vol. II, pp.156-176; IDEM, *Introduction à Capri*, Capri: Edwin Cerio Editore del mare del cielo e della terra, 1929; IDEM, *Aria di Capri*, Portici: Casella, 1935; IDEM, *Flora privata di Capri*, Napoli: Rispoli, 1939; IDEM, *Guida inutile di Capri*, Roma: OET 1946; IDEM, *L'ora di Capri*, Capri: Insula, 1950.

[7] *Il Convegno di Capri*, in: "Il Mattino", July 9-10th, 1922, n.164, XXXI, Cronaca di Napoli.

[8] n. 778 law, issued on June 11th, 1922.

[9] More critical studies on the building development and noteworthy architecture of Capri, see: CANTONE Gaetana, PROZZILLO Italo, *Case di Capri. Villa, palazzi, grandi dimore*, Napoli: La Conchiglia 1994. The essay by Hoffman is also significant: *Sull'architettura dell'isola di Capri. Un contributo al pittoricismo in architettura*, in "Der Architekt", III, 1897. On these themes, one of the most recently books is MANGONE Fabio, *Capri e gli architetti*, Napoli: Massa editore, 2004.

[10] Currently, the Landscape Plan is dated November 1939. Therefore, it was designed before it was promulgated the law and approved shortly thereafter. The engineer Rusconi, Superintendent of the Region Campania's Monuments wrote in a letter that he sent to Minister of Public Instruction and to General Direction of "Antiquities and Fine Arts". The letter, dated on January 12th, 1952, is in the archive of the "Soprintendenza ai Beni Artistici e Architettonici della Provincia di Napoli", dossier "*Piano Paesistico Isola di Capri*", dossier "prot. n.271", January 12th, 1952.

[11] See: "Soprintendenza per i Beni Architettonici e Ambientali di Napoli e Provincia", dossier "*Piano Paesistico Isola di Capri", "Norme per l'applicazione del Piano di Zonizzazione del Comune di Capri*.

[12] To study the corrispendence between Rosi and and the General Direction of "Antiquities and Fine Arts" on November 11th, 1947, see: "Soprintendenza Beni Architettonici e Ambientali di Napoli e Provincia", dossier "prot. 11", November 1947, n. 4944, p. 2.

[13] See: "Soprintendenza ai Beni Architettonici e Ambientali di Napoli e Provincia", dossier "*Piano Paesistico di Capri*", 1956.

[14] PROZZILLO Italo, *Capri ha urgente bisogno di un Piano regolatore che risponda non a criteri ed a gusti di singoli ma alle effettive esigenze della popolazione*, in "La Voce di Napoli", December 27th, 1951, n. 224, VII, p. 4. The problem of the inadequacy of the Landscape Plan of 1939 was also discussed at the meeting of the Committee of the International Union of architects, held in Capri from 16 to 21 April 1956. The meeting's aim was to prepare the next Conference in Moscow. See: "Il Tempo", April 19th, 1956, n. 110, XIII, p. 4 e "Il Tempo", April 20th, 1956, XIII, n.111, p.4.

[15] On this theme, the report sent to the Ministry of Public Instruction by the "Gruppo degli Ingegneri ed Architetti Capresi" is particularly interesting. See: Soprintendenza Beni Artistici e Architettonici della Provincia di Napoli, dossier "*Piano Paesistico di Capri*", p. 2.

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The Management Plan of UNESCO Sites: from the conceptual model to the methodology application through GIS

Lina ABATEGIOVANNI
Department of Architecture and Industrial Design "Luigi Vanvitelli", Second University of Naples, Aversa, Italy
lina.abategiovanni@unina2.it

Abstract
The current guidelines for the development of cultural heritage identify the link between the concept of preservation and protection with that of management as one of the possible development lines.
The research sets out below in this article wants to show a synthesis framework on the Management Plans of UNESCO sites registered in the World Heritage List - WHL, which are oriented to the definition and planning of interventions to be implemented over time to maintain the integrity of the values that have allowed for the inclusion of the site on the list, in order to preserve them for the future generations.
In addition, in the document, there are outlined some illustrative and experimental applications of Italian managements provided with universal value and there are developed some considerations about the implementation of the related assessment, control and management tools of cultural heritage through the use of GIS (Geographical Information Systems).
The purpose of the study is to demonstrate that the Management Plans, if properly integrated with the instrumental support of GIS, can provide a mean to support a territorial development model, which has the final aim to take account of all existing resources and to combine conservation with economic development in order to achieve a unique cultural product.

Keywords: Management Plan; UNESCO Sites; GIS; Cultural Heritage; Territory.

1. Introduction to the universal meaning of the Management Plan: identification, methodology, settings
UNESCO demands to the declared human heritage sites and to the registered sites in the World Heritage List- WHL to provide themselves for a Management Plan, a tool to protect the safeguard and preservation of properties that have justified the inclusion in the List in the course of time.
These sites are defined by the presence of a rich cultural heritage immersed in a natural environment and/or in high quality urban localizations. In every of them, the operators are involved in planning, before, and in the production, after, of a particularly complex appreciation process. To face this complexity and to overcome the difficulties that derive from it can be efficient the start up of a planning, organization and control process.
After the implementation of the *Convention concerning the protection of the world, cultural and natural heritage* on 1972 in Paris, thanks to the competitor States accepted the commitment to <<guarantee the identification, protection, preservation, appreciation and transmission of cultural and natural heritage to the future generations>> and thanks to the following *Budapest Declaration* in 2002 even Italy moved towards this direction, making necessary, with the *Law 77 on February 22- 2011*, the editing of the Management Plan which the main target is "to guarantee the identification, safeguard, conservation, appreciation and transmission of heritage to the future generations".
The prevision that the elaboration of the Management Plan of the sites represents a necessary equipment has the purpose of guarantee a protection and continuous defense of properties to achieve the standards and the indications contained in the Budapest Declaration of 2002, with which the

UNESCO World Heritage Committee (WHC) have invited the member States of the Organization to strengthen the protection initiatives of the global cultural heritage, incentivizing the effective protection of single properties that are already registered (or wished for the registration) in the World Heritage List, to guarantee a just balance between preservation, sustainability and development of various sites that are considerable not only on the cultural plan, but also on the economic and social one.
The Management Plan of the UNESCO sites represents an essential tool for the management, protection and appreciation of the Heritage. It allows the planning, in a strategic view, of actions and activities to be implemented so that the site, identified as Human Heritage, could guarantee its preservation as a statement of the history of civilization and could become a place where meeting and exchange of knowledge occur, in the wide net of worldwide sites.
The Management Plan is suggested like a political and economic administration tool of the site in the middle-long term, it can facilitate and drive the conception, the planning, the realization and the control of safeguard projects and appreciation of heritage.
Its first purpose is mainly explained by the planning of cultural initiatives for protection and preservation supported by appreciation actions, mainly, in the short-term, with a relevant economic impact on the territory.
The Management Plan of a UNESCO site is built on primary basis that recognize the universal value (statement of significance) that makes the site a unique or provided by extraordinary worldwide value place. It's about the motivations that have allowed, or that could allow to new candidates, the inclusion of the site in the World Heritage List.
To formulate a Management Plan is necessary follow a clear process without which you risk to generate a less structured document that doesn't contain the suitable tools to weigh on preserved properties and doesn't select the options to use for the local economic development.
The definition of an efficient tool for managing the historic, cultural and environmental resources of a given territory is the main target of any project to appreciate a certain geographic area, which is explained in the identification of exact addresses of knowledge, preservation and appreciation, directed to the development of these resources and territory.
The Plan aims at defining the "local development model based on culture", defining a management system that, starting from the analysis combined with the conditions of places, considers the ongoing alterations and the opportunities of preservation and appreciation; so, it defines the possible future achievable scenario articulated in targets and in options of intervention, it evaluates the repercussions on the local system and then chooses the strategic plans that better fulfil the goals. Finally, on the basis of suitable indicators it supervises the realization in the time.
It has the end of guaranteeing an high level of protection of eminent property, but it must also encourage the integration with the plans and programmes oriented to the local development.
During the training process of the Plan it is needed, on the one hand, the building of the awareness for the value exhibited in the site and on the other hand, starting from these values, it is needed the definition of the local development project which outlet is the production of the culture.
The National Commission for UNESCO World Heritage Sites and Local Tourist Systems, established at the Ministry of Heritage and Culture, to support local actors in the preparation of management plans, has prefigured a plan model that considers the UNESCO sites as "active sites that produce contemporary culture", places then able to promote over the protection of property and cultural identity, the development of cultural activities in the supply chain and productive activities and services related to them.
It has tried to respond to the need expressed by UNESCO, developing a methodology that can serve as a guide for the implementation of management plans for all Italian sites.
A uniform methodology, shared and coordinated ensures an exchange of knowledge and virtuous practices that enhance the overall capacity of the Italian cultural system.
The innovative aspect of the developed methodology, compared to the demands of UNESCO, is summed up in the concept of "integrated approach" that combines the need to protect and preserve the sites with the needs of socio-economic development of its territories. The Management Plan, therefore, moves its boundaries, integrating both horizontally (from the individual assets to the reference area, even beyond the UNESCO site) and vertically (from the knowledge to the economic appreciation and communication). The appearance of the enhancement, in the cultural and economic meaning, then becomes a relevant part, particularly in light of the importance that the heritage may have in our country in supporting the development of local economies.
The formation of the Management Plan should therefore have a basis for a methodological approach able to closely combine the recognition of the value of the property subject to protection (and the actions required to properly preserved) with the construction of a local cultural development which is the added value that can result from being included in the list of World Heritage property and thus from being, as such, most recognizable in the global network of the cultural offer.

Hence the Management Plan can be a tool to trigger or support a model of territorial development that has the final intent to combine conservation with economic development in order to create a unique cultural product.
In fact, the management plan has its own autonomy and a procedure that aims to establish a model for local development based on culture but also to plan activities to meet the demands of UNESCO.
The Management plan defines how to manage the resources of historical, cultural and environmental nature, and it is able to guide the instruments of urban and economic planning through knowledge, conservation and enhancement.
Under this perspective, the Management Plan helps to coordinate schedules for all other: to maintain and to enhance the integrity of the values that have allowed for the inclusion in the WHL; to combine the protection and preservation with the integrated development of resources area of the local economy; to make compatible a local process shared by several organizations and authorities, who may also have conflicting interests.
In other words, the plan defines a management system that, starting from the values that motivated or will motivate, the inclusion of the site in the List of World Heritage, it performs an integrated analysis of the condition of the places identifying the forces of change in place, then it identifies the future goals that can be reached through the intervention options and possible strategies, it assesses the likely impacts on the local system, it chooses the action plans to achieve the targets it defines the procedures for coordination and implementation and it tests achievement through a series of indicators that implement systematic monitoring of results over time.
The Plan also constitutes a "declaration of principles", through which the authorities responsible for the management of sites and communities to which national and local sites belong, are committed towards UNESCO and the entire humanity to an active protection. It is therefore considered as the plan the document that informs on the state of cultural heritage, it discovers issues to be solved for the conservation and enhancement, it selects how to implement a system of actions, a policy of sustainable local development, evaluating, systematically, the results.
The territorial setting Management Plan should be read according to a double conceptual level: the first concerns the core areas, the '"territorial setting registred", that is one that identifies the asset entered in the World Heritage List and which coincides with the perimeter proposed at the time of registration at the above list and its buffer zone (a sort of buffer zone or "bearing" of protection), a limit perimeter recognizable from physical and administrative elements, and the second part identifies the '"extended territorial setting ", or that of its dynamic areas of cultural phenomena, dynamics and logics often spontaneous aggregation of economic phenomena, related to the development, that affect the surrounding territories, thus making reference to a concept of larger territory.
It's about two categories of territory, but also of two logics: the procedures for its administration of the territories and perimeters, that one of process of its enhancement projects that are difficult to adapt to predetermined perimeters, but whose boundary is the boundary itself of the action and perimeters depend on the content of the development project.
Ultimately, the Management Plan for UNESCO sites is a tool to address that draws its strength from the fact of not being standardized in content. This characteristic allows it to adapt to the territory, seen as an integrated environmental, landscape, cultural, social capital, traditional mosaic, making its own, the critical elements and serving as a tool of interpretation and implementation of plans and programs at the local level mandatory.
Not the secondary is the fact that the Management Plan highlights the concept a network between the UNESCO sites, at the administrative, territorial and also procedural level, involving public and private interests, organizations and residents, so that the territorial development is homogeneous and brings benefits to all those who are part of the regional system.
This is the first step because the territorial-cultural system is a real engine for development. The Management Plan for UNESCO sites, for these reasons, it is a valuable and indispensable tool, if you want that development is continuous and oriented to sustainability.

1.1 The importance of monitoring within the management structure of the Plan

The monitoring consists of the management phase of the Plan. The objectives of this phase aim for verifying the compliance of the actions themselves with the obtained aims with the application of management measures specified in the instrument of planning.
As part of the Management Plans for the UNESCO sites, the purposes of monitoring are aimed for evaluating the effectiveness of actions provided for the achievement of the objectives for enhancement, on the one hand, and protection, on the other hand, the regional and cultural system.
In other words, the monitoring system of the Management Plan has the primary aim to draw the attention to the management structure of the UNESCO site the overall progress of the planning activities, promptly reporting any critical work in progress and allowing you to take remedial actions to management that are considered necessary to achieve the planned objectives.

There are two types of monitoring: the first type of monitoring is focused on the implementation of the Management Plan and therefore on the revelation of indicators that are spread to the management structure through the reporting system, they can process the appropriate corrections to the existing Management Plan, and the second type of monitoring is based on the detection of the impacts of the Management Plan in the medium-long term, through an appropriate system of indicators and reporting one, which provide the promoting of the Management Plan the necessary feedback for the elaboration of the new Management Plan.
The reason why the monitoring is really useful to the planner, it is necessary to develop an appropriate set of indicators, designed to provide you with enough rigor and scientific information that can be used, both at the end of the “life” of the Plan, and during the various stages of implementation of measures contained therein, to assess their effectiveness, and, if necessary, to recalibrate target and / or actions on the basis of the obtained results.
The guidelines issued by the Ministry of Heritage and Cultural Activities suggest that indicators have the following characteristics, that is: being little, being relevant to the problem, valid, simple and easy to use, and based on existing data and easily achievable.
Also according to the Ministry of Heritage and Culture, it is clearly defined: a set of outcome indicators; the time interval that must exist between a check and another, a scale for the assessment of performance indicators collected (typically scales are used between 1 and 5).
The preparation of the set of indicators and of the monitoring system allows you to regularly report on the activity of planning. These reports are used to make the point about the state of implementation of the responses, so to check whether the time schedule has been respected in their implementation, to assess the real answers, and compare them with the potential answers provided at the time of formulation of the answers themselves. If the real answers are lower than potential, the targets can not be achieved: in this case, it is necessary to change the answers, in order to make them more effective, or you it will necessary to resize the objectives.
Other determining factors for monitoring relate to the construction of complete historical data, useful both for research and for future planning activities and making transparent the work of decision-makers, in order to allow the citizens to understanding, even in perspective of awareness and information, as well as to promote the formulation of suggestions and constructive criticism.
The monitoring and constant verification in the implementation phase of the Management Plan will therefore be an ongoing control of the effectiveness of the plan. The monitoring system must be based on the reiteration of the data relating to the territorial system and acquired from the database.
The monitoring of the Management Plan will ultimately compose of two different levels of control:
- check of the progress of the selected projects and possible achievement of objectives. The actions will be monitored in collaboration with the promoters of each project through control of the identified indicators. The tests will also be useful to highlight the efficiency of the projects and their possible replacement and / or increase.
- check the effectiveness of the Plan and survey of the mid and long term impact on the territory. Considering the complexity of the site, the originality of this management tool and its importance to achieve the coordination and shared management of the cultural heritage and landscape, it is considered worthwhile, in the first phase of implementation at least, to carry out a biennal examination of its effectiveness. In this way the Management Plan will be updated and adapted to the processes of change in the reality and to the specific needs that will arise.
The preparation of the Management Plan of the site should be observed as starting point tool rather than as an administrative act which ends the application process in the WHL of UNESCO.
As each document of programmatic-planning nature it is a "tool", in the sense that it must be really useful in achieving the two strategic objectives required by a subscription of the WHL, that is the protection / preservation of the property and its fruition on a global scale.
So being a "tool" the Management Plan has an "utilitarian" fruition, that is if it is able to activate the processes to achieve two strategic objectives it should be maintained, on the contrary it must be changed. This means that it is absolutely necessary to monitor the effectiveness of the management Plan with respect to its management architecture and, above all, the way in which it is applied from the actors involved in the management.
In fact it is need to find a virtuous balance between quality of the instrument of the management Plan and application efficiency of the same.

2. The network of good management practices of UNESCO Sites in Italy

Italy is actually the country holding the major number of sites including in the human heritage list with its forty-seven sites, following by Spain and China.

Starting from the major international experiences, particularly english ones, first italian sperimental applications were related to management plans of late baroque towns belonging to *Val di Noto* in Sicily (including eight late baroque towns of Caltagirone, Catania, Militello Val di Catania, Modica, Noto, Palazzolo Acreide, Ragusa e Scicli) and *Val d'Orcia*, a wide valley situated in Tuscany, in the province of Siena.

Between other sites that have edited the managment Plan under candidancy, there are the seven *Sacri Monti* (sacred mountains) *of Piedmont* (Belmonte, Crea, Domodossola, Ghiffa, Oropa, Orta and Varallo) and *Lombardy* (Ossuccio and Varese), groups of chapels and other architectural manufatcuring were erected from XVI and XVII century; the *Etruscan Necropolises of Cerveteri and Tarquinia in Rome*; the *Rocky Necropolis of Pantalica in Syracuse* (Fig.1); the *Strade Nuove and the system of the Palazzi dei Rolli in Genoa*, homogeneous urban spaces belonging to late renaissance and baroque age, supported by more than one hundred civic titled families that symbolize a special titled residential parceling model left in the centre of modern city.

Between the italian sites earlier registred in the WHL that are provided with Managment Plan today there are: *rock drawings in Valcamonica*, a Brescian valley of italian side of central Alps that includes an unusual sets of iconographic documents that allowed to follow the cultural evolution of Camunian Civilization during the centuries; the *Historic centre of Florence*, closed inside of the boulevard circle traced on the old medieval walls; the *city of Vicenza and the Palladian Villas of the Veneto*; the *archaeological area of Agrigento*, one of the most important city in the mediterranean world which supremacy is still clear in the ruins of wonderful doric temples that ruled the old city; finally the *city of Verona*, a wonderful example of a city that gradually and continuously developped during two thousand years, integrating sterling artistic elements of different periods that have followed. It exceptionally represents the concept of the city that fortified itself during different phases in the european history.



Fig. 1: From top to down: View of Val di Noto; Val d'Orcia and rocky Necropolis of Pantalica.



Fig. 2: Localization of UNESCO Sites in Campania based on orthophotos.

That which combines the different management tools just quoted is a common methodology able to complete the analysis stages (awareness), design (conception), management (action), evaluation (feedback) and able to renew the purposes of preservation of the site's values during the time in the light of latest considerations that assign a role to the cultural heritage, more and more important, in the development model's framework based on local identities and on appreciation of land endogenous resources.

In the case of Campania Region, there are six sites in the WHL (Fig. 2) and they relate the *Neaples historic centre* (1995); the *Royal Palace of Caserta dated XVII century with the Park,* the *Aqueduct of Vanvitelli and complex of San Leucio* (1997); the *archaeological areas of Pompeii, Herculaneum and Torre Annunziata (*1997); the *seashore of Amalfi* (1997), an extraordinary example of mediterranean landscape with its special natural and cultural values that derives from its complicated topography and its historical and compatible adjustment process served by the community, a shiny example of an intelligent resource's use; the *National Park of Cilento and Vallo di Diano* with their archaeological sites of *Paestum* and *Velia,* and the *Certosa di Padula* (1998). Not least *Benevento* and the *Church of Santa Sofia*, a registred site in the World Heritage List from UNESCO on 25 giugno 2011. It's about of a sequential site including seven places abundant of architectural, pictorial and sculptural depositions of longobardic art, which candidacy was accepted in march 2008 with the name "*Longobards in Italy. Places of the Power (568-774 A.D.)"*.

To this day the Campania sites aren't provided with a defined and complete management tool, but there are various tests in progress for editing an incisive management model and it's remarkable the necessity of increase the attraction of the artistic, historical and architectural sites in Campania with the purpose to realize some local tourist nets and original management models.

3. Manage, enhance and represent knowledge of cultural heritage through GIS technologies

The use of GIS technology (Geographical Information Systems) as a tool for cognitive survey of land and cultural heritage, has as its main objective to achieve a level of knowledge of the resources appropriate to their effective management, as well as to create and implement a management system of data and information that would allow it the simply filing, consultation and updating through a flexible database, constantly updated and adjustable.

The axis of knowledge is, therefore, the priority phase of the definition of a Management Plan, and the collection of data related to resources of the territory allows, in fact, the identification of correct programs for the protection and conservation, as well as coherent projects for enhancement.

A such analysis should consider, in relation to the analyzed resources, even a whole series of data useful for the definition of the applied protection measures, the state of preservation of the single elements that create the property, disturbing elements interfering with the property and the other possible resources that can be related with it.

It is evident that it is possible to collect and to relate a wide amount of data only by defining a unique method for acquisition and encoding of the data and an information technology support that will allow effective connection.

As it is well known for a long time, the Geographic Information Systems (GIS) are meeting these needs by offering the ability to associate a large amount of information to a precise and geo-referenced thing in the territory, linking them together and making them immediately availability and update.

The growing interest in Geographic Information Science combined with the success of increasingly sophisticated GIS technology has greatly encouraged the development of new fields of application for the management which Geographic Information Systems have showed an effective and irreplaceable tool. These circumstances have defined the development of new techniques, thus making possible the use of GIS applications in fields until recently unexplored, able to satisfy the most various demands not only from the world of scientific research (environmental local analysis, geostatistical processing, assessment) but also in terms of planning and development of the area.

Applications conducted with the use of GIS have resulted in the creation of thematic maps, which represent the essence of the system, from which it is possible to grasp, analyze, solve, critical situations of environmental, social, economic, anthropogenic nature, or all those situations related to the evaluation, control and management of a territory.

Through these instruments is therefore possible to interface and connect their diversified data, read in overlap, they can provide more information, reveal themselves useful for a better understanding of the reality in question and become a starting point for protection. But like any tool, GIS must also be properly designed in order to fulfill the objectives that have been outlined just above.

The structure of the information system is proposed to use for building of the database of a management plan that can be organized in a hierarchy both in the definition of the different levels or layers of knowledge, and in the identification of specific resources that can have different consistencies, from individual architectural assets, to the individual environmental resources.

The information system of the Plan must incorporate every possible information, in the form of data, reports, maps, drawings and photographs, to understand the condition of things of the Site and the causes that explain the ongoing changes. This first analysis of the heritage of the site provides an updated overview of the status quo divided into categories of assets to implement in a GIS.

A GIS, therefore, is composed of, a series of layers or information layers or even thematic layers (Fig. 3). This means that, having to represent a set of subjects on the same geographic area, it is possible to create a series of layers for each theme and then superimpose them as required and in the required combination.

The first step towards the realization of a GIS is the identification of the digital base map. The base map, as the name suggests, will serve as a basis on which to place the different informative layers (layers) each describing a theme.

Often this results in an overlap of themes and therefore arises the need to use transparent networking symbolizations, offered by the GIS in order to allow the vision and the overlap in the cartographic representation.

In addition, the geographical element contained in a large part of the commonly used data can transform this data into geo-information, a new type of knowledge linked to the territory and its physical, environmental and socio-economic dynamics.

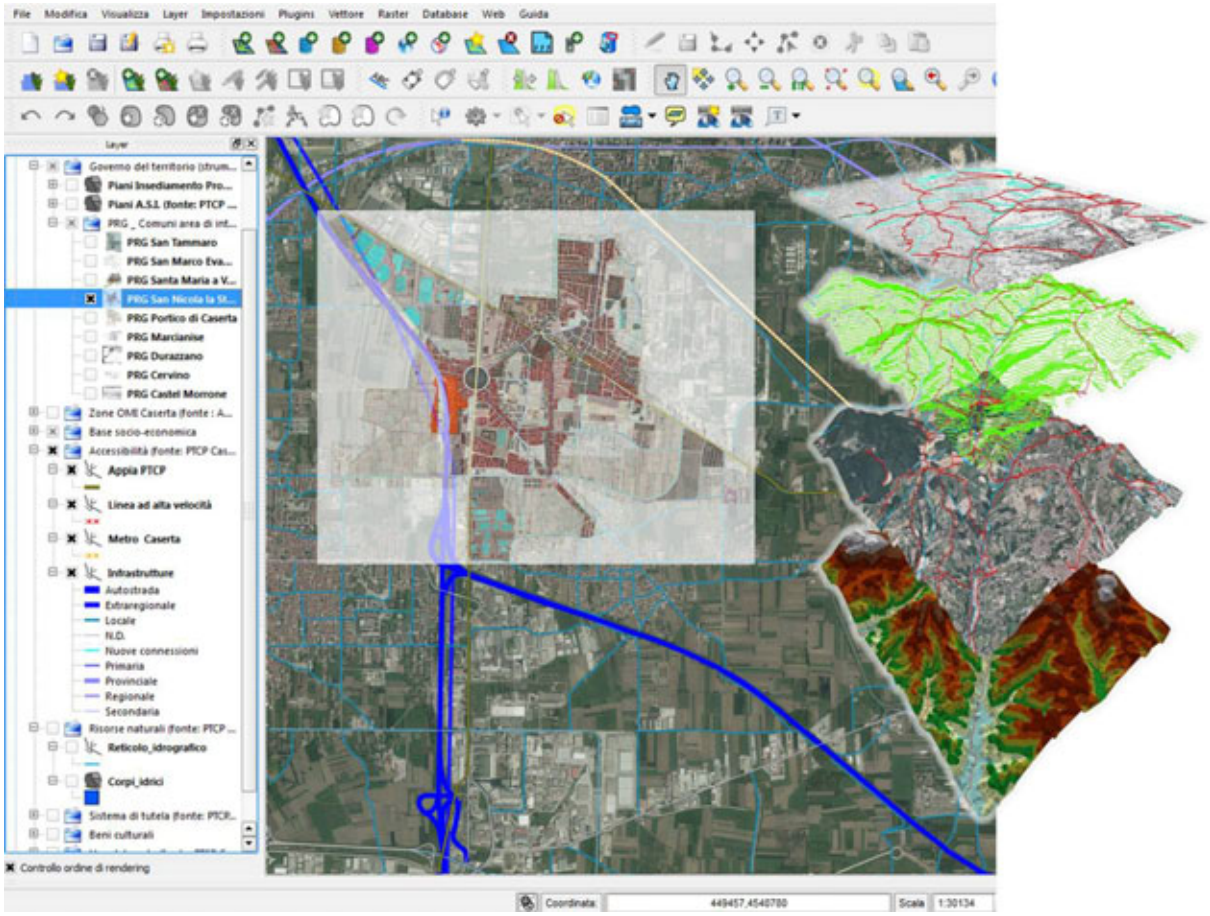

Fig. 3: Example of a overlapping about the different territorial layers within a GIS project (through the use of software Quantum GIS – QGIS 1.8.0).

Geographic Information, considered not only as an end to itself data, but as a series of information introduced in a wider geographical area and especially related to the socio-economic context, it helps us to enter the world of the geographical representation of the many aspects that constitute the socio-territorial around us.
Almost all of the data and information, useful to any type of analysis or study, have a geographical element that the GIS tool is able to capture and highlight making possible the analysis of the same data in an unexplored context that has the merit to show new aspects and correlations between the information related to the area.
Any type of data, therefore, contains in itself a geographical reference: it contains the position in space and time. Any given data from a simple number or value, can thus be transformed into geographic one, once equipped with geographic coordinates, then which position it occupies into space the numerical value of the data itself, which position it occupies in time, attributes etc.
The main attraction of the GIS tool, especially in relation to Management Plans of the UNESCO World Heritage Sites, is the ability to hold everything in many information and data even very different between them , such as maps about the use of land and , cadastral maps, orthophotos, topographic maps, satellite images and tables in Excel that, once integrated into a GIS, give the opportunity to non-experts, to be able to make judgments and / or forecasts related to the management of the territory.
A simple pair of geographic coordinates can not certainly be a useful information to any type of study, but if a number other numeric, alphanumeric and statistical value is tied to this pair of coordinates then the geographical data becomes information. If the whole is then represented on a map by means of the technologies offered by GIS that the use of this representation of information instrument becomes very ample and with very high potential.
The construction of a GIS implies the definition of technologies that enable the integration of data, different from each other as well as the development of functions in turn dictated by the needs of individual users.
Once built the GIS according to available data and the required objectives, it can begin the research phase and especially the data analysis.
A GIS allows to make simple requests for data by the “point and click” method (the action/function of positioning on a specific point of an object, click and get, for example, information about that object) on

the available thematic map, providing also useful tools to the analysis of temporal data such as the construction and graphic restitution of the time series, over the spatial analysis of the data.
Any process of analysis, enhancement and management of the resources of an area that aims to be accepted on the political, social and economic level, must be supported by data and information relevant to the purpose and must be developed taking into account the territoriality of involved variables.
The axis of knowledge arises, therefore, two purposes: to define, on the one hand, the method of implementing the activities of study, scientific research and analysis aimed at better identification and recognition of the cultural heritage of the UNESCO heritage site and build on the other hand, a dynamic geo-referenced information system for the collection and ongoing monitoring of the status of resources, of the programs and projects for the protection and conservation.
In this methodological framework, an integrated approach to cultural heritage over to include in term (and related legislation) cultural assets kept separate until now, can not take into account analyzes, the criticism, the different interpretations of the concept of territory that in recent decades, it has undergone a radical transformation, especially regarding the different views on the relatedness of the territory, the dynamics between local and global, between the observer and the observed object. The Management Plan therefore can represent the information base system on which to build and represent not only geographically, but also functionally, the identified management strategy. Furthermore, it is the information matrix (SIT) for the following implementations and upgrades related to the state of preservation and appreciation of resources.

4. Considerations and concluding remarks

The outlined method of investigation in this article has led to a systematic collection of information regarding the definition of the Management Plans of UNESCO World Heritage Sites, illustrated as a means of address for the enhancement and control of land and cultural heritage. Furthermore it is highlighted, through the use of GIS, that the implementation of activities organically inserted between the strategies of the Management Plans can play an effective role in the strengthening of local identity and especially in safeguarding the authenticity and integrity of those universal values thanks to which it can be defined a World Heritage site. In conclusion, the proposal to assemble and integrate the GIS technology with the management of UNESCO World Heritage Sites, is evaluated as a necessary model to build a unified framework of updated knowledge in which effectively manage resources through the various data.

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Promotion of cultural heritage as an engine for territorial development in France.

Alessandro CIAMBRONE[1]
(1) Department of Architecture and Industrial Design, Second University of Naples
E-mail alessandro.ciambrone@unina2.it

Abstract

This paper examines strategies to combine economic development needs related to cultural tourism with actions for the protection and enhancement of heritage in a sustainable way. France, first Country in the world for number of international visitors, according to updated data provided by the World Tourism Organizations, has developed a long-term government policy aimed at the protection and enhancement of heritage. Moreover, this Country promoted all forms of art and intellectual production. The culture in France, over the centuries, affirms itself in the policies adopted, as the most important tool for achieving a comprehensive development, including social and economic, which ensures the quality of life of every individual. In particular, this paper analyzes system of site's management, which focus on promotion of culture. The sites are: the Agglomeration of Montpellier, for planning and management at the metropolitan scale; Loire Valley, for the identity of the place linked to the territorial promotion; Saint Guillelm le Desert et la Communauté de commune Vallée de l'Hérault for the aspects related to authenticity, integrity and sustainable tourism; Pont du Gard, for the new models of management, economic and sustainable development; Bibracte for the enhancement of culture and scientific research; and the project for the Seine in Paris, for the transparence and public participation in the planning process.

Keyword: cultural tourism, integrated management.

The Role of Culture in France.

France, first country in the world by number of international visitors [1], developed a long-term government policy aimed at the protection and enhancement of heritage, through interventions on the assets, on the organizational structure of the institution responsible as well as on the promotion of all art forms of intellectual production. The critical analysis of case studies in France refers to emblematic sites of the French heritage included in World Heritage list and in the prestigious Réseau des Grands Sites de France. These examples have been universally recognized, by the French State and the relevant scientific literature, as models of sustainable management, able to mediate the needs of conservation and the economic development linked to tourism. The sites are: Montpellier; the Loire Valley; Saint-Guilhem-le-Désert et Gorges de l'Hérault; Pont du Gard; Bibracte; the Seine in Paris. The predominant role of culture in France is marked by a policy of national government, through a structured and organized administration and financial system of, which manifested itself in the past, for example, through the support of foreign artists living in France. Among the most famous links in the relationship between artists and representatives of political power or patrons, is recalled that between Leonardo da Vinci and Francis I, who honored him with the title of premier peintre, architecte, et

mécanicien du roi [2]. The culture in France, over the centuries, affirms itself in the policies adopted, as the most important tool for achieving a comprehensive development, including social and economic, which ensures the quality of life of every individual [3]. It is a State's duty for all to be able to access culture, as provided by the French Constitution. This is also the main objective of the Ministry of Culture, which foresees: making accessible to the widest possible public the works of art, primarily national ones; to encourage the creation of works of art and stimulate the spirit that enriches them (décret n. 59-889 du 24 juillet 1959), [4]. Indeed, creation is a cornerstone of French cultural policy that is expressed through two main actions. The first appears to support the artists in their training, assuring a system of support in the absence of work, protecting intellectual property and facilitating access to internal and external market. The second is materialized with the support of business through numerous public commissions, specific tax and financial measures and the creation of specific places for exhibitions and events [5]. The main role of the State is recorded in the investment for culture with funding in this economic sector: with a budget of 2.816 billion euro announced in the national budget for culture in 2009 - and an increase of 2.4 per cent more compared to 2008 - investments in culture have increased almost continuously over the last twenty five years [6]. France, with eighty-two million international arrivals, is the most visited country in the world. The concentration of natural and cultural heritage is very strong in the Country, forming the basis for a tourist economy, which represents 6.2 percent of Gross Domestic Product (GDP) [7]. The added value of tourism in France, as a percentage of GDP, is higher than that of other sectors which contribute decisively to the national economy. The total tourist income in the country in 2009 is 84.7 billion euro. Of these, the value added of 41.6 billion euro, exceeding the energy and agriculture (30 billion respectively), agro-food industry (25.7 billion) and automotive (11.2 billion) . By its nature, as a sector of services, tourism is a major generator of employment, with an average annual growth of twenty-seven thousand employees over the past ten years [8]. The field of cultural tourism has opened new perspectives to respond to market needs. The visit to the most emblematic and visited historic sites in France, no longer meets sufficiently and exclusively tourists, who ask and seek monuments and sites that are expression even of a minor heritage. Moreover, they ask for high profile cultural events. To meet these growing demands, the Convention "Culture tourisme" between the Ministry of Culture and the State Secretariat for Tourism was signed in November 2009. The Convention's main objective is to encourage innovation and practices of tourism development focused on monumental heritage, in order to differentiate the tourist routes and avoid massive flow of visitors that focus exclusively on a few properties, thanks to the organization of large events in other less promoted places. This is in view of the fact that "the greatest problem of tourism in France comes from the over-attendance of a dozen of well-known sites. Seven national monuments, in fact, achieve the 2/3 of attendance at such sites, and three museums accounting for sixty percent of visitors to the national museum system." [9] In fact, these initiatives are consistent with a cultural policy already initiated since years that allowed to the creation of many annual festivals and events, not only in France, but throughout Europe. To name a few, include: the music festival which is celebrated since 1982, every June 21st in all French cities; the European Heritage Days, which since 1991, is held in the third week of September; the night of the museums, which is held annually since May of 2005; and the film festival which is held for three days in late June. Between tourism and enhancement of heritage, while respecting the principles of sustainable development, the decentralization processes of territorial management has played a key role in France, in line with the requirements of the international conventions on protection of cultural and landscape heritage. In 1982 it has created a special procedure for decentralization (L*a*w Defferre 1982). As part of efforts to decentralize the management of the assets and to strengthen relations between State and local authorities, the law n. 6 of January 4th, 2002 introduces a new management structure: l'Établissement Public de Coopération Culturelle (EPCC). This is an institution for the management of a public cultural service, managed by a local institution, which can extend to several municipalities [Établissement public de coopération intercommunale (EPCI)]. This new tool allows to facilitate the participation of one or more local communities, also in economic terms, within a joint and shared project. The EPCC can assume different forms to support all the sectors of cultural activities. Among them, those in support of the activities of: heritage (museums, libraries-media libraries, historical monuments); the teaching of art (schools of music and art); the plastic art (art centers); and the organization of events.

Le Schéma de Cohérence Territoriale (SCoT) de Montpellier.

The idea of preserving and enhancing the rural landscape structures also le Schéma de Cohérence Territoriale (SCoT) of Montpellier, related to the agglomeration of the City, which includes thirty-one Municipalities and four hundred thousand inhabitants. The peculiarity of the SCoT is that its perimeter is perfectly coincident with that of the Communauté d'agglomeration de Montpellier, established on August 1st, 2001. The elected drew, at the time, the lines for a common strategy for urban development of Montpellier and its agglomeration, in response to the constant population growth

during the last forty years. To a policy incapable of managing the land wisely, in the respect of protecting its natural and built heritage, it replaces, in the late seventies, a strategic vision that sees in the planning of the metropolitan city, an environment committed to the principles of development of a more equitable and sustainable collective life. It was affirmed, in these years, the ordering lines of a territorial and landscape planning at the metropolitan scale, which proposed the City as principal productive, cultural and scientific pole for the entire Languedoc-Roussillon Region [10]. The large urban project is based on a landscape master plan, which is developed on a axis that foresees the expansion of Montpellier to the coast, along the “sea route", named, in June 2009, avenue Raymond-Dugrand [11]. The urban design strategies, launched at the end of the seventies, had the goal of giving to Montpellier, in the regional context, the role of a functional, dynamic and safe city, with a high quality of life for its citizens, under the environmental, urban and economic profiles, even through appropriate social policies. The Schéma has reversed the logic that perceives the agricultural land and natural sites as a variable to be adapted to the needs of urban expansion, in favor of a vision that, in contrast, interprets these areas as an expression of identity of places and a catalyst for economic development.The urban expansion, scheduled according to the directional axis of the "sea route", projects the city on the coast, with ample space project dedicated to nature and agriculture [12]. Policies of spatial planning and asset management in Montpellier have developed, not surprisingly, in parallel to those for the promotion of culture, which has enabled the City to become a focal point of regional, national and international reference for the provision of services to the population and visitors. It is here that is born, thanks to the support of the Ministry of Culture, the Festival de Radio France et Montpellier and the Festival International Montpellier Danse, which have become two locomotives driving the spread of this kind of events in the Country. Moreover, it was realized, since the eighties, the national regional conservatory, the high school of fine arts and Corum, a cultural and leisure center capable of hosting major events. To confirm the importance of this sector and of the policies in favor of cultural promotion, we observe that with a budget of more than eighty million euro, the Communauté d'agglomération de Montpellier is one of the first urban areas in France for investing in culture [13].



Fig. 1: Montplellier, Antigone centre (photograph by Alessandro Ciambrone).

The Loire Valley.

The inscribed area of the Loire Valley extends over a length of 280 km and covers an area of about eight hundred square kilometers. The area includes two Regions, four Departments, six Conurbations, eleven Countries, 164 Municipalities, a regional natural park and it houses up to about 1.2 million

people. The site is one of the most visited in France. Both Regions in which is located the property (Centre et Pays de la Loire) received a greater number of tourists in comparison with the year of the inclusion of the site in the UNESCO list. Tourists in the Centre Region increased from seven to eight million, and those of the Pays de la Loire Region, from ten to thirteen million in the last ten years [14].
In 2002 it was signed by regional, departmental, municipal and consultative bodies of the territory a "charter of commitments" with the aim of increasing the attractiveness of the area in terms of landscape, environment, tourism and cultural services. The State and local authorities, at the request of the World Heritage Committee, established a system of management and the site consists of three bodies:

- la Conférence Territoriale, which indicates the guidelines;
- le Comité pour le Développement, which assumes a consultative role; and
- Mission Val de Loire, which is the operative body in charge of the management of the site.

This structure allows a simplification of complex bureaucratic procedures, precisely because each body has specific functions that do not overlap, but it integrates to that of others. Cooperation is not limited to the local or national sphere, but also extends to international cooperation projects. The Centre et Pays de la Loire Regions, with the Universities of the Loire Valley, founded in 2005, the Institut international fleuves et patrimoine that develops, in cooperation with the Mission, basic and applied researches, through comparative analysis and studies of best practices among the rivers Loire, Niger and Mekong.



Fig. 2: Lorey Valley, Chateau de Chenonceaux (photograph by Alessandro Ciambrone).

All the programs of management and promotion of the site are connected, through a concerted strategy, to the criteria that allowed the site its inclusion in the World Heritage List. It has also designed a special logo, showing the temple of UNESCO, the emblem of the Convention on the Protection of the World Cultural and Natural Heritage of 1972 and the words Val de Loire Patrimoine Mondial. The label, thus defined, is advertised on all brochures and catalogs of scientific, cultural and tourist promotion of the area. Additionally, in each of the 164 Municipalities included in the perimeter of the listed site, were positioned appropriate panels in the same format. These confirm that the property is included in the World Heritage sites list. All the strategies of promotion and education respond to the desire to strengthen the attachment of local communities and, in particular, the younger generation at the historical background of the territory. Education for protection favors the creation of a management class attentive to the protection and enhancement of the heritage, which is, among other things, promoted through a strong promotional message in the international tourism market. In fact, the use of

the UNESCO logo and of the World Heritage emblem are perceived by foreign visitors, as a mark of quality and integrity.

Saint Guillelm le Desert et la Communauté de commune Vallée de l'Hérault.

La Communauté de communes Vallée de l'Hérault in the Languedoc-Roussillon Region, is located in the heart of the Department de l'Hérault, near the Agglomeration of Montpellier. La Communauté consists of twenty-eight Municipalities. Its population of thirty-two thousand inhabitants, has grown rapidly in recent decades. The territory extends over four hundred square kilometers. This is characterized by a unique natural landscape, eroded by the river Hérault, including forests, vineyards, olive groves and scrubland. The area is also characterized by the ancient villages, and a strong sense of spirituality. In fact, these sites are included in the route of Saint Jacques de Compostella en France, which includes the Pont du Diable and the Abbaye de Gellone in the village of Saint Guillelm le Désert, inscribed, for this reason, in the World Heritage list. Five out of the twenty-eight Municipalities in the Vallée de l'Hérault in 2002, were awarded the Grand Site de France label, which is a prestigious recognition given by the State for a management that combines preservation of the landscape and the "spirit of the place, as well as quality in the visitors' welcoming and participation of local communities. It was estimated in 2006 that these Municipalities welcomed a number of unsustainable visitors - about seven hundred thousand a year - with peaks of thirteen thousand tourists per day during the high season. All this resulted in inevitable negative consequences for the preservation of monuments and landscape of the area.



Fig. 3: Pont du Diable (photograph by Alessandro Ciambrone).

To avoid these negative impacts and limit tourist arrivals, local authorities, since 1991, decided to join the Opération Grand Site, launched by the French government in the eighties. L'Opération provided innovative management actions for sites protected by the Ministry of ecology and sustainable development. The main objectives of this initiative were: the management of tourist flows; improving the publics' reception and the conservation and enhancement of cultural heritage and landscape. In this sense, it was realized a center of hospitality for the territory, which is located in Pont du Diable. Also, it was realized a parking lot, sized in reference to the need to welcome people, and perfectly integrated into the landscape, which allows visitors to leave the car without entering in the most visited localities of the territory, as it was happening in the years before the creation of the complex. In the Management Plan of the Grand Site, particular attention was paid to the enhancement of the rural landscape, the promotion of agricultural products and local handicrafts as an engine for the

sustainable development of the territory. In terms of tourism, a special partnership agreement was signed with the inter-Municipalities office of tourism promotion. This agreement has allowed the development of a unique and agreed promotion strategy with the concentration of funds devoted to publicizing the sites and to optimize the services for visitors. To verify the degree of satisfaction of the visitors in the logic of the guidelines of *Grand Site*, were designed and implemented a number of initiatives, including: the observatory for the tourist fluxes, the observatory on landscapes; investigations related to the economic impact on the area in connection with its frequentation by visitors; the observatory on the natural environment and the state of conservation of the site.
In the framework of the departmental forum for sustainable tourism, the impact on the local economy since the beginning of the operation Grand Site, were evaluated in approximately fifty million respect the initial investment of about fifteen million. In other words, the economic impact on the community was over three times the initial investment.

Pont du Gard.

Le Pont du Gard in the Languedoc-Roussillon Region, is one of the few sites in France which received both the UNESCO brand and the Grand Site label by the State (Ministry of ecology).
In 1985, after inclusion of the Pont du Gard in the UNESCO list, the Conseil général du Gard, expecting an increase in tourism, decided to implement actions in order to protect and manage the most visited cultural and tourist site of the Department. In fact, there was no welcoming structure, at the time.



Fig. 4: Pont du Grad, Reception centre (photograph by Alessandro Ciambrone).

"Savages" paths were born spontaneously eroding the natural spaces. Between 1996 and 2000, an area of one hundred sixty-five hectares around the monument was the object of a major environmental restoration. The proposal is designed to ensure a careful form of protection for the site and the best possible conditions of access to visitors.
The realized project configures a new vision of the space, which is returned completely to pedestrian and interdicted to vehicular traffic. The whole area around the Bridge, for a diameter of five hundred meters, was returned to its original state. In fact, the parking lots that allow pedestrian access to the site. The silent architectures, respecting the prerogatives of the landscape, fit into the environment with a very discreet impact in relation to the monument. On the left bank of the Gardon river, in the building of new construction, which contains space for reception, bookstore, cafeteria and restaurant, was made the largest virtual museum and interpretation center on the history of Romans in France. At its side is located a recreation center dedicated to preschools and educational activities. The complex

includes the space for temporary exhibitions and cinema, with three hundred seats, where throughout the year, events and projections about the history and traditions of the place are organized.
With regard to the policies of management of cultural heritage and landscape, the UNESCO site and Grand Site de France du Pont du Gard is managed since 2003 through an Etablissement Public de Coopération Culturelle (EPPC). The objective of the EPCC of Pont du Gard is to develop the promotion of national and international cultural activities, tourism and environmental policies. The project contributed, in a few years, to the definition of a "cultural district" and allowed a significant increase in economic revenues for the site and the whole Region. The number of visitors has increased by one hundred thousand units in three years, from 1.3 million in 2008 to 1.4 million in 2011. In the same period, the economic revenues increased of the eighty-seven percent and the self sustaining of the EPCC, compared to the allocation of public funds, is passed from fifty percent to seventy-three. Pont du Gard moves an economy on a large area that involves fifteen hundred people engaged in cultural activities and tourist facilities, and produces an induced income of one hundred forty million per year in the Languedoc-Roissollon Region [15]. Another factor that contributed greatly to the promotion of Pont du Gard is the rich program of national and international events, which makes the "cultural district" alive and accessible in all the seasons of the year. Throughout the summer the site is illuminated at night and thanks to the organization of concerts and shows of various kinds, it has become a magnet for the entire Department. The Bridge, with Avignon and Nîmes, represents a must for French and foreign visitors, and is often promoted to the international tourism fairs, through an integrated offering that includes the two nearby Cities.

Bibracte.

Located in the heart of Burgundy, on the Mont-Beauvray, in the Regional natural park of Morvan, Bibracte is the name of the ancient capital of the Aedui, a powerful Gallic tribe. The site was abandoned after the Roman conquest. Later, the area was not significantly occupied, and it is for this reason that Bibracte is today one of the best preserved fortified cities of the late Iron Age. It is also a site of great symbolic importance for the French national history. For its historical and landscape characteristics, as well as the concrete actions for the protection and enhancement of the site, Bibracte has also been awarded the Grand Site de France label in 2008. The fortune of Bibracte is due to the political choices of the president François Mitterand, who proclaims in 1985 the oppidum "site of national significance", and in 1989 includes it in the ambitious program of the "Grands Travaux de l'État". The heart of the property's scientific activities is a program of archaeological researches on the Gallic city from which it takes its name. The project, started in 1984, involving approximately fifteen European Universities and Research Centers. The originality of the scientific and research program of the EPCC of Bibracte consists in the fact that it involves students and researchers from different centers of higher education, coordinated in their projects, by the permanent scientific team of the European archaeological center. Bibracte fully supports all the subsistence costs of students – who belongs at the scientific institutions partners - which are hosted free of charge. The European centre for archaeological research provides publication of the major scientific studies through a series called, precisely, Bibracte [16]. In the domain of research, Bibracte aims to consolidate its role as a European reference for studies related to the Celtic period and the emergence of urban civilization in Central Europe. In the field of training, the EPCC aims to become the place of excellence for continental practical education of archaeologists, because the site hosts the largest program of archaeological research on the field, organized in the last thirty years [17]. Also, Bibracte is a regional pole of cultural and tourist attraction. The EPCC invests half of its funds to promote awareness of archeology to the general public through the museum, the temporary thematic exhibitions and cultural events of a different nature.



Fig. 5: Bibracte (photograph by EPCC Bibracte).

The site receives between forty and forty-five thousand visitors a year, among them, eight thousand are young students.These data are stable since 1996, or since it was opened the archaeological museum. The EPCC is also a cultural point of reference for the Pôle National de ressources éducatives “Patrimoine archéologique”, which was constituted in 2003 within the framework of the inter-ministerial program for arts, education and culture. Finally, a number of tours to the site are organized especially with the schools in the area. The identity of the Morvan, which is based on music, languages and customs, it is not lost, but on the contrary, has been restored and enhanced in recent decades. Paradoxically, the new residents from other Regions, including some countries of northern Europe, contributed to the rediscovery of the ancient traditions of the area. In this context, Bibracte represents a cultural center of primary importance for a local community which does not have many opportunities for recreation as well as social and intellectual exchanges. For this reason, the program of the museum is not only focused on archaeological exhibitions, but extends to various events that may attract both local residents and foreign visitors.

Paris.

The World Heritage Committe decided to include the property “Paris, banks of the Seine” in the UNESCO World Heritage list in 1991. The bridges, as well as the built heritage on the banks of the river, are linked to the growth of the City and are intended to establish, activate and multiply all kinds of relationships among residents and foreign visitors [18]. The contemporary City that has developed between the sixteenth (in particular the seventeenth century) and the twentieth century, expressed through different historical and architectural traces, the evolutions of the relations between the river and the citizens. The project of enhancement of the banks of the river launched, in April of 2010, by the City administration speaks of these relationships, and of the different spatial, functional and architectural configuration of the Seine in a process of urban transformation that involves Paris and its metropolitan area. The project goal is to reduce the vehicular space on the banks of the river - in the center of the City – in order to return a larger pedestrian area, and then allow the citizens and visitors easier access to the promenade along the Seine. Therefore more spaces will be dedicated to public life, leisure and culture. The project covers an area of fifteen hectares of which four will be completely returned to the exclusive use of pedestrian and bicycle paths. The estimated cost for the entire operation is forty million euro. On the left bank, the project includes the construction of natural itineraries, sport areas,



Fig. 6: Paris, Beaubourg (photograph by Alessandro Ciambrone).

outdoor spaces for exhibitions and events. On the right bank there will be a reduction of the roadway and the installation of traffic lights, to decrease the speed of vehicular traffic, and allow for easier pedestrian and cycle access to the Seine. To promote the enjoyment of the riverfront, the project planned five mooring stations, including one designed for the transportation of passengers on the boats, and four other floating platforms, for recreational, cultural and tourist activities. The mayor of the City sent all the project's documentation to the UNESCO World Heritage Centre. Moreover, le Conseil launched a public consultation, in accordance with the Code of urbanism, to involve concerned local communities, citizens and everyone who could be involved through comments, suggestions and concerns about the proposal [19]. The consultation has been characterized by the participation of a large number of public and private institutions, for the communities involved on a metropolitan scale, according to a tool that went beyond the usual forms of advertising, such as public meetings and exhibitions of the project. The rich program of cultural events and initiatives, in fact, increases that already full of entertainment of Paris on the international scenario. Thus, buildings, monuments, works of art, landscapes and gardens as well as programs of reach and international events are able, today, to identify a site as a privileged destination and cultural center of excellence. Probably, in an increasingly competitive tourism market, which looks for originality and spirit of places, the attention for historical and natural heritage, has the same importance than the interest related to the intangible assets. In this context, cultural policy, not improvised, which arises from the historical consolidated historical matrices, and reinterpreted in a contemporary way, seems to be able to create not only economic but also better conditions of life for the community of the territory.

Conclusion.

We consider that the critical study of best practices in France, may contribute to the definition of sustainable strategies in cultural tourism management to be adopted in other territorial contexts. The SCoT of Montpellier, is characterized by aspects of planning and management on a metropolitan scale, through a strategic vision, which is the result of thirty years of political continuity. Public participation, partnership, public-private consultation, and landscape planning are the main tools of a design that brought the City and its metropolitan area, to establish itself, over time, as one of the main centers of social, cultural and economic development in France. The cultural network of the Loire Valley can be considered a model, both for the management structure adopted – including three organizations (political, advisory and operational) that work synergistically with Universities and local communities for the territorial development - that for the processes of discovery of local identity and local promotion linked to the historical background and criteria that allowed the property its inclusion in the World Heritage list. Saint Guillelm le Désert et la Communauté de commune Vallée de l'Hérault is taken into account for the aspects related to the promotion of the authenticity and integrity of places, as well as for planning actions aimed at limiting the negative impacts of mass tourism, through the implementation of a project that, in contrast, favored the promotion of sustainable tourism. The EPPC du Pont du Gard was able to start a process of cultural and economic development, at regional and local level, through an architectural, environmental and landscaping redevelopment project of the site, as well as a careful system of management of the recreational and cultural activities, linked to the fruition of the cultural landscape, new reception and entertainment facilities.The EPCC of Bibracte stands for integrated management actions able, at the same time: to protect and enhance the archaeological site and the amazing landscape that surrounds it on an extension of nine hundred and fifty hectares; to realize an archaeological museum able to become a cultural center of attraction for the entire region; and to contribute to the definition of an international scientific community through the research program of the European archaeological centre, which is located in the site. The project for the enhancement of the banks of the Seine in Paris, is characterized, then, for the transparency with which the proposal was presented to local communities, and the public participation involving all the concerned stakeholders of the territory. It was so defined a collective project, coordinated and concerted, which become a model of democratic participation, not only in France, but throughout the world. All the best practices considered show some common characteristics. These are consistent with national policies for the promotion of culture and tourism, as well as examples of integrated management [20], where issues of protection, enhancement and sustainable development of tangible and intangible assets, are part of a single process. In particular, we emphasize the particular attention given to cultural events, not only traditional, but in all their expressions. Also, what we have seen in these best practices is that in the current era characterized by the economy of knowledge, the cultural identity of places has a greater value than that related to the tourism industry, because this is an indispensable asset in the educational process to maximize human capital and to make competitive and attractive the territory [21].

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"Santa Sapienza allo studio" Chapel in Rome : a representation of its domed ceiling. Borromini master of "Trompe-l'œil".

Antonio MOLLICONE
Department of Architecture and Urban Design, Faculty for the Built Environment, University of Malta, Msida, Malta
antonio.mollicone@um.edu.mt

Abstract (ID nº 006)
The most obvious and recognised theory on the composition origin of the cornice (moulding) of the entablature is the geometrical one of superimposed triangles forming the six-pointed star. Symbolically the plant of S.Ivo is identical, perhaps by pure coincidence, to the profile of the four "tiles"(formelle) with allegoric figures of the Cardinal Virtues on the façade of the Loggia della Signoria (1386) with the starred background and the figures with wings. "Prudence" is said "*auriga virtutem*" (it leads the other virtues) and in Platonic philosophy is synonymous to "Wisdom" (Sapienza), the Virtue of the rational Soul. The important set-up of said moulding, if on one hand reveals the footprint of the chapel, on the other hand distracts the observer from the complexity of the surfaces that, generated from it, come together in the target circumference of the oculus. From the simple to complex shapes, from the *Analytical Surfaces* (*Primitive*) to the *Free Form* ones up to the *Global Shape Modelling* : a precursor of the art of joining between surfaces, nowadays accomplished with CAD systems modelling strategies (*interpolation, associativity*). The decorations are not casual but thought and placed to hide the discontinuities between surfaces in order to enhance the effects of parallelism and symmetry. Borromini wins the "challenge" building a wall structure subject to the laws of statics forcing the surfaces' generating geometric entities to *coincide* with the ones used for the solution of the statics and/or construction problems.

Keywords: Sant'Ivo ; Borromini ; Rappresentazione ; Trompe-l'œil.

1. Scope and Methodology.

The computer and graphic models both illustrate, the reality in itself, the object.
Based on the direct and/or indirect survey, analogue or digital, are useful for the objective of .... "*de répresenter avec exactitude,...*".(Figg.1,2)
The mathematical models can, thanks to software, completely illustrate distant objects with infinite ever more realistic views, furthermore the traditional graphical model can, automatically, be obtained on various layers.
Digital technology solves the problems related to representation, divulgation, to classification … from photo-reality to "*augmented reality*", a fascinating tool.
However in order to understand and not "forget" (study), the practice of *real life drawing* is fundamental.
To observe (not only look at), *build* the apparent contours of distant shapes, through intuitive sections of the same, reduces the problem of the impossibility of direct measurement.
The model of the cloud of points replaces the object to survey that can be "imagined" in our hands.
It can be rotated, measured, split and dismembered …
The different components, isolated, can be projected in any direction for a classical representation in true form of the directing and generating curves.
In representing the apparent contours of this ceiling, the use of details, both architectural and decorative, by Borromini for reasons of perspective, is appreciated.

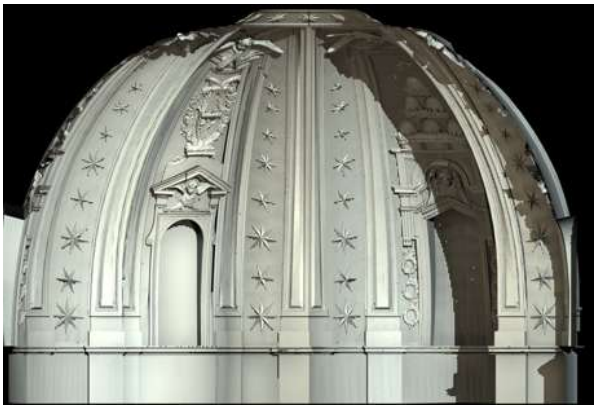


Fig. 1: Computer model.

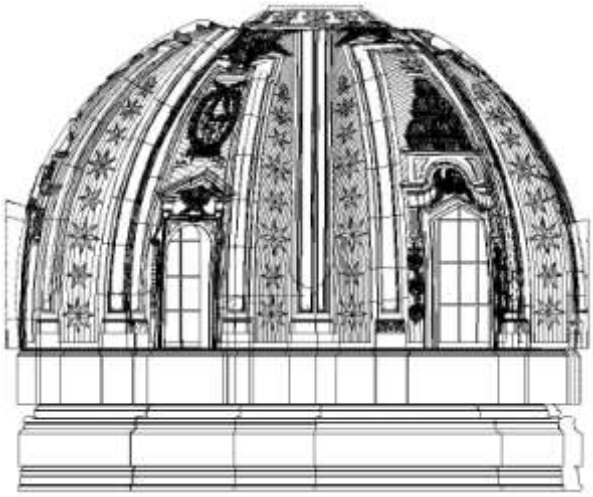


Fig. 2: Graphical model.

2. Geometry of the arris line.

Formed by the adjacent fasciae , “disappears” when said fasciae overlap.
Comparable to a circular arch, whose chord is the side of an isosceles triangle with a vertex in the centre of the arch, the other in the impost of the same arch and the last at the top of the arris.
Even the median sections of the surfaces can be likened to circular arches whose centre has an altitude greater of the impost plane like the curves of the arris for which the observer will see them from the relative horizontal quadrant upwards even when, close to the sides of the hall, the frame of the attic hides the part of the arcs under the point of quadrant: this perspective detail makes the vault seem lighter since said curves (arches) are seen in their ascending parts. (Figg.3, 4)

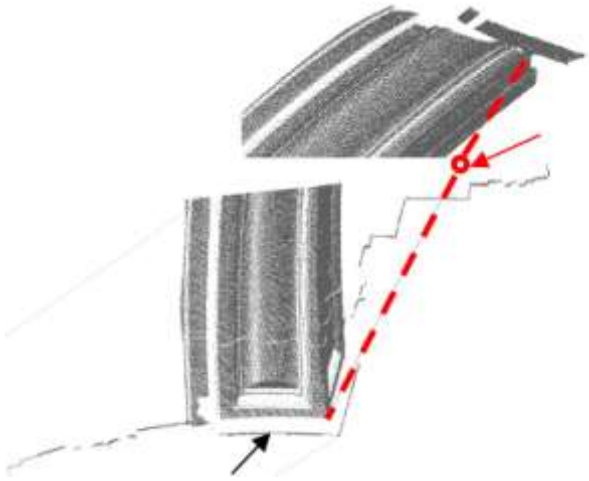


Fig. 3: Chord of the arris .

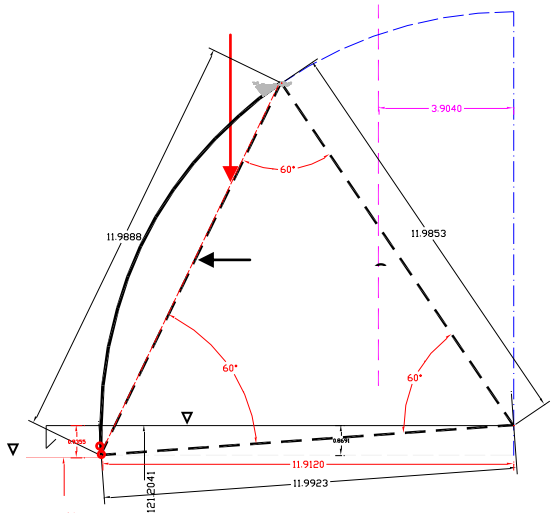


Fig. 4: Geometry of the arris.

3. (Circular) Crown.

The circular moulding (crown) that unites at the top the lesenes making up the ribs has a “wavy” pattern because said lesenes lying on different surfaces intersect with it (crown) at symmetric curves (joint), with respect to the arris lines, only in projection (or view from underneath).
This deformation, appreciable only in the classical representation, is one of the “deceptions” intended by Borromini, conscious of the fact that from the position of the observer the joining moulding (crown) would have been perceived as a horizontal band. (Fig.5)

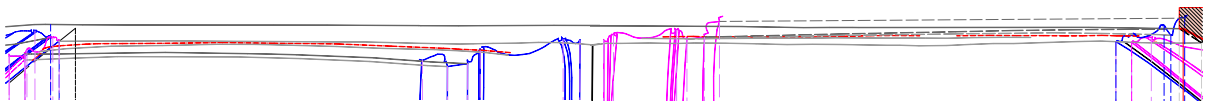


Fig. 5: Elevation view of the joining moulding (crown) of the lesenes of the ribs.

4. Convex/concave surface: angle frame.

The horizontal band of the angle frame, having to lean both on the (still) central convex surface and on the adjacent surfaces (cylindrical), will have a configuration illustrated in the model of Fig. 6.
The lower wings of the cherub, overlapping to the upper edge of the horizontal band, “deceive” the eye making it seem concentric to the circular aperture of the oculus.
On top of the frame the convex surface must morph to concave to join with both the circular crown and the cylindrical lateral surfaces.
This transition is resolved masterfully with a high relief modelling of the cherub with three pairs of wings leaning forward. (Fig. 7)

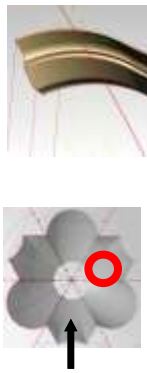


Fig. 6: Horizontal band (angle frame) .

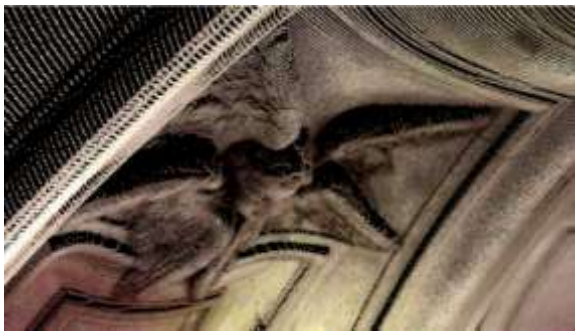


Fig. 7: Cherub (angle frame) .

5. Generating sections, guide curves (concave surface).

The representation of the apparent contours of the mouldings, through the projection of the sections, must take into account the differences of the surfaces on which they lay.
The silhouettes have been made to slide along the guide curves varying the inclination, the measure and/or opening with respect to the guides to obtain the effect of a constant section. (Figg.8, 9)

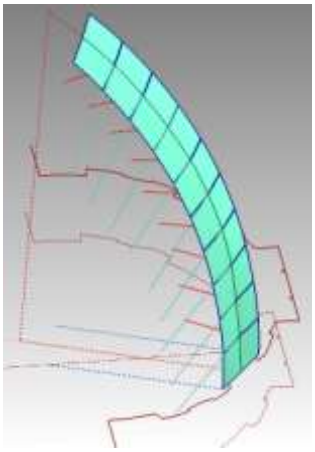


Fig. 8: Moulded band.

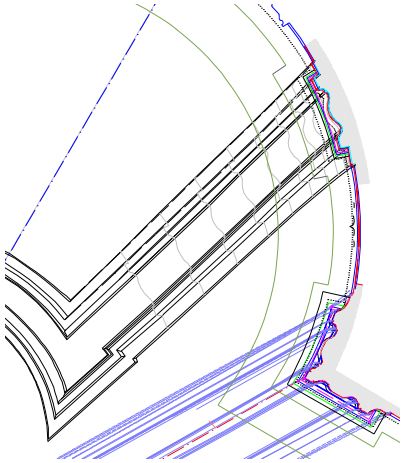


Fig. 9: Projection of apsidal frame.

6. Geometry of surfaces.

The great challenge to join/transform a mixed-linear profile in a circumference building a wall structure subject to the laws of static has been majestically “won” imposing on the genesis geometrical elements of the architectural form to “coincide” with the ones used for the solution of static and/or construction problems.
The geometrical element that solves the problem is the circle in the vertical plane.
Sectioning with vertical planes (on the upper part) the cloud of points relative to the apsidal concave surface, circles can be obtained tangent to the lesenes of the ribs and others circles, with other sectioning vertical planes, can be obtained and be considered (central) part of poly-circular curves also tangent to the lesenes.
These circular and poly-circular sections, together with the edges of the lesenes of the ribs and to the “goose neck” arch (symmetry section), define the edges of sections of the concave surface.
Same considerations for the convex-concave surface.
Given the mixed-linear configuration of the impost, the latter surface exhibits lines of discontinuity created by the sheets of linear generation and by those of curvilinear generation.
This “negative” arris ends when the surface, to join to the edge of the circular crown, is generated by circular arches with radii of increasing dimension.
The choice of the poly-centric (“goose neck” arch) as median section of the concave surface (apsidal niche), different to the arch circumference one of the convex-concave surface, is due to two factors: the greater distance, in projection, between the lower starting point from the ending one in the circular crown suggests a section curve statically correct; the possibility to insert discharging arches lowered in the least possible way. (Fig. 10)

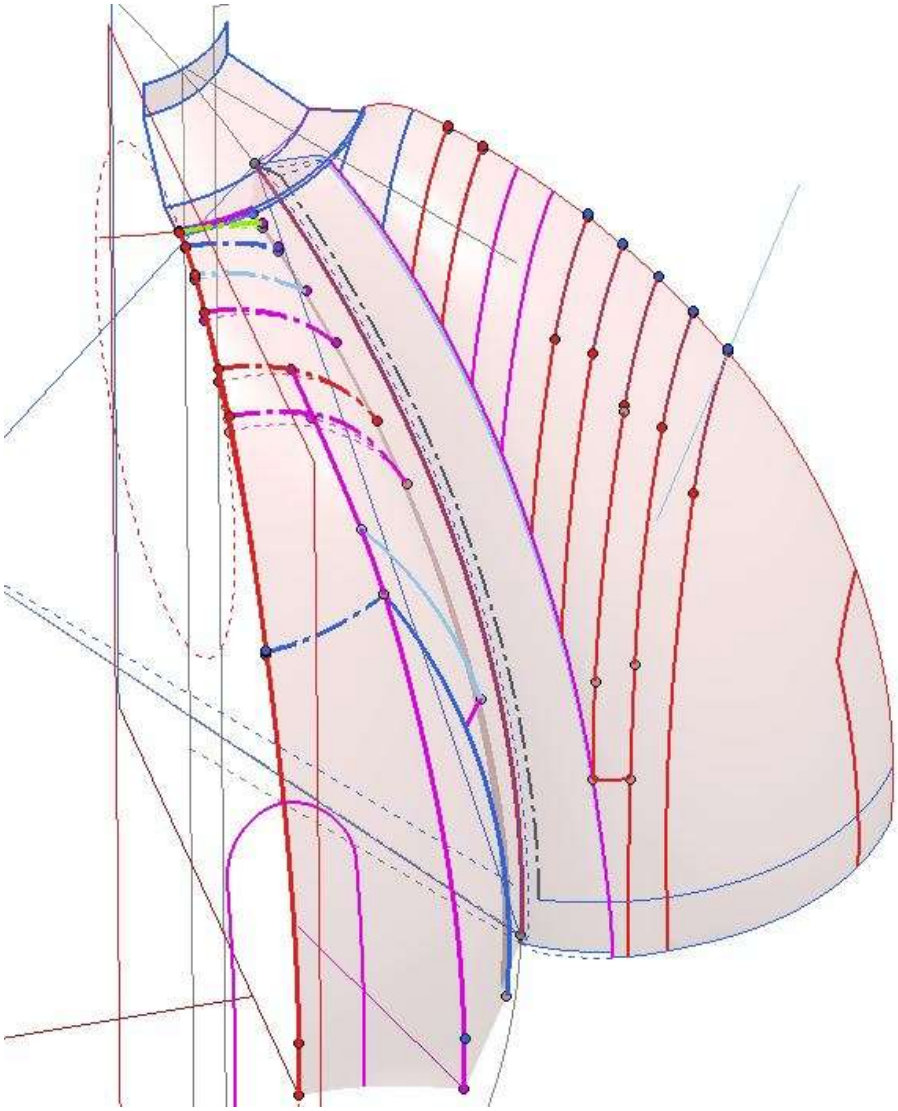


Fig. 10: Vertical sections of the surfaces.

7. The function of decorations.

To hide (trompe-l'œil) the diversity of the two surfaces, in particular for the excessive concavity, at the extreme top, of the concave surface for the “goose neck” arch adopted as section, Borromini, master of solid perspective, places an unlikely angel with six wings which are furthermore crossed. It does not matter if they are at different altitudes, as the horizontal fascia of the frames, because, since they are figures on parallel planes and equidistant from the centre, when seen from the bottom, do not show their different altitude. (Fig. 11)

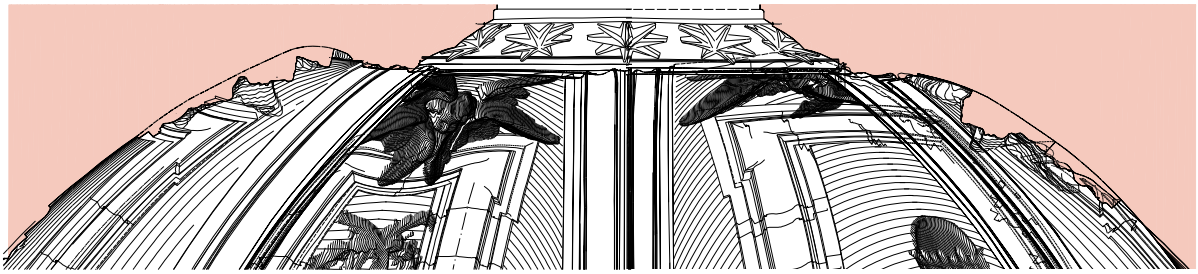


Fig. 11: Section of the upper part of the vault.

Eventual difficulties in accomplishing the continuity of the surfaces are overcome by the overlaying of majestic decorations with a heraldry theme. Even the position of the stars, with the horizontal arms aligned with the generating curve that defines the surfaces close to the lesenes of the ribs, adds lightness to the dome. (Fig. 12)

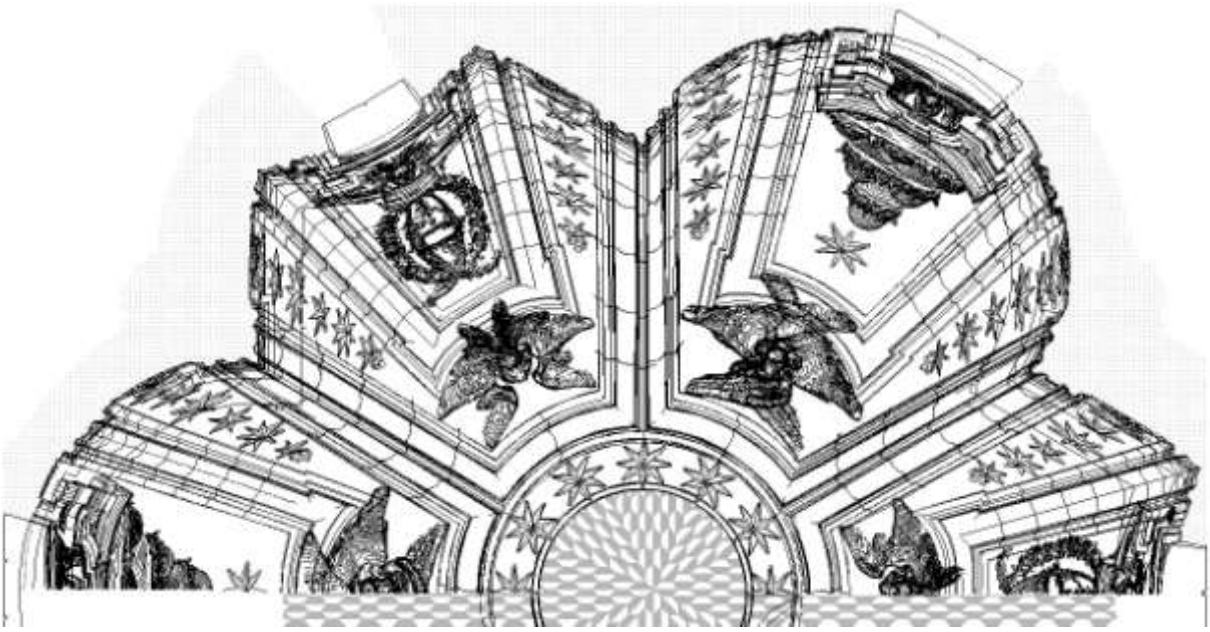


Fig. 12: Orthogonal projection of the vault.

8. Structural scheme (hypothesis): resisting arches and archivolts.

Having absorbed the generating curves and the guide curves of circular arches, belonging to vertical planes, the main structure of the centring can be hypothesised. (Fig. 13)

"The documents report that this vault, "*of extraordinary manufacturing, with a great number of distinct curves, that requires an expensive centring of a rather unusual kind*",had to be disassembled and reconstructed many times to please the Architect".-J.Connors-(Burlington Magazine).

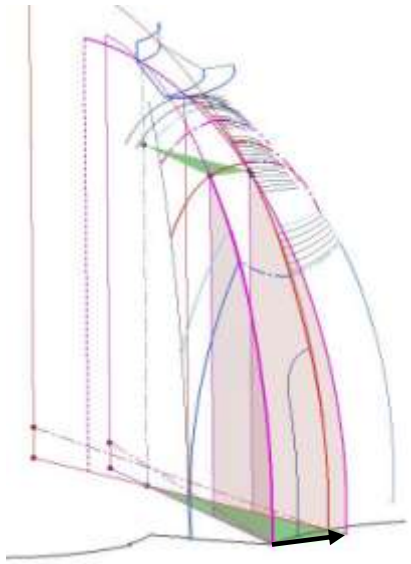
The median section of the entire dome shows at keystone level a horizontal surface with a width of around eight metres.

On this surface rests the walls of the lantern.

The geometry of the sails enables, in the horizontal area, to insert lowered discharging arches that load the main ribs.

The former will be tangent (plan alignment) to the sectors of the jack arch of the oculus hooked to the heads of the main ribs and at the same time contrasted at keystone level and hooked to the median resisting arches. (Fig. 14)

The next discharging arches go from segmental to a circular and finally poly-centric.







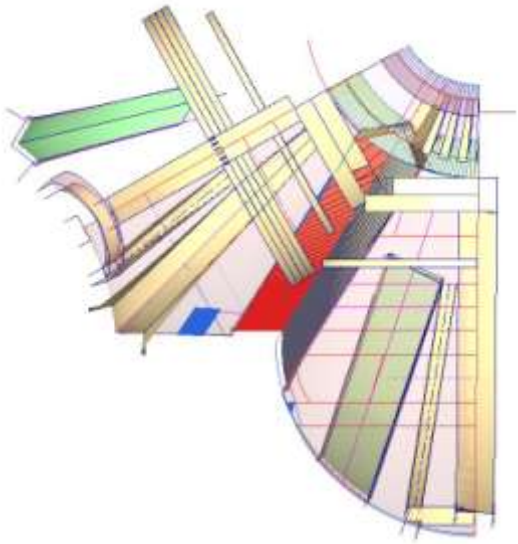


Fig. 13: Guide curves – main structure of the centring.

Fig. 14: Discharging arches system.

9. Observations.

When the dome is first constructed (1648) Guarinin is no longer in Rome but has spent time with Borromini and has probably seen (spied) the models of S.Ivo.
In the San Lorenzo (1668-87) the discharging arches are merged with the ribs reducing the masonry work of the dome. (Fig. 15)
This simplification (rightly of the mind of a mathematician) shows the interdependence between geometry and statics which is at the origin of the design process.
The “forces” that in the dome of San Lorenzo are perceived as sliding up to the impost plane, in the Mosque in Rome of Portoghesi are “seen” discharging to the ground the weight of a dome defined only by structural curves. (Fig. 15)



Fig. 15: San Lorenzo. (mobypicture.com)



Fig. 16: Moscque in Rome. (http://blog.archpaper.com/wordpress/archives/15547)

At the extreme top, various meanings are given to the surprising lantern (small temple with spiral dome). (Figg. 17-18)
The choice of a coherent theme to the entire composition but with an important mass, in my opinion, is due to the requirement to assure as much as possible the structural connection between ribs and discharging arches.
The choice of radial plan enables to distance from the centre the point of support of the structure. "However as soon as the construction of the lantern ends the dome is affected and remedial interventions are executed".
Connors states that had Borromini been aware of the excessive weight of the structure, he would have included as a precaution the chain in the wall of the drum (tiburio).



Fig. 17: The lantern.



Fig. 18: D. Barriére.

10. Details.

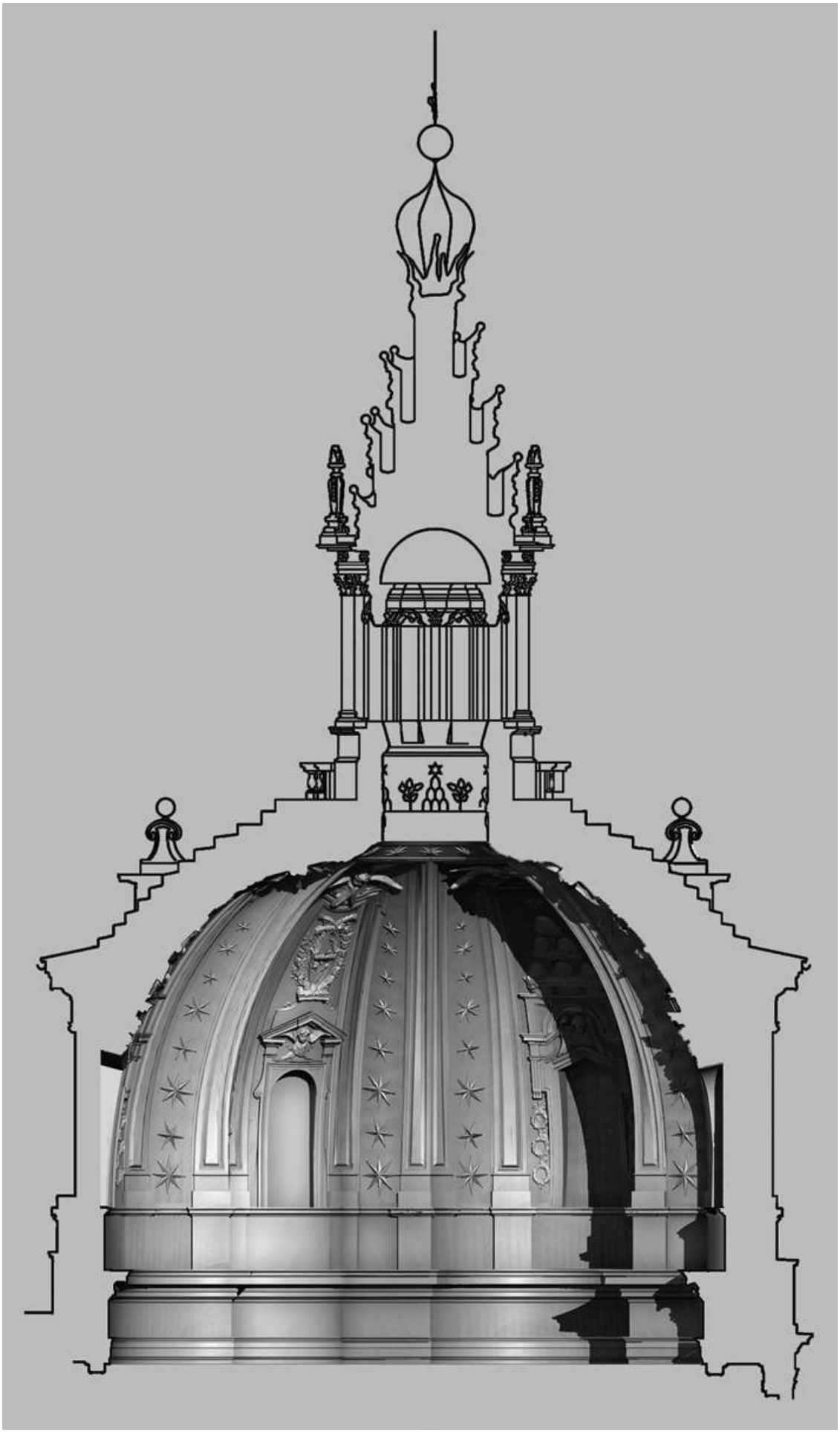


Fig. 19: Section: direction entrance-altar.

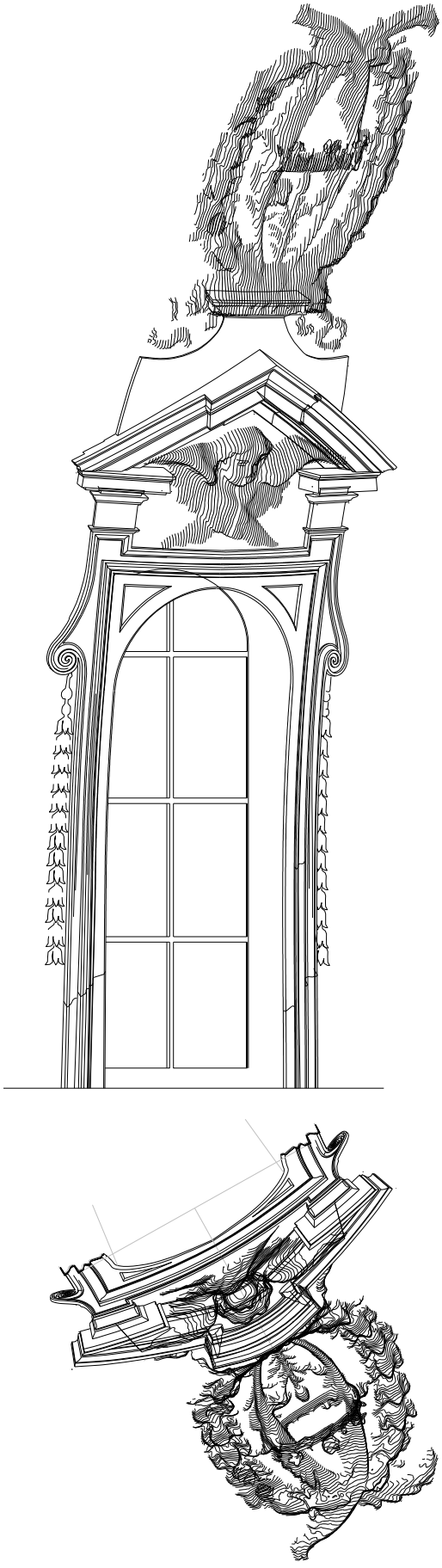


Fig. 20: Tympanum window.

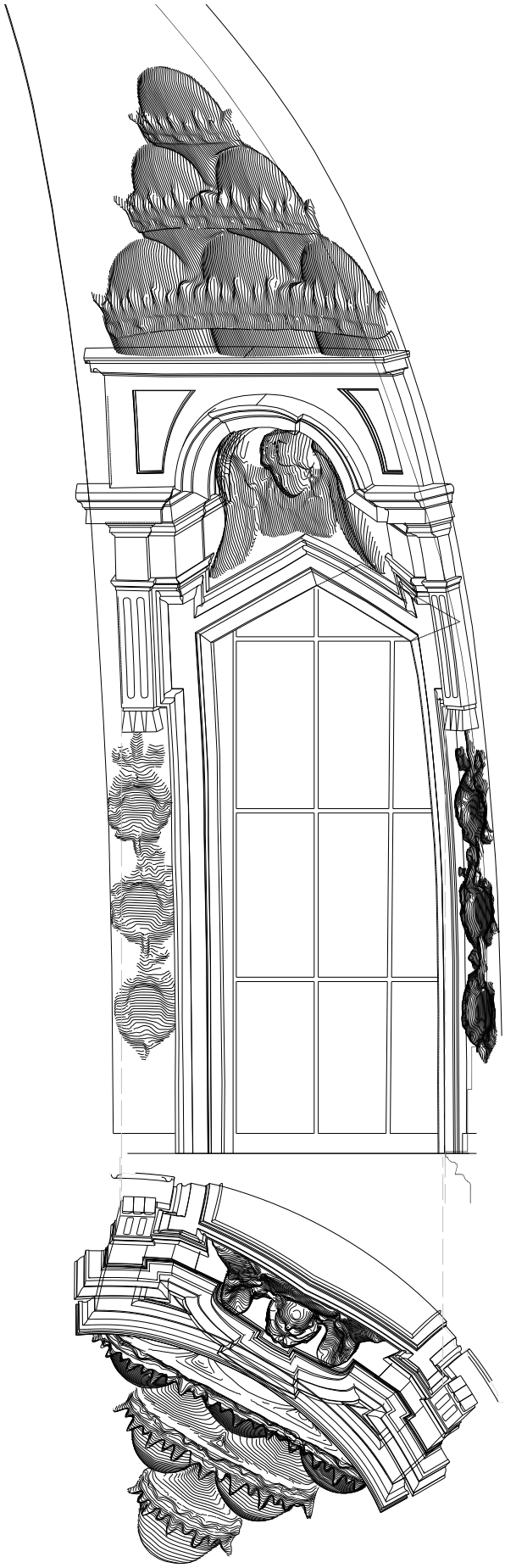


Fig. 21: Arched window.

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HERITAGE ARCHITECTURE LANDESIGN
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Survey of the architectural and historical characters of the Pavone "ricetto" for the retrieval of its own environmental identity

Pia DAVICO,
Dipartimento Architettura e Design, Politecnico di Torino, Torino, Italia
pia.davico@polito.it

Abstract
Near the "Serra d'Ivrea", in a landscape that preserves valuable natural views, rises the village of Pavone Canavese, characterized by the skyline of the old castle (known for Alfredo D'Andrade's works). Its volume stands out on a hilltop, surrounded by the ancient medieval village of the *ricetto*, consisting of small houses along an annular path: this leads to a charming environment where you can still get a breath of the atmosphere of past centuries. Largely constituited by the original stone cells, the *ricetto* has conserved the salient features that bring back to its origins, in spite of some delimited specific interventions that in the course of time have partially changed its physiognomy. This small building block, only apparently overwhelmed by the massive volume of the castle, has recently become a place of great attraction for the village and its territory: in fact in it we find physical and cultural characteristics that enhance the environmental identity, related to its own history in which the community has regained its identity autonomy.
The research on these characters, related to the single constructions, but also to those cultural factors that emerge from the environment, was the target of a methodological survey made with my students in a laboratory of restoration and urban survey. This work identified the typical components in order to supply the community with a regeneration and reutilization project (at different scales), aimed at increasing the value of an asset today still partially unknown.

Keywords: survey, ricetto, Pavone

1. Pavone Canavese and its territory
Pavone is a small village in the countryside of the Canavese, inserted in a charming flat landscape, surrounded by hills and mountains of the so-called "morainic amphitheatre of Ivrea." This natural environment is characterized in particular by the homonymous Serra's linear promontory, which creates a beautiful scenic background both for the design of the geometrical brindle of the vineyards and farmland, and for the crown of meadows and woods, which are typical of Ivrea's river basin.
The connections between Pavone and the surrounding area can be identified not only in the morphological feature of the place and in the environmental appearance. Today, more than in the past, this relationship is enhanced by cultural values, and especially by a historical awareness particularly analysed in the last decades by the local community, who has acquired the ensemble of the village and of the country like his own heritage.

2. The castle: a monument with many stories
For a long time, and until recently, Pavone acquired its identity through the impressive presence of the castle, an emerging volume compared to the built environment, both for the large size, and for the refined architectural feature.
The ancient castle of Ivrea's bishops has polarized upon itself for decades the touristic attentions of the area because in the collective imagination it perfectly correspond to the idea of "Castle". It is a complex building, with a rich and rather articulated history. Its present appearance is in fact the interesting result of Alfredo D'Andrade's restoration works which, between the nineteenth and



Fig. 1: Summary about the origins of the *ricetti* in Piemonte, their presence on the territory in the Middle Ages, and the current testimony of some of the best-preserved clusters like the one of Pavone (for example Candelo), and analysis of materials and constructive characters of the building cells.

twentieth century, permitted to enhance the image of the ancient castle, which had been lost in the course of time. Nevertheless his intervention is very disputed, because it is considered by many scholars too invasive, having integrated and modified the aspect of many parts of the building. Despite this, thanks to its restoration work, the castle (which was also for many years D'Andrade himself's home) is today a very interesting building, not only for the valuable appearance, but also as an example of a restoration approach today outdated, but significant as a cue for reflection upon the historical basics of the discipline and its evolution. [1]

The castle has played and still plays an attractive role for Pavone, directing the touristic attention for its impressive architecture and the services it hosts: a hotel, a restaurant and a luxurious conference centre.

In recent years, however, Pavone has become a place of tourist and cultural attraction also for other reasons, having increased the number of attractions offered centred on new elements of cultural, historical and environmental identification. Thanks to the local authorities and the cultural institutions, in accordance with its inhabitants, the important role of material and immaterial elements for a long time considered "minor" was revalued, even like a sort of enrichment for the tourist industry. In fact the Municipality has internalized the cultural trends developed in the last decades, researching and enhancing the local peculiarity of the history and traditions of its territory, which had been lost in the course of time. In particular, the Municipality and various associations in the area are working to master and support the peculiarity of the surrounding area: starting from the morphological and

landscape features, to the architectural ones, getting through to farming and craftsmanship production, in other words to all those aspects of the tradition whose memory was disappearing. [2]

3. The ricetto: a little cluster of great historical value

Among all of the local peculiarities, a leading role was recognised to the *ricetto*, a cluster of dwellings of medieval origin (at the feet of the castle), whose value has been underestimated for a long time. The interesting aggregate of small houses - that extends along two narrow parallel streets - preserved largely its ancient formal connotation, constituted by small size housing units built with stone. Although subjected to modification works of some cells, it maintained the environmental characters that make it a place where you can still "breathe the air" of the medieval period. It is not by chance that in the past twenty years, it is the venue for the folkloristic event *Ferie medievali*, with the revival of battles, works and customs.

Like Piemonte's other *ricetti*, the one of Pavone was formed in the period between the twelfth and fifteenth century, as a protected settlement for the rural population. In particular, the one of Pavone was born at first as a shelter with *cellaria* for the *homines* in a defended sector annexed to the seat of the lord in the site of the present castle; on the contrary a structure independent from the *castrum* is attested by the statutes in 1326, with obligations for men to guard the *ricetto* and the castle. [3, 4]

Its value, like that of Piemonte's other *ricetti*, lies not so much in the single building cells of very simple manufacturing, but rather in the urban structure of the cluster, as an attestation of a common settlement phenomenon in Piemonte's medieval history. The houses, one or two floors above ground, are mostly built with stone, with regular ashlars of large size for the edge elements (of the building or of the rare openings), and with river stones for the walls, often built with a regular mesh, sometimes having a "herringbone pattern". The shingles are almost always double pitch roof, with wooden structure and brick coats that have replaced the old stone roof (Fig. 1).

In the second half of last century, the insufficient perception of its historical value had reduced the cluster of housing in a state of semi-abandonment, being no longer considered appropriate for the new housing needs of the local population. This situation had led to neglect even some of the most attractive original buildings, or to the replacement of some cells or parts of them, condemned because of their state of abandonment. In spite of the degradation and transformations, as already mentioned, even so the *ricetto* preserved its overall environmental characterization. In fact until today it has maintained evident medieval characters, not only through the presence of many original buildings, but fundamentally by maintaining the aggregative structure and the dimensional characters typical of the old village. Despite the presence of some buildings of recent times (not so coherent with the typical typological characters of the core built, the architectural forms and the materials), thanks to the restoration and reconstruction works, the recuperation of the overall image and of many cells of *ricetto* has been realized, mostly in recent years.

In consequence of these interventions of valorisation, nowadays Pavone *ricetto* has become a place, as well as of great historical interest, of strong touristic and cultural attraction.

4. The methodological approach of the project of survey

A fascinating and stimulating environment like the one of Pavone has been the subject of the research of the interdisciplinary laboratory of survey and restoration that here is partially introduced, work proposed last year to the students of the "Corso di Laurea Magistrale in Sostenibilità" of the Politecnico di Torino. The survey was finalized to a restoration project of the *ricetto* (almost in its entirety) and of Pavone's other places of attraction, with the intent to pursue the Municipality's objective, not to limit the cultural interest only to the castle and to the *ricetto*, but to extend it to other items widespread on its territory.

So the survey work was organized like an analysis plan at more levels of knowledge, in order to identify and understand the characteristics not only of the constructed and of the natural environment, but also of the typical cultural matters of the territory, selecting the peculiarities and the possible connections which can exist or can be proposed for the future to the community. This approach has been chosen in order to direct the knowledge beyond the pure physicality of the built, as only understanding its history and the relationships with the context at more levels, those sometimes immaterial aspects that make it “a value” for the community can be understood. A value to grasp today, but to consider also in a future perspective: a great incentive for an activity finalized to a restoration work and an environmental recovery also on a large scale.

In the Atelier, therefore, the survey and the restore were grounded on the simulation of a realapproach, like a complete and indispensable formative moment for the preparation of future architects, and also like a useful occasion to suggest to a Community which has freshly disclosed the less obvious values of its cultural heritage.

Every study case was approached planning each time a methodological organization of the survey suitable to put in evidence the historical, cultural, and functional peculiarities of every building, and to find an answer to them in its own architectonic forms and of the environment with which it interacts.

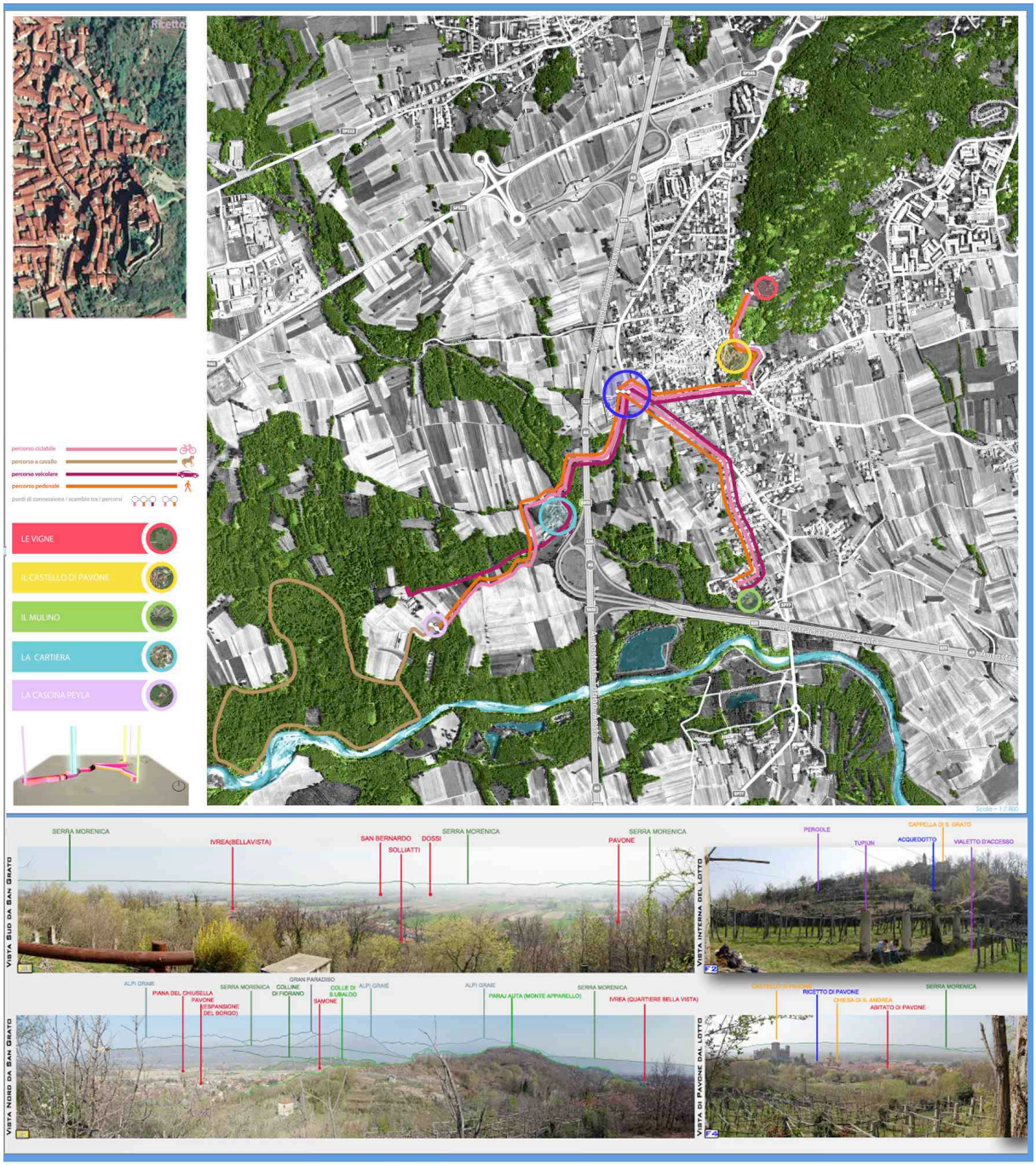

Fig. 2: The relationship between the built and the landscape is one of the important concepts to understand Pavone's territory and its culture. The natural environment is characterized by the linear promontory of the Serra di Ivrea, by the design of the geometrical brindle of vineyards, woods and farmlands, which link the places and buildings to the collective memory.

This approach guided every phase of the survey to identify the most suitable procedure in order to know each situation at more levels of analysis, and also to test the existence of complementariness between the obtained results, in a continuous interchange of information. Every method, from the most traditional to the one of the laser scanner, gave the possibility to understand the importance of any surveyed part. Each procedure has been chosen and adapted also in relation to the situation faced, that often opposed physical obstacles which did not allow to use the most advantageous method: seemingly trivial cases, like the inaccessibility of the rooms, either because condemned, or because of the absence of an owner who takes care of them, or because many buildings are often used as storehouses.

The *ricetto* itself is anyway difficult to survey, because it is placed on the small promontory at the feet of the castle, laid down on slopes with also severe altitude gaps, and the facades of the buildings extend along two very narrow streets in a tortuous way, along an uninterrupted but far from linear course. The survey is complicated still further, because many buildings are often made with ancient

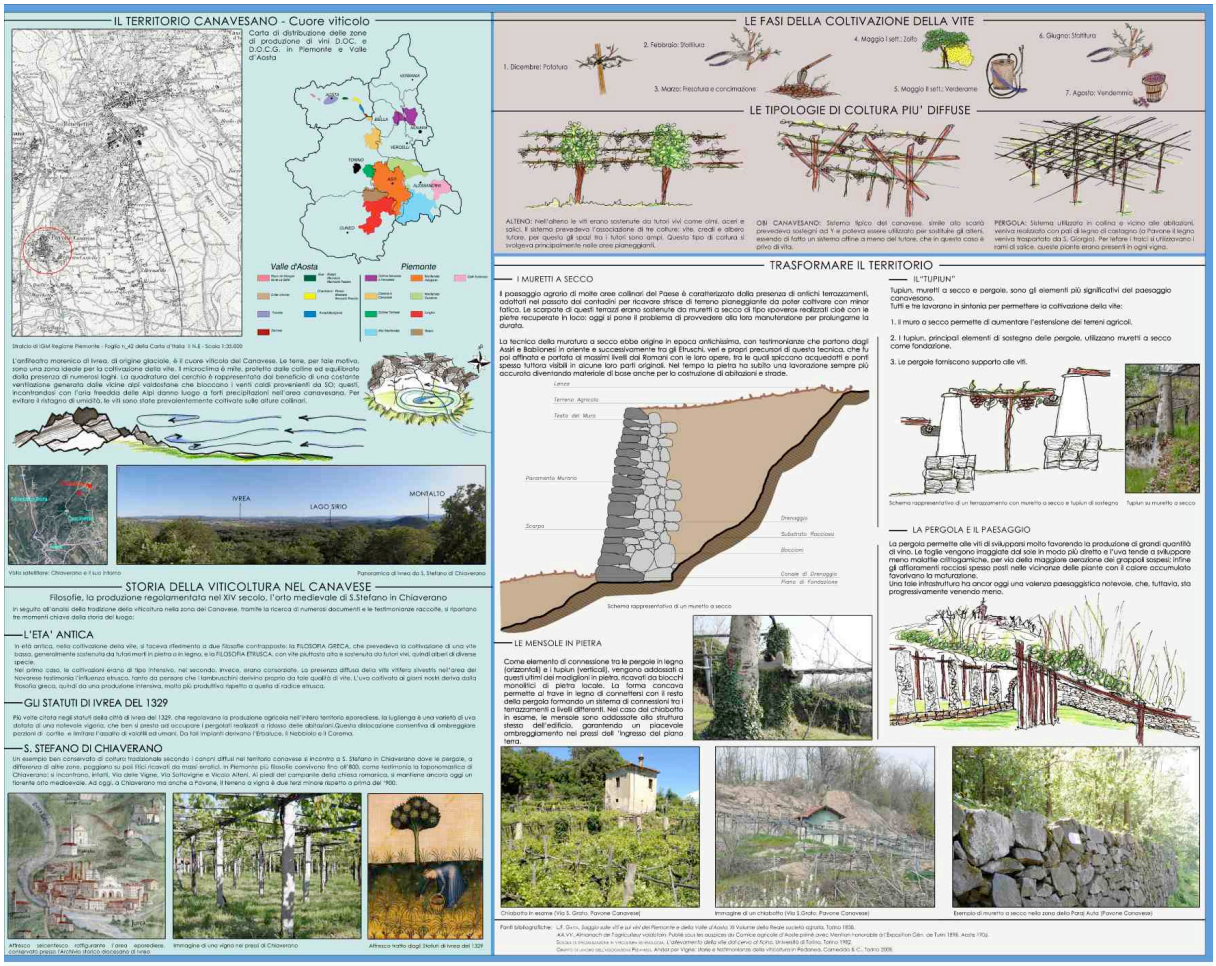

Fig. 3: Among the local traditions of the use of the land there is certainly viticulture, which has characterized the country in the past centuries, and today remains to characterize the environment surrounding the village: the vineyards draw the landscape, with the trellises and the dry stone walls (the *tupiun*), and the *ciabòt*.

handmade walls, of stone or mixed materials, revealing not plumbed. Sometimes, to get the situation worse, they manifest also important patchings executed with not much care, that create variations to the already precarious linearity of the plan of the front facade.
In the other cases, concerning buildings and locations outside the central body, the methodological approach of the survey has been similar, though having observed sometimes different problems, such as the presence of natural barriers that obstructed the sight of some parts of the built, or the contact with the same one, not allowing the metric survey.

5. The survey of the characterizing elements of the heritage of Pavone territory

From the analysis and the study of the typical aspects of the area surrounding the village, physically interesting places and routes have been identified, to be recommended like itinerary stages aimed at the discovery of the morphological and historical features, and of the local culture. The methods of the survey have been finalized for each case study, to search the relationships between today's area and the features of its traditional culture and, if not existent, they were created in the project phase, in response to this necessity (Fig. 2). From the various researches a still evident relationship emerged between the built and the natural environment, revealed by the presence in the area of buildings (sometimes abandoned or in a state of semi-abandonment) belonging to the culture of the past ages. The mills prove to be significant, connected to the manufacturing of hemp and paper, or the *ciabòt*, tiny constructions of temporary refuge existing in the vast vineyards that surround the village, interesting examples of a past use of the territory and of the handcraft works that have been lost over time (Fig. 3).
Directing the attention to the most compact and dense situation of buildings, like the one of the *ricetto*, the survey intended to understand the most significant aspects that interact with the definition of environmental quality (Fig. 4). For example different elements were analysed: the planivolumetric conformation of the dwellings, the use of each floor in any cell, the characterization of the free areas surrounding the built such as the roads, measuring the often important different slopes, and the

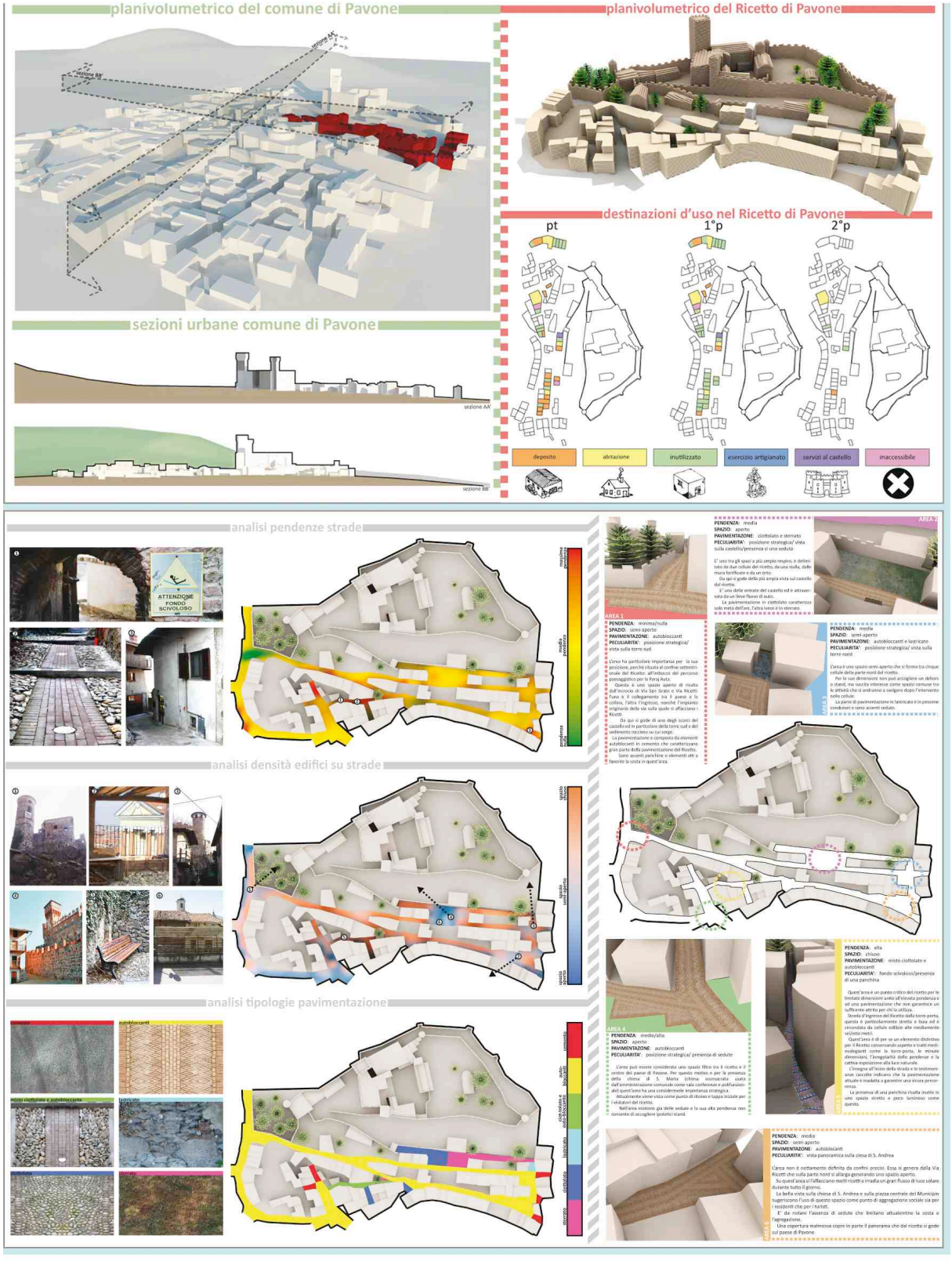

Fig. 4: Study of the *ricetto*'s cluster of Pavone, highlighting: the planivolumetric conformation, the use of each floor of the cells, the characters of the free areas, in particular the slope of the roads, the extent of open or closed spaces, the pavings' types. The objective is to identify the current critical points, searching for solutions.

presence of different pavings. The presence of a larger or smaller extent of open or closed spaces was also identified, influencing the appearance and today's environmental quality too. The objective, reached by many working groups, has been to understand the positive or negative values, at this time, of the various components that characterize the environment, to define important parameters of was also identified, influencing the appearance and today's environmental quality too. The objective,



Fig. 5: Survey performed with the laser scanner of the fronts and of the planimetric development of the *ricetto*'s two streets.

reached by many working groups, has been to understand the positive or negative values, at this time, of the various components that characterize the environment, to define important parameters of evaluation, on which the restoration works were planned.
In parallel to this analysis, shown here through some brief representation, the survey was performed at the urban scale with the laser scanner (Fig. 5). A survey executed simultaneously on both fronts of the two streets, which led to the interesting result of obtaining the dimensionally controlled and realistic image of each front of the street. The obtained result allows us to capture the environment's appearance in its entirety, which is impossible in reality, for its too narrow and articulate development.
It is also interesting to notice, by the image of the survey, that the weight of the building types differs from those of the ancient centre of the *ricetto*, about which we mentioned above. [5]
With a further change of scale, the survey took into account some buildings of the *ricetto* and of the surroundings, buildings that offered interesting ideas to investigate their conformation, and in particular the physical transformations suffered over time. From the survey in direct contact with the building,



Fig. 6: Survey of one of the buildings of the *ricetto*, made with the integration of the results obtained through the analytical straightening of digital images and the direct survey. This representation highlights the presence of different textures walls, showing the transformations that have occurred over the centuries.

and from the understanding and measurement of all its parts, the main features related to the original typology or to possible transformations have been focused, acquired as important notes to be considered in the steps of restoration and redevelopment of the architectural object.
Afterwards the survey of each building was represented through various vertical and horizontal sections. The graphic rendering of the fronts was obtained by comparing and integrating the results reached with the analytical straightening of digital images and with the direct survey (Fig. 6).
A similar experience, but extended to the area sourrounding the building, is illustrated here through some parts of the drawings and images that document it (Figg. 7, 8). The surveyed building is one of the *ciabòt* existing in the area surrounding Pavone, a small building that acquires importance only if put in the contex of the vineyard to which it belongs. A vineyard that develops along the slopes of the hill, showing the wooden structure supporting the trellis, leaning against dry-stone walls, the famous *tupiun*. The valuable design of the vineyard landscape was the subject of a topographic survey, whose graphic rendering has been debated for a long time, in an attempt to highlight (with these and other drawings) dominant characters which constitute the value of the natural and anthropized landscape.
As we have seen from the suggested examples - which represent only a very brief extract of the works done in the Atelier - the survey's study of the characteristic elements of the village of Pavone and of its territory allowed us to identify them as factors of recognizability of the local heritage. Beyond the single results, I believe that this long range work, which has been able to involve the local community, has produced a probably more important result than the one strictly didactic: making the inhabitants of Pavone more aware of their municipality's historical values, which they themselves will be able to preserve.

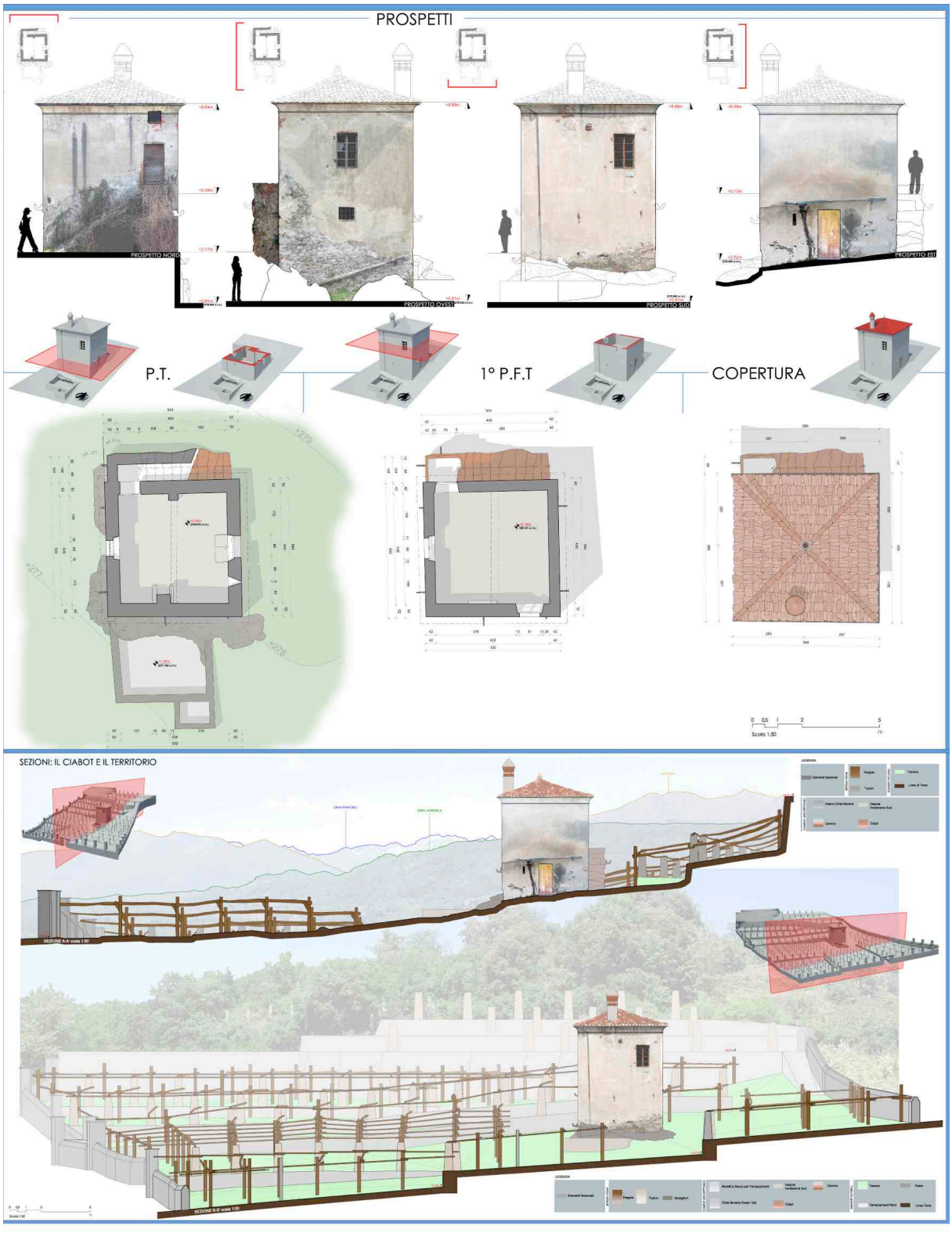

Fig. 7: Survey of a *ciabòt*, one of the small buildings existing within the vineyards surrounding Pavone. The survey highlights the strong link between the building and the structure of the vineyards that develop along the slopes of the hills.

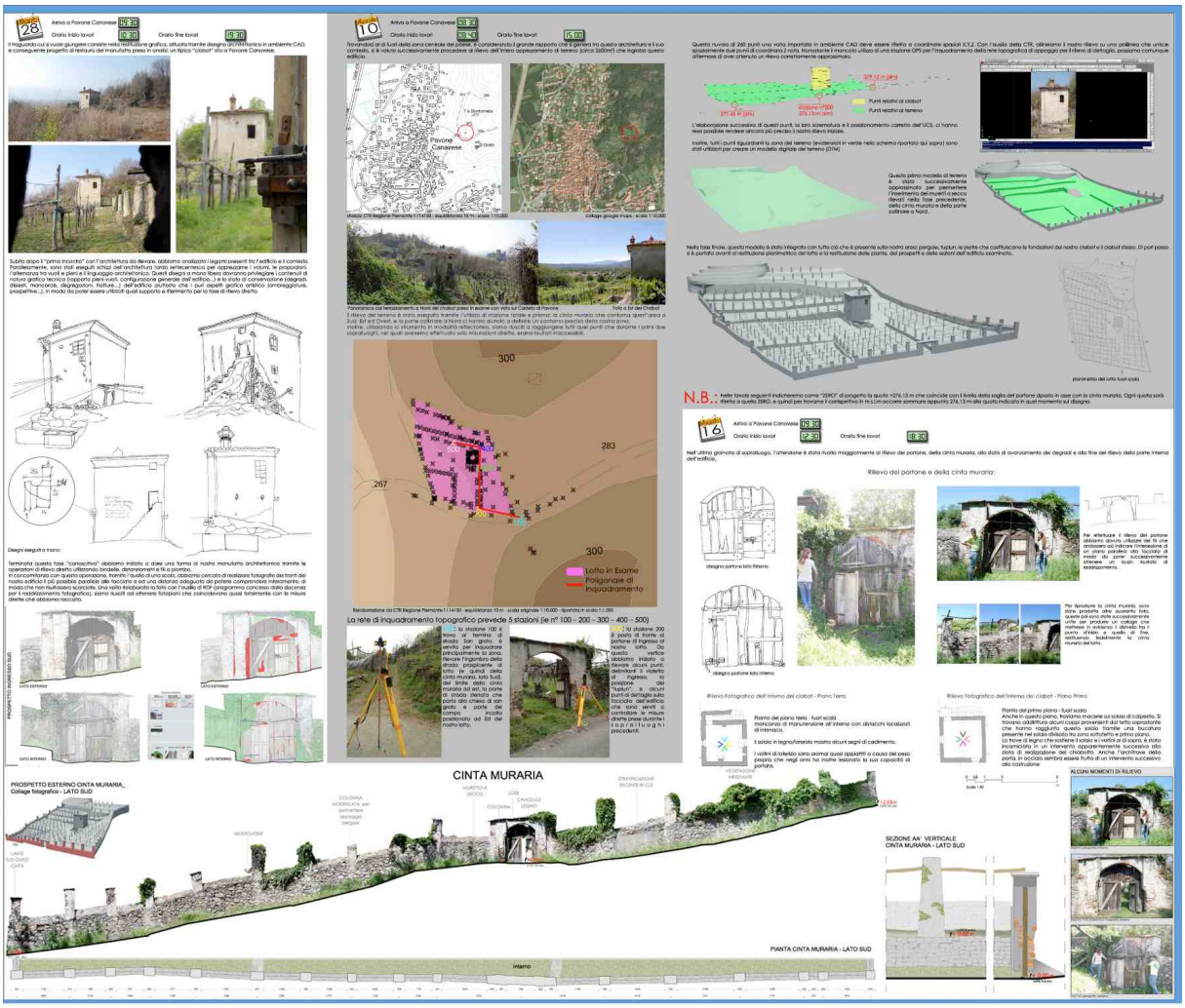

Fig. 8: Summary of the survey's phases from the topographic to the one of the direct method, with the analysis of the architectural form and of its degradation. In particular, in addition to the *ciabòt*, the enclosure wall with access to the lot, an important element in its environmental character, was surveyed in detail.

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The conservation project of the Roman Theater of Málaga

Esteban José RIVAS LÓPEZ[1], María Victoria LÓPEZ GALLARDO[2]
(1) Departamento de Expresión Gráfica Arquitectónica y en la Ingeniería, Escuela Técnica Superior de Arquitectura, Universidad de Granada, Granada, Spain
erivasl@ugr.es
(2) victorialopezgallardo@gmail.com

Abstract
Recently the city of Málaga has undergone a process of urban transformation, promoting the regeneration of an old town center with great historical and cultural value.
In this process highlights the conservation project of the Roman Theater, developed by the architects Antonio Tejedor and Mercedes Linares. During the intervention, it was carried out a thorough classification of the archeological remains through advanced computer procedures, and the reconstruction of the spaces was based on procedures of anastylosis, reconstructing the cultural heritage through the remains of its own ruins.
The conservation actions were completed with the creation of a Visitors Centre, constituted by a totally contemporary architectural piece. The materiality of the new building gives it a character of lightness and provisionality, using glass and wood. Inside, the building shows the visitors the history of the Roman monument.
Thereby, the recovery of the Roman Theatre of Malaga constitutes an intervention model very interesting, where the conservation of the original elements coexists symbiotically with the contemporary architectural contributions. It demonstrates how the implementation of suitable urban and heritage strategies, can allow a transformation of our cities without renouncing to the conservation of their pasts.

Keywords: anastylosis, andalusian heritage, conservation project, Roman Theater of Málaga.

1. Presentation: Transformation of the city of Malaga
Recently the city of Málaga has undergone a series of urban transformations that have changed its urban stage. These variations have had as one of its goals the revival of the historical, artistic and cultural life of the city. Largely for this reason, it is becoming the Historical Center of Malaga since the nineties [1]. So, the urban and heritage actions practiced in the city, joined with its privileged location on the Costa del Sol, make Malaga a focus of cultural tourism. The transforming work of the Historical Center of Malaga is embodied in *Plan Especial de Protección y Reforma Interior del Centro* in 1986, which continues until 1999 thanks to funds of *Plan Urban*, funds of *Interreg de la Unión Europea*, aid municipal and private initiative. Another incentive of transformations is program POL, that took place 2000-2004 and whose goals are to promote the commercial sector of Historical Center and create new cultural spaces. This program was funded by European funds and the city council of Malaga [1].
Those plans have resulted in the rehabilitation of the Palace of Buenavista as Picasso Museum, the conversion of the old market in Contemporary Art Center, the recovering of the Coracha garden, the action in the area of Alcazabilla, the restoration of the Roman Theatre, the intervention in the Aduana building and Alcazabilla-Gibralfaro, the rehabilitation of Rectorate of Malaga, and the qualifications of the path of the Arab Wall, among other interventions (Fig. 1)
Our goal is to study the particular case of the rehabilitation of the Roman Theatre of Malaga, situated in Alcazabilla Street, pedestrian avenue where it is held –from its rehabilitation- the most varied cultural activities: concerts, performances, festivals, etc. It is an enclave where harmonically attend a series of highly relevant architectural pieces, including the Alcazaba in Málaga, military fortification of kingdom of Taifa which it is possible a phoenician origin and an irrefutable Roman past, as recently

important ruins of this historical period have been found at the foot of the hill. Note that between the thirteenth and sixteenth centuries, the building was renovated and Alcazaba merged with the Gibralfaro Castle. Also of interest in the place cited the presence of the Picasso Museum, located in the Palace of Buenavista, with Renaissance style to which are added Plateresque façade and several Mudejar solutions [2].

2. Appearance of the remains of Roman Theater

Numerous proposals have suggested the demolition of the Alcazaba in Málaga, charting new alignments and gradients, but fortunately they did n´t ever undertake due to budgetary constraints. The proposals demolition can be explained by the poor image that the Alcazaba radiated, because neighbours had their houses inside in appalling conditions, both internally and externally, living in humble dwellings attached to the wall of the fort from the eighteenth century.

After the visit of Leopoldo Torres Balbás to Malaga in 1933, it was assigned to Ricardo Orueta the project to recover the Alcazaba and its surroundings, considering that it was declared National Monument in 1931 [3] (Fig. 2). In this context, it is projected the Casa de la Cultura, where years later it would find the remains of the Roman Theatre. In 1940 the *Diputación* and the City Council reached an agreement on the construction of the Palacio de Archivos, Bibliotecas y Museos of Malaga, group known as the Casa de la Cultura, The assignment of the project was made by Luis Moya Blanco, who built the file-library, but not before several cheap houses knock on the street Alcazabilla [3]. Gradually, the street was being transformed into an institutional avenue with public equipment, such as the Theater Albeniz (1947), the neorationalist building of Enrique Atencia (1948), the Palacio de Archivo y las Bibliotecas.

Years later, when the building of Casa de la Cultura was being completed, in the process of excavation of land necessary to act on a wall of Alcazaba, remains of blocks were found forming an arbor. At first it was thought that it was an ancient city gate, until the appearance of bleachers and it was known that they are the remains of a Roman Theater. Despite this, the construction of the new building continued and was inaugurated on 30th April, 1956 [3].

Subsequently, as a result of the finding named, it was decided to address the recovery jobs of the Roman Theatre in 1957, initially focusing on the recovery of the main access and south side door, located next to the gardens of the Casa de la Cultura. So, the architect named Pons Sorolla who in 1958 would take care of the *"discovery of the Theater Works and ambience of the area"* [3].

In the second phase of the operation, a large area was excavated in a short time and without archaeological strict control, which caused a great loss of data and countless archaeological items value. Two years later, they classified the material found which would be used as a container of the same file next to a sector. The third phase would be undertaken in 1961, placing the blocks of the bleachers from the excavation supported on a new surface.

Finally, in 1995 the Casa de la Cultura was demolished, under the leadership of architect Rafael Martin. The demolition of this, but resulted in the loss of a valuable building not only for its architecture but also for hosting the Library and Regional File, on the other hand it contributed to recovery the Theater, showing the west wall of the Alcazaba, and allowing to appreciate the relationship between the fort and the city. In the demolition there were several problems of execution; one of them was the elimination of the foundation of the Casa de la Cultura – anchored at Roman Theater-, which required a delicate task of excavation [3]. (Fig. 3)

3. Historical research of archaeological remains

The research about the Theatre has revealed that in the area archeological roman remains were located, other than verifying the presence of a Phoenician settlement in the seventh century before Christ. It was also found the existence of public baths in the first century before Christ, which were destroyed for implementing the scene use building [4]. Thus the Theatre dates from the early years of Augustus, and its function was maintained until the third century after Christ. In later centuries, the building would be converted to other uses as a cemetery in the centuries V-VI after Christ, military compound in the century VIII, and finally site occupied by humble homes in century XIX [5].

According to research by Corrales [3], it has been shown that the theater was conceived as: "... a free building with a semicircular bleacher, belonging to the building type called mixed or semi-built, therefore, it taking advantage of the slope of the hill and also makes an important artificial terrace construction to support terraces ".

Thus, in the theater is divided into following parts:

-*Cauea*: grandstand, where spectators are situated. He's thirty-meter radius of sixteen high. Within the bleachers are distinguished: *inma cavea*, media *cavea* and the *cavea sunma,* separated by corridors.

-*Orchestra:* semicircular space of fifteen meters, where famous people were placed lower.

-*Proscaenium:* stage. We must distinguish between *pulpitum* -place of representation- and *pulpiti frons* -front wall that served as protection and have an acoustic function-.

-*Vomitorium:* main entrances to the stands.

-Aditus maximus: main entrance to the *orchestra.*
-Parascenium: stage sides.
After extraction work of archaeological remains, we can state that kept half the *cauea* addition to the *orchestra*, the *aditus*, the marble floor and marble grilles to drain water passing below the base of stage [6]**.** As for *pulpitum,* had an excellent decorative richness to be made from a variety of marbles. The *frons pulpiti* was retained a central exedra, exactly where the stairs connecting the orchestra with stage [3] (Fig. 4).

4. Intervention Project

With the intervention of the Roman theater of Málaga, the Consejería de Cultura of Andalucia sought recovery of the archaeological site, thus a place for receiving tourists and holding performances was setting up. The intervention project was entrusted to the architects Antonio Tejedor and Mercedes Linares (Figs. 5 & 6). As a preface, it began with an exhaustive classification and characterization of the elements discovered in archaeological excavations. As for how to deal with the recovery work, we chose to employ procedures anastylosis in much of the building as *cauea, the orchestra and the frons-pulpiti* [7], the meaning of anastylosis is a physical reconstruction, and even virtual of a site or monument from its ruins. It is a method criticized for the difficulty of knowing with certainty the hypothetical original layout remains. That is why in the present case, in order to successfully bring the return of parts to its original position, it was necessary to apply advanced mathematics to archeology. Based on the principle that knowing the radius of any part of a tier, each ashlar can be positioned in the stands, which the performance was achieved on the remains minimal direct out. De spite the above, new rows of travertine *cauea* would be over building with the same tone in 1996, and years later, Iroko wood would be placed on a floor *pulpitum* (Figs. 7 & 8).
Theatre Rehabilitation is finally completed with the construction of a contemporary piece of architecture; it was designed to function as a reception of the archaeological site. This is a free piece of 170 m2, located perpendicular to Alcazabilla Street, which is the end of the party wall of building called Albéniz (Fig. 9). Among the new functions of the piece are to introduce the visitor to the exhibition, organize the visit routes, and report on the values of archaeological site. The materiality of the new piece of architecture encourages lightness and provisional, having etched glass and wood used in its construction. The interior of the building is in constant dialogue with the outside (Figs. 10 & 11), the new building accommodates various elements found in the excavations that require certain conditions of conservation and protection, as small sculptural elements, plaques and headstones, ornamental reliefs, masks and sconces, chandeliers, inscriptions, musical instruments, coins, ... [8]. The building also has an exhibition of mockups and screening room. The building also includes a gazebo in the southern part of *aditus,* a light wooden platform that leans slightly to the *cauea* (Fig. 12). In terms of lighting and irrigation installations, which are placed under the wooden platform, that it is complementing with light and sound installations with three restraints located in *cauea* [8]. As a public building that is, it must comply with the rules of safety and accessibility; this is why they set a series of additional structures in cauea like handrails, seats and stairs adapted.
After intervention, the the ater currently develops a dual functionality as a museum and as a public stage. Finally, we would like to note that recently a very interesting initiative has been taken in order to the maintenance of the monument. It is the creation of an International Festival, whose profits are intended solely to the conservation of the building. These types of actions are which, together with the necessary implementation of suitable economic and urban strategies, transform and improve our cities.

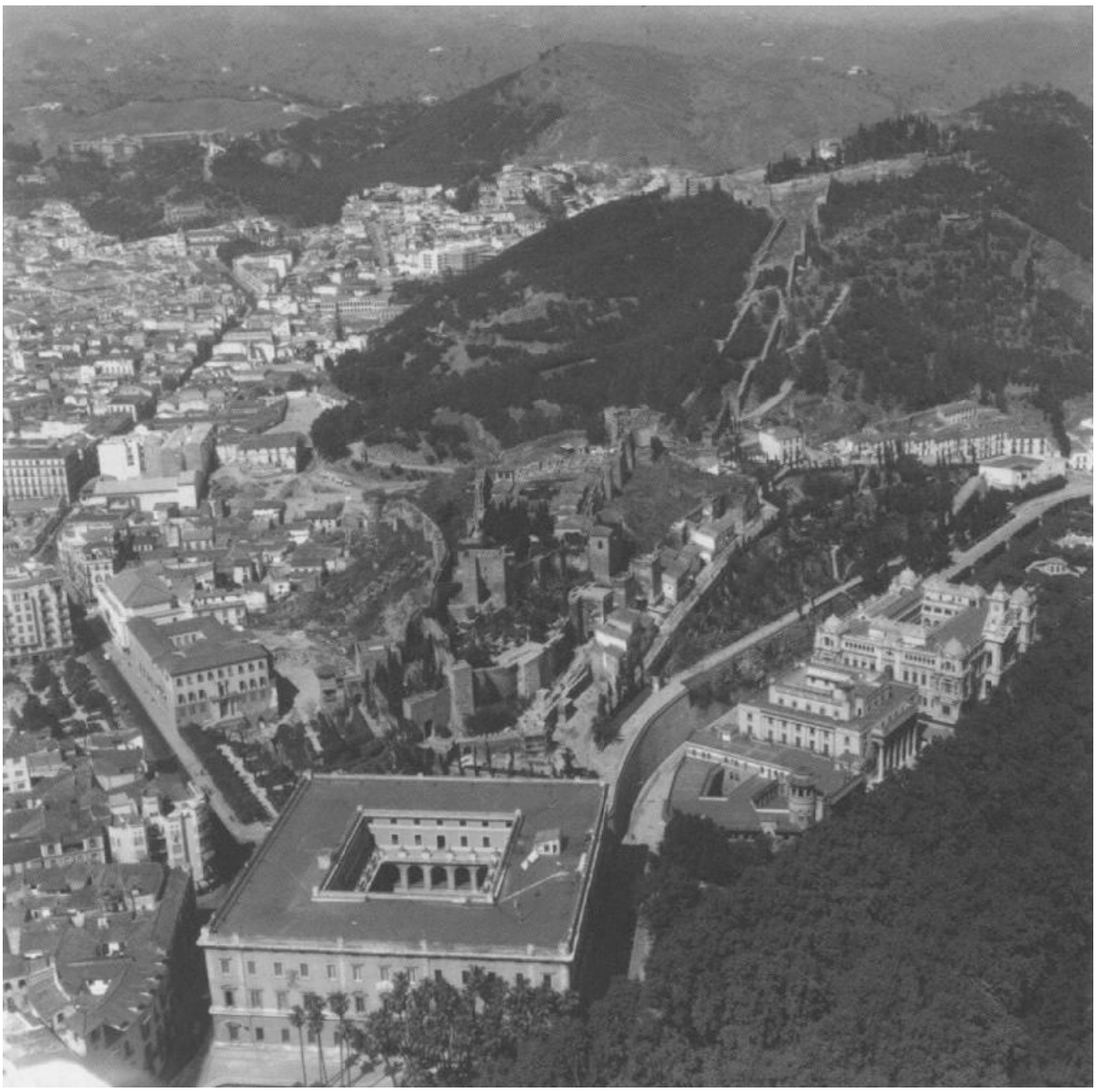

Fig. 1: The Alcazaba of Málaga and the Alcazabilla Street seen from the air in the sixties [3].



Fig. 2: Alcazabilla Street in the thirties [3].



Fig. 3: Former *Casa de la Cultura* on the roman remains [3].

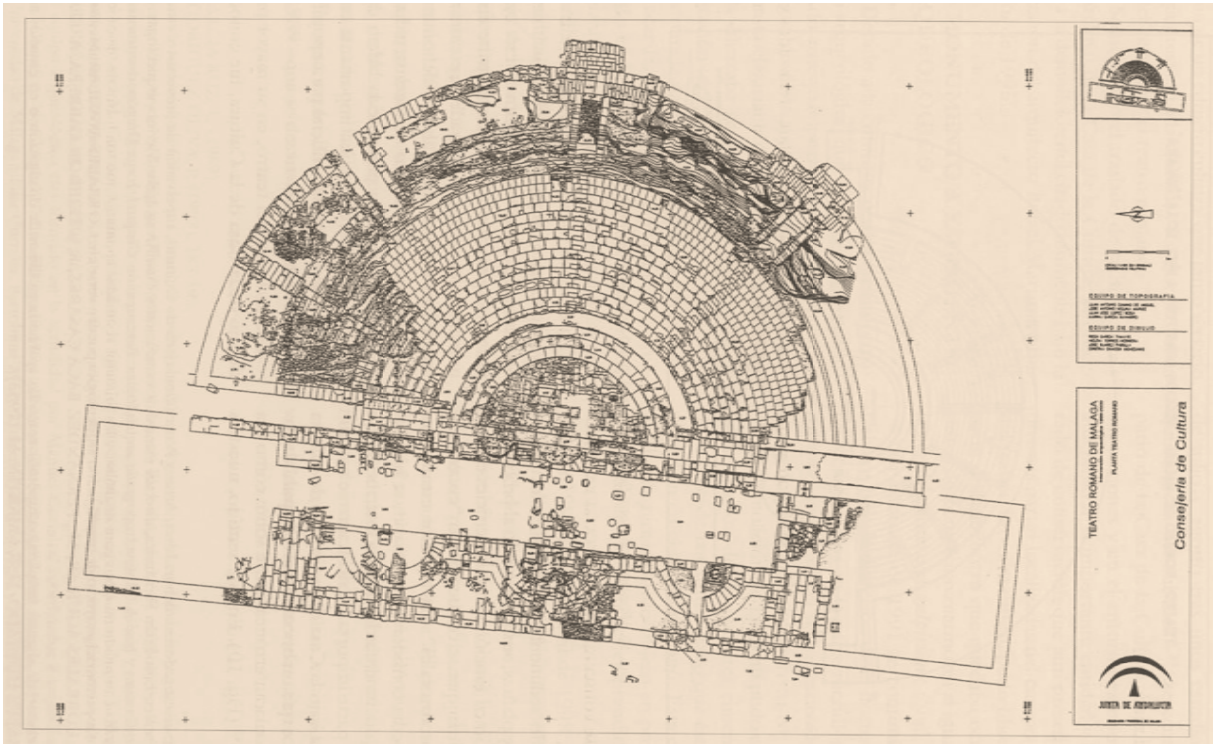

Fig. 4: Plan of the Roman Theater of Málaga in 2000 by Consejería de Cultura de la Junta de Andalucía [3].

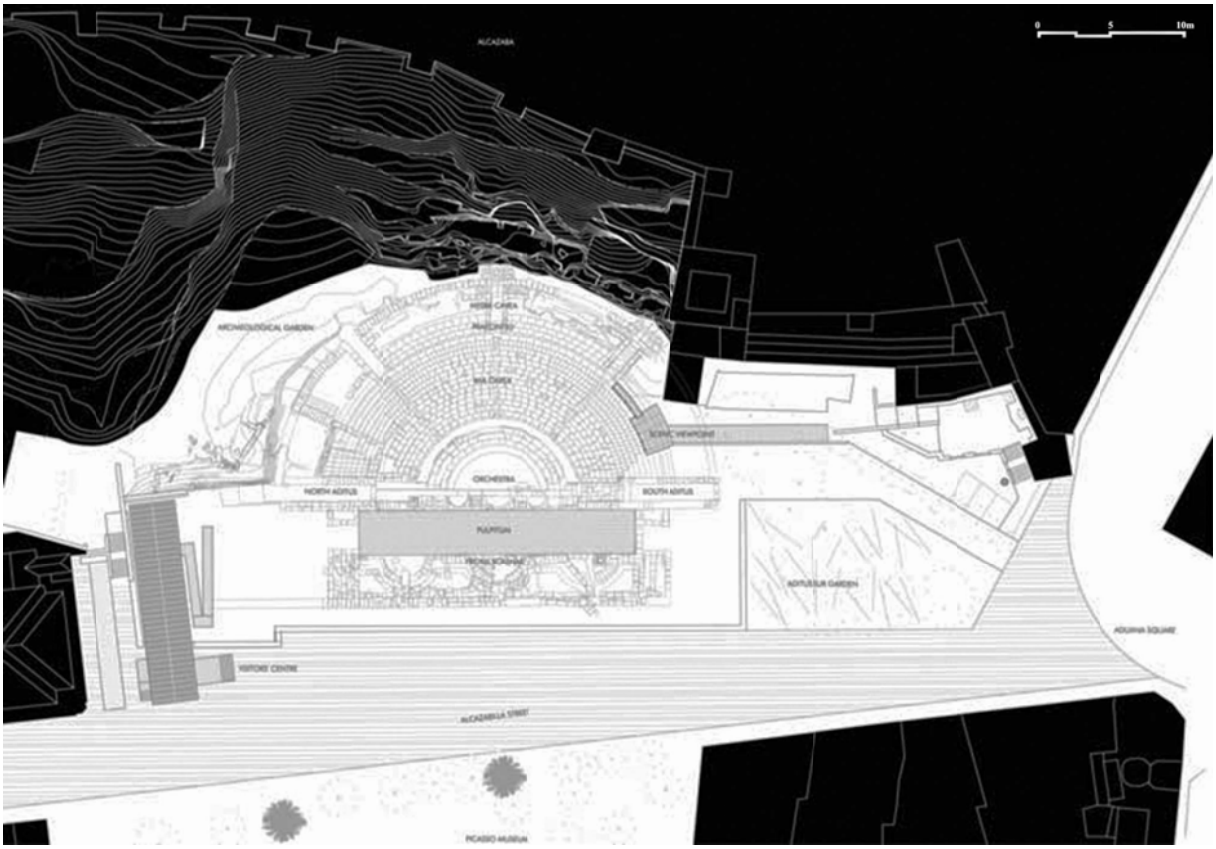

Fig. 5: Main floor of the conservation project of the Roman Theater of Málaga by Tejedor Linares & Associates [9].

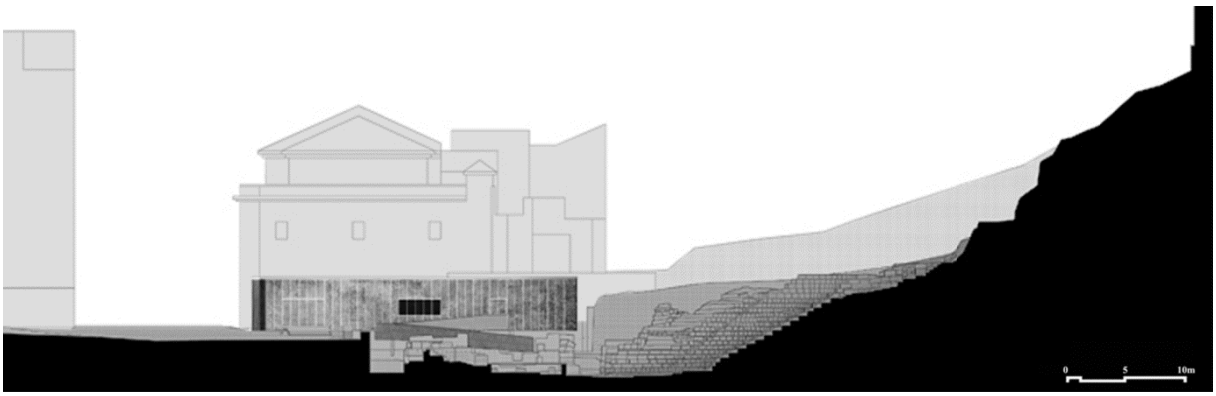

Fig. 6: Main section of the conservation project of the Roman Theater of Málaga by Tejedor Linares & Associates [9]



Fig. 7: Picasso Museum seen from the Roman Theater. [8].



Fig. 8: The Roman Theatre of Málaga currently by Fernando Alda. [9].



Fig. 9: Center of reception of visitors by Fernando Alda [9].



Fig. 10: Inside of center of reception of visitors by Fernando Alda [9].



Fig. 11: The Roman Theater seen from inside of center of reception of visitors by Fernando Alda [9].



Fig. 12: Viewpoint of *Aditus Sur* [8].

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Designing Future Heritage: Aldo Rossi's *Città Analoga* as Incomplete Algorithm of Individual Expression within Collective Imagination

Jean-Pierre Chupin
Director of the Research Chair on Competitions and Contemporary Practices in Architecture and codirector of the Laboratoire d'étude de l'architecture potentielle (L.E.A.P),
School of Architecture, Université de Montréal (www.leap.umontreal.ca)
jean-pierre.chupin@umontreal.ca

Abstract
Left unfinished at the turn of the 1980s, partly published as A Scientific Autobiography (1981), and since the unveiling of his personal notebooks (*quaderni azzuri)* by the Getty Research Institute in 1999, Aldo Rossi's theory of the *Città analoga* (Analogous City) can now be recognised as an original algorithm of architectural design within historical contexts. Furthermore, Aldo Rossi's analogical principles can be included in a general theory of the role of analogical thinking in design thinking be it at the architectural, landscape or urban scales. In a widespread situation of cultural uncertainty, the concept of the analogous city proposed to establish new relationships between "reality and imagination." This reality concerned the state of cities, historic centres and suburbs of Italy in the early 1970s and the fault – for Rossi - lay with architects as well as with critics and theorists unable to offer anything convincing against land speculation and fraudulent historic preservation. Among the problems listed by Rossi were broad questions on the role of architecture or the training of the architect, to issues of the city in a crisis of modernity: all still pertinent in our present condition. This criticism led him to set out two hypotheses: imagination and analogy. Although, in retrospect, Rossi's theory is illuminating in many ways, it is understood that he could have seemed cryptic in his Jungian tinted call to the problematic concept of "collective imagination".

Keywords: Analogous City, Aldo Rossi, imagination, analogical thinking, cultural landscapes

1. Aldo Rossi in search of design method in historical urban contexts
How can an architect intervene in a historical context without putting in danger the inherent quality of a city or a place? How can a project be in tune with the complexity of past and future urban interventions? In other words, what would be the most appropriate way to design the "architecture of the city"? If it is well known that some of these everlasting issues have been carefully addressed in Aldo Rossi first work as early as 1966, in his classic "L'Architettura della Città", it is also understood by most readers and followers that Rossi was not entirely satisfied with this first essay. Although some of his proposals have given way to a series of design methods of what came to be named the "typological / morphological" school, it was not clear in this seminal book how to operate in the complexity of urban texture from a contemporary, if not postmodern, standpoint. Since 1999, thanks to the reproduction his *quaderni azzurri*, blue notebooks gathering a collection of notes devoted to architecture that cover the period 1968 to 1992, we understand a bit better Aldo Rossi's reflexive path during a pivotal phase of his intellectual and professional maturity [1]. These notebooks reveal that as of 1969 (barely three years after the publication of *L'Architettura della Città*) Rossi envisaged the composition of a major book on the theory and pedagogy of the architectural project. In a way that could not be more symbolic, this book would have been entitled *La Città analoga*. Unless one considers certain passages in *A Scientific Autobiography* published in 1981 as fragments of such a work, the draft of the great treatise that Rossi nurtured for a time, would never see the light of day [5].

What did we know to date of the *Città analoga*? For some, it was a panel by Arduino Cantafora exhibited in Milan in 1973 (Fig. 1), for others, a provocation issued in Venice in 1976 by Rossi and some of his young assistants and disciples (Fig. 2), and for others still, a series of drawings circulating in New York in 1979, then in Toronto and elsewhere. Nothing in this would allow us to imagine the scope of the theoretical project on which Rossi worked assiduously during a period of almost 15 years. There were a few allusions to the theory of the "analogous city" as of the second Italian edition of the *L'Architettura della Città* (written in 1969, published in 1970) and in the Introduction to the Portuguese edition (written in 1971, published in 1977). But could Italian readers have imagined the central place that Rossi would accord to analogy at the turn of the 1970s? It is doubtful. Spanish readers would have had a little more luck because in 1975, Aldo Rossi published an article entitled, "La arquitectura análoga" in a special issue of the journal *2C: Construcción de la ciudad* [2]. In it he proposes a new strategy for the architectural project that rests on a definition of analogical thinking borrowed from Carl Gustav Jung, and he expresses his fascination for the analogical compositions of the painter Canaletto, master of the *vedute* and the *capriccio* (Fig. 3). But until 1976, only a few dispersed texts in Spanish, Japanese or Italian publications would be available to an attentive reader [3] [4].

Contributing to this in 1973, in the middle of the debate on *La Tendenza*, visitors to the Milan triennial discovered a large panel by Arduino Cantafora, reminiscent of the canvases of Giorgio de Chirico, enigmatically entitled "*La Città analoga*". In this oil on canvas, measuring almost 2m in height and 7m in length, Cantafora, then a regular collaborator of Rossi's presented an urban landscape comprised of numerous architectural references. In the Introduction to the architecture section of the catalogue of the 15th Triennale, it is in his role of guest director that Rossi comments on Cantafora's panel and defines the *Città analoga* as a system of composition that refers to the human dimension of the construction of cities over time, as an ethical stance making monuments as much points of reference as the articulation of collective memory. But Rossi does not co-sign this work, which he nevertheless commissioned, presenting instead a film, "Ornamento e delitto," inspired by the theories of Adolf Loos.

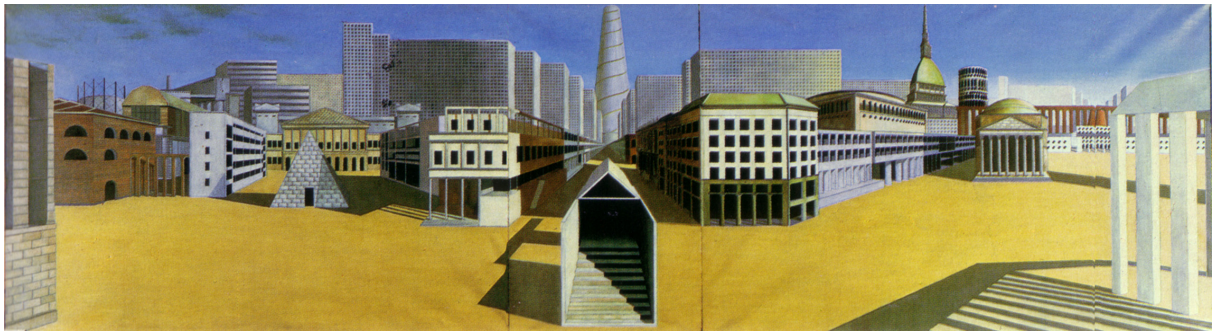

Fig.1: La Città Analoga by Arduino Cantafora (1973)

It must be said, that in its craftsmanship this first *Città analoga* resembles a décor, a painting more than a scene, in the double sense of theatrical and psychoanalytic, as I would now like to show with regards to the ambiguous and ambivalent version that was shown at the Venice Biennale in 1976. A collective undertaking by the architects Aldo Rossi, Eraldo Consolascio, Bruno Reichlin and Fabio Reinhart, this large, composite *Città analoga* measuring 2m by 2m is a monochromatic image (Fig. 2). This plate, intended to serve as a roadmap for *La Tendenza*, was published in most of the monographs and catalogues devoted to the oeuvre of the emblematic figure of this architectural circle of influence. Judging from issue 13 of the journal *Lotus international* that appeared in December 1976 and which devotes its opening pages to a connection ever since considered to be historic, between the explanation that Rossi gives of the *Città analoga* and the scathing response by Manfredo Tafuri, there is every indication to suggest that things were not so clear for the visitors to the Venice Biennale. Solicited by the editorial staff to comment on this image, Rossi agrees ambivalently, specifying that he is not explaining the piece, but rather stating its political and theoretical significance. In fact, as Pierluigi Nicolin will admit twenty-five years later, Aldo Rossi responded in anticipation of the attacks by Tafuri, which are included immediately after his text in this issue of *Lotus international* [4].

Among the problems that Rossi listed was nothing less than broad questions on the role of architecture or the training of the architect, to issues of the city in a crisis of modernity. In the context of a widespread situation of uncertainty, the concept of the analogous city proposed to establish new relationships between "reality and imagination." The principle of reality concerns the state of cities, the historic centres and the suburbs of Italy in the early 1970s and the fault would lie with architects as

well as with critics and theorists unable to offer anything convincing against land speculation and fraudulent historic preservation. This reading of the modern city leads him to set out two hypotheses: imagination and analogy. Although, in retrospect, this text of Rossi's is illuminating in many ways, it is understood that he could have seemed cryptic in his criticism of contemporary architecture coupled with a call to the imagination, going far beyond an analysis of the urban developments asserted in *The Architecture of the City*: a capacity of the imagination that must be pitted against reason and fits into the scheme of that which he calls a "dialectics of the concrete".

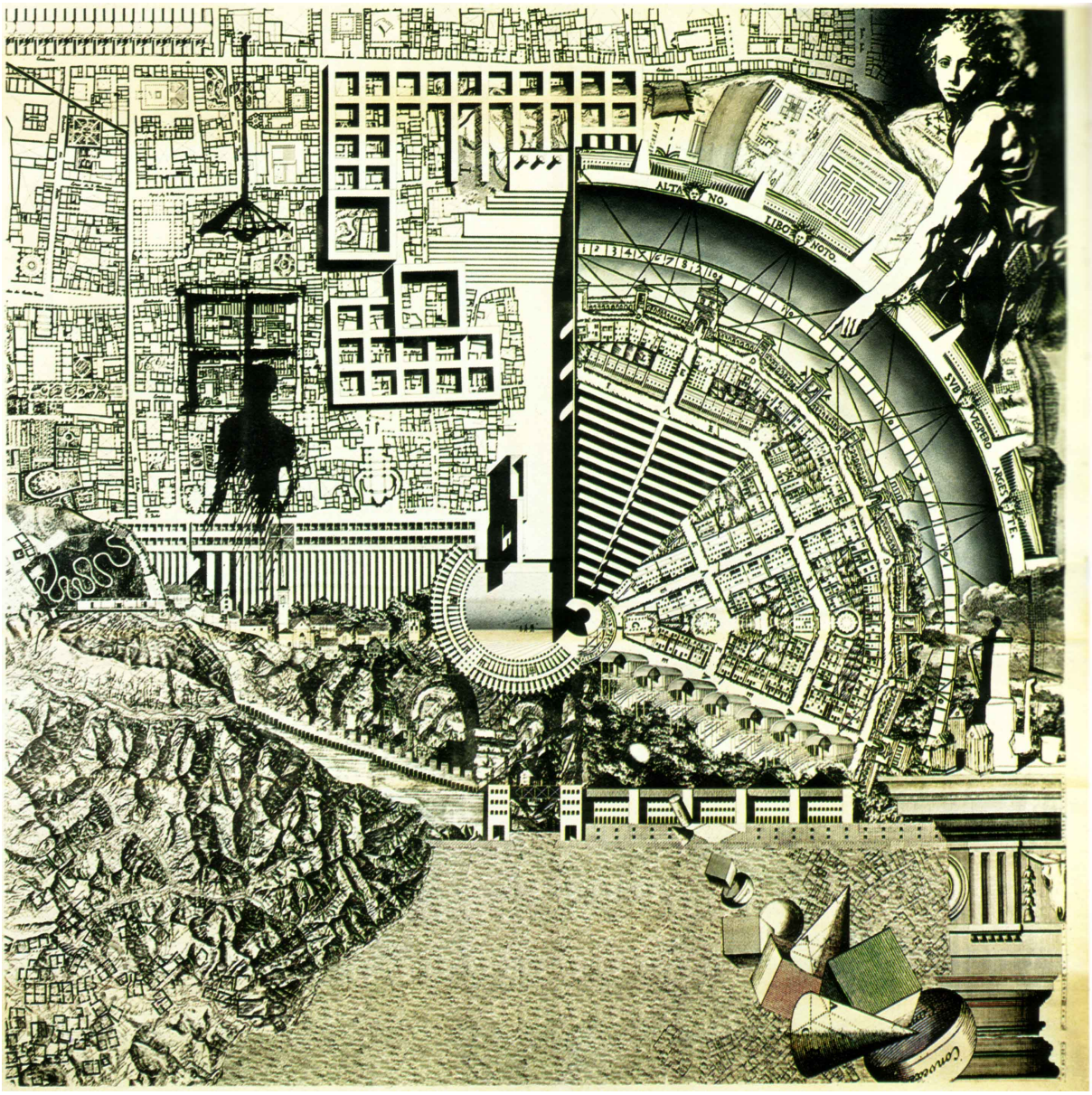

Fig.2: La *Città Analoga* by Aldo Rossi, Fabio Reinhart, Bruno Reichlin and Eraldo Consolascio. This emblematic scene was displayed at the "Europa/America" exhibition within the Venice Biennale in 1976. It is the object of many reproductions in the majority of monographs devoted to the work of Aldo Rossi. The theoretical legend of the *Città analoga* is generally associated with this montage.

For Rossi, the hypothesis of the *Città analoga* was based on the capacity of the imagination to be born of the materiality of things in itself, of their history, and the painter's gaze, the work of Canaletto in particular, would serve as a reliable method and model. A panel framing a Venetian scene dating from 1759, here plays a decisive role that will never lose its power in Rossi's development. This painting brings together the project for the Rialto Bridge, the Basilica of Vicenza and a view of the Palazzo Chiericati, juxtaposing real or imagined projects of Palladio on a site in Venice thus constituted as an intermediary world (Fig. 3). Rossi will confirm, on many occasions, that this painting constitutes an "Analogous Venice", a Venice that is imaginary and therefore very real: "Without the capacity to imagine the future there can be no solution to the city as an essentially social fact" [4].

But, he hastens to add that the panel exhibited at the Venice Biennale is not an explanation of the analogous city, for it cannot have an interpretation! This panel (*tavola* in Italian) advances an "analogical" process – in fact a true algorithm as designers would say nowadays - consisting of making new meanings emerge from the reinsertion of objects and projects according to a relatively arbitrary montage, but one that is of a moderate automatism: the whole is aimed at expressing a sense of environment and memory. Territories, concludes Rossi, with their signs and their emblems, are also the constitutive elements of collective memory.

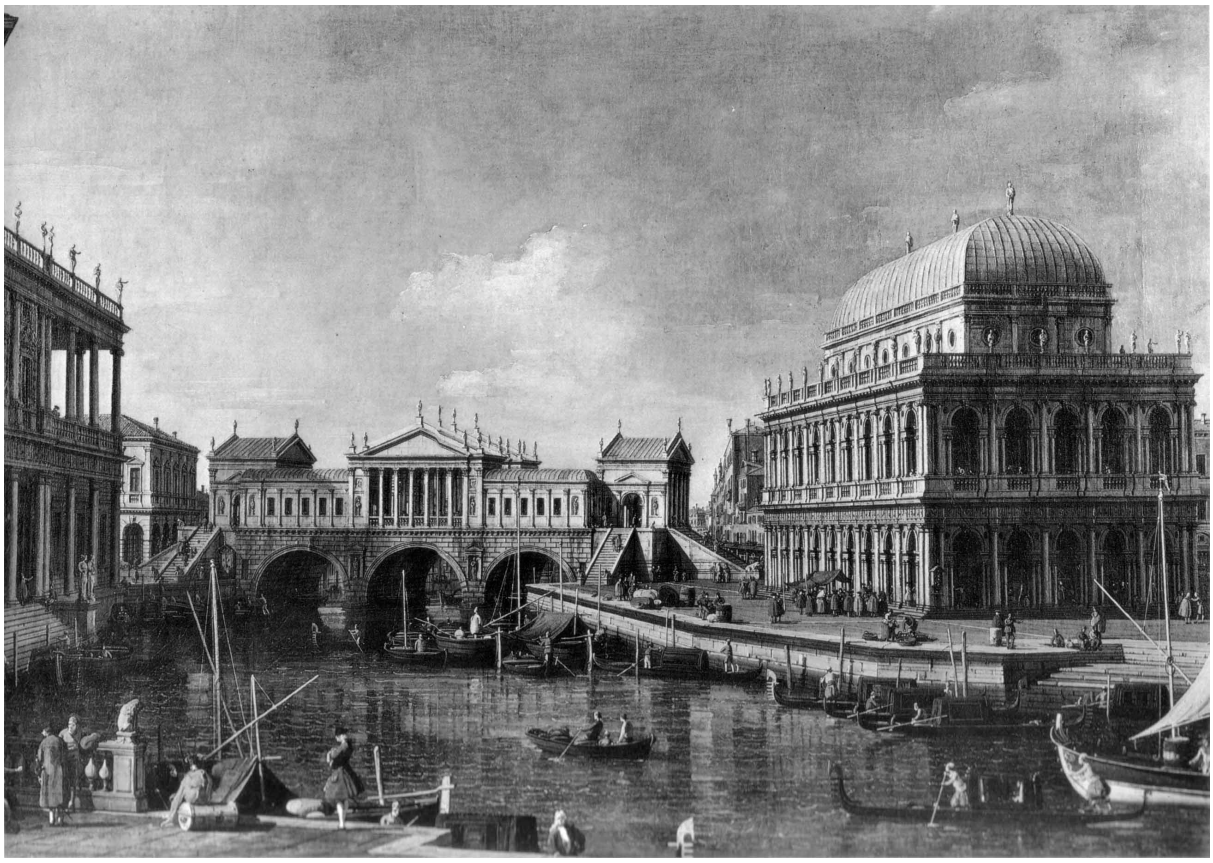

Fig. 3: Giovanni Antonio Canal (1697-1768) referred to his painting as "Capriccio con il ponte di Rialto secondo il progetto di Palladio, il Palazzo Chiericati e le Logge palladiane di Vicenza" (1759).

The *Analogous City* would be the emblem of a reality that one seeks to destroy but which resists. In the blue notebook number 21 (October 1976 – May 1977), a comment confirms this interpretation. In a nervous hand, Aldo Rossi qualifies the "analogous city" as "the response to the destruction of the urban centres and at the same time the construction of a new city." If the city is the ultimate human creation, as Rossi enjoys reminding us from his first book onward, alternately citing Viollet-le-Duc and Lévi-Strauss, he writes, "[t]he quality of architecture – the quality of the human creation – is the meaning of the city."

2. Critical fortune

Interestingly enough, and in spite of its cryptic character, the hypothesis of the Città analoga quickly found an echo and influence in various architectural doctrines that can be traced back in Italy, Spain, the USA or France. Indeed, we find several texts referring to analogy in the wake of Rossi's theories, spanning nearly a decade after 1976, which include Giancarlo Durisch, Vittorio Gregotti, Ignasi de Solà-Morales Rubió and Kenneth Frampton [7]. For example, in issue 15 of *Lotus international*, Giancarlo Durisch introduces an "analogical analysis" of his house of Riva San Vitale in an article entitled, "Le figure analoghe – Analogous figures". In 1979, this time in issue 22 of the same journal, Vittorio Gregotti also engages in the game of analogy in an article entitled, "Analogie e confronti – Analogies and comparisons." In the two cases, we note that the composition of each page layout is as analogical as it is carefully thought out and didactic. The blossoming series of *Lotus* issues extends until 1985, when, in volume 46, Ignasi de Solà-Morales Rubió publishes a fine article entitled, "From Contrast to Analogy: Developments in the Concept of Architectural Intervention [15]." This text, that draws from the Gestalt theory of Köeller and of Koffka, returns to the question of the tension between

ancient and contemporary architecture. For Solà-Morales, the technique of photomontage or those of "analogous perspective drawings" can highlight a contrast between the old and the new that does not mean a repudiation of historical heritage. They are techniques of "extracting" that facilitate a mutual recognition between the present and the past. Alluding to (but not quoting) the title of Gilles Deleuze's 1972 book, *Différence et répétition*, he redefines analogy by drawing at times from the project by Erik Gunnar Asplund for the extension to Göteborg's City Hall (1913-36), and at times from Carlo Scarpa's project for Castelvecchio (1957-67). Here again, the definitions are worthy of insertion into the general framework of our inquiry into analogy. Concerning Asplund he writes: "Difference and repetition were seen simultaneously through a controlled handling of the relations between similarity and diversity that are proper to any *analogical* operation". The architecture of Scarpa inspires in him a different understanding of architectural analogy: "Here the *analogical* procedure is not based on the visible synchronism of interdependent orders of form, but on the association made by the observer over the course of time. By this means situations of affinity are produced and, thanks to the connotative capacity of the languages evoked in the intervention, relations or links are established between the historic building – real and/or imaginary – and the elements of design that serve to make the building effectively dependent" [15].

This definition, clearly influenced by Rossi's argument, interprets the *Città analoga* as an intermediary space between the real and the imaginary. In the end, Solà-Morales evokes the critical reception of Rossi's "typo-morphological" analyses and confirms the failure of the architectural analysis in its operative relationship to the project. Instead he valorizes an aesthetic operation, an imaginative approach that is arbitrary and liberating (the allusion to Rossi's proposition being evident here too), before concluding with the pertinence of the comparative dimension of analogy in architecture (as Gregotti did six years prior).

3. Aldo Rossi's quest for an analogical algorithm

At this point we can already summarize Rossi's path through the hypothesis of an "analogical algorithm" by distinguishing three periods:

- The first period that we could describe as "the shock of Canaletto" and which goes back to the mid-1960s;

- The second period, corresponding to a definition of analogy written in a letter from Jung to Freud which comes to light in 1975, coinciding with the publication of the first monograph on Rossi's oeuvre by Vittorio Savi resulting in a process of an increasingly pronounced process of personal identification between Rossi's life, his work and his theory;

- And finally the third period, which corresponds to a reading tinged with mysticism, of the surrealist novel *Mount Analogue* by René Daumal (1943), the analysis of which would go beyond the scope of this paper.

As part of this overview, we will stick to emphasizing that the reference to Canaletto will remain a consistent backdrop for Rossi, the absolute model of an operative ambition articulating the project around a principle of architectural composition. We need to focus, however, on the second period in which an obscure letter from Jung to Freud plays a major role in Rossi's understanding of analogical thinking as opposed to rational or logical thinking. Beginning with the passage in Rossi's text "An Analogical Architecture", published in the Japanese journal *A+U*, the original translation by David Stewart facilitates our understanding of the issue central to our demonstration [3]. Rossi summons that which he presents as Jung's intellectual authority in matters concerning analogy: "This concept of the analogical city has been further elaborated in the spirit of analogy toward the conception of an analogical architecture. In the correspondence between Freud and Jung, the latter defines the concept of analogy in the following way: "I have explained that 'logical' thought is what is expressed in words directed to the outside world in the form of discourse. 'Analogical' thought is sensed yet unreal, imagined yet silent: it is not a discourse but rather a meditation on themes of the past, an interior monologue. Logical thought is 'thinking in words'. Analogical thought is archaic, unexpressed, and practically inexpressible in words." "I believe [writes Rossi] I have found in this definition a different sense of history conceived of not simply as fact, but rather as a series of things, of affective objects to be used by the memory of a design".

For Rossi, this remark of Jung's is anything but insignificant. It opens the way, literally, to a redefinition of the history of architecture, no longer a simple repertoire but a series of affective objects mobilized by memory during the design of a project: as a "meditation of subjects from the past". To understand how Jung's suggestion will have a double effect of liberating both visual analogical thinking and self-censorship regarding the possibility of theorizing, and thus, to put into words, the architecture of the

city, in other words, to appreciate this confrontational turning point, it is necessary to introduce an actor and key witness to his American period. Rossi's experience of America will coincide with a characteristic acceleration of psychological explanations of the *Città analoga*, and the American architect Peter Eisenman will play a key role in this introspective phase [6].

In the catalogue for the exhibition *Aldo Rossi in America: 1976 to 1979*, Peter Eisenman publishes a first attempt to interpret that which he calls straightforwardly "analogical thought" under a title that is at once inspired and binding: "The House of the Dead as the City of Survival [8] [12]." The essay is structured in three parts functioning as a dramatic crescendo: "Part I: Architecture assassinée: Architecture Abandonée [sic], Part II: Città analoga: The City of Survival, Part III: The House of the Dead". Few commentators will go as far as Peter Eisenman in the inferences they draw from the Jungian quotation, but all or most, reproduce it alongside the 1976 image of the *Città analoga*: as two mutually-completing emblems. We cannot however, name Eisenman as the main protagonist of analogy's Jungian spin, since Rossi himself was particularly negligent in the semantic dissemination of the translations. When we consider the phenomenon more attentively, we discover surprising operations of semantic distortion, and it requires the greatest vigilance to follow our architect quoting Jung (in his blue notebooks), from an Italian translation of the English (the original in German unpublished), translating this quotation the same year in an article in Spanish, published a few months before an English translation, figuring prominently in a Japanese journal. This quotation is found later in an American version of the original Italian (referring to the Spanish publication), but distances itself considerably from the version offered in the English publication edited by McGuire and translated by Hull and Manheim in 1974, being the most common and most reliable reference [13]. From a strictly historical point of view, it is also the first time these letters were published. One thing that is certain is that the systematic comparison of the excerpts reveals the reason for the semantic slippage: analogy's inexpressible dimension.

4. An incomplete algorithm

Today we can rightfully ask if Rossi really read in depth the correspondence between Freud and Jung, published in English and in Italian beginning in 1974, or if he was familiar only with this excerpt [13]. One could already suspect the latter from reading the monograph by Vittorio Savi, which was the first to introduce this quotation [10]. This account exposes us to a case of assisted reflexivity, all the more troubling, in that it is based precisely on the role of analogy in the architect's process of thought and creation [16]. Rossi appropriated it and the successive translations did the rest.

That said, even if Rossi on his own would have unearthed this rare passage on analogy in the correspondence of the two psychoanalysts, it is clear that its true theoretical impact could not have been based on a stronger psychoanalytical ground. Everything indicates that analogy was not at issue in this letter between Jung and Freud, which certainly did not constitute an "act of revolt" as Peter Eisenman eagerly presents it, in a translation a bit too interested in the Italian expression "*un atto rivolto all'interno* [12] [14]." Placed in its context, the exchange confirms that Freud and Jung, who return quickly to questions of organization surrounding a colloquium on psychoanalysis, were not engaging in a major debate on the inexpressible in analogy. Unfortunately, we do not have Freud's original and probably severe letter, to which Jung replies to what must have been his mentor and friend's criticism and lambasting. We have a sense of their imminent break through this tension that grows from letter to letter, and Jung's first words reveal the severity of the misunderstanding engendered by words. From there, to say that Carl Gustav Jung is going through a period of evaluation of the unspeakable and of images, there is but one step for him to cross into a redefinition of analogy or from that which he calls "fantasy thinking."

However, we realize also that which must have deeply inspired Rossi, in this presentation of history as a "rumination on materials belonging to the past": how this singular definition of analogy did not only sink into a return to metaphysical silence, but also, resulted in self-censorship with an emphasis on the visible to the detriment of the readable, on the unconscious instead of the reflexive, and on personal fiction at the expense of theorization. Having situated the imagination at the summit of a mountain as invisible as it is unattainable, and seeing in analogy a visible door – the means to climb its contours, both scientific and autobiographical – the case of Rossi is remarkable in the way in which an architect seeks to think through a theory starting from his own projects.

Placed under the emblem of *la Città analoga* at the turn of the 1970s, the theoretical work of Aldo Rossi continues to avail itself as a hypothesis of the central place of analogy within the architectural project. Rossi's quest, which was even more personal than intellectual, nevertheless experienced setbacks that were intimately related to the risks of a body of research that led him from an attempt to state the principles of architectonic composition, to the poetic silence of a mysticism of inversion, by

passing through a Jungian redefinition of archetypal imagination, which was as risky an undertaking as it was incomplete. From that moment on, it is not so much the misinterpretations that matter, as what they reveal about a search that is openly mystical. This has to do with a definition of analogy able to formulate a theory largely going beyond the one operative goal, to make the project of architecture a process in which we never know the outcome, itself analogous to something else that we do not know: from project to project, from one silence to another. As Rossi admirably summarizes in a particularly inspired aphorism: “Perhaps a project is merely the space where the analogies in their identification with things once again arrive at silence” [5].

Invested in this quest for autonomy and opposing himself to the prospective expectations of modern architecture that, in his eyes, made a *tabula rasa* of the history of places, Rossi wanted to define the conditions of a retrospective anticipation of the architecture of the city, bringing into play memory and perception in a vision of that which Walter Benjamin called the “aura” of the city. And the architect of the “Theatre of the World” believed very early on in finding the sign of an absolute method in the emblem of the “analogous city” that would be even more aesthetic than scientific. But, that which quickly became a legend – to the point of inspiring a generation of architects, some of whom still hold high positions, particularly in the Swiss schools – however, was lost in a holistic, unifying and inexpressible conception of analogy [17]. The contradictions between the fragments of its definition were insurmountable, to the point that today we may conclude that despite his efforts, Rossi had voided analogy of its power to open up the realms of difference and otherness. When the cycle of inversions ends with bringing the player to the starting point, the risk of condemning the project to immobility and repetition is great, despite being hidden behind the talent of the poet.

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HERITAGE ARCHITECTURE LANDESIGN
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Kultur-Fabrik-Perugia

Paolo BELARDI[1], Valeria MENCHETELLI[2], Luca MARTINI[3]
(1, 2, 3) Dipartimento di Ingegneria Civile e Ambientale, Università degli Studi di Perugia, Perugia, Italy
belardi@unipg.it, valeria.menchetelli@unipg.it, lucamartini1978@gmail.com

Abstract
As in most Italian cities, the historic center of Perugia has been experiencing for some time now a steadily accelerating process of social deterioration. Despite this deterioration, the city center's identifying features, understood as the sum of it material and immaterial goods remains strong and rich in positive elements. The latest evidence of this continuing vitality is Perugia's candidacy to be designated as European Capital of Culture for the year 2019; the city's commitment to outfit itself with facilities and spaces capable of hosting large-scale cultural events.
In this context, the research project Kultur-Fabrik-Perugia, inspired by Stefano Boeri's invitation to "do more with less," aims to promote the revitalization of the historic center and encourage the internationalization of culture. The project is founded on the idea of transforming the historic center of Umbria's capital city into a European Capital of Culture in the literal sense, or rather, to reorganize it as a system of strategically-distributed European-state "cultural embassies," by identifying, studying, and recovering its areas and locations which are currently in disuse. These rediscovered locations will then be integrated into a network for the virtuous transformation of the city into a veritable "factory of cultural awareness and dialogue" of international rank, thus prefiguring a possible strategy for the regeneration of the historic center at no cost to the local community.

Keywords: Perugia, regeneration, culture, survey, project

1. From city-cum-museum to museum-cum-city
In 1975 the Council of Europe published a cartoon titled *It is your town: know how to protect it* signed by Yona Friedman. It listed the problems plaguing the historic centre of *Whateborough*, an imaginary sample-city built upon successive layers and integrations of the original central nucleus. The main caption was a question meant to be rhetorical: *who wants to live in a museum?* [1]. Aiming to defend the right to gain access to even the most difficult-to-get-to areas of our cities, such a question left no room for uncertainty as to what the right answer should be: *nobody!* And back then it could not have been any different. After the 1964 promulgation of the International Charter for the Conservation and Restoration of Monuments and Sites [2, pp. 162-164], museification represented a real disciplinary nightmare with which every project undertaken in the field of historic centre recovery had to come to terms. The inevitable result was it entanglement in a series of issues set against the trend to turn heritage sites of historic and artistic interest into picture-postcards. Things, however, change, and so too does our point of view. Indeed today, if posed the same question, we would not be so quick to answer and would, to the contrary, entertain several doubts. Perhaps we might even think back to what Aldo Rossi lucidly said on the topic, and that is, that the problem of the postindustrial age has never been a matter of avoiding the risk of the city-cum-museum, but rather managing the opportunities of the museum-cum-city [3, pp. 365-369]. Besides, the crusades launched against the excessive development of historic centres as picturesque discoveries placed at the mercy of tourist consumption have proven to be a failure. Consider too that, despite its small size, with 60 million people living just over 300 square kilometres, our country holds approximately 40 per cent of the planet's artistic and architectural heritage [4]. Perhaps, then, it is well worth the effort to seek out alternative solutions. Why should we not endeavour to go beyond the sterile struggle between conservation and innovation and bet, rather, on an hypothesis of reconciliation? In such a way, we would not be sitting back passively but, to the contrary, actively participating in the transformation of

our historic centres into a veritable network of cultural producers. That is to say, given that culture regards not only the past but also the present, and topics such as progress and sustainability, why not endeavour to guide the process of museification concerning our historic centres with greater virtuosity (from certain points of view it is unstoppable anyway) while contrasting the drift towards formal inbalsamation and favouring the convergence towards functional development? Besides, in the era of mass culture, museums are no longer obsolete structures or static places, but rather dynamic containers evolving all the time. They are receptacles of interrelated knowledge that, in actual fact, are the only urban component truly capable of taking on omnivorous city logic [5, 6, 7, 8]. Taking the opportunity to expose the most anachronistic of prejudices, on the one hand, it is precisely the small historic towns that participate the most in cultural activities and display the greatest capacity for innovation. On the other, not only is residential attractiveness not penalized, but it is actually fostered by the opening of local museums [9]. This is demonstrated by exemplary projects which the various local governmental bodies have taken on with great commitment and at great expense, such as the *Great Court at the British Museum* in London, the *Museumsinsel* in Berlin and the *Musée des civilisations de l'Europe et de la Méditerranée* in Marseille, or at no expense at all, such as the experiment carried out by the City of Milan *Piano City*: "240 piano concerts over three days in private apartments, studios, courtyards, and libraries, carried out thanks to the appeal made to all the pianists of Milan, including concert pianists, teachers and amateurs, to execute one piece each. A web site managed all the bookings and venues for the audience who then wandered around the city gradually piecing together their own concert programme" [10, p. 31].

2. From regional capital to European capital

The Cities of Perugia and Assisi emblematically set out on their joint venture together as candidates to become the European Capital of Culture when the respective mayors shook hands in front of a line up of flashing cameras in November 2010 [11]. Since then, the candidature has taken on form and made vital decisions, the most important of which was the competetion in search of a logo. On 31 January 2011, 225 proposals were made by professionals, students and other keenly interested persons [12]. In time, and respecting its own ideals, the candidature extended its reach to all its regional boundaries where the main municipal administrations expressed their support [13]. Such support was also expressed by the President of the Region of Umbria, Catiuscia Marini [14]. The undertaking then received even greater coverage when its candidature became official on the last day of Festarch 2012 (International Festival of Architecture) that was held Perugia 5 June 2012 during which the winning proposal, created by the designer Francesco Panzella, was also presented as the official logo [15]. Nevertheless, beyond the buzz of the press, it is also obvious that the Perugiassisi 2019 Foundation is facing a complex challenge that, before anything else, implies a re-thinking of the role of urban reality in Umbria within the national and European context [16]. It implies, that is, renewed emphasis on themes such as sustainability, which should be cultural before it can be environmental, inclusiveness in social solidarity, and innovativeness in the model of development. On 12 April 2012 the Foundation (constituted by the Region of Umbria, the Municipality of Perugia and the Municipality of Assisi, with the participation of, amongst others, the University of Perugia, the University for Foreigners of Perugia, and the Academy of Fine Arts of Perugia) nominated the Administrative Board in the persons of Bruno Bracalente, as president, Stefania Giannini and Andrea Ragnetti. It then nominated the Advisory Committee, including illustrious names such as Ilaria Borletti Buitoni, Pierluigi Celli, Giuseppe De Rita, Alberto Grohmann and Bruno Toscano, and the Artistic Director, Arnaldo Colasanti. The first job that the various bodies were to carry out was to draw up a plan defining the vision on which the entire candidature should be founded: the title of European Capital of Culture is assigned on the basis of the capacity to plan events in the long term "of European significance […] placing culture as the strategic resource for economic and social growth" [17]. It is with this very spirit that the European Union selects two nations every year whose cities, which may draw upon their own surrounding territories, can enter the competition for the title; Italy and Bulgaria were offered this possibility for the year 2019. For this reason the cities of the two nations chosen must present their final dossiers for the candidature by September 2013. In September 2014 the selection panel, made up of seven European experts and six national experts, shall select the winning city. Over the years, the coveted title has come to be known as a flywheel for economic, social and cultural growth for the cities that have been lucky enough to hold it. A case in point is Lille (2004) which significantly boosted the image of the region on an international level. To reach such an objective, however, the historic-artistic patrimony or the cultural events already up and running are not the only elements taken into consideration. An evaluation is made of the long-term cultural projects that a candidate city proposes to carry out before, during and after the year for which the title is assigned. This brings out the creative capacity to develop its own historic and cultural heritage with a sense of belonging to the European Community while favouring the use of new technologies and the involvement of young people. In particular, what this means for Perugia, Assisi and Umbria is the need to hone its capacity to re-read in an innovative fashion all those unique characteristics that have made them famous today, starting from their heritage (from

preservation to development) and including the architectural treasures (from the medieval hamlet to the smart city) while passing through (lan)design (preservation of the landscape to landscape design) [18] and thus truly transforming Perugiassisi into an "augmented European capital" of culture.

3. From a place of physical constraint to a place where ideas can freely circulate

Taking on Stefano Boeri's invitation to "do more with less" [10], the research project Kultur-Fabrik-Perugia, co-financed by ANCE Umbria and the Chamber of Commerce of Perugia, plans to promote the revitalization of the historic centre, knowledge, cultural dialogue and the internationalization of culture. Indeed, Perugia's candidature (together with Assisi and Umbria) to become the 2019 European Capital of Culture, has also brought about a collaborative project between the University of Perugia and the Perugiassisi 2019 Foundation founded on an idea which is both simple yet also subversive: to turn the historic centre of the capital city of Umbria literally into a European Capital of Culture by re-organising it as a system of "cultural embassies" of the member states of the European Union strategically distributed within its heart. Via investigation and project experimentation carried out also perhaps as learning experiences, the areas and containers currently abandoned or under-used can be sought out, taken over and brought back to life by involving them in a network aimed at virtuously transforming the city into a "knowledge factory" at an international level. One such area and container of particular importance is the former men's prison in Piazza Partigiani. It was built as a true icon in the area of greatest potential for transformation created in post-unification Perugia after the sixteenth-century Rocca Paolina, designed by Antonio da Sangallo, had been demolished by popular acclaim. Built between 1865 and 1870 on a project by Giuseppe Polani (who in the same period also signed the imposing detention structure in Turin called *Le Nuove*), the building presents distributive characteristics typical of structures for detention and segregation, with a panoptic plan with four arms and a cell-like scheme comprising nearly 350 units. The modifications the building took on in the course of the twentieth century have not, however, altered the original structure to any substantial degree and have effectively seen it through to the third millennium practically intact from the point of view of its typology. The former prison has not been used as such for more than twenty years and various proposals have been made as to what should be done with it, the most interesting of which were developed during the project *Disegnare Perugia. Tra natura e artificio* [19]. The final exhibition of this project showed sketches and plans for its transformation developed in the early nineteen-nineties in the teaching programmes enacted by the then Istituto di Disegno Architettura Urbanistica (Institute of Design & Urban Architecture). These depictions raised an issue, which is still undeniably topical today, and brought it to the attention of both the people of Perugia and the scientific community at large. Many other examples, analogous in both typology and aim, have been made throughout Italy, Europe and the world. These range from the former jail called Le Murate, in Florence, converted into a residential-managing-commercial mix on a concept by Renzo Piano, to the former jail in Ferrara that now houses the National Museum of Hebraism and the Holocaust; from the Langholmen Hotel in Stockholm to Hostel Celica in Lubiana, both former penitential centres now remodelled as hotel structures; from the Plaza de Toros Las Arenas in Barcelona, turned into a state-of-the-art shopping mall, to the New University of the Arts in London, set up in the former Granary Building after complete refurbishing; from the Jail Hostel in Ottawa, which was hewn from the former Nicholas Street Gaol, to the Liberty Hotel in Boston, built out of the former Charles Street Jail. In the wake of such transformational successes, the Advisory board of the Perugiassisi Foundation has chosen the former jail in Piazza Partigiani as both its symbolic seat and its manifesto for the candidature of Perugia as 2019 European Capital of Culture. Workshop events will be organized in conjunction with Italian universities to turn this place of physical constraint into a place where ideas can freely circulate via its transformation into a "smARTvillage", a citadel-cum-laboratory-cum-workshop dedicated to the development and enhancement of youth creativity. At the same time a possible strategy is thus foreseen for regenerating the urban fabric at no cost for the local community so as to create yet another example, in the light of pilot experiences such as Gianfranco Caniggia's in Como, Pier Luigi Cervellati's in Bologna and Giuseppe Pagnano's in Siracusa, of a new "Italian way" of understanding historic centres and bringing them back to life.

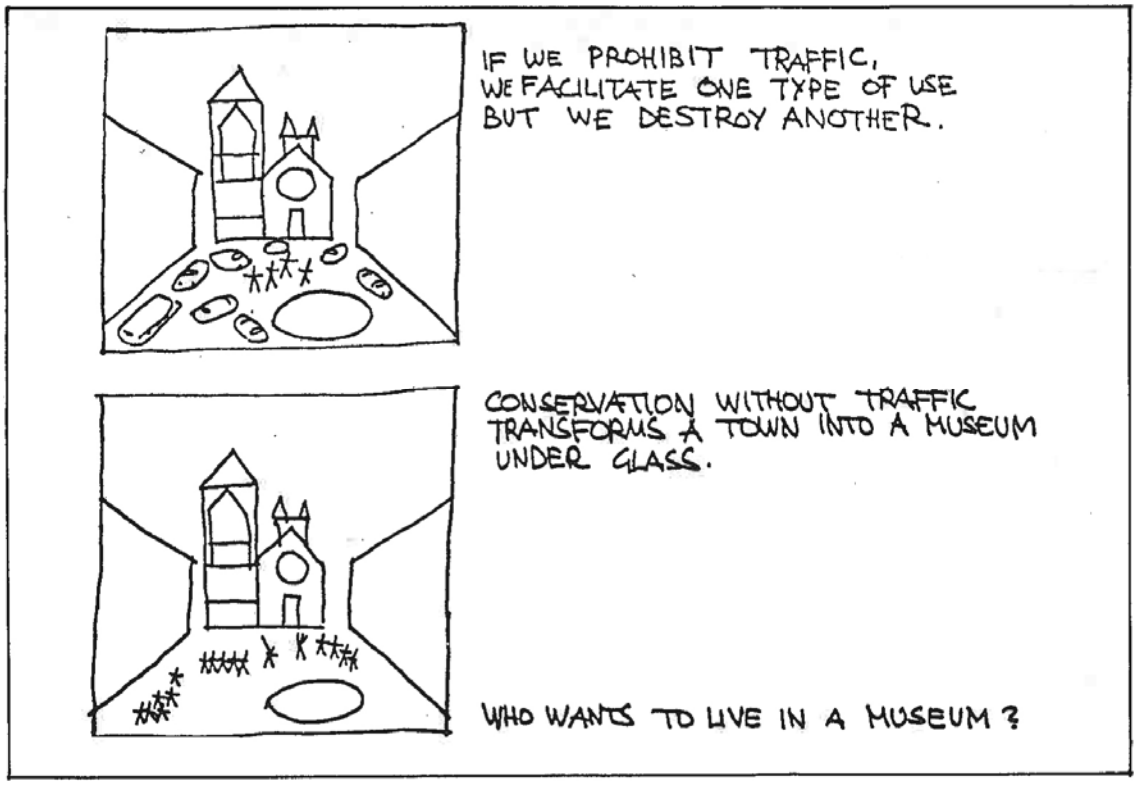

Fig. 1: *Who wants to live in a museum?* (Yona Friedman, 1975)



Fig. 2: London, Great Court at the British Museum, (Foster + Partners, 1994-2000)



Fig. 3: Perugiassisi 2019, logo (Francesco Panzella, 2011)



Fig. 4: Perugia, meeting to promote Perugiassisi 2019 candidature

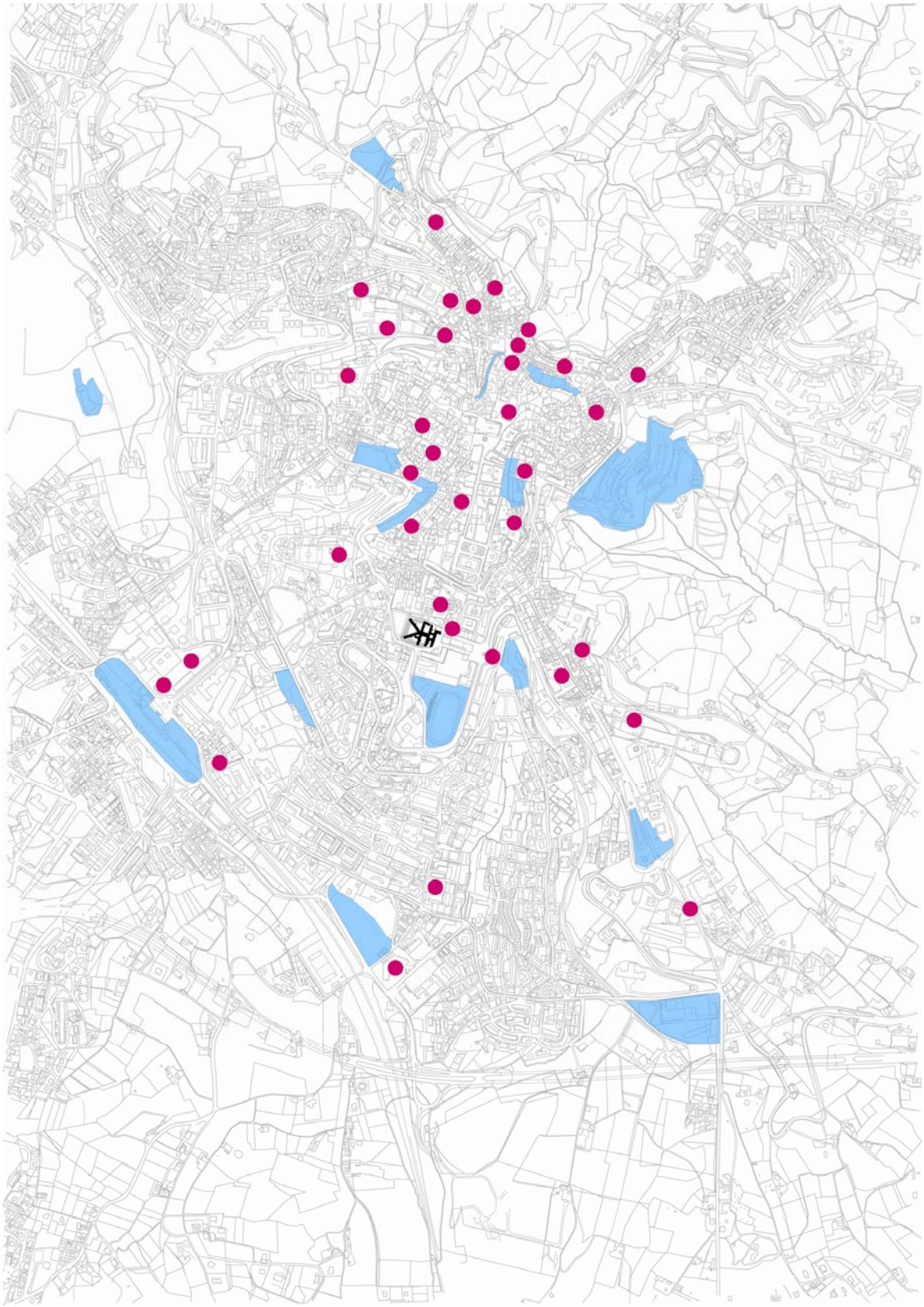

Fig. 5: Kultur-Fabrik-Perugia, map of the areas and containers abandoned or under-used (IDeA, DICA, University of Perugia, 2013. Scientific supervisor: Paolo Belardi, 2013)



Fig. 6: Perugia, former men's prison in Piazza Partigiani, bird's eye view



Fig. 7: Perugia, former men's prison in Piazza Partigiani

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Interpreting the Transformation of the Identity of Asmalimescit

Avşar KARABABA (MSc, PhD Candidate)
Architectural Design, Faculty of Architecture, Istanbul Technical University, Istanbul, Turkey
avsarkarababa@gmail.com

Abstract
This study focuses on an old quarter of Beyoglu in the city of Istanbul, called Asmalimescit. In the last decade this historical settlement, where once out of sight taverns, artisan shops and artist ateliers were used to be located, became a favored place for urban nightlife activities and entertainment. Both the historical pattern of its built environment and the lifestyles of its users have significant influence on the socio-cultural transformation of the area. At the same time the neo-liberal economy and the global culture politics that are transforming the area are reflected on the architectural production in the area. Transformation can be investigated in relation to the concept of identity. This study aims to interpret the identity of Asmalimescit, which is in a state of *Becoming*, as Lefebvre puts it "a continuous development … punctuated by leaps." In this regard, the prevalent and ongoing transformation of the identity of the area is read through relational experience. The superimposed relations of the tangible and the intangible stimuli of the area are studied through a parallax position. Could understanding Asmalimescit through the concept of identity interpreted as *Becoming* problematize the relations of materiality and immateriality and generate alternative ways of dealing with the effects of globalization?

Keywords: transformation, *Becoming,* identity, relational experience, parallax position

1. Introduction
This article attempts to understand the constant transformation of Asmalimescit through the concept of identity, which is employed to construct an interpretive framework. Asmalimescit [1] is scrutinized as a fragment of the city of Istanbul, which includes relations in itself and related to the city - and the global world on a higher scale. The transformation of its identity is explored, in Lefebvre's terms, as *Becoming*, via the contradictions of local-global, past-future, repetition-difference, tangible-intangible. In this study, the identity of Asmalimescit is understood and interpreted through relational experience of the body within space-time. Merleau-Ponty refers to the body as the source of experience, without which the experience would not be possible.[2] Furthermore he argues that the body is the very location of metamorphosis and exchange. The body produces and reproduces itself through relations it constitutes with space-time as well as other bodies. Therefore the body is not a closed and static entity, but it is open to interaction and therefore in a constant transformation. The space is also constantly transformed due to its relations with body and time, and transforms the body simultaneously.

2. Re-interpreting the Concept of Identity
In the Western oriented modern thought, identity of a place was not subject to change; it was static and frozen in time. However today, it is not possible to grasp the global world and its constantly transforming relations (economic, political, social, cultural, historical, geographical) as part of a static understanding of identity. The body perceives, experiences and imagines the space simultaneously and produces the space and also the images related to it. The concept of identity refers to these constant but ever-shifting images of a space-time, in one's consciousness. These images are reflected by space-time and are being articulated to the transformation of space-time as well as the body. Thus, moving from the tangible aspects of the space, the body relates them to its intangible aspects, and transforms both the tangible and the intangible while the concept of identity emerges and its being re-

interpreted. The ever-transforming and superimposed body-space-time relations could be explored via what Lefebvre defines as *Becoming*:

"The *Becoming* is a continuous development (an evolution) yet at the same time it is punctuated by leaps, by sudden mutations and upheavals. At the same time it is an involution, since it carries with it and takes up again the content from which it began, even while it is forming something new. No *Becoming* is indefinitely rectilinear." [3]

Lefebvre is not referring to *Becoming*, as a development, which pursues a linear path and aims for the better. On the contrary, the path of *Becoming* is constantly being interrupted by many dynamics, regardless for the better or worse. For instance in Asmalimescit, the events of 6-7 September opening of Babylon, removal and banning outside table placement of cafés/bars could be regarded as some of the dynamics that interrupted its path. Every interruption shifts the route of the path, transforms it, along with both the subject of interruption and the path itself. Although the path of *Becoming* is not linear, the shift in its route does not put an end to its relation with its previous route. In its present route it is still in relation with its past as well as its future in one-way or the other. These shifts, the relation with the past as well as the future, the transformation of the route as well as the object and the subject that Lefebvre's understanding of *Becoming* points to, could be employed to re-conceptualize identity as *Becoming*. For example in Asmalimescit, the inhabitation of artists to the area, due to its physical attraction and economically moderate living standards, transformed the socio-cultural environment of the area and the artists and their relation to the area. When the body encounters with tangible aspects of the site, its intangible aspects are re-constituted, putting its identity in a new route, while transforming the tangible aspects and the body simultaneously. In this regard understanding the concept of identity as *Becoming* could make it possible to explore the transformation of Asmalimescit.

Considering Lefebvre's idea of *Becoming*, the transformation of Asmalimescit could be scrutinized in relation to its identity. It could be argued that a transformation occurs when an intervention is faced. The transformation of identity seems like a natural route of its transformation when the interventions do not cause big changes. While the space is transformed within the historical process, a political decision of the government or a personal act of a regular person, or a natural disaster such as an earthquake or flood can be the cause of that transformation as well, and can cause big changes. These interventions might shift the route of the transformation of space or change the speed (accelerate or decelerate) of transformation. It should be noted that, who or what intervenes in the transformation is also being transformed in a reflexive relationship. In this regard it could be argued that Asmalimescit is being transformed every year, every month, every day, hour and even second in relation to the perceiving body. While the body re-imagines the identity of Asmalimescit, the body simultaneously becomes the subject of intervention and it is also being transformed along with Asmalimescit and its identity.

The concept of identity as *Becoming* could be understood as a reflexive action of the body that refers to relations of the space-time and the body and also transforms them. In order to interpret the identity as *Becoming*, a parallax position should also be embraced while relational experience takes place. Relational experience indicates lived experiences of the body simultaneously producing images about space-time, shifting between contradictions of its past and future, tangible and intangible dimensions, forgetting and remembering memories and so on. The complexities and contradictions that the space has can be grasped by identity as *Becoming*, through a parallax position. According to Žižek (who borrowed the term from Karatani), parallax position refers to the shift in the understanding of the body-space-time relations, generated by the positional difference of the body that offers a new and a different line of sight.[4] Considering this, the identity of Asmalimescit could be interpreted as *Becoming* regarding the constant transformation it is being subject to via a parallax position, as long as the body relationally experiences it.

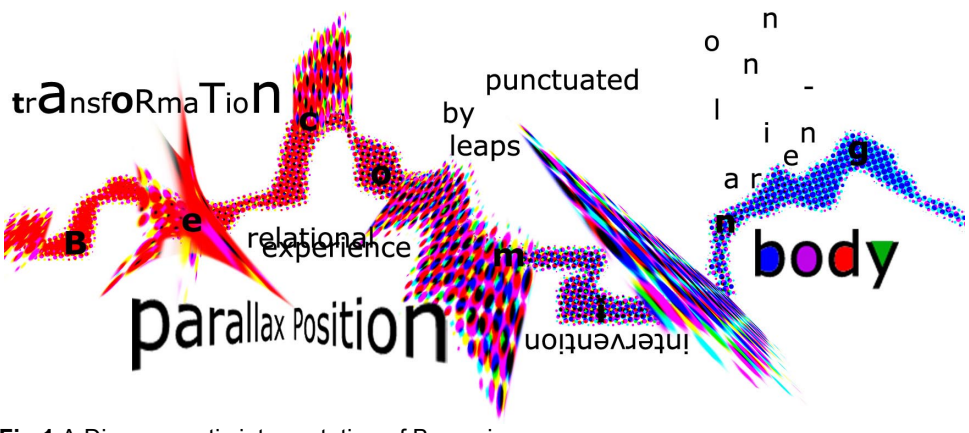

Fig.1 A Diagrammatic interpretation of Becoming

3. Reading Asmalimescit's Identity as *Becoming*

3.1. Occurrence (of a Locality)

Sitting at the Tunnel Square, at the end of Istiklal Avenue, neighboring Asmalimescit, waiting for the tram, gives one time to think about how Asmalimescit transformed not only in the past decade but during centuries as well. The Tunnel square is enclosed by the Lodge of Mevlevi Dervishes, the old Tunnel Building and the old Sixth District Municipality Building which are a few of the many reminders of its past and they relate the body to its future. These architectural productions trigger the imagination of the body, and take it to a journey in time, to both its past and its future. The Lodge of Mevlevi Dervishes reminds how and why Asmalimescit was established.

It could be claimed that Asmalimescit quarter is itself an intervention to the historical scene of Beyoglu district, since it was established as a Muslim district within a Christian and Jewish settlement. Walking down the slope of Galip Dede Road, passing through the lodge, Galata Tower is seen. The tower still stands as a reminder of the past inhabitants of the area, at a time when it was an important harbor-city. Until the Conquest of Istanbul in 15th Century, by Mehmet II, Venetian and Genovese merchants who were busy with sea trade, ruled Galata (which is now within the boundaries of the Beyoglu district). Following the dominance of the Ottoman Empire, the city extended outside the city walls of Galata, through Beyoglu (also known as Cite de Pera). Asmalimescit was established in this century as a Muslim quarter in order to form a Muslim population in the Christian and Jewish populated district. It was located, at the intersection of main trade routes of those days: Kumbaraci Street, Istiklal Street (it was not an avenue in those days) and Asmalimescit Street. In order to encourage the increase of the Muslim population the Lodge of Mevlevi Dervishes was built in the following years. Thinking back to those days it could be interpreted that the establishment of Asmalimescit quarter as well as locating a Mevlevi Dervish Lodge are political acts that shifted the economic, social and cultural relations in Galata and Beyoglu. While these establishments articulated to the non-Muslim scene of Galata they triggered the development of the area towards Beyoglu, transforming the identity of Galata.On the other hand, today they are considered as some of the main locations that give Beyoglu its identity.

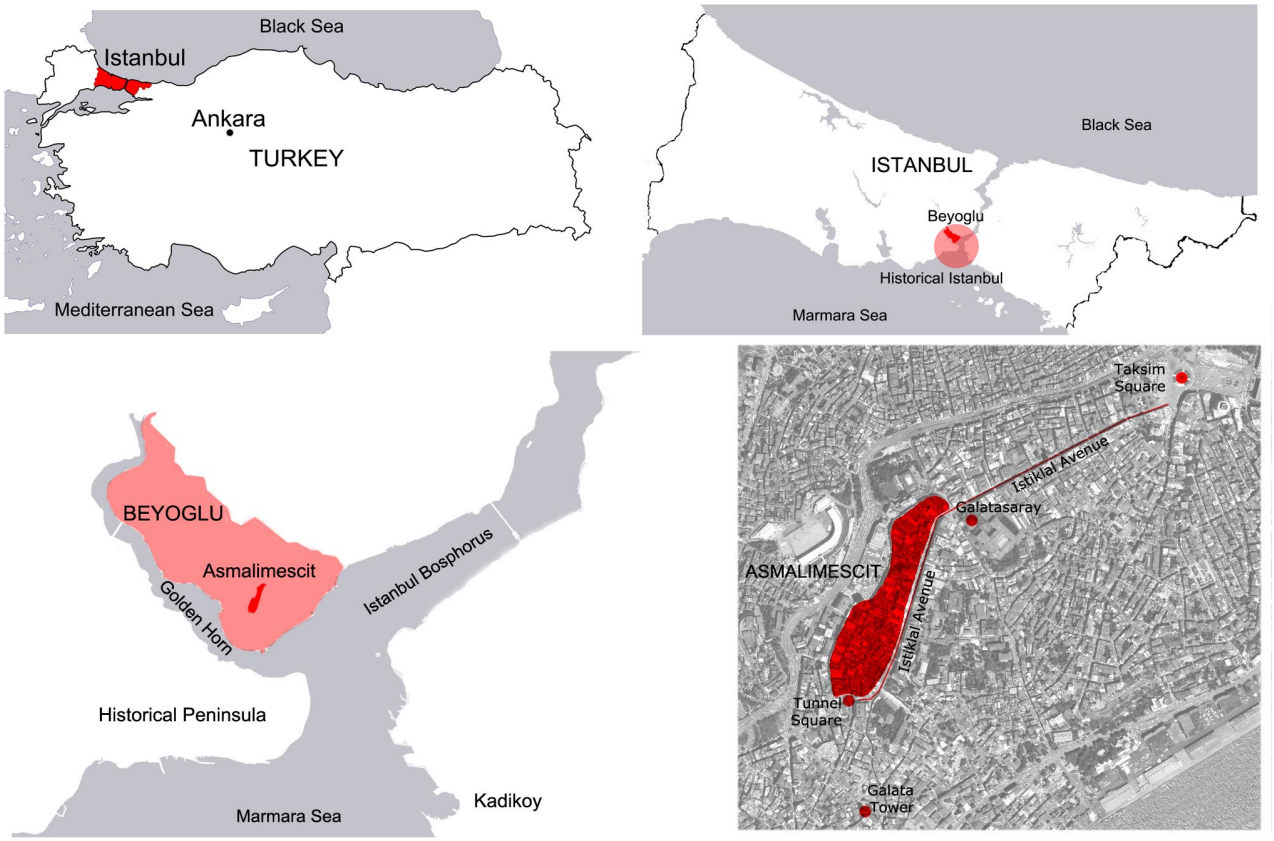

Fig 2. Location of Asmalimescit quarter.

The Sixth District Municipality building built in 1880s, which is under renovation today –a polemical process in the contemporary political and cultural scene–, reminds the glory days of both Asmalimescit quarter and Beyoglu district, gives clues about the modernization process of Ottoman Empire –and makes one anxious about the future of the area. Following the establishment of Asmalimescit quarter, keeping it as the commencement point, Galata began to extend to Beyoglu, on the main axis of Istiklal Avenue (Grand Rue de Pera). Beyoglu, especially Istiklal Avenue, was the European face of the Ottoman Empire in 18th and 19th Centuries. While strolling on Istiklal Avenue today, it is not surprising to encounter architectural productions of the glorious lifestyles of its former cosmopolite society. The embassies for international business and governmental activities, schools providing education for the European communities (Germans, French, Italian, English etc.), along with Huseyin Aga Mosque, many churches and synagogues, luxury shops selling imported products from all around the world, bohemian cafés, restaurants, bars and theatres providing rich intellectual environment, hotels offering first class accommodation for merchants and tourists, and all other necessities of a modern European lifestyle were located along and around the avenue and built in European architectural style of the time. The district benefitted from Istanbul's position as an important harbor city at the intersection of international trade routes and was dominated by the non-Muslim (Jews, Greeks, Armenians etc.) communities. Beyoglu was identified with international economy that generates cultural diversity and constitution of a cosmopolite society. It could be interpreted that the center of the district was still the Muslim populated Asmalimescit quarter. Thus the implementations regarding modernization such as the establishment of municipal governments was embodied as the Sixth District Municipality Building. Seeing this building today, wrapped with scaffold covering, makes the body to think about the future of the area as well. The contemporary renovation process of the building is undergoing in an secret way. This process raises questions on not only restoration but also the commodification of a locality, and also relates to similar implementations that take place in Asmalimescit quarter along with Istanbul in general.

The built environment offer relational experiences if the body relates itself to it by a parallax position. Architectural productions that belong both to a past and a future that could be experienced in the present, enable the body to imagine various dimensions of the locality, and produce images that resemble its identity. These images constantly shift; they re-appear in every moment and they are never fixed. The attempt to fix these images arise the problematic of aesthetization and/or commodification of the locality. Locality is a fluid and hybrid entity, which is constituted and re-constituted over and over again and transformed within the relations of body, space and time. It could be claimed that in relation to the late-capitalist economy and neo-liberal politics of the global world, since they aim to maximize profit, localities are threatened to become commodities. Asmalimescit could be referred as a locality, where the relations of body, space and time superimpose and form a complex, fluid –and endless– entity. The increased land values of Asmalimescit, due to its popularity today, attract various investors. The old buildings in the area, dating back to 19th Century are re-functioned mostly as commercial buildings, such as long or short-term accommodation buildings. However, instead of restoring the small buildings separately, as they are, the investors rebuild single but larger buildings in their places to utilize them as commercial facilities like a hotel. A single high square meter building becomes even more valuable in this area, since it does not need to be re-built, renovated with a new facade. This is what seems to take place in the old municipality building however it is not very obvious since the process takes place under covers. Furthermore, new buildings, equipped with latest technologies are designed to reflect the styles of the past, through their facades while they are re-built. Tearing down the old buildings and re-building them in the historical styles could be considered as an attitude to stabilize the locality as an image at a certain time in its history or its made-up history. In this regard the historical pattern and cultural dynamics of the area are being reduced to an image, while it is being adapted to late-capitalist relations as a commodity of material culture. This process could also be considered as an intervention to the transformation of Asmalimescit quarter.

The Tunnel Building is another reminiscent of the significance of Asmalimescit quarter in 19th century. Along with Beyoglu district, Asmalimescit quarter was highly benefiting from the technical developments of the century. Tunnel, as the world's second subway line was built in 1875, working up and down between Karakoy and Tunnel Square, and is still in use today. This modern vehicle accelerated the speed of transportation of people and goods, and triggered commercial activities in the area and transformed the social life. Construction of Tunnel as a tangible intervention to the site articulated its intangible dimensions and reflected its identity. In relation to the aforementioned interventions it could be argued that Asmalimescit gained its identity as a Muslim quarter, which was not densely populated but has preserved its importance in economic, political and socio-cultural scene of Beyoglu for almost two centuries (18th and 19th Centuries).

3.2. Decay

Passing through the Tunnel Passage, just across the Tunnel Building, the body finds itself in Asmalimescit. The tables and chairs scattered on both sides and even on the hallway of the passage, inviting the body to sit for a moment and explore its historical atmosphere. The apartment blocks that constitute the passage are delicate examples of the productions of modern European architecture of 19th and 20th Centuries in Asmalimescit. They are the resembles of the 5-6 story apartment blocks in Asmalimescit quarter which were built with modern infrastructures of their times such as elevators, making them favored places in the first half of the 20th Century. Walking across the Sofyali Street, occupied with bars, cafes and restaurants on both sides, the body reaches Asmalimescit Street. Yakub Tavern and the Asmalı Cavit Tavern just across it are some of the taverns that have been settled in the historical buildings of the area on this street. Their physical existences as well as their functions allow the body to remember the socio-cultural scene of Asmalimescit in the first half of the 20th Century.

Following the fall of the empire and proclaim of the Republic of Turkey in 1923, Istanbul was losing its importance slightly in the global arena. This could be noted as another intervention to Beyoglu as well as Asmalimescit quarter that shift the social, cultural and economic relations in Asmalimescit. Although the population of non-Muslim communities had decreased due to the political and economic implementations of the Republic, they continued to live in the district and pursue the lifestyle they grew up with, in a moderate way until the 1950s. In those days, Asmalimescit was not only hosting artisan shops and artist ateliers but also entertainment places such as taverns. The White Russians owned these taverns that give service to the non-Muslim community living and working in Beyoglu (including Galata), as well as the intellectual community of the new Republic.[5] Unlike today, Asmalimescit was also an accommodation place for the people who worked in the shops and restaurants of the area. Today the land-value of the area is probably higher than ever increasing the rents as well. However, raise of the luxury apartments do not date back more then a decade, since the socio-cultural scene as well as the economical activities that took place in 1950s was to shift once more.

Strolling in the narrow, empty streets of Asmalimescit in 2002, old buildings, most of them left to decay were giving a gloomy atmosphere to the area. Different from today, there were only a few daytime cafés and a few out of sight taverns. It was not hard to tell that something had happened and was only beginning to be recovered. The decaying, abandoned buildings, recall the unpleasant memories of 6-7 September. In September 1955 a bomb was set in Atatürk's house in Selanik. 6-7 September refers to the event that began as a protest, especially in the streets of Beyoglu, and turned into indignation and the actions of plunder and destruction towards the Greek community. This event forced the Greek minority to emigrate, who were highly populated in Beyoglu. This event, which was a political act, could be considered as severe intervention both in Beyoglu in general, and Asmalimescit in particular. When Beyoglu district was abandoned in the mid 1950s and 1960s, Asmalimescit was also neglected. Abandoned houses of the minorities in Beyoglu were occupied by the workers migrated from Anatolia in the 1960s. In the following decades, Beyoglu and Istiklal Avenue slowly fell from grace. The glittering lifestyle of the area, which dominated its identity for the past two centuries, was a history. In the mid 1970s until the end of 1990s Beyoglu was a rundown city center.

3.3. Rebirth

Entering Sehbender Street one Friday night, the crowd makes it hard to walk, but forces the body to hang around and identify the reason of the crowd. The crowd is probably waiting for a band, whose concert is about to begin at Babylon Music Hall. Babylon Music Hall could be referred as the first significant intervention to the area in the recent past that enabled the body to re-think Asmalimescit, both before and after its operation and re-discover its past and relate to its future. At the end of the 1980s some of the artists started to move into the district, because of the low-rents and the attraction old buildings. The area evoked a bohemian image, with various artisan shops, artist ateliers and introverted daytime cafés where the regular customers were actors, musicians, poets, writers and fine-art artists and their assistants who live and/or work in the area.

It could be stated that following the opening of Babylon Music Hall in 1999, Asmalimescit was developed into one of the focal points of eating, drinking and entertainment in Istanbul, that still dominates its identity. It was designed and built as a music hall and it introduced live music concerts to the nightlife scene of Beyoglu. Fans of musicians and groups started to visit Asmalimescit more, to listen to the concerts taking place at Bablyon. In the following years, especially the ground floors of the historical apartment blocks began to be re-functioned as cafés and bars for knocking back a few drinks before the concert. In the 1990s Asmalimescit was a hide-away place in the nightlife scene of Beyoglu for artists and university students, but this was changing due to the appearance of Babylon.

Although Istiklal Avenue was developed historically from Asmalimescit to Taksim Square, part of the avenue between Galatasaray and Tunnel Square was a secluded place, from 1970s until mid-2000s. Following the articulation of new eating, drinking and entertainment places, to the historical taverns, intelligentsias as well as university students began to visit Asmalimescit more. This motive force-

increased the circulation between Galatasaray and Tunnel Square as well and encouraged new shops and restaurants to be located along the route. As the regular customers of Asmalimescit were increasing, some new customer types also evolved, such as urban professionals working at the corporate firms and foreigners who stayed for either long or short term in Istanbul. Babylon Lounge, which is connected to Babylon Music Hall inside the building, but faces a parallel street, points to the transformation of the user profile of the area in relation with its built environment. While some new buildings were added to the setting of Asmalimescit, such as Babylon Lounge, the renovation of decaying historical buildings were also supporting this transformation (Fig.3). While strolling around the streets of Asmalimescit, the boutique of the fashion designer Umit Unal or the interior architecture firm Autoban and its showroom are some of the few stores and offices that the body can come across. The site is also a host for creative industries such as the Apartment Project, an exhibition and interdisciplinary collaboration space for artists. This diversity of functions –as the tangible aspect of the site-, emerges from its economical potentials and the socio-cultural environment –as its intangible aspects. Simultaneously these functions transform the site from a hideaway place of the artists and students to a new gathering place in the city as well as provide prestige to offices and attract the creative industries. While the body experiencing its tangible and intangible aspects, constitutes and re-constitutes the identity of Asmalimescit as *Becoming*, the forces/relations of global capitalism pulls its transformation into another direction, by favoring the material culture.

The popularity of Asmalimescit becomes an attraction for the investors who wish to make profit out of its vivid cultural scene and for its present local government who aims to market its locality to them. The local government (in relation to general government policies) put the culture politics of neo-liberal economy into work. The neo-liberal economy and the politics that place culture to its center, regard culture not as an entity that emerges in a historical process but rather as a given thing. Regarding culture as a given thing, freezes its historical process and converts culture into a commodity. The locality and its culture that exists in relation to it, becomes a tool for generating heterogeneity as cultural difference and market it under the name of local culture. This kind of production of difference points to the production and consumption relations of late-capitalist economy: the mass-customization of post-industrialization. In Asmalimescit, the entertainment places, cafés and hotels that only aim to make profit, hold on to its culture through its historical pattern, and freeze it as an image by re-producing the historical buildings. Since these places serve to an image of culture that is not subject to transformation they are not being articulated to the locality and become an extension of its social and cultural life. However, since they survive with this image of culture, they also wish to stabilize the culture of Asmalimescit in time as an attractive entertainment place that smells history. In this regard the material culture of Asmalimescit is predominated and its locality carries the risk of being commodifed. On the other hand the transformation of Asmalimescit continues due to the effects of global socio-politics.



Fig. 3: Diagrammatic interpretation of Asmalimescit through old-new contradiction / tension.

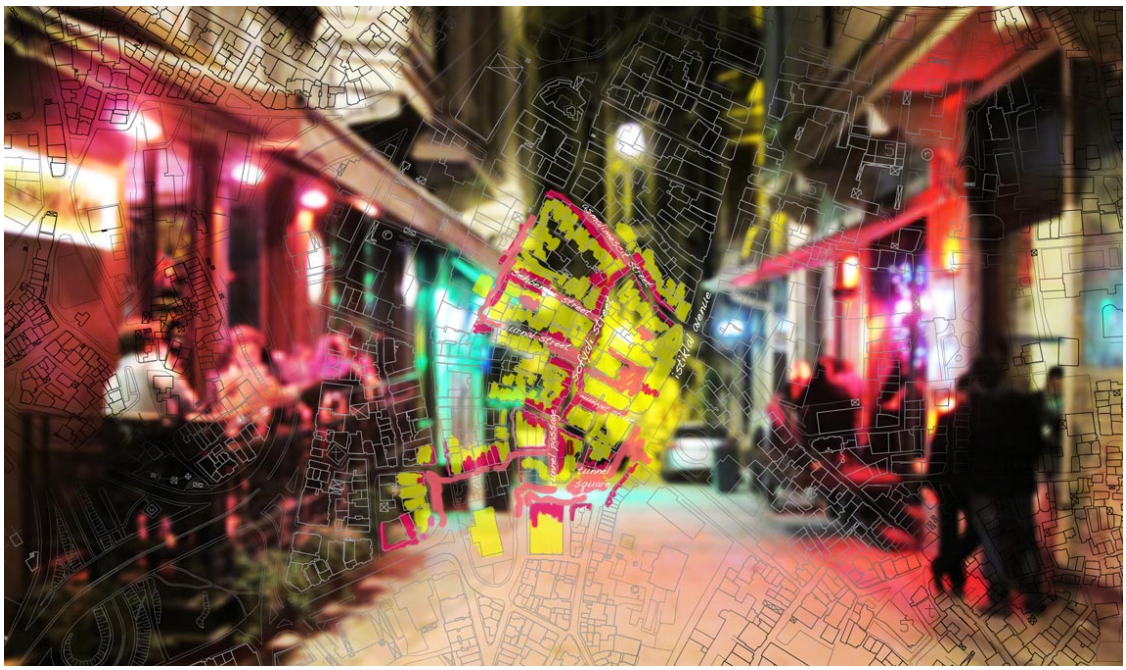

Fig. 4: Diagrammatic interpretation of Asmalimescit through indoor-outdoor contradiction / tension.

The pale yellow light of the lit historical buildings mix with the warm red lights of the heaters, located outside, hanging down from the ceiling of the balconies on the ground floor of the cafés. This combination gave Asmalimescit a cozy atmosphere at night while making you think of both the smoking ban in Turkey and the outside table placement ban in Asmalimescit (as well as Beyoglu). Regarding the process of alignment with the European Union (EU) norms, Turkey banned smoking in indoor public areas in 2008. This ban can be considered as an intervention of the general government, triggered by global forces, that deeply transformed Asmalimescit's new identity as a popular night-life spot. As a way of dealing with this ban, the shop owners took permission from the local government to place tables and chairs on the narrow streets of the quarter. The establishments located heaters on the walls to host their guests outdoors even in the cold days. In the mid-2000s, the refreshed face of Asmalimescit was already attracting people. People enjoying themselves in the streets made the guest population of the area visible. As the population was rendered visible the quarter was turning into a popular place for both daytime use and nightlife activities. The street tables were full of people, and the pedestrian flow on the streets was dense especially in the evenings and at night. Tunnel Square became a meeting point at nights where people were enjoying their drinks, from the enclosed bars such as Lokal, while stretching along the square. Another hotspot of the quarter was Otto, at the end of Sehbender Street. Otto was not only a restaurant-bar, but its music spreading into the street from within was one of the transformative powers of Asmalimescit for half a decade. People were dancing, chatting and meeting with each other in an interactive relationship with the place through the immaterial aspect of music (Fig.4).

Today that crowd is not visible on the outside because of the table ban of the local government. The crowded streets are left empty, while the users moved to the terraces of the buildings, or the back gardens on the ground floors. For the ones who preferred to stay on the street (for smoking or breathing in the autumn breeze) were moved to the tiny balconies added to the buildings. These balconies could be read as the reflection of a political act and the social and economical reaction to it, to the built environment. While strolling around in the emptier streets of Asmalimescit at one autumn night, the times when it was hard to move along the street to go to the bar you were supposed to meet with your friends could came to the memory. The streets, where you came across with very few people today, remind you the street filled with tables on both sides, people enjoying themselves on the street, while eating, drinking, smoking, talking and laughing. The table–free streets become the trigger for the dreams of its future while at the same time it becomes a reminder of the recent past of Asmalimescit. Just like when the crowded streets with the people and tables were the reminder of the times when the place was only know by regular costumers of out of sight taverns and artisan ateliers. The interplay between the contradictions and tensions of the locality, in one's mind, produces and reproduces the space and the body continuously over and over again. Flashes of past memories and future imaginations, experiences of the materiality of the empty streets and the immateriality of the emotions it recalls when it was crowded and full of life make it possible to experience the identity of Asmalimescit -that is in a constant transformation- as *Becoming* (Fig.5).



Fig. 5: Diagrammatic interpretation of Asmalimescit through flow-pause contradiction / tension.

4. Concluding Remarks

The architectural production that belongs both to a past and a future, that could be perceived, lived and imagined at the present, work as an interface to interpret the identity of Asmalimescit as *Becoming*. The architectural production and the built urban environment of Asmalimescit can be regarded as one of the prominent elements that offer a relational experience to the body, when the body embodies a parallax position. The differences in the background of different bodies generate many identities of Asmalimescit through their relational experiences. These identities shift at every moment, since the bodies are transformed at every encounter with the locality, and transform it. In this regard, the concept of identity could be re-interpreted, not only as something that refers to a multiplicity, but also as *Becoming,* that is in a constant transformation simultaneously departing from the body and space time through the interplay of contradictions and contrasts.

It could be argued that the transformation took place in Asmalimescit during centuries was due to the interaction of the people with the place, in every scale, that shift the relations in it, while they are being a part of its transformation and being transformed. In the contemporary world, this transformation carries the risk to be manipulated in the favor of neo-liberal economy of global capitalism though its culture politics. The neo-liberal culture politics seek to engender the materiality of the built environment as opposed to its immateriality by commodifying the localities. This tendency could be unstabilized, through the understanding of identity as *Becoming*. This understanding of identity puts the interplay of material and immaterial into work. The interplay of materiality and immateriality that the body generates, do not aim to predominate one another or balance them at one point, but become the reason for the body to constantly transform both of them, through which the identity is explored as *Becoming*.

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Avalanche hazard in mountain chalets: prevention and modelling

Bernardino CHIAIA[1], Barbara FRIGO[1], Valerio DE BIAGI[1]
(1) Department of Structural, Buildings and Geotechnical Engineering, Politecnico di Torino, Italy
bernardino.chiaia@polito.it, barbara.frigo@polito.it, valerio.debiagi@polito.it

Abstract
Snow avalanche hazard in the Alpine region represents a dramatic factor of risk not only for skiers and mountaineers but also for dwellings and villages, with relevant consequences for local economies and transportation networks.
Traditional alpine architecture and land planning show that, in the past, there was respect of humans versus Nature. Nowadays, the increasing demand of building and leisure spaces pushes the occupancy of the territory to more risky areas where appropriate design is therefore needed.
Modern techniques of land surveying, e.g., laser scanner and 3D CAD, permit to model the avalanche phenomenon with great precision and to study the effects of impacts against buildings and structures, thereby enhancing the mapping of associated risk and suggesting strategies for protection. An experimental site has been realized by the Politecnico di Torino in the Gressoney Mountains - Valle d'Aosta, where monitoring of snow avalanches under different climatic conditions allows a progressive improvement of knowledge.
Sustainable urban planning can therefore be pursued also thanks to these modern technologies, coupled with respect to Nature and attention to traditional architectural solutions.

Keywords: snow avalanche, impact pressure, hazard maps, risk prevention and protection.

1. Introduction
The snow is one of the keys of life in mountain environments: a cover against winter frost for ground, animals and vegetation protection, renewable energy and water resource and happiness for children and adults. But today, snow is the “White Gold”, the heart of the economic (tourism and winter sports industries) and social development of mountain regions. However as water with debris-flows, rocks with rocks falls, wind with tornadoes, snow can lead human-life to uncomfortable (e.g., interruption of roads or access restrictions in temporary avalanche hazard areas), dangerous (e.g., avalanche interference with populates areas such as communication routes, ski slopes, villages) and catastrophic situations (e.g., destructive avalanche impact causing damage to people and property).
Since people were settled in the mountain (from a few tens of thousands of years), an adequate protection from snow avalanches has been needed. The first historical references to avalanche were found in documents written by Greek geographer Strabo (63-23 BC) and Roman historian Livy (59 BC - 14 AD) which describes the crossing of the Alps by Hannibal (218 BC), but the first reports of accidents caused by snow avalanches go back to the retreat of the 10,000 Greek soldiers through the mountains of Armenia in 1.401 BC, told in Anabasi by Senofonte [1].
Today, along the Alpine region, the memory of the destructive power of the snow is alive as a result of the tragic 1998/99 and 2008/09 winter seasons. Characterized by exceptional avalanches, the Winter 1998/99 saw the occurrence of 850 events in February. In the week between 23.02.1999 and 01.03.1999, 12 people death, 5 buildings were destroyed together with over 200ha of forest, 6,000 people were evacuated from 1,320 buildings and 71 road sections were closed only in Valais (CH) [2].
In Austria, on February 23rd, the avalanche fell on the village of Galtuer and stroked on 24 buildings (6 completely destroyed and 7 severely damaged), with 60 people buried with 31 killed and 22 wounded.
On the same day, in Italy, the avalanche of Lavancher (Morgex - AO) provoked the destruction of 1 building and 1 victim [3]. In France, the event of Montroc (Chamonix) destroyed 14 chalets and caused 12 victims [2].

December 2008 was characterized by intense precipitations, in particular in the middle of the month (14th – 17th) throughout all the Italian Western Alps. Numerous avalanches occurred causing damages to villages and affecting the viability. In Aosta Valley (IT), the winter started dramatically: from 15 to 17th the avalanche Warning Service detected 419 natural avalanches, 69 of them exceeded the avalanche cartographic limits and 68 are never detected [3]. In December 15th, under extreme snow and meteorological conditions, at about 1:00 p.m., a thick and soft snow slab of about 50.000 mc (maximum width of 350m and thickness up to 1.5 m) released from the slope ``La Tour'' and stopped with a big jump over Les Thoules village at 1.600m asl.. Splitting into two branches just before the regional road, the avalanche destroyed 7 houses (Fig. 1), the telephone and power lines (a lot of masts and also a high voltage pylon) and portions of wood. It also damaged buildings and one hydroelectric power-plant, interrupting the regional and the communal roads. The branch on the left side of the basin destroyed 4 houses whereas the branch on the right side impacted two chalets and one house [3, 4, 5]. In Piemont (IT), in the period between the 15th and the 16th of December 2008, the meteorological situation and the intense avalanche activity influenced the area around Ceresole Reale, a small village at 1.570 m asl in the high Orco Valley and many avalanches occurred. Some of them have been classified as extreme avalanches and flowed in areas where no avalanches were reported in the past, overcrossing the limits of the official regional avalanche map. In particular, 4 simultaneous avalanches released from Monte Cialme and destroyed 6 houses and 12 ha of forest. The deposit and damages analysis has shown that the avalanches presented both a dense and a powder part. The volume of snow was estimated around 100.000 mc released from 2.450 m asl and flowed into the lake Ceresole at 1.580 m asl [6]. Not least are the usually Winters in Alpine regions. In Aosta Valley, the winter 2011/12 saw the avalanche interference with 3 alpine huts: the first newly built – the “Rifugio Letey” in Doues (AO), the second after maintenance – the Agriturismo “Le Lapin” in La Thuile (AO), and the latter the new extended part – the “Rifugio Bezzi” in Valgrisenche (AO)) [7].



Fig. 1: A mountain chalet in Les Thoules – Valsavarenche (AO) before and after the avalanche event in December 2008 [4, 5].

2. Avalanche risk prevention and protection

The aim of the paper is to provide a quick overview on the role of the planning, the architecture and the engineering compared to the avalanche hazard to protect human-life. From the management of avalanche hazard thanks to zoning restrictions to how to design and construct buildings against avalanche impact, the paper overcomes the gaps in our knowledge of the avalanche phenomenon, supported by field research and numerical models. These are only two paths to increase the structure safety in avalanche hazard zones considering the purpose of territory to construct new buildings and the lack of public financial support for the expensive structure defences (e.g., snow nets, tunnels, dams, etc. ..).

2.1 Planning and avalanche hazard

Today, Urbanism is one of the main tools for the prevention of avalanches.
Permanent measures against snow avalanches directly indicate urban management and land use planning (zoning) of mountain areas. For example, in Italy, the Carte di Localizzazione Probabile delle Valanghe (C.L.P.V.) highlight the areas potentially affected by avalanche phenomena based on eyewitness and/or historical archives, as well as the analysis of the parameters that characterize an potential area of avalanche release (dynamics, morphology, inclination, exposition, vegetation, etc …). The C.L.P.V. are coupled with Piani delle Zone Esposte al Pericolo Valanghe (P.Z.E.V.) which subdivide the recognised avalanche basin in three danger degrees (high, medium and low) plus the "presumed" null. On the basis on the different regional laws, in each of the identified avalanche areas, the planning indicates a well-defined requirements such as the prohibition to build [8].

Example of EU excellence and the first (and only) in Italy, the Regional Law n.11/98 of the Aosta Valley links the planning of the regional territory on the natural hazard: landslides, snow avalanches and floods. About snow avalanches, in all regional territory the avalanche basins are identified thanks to the historic information and environmental features (altitude, slopes, vegetation, geology, weather conditions, etc …). Each basin is subdivides according to estimated (by dynamical models) impact pressure induced by the maximum avalanche event known or statistically defined considering a return period of 100 years. The human-life in the avalanche basin is governed by the planning of three avalanche danger degrees (high in red, medium in yellow and low in green) based on a range of the estimated avalanche impact pressure (more than 3 t/mq, between 0,5 and 3 t/mq and less than 0,5 t/mq, respectively) of the reference avalanche (Fig. 2). For each avalanche degrees, the regional law defined the requirements to build (or not to build) and what it is possible to build, but not how to build.
Nowadays, in Europe, there are no laws or technical standards that regulate how to protect structures from the danger of dense or powder part of snow avalanches, reducing their vulnerability or designing and building properly. These hazard maps are obviously the result of an important analysis of the territory, from the morphological, geological and forestry point of view, linked to the study of the local climatic conditions, avalanche investigations on the past events (historical memory) together with the analysis of possible dynamics of the avalanche phenomenon based on different snow conditions and the subsequently choose of the best avalanche dynamics model (analytical, statistical or continuous) to identify, essentially, two unknown dynamic variables: the velocity and the density of the flow avalanches in time and space. Fundamental parameter to estimate the runout distance and the avalanche impact pressure for each basin, the flux velocity can be estimated thanks to a sophisticated commercial dynamic 3D models based on the morphology of the ground. The variability in space and time of the flux density is now not physically understand: for instance the flux density is considered constant and chosen in the range of 200 and 550 kg/mc.
So, avalanche hazard maps are “dynamic”: they may update over the years with the integrations of information given studying new events. For example, after the event in 2008 of Les Thoules avalanche in Valsavarenche (AO), the old hazard map (in which destroyed houses where in a low risk – green - zone) was update with the perimeter of catastrophic avalanche of 2008. After the realisation of active structure defences (714 snow-umbrella to cover 2,6 km of the length and an amount of 2.245.000 Euro), considering the positive effect of the structure defence, the definition of the risk in the hazard map has been revised (Fig. 2).

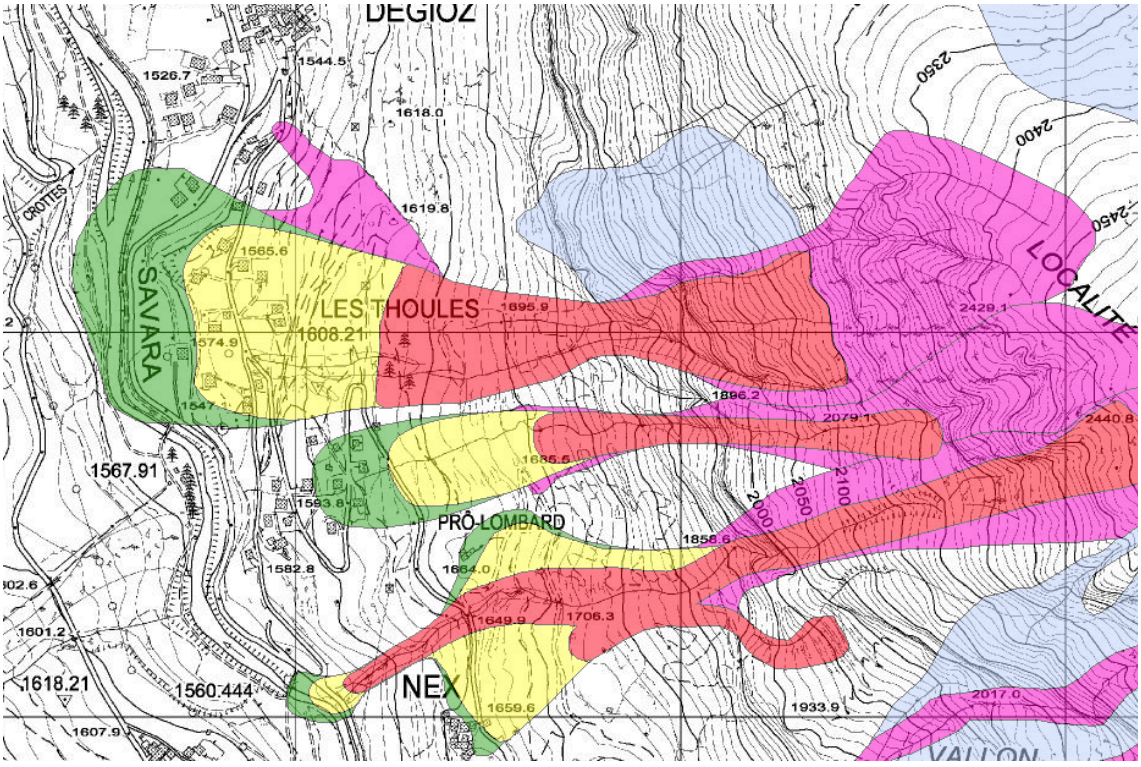

Fig. 2: The avalanche hazard map (Carta Ambiti inedificabili Art. 37 LR 11/98) of Loc. Les Thoules in Valsavarenche (AO) revised after major intervention in relelase area.

An example of erased historical memory is the event of the same December 2008 in Ceresole Reale (TO) [6]. In this case, the chalets destroyed by avalanche were cartographically indicated in white or “free of risk” area, outside the avalanche perimeter. Few years ago, a deeper historical research discovered the presence of a wall against avalanche to protect houses now flooded by the artificial lake of Ceresole Reale. The water covered the ancient defence structure and lose the historical memory on the arrest distance at 200m height below the houses destroyed in December 2008.
The Past usually helps avalanche planning. Easily, avalanche areas usually present toponyms as Lavanche, Lavanchey, Lavancher (which reminds us the avalanche of Lavancher village in Morgex-AO); lavèntsé in patois means a place where an avalanche falls. The word lavèntse (snow avalanche), derived from the Latin word Labina (landslide). In the lower Aosta Valley, to designate avalanche areas, it is possible to find Combia, Quiomba, probably from Latin word Cumulus, in this case, of snow. The Lavancher village is also an example of urban land influenced by natural hazard. The village is developed around the church (dedicated to St. Anna, protector of landslides and snow avalanches) in the right hands of the avalanche basin, while the two new houses destroyed by ‘90s event are isolated and away from the core of the village.
Another example of urban land development influenced by natural hazard is the village of Elevaz in Pré-Saint-Didier (AO). At an altitude of 1.302m asl, Elevaz is a sixteenth-century village with a population about 40 people and set on degrading bands parallel to the main road that connects it with La Thuile and Pré Saint Didier. In this village, avalanche phenomenon is directly related to the urban land development and this architecture. With the South limit dictated by S.S. 26, Elevaz grew up to North to a major rock, to East up to the gutter line and to West to avalanche structure defence (Fig. 3 in black). The inhabited area presents a triangular shape with the oldest (1600’s) to the northwest. The town is therefore protected from interference with snow avalanches.
The viability of the village consists in 3 main roads that allow vehicular traffic - two parallel to the S.S. 26 and the other one that reaching the centre across the fields. The internal only pedestrian roads are a tangle of narrow rock paved streets leading to the core of the village represented by a chapel (Fig. 3 in red) dedicated to San Defendente, another Saint devoted to snow avalanches [1].



Fig. 3: The village of Elevaz – Pré-Saint_Didier (AO): avalanche phenomena directly meddled with architecture and urban land development.

2.2 Avalanche and Architecture

Not only the planning, but also the interior and exterior design was influenced by avalanches. For example, in Elevaz, the typical houses made in wood and stone present the stable (on the ground floor), the living area (on the first floor) and the barn (on the top floor), which are usually accessed by way upstream. All households, also built in later periods (eighteenth century), have openings only in the downstream facades and the door on the first floor served by stairs, essential in the presence of the snowpack or avalanche deposit. The development of the Elevaz shows also a characteristic construction method that inserted house into another one – sharing, for example the roof or a wall - giving rise to a complex and articulated plot that composes a real boundary wall against avalanche around the perimeter of the village.

Typical architecture against snow avalanche can be found also in some recent underground or semi-underground constructions (80's) devoted as garages in which there is not the necessity of natural lighting inside the building. In Swiss literature, they are called Ebenhöch (Fig. 4) where the side of the roof exposed to avalanche is continuous with the morphology of the ground. The idea of this type of building stems from the belief that the continuity of the slope and a good fit to the ground can protect the building from the direct impact of the avalanche, loaded only by sliding snow masses. In this way, the absence of directly impact surfaces on the external walls and obstacles on the avalanche flow, eliminates the risk of damage to the structure. Typical for avalanche hazard areas, this architecture derives directly from hiding to protect people from an event. The concept of hiding arises from the inability to stop the avalanche without causing damage or injury.



Fig. 4: Some examples of Ebenhöch: a garage in Elevaz, Pré-Saint-Didier (AO) and a Durupt's house in Pesey Nancroix (FR) [9].

Transferring the project design of the passive structure defense against typical architecture of dams and braking wedges is directly integrated with the architecture of the houses, giving a particular shapes of buildings called, in Swiss literature, Spaltkeil. Although not new (in alpine areas, there are some distinctive architecture protected upstream by a wedge of stone, for example the Credemi-Kredemi pasture in the Gressoney Valley (AO) – Fig. 5), the idea is also used for new construction or maintenances in avalanche hazard area. For example the Frauenkirch in Davos (CH) (Fig. 5) built in 14th century and an '70s house in Le Pont village in Val Ferret - Courmayeur (AO).



Fig. 5: Some examples of Ebenhöch: the Credemi-Kredemi pasture in the Gressoney Valley (AO) [10] and the Frauenkirch in Davos (CH) [11].

A deviation of a slow avalanche flow can be easily obtained thanks to the extension of a wall on the side avalanche impact direction to protect access, balconies, gardens and external lateral zones of a building. Typically in concrete, this “wing of wall” is just an arm of the deviating wedge directly integrated in the architecture of the building [9]. Other typical architectures against avalanche require a little change in Alpine architecture of the roof with the elimination of its drip edge, in order to avoid uncovering of the roof due to the depression induced by the avalanche impact.
The architecture against snow avalanche shows its highest expression on the study of the shape of construction: the reconstruction (1990’s) of the 1600’s church dedicated to San Giovanni Battista in Mogno - Maggia Valley, Canton Ticino (CH), destroyed by a catastrophic event in 1986 is the most important project (Fig. 6). With its cylindrical shape elliptical sloping down to the circular shape at the roof (to reduce areas of potential impact and, consequently, the impact pressure), the structure is made in double masonry blocks of Riveo grey stone and Peccia white marble filling with reinforced concrete, while the roof is made in glass supported by a metal structure [12].



Fig. 6: The church dedicated to San Giovanni Battista, Mogno, Valle Maggia (CH) [12, 13].

2.3 Avalanche and Engineering

Thanks to the reliability of construction techniques, new technologies and the application of innovative materials, the avalanche risk mitigation may be done by an appropriate and targeted design. Subject to the estimation of the impact pressure and height of the avalanche flow provided by a proper analysis of the avalanche dynamics, it is now possible to realise structures and infrastructures that resist to avalanche interference in a medium and low hazard areas.
There are two most important research objectives in this framework: the first is the understanding the load induced by the avalanche impact on the building, the second sees the correct design using innovative materials (e.g. FRP, etc …) for both new construction as well as renovations. The DISEG - Department of Structural Building and Geotechnical Engineering of Politecnico di Torino wrote the first European guidelines for the mitigation of avalanche risk through the design [14]. Beyond the guidelines, through a deep understanding of the dynamics of the avalanche phenomenon, there is an analysis of the effects of the avalanche impact on the structures thanks to the study of: theoretical and experimental (from direct measurements on site) pressure profiles, shape coefficients, direction of the snow flow and its velocity profiles. This is linked to the Civil Engineering evaluating the resistance of structural elements for each type of building material (reinforced concrete, wood, steel and masonry) against the stresses imposed by the avalanche phenomenon. The guidelines (on-line at www.risknat-alcotra.org) are the one of the most important result of a research activity of Snow and Avalanche Engineering group at DISEG - Politecnico di Torino. They are addressed to the two key issues of the study of avalanche dynamics: the measurements and the estimation of the impact pressures range induced by an avalanche and the understanding of the failure mechanisms of different kinds of buildings.
The available tools at DISEG to pursue the research on avalanche impact on building are essentially three. The first is the experimental site of Punta Seehore in Gressoney-La-Trinité (AO) in the Monterosa Ski resort [15, 16, 17, 18]. The slope, with an altitude difference of about 300 m (from 2.300 to 2.570 m asl), has a mean inclination of about 38°. Generally small/medium size avalanches are artificially released for the security of the ski-runs; they are usually dense flow avalanches but also a powder cloud may occasionally form; the release volume is around 200-400 mc (Fig. 7). The site is instrumented with a steel obstacle on which load cells and other devices are installed in order to measure the effects of the avalanche impact on it. The first two recorded avalanches showed an

impact force on the obstacle up to 5 kN on a flow height of 60 cm. Different kind of activities are made before, during and after each artificial release: physical and mechanical properties of the snow in the release, track and deposition zones of the avalanche are recorded, front velocity, erosion and deposition mass are estimated by field surveys or by multi-pictures analysis and laser-scan measurements.



Fig. 7: Avalanche artificial release at P.ta Seehore experimental site in Gressoney-La-Trinité (AO) [15,16,17,18].

The second is the back-analysis of structural damage caused by avalanches events. Thanks to the structural back-analysis of avalanche events of Lavancher in Morgex (AO) [19] and Les Thoules in Valsavarenche (AO) [4, 5] and forest damage in Lavancher and in Ceresole Reale (TO) [6] was possible understand some collapse mechanisms of roofs and walls for reinforced concrete, masonry and wood structures and the total possible collapse of traditional wooden chalets.
The third is the development and use of dynamics models for the assessment of avalanche flow velocity lines**.** In order to analyse the problem from a numerical point of view, a FEM model considering the avalanche as a fluid is implemented. It can be considered in its transient version (the two dimensional Navier-Stokes equations are coupled with the level set method, suitable for the free boundary conditions with the evolution in time) as well as in its stationary one (the Navier-Stokes equations are sufficient to describe the avalanche behaviour and a simplified a 3D analysis can be carried out). The software is able to understand the influence of the shape of obstacle on the avalanche impact pressure (Fig. 8) and calculate the Cd and Cp coefficients [4].
The research carried out, coupled with the guidelines, is essential to develop the research on snow and avalanches engineering and to support technicians and experts to design structures and planning maps considering a quasi-unknown (from physical, dynamic and loading point of view) hydrogeological phenomenon without technical and national regulations.

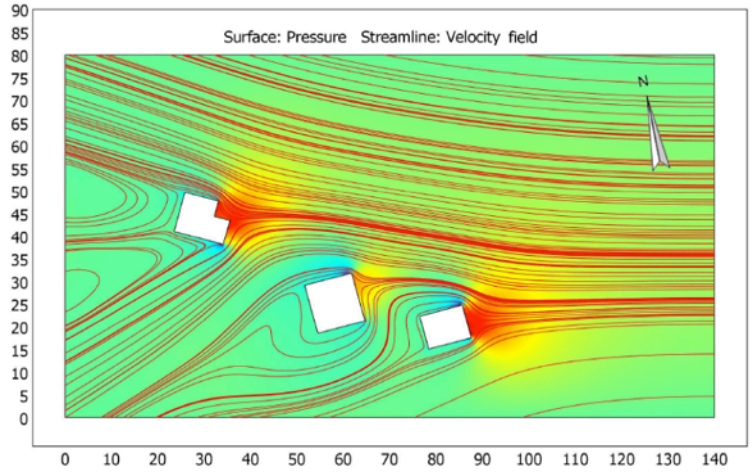

Fig. 8: Simulation of a impact pressure on the velocity field streamline on buildings of Les Thoules village (Valsavarenche – AO) during the 2008 avalanche event [4].

3. Conclusions

In recent years we are witnessing a resurgence of events attributed to various causes: from climate changes on our planet, the lack of maintenance of the environment, poor urban management of the territory. But the rapid development of the mountain tourism and the economy has led to its rapid and intense urbanization, resulting in increased attendance and consequent rise up of the risk.
However, people have always lived with hydrological hazard by observing, assessing and trying to avoid its consequences. Today, thanks to technological innovation, we are able to adequately protect from catastrophic avalanche events, respect for nature and the environment that surrounds us.
The financial support provided by Regiona Autonoma Valle d'Aosta in the framework of MAP^3 project – P.O. Italia-Francia (Alps – ALCOTRA) is gratefully to acknowledge.

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The gap between the developed and the experience in the architectural space

Najjar ONS[1]
(1) Unity of Research SEA, Architectural department, National school of architecture and urbanism, Tunis, Tunisia.
Najar_ons@topnet.tn

Abstract
The aim of this work is to look at the interaction between the man and his surrounding architectural space. The purpose of the research investigation is to demonstrate the gap between the designer's conception as a way of space thinking and users perception. The investigation takes place from the principle that in a same spatial outfit many levels of apposite places are interlinked, and that these places are themselves tributary of temporal space configurations outlined by the space users. The main task is to extract the values and further concepts in order to make a distinction between static and dynamic configurations. These gaps have allowed us to put forward the different levels of opposite places, knowing that concepts are 'interpreted' and 'said' in different ways according to their understanding, perception and representation by different users and actors.
The study makes two assumptions, valuing the singularity of human being in his behaviour and the importance of his integration during the space design phase, in order to reduce from one side the gap between the conceived and the perceived space, and to highlight the complexity of these two actions. In this context banking space is taken as investigation support.

Keywords: Gap, Conceived/perceived, apposite places, semiotic reading, concepts.

Architectural space is a contextual configuration of the space that allows the development of the activity. Architectural space is often interpreted in relation to its form, distribution, function but not in the signification it generates. The space is defined through its Cartesian dimensions and the space is apprehended by the designer as a two-dimensional image representing approximately a three dimensional space. The notion of movement gave birth to a fourth dimension that is "time", space is constantly evolving over time. As in the visual sense, the space is seen, but also experienced by other senses. The space is taken up by all the human senses, they can have a spatial perception which gives rise to a reaction in humans causing an emotional connection with the perceived space. Man interacts with the space through sensor motor abilities, he uses all of his five senses to define the first benchmarks understanding of space, and this is the primary means of making contact space. The space is also included to the direction it generates and its function, as it awakens in us in terms of feelings and sensations.
According to A. Renier [1] "A*rchitectural space can not be reduced to its physical size, it must be seen and understood considering all its dimensions* ". Thus, we consider the space in both its physical size and in its relation to man, as a being with particular socio-cultural dimensions that lead to user behaviour result. The architectural space is then formed by a material object and a social context. The purpose of the architectural design is therefore a complex and interactive system that integrates both the hardware and the social/cultural aspect, the building is a part that can not be defined autonomously. Thus, there can be no question of considering only the "built", but also the "use" of the built and the furnished, which turn into living spaces as they are lived by man.
Our problem raises questions about the relationship between designs as a response to a functional program on the one hand and as a response to a need and a lifestyle reflecting a specific culture to users. In other words we try to see if there is a gap between the developed and the experienced

space? And to what extent our devices incorporate architectural production or can they integrate perceptions / multiple representations of future actors in a given area?
In this study, we propose to focus on the complexity of the relationship between man and space; we will try to see how the space is invested with dimensions other than those which are represented in the conceptual design. We will notice that dimension and functionality are essentials in conception of space but are not sufficient. Space users need more to feel better in using. We need to know how architects can understand such a feeling and help users to live on space.

This study is part of a research on the complexity of human behaviour in a space. The study is based on two assumptions primarily on the development of the singularity of being in the behaviour of a part. Thus man is a being that is and is it reacts and expresses himself facing a space apparently satisfies his needs but it is often forced to live there. On the other hand the importance of the integration of future users of space in the design to reduce the gap between the developed and the experienced and highlight the relational complexity of these two actions, taking as investigation medium a banking space.
According to A. Renier [2] "An architectural space gives the appearance of stability. These forms allow them in the co-presence of other forms of nature". These configurations exist and are integrated in the architectural field, leaving no traces. Man is thus faced with an architectural thought to serve and in which he lived experimenting with a different one that is designed and represented mentally. The study allows us to put the first point on the concepts implemented by the designers of the space when thinking about the project, the second time, the study of configurations allows us to identify areas of "significant substance "of the architectural space experience.
Our body operates from choosing a space integrating various stakeholders between designers and users. As previously mentioned banking space was choosing as an experimental support. This example of space seems a representative case study to the extent that it is scalable it incorporates the latest in design and use but it is open to all, regardless of cultural and social background, attendance is not limited to a particular type or class. This will enable us to verify that the multi-dimensionality of space depends on the size that involves in representation. Our choice of bank space is structured with respect to types incorporating both novelty in spatial design and positioning of banks in differentiated tissues of the city of Tunis. For this purpose we opted for four bank branch part of the same brand "BIAT" newly redesigned. Among the four banks two are located in the suburbs, the other two in the city centre. We note that the four banks selected are diverse enough to be of great interest for the qualitative study business. The supports of analytical part are identified as follows:

- N 1: BIAT Menzah VI is a bank "intermediate", it has undergone some changes compared to the old design BIAT.
- N 2: BIAT Lake is a bank "new concept."
- N 3: BIAT El Manar, it is a bank "new concept", it is spread over two levels.
- N 4: BIAT Street of Egypt, it is a bank "old concept" and is being edited.

The analytical method used during this work is divided into two main phases: the first is questionnaire based for both designers and for a sample of users (clients). Analysis codes transcribed by the banking system "BIAT" helped us to identify the concepts as reflected by the designers during the design phase - production of architectural and compare these with the concepts experienced by users in their use of the banking space bank if they are lived in the same way. The confrontation of different concepts such as investment by developers during the design of a hand, and experienced by customers in the use of space allows us to distinguish similarities and differences in the perception of the concept itself or even how it is lived.

The second phase is based on the superposition circuit schematic customer as reflected by the designers and transcribed during the observation of the behaviour of customers in the bank. The observation of customer behaviour in space allowed us to model space-time patterns identified in the study of the behaviour of actors in space and compares them with the channels used by users of the bank in their movement and raised in our on-site observation of the bank. The banking space is usually designed based on existing technological solution and the branding that designers want to display. Design from a quantitative approach subject to financial and technical constraints. However, space is subjected to several stresses that the designer must identify in order to incorporate in the design. The process consist of analysing the architectural space from the developer side to the customers, the aim being to capture the design process as seen by the designers of the space, and on the other side starting from the customer perception towards an attempt to decrypt the premium for them when communicating with their banks. This approach taking the concepts from designers and

verifying it is impact on the customers allows us to identify the importance of certain concepts over others for both designers and users.

1. Designers and users concepts on space banking

The design of the space is a response to a pre-determined program and an idea developed by the architect as a viewing of the best way to organize a space. The designer (architects) study the program and tried to offer a transcription by drawing material that is commonly called "sketch", which is supposed to consider the program, the project budget and integration with the environment.
But he need to consider also that the space evokes not only a geometric concept defined by measures and surfaces, space is also defined by the user, his behaviour in this area, his feelings and that he returns this space. Indeed, the space also includes the concepts of sociological, historical and symbolic that we will develop. Designers use their knowledge and pre-requisites for the design space in terms of size and shape of the space, as well as the quantitative approach and the allocated budget for this project. Same space can be designed in a multitude of ways depending on the parameters implemented for this design, where the ambiguity and danger to both. If the requirements are clearly identified, the spatial responses are therefore less complicated, as explained in R. Prost. Formulation needs functional, physical, aesthetic, and symbolic and social facilitates architectural design. Designs convene several "measures of relevance" temporal, segmental, cultural, social ... The impact of these measures or parameters on user behaviour are extremely complex.

As a first phase we process with meeting the designers of the bank space to grasp the concepts implemented by them during the design. We were able to conclude that the banks operate to attract clients by serving those best, being efficient and quick. Design help to organize space, to make it comfortable, attractive, pleasing and clear, so it can attract a maximum number of customers.

The goal is then to ensure speed and efficiency in terms of performance of the service by hiring qualified staff. We were able to capture four basic concepts used by the designers of the bank:

1- Symbolic dimension: Reflecting an image that stands out and has a research interest in colours, noble materials transparency through the use of glass facades.
2- Functional dimension: The distribution of space within the agency is reflected in a circuit driven by the designer
3- Security dimension: Differentiate between customer needs and the degree of privacy needed for each service and allocate space according to privacy and confidentiality.
4- Technological dimension: Through the use of new technological providing a quick and easy communication with customers and easy access to information.

The study allowed us to conclude that the designers based their work on functionality, symbolic, security, social and technical dimensions. To be operational, we will now try to understand from the users side the concept experienced in the use of the space, in order to verify whether concepts are lived according to the interpretation of the designers or not.
A phase shift between the perceived and experienced provides us with an intelligible frame that will be used for the study. To this end, we conducted a survey for 25 people in each branch (total of 100 people). The survey consisted of set of open question recorded using a Dictaphone upon the customers approval in this way.
The customer has complete freedom in the answers, he expresses this way concepts that attract attention (positively or negatively) and which influence his behaviour. This method allows us to get objective opinions. The results allowed us to conclude that customers choose their banks based on the location that is usually closest to their home or work. The second criterion is knowledge of one or more staff officers in the bank that reassures and provides a faster and easier access to information and ultimately the cost of service, for banking operations and loans.
Then we try to ask clients by testing the impact of design concept on there behaviours. This way helped us to identify the importance of designer's concepts and the way that users interpret and appreciate them or not. There after we draw a conclusion that is the conducted sampling is categorised in 5 concepts.

- Financial concept: customer attaches great importance to this concept. Indeed, the charges taken by the bank appear to some expensive.
- Social concept: The presence of a friend or relative in the bank largely comforts customers and encourages them to choose the bank.
- Security concept: the customer does not feel safe in the bank when transparent and open space exposed to the outside.

• Aesthetic concept: this concept is important for some and not for others, the customer sees
• Functional concept: this concept is perceived by the client, although not expressed but he appreciates the speed of services.

The analytical approach taking by the designers in one hand and the feed back collected by the users in the other hand reveal a gap of scales that involve both for the same space. This analysis allowed us to qualify the difference in interpretation, and understanding the impact of concepts seen on the designer side or the client side.

Indeed, analysis of the same concept (ex. safety) shows that this concept is understood differently between designer and user. The designer sees in it an opening to the outside and an indirect invitation to the customer via transparency in service, while the user sees this customer transparency, as a lack of security and a violation of his privacy withdrawal or payment of money. The customer does not agree to be controlled or be subject to external eyes when handling money. He has a fear to be targeted by thieves outside the bank.

As a first phase, speech analysis of both designers and users allowed us to delineate the different levels of “gap” between the concept seen from the designer point of view and way of thinking and the space user’s one. The study by the way of semiotics, and particularly laying down the syntagmatic chains by doing a transcription of the behaviour of the space users shows us the diversity of valences in an architectural space. This diversity is seen through the presence of multiple space time configurations and translating into potential places.

Confronting the acquired results allowed the partial validation of the assumption, as the concepts take different meanings and values according to the different users. We can then say that in the same spatial conformation intertwine several levels of topical places themselves dependent spatiotemporal configurations set by the user, it is clear values or concepts to qualify these differences between static configuration and dynamic configuration. Differences have to highlight the different levels of topical places since the concepts are "interpreted" and "expressed" in a different way according to their understanding, perception and representation by the various actors. Furthermore, this first level validation has the merit of showing that in architecture the conception act requires mechanisms of “doing” others than geometrical and metrical ones.

The multiple interpretations that could be giving by different “Actors” to a same defined space or according to a same concept justify the necessity of the integration of singular forms and meanings diversity in a conception process. Therefore the participation of space users during the architectural phases becomes important in order to compensate up to a certain degree the imperfection in the architectural doing mechanisms. In the second part of our analytical study, we proceed to study the temporal space patterns by observing and analyzing the various configurations of the players in the banking space. Cognitive modelling allows us to translate the conceptor programs observed as spatial configurations. Modelled in each configuration we distinguish relevant fragments approached by individuals and by interacting with the space. The variety of programs shown by the users allows us to define the multiplicity of space use by customers and agents either separately or in a common space.

It is therefore an inventory of programs users / clients observed during the visit of banks. These programs are similar in part because the players come to the agency for the same purpose (cash withdrawals, transfers, balance inquiries, account opening, credit application, agents visit friends ...) Gold the behaviour of actors varies depending on the player itself and the architectural space. Programs generate interaction between the path of the player and its movement in space so the social and spatial. This interaction can define the path space time users. The displacement varies in terms of tracking and goal orientation. Indeed, customers choose paths more or less variable depending on the client.

2. The gap between the developed and the experienced space.

The actors (Man) is a being who interacts with the place it occupies; it has different needs that vary from one person to another, sometimes mechanisms or reflections in the components of the space can intersect some of them but not all, which is for us a semiotic reading, so-called areas of relevant segments. These areas are seen as constants in a reading space.

For that will use for the second phase of our study a semiotic method study and especially the statement syntagmatic chains via the transcription of user behaviour. This way can allow us to read the variety of using of the same architectural space. This diversity is manifested by the presence of multiple temporal and spatial configurations resulting in a potential "topical places". The syntagmatic chains resulting from a variable number of segments according to the actors and spatial configuration. These segments are sometimes stable especially when they follow the path pre-established designers. Players draw the same line when travelling but this line incorporates it plural scales (social,

psychological, etc ...). This brings us to see the project as a whole architectural image conveying concepts, the understanding of which is dependent on the player and its singularity.
Upon spotting, this gap between the developed (corresponding to a form of "conduct of the project) and the experienced (during the occupation by the actors), we highlights the importance to involve the future occupant (potential) in the design of the space. By integrating the users in the conception phase, we achieve abetter understanding of the concepts that were introduced previously by both designers and actors.

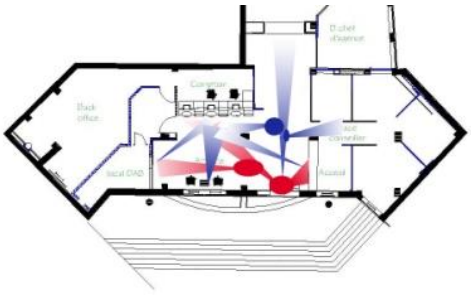
Starting from the observation of customer behaviour in a workspace (in this study: the banking space) we could transcribe and make the distinction between the different interactions or "path creation" brought into play as well by the designers in the design of an architectural project as actors in the use of space. The comparison of the results obtained allowed us to validate the hypothesis in part insofar as the concepts are worth understanding and different depending on whether it is placed on the side of the designer or client "actor". These diagrams summarize our analytical approach starting from the initial plans of banks, in the first illustration we can read the paths used by the designers when thinking about space. The second illustration is a superposition of paths as reflected by the designers and those fingerprints by customers, allows us to see the gap between the developed and the experienced of the banking space.



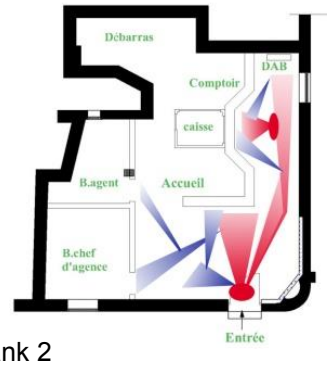
Fig. 1: Spatial and temporal patterns as reflected by designers.

Spatial and temporal patterns as reflected by the designers allowed us to read a linear organization, illustrated by the main direction of movement (to counter, to cash machine or reception in red), the nodes, schematized in ellipses, mark the change in direction of the users. It is a stopping point to choose the direction needed. We can also say that according to the designer, using space is the same; it is completely independent from the plan of the bank. It seems like using any space and putting in functionality according to measures need. In any of the four examples we see that the principal orientation is directed to the counters, were users need banking operations, two small directions exist also and are oriented to the cash machine or to the information. These configurations

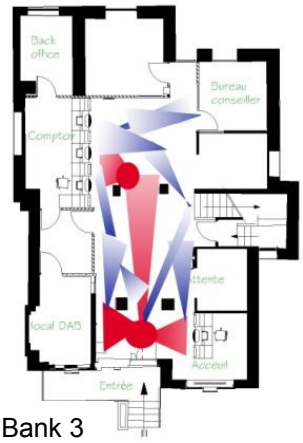
are limited, direct and reflect a systematic using of a bank. For the conceptions, it is like a model that can be used any were in bank space, it make relation between functionality and banking style without thinking about users differences. Through our second part investigation we will observe in the same banking space the way that users move in the banking space.
Through space time superposition of configurations both designers and users, we have seen that the configurations as reflected by the designers are linear and direct, they start from a departure point: moving towards the reception counter or to the internal distributor.
While transcription when observing the movement of customers, reveal a multitude of configurations paths that incorporate more flexible and not limited only to service counter or reception. Customers faced with such a space, have moments of pause between observation, reflection, hesitation, back and throat a poster reading or searching for personal information.



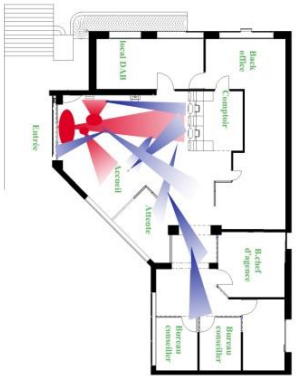
Bank 1



Bank 2



Bank 3



Bank 4

Fig 2 : superposition of the designer's configuration (red) and the user's use of the space (blue).

The study of course customers in the banking space has allowed us to highlight that for the same space are spatial and temporal patterns in multiple dimensions or concepts (relative to the framework that we have established) interrelated, and changing distanced in the same time. And segmentation paths are realized due to various parameters in addition to that related to the physical form of a place called topical these parameters can be functional, aesthetic, sensory, symbolic,...
Course distribution syntactic Customer consists of several sequences. The syntagmatic sequences corresponding to various programs of users consist of a different number of segments according to the social actor space and spatial configuration. Superposition of syntagmatic chains run clients from different banks allows us to see that there are stable path segments, these segments are the result of the path predetermined by the designers and followed by clients. For example, the space of the hall is a very important place for the customer. In fact, customers are not accustomed to the bank, marking a pause of several minutes, the time to scan the area and establish benchmarks guidance. The regular customers go directly to the service they want, the hall has a space for them to pass.
According to A. Renier[1] "In the same space, we appropriate the different places between individuals and objects that inhabit them." Thanks to the graphical representation of various configurations changing places it is possible to distinguish between the conformational spaces constructed and

equipped one hand, configurations and locations for those who use the other. This illustrates the relativity of these configurations are likely changing as social actor through space to study.
We concluded that the architectural space contains temporal space configurations that emphasize the use and behaviour of men in space. These configurations are numerous and vary according to the concepts (understood, perceived and represented by the designers) transcribed by users on the move. The implication of this variety in the use of space allows a better understanding of the needs and practices within it.
This study has allowed us to highlight how taking into account certain parameters such as the man and his perceptive and interpretative singularity, its specificity and context is of importance in the "trial" architecture. Starting from the observation of customer behaviour in a workspace (in this study: the banking space) we could transcribe and make the distinction between the different interactions or "path creation" brought into play as well by the designers in the design of an architectural project as actors in the use of space.

Moreover, confrontation or the superposition of different modes of transcription of these pathways has identified "valences" or different way of using, moving and feeling on the space. Man is a being who lives in interaction with its space, it acts and interacts depending on how it is organized and organizes its report, its perception and representation of space elements. Its behaviour is defined from its history, its sensitivity and its relationship with others. Also, the questioning of this research is to qualify the idea that architectural space is not restricted to geometric measurements or typological concepts, or even topographic economic only. The space is defined and understood "by" and "through" the interaction with human behaviour. Architectural space contains temporal space configurations that emphasize the use and behaviour of men in space. These configurations are numerous and vary according to the concepts (understood, perceived and represented by the designers) transcribed by users on the move. The implication of this variety in the use of space allows a better understanding of the needs and practices within it.

Designers use their knowledge and prerequisites for the design space in terms of size and shape of the space, as well as the program, site and budget for this project. How often this "mimetic" design spaces rest somewhere insufficient because customers are often dissatisfied. This is to meet the challenges and reasons for this "dissatisfaction."
Also, it is noted that airspace users are involved at any stage of the design and implementation of the project; the designers only design the space for the benefit of future occupants.
Thus, a gap (with various levels of interpretations) could be detected between the developed and the experience. There are probably other forms to detect differences in varying media and sampling actors. The study of user behaviour through the spatio-temporal configurations is used here as a tool to identify the differences between spatial conformation designed by designers and values in the spaces.
The gap between the developed (corresponding to a form of "conduct of the project" players in the design) and the experienced (during the occupation by the actors) highlights the interest to involve the future occupant (potential) in the design space.
Thus, the architectural design is not limited to a combination of geometric shapes, it implements concepts vary according to the position they occupy and that is the design: designers and actors. The analytical investigation based on semiotics by the study of spatial and temporal configurations make intelligible some scales on the socio-cultural. Spatial and temporal patterns are multiple dimensions (concepts), the movements of players depend not only on the physical form of a place, but also parameters functional, aesthetic, sensory, symbolic. The syntagmatic chains resulting from a variable number of segments according to the actors and spatial configuration are not as simple as the designers imagine. These segments are sometimes stable especially when they follow the path pre-established designers but some times variable. We can say that each user has his own way of doing things and acts in the same banking, and more for the same users the way of proceeding in the same space is not the always the same. But this point can be the object of others study. For us we are focused on the gap between the designers and users space.
The discourse analysis designers on the one hand and users on the other emphasize the gap in "scales" that involve each other and for the same space. "Concepts" (whatever scale they imply) even if they are common are not interpreted and understood in the same way.
Players draw the same line when travelling but this line incorporates it plural scales (social, psychological, etc ...). This brings us to see the project as whole architectural images conveying concepts, the understanding of which is dependent on the player and its singularity.

The main feature of our study is to highlight the life process in space-time by confrontation, as a first step, of designers and users, of there conception and interpretation of space and then by using of graphical representations of there movement in space. This study does not purport to be exhaustive. Rather it allows us to highlight how taking into account certain parameters such as the man and his perceptive and interpretative singularity, its specificity and context of importance in the "process" of the architecture. In this work we tried to represent the structures of experience starting from the observation of facts that reveal the practices of people in their living environment (bank space). From these abstract representations of concrete phenomena, we could interpret the facts themselves.

The spatial conformation identifies multiple configurations of life. It appears more experience than the spatial conformation does specifically. The architectural space is not only a framework, but an active agent by interacting with the people who live and by active programs, delegated by them to the device environment. The environment is not reduced to the volume of architectural space. It has all the elements (people, decor, furniture, lighting, etc.) That differentiates the life of every configuration path corresponding to program. These elements are brought together by the intellect into a three-dimensional geometry. More precisely, any architectural space is the conformation of support globing multiple spaces living spaces generated by programs and potential users. Architectural space is not only in relation with space dimension and functions' needs it is in relation also with the practices of potential users.
The space requires a certain mode of behaviour that the user is forced to either mechanically without a priori to its natural way, without wondering if the space suits designed to serve. This is the man who built to meet their needs, and that the relation man / space are reversed so that the space needed to man the proper behaviour. The relation between human and space is complex. Indeed, the space is not limited to specific dimensions from predefined requirements; it is defined from a plurality of dimensions in relation with the human being.
These initial findings emerged from this study will have at least the merit of enhancing the value of interpreting parameters other than those related to architectural forms, geometrical or functional in any "project management" whether professional or educational situation . They will implement awareness on the part of architects on the importance of integrating users in the design space.

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Love_As

Iosif DAKORONIAS-MARINA, Michalis STOUPAKIS
Architects, National Technical University of Athens, Greece
idm.arch.design@gmail.com, michalis.stoupakis@gmail.com

Abstract
"Public interest and affection for the industrial heritage and appreciation of its values are the surest ways to conserve it." The paper is a reflection on the re-use of the Arsenic production complex in the Lavrion Technological and Cultural Park (LTCP) in Greece and aims to make the complex known to the wider scientific community. The paper presents the various findings and aspects of a research project concerning this listed, polluted building and its outputs: the history and evolution of the buildings from their conception in 1913 up to their abandonment in 1957, the poisonous product, the pollution and the production line. A design proposal for the re-use of the complex as a Digital Media Centre is also presented. The Centre, through an edutainment business cluster would contribute to the work of the LTCP as a scientific and research community and would ensure the survival and promotion of the buildings which are still in decay, waiting for salvation.

Keywords: decontamination, arsenic, Lavrion, Greece, industrial, heritage, contamination, re-use

1. Introduction
"Public interest and affection for the industrial heritage and appreciation of its values are the surest ways to conserve it." [1]
Greece is not widely known for its industrial past and heritage which lies in the shadow of the rich cultural one. Chemical plants, shipyards, railway restoration facilities, mining facilities and power generation plants are some examples of industries that thrived in the Greek peninsula in the past century, taking advantage of the rich underground, producing various products and machinery and, mainly, contributing to the development of the recently formed country. [2]
The following paper is a reflection on the re-use of the Arsenic production complex in the Lavrion Technological and Cultural Park (LTCP). The aim of the paper is to raise awareness to the wider scientific community and share various findings concerning a rare, listed set of industrial buildings of the early 20th century. The paper will highlight the unique and intriguing aspects of the buildings: heavy, decayed machinery, oversized masonry buildings, various spatial qualities and the high level of engineering coexist in a weird set with the weary past of a poisonous product, pollution and death. A design proposal is also presented, concerning the re-use of the buildings as a Digital Media Centre, a centre for production and research on edutainment.
The paper is mainly informed by the findings and outputs of our Diploma Project that was presented in July 2011 at the School of Architecture of the National Technical University of Athens (N.T.U.A.) and was academically supported by the Ass. Professors E. Efesiou and Y. Kizis. [3] The research on the complex is on-going in collaboration with the administration of the LTCP in order to clarify the undocumented history of the monument.

2. Lavrion
2.1 City-Past
The city of Lavrion is located in Greece, 42 km south east of Athens and about 30 minutes by car from Athens International Airport ''Eleftherios Venizelos''. Lavrion is a brownfield-city as it used to be a pure industrial region since antiquity.
Lavrion was well-known before 3,000 B.C. for its silver production. The ancient Athenian economy and the golden age of Pericles were based on the Lavrion silver mines. The ancient coin of the

“tetradrachm” was made of silver mined in Lavrion. The mining activity ceased in the 2nd century B.C. until 1864, when new metallurgical methods were invented. In 1864 Andreas Cordellas and Giovanni-Battista Serpieri established the company “Roux-Serpieri-Fressynet c.e.” for the production of lead. In 1867 the company employed over 1,200 employees. The “Lavrion issue”, as was then named the conflict between the Greek government and the company about the rights on the ancient mine residues, from 1869 to 1873, led to the formation of two companies, the “Greek Company of the mines of Lavrion” and the company “Kamariza mines”. The latter, gave place to the “French Company of the Mines of Lavrion”. As a result, the city of Lavrion in the turn of the 19th century became a company-town of 10,000 inhabitants. Major technological innovations like the railway, electricity and phone lines were first applied in Lavrion.

The heavy industries of that period produced a great amount of pollution in air, water and grounds. Workers worked in high risk, poor conditions and died young. As macabre as it sounds, industry in Lavrion back then was linked with injury and death. Our contemporary perception of health and safety, ecology, nature preservation etc. was not an issue.

Today, the mining activity has stopped and the city is expected to become one of the main ports of Attica with the development of port facilities and the suburban railway. The reconversion of this brownfield-city seems to be an exemplary one and citizens go along with this project.

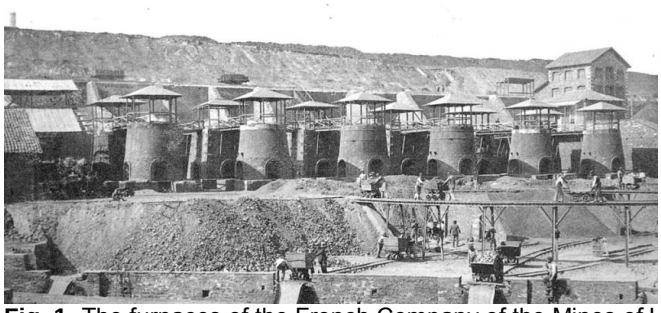

Fig. 1: The furnaces of the French Company of the Mines of Lavrion.

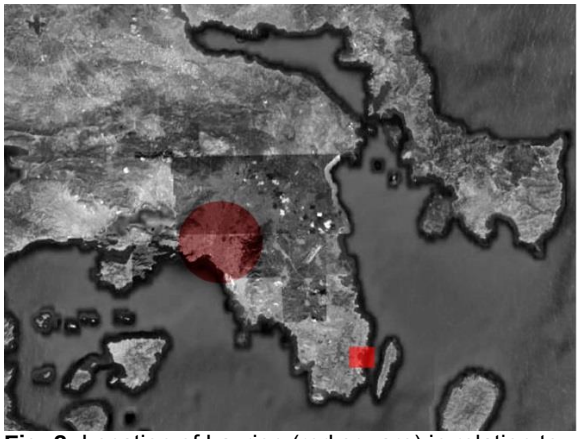

Fig. 2: Location of Lavrion (red square) in relation to Athens (dark red circle).



Fig. 3: Location of the Lavrion Technological and Cultural Park in relation to the city of Lavrion.

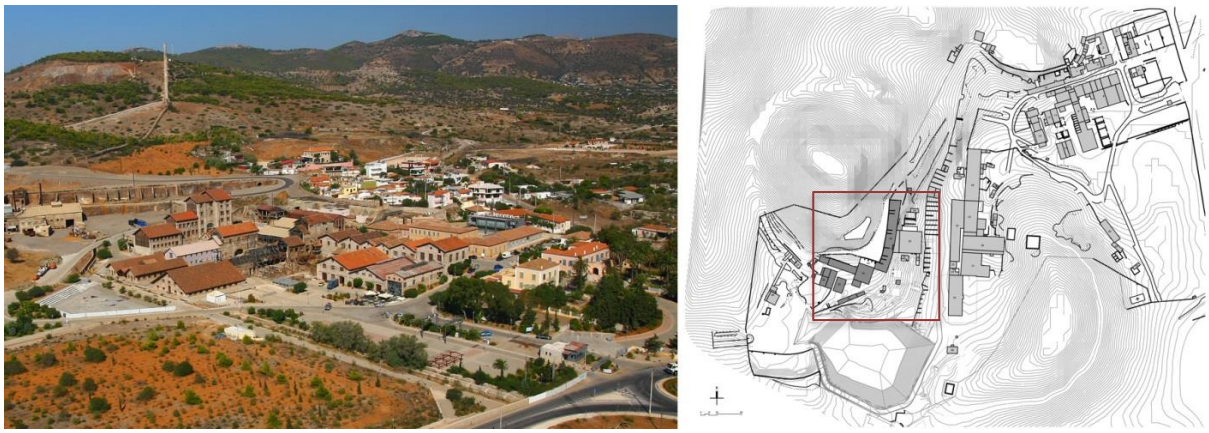

Fig. 4: The Lavrion Technological and Cultural Park (left) and location of the arsenic production complex on the LTCP topographic chart (right).

2.2 The Lavrion Technological and Cultural Park

In this context, the Lavrion Technological and Cultural Park (L.T.C.P.) (Fig. 2), is a body of scientific research, education, business and culture, located in the northern part of the city, occupying the site of the former “French Company of the Mines of Lavrion” (in French “Compagnie Française des Mines de Laurium” - C.F.M.L.) as a result of the initiative undertaken from the National Technical University of Athens.

The C.F.M.L. was permanently shut down in 1989 and in 1992 the facilities were given to the N.T.U.A. to create a technological park and a technological museum. The entire plant, along with its machinery, has been listed [4] and has been divided in three phases of intervention. Today, 19 buildings of the first and second phase out of 43 have been restored and are rented occasionally to companies of technology and research.

The activities of the C.F.M.L. left back a great quantity of polluted material, scattered in the premises of the factory, contaminating the soil and the beaches of the city of Lavrion. Since 1992 the L.T.C.P., in order to face the pollution, has performed the following projects:

- decontamination of 155,000 t of soil in the metallurgical waste dam
- construction of a landfill for contaminated soils, with a capacity of 113,000 m3 of soil
- construction of an underground storage for hazardous waste, with a capacity of 5,000 t of waste

Given that the restored 19 buildings where not heavily polluted, the LTCP has not yet completed any big scale building decontamination. Pollution is still present on most of the buildings of the third intervention phase. These consist of the arsenic production complex -where the product itself was poisonous- and the main smoke filters. The main contaminants in the LTCP consist of Lead, Arsenic and Cadmium and their elimination is one of the main goals of the LTCP.

The pollution, however, contributed to the survival of many of the buildings of the LTCP, as ironic as it may sound. In this harsh environment, no living organism survived. As a result of the absence of bugs and pests, the majority of the wooden parts (roofs, floors etc.) were preserved in an excellent state, needing minimal interventions.

3. As [5]

3.1 The buildings

The arsenic production complex is a monument of the modern industrial history of Greece with European significance, and part of a larger industrial complex. The complex is part of the third intervention phase of the LTCP. It was constructed as an independent production unit and includes four buildings (Fig. 5):

- administration and baths (no 33),
- main furnaces (no 34A), silos (no 34B), condensation (no 34C) and ventilators (no 34D)
- barrel workshop (no 35)
- packaging (no 36A,B) and lead oxide production (no 36 C,D)

The design of the buildings began before WW I, but construction of the first phase was not completed until 1917. Main products of the complex were white arsenic and, later, lead oxide. Part of the buildings housed at some point the cupellation of silver.



Fig. 5: Aerial view of the buildings.

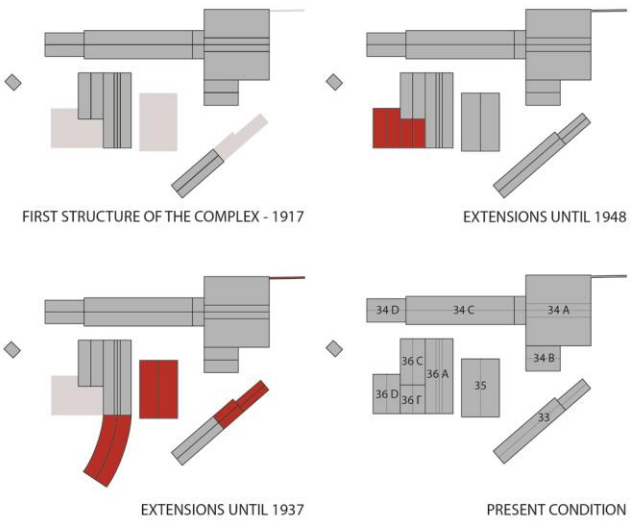

Fig. 6: Evolution of the complex.

The over-sized buildings of the complex are a typical example of machine-buildings, where equipment and structure function together to produce the final product. The buildings are not just a shed for machinery, they are the machine itself. Each part is designed as part of a huge mechanism that serves the sole purpose of production. The production process is the one that generally defines the architecture of the complex. The specific arrangement of the buildings, the variety of spatial qualities that can be observed, and the different types of openings are directly associated with the production process, covering operating needs. For this reason no main entrance can be identified on the complex.
In times, various interventions were made, by means of new constructions or modifications that served new needs that arose (i.e. electrification), without modifying the previous functional structure of the complex, as seen on the evolution chart. (Fig. 6)
Stone, brick, steel and wood are the main materials used for the structural elements of the buildings. The termination of arsenic production in 1957 and the abandonment of the buildings led eventually to deterioration of the steel roofs. However, the relatively good current state of the masonry walls indicates the high quality of building design and construction.



Fig. 7: South-east (top) and south-west (bottom) elevation of the complex (original scale 1:100).



Fig. 8: Polluted material on the furnace wheel (left) and the condensation building (right).

3.2 The production line

White arsenic (otherwise arsenic trioxide or As_2O_3) is a substance generated by processing arsenic ores, by the hydrolysis of arsenic trichloride ($AsCl_3$) or by smelting arsenic (As). White arsenic is used in pharmaceutical products, wood preservation, electronic components and production of white glass. At the same time it is poisonous and deadly. Approximately 50,000t of white arsenic are produced yearly around the world.

In the C.F.M.L. white arsenic was the product of the smelting of arsenic residues of the smelting process of lead. Production started in 1917 and was ceased in 1957. Arsenic can be still found on parts of the complex, polluting the buildings and their soil. (Fig. 7)

One key aspect of this research was the decoding of the long lost production line, as there are no records of the buildings in use. The production of white arsenic being ceased since 1957, no workers are still alive in order to tell the stories of the buildings. The process of this decoding is still in progress, in collaboration with the LTCP and the School of Mining and Metallurgical Engineering. At this point a graphically simplified drawing of the production line is the one in fig. 9. Part of the machinery was digitally represented, according to the existing remains and the original drawings (1913) of the complex (Fig. 10). A detailed list of the existing industrial equipment was produced, evaluating it in terms of the present condition, knowledge of the initial state and reconstruction possibilities.

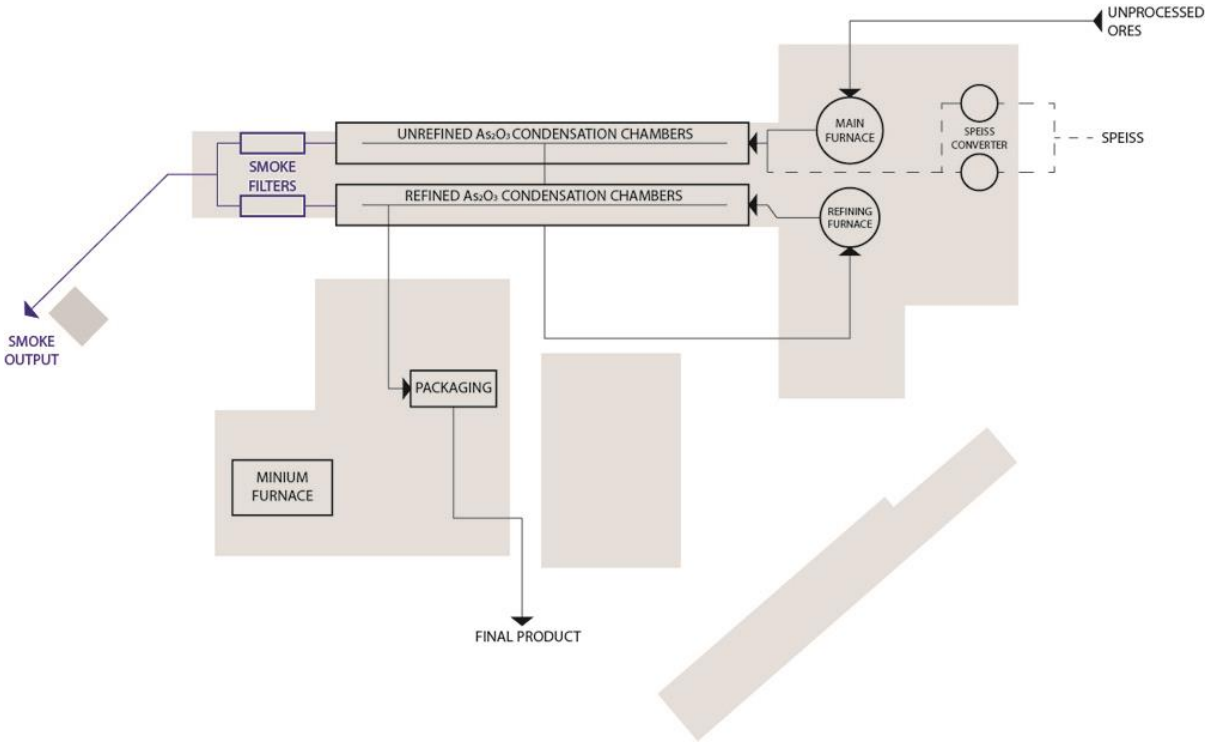

Fig. 9: The production line of the complex.



Fig. 10: The digitally reconstructed main furnace (left) and speiss converter (right).

3.3 Re-use

Through the strategic plan of the LTCP, two where the main uses that the building could accommodate: either a guesthouse for the official guests of the LTCP or a Digital Media centre. At first we were charmed by the idea of incorporating living spaces in such an interesting industrial environment. Soon we realised that the weary past of the buildings could have a negative psychological effect to visitors. Additionally, the financial feasibility of a guesthouse would rely solely to the LTCP, whereas a Digital Media Centre could be funded by a business cluster on education and technology. Business clusters, as strategic management could incorporate the decontamination cost.
The Digital Media Centre could contribute to the work of the L.T.C.P. by means of:

- disposing facilities for the production of digital movies,
- conducting research on new media display and projection, introducing innovative technologies
- producing 3d entertaining and educative programs for use on computers (edutainment),
- organising projections for the public with new digital media (3d, 3d mapping, pepper's ghost, holograms, virtual reality etc.)

The proposed structure of the Digital Media Centre is shown on fig. 11.

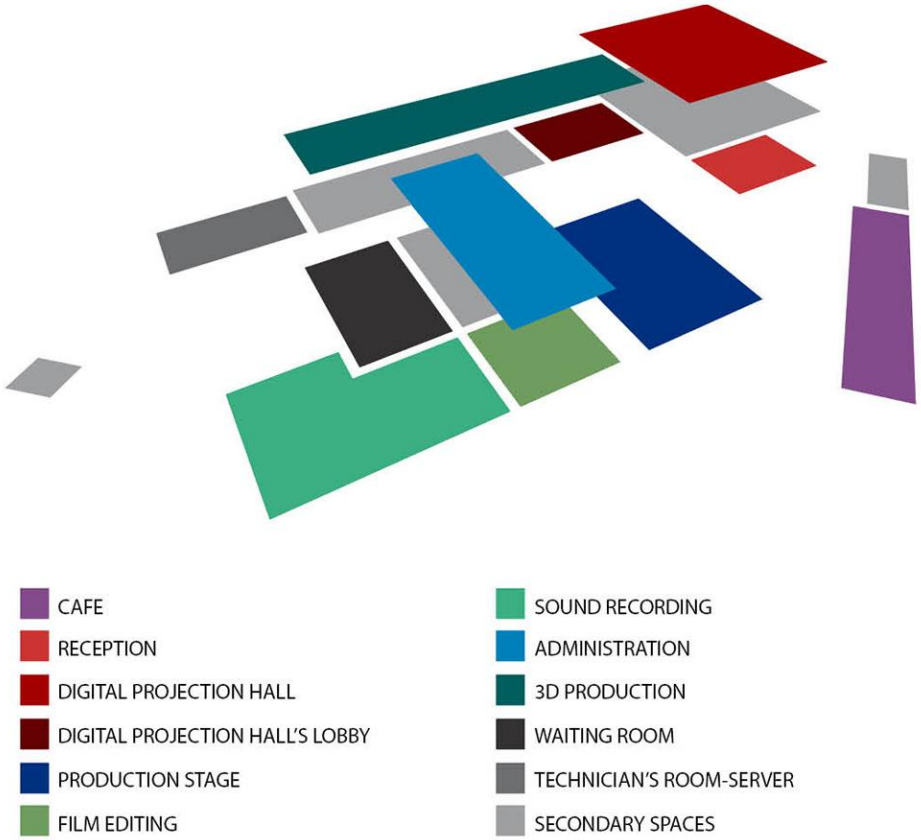

Fig. 11: Structure of the proposed Digital Media Centre.



Fig. 12: Paths and access around the complex.

Basic goals of the rehabilitation set as constraints to our design ambitions were:

- the preservation of the industrial identity of the complex
- the preservation or reconstruction of the of the industrial equipment as an integral part of the buildings, depending on the decontamination process
- the preservation and enhancement of the qualities of the complex's spaces in conjunction with the industrial equipment
- the re-integration of the complex in the life and operation of the L.T.C.P. and
- the sustainability of the complex, according to the needs of the new usage.

In order to accommodate the new use we proposed a series of interventions that would ensure the rehabilitation of the buildings architecturally, structurally and health-wise. These interventions can be summarized to:

- The decontamination of the complex through a carefully planned and risk assessed scheme,
- The design of free walkways around the buildings and their connection with the existing network of walkways of the L.T.C.P. aiming to highlight the industrial complex (fig. 12).
- The organisation of accessibility in buildings by redefining the function of open spaces and the level of accessibility, combined with the free walkways. Thus, two outdoor areas with different functions are organised: i. The south outdoor space, which is a transitional area between the technological park and the internal life of the Centre. This space operates as a rest area on the free walkway and it is directly related to the use of the café. ii. The central outdoor space, which receives the new entrances of the buildings and works as a link between them.
- The location of the operations of the new usage based on the qualities of the existing spaces
- Conducting modifications on the buildings with basic principles:
    i. the morphological-geometric relationship of the old and the new constructions,
    ii. the function of the new usage and
    iii. the promotion of the architectural and cultural values of the original structure.



Fig. 13: Proposed south-east (top) and south-west (bottom) elevation of the complex (original scale 1:100).

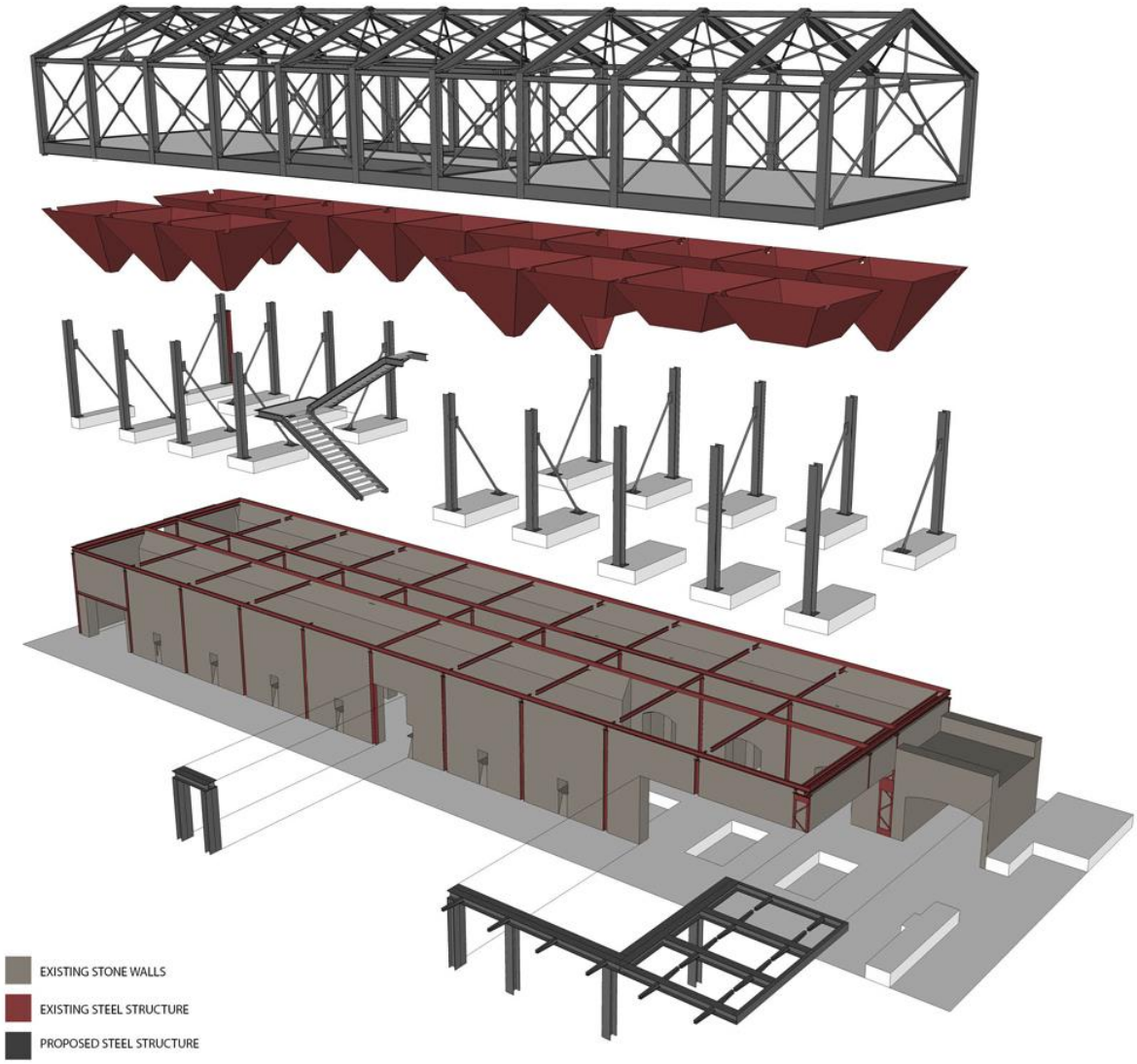

Fig. 14: The proposed structure of the new building.

In order to support the new use of the building and enhance the complex, we proposed along with the modifications on the existing buildings, a series of new structures, both small and large. The new structures where:

- Two steel lightweight shelters each with a specific role in the organisation of the buildings. The first one is designed to separate the two open spaces defined by the buildings and to indicate the reception of the complex. The second one, at the west end of the central open space, in order to organise and indicate the entrances to the different buildings.
- A new building volume that respects the shape of the collapsed upper floor of the condensation building in order to cover the needs in new spaces and to house the innovative production processes of the complex. The new structure is formed as a continuous folded metal surface, detached from the existing building in order to create to the viewer a smooth transition between the existing and the new building. The structure of this building has a dual, interactive role, both supporting the new usable space and reinforcing the existing structure. This volume is proposed to be covered with zinc, a material with a colour relevant to the surrounding built and natural environment colours.

Although the new structures seem to be architecturally simple, they are a product of a careful evolution of initially bold design attempts. Bearing in mind the established charters on conservation and through continuous re-design informed by the theoretical background and our understanding of the buildings, we proposed an architecture that would be simple, but not simplistic.



Fig. 15: Model of the proposed new structures (scale 1:100).

4. Future

Industrial buildings are not appreciated by the public as “real” monuments as they are linked with a harsh past and a polluted, unsafe part of the history. However, they are a part of our history that cannot be overlooked. The amount of embodied energy in these buildings is huge. As mentioned in the Nizhny Tagil Charter for the Industrial Heritage: “Continuing to adapt and use industrial buildings avoids wasting energy and contributes to sustainable development. Industrial heritage can have an important role in the economic regeneration of decayed or declining areas. The continuity that re-use implies may provide psychological stability for communities facing the sudden end a long-standing sources of employment.” [6] The role of the architect in these cases is not to project his ego and design ambitions, but to design a supportive background that is architecturally smart, protects and promotes the buildings. It is this kind of relation between new and old that will help the building survive for the next generation. The survival of important industrial buildings, as the one mentioned above, relies, unfortunately, on economic factors. Technical solutions are always available, but their unique application to each building creates major financial setbacks that delay indefinitely the process of rehabilitation of a listed, polluted monument. The Arsenic production complex is still, up to this day, standing in decay, its past being still not fully documented and its future being uncertain, relying mainly on financial factors as many other buildings around the world…

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[3] DAKORONIAS-MARINA Iosif, STOUPAKIS Michalis. Re-use of the Arsenic Production Complex in the Lavrion Technological and Cultural Park, Athens 2011, ISBN 978-960-93-3530-0

[4] Official Gazette, Φ.Ε.Κ. 293Β/1992

[5] All material presented in this section is part of the documentation process of the project and was produced by the authors, based on on-site visits, the official topographic chart of the L.T.C.P. , the 1995 drawings of the N.T.U.A. School of Architecture and the original plans granted from the M. Markoulis collection.

[6] The Nizhny Tagil Charter for the Industrial Heritage, http://www.ticcih.org/industrial_heritage.htm, §5.V.



Fig. 16: General view of the complex.



Fig.17: The condensation chambers (left) and the furnaces (middle and right).



Fig. 18: Model of the complex (scale 1:100).

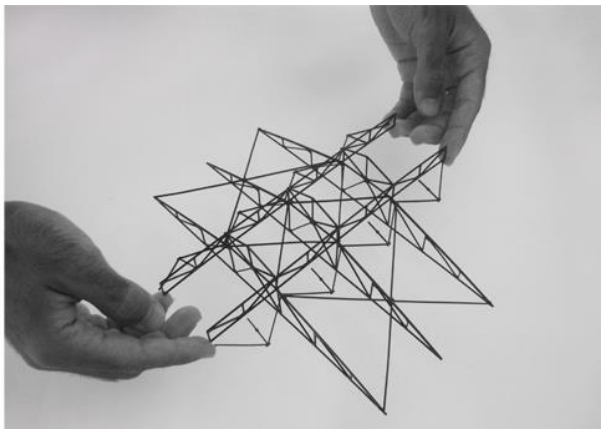

Fig. 19: Model of the structure of the roof of the furnaces' building.

HERITAGE ARCHITECTURE LANDESIGN
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URBAN STRATEGIES TO REGENERATE THE MOROCCAN PUBLIC SPACE IN THE URBAN HISTORICAL TISSUES
Study case: Boulevard Mohamed 5, Casablanca

Fatimzahra BENHAMZA
Casablanca's architecture school (EAC), Casablanca, Morocco
Fati.ben6@gmail.com

Abstract:
The proposal aims to define a potential strategy to investigate and intervene into the core of the historical tissues of Casablanca's inner center. We chose the Boulevard Mohamed V as a representative site of the actual situation of most historical areas in the city.
Those areas, had been neglected and undergo the pressure of external forces, consequently they are into perpetual transformation and change in the opposite direction of the natural environment. Changes that are suppressing their own identity. Renewal programs are actually ignoring the specific typology, architectural heritage and collective memory of the areas.
Public spaces are important structuring elements of Casablanca's urban space and they represent the essence of her identity. This project proposes a new way of thinking the Moroccan public space, with innovative strategies, to revitalize the Boulevard Mohamed V trough the realm of public space, an itemized analysis of the Boulevard had lead as to specific physical and social components, that will support our reflection, The boulevard Mohamed V is constituted with interconnected public spaces, (inner galleries, inner courtyards, piazzas etc), that work as whole, it's important to rethink the public space in this historical area according to this elements through a small scale interventions that involve an interaction between the public buildings, housing, and public spaces within the area, in order to regenerate the existing spaces, and to create a compact and sustainable spaces that are closely linked to the community daily life and urban morphology of the area.
The project calls for a contextual approach that takes into consideration the complexity and the different components of the Boulevard Mohamed V in order maintain equilibrium into the historical areas and to preserve our tangible and intangible patrimony.

Keywords: regeneration, historical city center, public space, small-scale interventions, Casablanca

1. Introduction:
Cities all over the world are in a state of continuous transition, getting better, bigger, or maybe smaller or just worst, cities experience periods of growth and decline, being shaken by economic, industrial, political and social changes, with an intrinsic transformation of urban space from one economic and social use to another. Public space is the realm where of all this collisions, fissures, transformations, happen and take form.
Since 1914, Casablanca has been in perpetual changes that had influenced the development of the city's urban space. With its transformation, decay of inner urban space is an inevitable result. Those areas, had been neglected and undergo the pressure of external forces, consequently they are into perpetual change in the opposite direction of their natural environment. Nowadays, it becomes clear that the making of the Moroccan public space must be revisited in the historical tissues of Casablanca city center; otherwise its identity will be lost.
The purpose of this paper is to highlight the importance of public space in the historical tissues of Casablanca city center as a tool to regenerate its lost dynamic and vitality, through a contextual approach with urban small scale interventions which take into consideration the local identity, communal way of living and the very specific architectural features.

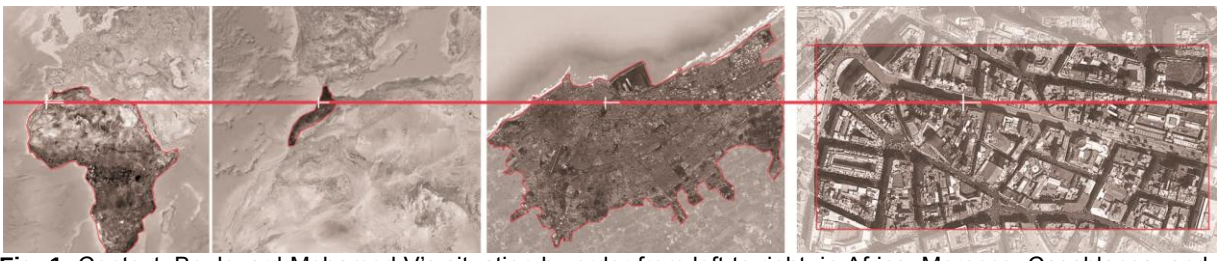

Fig. 1: Context, Boulevard Mohamed V's situation by order from left to right, in Africa, Morocco, Casablanca, and the Casablanca's historical inner city center.

The Boulevard Mohamed 5 is widely renowned as both the commercial and symbolic centre of Casablanca, although it's a residential area; the boulevard is dominated by commercial use.
Casablanca's Mohammed V Boulevard is lined with buildings from the 1920s and 1940s, it is regarded by historians, scholars and architects, as an important heritage of the colonial architecture; it's an important leg of art deco architecture. For the Casablanca's collective memory, it represents along with the medina one of the oldest parts of the city. It's a meaningful element of the Casablanca's historical core center; it hosts important historical building, with a specific architectural typology, and way of living. [1]
It was one of the most prestigious boulevards with prestigious shops, but due to visible deterioration and destruction since the late 1970s, it fell apart. In fact Casablanca's historical city centre have faced stiffer competition, generated both externally by other cities, and internally by the emergence of new centralities (like Maarif or Anfa districts).
The Boulevard that becomes abandoned was a symbol of social and physical decline of Casablanca's inner town center. A renewal program has been implemented, with the installation of the tramway one year ago, the boulevard Mohamed V went from a carrossable way to a pedestrian zone that hosts the passage of the tramway, with a tramway station in front of the "Marché central and "hotel Lincoln", which are emblematic buildings in this Boulevard., However In most Moroccan's redevelopment projects public space is often seen as performing a secondary or supporting role within urban regeneration projects; one that merely adds the finishing touches to a broader project rather than being a driving force.
The project tries to incorporate those missing urban interventions, in the actual renewal program, by grasping all the particularities of the Boulevard Mohamed V.



Fig. 1: Boulevard Mohamed V historical buildings, 1: "Grand Socco" building, 2: central market (Marché central) entrance, 3: inner gallery Tazi, 4: a view from the Marché central interior

2. Urban small-scale interventions in the Boulevard Mohamed V:

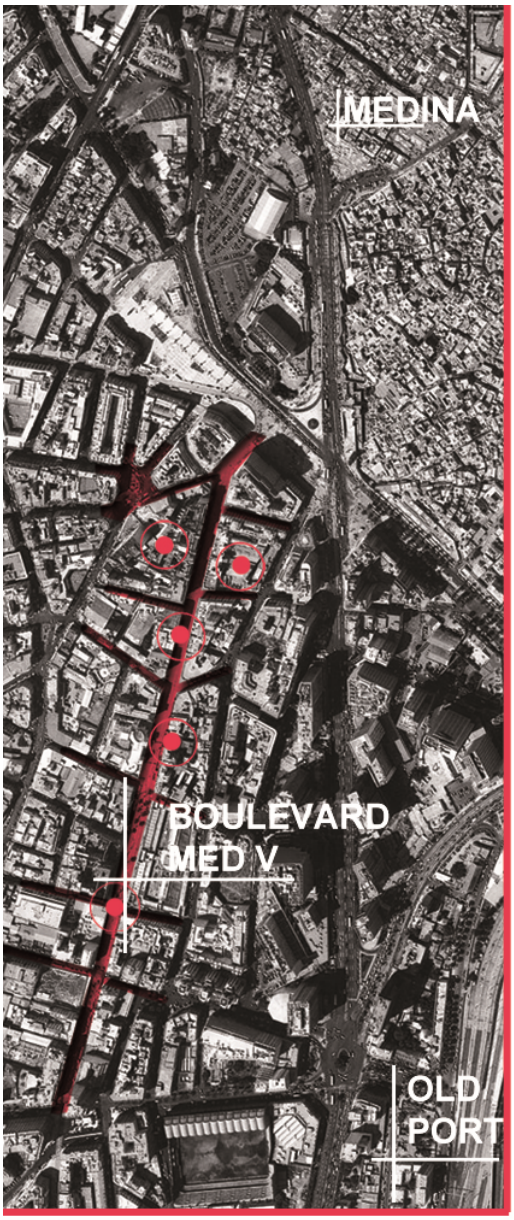

Fig 1.



Fig 2.

Fig. 1: Urban interventions Master Plan
Fig. 2: Concept schemes, 1: inner courtyards and inner galleries, 2: the passages under the portico, 3: the rooftops, 4: The Boulevard, the perpendicular streets and the piazzas.

The proposal aims to cling into the specificity of the site, which means to use its historic and architectural features and social organization in order to regenerate its own public space. The project explores potential strategies for urban interventions in the city historic core area, in opposition of the renewal programs that ignore the existing cultural and architectural heritage. Urban settlements that enhance the local way of living respect and harness the architectural identity of the site. Analysis of the tissue reveals a need of small scale interventions to regenerate the existing urban space. Community life is strictly attached to the urban morphology and, for this reason; the proposal tries to restore the identity of public space as a place for daily life, to reinforce the ongoing processes. The

analysis of the characteristics of this historical urban tissue, had lead to representative sites that will work as a catalyst for regenerating the existing space.

2.1 Inner courtyards and inner galleries:

The intervention tries to restore the inner passages and inner courtyards entity, as an important component of the boulevard Mohamed V architectural heritage, they are considered as shortcuts that bring you in the inner core of the historical buildings, they also form one of the most important points for communal sociability and commerce, along with the boulevard. The first one was built for El Glaoui, Marrakech's pasha, by Marius Boyer. Those passages remind also, the Moroccan "souk and kissaria"'s constitution (wish means the traditional market in the Moroccan language). Unfortunately, they are today, subject to abandon, a source of insecurity for inhabitants, and lack of ventilation and lighting. The passages of 5 m height are constructed in a way to receive natural light, the light penetrates by a glass-made roof, due to hygiene and maintenance lack, the passage looks miserable, it became a deserted place without commercial activity. We propose an adapted system, which grasps all the particularities of those passages in order to re-activate the social activity. In fact, commerce are not only in the ground floor, but also in the first floor, sometimes in mezzanines, in fact the original street pattern has been overwritten by a covered invisible pedestrian network of interconnected shops at the first floor[2]. The scheme below shows that the best way to regain, light and redynamization of the passages, is to open the first floor to the ground floor, and to replace the deteriorated and no longer useful glass made roof, by new one that respect the original design and will allow a better natural lighting and with integrated ventilation system. The fact that the passage will be used in its ground and first floor, will enlarge its scale (8m height), and invite the population to reinvest it again.

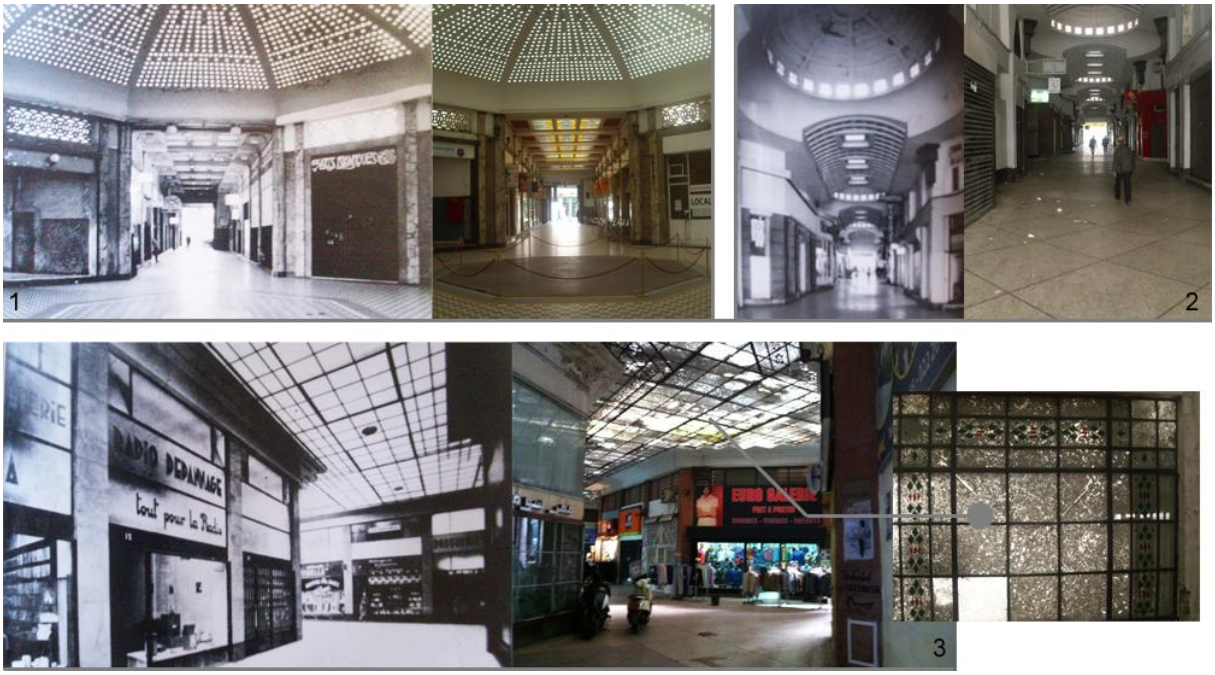

Fig. 1: The before/after inner galleries state, 1: Inner gallery Tazi (19/2013), 2: the inner gallery El Glaoui (19/2013), 3: The inner gallery Sumica (19/2013) [3]

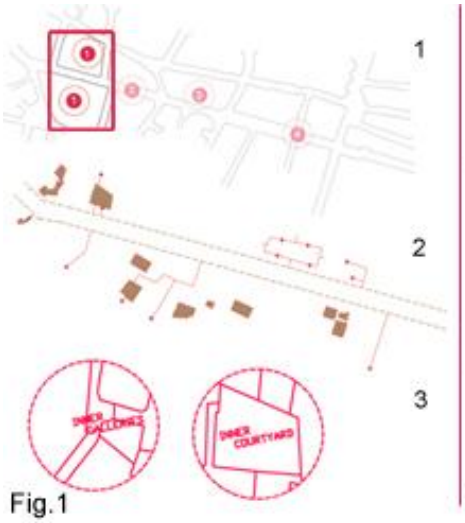

Fig.1

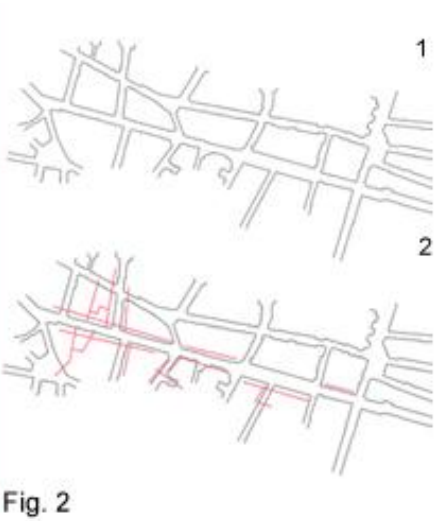

Fig. 2

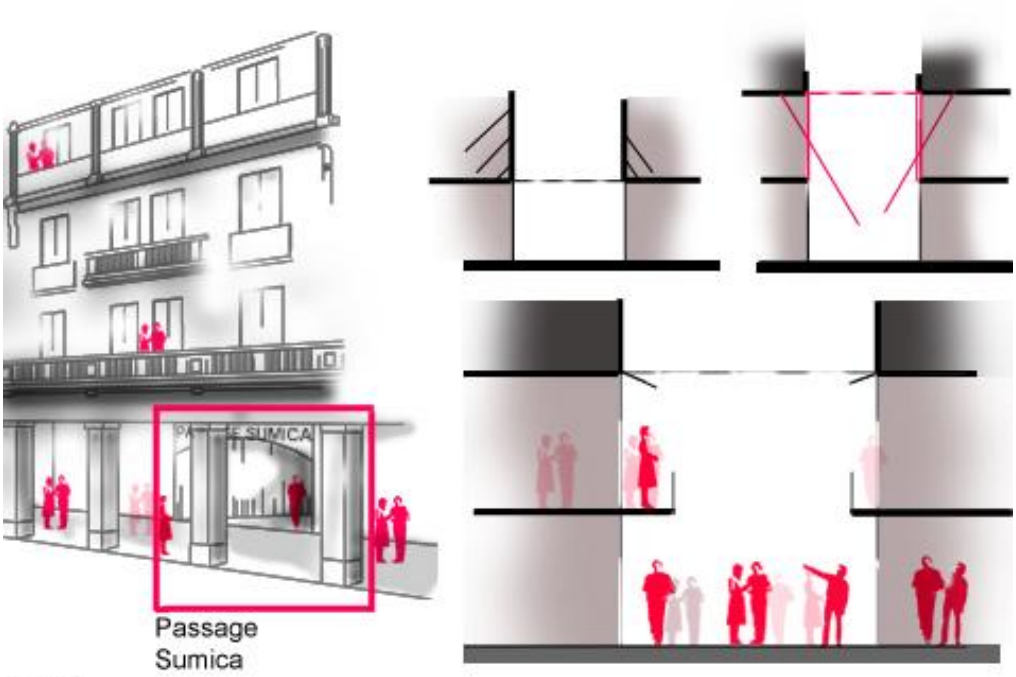

Fig. 3

Fig. 1: Location of the urban intervention in the master plan
Fig. 2: the invisible network of commerce at the first floor
Fig. 3: example of the intervention: inner gallery Sumica, the schemes are showing how we integrate the first floor to the ground floor.

2.2 The passages:

Those passages, are constructed under a portico, and extend the Boulevard by 5m; they are a continuity of the boulevard's urban space. At that time when the boulevard was a roadway, it was the pedestrian passage of the boulevard. Restaurants, fast foods, cafes, shops, banks, societies, are filling the passages. The proliferation of that commerce has negatively changed the view of the boulevard, posters, billboards, notes are destructing the esthetics of this historical area. We propose a graphic charter, to be respected by the new implemented shops commerce, in order to work as a model for the old and new commerce, shops, cafés etc. The graphic charter incorporates a simple work in the ground floor's façade, first of all to eliminate all the insignificant billboards, the only one to keep is the brand shop or commerce or café, brand, with a homogeneous dark colour for all, posters are allowed in the columns as signing tools.



Fig. 1: a commercial ground floor façade treatment on how it could look if the graphic charter is respected.

2.3 The boulevard, the perpendicular streets, and the piazzas:

The actual renewal program, disregarded the spaces that are forcefully linked to the boulevard, and its approach was rather linear and 2 dimensional. Which restricts the interventions only to the boulevard Mohamed V; this emblematic boulevard is an open network of interconnected public spaces, it works as a whole. It is also the main body that supports all the historical built area. Our approach is to include a perpendicular network to the boulevard's streets _mainly crossable streets_ to the pedestrian public space. Which is going to regenerate the old piazzas and makes them “areas for rest stops”. Those areas are; The “place de France”, “place du 16 Novembre” and the “place du Marché”. The market square (place de Marché) is related to “Marché central”(central market), wish is one of the oldest markets in the city, it is very known for its products and food quality, in fact, small restaurants take place in the market’s interior space. By making them more active outside the market as well will create interesting human activities in this area. We can use the presence of those piazzas as a structuring element to attract tourists and residents along the boulevard course (1200m).A very important social issue is yet to mention, in Morocco, the informal economy is a reality, and take part of our daily life, what we call ”Les petits métiers”; that regroup artisans, street vendors, day laborers, etc.. Those informal jobs propose a fast, direct and punctual service at a low cost, wish constitute a huge economical benefit to the city. Today, the challenge for Casablanca city is to recognize this economic system, and to integrate it in her development strategies. The boulevard Mohamed V is not an exception, it hosts very specific informal jobs, what we call “El ferracha”, a term commonly used in the Moroccan dialect to point out the vendors that put in the ground the products that they sell, it includes books, magazines, clothes, food, there are also day laborers (plumbers, carpenters etc..) and street vendors especially for the food. What is important to relieve here, is the juxtaposition of the informal and formal worlds wish create a novel condition that respond to a punctual need. For example, the professionals that are working in the Boulevard Mohamed V , may not have time, everyday for a power lunch, and there will be days when grabbing a grilled meat from the street vendors is the most efficient use of time [4]. In order to maintain those very interesting interactions and juxtapositions, it’s compulsory to maintain the activity of those informal jobs in the Boulevard, it’s an identity element for the historical areas, otherwise it will be lost, hence we will try to restore the place of the informal jobs, by giving them a more dignified role in the public space’s Boulevard Mohamed V realm. The idea is then to create a system of trees and branches, where the boulevard med 5 is the main branch, where we inject, a number of artifacts that will organize the existing urban scene by restoring the identity of public space as a place for daily activities and social interactions. these artefacts, embrace the needs of the population that use the boulevard every day, the first device is a multifunctional kiosk, it’s a station, with a shelter and modular benches, that provides the daily labourers a place where to stay, while waiting for an opportunity job, this is also a place where the “El Ferracha” can put their products and sell them, or maybe it can just be used as rest stop for the tired street vendor. It’s not only a device, it’s a structure that acknowledges a marginal social class, and keeps a social cohesion

between them. The Boulevard Mohamed V lacks from urban furniture, so we thought for an another device, that can respond to the needs of workers, students, passants, or tourists for an adapted equipment for resting, eating or just wandering.

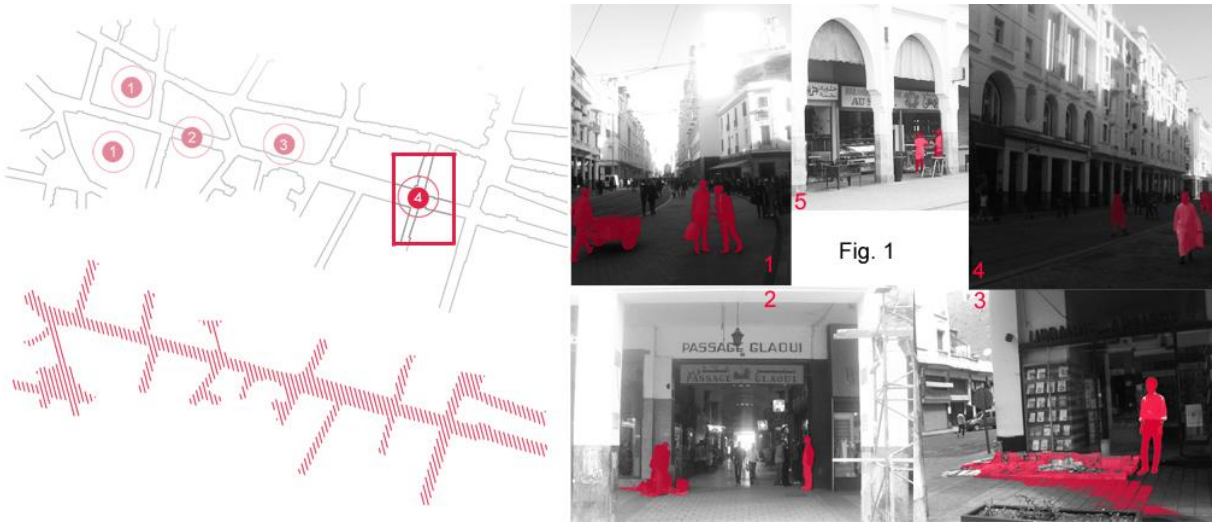

Fig. 1: Daily activities in the Boulevard Mohamed V, 1: street vendors and professional workers, 2: day laborers waiting for a job opportunity, 3:" El Ferracha", a vendor is exposing books and magazines to be sold, 4: visitors, residents…, 5: workers at small businesses

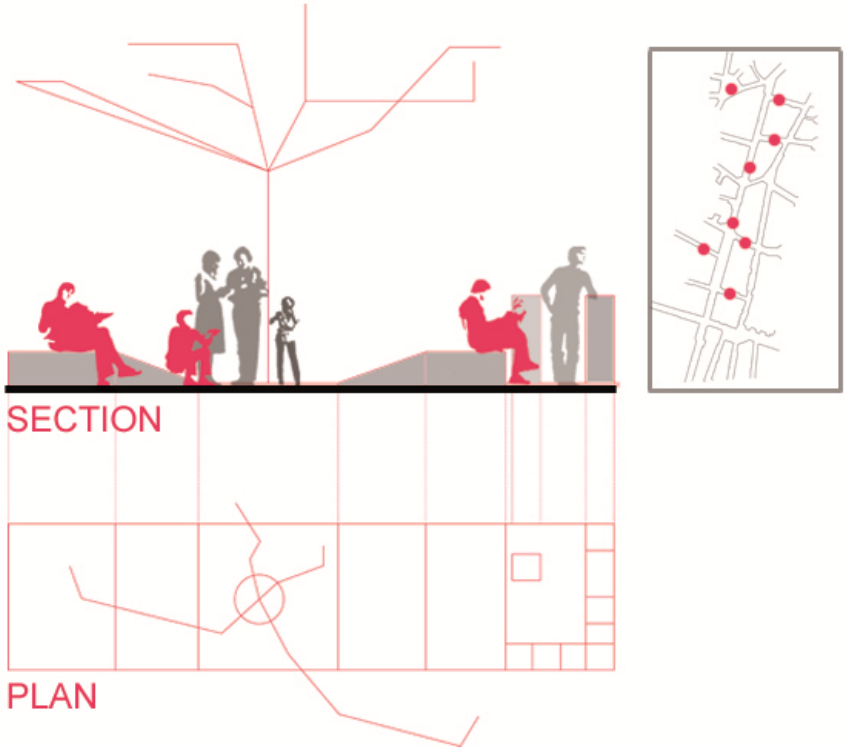

Fig. 1: a urban equipment to rest, eat and play.



Fig. 1: Photomontage of the redynamization of the “central market piazza” with cafés and small restaurants in the outside of the market

2.4 The rooftops:

The boulevard Mohamed V presents a very diversified built template, with various heights, that vary from only a commercial floor to a eight floors + commercial ground floor. The experience in the Boulevard is strictly horizontal, we can only wander in its streets, passages, inner galleries or piazzas, what about the roofing? Terraces are an important component of the Moroccan culture; it’s a predilection zone for sociability, leisure and relaxing. We propose then to reinvest some interesting rooftops that present important points in sociability by putting cafés for example or just transforming it into a place where residents or tourists, can come to appreciate the magnificent view of all the historical area.

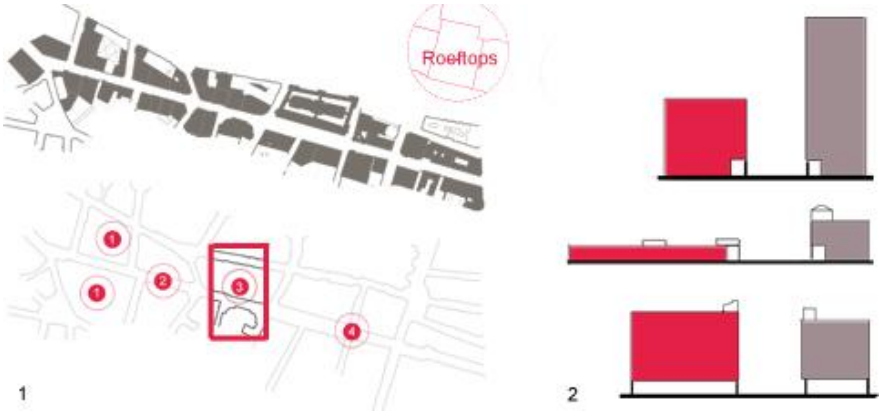

Fig. 1: The different built templates in the Boulevard Mohamed V

2.5 The infrastructure:

The use of water in the Boulevard is a waste, the municipality use drinking water, for cleaning. Creating rain water collection areas will support the existing water supply network, and will help to clean the boulevard and the market “Marché Central” in the end of the day.

Acknowledgments: this work has been directed by professor and architect M.Mohamed El Malti

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Spomenik in Flux

Erika LINDSAY
Architecture, Taubman College of Architecture and Urban Planning, University of Michigan, Ann Arbor, USA; erikalinds@gmail.com

Abstract
This research into former Yugoslavia's spomenik (monuments) explores the critical relationship between a series of material memorials, their mediatized representations and their most recent appropriation in order to underscore the transformative nature of historic signification as both a built and symbolic continuum. Erected over the span of twenty years before Josip Tito's death and just prior to Yugoslavia's disintegration, the spomenik currently epitomize a gradient of decay, some fixed while others are in rapid flux at a critical point for conservation efforts. In each instance, however, their contemporary condition in stark juxtaposition to an original intended meaning points to the persistent power and allegorical potential of counter-monumentality. Tracing the modes in which these contradictory and semantically charged sites operate in response to or in spite of contemporary preservation efforts, allows for reflection upon both authoritative and informal cooption of singular cultural connotation and speculation about the power of memorial elasticity.

Keywords: spomenik, post-yugoslav context, counter-monument, conservation, monument

1.Context
1.1 Anti-fascism, Partisans and the Yugoslav Republic
Spomenik were built by a regime set on moving forward and forgetting wartime atrocities committed on all sides by commemorating partisan victories over the axis powers. During World War II, many battles were fought on Yugoslavian soil by the anti-fascist partisan resistance against the fascist axis powers. At the same time, the region was enmeshed in a civil war, which resulted in the formation of the Republic of Yugoslavia, comprised of six republics. In the post-war years nearest to the war, this gave the Yugoslav people something to unite around. Anti-religious propaganda of the postwar era unified Yugoslavia and attempts at ritualizing the act of remembrance around World War II anti-fascist struggles were done in an effort to seek this unity and focus on what the peoples of the newly formed republic had in common.

Josip Tito, leader of the partisan resistance during the war years, had constructed a collective memory upon which to build the new Yugoslavia from the end of the war in 1945, when he came to power until his death in 1980, at which time, Yugoslavia remained peaceful. Spomenik comprised a large part of this new Yugoslavian nationalism under Tito's leadership. When communist states began to fall in the late 1980s in neighboring eastern Europe, the republic began to separate, focusing instead on its differences rather than what it had in common, the battles of the Second World War, mere stories of their grandparent's generation. The new generation was interested in an attempt at re-discovering the cultural heritage that generations before had been expected to leave behind. Ethnic and religious tensions were heightened as each group sought to find its lost identity that was relinquished or forgotten in order to live as a united Yugoslavia under Tito. Within a decade after his death, the Yugoslav Wars ensued, and with it the disintegration of the republic, as those who inhabited geographies of opposing ideologies, ethnicities and doctrine attempted to make territorial claims and proclaim independence. It is also important to note that not everyone within the Yugoslav territory had been a part of the partisan resistance. Tito's nationalism alienated groups who had sympathized with the fascist occupation, as the victorious partisans wrote the history.

1.2 Abstraction and Universality
The abstract form of the spomenik was an attempt to provoke collective forgetting in an effort to create a far-reaching, productive amnesia capable of galvanizing groups once pitted against one another. Productive gaps produced by abstract monuments allow the viewer to situate their own narrative



Fig. 1: Grmeč, (2007) [5]

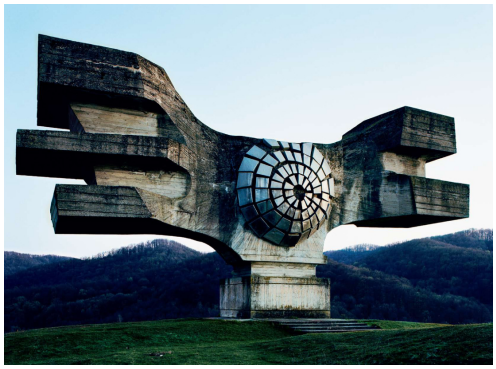

Fig. 2: Podgarić. Croatia (2006) [5]



Fig. 3: Petrova Gora. (2006) [5]

within the form which holds the possibility of universal signification, thus becoming all things to all people. This stands in opposition to the man on the horse as a traditional and figural form of monument which has been used to commemorate significant human achievements for hundreds of years. In the abstract partisan spomenik, signification is varied and fluid, rather than specific and rigid. Operating through pure signification, many partisan monuments did not use existing symbology such as that of the red star, or hammer and sickle indicative of many communist memorials, nor did they use religious symbology, opting instead to create their own symbology for each site, as part of the branding of the new Yugoslavian republic. This variability allows for multivalent reads, which is what has ultimately lead to their continued relevance today. [10]

Partisan spomenik standing today can do little more than represent a failed regime. Through acts of vandalism, natural forces and neglect, monumental decay writes a counter-narrative for the spomenik, which have come to stand in opposition to what they originally signified. [9] It is in this moment that the spomenik are rendered in their present state to be *dialogic,* that is, in dialogue with the ghosts of their former glory.

2. Spomenik Case Studies

2.1 Ilinden Memorial (Makedonium)



Fig. 4: Makedonium / Illinden Memorial. Near Krusevo, Macedonia. (Zlatko Avramovski 2008)

Ilinden Monument, space age in form, commemorates the anti-fascist liberation of Macedonia after World War II as well as the Illinden uprising against the Turkish occupation of 1903. Both events have been pivotal to the creation of present day Macedonia.

Along the conservation gradient, the Illinden Monument has been well-conserved, due to its alignment with the nationalist narrative of Macedonia. This monument has endured through the parasitic linking of partisan endeavor to the long-standing local commemorative practice of Ilinden. Its added significance comes from the entombment of a local hero. The site recently saw the equivalent of 350,000 US dollars of investment for renovations in 2003, just in time to mark the 100th anniversary of the uprising. Each year on the day of the Republic, also known as Illinden Day, memorial reenactment celebrations take place. It is due to this commemorative use that the monument continues to have cultural significance. Known to some as the Makedonium and others as Ilinden—the monument, which is not formally tied to one or the other can exist to commemorate both. [4]

There have been multiple attempts by the Macedonian government to keep the site relevant to the nationalist narrative. In 1990, 85 years after his death, Nikola Karaev, the schoolteacher who led the uprising in 1903, was entombed in the memorial. This worked as a means to further strengthen the local narrative while at the same time, solidifying its role in the greater national narrative. In 1993, renovations were made for celebration of the 90th anniversary of the uprising and ten years later, further investment was made in the site, marking the 100th Anniversary of the uprising, which also marked a televised event. [2]

2.2 Conservation Through Parasitic Cooption

This imposed significance on the part of the state began at the inception of the memorial in 1974, with the negation of the rich local heritage associated with the site. Instead, favoring the nationalist Macedonian narrative of Illinden as the beginning of a Macedonian state as well as the formation of the current Macedonian state by way of the influence of those within the Anti-Fascist Assembly for the National Liberation of Macedonia (ASNOM). ASNOM was the group which determined the parameters of the People's Republic of Macedonia, as part of the Yugoslavian republic. In keeping with their Yugoslavian nationalist agenda, the anti-fascists, now in power, with partisan war hero, Josip Broz Tito at the helm, were interested in making monuments to partisan war achievements, as a way of reifying their power. They did so by building numerous spomenik across the landscape, as both a means of celebrating the partisan victories of World War II and honoring those who were causalities of war. With each successive move, history was being rewritten by the victors, and with it an erasure of the idiosyncrasies of the many cultures represented in the region. A ritualization through indoctrination, as an attempt at making the sites meaningful to new generations, came to surround the spomenik, as schoolchildren were bussed to the sites for state-mandated visits. In this case, the authoritative power of the state has been used to co-opt the memorial, imbuing it with a multitude of significance and turning it into a site of heritage consumption. It made the transition from Yugoslav to Post-Yugoslav memory with relative ease, due to its alignment with the Macedonian nationalist narrative, only further amplified by the Macedonian state after the disintegration of the Yugoslav republic through the entombment of Karaev, acting in ways that a standard conservation practice could not.



Fig. 5: Official Government Delegation at the central ceremony marking the 109th Anniversary of the Ilinden Uprising in Kruševo, Macedonia. (2012)

2.3 Petrova Gora



Fig. 6: Petrova Gora Condition of Facade. Near Gvozd, Croatia. (Damir Krajac 2008).

In a bold gesture, the monument sits perched atop the highest point of the Petrova Gora mountain range, built as an anti-fascist monument to commemorate the underground partisan field hospital operating on site during World War II. Monumental in size, Petrova Gora stands at 37M, an 8 story tall inhabitable structure with a form reminiscent of curvilinear late modernism. The monument was designed in 1970, and due to financial difficulties, it was finally built over the course of 8 years, beginning in 1981. Following its completion in 1989, it stood as an empty signifier, representative of a lost ideology, marking the demise of the Yugoslav Republic. In an ironic turn of a events, the structure itself is said to have been used as a field hospital during the Croatian War for Independence in the 1990s, shortly after it opened. Today, its visitors include those interested in its formal qualities as well as its place in the current context of Croatian identity politics. Forgotten by its people and neglected by the state, Petrova Gora succumbs to a slow disintegration, as a site of active material extraction, opportunistic use (note the telecom antennas which have sprouted) and natural decay. [3]

2.4 Conservation as Product of Impossible Circumstance

Petrova Gora is enmeshed in the kind of circumstances that produce a ruin. At its core, a hulking mass of cast concrete makes the structure impervious to demolition. A lack of existing documents for the building and its site, has rendered any opportunity for security and protection of the monument impossible. There is little interest in the ideologies of the past, partisan spomenik and fewer people feel that they signify anything about the Second World War worth remembering. Sections of stainless steel cladding remain, though the vast majority has gone missing, appropriated by locals with whom the ideologies that made such an icon possible no longer resonate. [6]



Fig. 7: Petrova Gora Stripped of Metal Facade. Near Gvozd, Croatia. (Armin Linke 2011).

2.5 Makljen Monument

Built on the highest point on top of Mt. Makljen in Bosnia and Herzegovinia, this Spomenik was a gesture toward political unity. Makljen Monument is one of many anti-fascist memorials commissioned by the state to commemorate the triumph of the partisans over the Axis powers. Opened to the public in 1978, on the anniversary of the Battle for the Wounded, which had happened in 1943 on this site, Makljen Monument was one of many anti-fascist War of Liberation memorials commissioned by the state and designed by renowned sculptor, Boško Kućanski. Its bears an uncanny resemblance to a fist, and Makljen has not been able to shake the associated narrative of being “Tito’s Fist.”

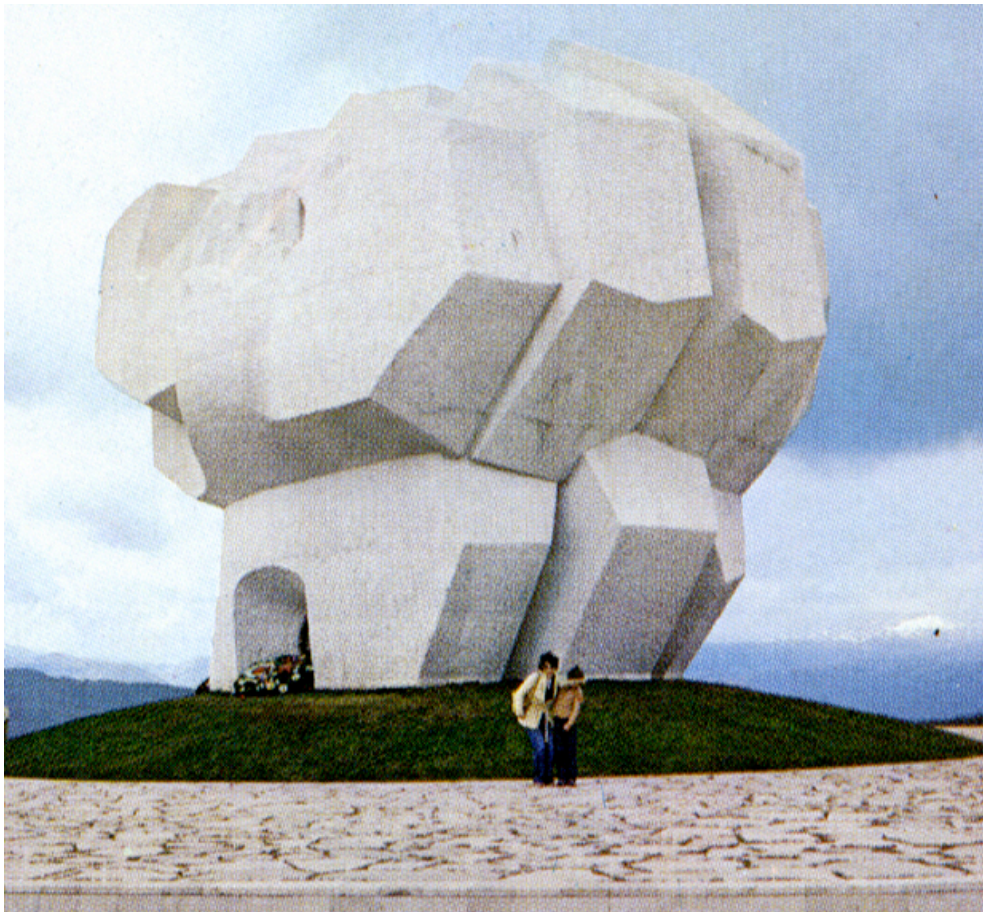

Fig. 8: Makljen Monument Prior to Explosion. Near Prozor, Bosnia. (198?).

2.6 Conservation Through Destruction

On November 13 2000, the same date as the battle which the monument commemorates and only five years after the end of the Yugoslav wars, there was an attempted erasure of the monument via explosives. It was not entirely successful in its aim, having made the monument more visible. The blast had exposed the skeletal remains of the flower’s heavy concrete beams, while its concrete skin lay crumbling at its feet. Though the form may have been lost, the monument gained new significance from this iconoclastic act. One could argue that it holds greater commemorative value, and therefore functions as a stronger monument, in its ruined state than it did when pristine. In the attempt to render invisible, the act of iconoclastic ruination made what had already been rendered invisible with apathy and time quite visible.It was not until after the monument was re-rendered visible through destruction that it became protected through a petition to the Commission to Preserve National Monuments in 2010. It now stands, protected as a National Monument as a skeletal form, the ruin of a monument, perhaps having gained new significance. [2]



Fig. 9: Makljen Monument. Near Prozor, Bosnia. (flickruser: rb.fzz 2008).

3.Counter Spomenik

3.1 Signification and the Remnant

It is perhaps through their corroded patina, showing signs of wear, that the aura of time is rendered visible. Some spomenik are still in use; visited annually to commemorate a national holiday, such as Illinden, in the case of the Makedonium, which has received facelifts for the past two decades, just prior to both its 90th and 100th anniversary celebrations. Petrova Gora and Makljen are being reappropriated as sites of intrigue in their ruined state, a product of resource extraction, and iconoclastic actions made against each of them, respectively. It is with their newly minted patina that these spomenik find cultural relevance today.

Built of materials meant to stand the test of time, these material remnants often outlast the regimes that commission them, leaving their fate to the next generation, heir to a forgotten past. Once sites of commemoration, cultural memory and significance, at worst they become sites of neglect, disuse and abandonment; at best, they lose significance and become invisible, blending into the landscape or being removed all together. Often, we are met with these immense pieces of the past, signifying a specific ideology, no longer in favor. Designated at a specific time and place, they have trouble standing the test of time as relevant cultural signifiers. As meanings change and interest fades, the spomenik are relegated to the backdrop, little more than a place to picnic. Many have problematized the notion that once a memorial is made prosthetic, memory fades. No longer necessary to remember, the material form does the memory-work for us. [7]

Can a monument transform its signification if the cultural signification, commemorative use and perceptions encircling it change? In post-war Yugoslavia, spomenik were built in an attempt to unify a region divided. What do spomenik signify as they stand within the landscape of a fractured past and present?

3.2 Spomenik at Risk

From the fully restored, to the unlocked, overgrown and reappropriated, these spomenik operate through a gradient of conservation efforts, both sanctioned and Illicit. While the majority of preservation groups remain focused on much older histories of civilization found in this region, it is the recent past that is most at risk. Spomenik sit in varied states of disrepair, neglected by newly formed democratic governments who do not wish to align themselves with the past and all but forgotten about by those who have inherited them. [5]

Sites in southeast Europe which tend to garner conservation attention do not belong to a shared national heritage or recent past. Instead, ICCROM and other preservation-minded entities, are focused on preservation of much older, heritage sites “at risk” within the region, rendered as the fallout of wartime atrocities. These sites are often sacred spaces, aligned with the Post-Yugoslav narrative which places importance on independent nationhood based on ethnic and religious difference. With a focus on the differences of the peoples of the former republic, priority has been given to preserve the contrasts, rather than the unifying principles of the former socialist regime. Today, this practice finds resonance within people of the smaller ethnic populations of Croatia, Bosnia-Herzegovina, Macedonia, Serbia, Slovenia and Montenegro.

To this end, World War II partisan monuments are not considered “at risk” as part of the Bosnia and Herzegovina Commission to Preserve National Monuments and are therefore not protected from illicit building, inexpert construction or lack of maintenance. The Commission acts as a watchdog group that monitors activities relating to national monuments. Few spomenik are protected as national monuments. [1] These monuments, transformed by time, sit in relation to their original context, becoming monuments counter to, yet in dialogue with the memory of their past life as partisan monuments. Is it this dialogue which allows them to remain relevant long beyond the disintegration of Yugoslavia.

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Assessment of the Bioclimatic Elements of Vernacular Architecture. The Historic Centre of Nicosia, Cyprus

Maria PHILOKYPROU[1], Aimilios MICHAEL[2], Stavroula THRAVALOU[3]
(1) Department of Architecture, School of Engineering, University of Cyprus, Nicosia, Cyprus
mphiloky@ucy.ac.cy, (2) amilios@ucy.ac.cy, (3) stralou@gmail.com

Abstract
The present study addresses the identification of the factors and elements that contribute to the improvement of thermal comfort within traditional buildings and their built environment. This investigation is part of an ongoing research programme that is funded by the Republic of Cyprus and the European Regional Development Fund (through the Research Promotion Foundation) regarding the vernacular architecture of Cyprus that includes *in situ* measurements of temperature and humidity using data loggers and weather stations. Two areas of the historic centre of Nicosia, which have preserved their original character, were selected for the study. After an overall historic and architectural investigation of these areas through historic documentation and survey maps, a study of a large number of buildings from a typological, bioclimatic and construction material point of view has been carried out. The bioclimatic strategies of heating, cooling and microclimatic conditions were studied in detail. This preliminary research showed the various environmental features of vernacular architecture (central yards, semi-open spaces, construction and materiality etc.). The research aims at establishing a bioclimatically-based approach in the conservation of traditional buildings and thus contributing to the regeneration and sustainable development of the urban environment of such a solid traditional historic core as that of the Walled City of Nicosia.

Keywords: vernacular, bioclimatic, traditional construction, courtyards, semi-open spaces

1. Introduction

Vernacular architecture, which incorporates rural settlements as well as urban historic centres, has always constituted an important part of the cultural heritage of every country. Traditional dwellings are considered by definition sustainable, incorporating many features friendly to the environment (use of local materials, adaptation to the landscape, central yards, arrangement of open and semi-open spaces etc.). The identification, protection and preservation of these features in the rapidly changing context of contemporary cities is imperative in order to maintain the values linked to sustainability.
A "BioVernacular" research project (*ΑΝΘΡΩΠΙΣΤΙΚΕΣ/ΑΝΘΡΩ/0609/ΒΙΕ)* is currently underway in the aforementioned domain. It is funded by the Republic of Cyprus and the European Regional Development Fund (through Cyprus Research Promotion Foundation's Framework Programme for Research, Technological Development and Innovation *Δέσμη* 2009-2010) and was initiated in July 2012 in the historic centre of Nicosia in Cyprus with the selection and detailed analysis of two neighbourhoods in the historic core, using typological, architectural and structural criteria. The project incorporates the following goals: identification of the bioclimatic elements encountered; monitoring of temperature and relative humidity levels in a selected number of dwellings; definition of the bioclimatic and microclimatic conditions that affect thermal comfort; simulation of the energy efficiency of a selected sample of buildings; calculation on an hourly basis of thermal and cooling loads; drafting of technical guidance and proposals for traditional buildings and measures so as to improve bioclimatic features and comfort conditions within the building envelope.
This paper presents some qualitative findings of the project regarding the identified environmental design elements in the built heritage of Nicosia. The observations refer to the urban tissue as well as the vernacular dwellings. The paper aims at identifying and documenting the bioclimatic

characteristics of traditional dwellings in the Walled City of Nicosia and their immediate built environment which is essential for enhancing an environmentally-friendly approach in the rehabilitation process.

2. The methodology

The methodology used in the initial part of the research project refers to the preliminary qualitative analysis, diagnosis and assessment of the bioclimatic elements of the urban tissue and vernacular dwellings of Nicosia. The main objective is to confirm all the individual factors that constitute the so-called "environmental approach in vernacular architecture" through scientific and systematic investigation.

Initially an in-depth research through historic documentation which provided insight into various historic, ethnic and social factors that contributed to a series of events such as the setting of the city in a specific location and the relation to the evolution of the built environment was conducted. The reinterpretation of the urban evolution and examination of the interrelated structural and morphological components provides significant information with regard to the origin of elements such as the urban tissue and form, the types of buildings and their architectural characteristics that may embrace an environmental essence.

Another important tool of great significance is the study of survey maps of various periods. The relative information, derived from the study of the maps, refers to: "the area and city level', "the urban tissue level' and the "building types level". With regard to the "area and the city level" the information refers to macroclimatic conditions, geomorphological and landscape qualities, city shape and form. With reference to the "urban tissue level", the orientation of the streets, shading and sunlight provisions, ventilation and cooling factors as well as urban vegetation and quality of open and semi-open spaces are investigated. Under the "building types level", the typology in terms of arrangement of spaces (courtyards etc), the building materials and techniques and the cooling and heating strategies and use of local resources such as water are examined.

At this stage of investigation, a field study is of great significance. It provides updated information on the fusion of civil components and the historic stratification. Furthermore, the personal communication with the residents, the actual users of the vernacular dwellings and the city form, enhances evaluation of the comfort offered by the specific urban tissue and the individual buildings. The wide variation between objective and subjective sense of comfort, the residences' observations, opinions and experiences are a valuable tool in both the comprehension of the bioclimatic function of the houses as well as the evaluation of its contribution to the achievement of comfort.

Concluding this part of the research, the findings are presented according to the scale they apply: beginning with the territory and city level (location, geomorphology, limitations of topography), moving on to the urban tissue level and the scale of the neighborhood (urban development), and focusing on the building level and the applied bioclimatic strategies (cooling, heating and microclimatic environment strategies).

3. Territory and city level. Evaluation of environmental elements

Initially, the main parameters for the location of the city of Nicosia were examined with the aim of commenting on the suitability of such a location from the environmental point of view. The location of Nicosia in the central area of the island, in a fertile plain, between two mountain ranges and the spring torrent that crossed it played an important role in the creation of its climatic conditions.

A main characteristic of the Mesaoria plain as well as of the whole island is the large fluctuation between the highest temperature during day and the lowest temperature during night (being between 8-10°C during the winter, and 16°C during the summer in the plains). The sunshine during the summer has a duration of about 11.5 hours and during the winter 5.5 hours. The prevailing winds during the winter are southwest and east, during the summer west and north and during the spring and the fall west and northeast [1]. The relative humidity level, due to underground water sources, is another factor to be considered. The city elevation and the distance from the seaside play an important role in the amount of relative humidity in the air. During the days in winter and the nights throughout the year the relative humidity varies between 65-95%. At noon during the summer the relative humidity becomes very low to a level of 30% [1].

It is quite evident that the location of Nicosia has been crucial for the city's evolution. The Pedieos river has played a vital role in Nicosia's setting and development [2]. Even though it is practically a spring torrent, the Pedieos has nevertheless sustained human settlements in its vicinity for thousands of years. Nicosia has been inhabited without an interruption since at least the Chalcolithic period (4000 BC), but it was not until the 11th century, in the Lusignan Times, that Nicosia became the capital of the island [3]. Under the pressure imposed by the Arab raids on the island, which eventually resulted in the abandonment of the coastal towns [4, 5], the administrative centre was moved to the interior of the island. The location of the ancient "Ledra" (Nicosia), being at the central crossing point of the commercial routes, offered comparative advantages for the new settlement [5].

From a geomorphological point of view, Nicosia lies in the middle of the island's two largest plains (the Mesaoria in the East and Morphou plain on the West), at the foothills of the two mountain ranges. Troodos Mountain lies in the South, at a distance that prevents it from being considered as a physical obstacle causing obscuration and shading. However, the range of Pentadaktylos Mountain extending on the north side prevents the wind descending from that direction in the summer period. As a result, a summer day is noticeably hot and dry, while at night north-westerly wind accesses and cools the area. The winter is moderate and rather rainy [1].

As far as the city form is concerned, there were a few limitations posed by the topography; the river bed and the rather moderately low hills in the vicinity. The importance of the Pedieos river in the formation of the built environment of Nicosia was great; it crossed the whole walled city, transporting water and other materials (clay and marls from Troodos Mountain) and divided the city into two areas (north and south) connected with bridges. When the Venetians began to build new surrounding walls of the city in fear of Ottoman attack, the route of the river was diverted so as not to pass through the city; a route which is followed even now. With the primal criterion of the defence of the city the fortification wall formed with the 11 bastions defined the size of the city incorporating the aesthetic idea of the renaissance "citaedeal" [3].

Concluding on the evaluation of the environmental parameters incorporated in the design of the city, as far as the location of the settlement is concerned, despite defensive and financial issues, the location offered comparative advantages. The presence of crucial and vital sources, such as the river and the fertile land of the plain providing arable land and necessary building materials were decisive. The limitation of the location is the insufficient ventilation in the summer due to the mountain in the north. Consequently, vernacular architecture in such a location is called upon to respond to the favorable winter and rather unfavorable summer conditions, especially during the daytime (taking advantage of the winds and being protected from the direct sun radiation).

4. Urban and building level. Bioclimatic design parameters

4.1 Urban Evolution. Typology

Nicosia began its development by following the type of rural development of the settlements in the plains with houses occupying a large area and adapted harmonically with the surrounding geomorphology and the climatic conditions. Gradually the urban development of Nicosia was directed towards a more compact character with houses occupying a smaller area and adapted mainly to the street network [4,6].

According to the study of Demi Danilo [4], the first building type adopted in Nicosia was the so-called "domus" or "rural courtyard house", built in the most elementary form of a single-storey building inside a fenced area used as a farmyard or orchard. The entrance was achieved through the courtyard from where access to the living areas of the house took place. The area occupied by the building in the plot varied in relation to the road access and the plot orientation, while the courtyard was always south orientated [1, 4]. In order to protect the doors and windows of the main living areas from the rather uncomfortable summer sun, a kind of semi-open space (covered area) was developed along the south side of the building, locally referred to as "iliakos" based on the Greek word "ilios" (sun) [6, 7]. This element was clearly incorporated into the building shell with the purpose of providing shelter from the climatic conditions, thus its bioclimatic function cannot be argued. Due to its size (3m in depth) it provided shading in the summertime when the sun was almost perpendicular, and allowed the sun to enter the living areas in the wintertime when the sun was lower.

With the development of the city, the increase of its population and prestige, the house gradually acquires more urban characteristics while the road allocation adjusts to a more urban dimension. The Byzantine "domus" presents a significant increase in the number of the original cells, capable of filling the entire plot area and facing the road, yet allowing an empty space for entrance, which was always achieved through the courtyard and never directly into the main living areas. In the cases of north south allotment the entrance was soon covered by a roof joined with the roof of the "iliakos", irrespective of the position of the plot; it was always extended so as to protect the entire southern facade of the building [4]. It is worth mentioning that in cases of east-west oriented roads the expansion was notable, increasing in this way the south-facing elevation and the corresponding area of "iliakos" (figure 1: B7). In the cases of north-south oriented roads, the buildings were located on the northern side of their plots, enlarged by filling the whole of that side [4]. The courtyard in this way remained south orientated, excluding obstructions and shading from neighbouring buildings. Consequently, in all plot cases the criterion for choosing the direction of the extension was purely climatic; the preference for a south orientation and direct solar gains is evident.

Another element of great importance that became remarkably widespread and eventually constituted one of the most important components of Nicosia's development in the 19th and the early 20th century is the appearance of special function buildings such as shops, inserted into the house courtyard fence as an independent space with direct contact with the road and access from it. In some variations, depending on the size of the plot, this individual function occupied the space between the covered

entrance area and the fence (figure 1: B2, A3). The resulting shape was the articulation of the main living areas alongside the road and the creation of a central covered entrance hall called a “portico” with lateral rooms opening into the yard and covered by a roof [4, 6] (figure 1: B3, A4, figure 2).
During the Lusignan Times intense urbanisation and increasing population within a limited available area initiated a process of land fragmentation using “cul de sac” type roads which are actually branches from the road, providing access to the inner core of the plots. The plots themselves were subdivided by an irregular tissue, embedded smaller and simpler variations of the courtyard house, while at the same time, some streets became wider. Serial allotments along the main axis appeared along with the urban mansions, prevailing in architecture design and height [4, 6]. The first extension of the original courtyard made by filling the side facing the road, was followed by a supplementary extension: i.e. the addition of a floor and a relevant loggia to protect the south façade or the addition of an extra room to one or both short sides of the plot which resulted in the typology of “L” (figure1: B8, A5, A7) or “C” (figure 1: B5, B9). The access to the first floor was achieved mostly by an open-air linear staircase. The side facing the street beside the main entrance had small square windows at a considerable height above street level for security reasons [6] while the first floor windows were sometimes arched but considerably larger [4].
Actually, it was not until the Ottoman Rule that the urban tissue and the building types changed considerably; serial allotments along the main routes were largely increased by further land fragmentation using the “cul de sac” roads. The direct contact with the road became the prime criterion for the location of the building in the plot and more than any other variation; the “L” shaped arrangement became the most popular form for urban life [6]. Within a few decades after the arrival of the British in the late 19th century, the tissue was definitely completed by filling up all the empty areas. The traditional courtyard house was replaced by a “serial type” building which contained all the house functions within a smaller area; in this case, the central entrance door provided direct access to the central room and the yard acquired a decreasing size and importance (figure 3). The windows on the street front appeared at a lower level and acquired a larger size due to the change of social life (feeling of security).
Looking at the 1920s and 1930s, many variations of the “serial type” house appeared [4] and a new development was created: the “new courtyard house” (figure 4) as a combination of shapes and concepts of the two previous types (the position of the building facing the street-front and the courtyard type house looking into the yard in the back side). Consequently, the environmental criterion of the best orientation was left behind under the new development of the urban tissue and the necessity of direct contact with the street. In contrary to the above, the importance and the use of the semi-open spaces prevailed, being attached to the custom of living in the open air, which is actually a cultural expression related to the mild Mediterranean climate. It is notable that all the semi-open spaces are situated at the back of the house, leaving a plain frontage, as the social life of the family took place in the inner courtyard due to the introverted character of the society.

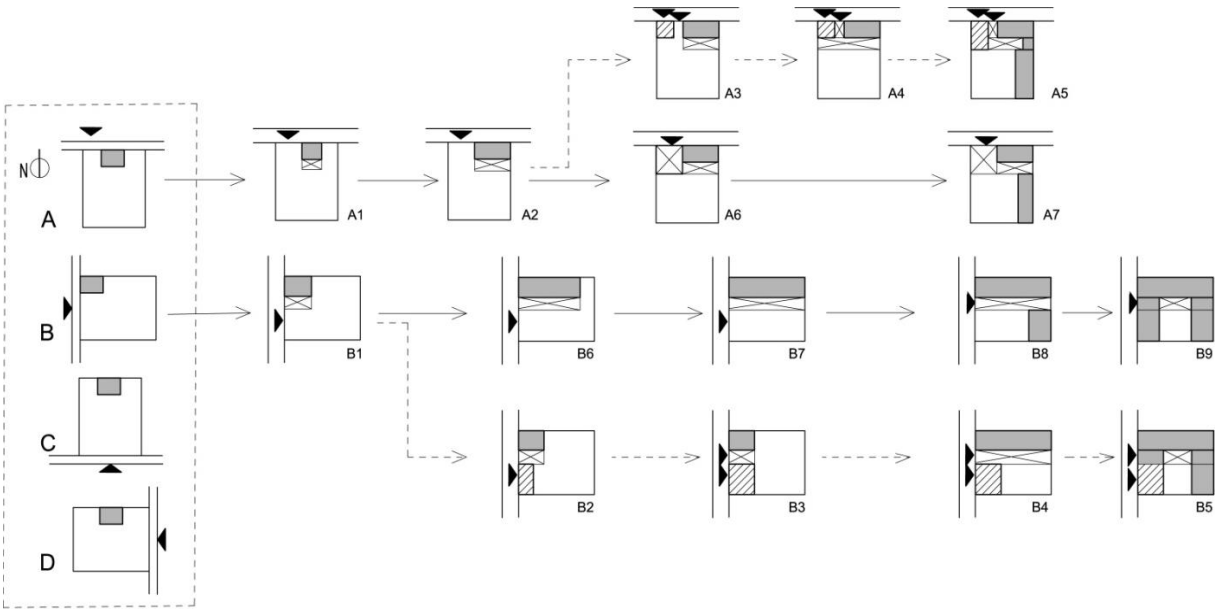

Fig. 1: Evolution of the original courtyard house - interpretation from reference [4]

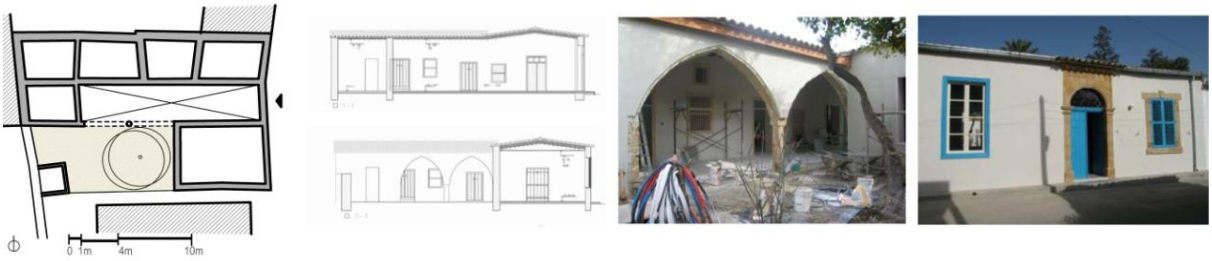

Fig. 2: Example of a typical courtyard house



Fig. 3: Example of a “serial type” house



Fig. 4: Example of the “new courtyard house”

The following map (figure 5) graphically presents all kinds of semi-open spaces encountered in the south part of the Walled City of Nicosia; it includes the semi-open areas described in the typology report as a main entrance to the courtyard or as a shelter in the form of loggia or “iliakos”. Partially covered alleys on the first floor are also marked. The map does not necessarily represent an accurate present situation because “porticos” were originally considered as semi-open spaces. However, at the present time many “porticos” are more likely to be closed, becoming part of the main internal living areas. Concluding on the number of semi-open spaces, it is evident that they are widespread; even denser in residential cores such as Ayios Antonios neighbourhood in the southwest and Chrysaliniotisa and Ayios Kasianos in the west. As far as the main direction of the spaces illustrated on the map, it is pointed out that, in accordance with the typology report, the “portico” as a main entrance space is perpendicular to the street, marking the entrance to the house. When the semi-open spaces are arranged in other directions or locations they can be considered as shelters serving as a protected transition from the internal to the external environment. The north-west quarter of the city, Chrysaliniotisa neighbourhood, offers a representative example of the evolution of the urban tissue where the presence of the “cul de sac” roads is recognizable and the dwellings preserve much of their original features. The map in figure 6 shows all the courtyards which appear in the Walled City of Nicosia, with various sizes thus underlining the introverted character of the social life. Figure 7 focuses on the neighbourhood of Chrysaliniotisa showing all courtyards and semi-open areas of the traditional buildings. All traditional dwellings incorporate a central yard and most of them have at least one semi-open space (more often a “portico” serving as an entrance to the houses). A number of dwellings incorporate a second semi-open space, an “iliakos” as an intermediate area between the separate rooms and the yard.

Through the study of the historic architectural evolution of the typology of Nicosia it is clear that some elements that remained and have been used during all periods are: the central yard at the back of the plot, the arrangement of spaces around the yard and the prevalence of semi-open spaces (used as entrances and shelters). These elements underline the aim of the residences to adapt their dwellings to the climatic conditions of the area (hot summer, mild winter, limited winds). The dwellings were frequently arranged in compact patterns, closely built with common walls, one attached to the other,

following the continous urban system leaving small empty spaces in the form of public narrow streets and private courtyards. Thus, the vertical surfaces (walls) exposed to exterior environmental conditions are reduced and the thermal protection of the building envelope is increased The shade between neighbouring buildings reduces the warming up of their walls by radiation. Thus, topography, geomorphology and climate are important parameters that play a significant role in the design.

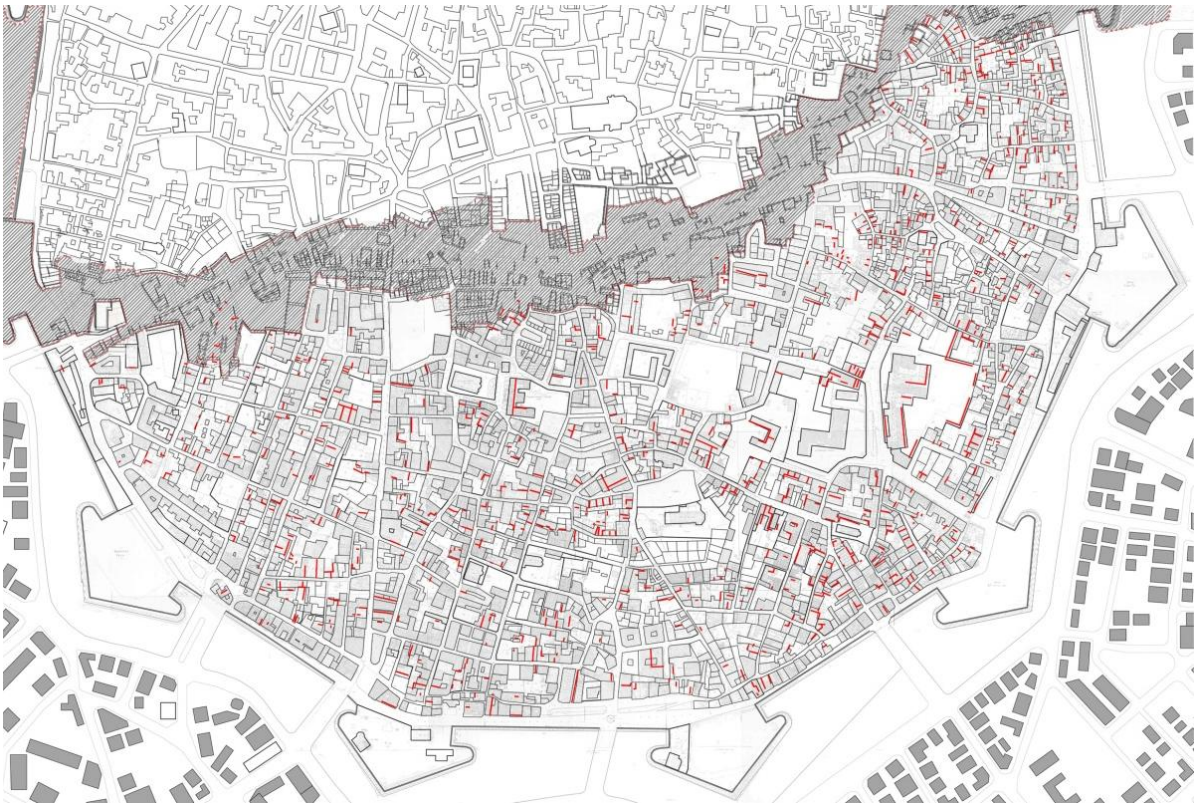

Fig. 5: Semi-open spaces in the south part of the Walled City of Nicosia

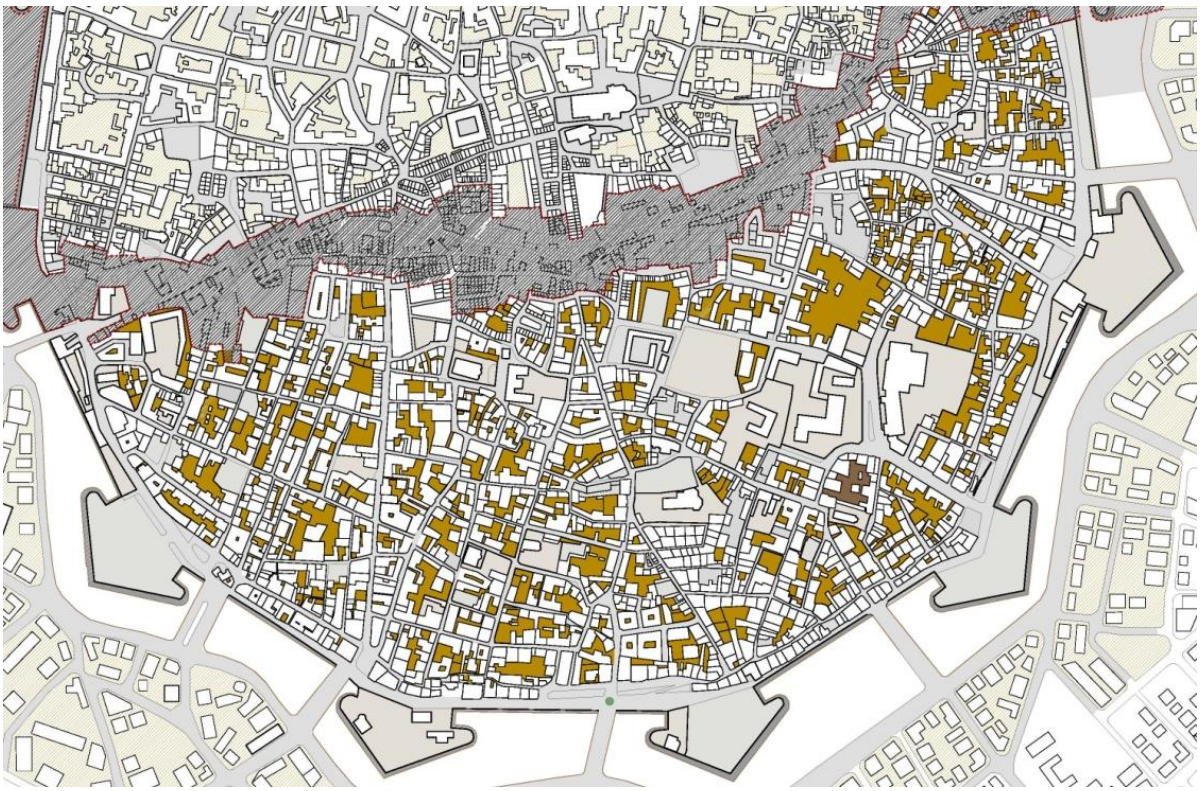

Fig. 6: Open spaces in the south part of the Walled City of Nicosia



Fig. 7: Open and semi-open spaces - Chrysaliniotisa neighbourhood

4.2 Building techniques and constructive materials

Besides the typology and the organisation of the traditional dwellings, building materials and techniques played a very important role in the design of vernacular architecture (morphology etc.). Descriptions of travellers visiting Nicosia in the late 19th century provide interesting information and perspectives of the city with regard to the urban morphology, the building materials used and the local architecture. In one such description Deschamps [8] stated: “Nicosia comprises a complex of mudbrick built houses with some stone constructions. Nicosia resembles a large village with narrow and winding streets. The newly built and quite presentable buildings do not constitute a separate neighbourhood but are to be found everywhere”.

As mentioned in the above extract and still evident at present, the materials used in the vernacular architecture are earth and stone which are to be found in abundance in the vicinity. The traditional dwellings constructed with earth and mudbricks, have stone foundations of local limestone, of Athalassa-Nicosia Formation called “Stone of Gerolakos”, [9] so as to protect the mudbrick walls from the rising damp. The building practice and techniques used are also described by several travellers. Louis Salvator [10] stated: “Building is carried out with great rapidity; some mortar composed of earth and straw, is poured from a mason’s tray with two handles over the mudbrick, another mudbrick is put on top, some more mortar is put on top of it, another brick and so on and the house is finished in almost no time. It also has the advantage of drying very soon after the process is finished”.

The financial aspect described, that is related with the cost of the construction and preservation, is also worth mentioning, as an indication of the value of each material according to its accessibility, cost of transporation and mechanical properties. According to Louis Salvator [10] “These houses (earth houses) are exceedingly cheap; a fine building costs hardly more than about half the price of the finest stone house in Nicosia. Houses made of mudbricks will last a hundred years, but they must be frequently repaired, as the plaster with straw with which the mud bricks are covered up will get rotten and leave holes in the wall.”

4.3 Bioclimatic strategies in traditional dwellings

The selection of appropriate building materials, apart from being partially imposed by availability, is also climatically driven. The suitable use of materials in the building’s envelope provides direct protection from the climatic conditions, while the materials of the buildings’ surroundings contribute to the development of desirable microclimatic conditions [11]. Thermal inertia secured by the thick mud brick and stone walls and the mass of the roof materials provide a small fluctuation in the internal temperatures [12]. The materiality of the floor surfaces, covered often with gypsum slabs, also affects the temperature of the immediate environment. Materials with high thermal inertia, such as stone,

were used in the open and semi-open spaces; their capacity to store heat and emit it with a delay, when the air temperature is lower, was appreciated and used [13].



Fig. 8: Bioclimatic design strategies in traditional dwellings in the historic centre of Nicosia, Cyprus.

With regard to the Mediterranean climate, vernacular architecture contributes during the entire year towards the bioclimatic strategies as follows: During the winter period improvement has been achieved by direct solar gains through the building envelope and the buildings openings (figure 8) and also by the protection against strong and cold winds. During the summer months the climatic conditions are improved by the reduction of the exposure to the solar radiation and the ensuring cross ventilation (figure 8) of the building envelope [12]. Cooling, heating and microclimatic environment strategies are described below in detail.

i) Cooling strategies

As mentioned before, vernacular architecture had to provide a climatically-responsive building model that could handle ventilation during the summer daytime, due to geomorphological limitations. Therefore, the building form had to offer as many ventilation possibilities as possible by combining night ventilation and cooling and at the same time being protected from the direct sunrays during hot summer days [13].

Suitable openings, frequently of small size, in the walls (figure 8) function as valves ensuring control of the air flow. Thus when they are closed during the winter they offer protection from the cold winter wind while when they are opened during the summertime they allow the circulation of cool air. The movement of the air through the building envelope depends greatly on the size, the shape and the position of the openings [13]. The small size openings on the façade on the streets (called “arseres”), located at a considerable height, were designed for the privacy of the domestic life [4]. Nevertheless their bioclimatic function cannot be disregarded. Due to the difference in temperature and density of the air, the hot air was forcibly extracted from the building envelope (stack effect) during the summer period (figure 9: C3, C4) [13]. The semi-open spaces (“iliakos” or “portico”) also enhance the air flow (figure 9: C5) especially due to the cross arrangement of the “portico”.

Another important cooling strategy is sunshading which protects the interior spaces from overheating during the summer period [13]. Shading covers, “iliakoi” and light pergolas with plants (in front of the south side of the buildings), solid plank or adjustable (movable) shutters (figure 9:C1, figure 8), roof overhangs, small or large balconies offer shading (figure.8, figure 9:C2) thus minimizing the direct sun radiation. In addition they favourably influence the natural lighting by reducing the reflection and offer protection from the rain.

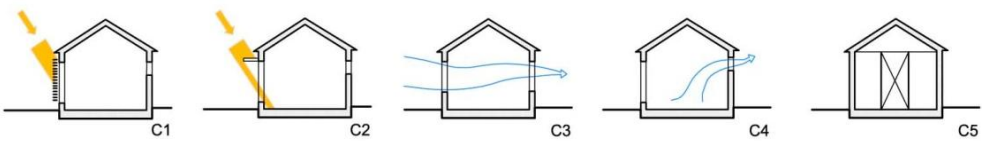

Fig. 9: Bioclimatic design strategies of the traditional courtyard house during cooling period

ii) Heating strategies

Direct solar gains constitute the main strategy of bioclimatic design during the winter period (figure 10: H1). Such gains are derived from the south orientation of the building and its openings [13]. In cases where the south orientation is not an available option, indirect solar gains are derived from the building envelope, as solar radiation is captured through the walls and the roof (figure 10: H2). The elimination of heat losses also functions as protection from the strong cold winds (figure 7: H3).

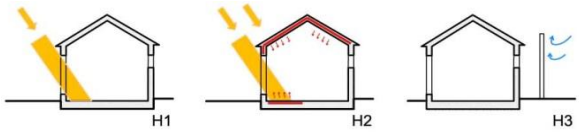

Fig. 10: Bioclimatic design strategies of the traditional courtyard house during heating period

iii) Strategies on the microclimatic environment

The existence of water elements in courtyards and in the surrounding areas of the buildings provides evaporation cooling which results in the decrease of the high temperatures during the summer (figure 11: E1). The watering of plants and the courtyard is a widely used technique -that has prevailed as a traditional activity since the beginning of the last century- for enhancing evaporation cooling. The relationship of the built and natural environment in addition to the improvement of the microclimatic and consequently the comfort conditions also provides a visual pleasure [11, 14].

Small scale central courtyards (figure 8, figure 11: E2) enhance the increase in temperature in relation to the larger open air spaces. This is desirable during winter as the floor materials (stones and/or earth) and the surrounding walls of the courtyard increase the urban heat effect. During the summer months the necessity of cooling such an area is imperative. In several cases the largest part of the courtyard is shaded from the surrounding building volumes and thus the temperature is kept at lower levels. External shading, especially with plants on pergolas (figure 11: E4), prevents the sunrays entering this area. Evaporation from green leaves causes cooling of the air which becomes heavier and falls down under the tree shadow, while the hot uprising air outside the house drives it through the archways and cross openings of the rooms, causing cool breezes in the interior spaces. During the summer nights the downlink nightly cooling air enters and is channeled through the rooms (through open windows and arches) because of the rising hot air outside the house and thus removes the heat stored in the rooms during the day. The combination of shading and the night cooling reduces the temperature keeping it at a level more close to thermal comfort in relation to the outside environment.

The vegetation forms a naturally protected environment, which reduces the high temperatures during the summer period, shading the building envelope and reducing the sudden changes in humidity (figure 11: E3). Besides shading, vegetation can also prevent, filter or divert the air flow, thus affecting the internal ventilation of buildings (figure 11: E2). Evergreen as well as deciduous trees offer protection from a substantial amount of sun radiation, thus reducing the ground temperature. Shading provided by vegetation varies according to the kind of trees planted. Trees can also be used to prevent, filter and divert the air flow, thus influencing the ventilation of a building. It is worth noting that deciduous trees are usually planted in the south side of the buildings so that they allow the sun radiation onto the building during winter time. The planting of evergreen trees on the sides of the buildings affected by strong winds functions as a barrier to air flow and thus offers prevention against undesirable hot dry summer or cold winter winds [13].



Fig. 11: Microclimatic environmental strategies of the traditional courtyard house

5. Conclusions

Vernacular architecture was mainly developed on the principle of providing the necessary requirements through the local resources and nature's energy. Throughout time, while architecture and urban morphology were subject to different socio-economic, cultural and political factors, different solutions have been provided, always based on the fixed environmental factor which is the climate. This study refers to the main climatic design considerations in the early stages of Nicosia's settlement.

From the analysis made above it is evident that the choice of the location of Nicosia, in the middle of Mesaoria plain, between two mountain ranges and the existence of the Pedieos river played a crucial role in the creation of the climatic conditions of the city. According to the typology study, as described, if a plot did not have any limitations, the building volumes and the courtyards were located in such a position that its longest side had the optimum orientation. In parallel, with the proper isolation the building envelope dealt successfully with matters of sun shading, cross ventilation and other bioclimatic principles. The practice of choosing the optimum orientation remained valid for as long as the degree of urbanization and the availability of space did not impose any restrictions. It was not until

the Ottoman Rule, that these factors became apparent and the direct contact and access to the street became the prime criterion for orienting the building. Nevertheless, the strategies applied in the building form and its immediate built environment, show high adaptability to the climatic conditions. The prevalence of the central yard, the arrangement of close and semi-open spaces around the yard, the use of materials with high thermal inertia showed the environmental consideration during the erection of traditional dwellings.
Further investigation is being conducted and selected buildings are being monitored in order to proceed with the goals of the overall research programme and introduce a quantitative documented bioclimatically based approach in the rehabilitation of the built heritage.

6. Acknowledgements

The research described in this paper is based on a research programme that is funded by the Republic of Cyprus and the European Regional Development Fund (Cyprus Research Promotion Foundation's Framework Programme for Research, Technological Development and Innovation *Δέσμη* 2009-2010, *ΑΝΘΡΩΠΙΣΤΙΚΕΣ/ΑΝΘΡΩ/0609/ΒΙΕ*). The Host Organisation of the programme is Nicosia Municipality and the Partners are the University of Cyprus, the ICOMOS, Cyprus and the Frederick Research Institute.

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Structural assessment of a roman aqueduct "Pont del Diable" in Tarragona by F.E.M.

Jaume FABREGAT[1], Anna ROYO[1], Agustí COSTA [2], Gerard FORTUNY[3], Josep LLUÍS[4].
(1)Architecture Student, ETSAR, University Rovira i Virgili, Reus, Spain.
jfabregat.jp@gmail.com, anna.royo@estudiants.urv.cat.
(2) Pd.D., Student, ETSAR, University Rovira i Virgili, Reus, Spain.
(3) Pd.D., Informatics Engineering and Mathematics Department, ETSAR, University Rovira i Virgili, Reus, Spain.
(4) Pd.D., Construction Department, ETSAR, University Rovira i Virgili, Reus, Spain.

Abstract
The object of study is a roman aqueduct which construction was ordered by Emperor Augustus the first century b.C. in Tarraco, a city in the north of Spain, today known as Tarragona. The city was declared Heritage of Humanity by UNESCO in 2000, some restoration works were planed since then and those concerned the aqueduct as well. The restoration work consisted of a landscape performance and a physical and mechanical review of the aqueduct state in order to reinforce it if it was required. The landscape performance had the responsibility to rehabilitate a green area. Its direct relation with the River Francolí makes it a performance of great interest for the city, since it is its most important green corridor.
The study analyzes the entire structure of the bridge considering several load cases. The purpose is to obtain data about the structure physical and mechanical behavior. With this information we will reach several conclusions concerning deformation and stress parameters.
Hypothesis of load cases will take into account weathering effects since these would have changed stone properties through the years. Furthermore the aqueduct will also be analyzed when affected by horizontal loads. By superimposing the entire cases we will highlight the weak points of the aqueduct. This could help taking relevant decisions in order to reinforce the zones detected as well as streamline the restoring process.

Keywords: Structural Assessment, F.E.M., Aqueduct, Weathering, Heritage.

1. Introduction

Aqueducts are a sample of the Roman Empire engineering resources.
Water engineering had been widely developed in times of the Roman Empire. They had conquered most of the land surrounding the Mediterranean Sea, and at their step they funded the most important cities which began as a military campus and have remained until today. These were located thoroughly in strategic and favorable places. Several parameters were considered for their set up. Topography, vision range and resources like freshwater were taken into account, parameters such as these formed the basis for a new urbanism which would help developing a new civilization over the rest. Tarragona is one of these cities which origin goes back to these times. Even though there is awareness of the presence of previous cultures in this site (Phoenician, Iberian,...), Romans were the ones who decided the nowadays city location. Moreover, they are responsible of its urban planning structure which considered as well the incoming canalizations of the aqueducts in order to provide the city with freshwater.

The water supply was effectuated by 2 aqueducts; they brought water from the River Francolí and from the River Gaià respectively. From these two hydrological structures just remain a few traces and stones. However, as these water webs were studied from a topographical point of view, sometimes,

romans were forced to build big structures to cross valleys they couldn't save in any other way. These great constructions had survived through the years because of their size and consistency. It is a structure of this nature in which we have focused on our analysis.

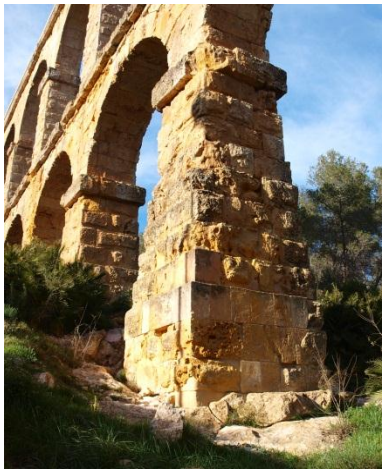
2. Aqueduct physical and mechanical description

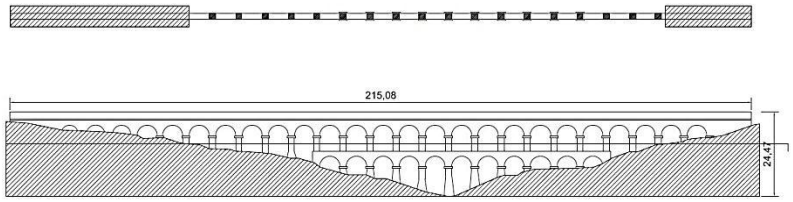
2.1 Physical description

The aqueduct was built in order to save a distance of 217m and a depth of 27m of a valley named "Vall de les Ferreres"(Fig.1). It is said that the name of the Valley rises from the idea of the shape of the bows recalling yellow bright horseshoes. The equilibrium of the structure is based on download arches. The bridge was built up with ashlars, superposing stones without any adding material. On the other hand, the bases of some of its pillars are widened to the contact with the ground. And there, in the basis they may be provided with a matrix of concrete which function is to fill the structure and promote its monolithic behavior. We can say that the structure of the bridge has survived until today due to stress compression. The more weight the aqueduct had, the more stable it would be.
Ashlars had variable sizes. The bigger ones were placed at the bases whereas the smallest were placed at the top. Furthermore as can be imagined, there were other singular pieces specially sliced, and modeled. These are the belonging to the arches and the capitals.
As can be seen in Fig. 1 the bridge is composed of 11 arches in the base and 25 in the first level.

2.2 Material Parameters

Most of the stone used in the construction of public buildings and spaces of the city was taken from the Mèdol Quarry, located 6 km far from the aqueduct. However, recent studies have reached new evidence that the aqueduct was built with a stone coming from a quarry that used to be immediately under it. This seems to be logic since the pillars of the bridge rises on visible rocky foundations (Fig.2). IGC (Institut Geològic de Catalunya) studies have detected that the area where the bridge stands corresponds to a kind of sandstone "Calcarenita escullosa"(Fig.3).





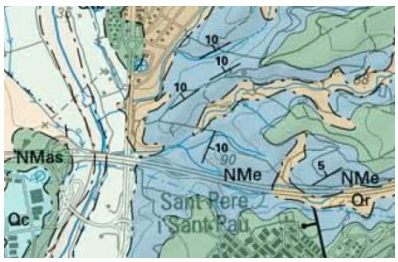


Fig. 1. Avobe
Fig. 3. Left

Fig.2. Up.

Fig. 1: 2D Plans for the aqueduct model.
Fig. 2: Image of the base of a pillar in contact with the ground.
Fig. 3: Image taken from de IGC data base. NMe - Local Stone.

This is a sedimentary rock. It may contain fossils and be quite soft but on the other hand may be well cemented and resistant. Its color changes as the weathering processes advance. In its origin, the color may have been pink and white but it can turn to grey or yellow depending on its composition.
The porosity degree is high; this is a reason why it might be a rock which can be easily sliced.
In consequence rock density is neither high. It is 24 kN/ m^3 approximately. This affects directly to the results of the tests required to get the value of the resistance compression of the rock.
So as to prove this resistance to compression we proceed to make a stress analysis. Its purpose is to compare the resistance of the stone of the bridge and the resistance of the rocks found in its surroundings. This way we could see how much the weathering processes have affected the stone of the structure.
Data was obtained in the same place. The device used to help the analysis being developed was a Schmidt Hammer (Fig. 4). It had to be found a reliable stone in the surroundings which could be used

as a basis. The same had to be done with the bridge, looking for a surface not too damaged to carry out the test.

Fig 4. Fig 5. Fig 6.



Fig 4: Schmidt Hammer while making the stress analysis to the local stone.
Fig 5: Local Limestone Stone.
Fig 6: Stone of the bridge under weathering process.

Table 1:

A	30	31	32	36	36	37	38	38	40	41	42	42	43	43	44	45	45	46	47	50	40,2
B	0	0	14	14	14	14	14	18	18	18	18	19	21	22	22	23	24	25	26	26	22,6
B*	0	0	0	1	1	10	10	10	10	11	11	11	11	12	12	12	14	14	16	16	12,9

A: Local Stone. Found in the surrounding of the bridge.
B: Weathered stone of the bridge.
B*: Weathered stones of the bridge. It fades with the touch of the hand.

Table 1: Data obtained with the Schmidt Hammer.

Table 2:

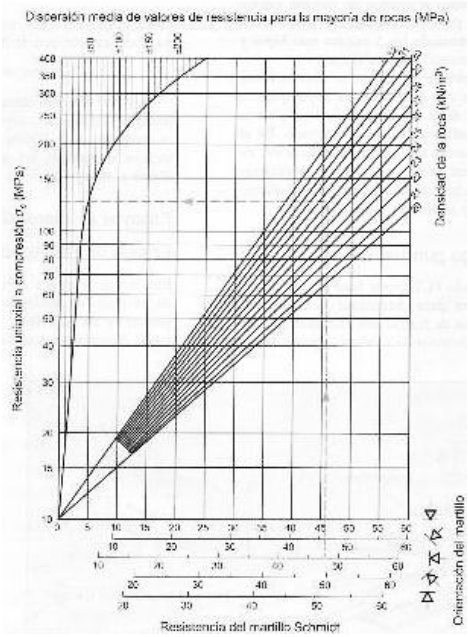


Table 3:

	SH value	Direction Test	Density (kN/m3)	Resistance to Compression (MPa)
A	40,2	⩛	24 kN/m3	70 MPa
B	22,6	⩤	21 kN/m3	27 MPa
B*	12,9	⩤	16 kN/m3	16 MPa

A: Local Stone. Found in the surrounding of the bridge.
B: Weathered stone of the bridge.
B*: Weathered stones of the bridge. It fades with the touch of the hand.

Fig 7.



Table 2: Compression Stress Resistance. Table for Schmidt Hammer.
Table 3: Resistance to compression values.
Fig 7: Weathering adverse effects on the stones of the bridge.

Once a reliable surface is detected, we proceed to do several tests in order to get an average result. The results of the tests gathered with the ones obtained by the Schmidt Hammer, are shown in Table 1. These values correspond to the value for the rebound of the hammer when applied perpendicularly to a surface. The lower 50% of the results are not taken into account, and the average is obtained with

the other 50% of the higher values. The Table 2 is used in order to determine the uniaxial resistance to compression of the stone. This Table relates the value gotten from the Schmidt Hammer with the density (kN/m^3) of the rock so as to get the uniaxial resistance to compression (MPa). Results for tests uniaxial resistance to compression are shown in Table 3.
It is shown that local stone presents higher results in comparison with the weathered one. These results could be associated to the starting properties of the stones of the bridge just being cut. The values in the second and third cases are not higher, as they belong to weathered stone tests. We can see that stone resistance tends to 0 as the weathering effects are more adverse. This kind of stone, calcarenita escullosa, turns to dust as it weathers as shown in Fig. 7. It is easy to imagine that a stone in this state of conservation will not offer any resistance to compression (Values of 0 in the Schmidt Hammer test).

3. The model

The object of study was drawn and modeled in order to perform the structural assessment by the Finite Element Method. The calculation was carried out by the free software Salome Meca 6.3. An accurate drawing of aqueduct is made using a CAD application (Figure 1). These were the basis for the 3D model, done with the same software. The Model is drawn as a single solid and it could not contain any other elements such as lines, polylines or surfaces. These were basic impositions to enable the assessment.
The modeling process is shown in Figure 8.

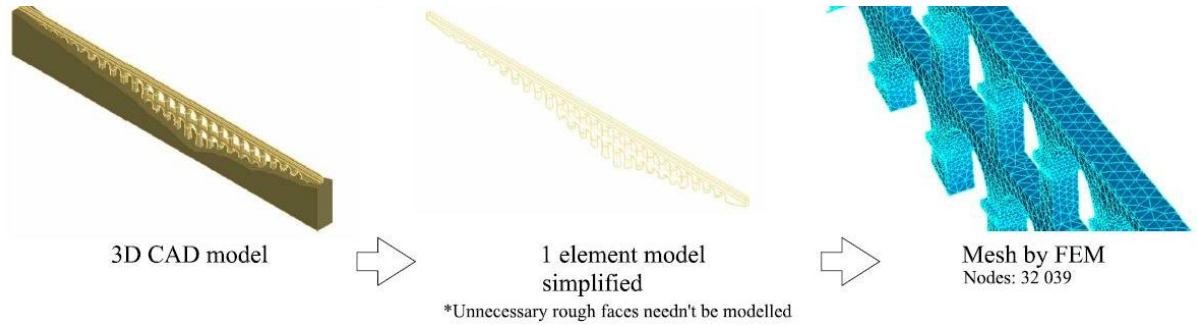


Figure 8: Modeling Process. From 3D CAD model to Mesh .med file in preparation for FE study.

These impositions do not allow modeling an exact replica of the aqueduct, so it is necessary to make a simplification of the geometry, which means the analysis will offer us a general view of the bridge behavior. When the model is prepared, stress assessment in Salome Meca 6.3 can start.
We considered one single and homogeneous material which characteristic properties are introduced. The software will not consider the complexity of the components of the bridge, since the aim of the study is to approach us to a general acknowledge of the behavior of the entire body.
Once the model 3D in .stp file is imported to Salome Meca 6.3, we turn it into a 3D Mesh (Hypothesis Netgen Simple Parameters). The mesh will be given nodes values. And the body is finally given the data gathered in the previous studies.

The calculation procedure will be an isotropic linear elastic study on the 3D Mesh. The first material properties required are the Young's modulus and the Poisson's ratio; these are shown in Table 4. Since the value of the density of the stone is known in each state we can deduce the Elasticity modulus by the checking Figure 9:
In addition we will have to decide the boundaries conditions, such as adding imposed degreed of freedom on groups of the Mesh or adding pressure on them, depending on the case we will be working on.

3. Calculation Cases:

The aim of the assessment is to get qualitative data about the structure behavior in order to detect the weak points of the structure, those which are more likely to fade. Highlighting these areas can help preventing future damage among the structure.
First cases will look forward to get information about the structure natural compression working behavior. Horizontal loads will be studied as well in the last cases so as to figure out what are the lines and zones affected by this kind of load. The calculation cases look for the comparison between an ideal state of the rock and a weathered state of it, after 2000 years. This will show how much weathering affects the behavior of the structure in addition to the information related to the potential damaged areas provided by vertical and horizontal loads.
This way the calculation cases are the following:

Figure 9:

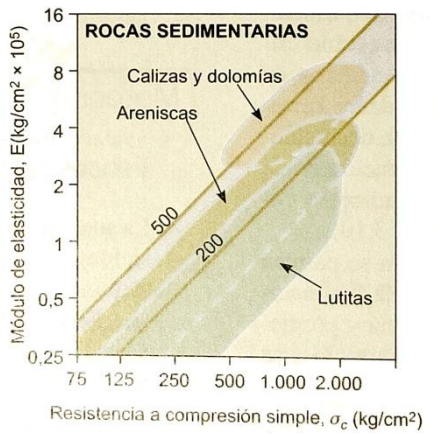


Table 4:

	Elasticity Modulus	Poisson's ratio
A	30 000 N/mm^2	0.23
B*	7 000 N/mm^2	0.23

Fig 9: Rock classification based on the relative modulus (E/σ)
Table 4: Elasticity Modulus and Poisson's ratio for Local sane rock and for weathered stones of the bridge.

Vertical Load Cases:
a) Ideal Behavior of the bridge. Local Stone Data.
a1) Under weathering processes. Bridge Weathered Stone Data.
Horizontal Load Cases:
b) Wind effect over Local Stone Data.
b1) Wind effect over Bridge Weathered Stone Data.

Case A

This first case looks forward to find the qualitative behavior of the initial state of the bridge. The model is provided with the values belonging to the local sane stone in order to approach the initial situation in which weathering agents had not affected the structure yet.
So as to carry out the assessment an external load is needed, in this case as we want to know the behavior of the bridge against its own weight we divided the bridge in two so that we calculated the load of the top first 2 meters, and used it as a load. A scheme of this division is shown in Figure 10.
The value for this 'external load' is 16 600 900 N.

Figure 10:

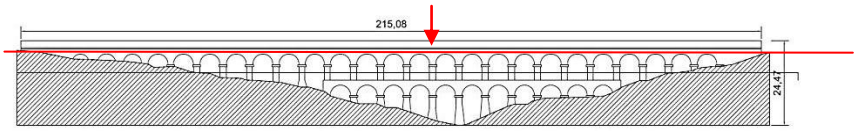


Figure 10: Scheme of added pressure on the bridge mesh.

After calculating the case, the information of the stress is offered as a Scalar Map (Figure 11). The degradation of the colors shows the magnitude of the tensions. Reddish points are the ones which stand more compression stress while cooler colors show which parts of the aqueduct do not suffer as much. This kind of representation makes it direct and simple to detect such critical areas.
As can be seen weight goes directly to the ground through the vertical structure while the arches just help bracing the structure and download their own weight to the supporting pillars. It can be observed that capitals and other bulky items do not make any structural function as their coloring is the coolest.
The deformation shape (Figure 12) shows which points are the ones to suffer more deformation.

Case A1

The second case is a replica of the first. Otherwise, we will use the data belonging to the weathered state of the stone (B*). We see that the degradation and distribution of the compression stress Scalar Map colors is the same since the scale in which stress is distributed does not change (Figure 13 and Figure 14). However stress and deformation values have increased. In this case the porosity increases and so the density drops, the resistance of the material is reduced and as a result deformations increase.
So, logically the structure becomes much more vulnerable to the attack of weathering agents. In addition to the effect of the wind, water or salinization, there are others such as insolation which can

make the stone surface suffer superficial movements of expansion and contraction which may weaken it. The collection of weathering agents can turn the stone into dust until it disappears.

Case A

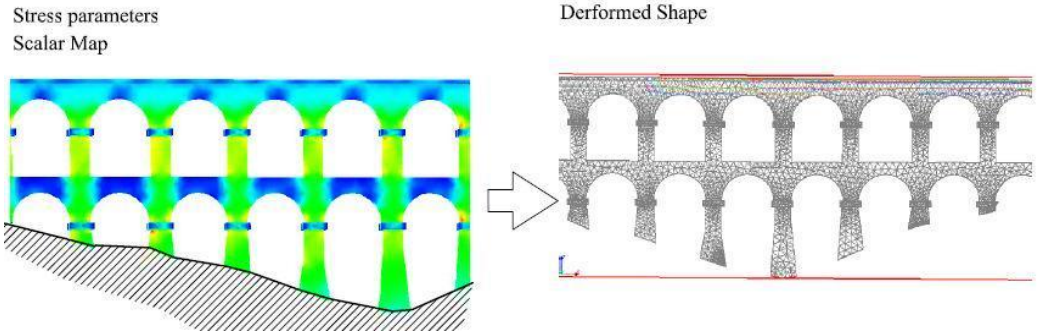


Fig 11: Compression Stress Scalar Map. Case A.
Fig 12: Deformed shape. Case A.

Case A1

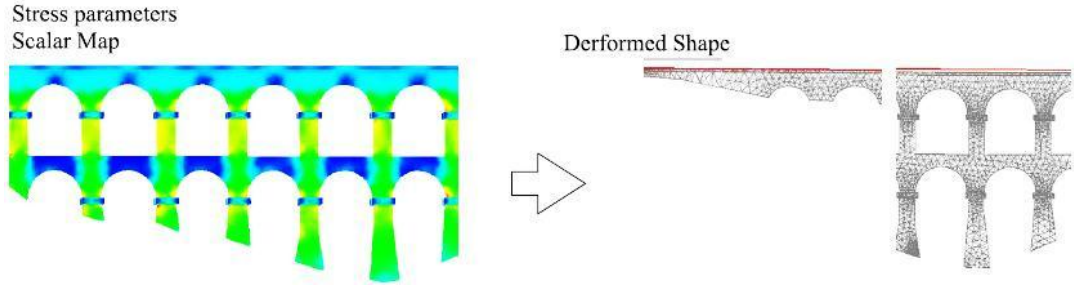


Fig 13: Compression Stress Scalar Map. Case A 1.
Fig 14: Deformed Shape. Case A 1.

It can be said that this case is a case of a state in the procedure of a stone in weathering, which means in the procedure of disappearing, unless any external agent acts in order to avoid it.

Case B

The following two cases will make an assessment of the effect of the horizontal loads on the structure. To carry out the study we will take into account the year average load of the wind (0.52 kN/m2) in the location in addition to its own weight load.

In this first case the properties of the stone will be the ones belonging to the sane rock. The load of the wind will be applied on the face facing the wind direction. Although the surface hit by the wind is lightened by arches still it offers resistance to the horizontal load. The Scalar Map and the Deformed Shape for the wind horizontal load first case show how much and in which zones the stress and the deformation are higher.

Pillars are subjected to cut stress showing a kind of a circle stress area which center is in the middle of the top of the structure. This can be clearly seen in the deformation Scalar Map. So we can guess that in an extreme case, only the base of the pillars connected to the ground would remain, while the area described by the stress circle would collapse.

Moreover, wind as a weathering agent, transports salinity from the sea, as well as grains of sand which hit the named surface. At the place we could check how a face of the aqueduct is more affected than the other because of the wind weathering effect.

With this case we can add a stress line to the results gathered in the first two cases. Not just some isolated points and corners suffer stress, but the whole structure in case of horizontal loads. It can be seen in the Scalar Maps that the arches help the structure working as a web in its entirety.

Case B1

In this last case we will assess the structure of the bridge in a weathered state (B*) for horizontal wind load. Again, the Scalar Maps are similar to the previous. The values of deformation and stress increase since the stone is not as resistant as in Case B. It is proved that the structure suffering is higher if nothing stops the weathering effects.

Figure 18 shows the effect of the wind on the edge of one of the first floor arches. The face hit by the wind tends to lose its original shape while the other remains. Lost volume of the edge of the arch is colored in red.

Case B

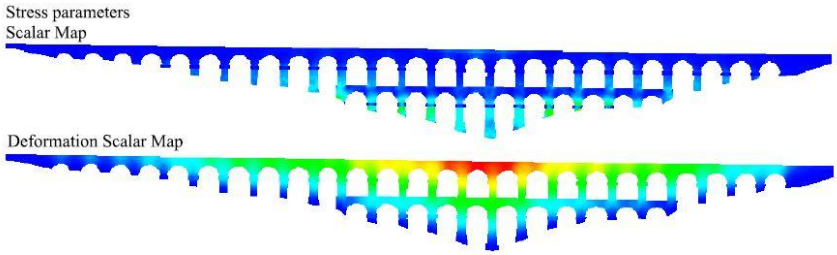


Fig 15: Compression Stress Scalar Map. Case B.
Fig 16: Deformation Scalar Map. Case B.

Case B1

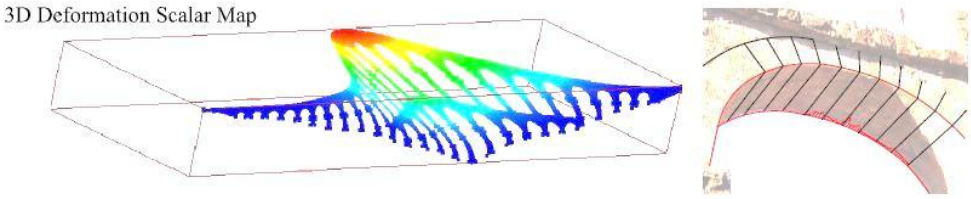


Fig 17: Deformation 3D Scalar Map. Case B1.
Fig 18: Picture showing the bad state of the face of the arches facing the wind.

4. Results

Structural assessments enable us to detect the points we have to take more care of in this type of structures. Cases A and A1, which carry on an assessment of vertical loads, show that in this case corners and the parts in which the volume is reduced such as singular points and edges are the ones that suffer more stress. In this case, some parts of the bridge held the function of bracing the structure and do not really support important loads. This would be the situation of the arches and in an ornamental way, of the capitals.

After seeing the third case, we can see that there are other critical areas to take into account. We could add a new critic line to the scheme of points we have to beware of. It consists of an approximate semicircle drawn from the top center of the structure. This line marks the place that suffers most when the bridge supports horizontal wind load.

As the Scalar Maps show the distribution of the stress and the scale of the deformation are the same in N and N1 cases, otherwise values change because of the loss of resistance. These values will always get worse due to the weathering effects, up until the extreme situation of making the stones disappear.

Recently some restoration works have been done so as to protect the monument, among them to reinforce of weak points of the structure of the bridge. Some parts of it had been replaced in their entirety because of their bad state. In order to contrast the data gathered in this study with the current state of the aqueduct some pictures were collected to portray some damaged zones or parts of the bridge (Fig.19). Weak points detected in the analysis are highlighted with a red point in the Scalar Map elevation. These images corroborate the fact that the small parts of the structure such as corners and edges are the ones to suffer more and are harder to maintain trough time due to their fragile state. It can be seen that some of the parts have been already restored by the recent works due to the opening of the new green area surrounding the bridge (Fig 20).

5. Conclusion

Structural assessment by Finite Element Method using software Salome Meca 6.3 enables easy and fast analysis of structures behavior. Although it is qualitative data what we get in the assessment, these procedures make the task of preventing deterioration of monuments more precise and comfortable. This kind of analysis helps deducing which parts of the object are likely to suffer problems. This is due to the collection of several weathering processes in addition to the own stress efforts. As seen the areas affected correspond in most of cases to bulky surfaces and parts in which

the area of the stone is reduced. These are the cases in which weathering processes are more violent with the stone breaking it into small pieces or even turning it into dust so that the monument slowly reduces its shape and volume.

Fig.19

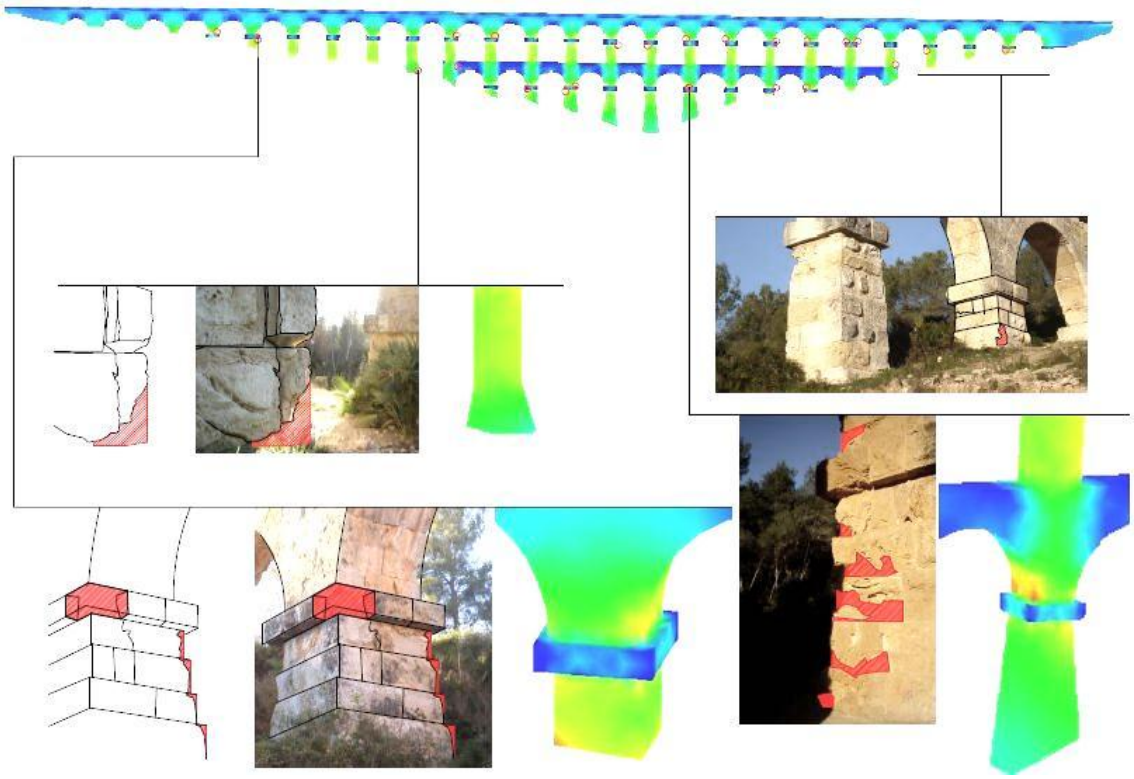


Fig 19: Pictures taken on 28th December, 2012.

Figure 20



Figure 20: Panoramic view of the bridge and its area.

Knowing the exact points that require more attention in the prevention of deterioration, it becomes necessary to imagine solutions so as to slow down the rhythm of the harming weathering processes. Sometimes there is no chance to act forcefully replacing damaged stones by new ones which weathering state is not as advanced. Other times, we may find ways to protect monuments in an indirect way. It should be necessary to develop a project focused on protecting the surface of the monument stones. These could consist on an aerodynamic project, for example proposing obstacles to the wind such as trees in order that it would not hit the surface of the aqueduct as hard. Water should also be considered proposing drains surrounding the aqueduct to reduce the capillarity of the stones. This kind of performances might be helpful to protect monuments while taking care of landscape.

Nowadays, protecting Heritage of Humanity has become a worrying topic because of the dramatic fading of the entire built Heritage. It is a problem that deserves a special attention since it advances quietly. However, there are simple ways, such as this, to start preventing and taking into account those parts of the monument which require immediate attention.

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Plurisensory Approach as a New Technological Way for Building Design

Luigi MOLLO[1], Rosa AGLIATA[2], Carlo GIUDICIANNI[2]
[(1)]Department of Civil Engineering, Design, Environment and Architecture, Second University of Naples, Aversa, Italy
luigi.mollo@unina2.it

Abstract
Normally, the perception of the built environment occurs through visual exploration, but if the user is visually impaired or guidance cues don't get a single view, (i. e. with contemporary architecture), users can feel a sense of anxiety and frustration, leading to the rejection of the space. To think about an imageless communication is nowadays almost impossible, however another way of communicating exists. To get into this different way of knowing, it is enough to pay more attention to information coming from the "view-helper" senses. This new design approach is the so-called "multisensory approach", which promote connections between the different sensory information, avoiding them reaching the user in a disconnected and meaningless way. The innovation that this design method can make, is to put men in contact with the main features of the architecture, thanks to the relationship between him, the space and its elements: light, voids, sounds, smells etc. This way, a remake of the classic eye-leading based architectural concept is achieved and structural elements can help more and more people to explore the built environment. Multisensory design then is a new interpretation of the whole design concept.
The aim of this paper is to examine the main elements of the built environment - signs - to be used in the design of buildings usable by people with visual impairment (blind or partially sighted).

Keywords: Plurisensory, Approach, Building, Technology, Design.

1. Introduction
The knowledge of a place or a built space, occurs through the acquisition and subsequent development of sensory information, which must be processed in order to hand back to the user the perception of the environment in which he moves. The interest to the seaspects of project has produced a new design approach called multi-sensorial approach; the designer, to realize it, must be able to promote connections between the various perceptual information.
Until now, the predominant attitude was to allow the orientation using the welter of data coming from visual exploration. When, as it is often the case in contemporary architecture, the alone guidance clues are no longer sufficient to report of the various components and architectural functions or they are not organized according to a unified vision, it is generating in the individual a sense of anxiety and even of fear, that adversely it affects the balance and state of well-being.
This condition is accentuated when, to make use of a built space are people with mobility problems.
In the current society, where visual communication is predominant and where seem that without it the world cannot progress, it thinks of a communication without images is almost impossible. Nevertheless there is another way of communicating which, although not usually used, provides infinite resources and possibilities of application. To enter in this different way of knowing, it is need to pay more attention with to information coming from the senses that replace the view. They allow to understand how the object can provide information various and articulated. It is, after all, a concrete and effective system because the understanding of a message or information occurs through direct stimulation of all the senses.

The innovation of this design methodology is to put in contact man with the main dimensions of architecture thanks to the direct physical relationship that he can have with space and elements that compose it: light and vacuum, sounds and smells of materials. So it changes classic architectural concept based on the primacy of the eye and it puts under discussion the capability to help to explore the built world of the various and different building elements, for a handicapped as well as for a normal persons.
Therefore, the multi-sensorial design is a new way to live the architecture and to feel the architectural design and so it isn't only the way to approach and overcome the problems associated with removal of architectural barriers.
It is clear that the view is the predominant sense and the most of information are received through the eyes. Eye first one serves to maintain the position taken as well as it permit to characterize and to define spaces to live and to walk
Hearing have an equal role in the orientation and mobility. In fact, it contributes significantly to the formation of cognitive map of the living space. Therefore, it plays an important role for the understanding of the environments in which it moves (it thinks, for example, as each one has capability to perceive in dark the position of a noise source) although it is a sensory input less understood, less stable and less rich of eye.
The sense of smell, while allowing to detect environment's nature and characteristics by picking up odours, does not allow to determine the position of the source.
Touch, whether direct or indirect, allows to obtain more information about the space in which you are located. In fact, radiant objects in a room can be detected thanks to the energy emitted or absorbed. More information can be obtained from the environment humidity levels (i.e. the feeling entering a cellar). Further these clues there are the ones from haptic perception, which provides information about the position of surrounding objects when in direct contact with you. A wide range of information can be also picked up by through the contact with the floor because "*attraverso il senso tattile plantare si ottengono informazioni sulla texture della superficie del suolo, sulla sua rugosità, levigatezza, regolarità e sulla pendenza. La percezione aptica fornisce informazioni sulla posizione attraverso la direzione dei piedi e la pressione dei vestiti sul corpo*"[1].
Further information about the position of man in the world around him are provided by kinesthesia: it supplies important data related to the perception of distance and three-dimensional dynamics.
To enjoy the architecture as a sensory whole "*basta considerare per esempio, i numerosi fattori che concorrono alla percezione completa dello spazio interno di una grande cattedrale. Qui giocano un ruolo fondamentale la temperatura e l'irraggiamento delle pareti, l'immobilità dell'aria, l'odore d'antico, di polvere e degli aromi usati nelle funzioni religiose, il tempo di riverberazione dei suoni registrabile come eco, rimbombo e coda sonora, l'elevato grado d'isolamento acustico dall'esterno e la consapevolezza delle reali dimensioni delle navate, il tutto inquadrato nella condizione di notevole emotività in cui si trova l'osservatore*" [2].
For the blind, the spatial image corresponds to a "data set" acquired through direct experience with all the components and parts of a given space. For a normally-sighted person is sufficient to dwell on the threshold of a room to understand it because he's able to acquire through sight the most of the information required to mental space construction.
The blind man, on the contrary, needs to "verify" the space crossing it, listening to it, touching it and paying attention to all the non-visual stimuli characterizing the spaces.
Below the main characterization elements of the built environment will be examined. These distinguishing features, to be used in design of buildings usable by visually impaired people (blind or partially sighted), will be defined "signs" because, as those used in one-sensory design and perceived by sight, are the guiding elements in the project and use of architectural space.
To respect the maximum length required, in this paper only acoustic and olfactory signs will be examined, referring to other publications for tactile signs, already widespread in practice.

2. Acoustic signs

Acoustic signs employed in interior design can be divided into two groups: active signs and passive signs, used in combination in the design of architectural space. In fact, to guide blind people inside buildings, it is possible to modulate the acoustic response of technological elements both with the use of suitable construction materials and with an adequate configuration of the internal spaces and even with a suitable arrangement of the emitting sources. Obviously it is impossible to use independently the three opportunities, but it is more efficient to organize them into an organic system of guided tours.
Emitting sources are useful but can often cause discomfort to able-bodied so they should be reduced to a minimum by restricting them only to the doors-opening (main door, elevator, etc..). It would be

[1] T. Empler, *Progettare il comfort urbano e d'interni*, Rimini 1997, pag.18

[2] R de Rubertis, *Progetto e percezione*, Roma 1971, pag.69

more useful to be able to activate them only in the presence of blind people. In fact, it is not a difficult task. It is sufficient to report architectural barriers by placing sound sources, switchable by blind people, in correspondence of them. This solution would provide a safe guide to movements without causing nuisance to other users. Another solution could be to place some rattles, sounding only when struck by doors opening.
This acoustic emissions system however, is only one element, often secondary, in the organization of sound-guided paths. Usually the blind person can emit sounds himself; for example, thanks to his sense for obstacles, he can snap his fingers to exploit passive signs thus obtained as a guide. At this step the attention for design plays a key role because, appropriately changing the dimensional relationships between components, it's possible to change the passive response, providing useful information to blind person. This effect can be improved by making appropriate technological choices about materials and construction techniques.
The first information you should know is that inner depth should not exceed 3 m^3. Above this height (Fig. 1) the effect of reflection is practically zero. So, it should be appropriate that rooms' internal height does not exceed 2.70m, reducing this value till 2.40 m in corridors. Below this value, perception becomes virtually zero if rooms are less than a meter wide. Another key data is about the wall's provision. In fact, a person walking on a floor emits sounds spreading in all directions and, even if in the presence of the slab they permit locating a covered space, these sounds are substantially useless as a guide. Walls are therefore essential to create an acoustic path. A final suggestion concerns changes of direction. Thanks to acoustic signs, blind people can perceive correctly only changes of direction at 90°. Any other angle has to be signalled in other ways, avoiding curved direction changing[3].
Basically, only materials able to modify acoustic characteristics of the room have to be used. Such materials can be acoustically insulating or soundproofing, but for the prefixed purposes only soundproofing materials are used. They can be divided into two categories:
1. Materials able to absorb thanks to special characteristics of their surface.
2. Materials that absorb noise because of their construction technology, i. e. vibrating panels and acoustic resonators.
For the first ones, it is possible to refer to the material's intrinsic characteristics definable through experimental tests (many data are available in the literature).
For the second ones, being understood to refer to market products, it seems appropriate to clarify how they work. As is known, a part of sound energy investing the absorbent material is converted into heat, another part is reflected and another one can pass through it. Porous materials have an internal cavity filled with air which starts moving when sound waves penetrate and propagate in the interstices, creating friction between air and the walls and transforming acoustic energy in heat. Vibrating panels (Fig. 2) are characterized by a thin panel nailed or elastically glued on two uprights connected to the wall the way of creating an air chamber behind the panel.

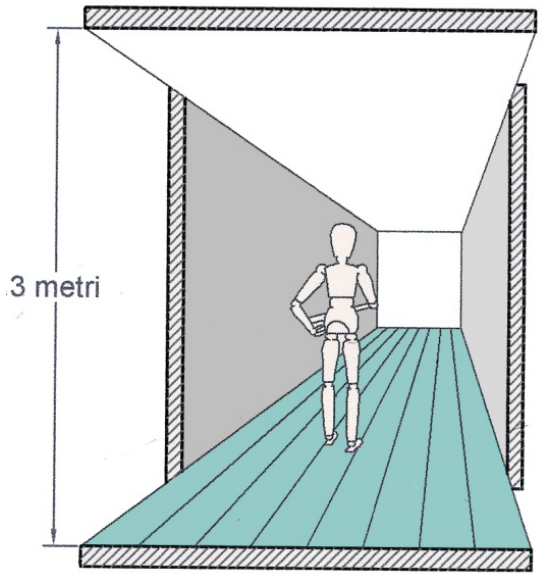

Fig. 1: Height limit for sound reflection in a room

[3] T. Empler *op. cit*. page 52 and following.



Fig. 2: Vibrating panel

Panel's sound absorption creates a selection between waves having different frequencies, as it becomes absorbent only for its resonance frequencies. The larger is the panel's distance from the wall, the lower are the absorbed frequencies.
Panel's absorption at various frequencies can be increased by interposing behind it an open-pores or fibrous material, with the aim to increase the damping produced by the air behind.
Cavity absorption (exploited by acoustic resonators) is more complex. An example is the Helmholtz resonator, consisting of a known volume bottle: when a sound wave enters the bottle, it compresses the air contained in, producing a push-pull wave due to its own elasticity. If the incident sound frequency is equal to the resonator frequency, there is a perfect resonance with cancellation of the incident waves' energy.
Cavity sound-absorbing panels (Fig. 3) are formed by panels a little bit distanced from the wall and have holes of different diameters in order to form different frequency resonators.
In the graphic schemes, reference was made to a ceiling panel but the same principle is also applicable to wall coverings or floating floors.

3. Olfactory signs

The first thing that comes into our minds when we think about a Greek temple is the purity of the lines and the sublime harmony between the parts, but no one of us thinks about "*cosa succedeva, tanto per dire, sull'altare? C'erano mucche, tori, si sacrificava macellando gli animali. Quindi c'era sangue e puzza... Non si pensa mai a queste cose, all'odore di un edificio... Invece questa è una parte importante della conoscenza che si può avere di un edificio*". Plurisensory design aims to recover this aspect of buildings' use, particularly with regard to issues related to the elimination of architectural barriers for blind people and visually impaired. For these people in fact, the smell, joined to other senses, must contribute to the definition of places' maps. The smells, although being unstable references, can provide impressions and information about the surrounding world which, if supplemented by other sensory references, help people fully understand the characteristics of the environment.

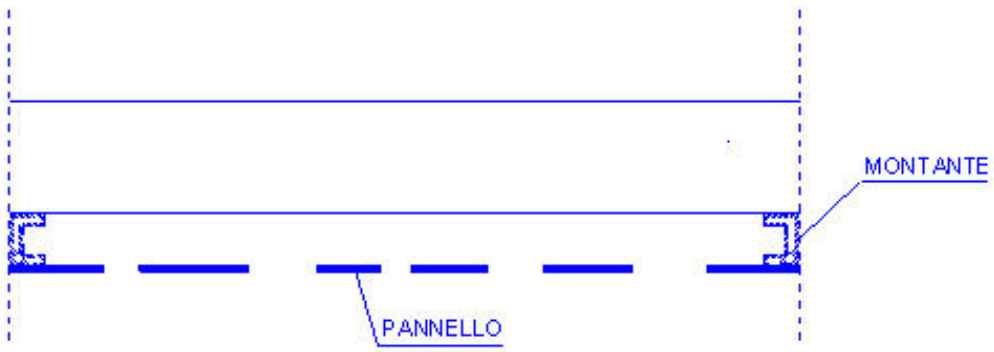

Fig. 3: Cavity sound-absorbing panels

To olfactorily characterize environments, the designer should use three ways:
1. Exploit odours related to the use classification;
2. Exploit materials' natural odours;
3. Exalt with olfactory sources certain spaces or paths.

These three design approaches, are not divergent or conflicting between themselves, so they must be integrated to achieve the maximum effectiveness of olfactory signs in the construction of plurisensory buildings.

Whatever the design process is, it seems appropriate to point out that odours produced or used in design should not create discomfort or allergic reactions. Therefore they must be within acceptable levels, also considering the greater senses' receptivity in people with visual impairments.

Since the odours level cannot be measured with ordinary chemical analysis, a few years ago two measurement units have been introduced (although with other purposes): the *olf* and the *decipol*[4], which can be adopted to evaluate the maximum emission levels of odours in buildings. To ensure an indoor air quality acceptable for the majority of users, in agreement with the indications of ASHRAE Standard 62/1989, it is assumed that the indoor air is characterized by a value of pollution perceived (C_i) of 1,4 decipol/m^2 (20% unsatisfied).

Known that[5]:

$$C_i = C_e + G/Q$$

where:

C_e = perceived value of outdoor air pollution [decipol]

G = ability to emit bioeffluents from all sources in the room [olf]

Q = outdoor air flow rate [l/s]

it is evident that, being constant the values of C_i, C_e and Q, the designer who wants to include the olfactory signs, exploiting natural odours or putting in new ones, must necessarily act on G. However, according to studies carried out[6], the value of G for a building occupied by one person every 10 m^2, should be between 0.2 olf/m^2 (for non-smokers) and 0.4 olf/m^2 (for 40% of smokers). These values in fact, can guarantee a value of C_i = 1.4 decipol/m^2 keeping, at the same time, the external air flow within reasonable values (1.4 l/s per m^2). Considering that one person each 10m^2 is equivalent to 0.1 olf/m^2, the designer's choice is very limited because he can only act on the remaining 0.1 olf/m^2 (the value of 0.2 olf/m^2 has been adopted, because of the net reduction in areas where smoking is allowed). It 'also evident that this odour load cannot be generic or annoying but should be a clear sign design providing the user with useful information on the ambience. The reference reduction of disturbing odours (which could be defined as "odours fund", by analogy with the acoustics) should be the designer's priority. As in all fields, the reduction of complexity is a factor of ambient noise reduction. In other words, the possibility of obtaining air changes through the windows without using air conditioning or ventilation constitutes a considerable reduction of the environmental olf load. Obviously this is not always possible, and the n the technician should search for technological solutions and material able to reduce the facility's olf emission. It is recalled that currently ventilation systems contribute for about 0.2 olf/m^2 to a building olf load. It 'also important to pay attention to the average age of the air and to the efficiency of ventilation: the olf load in fact, is directly proportional to the average age of air and inversely proportional to the ventilation efficiency.

Another important interference component are emissions from the use classification and the construction materials of the building and decor. Actually this olf load is part of what the designer can exploit as sign design. For odours related to the use classification the designer's attention should be directed towards a careful study of ventilation with the aim of obtaining for each ambience different intensity and characteristics of odours such as to constitute a characterization of the ambiences similar to the colour for the non-blind.

For olf load due to construction materials, the designer's attention should be paid to the study of technological solutions not only in terms of architectural requirements but also taking into account the creation of spaces olfactory usable. These two choices must be integrated with the adoption of ornamental plants such as olfactory sources. The green interior, if properly designed according to the olf load, is a useful guide for the blind and at the same time a comfortable piece of furniture for the able-bodied.

A last consideration is of a social nature: the development of new ways of life and the development of Western civilization are pushing towards the total elimination of odours from cities and housing. This

[4] The *olf* is defined as the rate of bioeffluents issued by a standard person; the *decipol* is the perceived air quality (PAQ) in a space with a sensory load of 1 olf ventilated by 10 l/s. So 1 decipol = 0.1 olf s/l [Manuale di progettazione edilizia, Milano, 1994, vol. 2 pag. 195].

[5] Manuale di progettazione edilizia, Milano, 1994, vol. 2 pag. 197

[6] Manuale di progettazione edilizia, Milano, 1994, vol. 2 pag. 199

act certainly constitutes an impoverishment of sensory perceptions but also represents a cultural impoverishment as cities and architectures are losing, also through this process, another typological evolution link in the history's continuity and in harmony with the physical and socio-anthropogenic environment.

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Monitoring and storage: integrate survey of the old towns “crater”

Caterina PALESTINI
Dipartimento Arch., Università “G. d’Annunzio”, Pescara, Italia
caterinapalestini@libero.it

Abstract
This contribution aims to present the experience gained by the emergency created by the earthquake that struck L'Aquila in 2009 and several neighbouring towns. This event represented the reason why we began our research at the Faculty of Architecture in Pescara.
Specifically, our research refers to surveys, targeted monitoring and conservation of some municipalities of the “crater”, including those belonging to the homogeneous in area n.5. This area contains of seven historical centers. We have surveyed the effective damage, with its representation topics, bidimensional and tridimensional studies. Priorities dictated by the knowledge and documentation of the damage caused by the earthquake have structured the different phases of our research, articulating them within an operating system specifically designed with integrated methodologies. The draft survey and the related interventions have been planned in accordance with the prefixed objectives and purposes. Furthermore, the have been organized in stages and in different levels of detail, established according to the urgency of the first actions of intervention regarding the "emergency phase" and the subsequent stages decreed by the reconstruction policies. This strategy aimed to provide the technical assistance in view of the reconstruction plans, pilot projects and strategic plans to re-evaluate the territories affected by the earthquake in a new cultural perspective of sustainable development.

Keywords: Integrate survey, representation, monitoring, earthquake, heritage.

1. Integrate survey and representation
The strong earthquake that on 6 April 2009 devastated the city of L'Aquila radiating in an area of about three thousand square kilometres and affecting, to various degrees, more than 57 municipalities in Abruzzo, provides an immediate idea on the extent of the damage, the analytical and planning difficulties related to various organizational stages of the reconstruction.
The coordination of activities related to the different moments of emergency, the definition of a unified methodological framework for the management of operations, required multidisciplinary experts who were called to operate on the territory. This is where the dutiful commitment of the University of Abruzzo derives from, the research conducted in these years by the working group of Pescara at the places hit by the earthquake.
The different experiences assembled on the field primarily concerned the investigation of the current situation and competence of our subject area, the organization of a cognitive system, which provides analytical data that can graphically help the various issues of intervention.
Firstly, it must be specified that the so-called "seismic crater" has been divided into nine equal areas, decreed by a committee that was established to handle the emergency in a systematic way, through a Technical Structure of Mission (STM). The homogeneous areas, voluntarily grouped together, have strengthened the ability to collaborate between the small towns that belong to it. In particular, our research unit occupies of the N°5 homogeneous area, extending between the valley of the river Pescara and the foothills of the eastern side, adjacent to the two National Parks of the Gran Sasso and Monti della Laga, and Velino Sirente, where there are nine municipalities. The SCUT research centre of the G. D’Annunzio University specifically designed seven of them.



Fig. 1: Localization of the seven towns under study, included in the Homogeneous Area n°5.

The integrated survey activities, included in an exact Technical Specification, covered the municipalities of Brittoli, Bussi sul Tirino, Civitella Casanova, Cugnoli, Montebello di Bertona, Popoli and Ofena, for which an operational work-program was set up that describes the methodologies used in the different stages point by point.
The contribution shows the operational plan and the achieved results, reporting methodologies that were used for the acquisition of data and results, which derive from their processing, documented through the attached graphic material.
Beginning with the support network and topographic survey, the definition of the absolute reference system was realized, which was obtained through the identification of 4 reference points, defined with topographic nails and appropriately positioned in respect to the perimeter of the study areas individuated in the single historic centres.
The calculation made with GPS helped us to obtain the vertices of densification, attributed to the IGM95 network of Abruzzo region.
These were the preparatory procedures for the geo-referencing of the settlement and for a subsequent scanning carried out with Laser instruments.
In each municipality, every topographic survey was therefore anticipated by the research of the extremities, closest to the boundaries to be defined.
This first operation, performed in order to reconnect the measurement systems, was carried out first on the official documentation issued by the Region, and later on the site to verify the accessibility, the status of the vertexes themselves, and their correct position.



Fig. 2: Topographic surveys, identification and materialization of points with GPS.

On the basis of the principal topographic polygonal lines the secondary ones were defined, inside the settlements, and arranged in a way to be crossed longitudinally and transversely.
These latter ones allowed the topographic map coverage to be guaranteed and the restitution of the orographic situation of the historic centres under study. The internal reference grids were realized according to the scheme of the closed polygon rings, so we tried to create a single, large ring that surrounds the confined zone to be pointed out, crisscrossed by linking the opposite extremes.
At the same time the targets, the points of connection were fixed and at this early stage they were detected with topographic instruments and then got relinked with a 3D laser scanner in order to geo-reference the point clouds. These targets were placed evenly in the area covered by the survey, with particular attention to the crossroads, squares, open spaces and, in general, to public places.
The detection of the areas included within the delimitations, at this stage, required the acquisition of photographic documentation, accompanied by graphic notes that show rapid judgments about the damage done to the architectural and urban structure, indicating the location of subservice networks that will be useful for future inspections of internal pipelines.
The photographic survey was organized in two phases, the first is referable to the indicated image shooting, carried out with the aim to document the damage immediately after the earthquake and to monitor the initial state and the following interventions. The second and more detailed one, with the aim to control the metric data and to provide a preliminary feedback between the photographic and measured information.

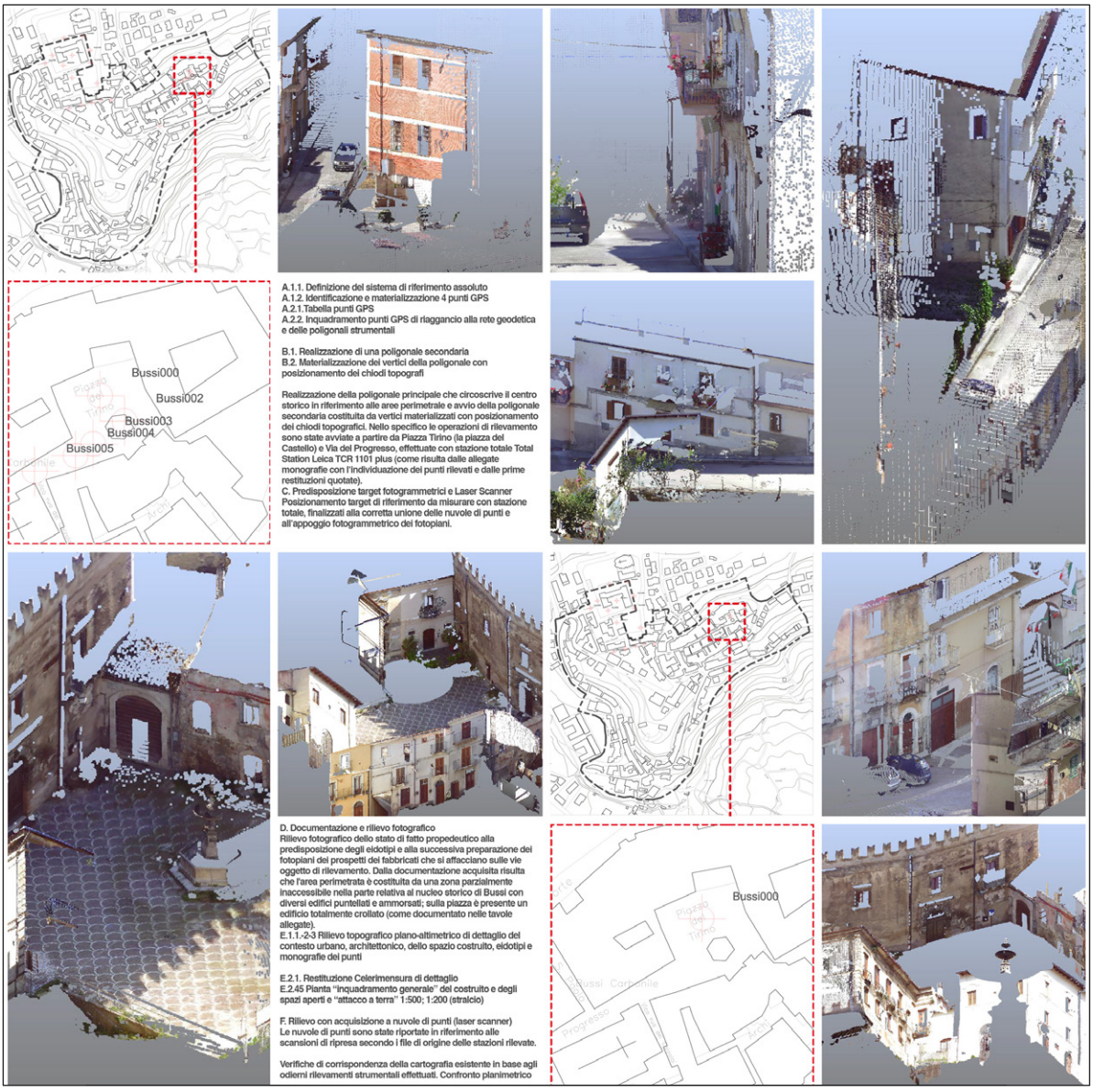

Fig. 3: Overview of some of the phases of the survey, referred to one of the historic centres under study.

Another test regarded the existing maps, comparing them with the urban reality of the individual municipalities; these interventions allowed a first comparison to be done on the actual correlation between the existing map data and present post-earthquake instrumental surveys.
We then proceeded, in each municipality, with the plano-altimetric survey of the urban environment, the architectures and built spaces, aiming to resituate contour plan of the area with its altimetric profiles.
The surveying, carried out with total station, covered the detailed survey of the facades and individual building elements for the definition and placement of the joint to the ground and, off the ground, of the previously affixed topographic targets. The sketches and the reference monographs correspond to the detection of the single points, which are numbered and are shown in charts.
For motives of optimization of the measurement system, it was decided to proceed in blocks, giving priority to main roads and areas identified by the "Pilot Projects".
To reach the desired effect, in other words the definition of a map equipped with the maximum information, the following main elements were identified, measured and summarized: blocks, appliances, buildings, elementary volumes, public spaces, visible points of the coverings and networks of subservices. As regards to roads and public spaces, all the necessary elements for the preparation of a detailed plan, scale 1:500, were acquired.

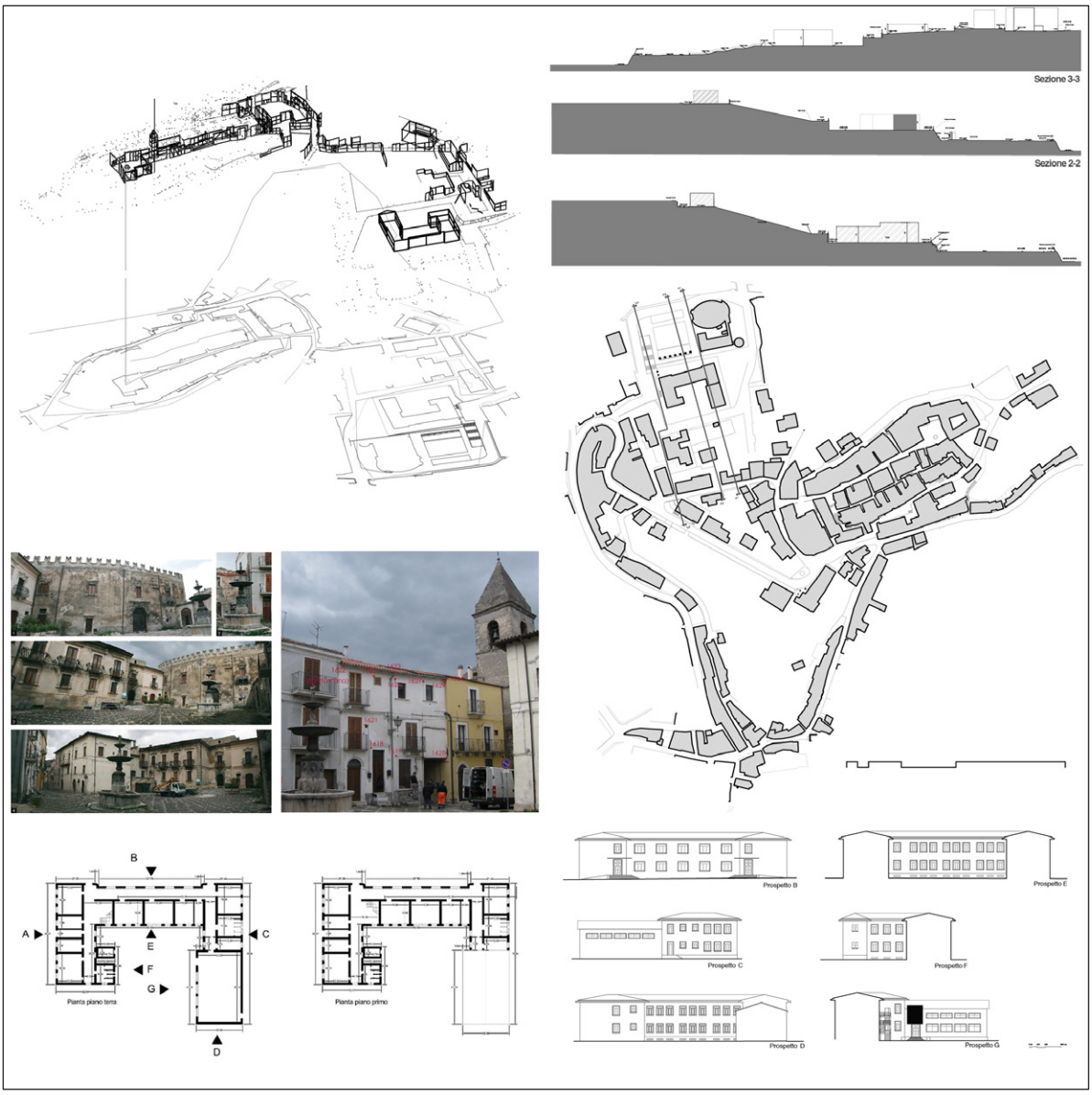

Fig. 4:Overview of some graphic representations and elaborations relating to one of the surveyed historic centres.

The surveying underwent some limitations due to the presence of scaffolding, shoring, and demarcation of off-limits areas to the public for obvious dangers; in such situations the information regarding the undetectable surfaces was still supplied.
The second phase, concerning the processing of the acquired data, determines the moment of the representation, the preparation of the graphic work in two- and three-dimensional format.
In particular, the materials collected during the enterprise of photographic documentation, were partly used to make image rectifications of facades. It has to be said that in many cases for the small road sections, typical of the historical centres, it was not always possible to realize the appropriate photo rectifications, balanced, in these situations with the aid of orthophotos, obtained by the restitution of point clouds, acquired with the laser scanning. Where it was possible, the photo rectifications introduced within the graphic design for the development of fronts were shown. In addition to the survey operations with total station, laser scans were carried out, as required by the technical specifications. These operations, after the apposition of the target of reference, allowed the geo-referencing of the point clouds. Each scan was then catalogued and reported in the plan for a proper file organization and to facilitate future merge operations.
The laser scanner survey of municipalities produced a substantial amount of information relating to the structural, morphological, material and chromatic characteristics of the urban centres. The individual data sets were ordered to the main streets that make up the historical centres. Following this scheme, registration of individual scans was carried out with the aim to make the complete point cloud model.
The scans were then aligned in advance through the identification of homologous points, which are recognized directly on the 3D (natural homologous points), after which it was decided to register "fine" performed by software through ICP (interactive closet point) algorithms implemented in applications devoted to the processing of 3D point cloud models. Recording operations allowed, moreover, to assemble the data within a single three-dimensional workspace; the explained tolerances, for each recording, from the values of Standard Deviation (RSM) and Average Deviation (AD) were maintained below 1.5 cm. The 3d models, corresponding to every street of the city centre, were then roto-translated in relation to the topographic network indicated by the targets, acquired bi-univocally both through the topographic station, both the laser scanner. This way, complete models of the surveyed area were obtained, which are oriented to the national cartographic system.
As to the production of two-dimensional works, after having optimized the model, horizontal and vertical sections have been realized in order to obtain maps and longitudinal and transversal sections of the urban areas. On the contrary, a series of virtual floors have been constructed on the street fronts, parallel to the layout of the individual facades, to which the view has been aligned. Using the 3D model of colorized point cloud, orthophotos were produced of every facade by *screen shot* mosaicking. To finish the orthophotos, scaled and reassembled in CAD, they were aligned with sections that derive from the model and they provided the basis for the preparation of line charts and photomaps.
To conclude, such study models were obtained from this experience that can be explored and monitored in laboratory and that, in the first place, made it possible to provide the necessary technical assistance for the preparation of the Plans of Reconstruction in the emergency phase, allowing then to assist the Pilot Projects and Strategic Plans, designed to revitalize the areas damaged by the earthquake in a new cultural perspective of sustainable development.

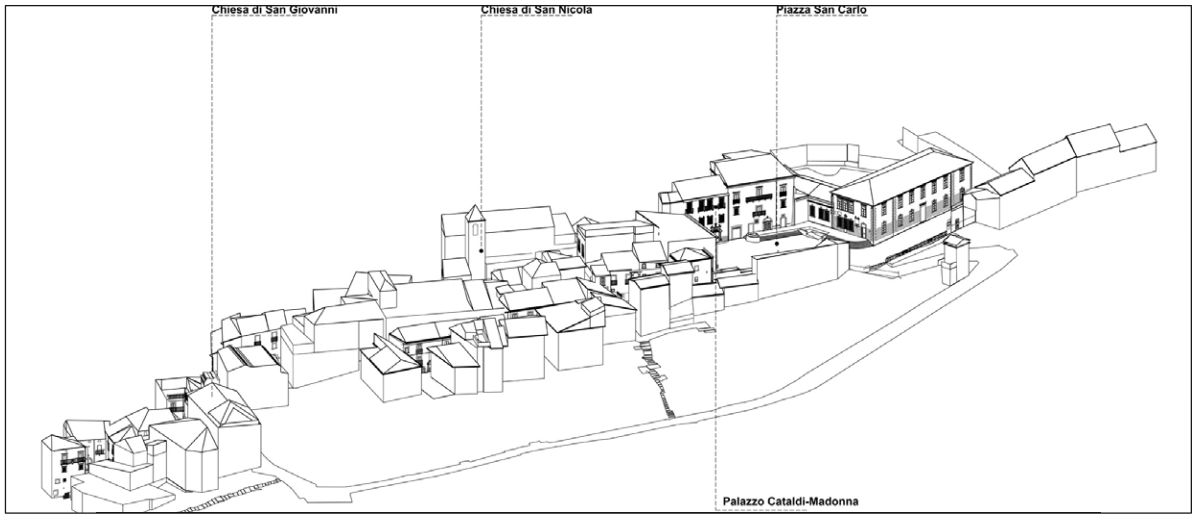

Fig. 5: 3D model illustration of one of the surveyed historic centres, Ofena.

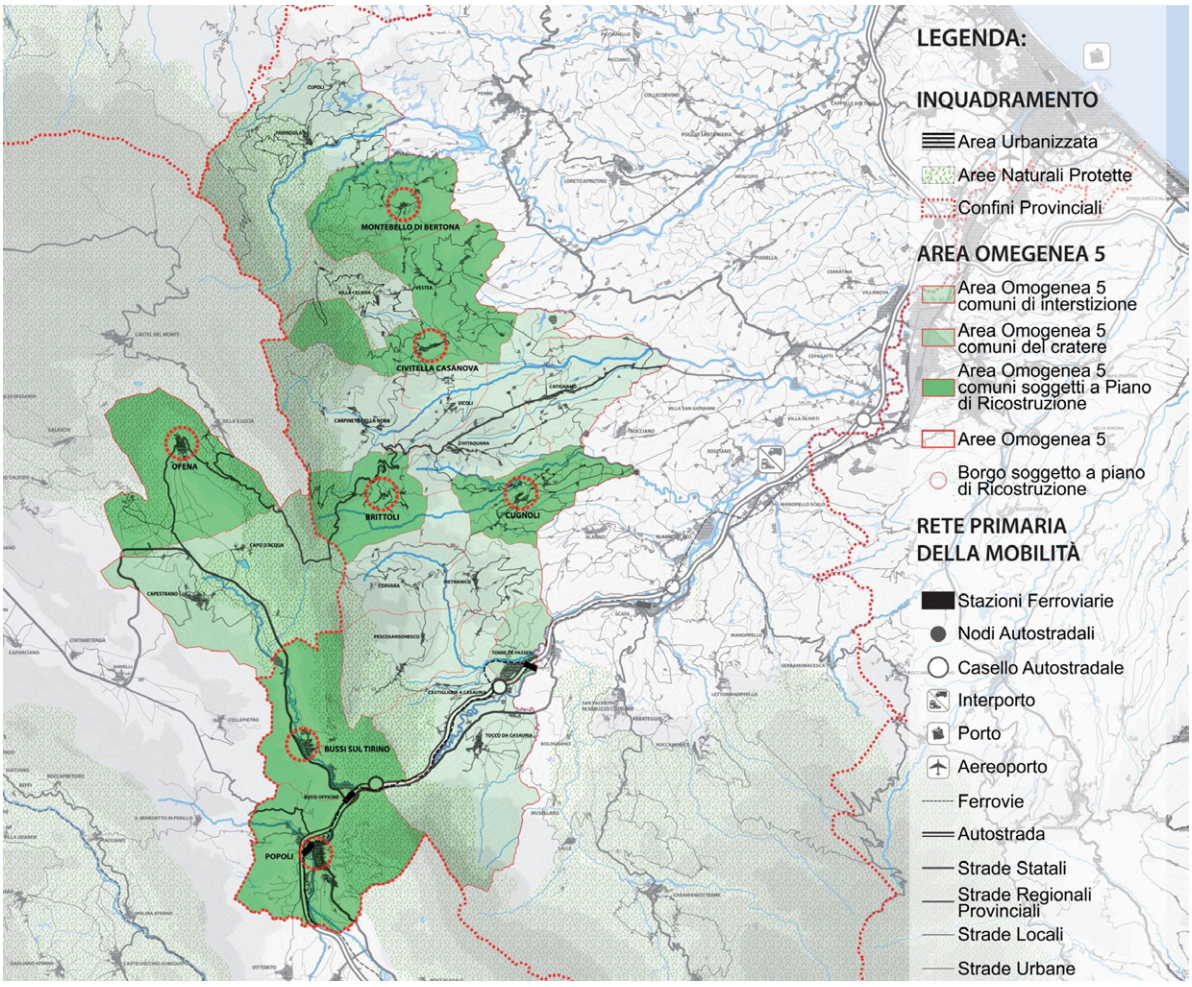

Fig. 6: Territorial context of the towns included in the Homogeneous Area n°5.

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[2] The Technical Structure of Mission (STM) constituted by Gianni Chiodi, deputy commissioner for the reconstruction, has been directed by Gaetano Fontana with Enrico Nigris, Claudia Genitti and Manuela Praticò.

[3] The Competitive Urban Development Research Centre (SCUT) of the G. d'Annunzio University of Chieti-Pescara is directed by Alberto Clementi, scientific coordinator of the activities of analysis and interventions conducted in the homogeneous area 5.

[4] The total station used is a Leica TCR 1101 plus.

[5] 3d laser scanner acquisitions were performed with the Laser Faro LS1105.

[6] The Reconstruction Plans were introduced in Abruzzo with the innovative law n.77 of June 24, 2009.

[7] See *Pianificare la ricostruzione* (Planning the reconstruction). *Sette esperienze dall'Abruzzo* (Seven experiences from Abruzzo), Alberto Clementi, Matteo Di Venosa (edited by), ed. Marsilio, Venice, 2012, ISBN 978883171520.

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Relocating the Past in Amman: Iraqi Architecture and Identity after Displacement

Sonia AL-NAJJAR[1]
(1) Department of Architecture, Faculty of Engineering, Philadelphia University, Amman, Jordan
Email najjarsonia@hotmail.com

Abstract
It has become common to observe that the spatial and social displacement of people has been accelerating around the world at a fast pace. Displacement provokes disruptions and shifts of meanings and conventions. Architecture can function as a receptacle, as an instrument, or as staging of displacement. Sometimes, architecture manages to generate possibilities to turn contradiction into ambivalence.
Cultural representations of memory, migration and migrant experiences provide fruitful points of departure for the development of new theoretical concepts of place and belonging that have direct effect on built architecture and urban form.
Jordan has received two primary waves of Iraqi refugees; the first arrived after the 1991 Gulf War. Many of these Iraqis were middle class, including doctors, intellectuals, and teachers. Since the start in 2003 of the war in Iraq, increasing numbers of Iraqi nationals have left their homes for different parts of Iraq or have taken residence in neighbouring countries, particularly Jordan and Syria. Iraqi refugees and migrants in Jordan represent a large sector of society; this research looks into the current architecture or urbanisms of displacement which took place in the city of Amman as a result of Iraqi migration into the city.
This research proposes a theoretical framework to examine the effects of Iraqi migration on urban form and urbanism in the city of Amman. The author looks at four agencies of impact (movement of capital, people, information, and culture) and their effects. These consequences, the author suggests, are expressed in the configuration of urban space, urban form, and urbanism in Amman. The goal of the research is to offer a critical framework for studying impact of migration and refugees on third world cities urban form.

Keywords: Displacement Architecture, Iraqi Refugees, Amman, Identity.

1. Introduction
It has been noted that refugees, through the process of forced migration, lose aspects of their identities that were embedded in their former communities, jobs, skills, language, and culture. Upon arrival in a new society, they seek to reconstruct their identity.
The increasingly complex relationship between the local and the global, ‘the near' and ‘the far away', has emerged as one of the defining characteristics of contemporary societies. With globalization's increased mobility of people and speed of information exchange, and the cultural encounters resulting from it, traditional essentializing and stabilizing definitions of terms such as 'home', 'belonging', 'place', 'identity' and ‘memory' have long become problematic and more adequate understandings of these conceptions are much sought after.
The issues of migrant resettlement, adaptation and acculturation have received increasing attention from social scientists. A dominant paradigm is Acculturation Theory, proposed by Berry in the 1980s, explains how individuals from a cultural background react when in contact with another culture (mostly in the context of immigration). The theory posits that, depending on how these individuals react to the “host” culture and how much of their “home” culture they retain, individuals will either; integrate, assimilate, reject or become marginalized.

Thus Iraqis in Amman are not recognized as refugees as the international meaning of the word suggests, but they are active residents of Jordan, participating in transforming the community's economic, social and urban status of the city. [11]

2. Research Hypothesis

This research aims to identify how the built environment is rendered and shaped by community identities. The object of the research is to pinpoint the effect of immigration on place transformation. It also aims to examine both new and historical urban fabric, and discover the different ways that they are occupied and transformed in reference to identity formation.

By examining both urban and suburban conditions, and discovering the different ways that they are occupied and transformed in reference to identity formation. Also by examining the experience of identity formation in a representative cross section of the city; the research seeks to identify both the significance and nature of architecture and urban form as part of the identity of individuals and communities. It will question whether 'place attachment' is still a valid concept, and should look in detail at the changing notions of cultural identity, as well as concepts of place identification and community belonging, through examination of displaced Iraqis influence upon architecture and urban form in the city of Amman. The aim is to look at new buildings and new urban influences, and also to examine the existing and historical urban spaces that are being occupied and transformed by Iraqis for different purposes.

The case with the Iraqi Diaspora in Jordan, and in Amman specifically, is that they have mastered the art of impact without real-time integration with the Ammani society. They're main catalysers of social and urban development. Empowered by strong capital and investment talents, they seem to transform and influence many changes inside the urban realm of the city.

Melvin Webber's celebrated "Non place Urban Realm" is what best describes the new metropolitan multicultural new city of Amman; where the built environment is subject to constant change due to different waves of immigrants coming into the city. Each group bringing part of their culture to the new city that does not represent a singular one identity place but a multi layered one urban realm.

The current forms of urban morphology that are occurring in the city of Amman, and the responsive developments initiated by new waves of displaced Iraqis and their counter effects build on what Melvin Webber describes as: "Dynamic, locational patterns of human communication that occur through space but transcend any given place." The Iraqis in the city are creating points of arrival for their trans-placed identity and culture inside the urban fabric of the city. In these points of arrival Iraqis can meet and socialize with fellow Iraqis and create a sense of home within their new city. One important point of arrival, is the restaurant or café, where 75% of guests are Iraqis, it is the new found Iraqi "medieval church" within each neighbourhood of western Amman, where an adequate number of Iraqi families are clustered. [15]

3. Refugees in Jordan

Jordan has the highest ratio of refugees to total population of any country in the world, and is host to the largest number of Palestinian refugees under the mandate of the United Nations Relief and Works Agency (UNRWA). Jordan acted generously towards these refugees, granting them fully-fledged citizenship while UNRWA provides health and education services.

Although Jordan is not a signatory to the 1951 Refugee Convention, both the authorities and civil society are sensitive to refugee and human rights issues. The Government considers the Iraqis in the country to be guests, rather than refugees, which ensures that they are secure and respected, but fails to provide them with a clear legal status.

While most Jordanians show tolerance and hospitality to the people of concern to UNHCR in their midst, the country's national systems and infrastructure have come under strain. The pressure has become more acute over the past two years due to the financial and economic crises, and was exacerbated in early 2011 as a consequence of the "Arab Spring". As refugees from many Arab countries have taken refuge in the country including those from Libyan and Syrian nationalities. One of the largest groups of Syrian refugees resides in Al-Zaatari camp, figure (1) which is home to more than half a million Syrian refugees [1].



Fig. 1: Refugees fleeing the violence in Syria gather at an emergency camp for Syrians in Zaatari village, east of Mafraq Governorate, Jordan. Le Monde, 2012.

3.1 IRAQI Refugees in Jordan

Throughout the 1990s hundreds of thousands of Iraqis fled their country, mainly Iraqi Shia and Kurds. Iran took the bulk of those refugees but by 1995, Iraqis also began to head to Jordan either to settle there or to use Jordan as a transit base to other countries. Although there are no accurate statistics on Iraqi refugees in Jordan before the 2003 war, it was estimated that by 1996 there were 100,000 Iraqis. By 2003, their numbers were put at 250,000 to 350,000 and only 30,000 were legally permanent residents in Jordan [2].



Fig. 2: Iraqi women in Downtown Amman area selling smuggled cigarettes, 2003.

In the immediate aftermath of the 2003 invasion, the first waves of Iraqis to flee were similar to the initial groups of refugees in the 1990s.
One of the issues facing international humanitarian organizations and research institutions is the fact that the Iraqi refugees, unlike refugees in many other war-torn areas, are not living in camps or tents; the vast majority of them are urbanites heading to urban centres [3].
The majority of the Iraqi community in Jordan resides in Amman, and had originally come from Baghdad. The population of Iraqis in Jordan is almost exclusively urban and hence most of them benefit from the infrastructure in the capital city of Amman and other large cities. Almost all households are connected to the public electricity network, the water network and the sewage network.



Fig. 3: Downtown Amman in 2003 home to less privileged Iraqis of pre 2003 migration waves.

Many Iraqis have been forced by their financial circumstances to move to poorer parts of Amman. Fafo's survey [4], indicates that 25 per cent of Iraqi households in Jordan own their dwellings. Household wealth plays a factor in home ownership; 60 per cent of the households in the highest wealth group own their houses, whereas only 1 per cent of the poor households do.

Lowest Wealth	21.5
Low Wealth	19.8
Middle Wealth	13.3
High Wealth	11.0
Highest Wealth	34.5

Table 1: Iraqis in Jordan, household wealth and employment of household heads (in %) - after Fafo [4].

In fact, with the passage of time, a real gap in wealth and status has evolved among Iraqis in Jordan. While there are stories of successful entrepreneurs whose business is booming, 100 thousands of other Iraqis are relying on humanitarian aid for food and blankets.



Fig. 4: Three Commercial Buildings in Mecca Street owned by one Iraqi investor. [16]



Fig. 5: Neighbourhoods in western Amman marked with (A) where wealthy Iraqis and investors own houses and businesses, and have invested in real-estate market. (B) Is the old Down Town of Amman where less privileged Iraqis prior to 2003 settled.

Some of the better-off groups have investments in and outside Jordan, and some even kept their investments in Iraq. Again, the survey shows a strong correlation between the household's economic status and the size of their investments. Within the households in the highest wealth group, 40 per cent have investments in Jordan, Table 2. [4].
Apart from purchasing their own houses to live in, some Iraqis invested in the property market which is considered one of the backbones of Jordan's economy. From 2002– 05, the value of Iraqi transactions in the Jordanian housing market has doubled each year, rising from about five million Jordanian dinars (JD) to JD 100 million (one Jordanian dinar is equal to $1.4). The value of Iraqi transactions as a percentage of all foreign transactions also increased dramatically from 21 per cent in 2002 to 68 per cent in 2005. Obviously, these purchases boosted property prices in Jordan and added to the inflationary pressures in the housing market [2].

During 2004– 06, the Jordanian economy witnessed strong gross domestic product (GDP) growth rates of 8.4 per cent, 7.2 per cent and 6.3 per cent respectively. The reasons for this growth have more to do with external and regional factors than government reforms.



Fig. 6: Photo rendering of JD 80 million mega mall project in Sweifieh District in Western Amman by Amwaj Properties owned by Iraqi investors.

Among those reasons were the ramifications of the Iraq war, increased wealth and savings in the oil producing Gulf countries which led to a rise in foreign flows into Jordan. One of the engines behind the impressive growth of GDP is the construction sector, which has grown by an average of 10.7 per cent each year from 2003– 07 to meet the demand for housing by the new wave of refugees. The Jordan Times estimated that the arrival of Iraqi families in 2004 and early 2005 pumped $2 billion into the Jordanian economy, and that 'clearly contributed to accelerating the cycle of the economy' [5].

3.2 Displaced Iraqis Identity

Identity is the foundation to a sense of belonging. It is the means by which people locate themselves as members of communities and groups and how they define their place in society. Identities are not singular, nor are they stable. New patterns in population movement, developments in transport and advances in electronic communication have loosened traditional ties between residence and identity. There has been a move from the community sociality of physically localised connections, to an increasing "network sociality" of informational, ephemeral and often temporary associations [6].



Fig. 7, 8: Esagila is an Iraqi restaurant in Western Amman owned by an Iraqi investor named after Esagila the famous ancient temple in Babylon.



Fig. 8

The globalizing era of rapid economic and cultural transformation has unsettled cultural locations and their settled ways. Those practices, beliefs, and ideas that were once considered folk culture and defined as organic expressions of locally lived experiences are, with ever increasing speed, being unsettled. The mobility and mobilization of both populations and territories raises questions about the nature of the ties social groups have to their places, about the durability of these ties and the kind of settlement practices enacted for those on the move [7].
The idea of belonging to a “community,” for example, is never simply the recognition of cultural similarity or social contiguity. It is instead a categorical identity that is characterized by various forms of exclusion and constructions of otherness [8]. Berry's acculturation theory when applied to Iraqi diaspora represents varieties of adaptation that differ according to the group economic situation. But Berry’s model recognizes the importance of multicultural societies, minority individuals and groups, and the fact that individuals have a choice in the matter of how far they are willing to go in the acculturation process [11]. Immigrants involved in cultural transitions because of migration must cope with their new cultural-societal pressures and standards. They must make sense of their new social environment and decide how and/or whether they are going to integrate themselves into the host culture. How is it that they develop situated behaviour patterns that are adaptive within the larger context [12].

Many Iraqi restaurants in western Amman are social Iraqi hubs where Iraqis could meet, and wedding ceremonies could take place. The interiors of these restaurants are vivid and have nostalgic elements that echo Baghdad or Mosul or any other city in Iraq. The naming of the restaurant is also nostalgic; it may refer to street names in Baghdad or Mesopotamian references or traditional dishes, etc.
The Iraqi restaurants of western Amman are not only places where Iraqis can eat, but they also represent political arenas. Scattered between the streets of Sweifieh, Abdoun, Umm Uthaina and Rabiah districts; they mark the territorial zones and act like middle ages churches or Islamic mosques, or as points of arrival for Iraqi displaced culture and identity.



Fig. 9: Interior of (Zad El Khair) Restaurant in Umm Uthaina District - framed pictures on the walls are vintage photos from Bagdad and Mosul**.**



Fig. 10: (Zad El Khair) Restaurant in Umm Uthaina District – Exterior. Detached restaurant buildings became prevalent Iraqi investors' favorites. Restaurant and café culture has been a significant trend of post Iraqis Amman.

4. Displaced Iraqis and the Changing Face of Amman

Jordan experienced a high rate of urbanization during the last five decades leading to concentration of population in the main cities. This has created high demand for the opening up of huge areas to meet housing, commercial, industrial and other service planning requirements.

The Urbanization in Jordan is the result of a rapid population growth caused by high natural growth and a flow of refugees. Historically, urban immigration in Amman has increased at rates that have exceeded those of infrastructure development in the destination cities, resulting in concentration of population and increasing of population density. Continuous migration flows have largely contributed to an increase of the population density and built-up areas, one of the main effects of such a situation is the transformation of settlement structures and urban services, figure 10.



Fig. 11: Increased population means more demand on housing and a construction boom, but more strain on public services.

The population growth of Amman since the second half of the 20th century has been phenomenal, in terms of its population, density, and socio-economic characteristics. This has transformed Amman from small town in the early 1920s of little more than 3000 people to a major city with a population of 2.4 million people. [9].
Currently, the spatial characteristics of the urban areas of Amman had become increasingly complex. The peak in the population number indicated an increase in the fragmentation of the urban areas, and decreases the existence of open spaces inside the urbanized areas, figure 11.



Fig. 12: The peak in the population means more congestion and less open spaces inside the urbanized areas
Due to the marked difference in socio-economic conditions, the form of urbanization in west Amman is considerably different from that observed in east Amman. The urban growth under the Amman Land Use Master Plan has been influenced by economic development of the country and the city. In the east it is over populated while the west is more fragmented, thus the wealthy Iraqis found holes to fill in the vacant pricy lands of west Amman.



Fig. 13: Name of one of the streets in Umm Uthaina District in Western Amman: Al-Furat after the famous Euphrates River of Baghdad.

The urbanization of Amman has also produced several patterns. The new urban areas were quickly assimilated into the old urban centre by the rapid and unexpected economic growth that followed the privatization reforms, while the areas of east Amman remained relatively less developed [9].
Amman, a city of refugees and migrants, Amman's inhabitants arrived in waves that resonate with the convulsions of the landscape upon which they settled. The steep hills of the city's eastern parts and natural setting reinforced distinctions between groups. It provided shelter for the reconstitution of poor communities of Iraqi refugees, those were the ones that claimed the status quo of politically displaced and under privileged [10]. Jordan's population is just over six million people and its informal economy is small and there is no doubt that the influx of so many Iraqis in a period of several years has put tremendous pressure on the quality of the infrastructure and the level of government services, particularly in Amman.

5. Summary

Iraqi diaspora in Jordan are not like any other ordinary refugees and displaced people as a result of war. They are residents of a city that they are participating in transforming socially and economically, in a way that is changing its urban typology and development.
The majority of Iraqis in Amman come from good economic backgrounds and a very good percentage are active investors in the real estate and construction sectors.
Effects of Iraqi migration on urban form and urbanism in the city of Amman are tangible. Four agencies of impact including movement of capital, people's identity, information, and culture have affected the lifestyle and urban morphology of the city.
The configuration of urban space is affected by Iraqis in a way that is felt in the city's urban form. The effects of migration on third world cities urban form and social life are tremendous, because cities like Amman have not formed their own strong identity yet. Amman is less than a century old city, which means that a large number of people moving into a small populated city and country can have their impacts on social life and also on the urban form, as well as architecture and architectural behaviour of the residents from all backgrounds.

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Jappelli's virtual garden: the scenographic engravings for "Palazzo della Ragione" in Padua

Andrea GIORDANO,[1] Cosimo MONTELEONE,[2] Isabella FRISO,[3] Marco PEDRON,[4]
(1)Department of Civil, Environmental and Architectural Engineering, School of Engineering, University of Padova, Padova, Italy.
andrea.giordano@unipd.it
(2) cosimo.monteleone@unipd.it
(3) isabella.friso@unipd.it
(4) marco.pedron@gmail.com

Abstract
During the XIX century, Giuseppe Jappelli (1783-1852) worked in Padua both as architect and city planner. His projects changed the urban aspect, even if the appearance of the city would be modified more deeply with the construction of his unrealized designs. There are, nevertheless, two engravings which represent a virtual garden thought for the interior of *Palazzo della Ragione* in Padua to wave the arrival of the Majesties Franz I and Maria Ludovika in December 20th 1815. Jappelli, who had a great experience in theatre sets, was influenced by the Projective Geometry rules, that during those years had been entirely codified. Our paper reconstructs those virtual spaces and links the engravings by Maina, that show the Jappelli's design, to the geometric rules and their exceptions. Starting from a study on the Jappelli's way to draw architecture and engeneering machines, considered inside the international context of the Descriptive Geometry, we proceeded to create from an inverse perspective a virtual garden to reach knowledge on perspective theories and practices in scenographic screens for theatre.

Keywords: Descriptive Geometry, 3D modeling, Architectural Drawing, Giuseppe Jappelli

1. Jappelli and the Architectural Drawing in the XIX century (A. Giordano)
Among the studies on Vision and Perspective, in the first decade of the nineteenth century a new prevailing model of observer comes in Europe, radically different from the type that characterized the earlier centuries and this for a series of phisio-philosophical researches on the act of vision [1] but, according to some researchers, thanks to a broader range of social practices and domains of knowledge, based on the use of optical instruments, ancient (such as the *camera obscura*), or new invention (such as the stereoscope). Studies of Herman von Helmholtz, John Ruskin, Arthur Parsey, William Herdman, just to mention some few scholars [2], become emblematic of a century that takes another important step towards the complete mathematical generalization of Perspective, with the coding, as we know, of Projective Geometry by the French-Swiss mathematician Jean-Victor Poncelet.
However we see, throughout Europe, a renewed scientific production in the context of Descriptive Geometry, particularly in Germany, with specialized publications that accompany, at the dawn of nineteenth century, the education of the architect and, beside the study of Physics and of Mathematics, Drawing plays a foundational role in the theoretical corpus of studies of architecture [3]. Drawing has been finalized till nowadays to the representation and communication of the architecture, particularly in nineteenth century when this discipline reached its technical and expressive peak. Drawing thus emerges as privileged means for the construction of the project and the subsequent construction of the buildings, but also as an autonomous art that allows image processing, whose interest is independent from the represented object [4]. During the XIX century, like pictorial and sculptural works, architectural drawings are also shown on several occasions and prestigious venues such as the Annual Exhibition in Paris and the Royal Academy in London, clearly intended for the pure enjoyment of the general public, thus inaugurating a trend - not only operational - which will last until

the early twentieth century, to the point that sometimes the architectural drawing compete with the architecture itself [5]. There is thus a wide graphic production, supported by the methods of representation now known and understood not so much as a figurative expression of the design process or as a tool of interpretation of the designer intentions, but rather as exercise imitating the reality, which identifies in the relationship with the antique a preferential model to copy. Italian art and classical antiquity, active elements in the formation of the architect after the Renaissance, in the nineteenth century play an even more important role. And the journeys to Italy or, as in Anglo-Saxon most famous diction, the Grand Tours, until then reserved to a small *milieu* of privileged people - as guests of the *Academie de France* in Rome, or artists or architects as part of the *entourage* of a prince or a collector/connoisseur - become more affordable; to them it is due the copious graphical works of personalities such as Henri Labrouste, Pierre Martin Gauthier, Paul Marie Letarouilly, to name just a few of the protagonists. Their works, essential for the emergence of the modern Drawing disciplines, will greatly contribute to lay the foundations even of the idea of Survey, if we consider that the basics "… di una così notevole produzione sono da ricercare nello studio delle esperienze dei secoli precedenti, nel perfezionamento della strumentazione messa a punto nel '700 e nella codificazione della geometria descrittiva, mentre la produzione stessa è caratterizzata da un vivo interesse per la conoscenza e il restauro dell'architettura monumentale, dallo studio dei periodi storici esulanti da quello classico e da quello rinascimentale, nonché da un nuovo modo di concepire il rilievo, proprio di alcune grandi figure di rilevatori…" [6].
But certainly, among others, we want to emphasize the presence of three personalities that characterize this century for the use they make of the Drawing. Let's start with Jean-Nicolas-Louis Durand (1760-1834), author of two famous collections of buildings surveys published in Paris, the most famous of which is *Recueil et Paralléle des Edificies de Tout Genre, Anciens et Modernes* [7], where it is possible to find pictures of ancient and modern buildings represented in the same scale of reduction. But the importance of Durand lies in its contribution to the architectural design process, that he considers inseparable from the graphic-figurative substrate of the methods of representation, now encrypted. Professor at the *Ecole Polytechnique* from 1799 to 1821, in this prestigious academic institution he holds his *Leçons d'Architecture*, collected in two volumes. Durand articulates and develops its course both from the theoretical point of view - supporting the thesis of the disciplinar autonomy of the architecture - and from the practical point of view - with a research directed to the development of a code for the rational construction of the architectural design. He also prepares a methodical catalog of types because he thought that, to reach a good design, it will be useful the knowledge of *exempla* as well as the mastery of a method based on Geometry and Drawing [8]. The first volume of *Leçons* ends with a table (Fig. 1) that pragmatically illustrates the "Marche à suivre dans la composition d'un projet quelconque": starting from a pair of orthogonal axes, Durand get to the creation of a modular grid that plays the role of structural spatial warp, where the architectural elements are hierarchically ordered.

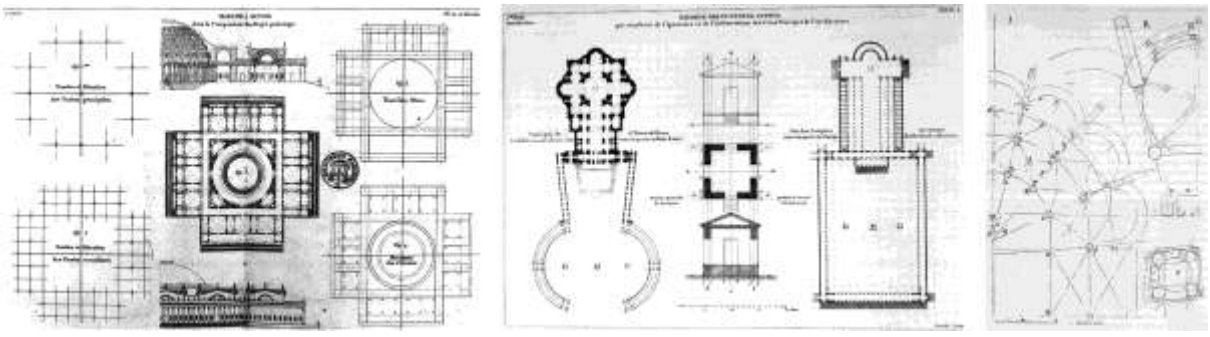


Fig. 1: J.-N.-L. Durand, *Marche à suivre dans la composition d'un projet quelconque,* from *Précis des leçons d'architecture*, Parigi 1813.
Fig. 2: J.-N.-L. Durand, *Exemple des funestes effets*, from *Précis des leçons d'architecture*, Parigi 1813.
Fig. 3: E. E. Viollet le Duc, Saint-Denis Survey, from *Dictonnaire raisonné dell'Architecture francaise du XI au XVI siecle*, Parigi 1854-1869, voce 'Trait'.

The mongian projections, which – through their tyrannical orthogonality – make measurable and executable the draft, in this cultural horizon play a decisive role, sublimated by the simultaneous presence on a single sheet. Compared to Boullée, although he considers this visionary architect his master, Durand prefer not to represent atmospheric effects or shadows in order to 'redeem' the inevitable bi-dimensionality linked to the Method of Monge, laconically rejecting the use of watercolor, preferred by those who believes that purpose of the architecture is to support the eye (Fig. 2).

Similar importance, but with different purposes and different cultural approaches, is ascribed to Drawing by Emmanuell Eugene Viollet-le-Duc (1814-1879), which will contribute greatly to convey different intellectual energies towards the birth of modern Handbooks [9].
It is through these words that Viollet-le-Duc, probably the most influential theorist of architecture of the nineteenth century, decrees the end of the eighteenth century and of Classicism. In the thought of Viollet-le-Duc, the Technique becomes the rational basis of each architecture. In the Gothic structure he sees a constructive principle that must be methodological paradigm of the future architecture, not determined by a taxonomy of external historicized forms, but internal and fundamental (Fig. 3).
In this regard, le-Duc writes in his *Entretiens sur l'Architecture* that the real art matter are symmetry and shape and each architecture is based on a principle first condition of structure [10]. Discussing the relationship between the parts and the whole into a building, he highlights a deep relationship between nature and architectural structure. And recognizing this romantic and organic feature of Viollet-Le-Duc, intrinsic in his interpretation of the Gothic, it is possible to explain his influence on the twentieth century Avant-Garde, on the Art Nouveau artists and architects, as well as on those of the Chicago School [11]. Keeping in mind these considerations, what is the contribution to Representation given by Viollet-le-Duc, whose graphic production plays a key role? In fact, his views will have the greatest impact on issues of Representation, as we have seen for the Design. And the Drawing will be placed as dialectic term between theory and practice in the definition of architecture. “L’idea di sottoporre l’arte e le pratiche dell’architettura a regole scientifiche della geometria e della matematica è un’aspirazione, con origini molto antiche, che prende sostanza nei nuovi insegnamenti che si vanno strutturando nelle scuole politecniche alla metà del Settecento” [12]. Le-Duc’s ideas will encourage this dialectic, which already found in the treaties the theoretical explanation, and will find in the handbooks the practice explication.
Precisely in the context of nineteenth-century handbooks authors, a leading figure is Jean Baptiste Rondelet (1743-1829). His Traité *théorique et pratique de l'art de bâtir* [13] is, despite the programmatic statement of intent, a handbook since not only implements an architectural theory through case studies, but also because it refers explicitly to Monge *Géométrie Descriptive*. This handbook, structured as a precise and scientifically informed 'breviary' of building technology, addresses both eminently practical questions - such as the organization of building site, the estimation of artifacts, the durability of the materials, etc.. -, discussed on the basis of tectonic exempla drawn from the past and from current events, but turns its attention also to the architectural Representation, so that construction problems will find their solution not only in the building site but on the designer drawing board, by virtue of graphic-geometric procedures (orthogonal projections) that can guarantee a faithful and rigorous two-dimensional representation of three-dimensional objects [14]. In particular, the third book of his *Traité* deals with Descriptive Geometry applications, organized as a classical text of this subject: after an initial part set to the teaching of plane curves tracing, Rondelet follows up a chapter - entitled *Tracé des épures* -, where the projections and the development of solids, contextually to problems of determination of true shape of figures and amplitude of angles, find solution in easy and understandable way, with the aid of clear construction drawings (Figs. 4-5). Rondelet accepts the concept of projection, proposing an effective analogy between the orthogonal projections and the shadow that solids (to be represented) projecting, if exposed to sunlight, on a plane perpendicular to the rays.

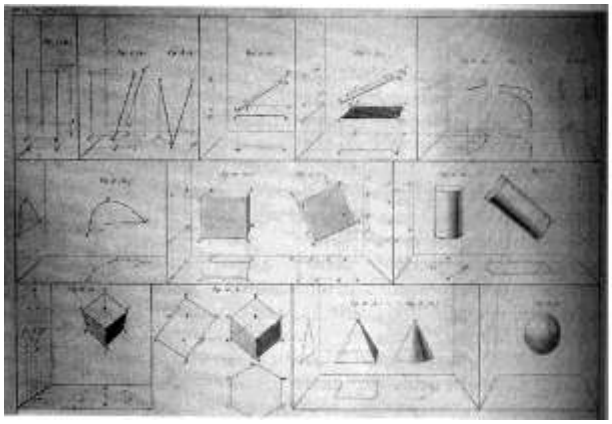


Fig. 4: J. B. Rondelet, Projections of solids, tab. 24, from *Traité théorique et pratique de l’art de bâtir*, Paris 1802.

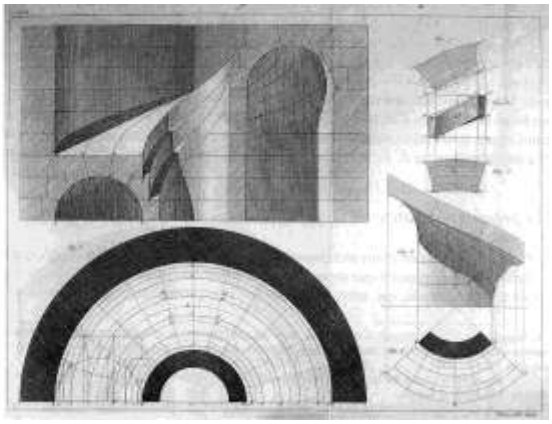


Fig. 5: J. B. Rondelet, *Vis de Saint-Gilles*, tab. 62, from *Traité théorique et pratique de l’art de bâtir*, Paris 1802.

However, if on the one hand the strict codification of Monge Method shows how the question about Representation is following principles strictly functional and educational, on the other hand Perspective - even if Poncelet will codifies and systematizes its projective origin - occurs in nineteenth-century thought with considerations on the physiological and psychological act of seeing, considerations that introduce significant elements of discussion in the cultural debate of the time, with non-negligible impact on attempts to make the drawn image more consonant with the structure of the eye.
In this cultural period Giuseppe Jappelli (1783-1852) operates: the Venetian architect greatly contributed to 'redraw' the configuration of Padua [15]. His large graphic production consists of 375 specimens (cartographic drawings, gardens designs, palaces, public buildings, monuments, landscape interventions, building details and even furniture), all stored within the same *dossier* in the *Gabinetto Disegno e Stampe del Museo d'Arte* of Padua [16]. This extensive collection unequivocally demonstrates the long career of the Venetian architect and, although most of the projects never found effective realization [17], embodies an ambitious idea, as general as homogeneous, which could deeply has changed the aspect of the city. To fully understand the nature of these drawings is necessary to turn our gaze to his training period, linked to Napoleonic French culture. Although subjected to an approximate analysis, it is not surprising that almost all of Jappelli's drawings have been performed using the Mongean Method, as we can guess from faint traces of construction lines that link two 'images' of the same architectural, civil or mechanical, subject (Fig. 6); and even when, for practical reasons, some representations of a subject are on separate tables, construction lines retain their connection (Fig. 7): Jappelli then joined with enthusiasm to the new method, proving to be well ahead of the Italian academic circles; in fact, although the orthogonal projection immediately find fertile ground in the Germanic professional culture, Italy will adhere much later - probably for political reasons, as in case of England. This is demonstrated by the fact that the first real contribution on this subject comes only in 1868 with the publication of Giusto Bellavitis (1803-1880) - Professor Emeritus of the University of Padua - titled *Lezioni di Geometria Descrittiva* [18]. In spite of in Italy Descriptive Geometry has not found a ready acknowledgment in scientific circles, Jappelli, who unlike his colleagues comes to the profession of architect after receiving a less academic and more practical training, recognizes the revolutionary impact method of representation introduced by French officers, with whom he has certainly the opportunity to confront during his stay in Lombardia. Jappelli's design drawings reveal a close correspondence between plans, elevations and sections, highlighting how he caught perfectly the convenience of representing through figures that lie on a single plane, on which among other things can solve some problems of space - such as finding the intersection of the surfaces in the genesis of the geometric vaults - using rigorous constructions such as to allow the passage from reality, or from the idea, to its precise two-dimensional representation and vice versa.
Yet, it is ironic to think that for an installation project on to the Palazzo della Ragione, did not remain any graphical trace, if not an interpretation made by Maina which, as we shall see, adopts without hesitation the graphic tradition of Perspective.

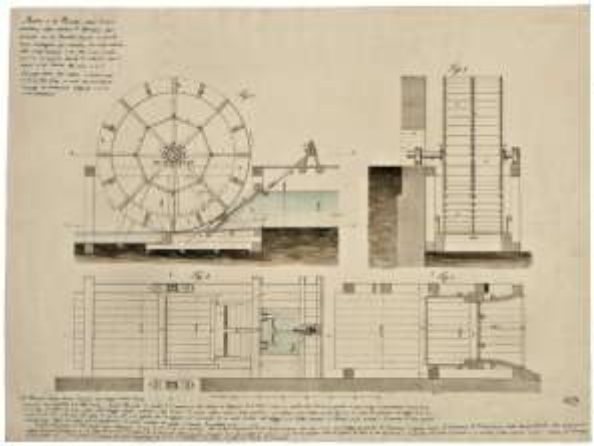


Fig. 6: G. Jappelli, Poncelet's Wheel, MCPd, Gabinetto disegni e stampe, Padua Museo d'Arte, inv. 1479.

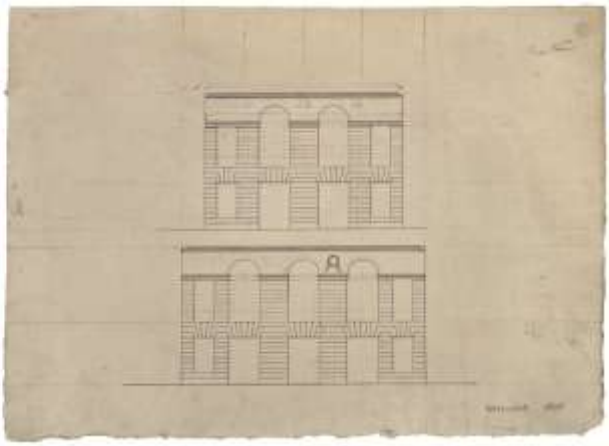
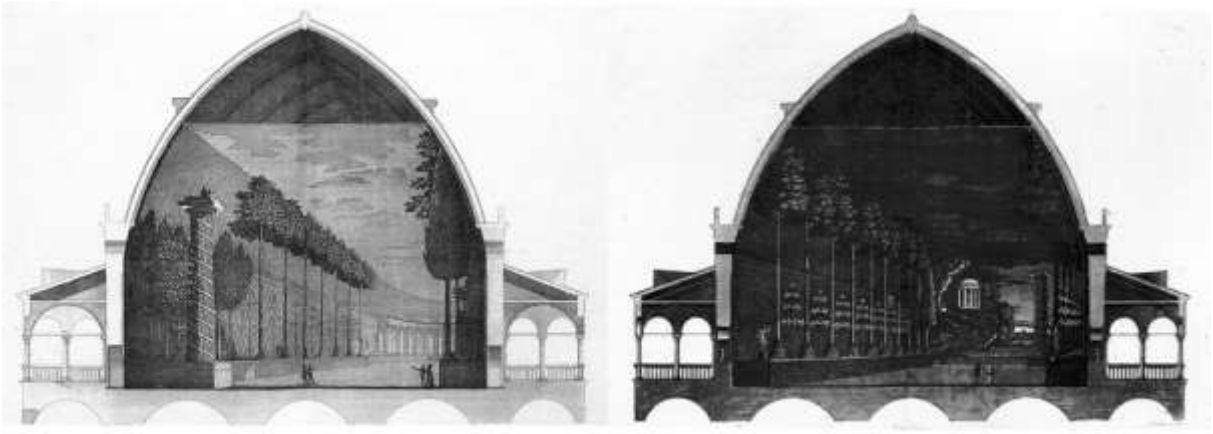


Fig. 7: G. Jappelli, *Caffè Pedrocchi*, MCPd, Gabinetto disegni e stampe *Padua Museo d'Arte, inv. 154*02.

1.2 Jappelli and the informal garden: an illusionistic set in Padova (C. Monteleone)

It was 1815 when, for the visit of Emperor Franz I, the "builder of romantic gardens" [19] Giuseppe Jappelli introduced, first in the cultural landscape of his region, the so-called informal garden, setting, inside the huge hall of *Palazzo della Ragione* in Padua, a mixture of optical illusion and reality, combining painting with physical elements such as: hedges and shrubs, rocks and fountains, colonnades and temples [20]. This particular episode helps to correctly position in the European scene

the multi-faceted personality of our Venitian engineer-architect, which took advance – we can assume – of the diplomatic opportunity to relate his illusionistic garden to the dispute over the paternity about the origin of the landscape garden, started in Padua, in the late eighteenth century, by some prominent members of the Italian culture. In these discussions, for example, Pindemonte defended the italian birthright of the “English” garden [21], because in the *Gerusalemme liberata*, describing the one belonged to Armida, Torquato Tasso had described it using these words: “E quel, che’l bello e’l caro accresce a l’opre, L’arte che tutto fa, nulla si scopre” [22].



Figs. 8-9: Illusionistic informal garden: view of the spiral column and view of the circular temple. Design by. G. Jappelli, engravings by G. Maina.

Two engravings (Figs. 8-9), performed by Maina for the important historical event, show that Jappelli proposed a romantic garden, on the one hand, leaving the rigid geometric “French” organization, which was widely used in the previous two centuries, and on the other, maintaining the close relationship between artifice and nature, vision and deception, typical of the same tradition, as evidenced by the chronicles of the time: “[…] Con notturno spettacolo, tramutando in giardino la nostra gran Sala della Ragione. Ascendere scale, entrare una stanza, e vedervi una notte d’inverno bosco, viali, prati, acque correnti, ponti, grotte, colline, diverse fabbriche di ornamento; e gli effetti gradevoli della luce usata con pittoresco artificio, incoronata dalle fronde, riflettuta dai zampilli della fontana, […] parve un racconto arabo diventato realtà; e durò appunto, come uno di que’ fantastici racconti, una notte” [23]. The design of this informal garden cannot be solely attributed to the desire of adhering to the changing taste of his time; especially if we keep in mind the cultural training of Jappelli, it is necessary to consider not only some political implications, but also the creation of a skillful interplay between nature and engineering artifice, designed to visually impress and deceive the observer. The Venetian engineer-architect began his career in 1803 as an expert surveyor, falling back on this profession after attending only for one year the Clementine Academy in Bologna, to become an architect, according to the usual path [24].

At first he worked with cartographers and experienced technicians [25] until, forced by the changed political circumstances, he joined the *Armée d'Italie* [26], in particular, it was this last experience to generate his substantial professional advancement [27], following the French armed forces, who at that time conveyed the latest scientific knowledge, developed at the *École Polytechnique* in Paris. This cultural debt is confirmed by his unconditional adoption of the Mongean Method as best tool suited to the representation of architecture and engineering machines, as well as by his use of the Durand’s Module as foundation design for the plans of buildings [28]. It could be argued, therefore, that the establishment of a illusionistic informal garden have played for Jappelli a political role, embodying “social freedom” in a “free-garden” and coming into conflict with the formalistic design, symbol of the nobility of France [29]. By the way it is interesting to note this kind of free compositions could be found also considering the European engineering tradition, in particular the one developed during the early seventeenth century by the figure of Salomon De Caus.

It is above all the 'cave', one of the most characteristic elements of the informal garden, that clarifies the link between Jappelli and European engineering tradition, linked to the perceptual deception, carried out using mechanical artifices, masked by natural elements. For example, the *Grote of Orfee* (Fig. 10), depicted in the De Caus’ treatise, entitled *Les Raisons des forces mouvantes* (Paris 1624), welcomes the mythological figure of Orpheus, moved by hydden machines and placed inside an apparently natural cave, but in reality created by placing the appropriate artificial material; in the same way during 1817, only two years after the "stage" set for *Palazzo della Ragione* in Padua, Jappelli designed and built *ab ovo* – still emulating nature – for Andrea Cittadella Vigodarzere’s garden in Saonara (Fig. 11), a cave within which a stream of water made its way among artificial stalactites and

stalagmites, surrounding the giant statue of the hermaphrodite idol Baffolometto [30].
In conclusion, the garden built in Padua for the visit of the Emperor Franz I, falls, though conveyed in the romantic context of the beginning of the nineteenth-century, in the sphere of the "illusionistic scenes", optically constructed to deceive an observer, as it will be shown in the subsequent analyzes.



Fig. 10: *Grote of Orfe*. Salomon De Caus, Les Raisons des forces mouvantes, Paris 1624.



Fig. 11: G. Jappelli Cave of the Cittadella Vigodarzere's garden in Saonara, 1817.

1.3 Two engravings (I. Friso)

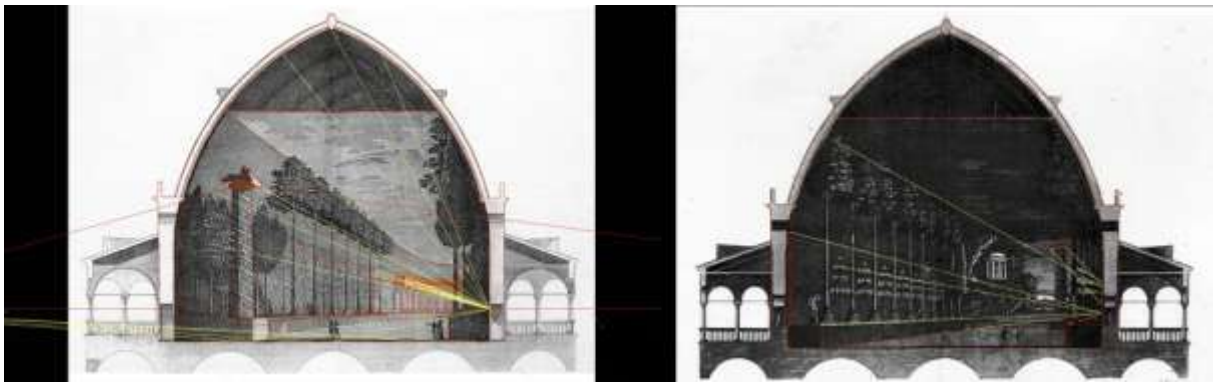
According to what has been emphasized till now this kind of practice of combining painted scenes with solid objects, that mislead the observer, was developped during the XVII century. One of the most important example of this practice is the Refectory of Trinità dei Monti by Andrea Pozzo in Rome (Fig. 12), where the autor artificially juxtaposed some architectural elements, that appear as drawings, with painted scenes that allude to real spaces, deceiving the view of the observer.



Fig. 12: A. Pozzo. Refectory of Trinità dei Monti. Fresco, Rome 1694.

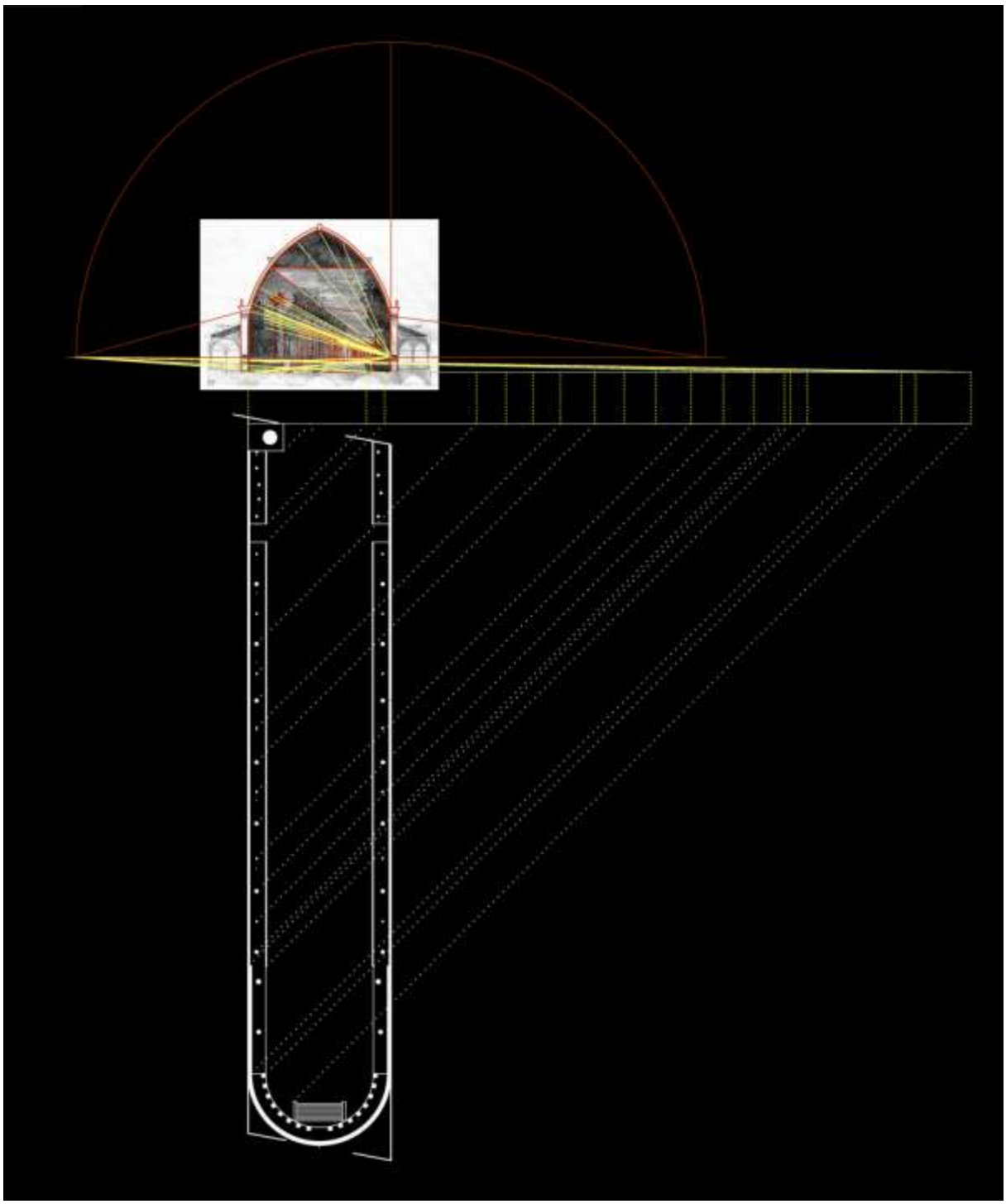
Giuseppe Jappelli turns to this tradition when prepares a scenography for the great party inside the hall of Palazzo della Ragione, so that this big hall will look like a night garden, as the same Jappelli would have liked.
The installation of the architect – who was one of the most important figure in the artistic and architectonic *milieu* of Padua, at that time –, proposes to transform the main room of the palace into an English Garden [31], using some scenographic expedients already tested in theatrical scenery.
The project provides a theatrical *mise en scène* in which the role reversal becomes the focus of the night: reaching the fixed place, the Emperor and his entourage leave the role of passive spectators,

assuming the one of unaware protagonists of the spectacle [32].
There are so many books where we can find some descriptions of this important event, and in their pages we can also find a lot of documents who talk about Jappelli's installation [33] attesting its realization, but unfortunately it isn't possible to find any original drawings by him which show the project's development: G. Maina realizes the only two copperplate engravings in the 1816 that represent two perspective cross sections of the huge room inside Palazzo della Ragione, using a perspective with a vertical pictorial plane. The Municipality of Padua gave to Jappelli these engravings as a sign of esteem and gratitude for the important work that he made.
Through the study of these engravings we are able to begin the activity of graphic representation of Jappelli's project. The first one (Fig. 8) shows a column decorated with bas reliefs ascending upward along an helix, relating Cesar's triumph: this kind of columns refers to the most famous Trajan's Column which is often used in representation in a similar way, assuming the meaning of glory and fame.
The great tree-lined avenue with the urban furniture and the public lighting seems to break off, leaving a wide space to an hemicycle building with its Corinthian columns and a decorated trabeation; furthermore a fountain and a Faun are in the scene. All the elements are developed along the perimeter of the hall and stand over a basement as tall as a man [34].
Instead the second engraving (Fig. 9) represents the counter-shot of the first one and alludes to a perspective breakthrough of the scene, bringing out the natural elements from the background which refer to the landscape of the Euganei's hills. We can admire e little ionic temple – the place intended to the emperor –, the Brenta's sources and a far wood bridge that marks the western boundary of the deep promenade.
We were able to apply the reverse perspective process [35] only for the first of the two engravings in which it is possible to locate the correct inner orientation, identifying exactly the projection of the observer into the pictorial plane, his distance from it, the horizon and the ground line (fig. 13).



Figs. 13-14: Illusionistic informal garden: view of the spiral column and view of the circular temple. Design by. G. Jappelli, engravings by G. Maina.

Not by chance, applying the same process to the counter-shot (Fig. 14), we can observe that the perspective doesn't lose its coherence, despite it was built basing on an wrong perspective procedure: as we know, in a vertical pictorial plane the main point (V_0 in our case) is the vanishing point of all the straight, orthogonal lines to the plane; considering this second Maina's perspective, only the straight lines that locate the architecture of basement of the hall of the building, satisfy this condition, because all the others don't converge in that point. Therefore, not being able to identify exactly the position of V_0 into the pictorial plane and having no other elements to identify other more vanishing point, it was impossible to obtain the inner perspective reference of the image and so that we were not able to obtain the formal and dimensional information about the architectures inside this scene. In particular it was impossible to specify the exact location of the temple that was intended to the Emperor.
Back to the restitution of the first image, maybe the engraver would have represented a landscape much deeper than the one that the hall of Palazzo della Ragione could contain, although relying on cartographic material and historical documents. In fact the cross section of the building –opportunely reproduced in the scale of representation – corresponds exactly to the one that is on the architectural survey, both in form and in size. First of all we have to recognize correctly the inner perspective reference system and then we can apply the reverse homology giving back the exact planimetric conformation of the space. If we place it on the hall's plan of the current survey we could reveal a deepness of about half more in reference to the one that is measured (Fig. 15), these kind of formal inconsistencies could be better visualized by a comparison between virtual models instead of a planimetric view.

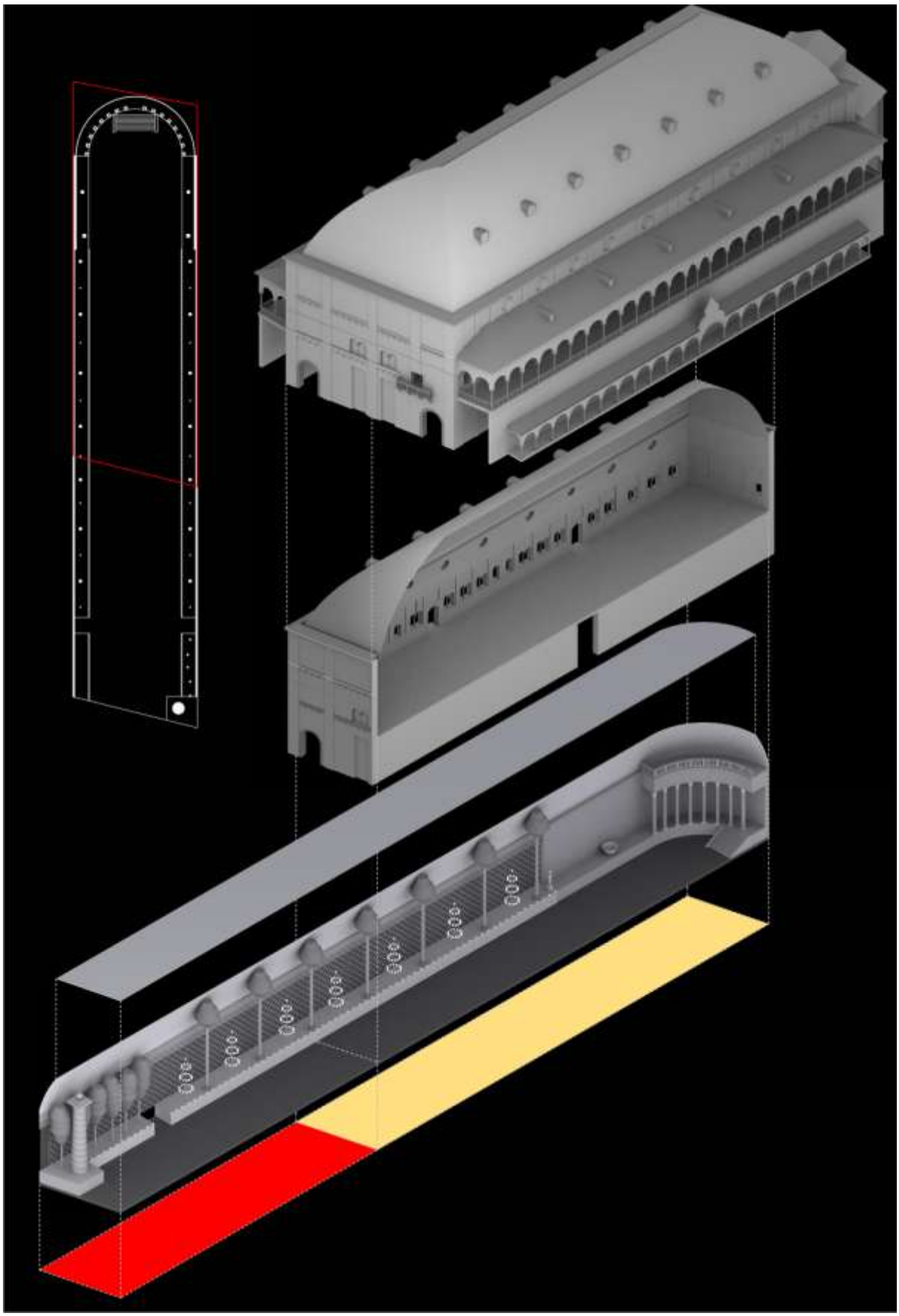


Figs. 15: Prospectic restitution. Drawings by T. Fietta and L. Viel.

1.4 The Model (M. Pedron)

The construction of a 3D model can follow different processes that depend on the object that have to be virtually represented. In architecture these objects are usually buildings, but frequently we have to work with different subjects or unusual situations. Furthermore the architectonical subjects are entity located in time that require a diversification of the three-dimensional modeling to visualize transformations.

Working with an existing building, if the aim is to create its 3D model in the actual shape, there are several technologically advanced instruments: metric survey and point cloud data that add to an architectonical model more rigor and less complications. On the other hand, the reconstruction of a specific historical landmark or the rebuilt of a precise outfitting, like our scenic sets, is essential to have visual information and analytical data (historical documents, primary and secondary sources, digital cartography). These sources are important to define the features of the architectural objects analyzed in a specific historical moment.



Figs. 16: The two overlapped 3d models. Drawings by T. Fietta and L. Viel.

In our study case, we tried to virtually rebuilt the set designed by Jappelli in 1815. The available information are a couple of images by Maina engraved the year after the installation and gifted to Jappelli to thank him for the success of his design. The reverse projective rules, applied to these perspective images, permitted to establish the successive three-dimensional model. Through this technique of reverse perspective it is possible to link what is represented on the engravings with our final product: the virtual model. The first and most important output we obtained from this process is the map of the main hall of Palazzo della Ragione (Fig 15). All the elements are proportioned to each other but they were not scaled with the real space. In other words, we need a reference system to define the orientation and scale of the map. To convert these geometrical data in spatial ones we used the width of the main hall. The historical documents show that this size of the hall have not changed during centuries: its only transformation was the removal of all the inside partition walls and the restore of a unique space. This statement is useful because we could use the width of this huge rectangular room as a continuity element through the centuries [36].
The part of the building we could use for this purpose is the height of the main room, that has not changed during time: the last restoration dates back to 1756. During years the entire roof was rebuilt due to a violent tornado. After the operation of scaling, it is possible to underline that the result of the reverse perspective shows an incongruity. The hall has a bigger length than its real size. We can suppose that this overstatement was a choice of the author to emphasize the depth of the space in the engravings.
Using this map as a starting point, we worked dividing the modeling procedure between architectonical objects and artistic ones. This division was necessary because the three-dimensional modeling required different rules for each case. Indeed the architectonical objects, for instance the big Corinthian column or the semi cycle, can be easily redrawn using also the classic ratio of architectonical rules. Conversely, the artistic elements like trees, bushes and lampposts had to be modelled using only the information of the two engravings, because they were specific and typical of the scenic set. We streamlined the free-forms and removed all the details that were not essential. This way we reduced the modeling procedure: trees and bushes don't require a perfect modeling, it is sufficient to create shapes that represent generically the space they occupied. Specifically, these elements were drawn as rotation surfaces [37], later repeated in sequence (Fig. 16).
Comparing the two 3D models it emerges a big difference between them. The size of the model obtained by the engravings is longer than the one created considering the real dimentions of this huge space. Therefore the three-dimensional model helps the visualization of these differences, highlighting how useful could be the use of Projective Geometry rules to compare real space and designed one. Furthermore, these technologically advanced tools confirmed their utility for visualization of historical transformation of architecture and cultural heritage.

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Semantic 3D models: surveying and drawing the virtual city

Maurizio UNALI
Department of Architecture, Faculty of Architecture, University "G. d'Annunzio" of Chieti-Pescara, Pescara, Italy
E-mail: m.unali@mclink.net

Abstract
The themes examined in this essay are situated at the barycentre between the surveying and drawing of the contemporary virtual city. The text presents a selection of experiments with a particular form of representation – the so-called "semantic 3D model" – that, above all for didactic purposes, would seem to represent an important medium for the expansion of knowledge, the discretization of heuristic processes, for triggering hybrids of dialectic couples and exercising the imagination; actions propaedeutic to the representation of cyberspace in all of its various declinations.
As a conceptual form of drawing it consents the elaboration of ideas through visual expression structured similar to a map-manifesto-index, with a strong identity and open to successive developments aimed at the creation of inhabitable online sensible environments.
The model of representation described in the text was developed as part of a educational project examining the aesthetic-spatial characteristics that shape the architecture of Virtual Worlds, elaborated through visual-conceptual syntheses derived from interdisciplinary processes of hybridisation. The principal objective of this type of drawing is not to expose an a priori form, but instead to test, in a unique sphere of operation, the "substances" identified for each project: selected references; preceding ideas; possible forms; consequent results based on a logic of forecasting. Not a predefined form-project, but instead "fluid objects" to be selected by our intellect from consequential series of coherent transformations triggered by the process of representation.

Keywords: Virtual City – Semantic models – Drawing – Hybridisation – Cyberspace

1. Semantic 3D models for the architecture of the virtual city
This text summarises the latest results of the study of a particular from of representation, defined here as the "semantic 3D model". This model was tested and investigated within the broader study of the *Architecture of the Virtual City* (cf. www.lineamenta.it).
The research (still underway) experiments with visual elaborations produced using mixed media, for the most part digital, situated at the barycentre between the surveying and drawing of the contemporary virtual city: conceptual drawings that consent the explanation and communication of ideas through visual expression, structured as a map-manifesto-index, strongly imprinted by identity, and open to successive developments focused on the creation of inhabitable online sensible environments; drawing as an interactive model and result of a specific plan for the thematic organisation of information, that conserves forms and proposes an archive of sub-models to be examined; representations that practice "semantic crossmediality", experimenting with the technocultural convergence of various fields – educational, educational, information and entertainment – available online in diverse formats and techniques.
It is becoming clearer that these semantic models serve as representations of the particular moment that anticipates and prefigures design; conceptual models as an instrument for understanding and verifying existing architecture, rather than prefigurations for new designs; representations useful to the visualisation of parts of the infinite quantities of information we bear and transmit; laboratories in which to recompose fragments of space, create relations between parts, study geometric characteristics and quantify groups of thematic elements; to visualise, personally and for others, the ideas we conserve in

our memory; images in which to elaborate that magmatic and sublime aesthetic chaos from which to discretize forms; graphic exercises that can be structured as methods for understanding, transmitting and elaborating cultural processes, ideas and forms; organisms similar to a “matryoshka” to be discovered.
Representations that, above all at a didactic level, appear to be a significant medium for broadening knowledge, reading the richness of historical stratifications, metabolising the conceptual and visual references of design, discretizing forms and exercising the imagination, unconditioned by the “myth of originality”; fundamental elements for prefiguring inhabitable architectural spaces in the digital realm, in all of its multiple declensions.
In particular, as anticipated, the model of representation referred to here has been developed above all through didactic experiences (at different levels of university education), pursuing the general objective of studying the aesthetic-spatial characteristics that shape the architecture of Virtual Worlds (cf. www.lineamenta.it/avc).
This study was developed primarily through visual-conceptual syntheses derived from interdisciplinary processes of hybridisation.
The principal objective of this type of drawing is not the depiction of an aprioristic form, but instead that of identifying and experimenting, in a single sphere of elaboration, with the creative “substances” useful to shaping the virtual city itself: selected references; preceding ideas; its possible forms; the consequent results according a logic of prediction.
This representative strategy is founded on the continuous comparison between the idea and its representation.
Not a closed and predefined design-form, but “fluid spatial objects” that our intellect selects from a consequential series of coherent transformations triggered by the process itself.
Semantic models as instruments of critical research that trigger relational processes; free (re)stagings of “things observed” that generate references to other works in turn transformed by this process of hybridisation; scenographies of ideas in which meanings must be interpreted; ideal and utopian drawings depicting atmospheres characterised by various aesthetics; spaces for experimenting with techniques and methods of visualisation, deformations, chromatic tonings.
This elaborative process originates in the hypothesis that all phenomena can be represented, and thus elaborated and communicated using shared disciplinary methods and techniques. What is more it is founded on the theoretical premise – a cornerstone of our studies of the *Architecture of the Virtual City* – that “inhabiting digital space signifies representing”, emphasising the central role of drawing (in the sense of “New Lineamenta”) in giving form to cyberspace (the design of the interface, the spatialisation of information, the conceptual map, etc.), in its multiple declensions.
Within this process of configuring spatial conditions, representation is the most natural and universal dimension of elaboration.
In primis as a multidisciplinary, synthetic and direct language, an expression that is simultaneously historical, theoretical and practical.
In other terms, the meta-linguistic coincidence between visual forms (drawing) and architectural forms (ideal, utopian, metaphorical or real as the case may be), practiced and transmitted through the graphic sign (iconic, symbolic, allegorical, etc.), makes representation the natural tool for the elaboration of digital space: for its unfolding in forms, intentions, actions and times; for aesthetic experiments and multidisciplinary processes of hybridisation.
Let us further examine this last aspect.
If we consider that the most interesting manifestations of contemporary creativity appear to be the result of a convergence between rapidly changing disciplines – in some cases shedding the traditional confines of specialisation – then it can be stated that an interdisciplinary approach will play a fundamental role in the creation of the virtual city, in research and didactics alike.
One of the most interesting conformations of contemporary architectural space appears in fact to be the product of a conscious and simultaneously instinctive intellectual action of multidisciplinary hybridisation involving “dialectic combinations”.
We can consider, for example, the following dialectic couples: original and copy, known and unknown, possible and impossible, real and virtual, centre and periphery, analog and digital, archaic and contemporary. Dialectic couples that, in our liquid contemporary culture may be integrated and comprehend one another, giving rise to new representations.
This fundamental structuring of the research is of a cultural order; it helps trigger open elaborative processes in which to represent spaces in the midst of apparently antithetical meanings.
In particular, in the best elaborations of inhabitable online environments – shaped, architecturally, by the idea of “cities of bits”, “information highways”, virtual worlds and social networks – the creativity of the spaces proposed appears to be nurtured by an awareness of the stratified and articulated history of architectural space and, at the same time, by the value ascribed to forms and messages we perceive in the rapid and fluctuating action of contemporary technoculture, by its very nature shifting, chameleon-like, super-fast, interactive and crossmedial; in a commonly accepted term, “liquid”.



Fig. 1: Examples of 3D semantic models developed by students as part of the course in *Scienza della Rappresentazione 3*, Pescara Faculty of Architecture, 2011-2012, prof M. Unali (specialist G. Caffio).
Cf. http://www.lineamenta.it/avc/category/semantic3dmodelsurvey

Within this theoretical context representation does not always constitute a “flight from reality”, but in some cases an improvement: from this point of view for architecture the notion of the virtual means above all “broadening vision”.
This produces an “ulterior substance” of design that may serve as an input to the action of modification and its concrete outcome. The latter is not always possible to distinguish from the former.
As observed, contemporary architecture appears to renew its cyclic need for interdisciplinary; it seems to elaborate theory and practice directly through a process of hybridisation with “the other”, producing representations often generated by intrusions and procedural deviations along critical-technical lines of reasoning, and as part of operative practices and the observation of reality.
Finally, the semantic 3D models being analysed may express concepts that develop and reinvent theories and practices treated by the historical traditions of architectural drawing (testifying to a contemporary declension), actualising them with respect to the interactive visualisations introduced by current technoculture.
Examples that come to mind within the furrow of the historic tradition of representation include: the notion of “interior design and exterior design”; the drawings of ideal, utopian and radical projects; the phenomenon of paper architecture; the “morphemes” designed by Franco Purini.
As anticipated in the premise, this study of “semantic 3D models for the architecture of the virtual city” is an experiment (still underway) that mixes research with teaching, and wishes to broaden and further investigate methods and techniques of visual elaboration, prevalently digital, positioned at the barycentre between surveying and designing contemporary online inhabitable spaces: spatial conformations for inhabiting digital space as a free container of experimentation and information.

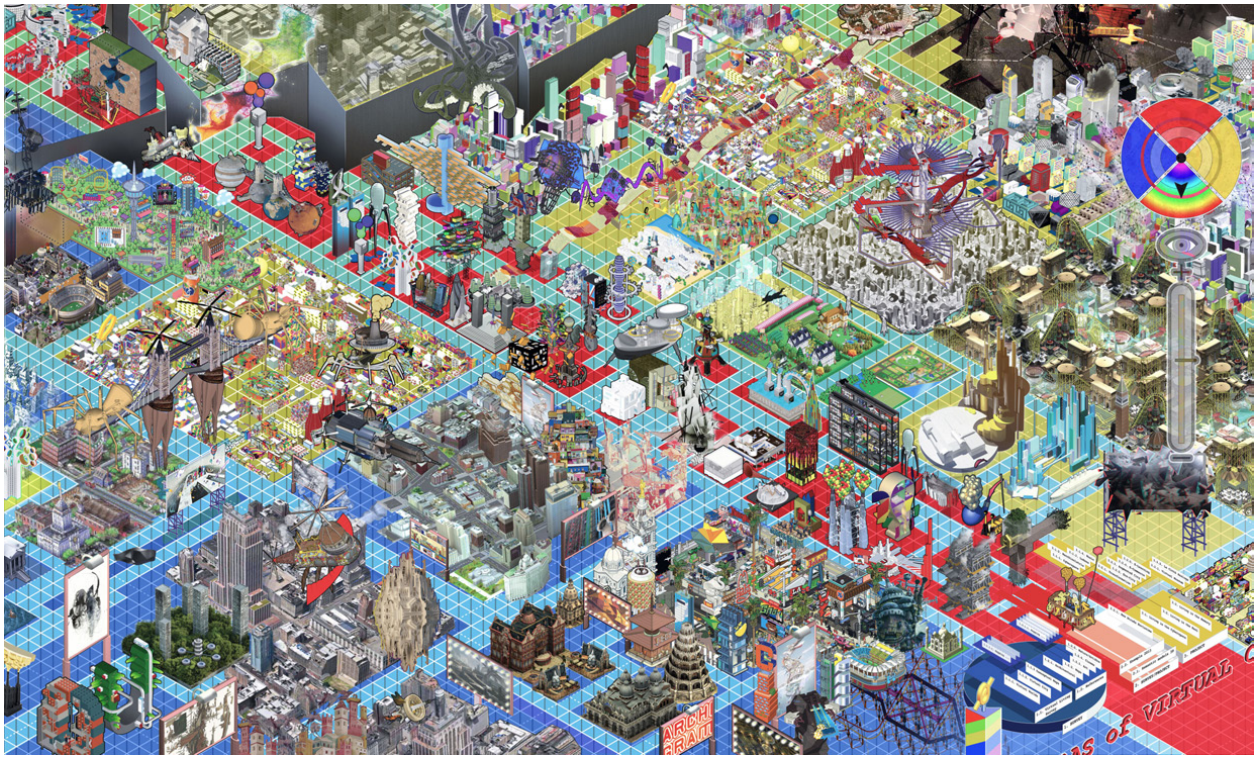
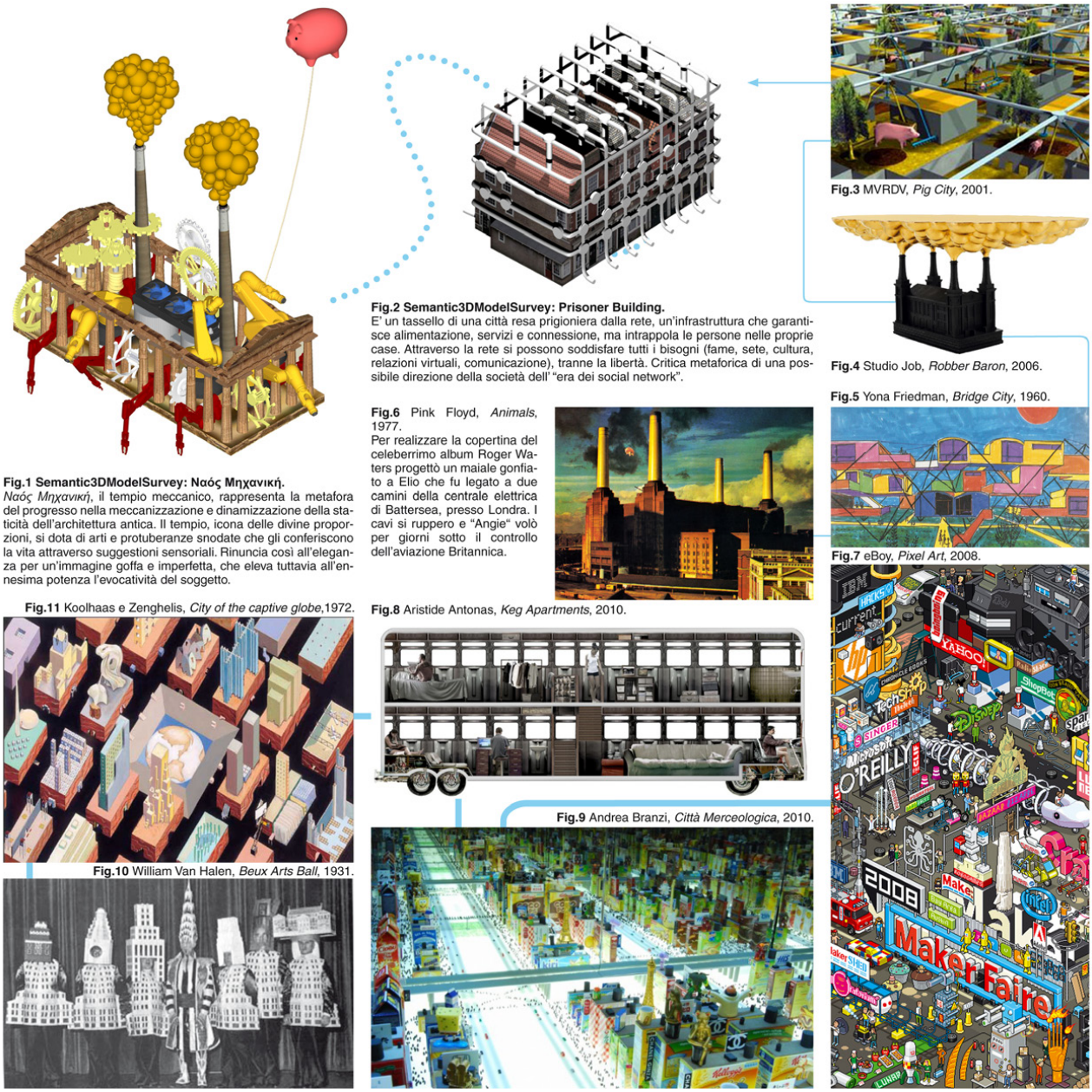


Fig. 2: Examples of 3D semantic models – developed by students as part of the course in *Scienza della Rappresentazione 3*, Pescara Faculty of Architecture, 2011-2012, prof M. Unali (specialist G. Caffio) – as part of the composition of the *Atlas of Virtual City* rel. 2013.
Images (part.) conceived by M. Unali with G. Caffio and A. Basso. Cf. http://www.lineamenta.it/avc





Figs. 3 & 4: Example of a project for the virtual city as the output of an elaborative process triggered by semantic 3D models developed as part of the course in *Scienza della Rappresentazione 3*, Pescara Faculty of Architecture, 2011-2012, prof M. Unali (specialist G. Caffio), students: Elita D'Onghia and Paolo Fagliarone.
From top to bottom: two semantic 3D models, with their principal conceptual and visual references; an island in the virtual city.
Cf. www.lineamenta.it/avc

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THE FUNCTIONAL NODE OF TRADITIONAL HOUSE IN KOSOVO

Flamur DOLI [1], **Jetik DOLI** [2]
(1) Department of Architecture, Faculty of Civil Engineering and Architecture, University of Prishtina, Prishtina, Republic of Kosovo
E-mail: flamur_doli@hotmail.com
(2) E-mail: jetik.doli@hotmail.com

Abstract:
The traditional medieval house of Kosovo, almost always in its functional and architectural structuring of the guest room and other rooms, even in the more modest homes of the time, implied a functional node. The functional node inside the room, with its complex architectural features, appears as a peculiar and distinctive feature of traditional Balkan architecture. The functional node, with its architectural features framed by a functional scheme - uniquely stereotyped, reflects a high traditional residential culture. In terms of architectural and functional disposition of the functional node, the earthen furnace with elements of faience appears as a central element. The stove, as the central element of the functional node is connected with other areas of the house into a functional whole, realized by a stereotyped scheme. Increasingly, the central element - furnace is placed at the entrance of the room, and functionally interconnected with the room - the main part of it, then with the bath and small alcove or fireplace. Igniting the fire inside the earthen furnace is always done from the outside of the room, i.e. from a separate alcove, of smaller dimensions, or the fireplace. In the traditional home of Kosovo the functional concept is not just a functional scheme, but is also a concept of compositional architectural structuring of these spaces and their functional elements. This means namely that the functional concept of architectural configuration merges with the functional concept into an organic whole. So, all of this has to do with a high degree of creativity of the Albanian popular craftsman who created top and unrepeatable values of various genres. In this context, traditional home of Kosovo after a multi century development has reached an organic harmony between function, structure and form. Given the fact that the functional node is found in certain typology homes, inevitable in this study, according to the analytical method, we will elaborate typology and architectural values of Kosovo traditional house, built over the centuries.

Keywords: traditional house, functional node, earthen furnace, functional concept, shaping concept.

Introduction
The earthen furnace in traditional residential culture was wide spread. From the literature we know, that the earthen furnaces in Europe appear from the 13th century. The oldest data of its appearance were presented in a coat of arms of Zurich, from the middle of the 14th century. In these appearances, according to R.M. Franz, Der KACHELOFEN, Graz 1969, a square based bottom is clearly distinguished with an upper cylindrical dome part, on the top of which is placed an element in a baked form with respective configuration. In this view of the stove faience elements are depicted, the order of which reminds us of the earth stoves built in traditional homes in Kosovo, as in Fig.23. Earthen furnaces in traditional homes in Kosovo stand for another harmony between proportions and outline. Earthen furnaces in traditional homes in Kosovo, in the final stage of the development process, in a broader forming and functional context gained designed characteristic features. Earthen furnaces as an important element of the interior, as we can see from the floor plans presented in this study strongly influenced the concept of home interior architectural structuring. The earthen furnace in all the traditional homes of Kosovo is heated by another alcove. There is evidence that, igniting the stove

from the outside, i.e., from a special alcove has occurred in the seventeenth century, the same century when a number of room baths (hamamjiks) were built. As we see from Fig.19, the old town house of Prizren, built in the 18th century, had four hamamjiks on the first floor, with two others on the ground floor. Construction of baths (hamamjiks) in the house, and later in each room, raised the residential culture to a new high level. In general, by the half of the 17th century, the number of hamamjiks built in the house was enormous. "In the 17th century, Prizren as one of the most important Balkan cities had over 10.000 homes. River Lumbardh with rich waters and Prizren's convenient configuration enabled the neighborhoods to build a network of channels with running water, which passed through the yards of every house" [1].

Architectural concept of functional node

We said that in the context of architectural and functional disposition of the functional node, the earthen oven with elements of faience appears as a central element. The stove, as the central element of the functional node is connected with other areas of the house in a functional entirety, performed according to a stereotyped scheme, as presented in Fig.1. So, in Fig.1, is shown a general diagram of earthen furnace's overall functional connections with other units that made up the functional node. This scheme, in concept and in its composition hardly changes. It, however, appears in different variations, depending on the position of earthen furnace in the context of the functional availability of the room within the floor layout. The functional node in all floor plans presented in this study is marked with a circle, in the center of which is the central element – earthen furnace. As we see from Fig.1, and other plans related and presented in this study, the entirety of the functional node consists of alcoves from (1) to (7). These alcoves, which will be discussed later, are structured, i.e. functionally related between them under the general stereotyped diagram shown in Fig.1. The entirety of the functional node consists of the following elements: 1. Earthen oven with elements of faience; 2. Introductory part of the room; 3. Main part of the room; 4. hamamjik; 5. Copper water cauldron; 6. Small alcove; 7. Corridor, or garret (d); 8. Earthen furnace ignition space; 9. Cupboard; 10. Fireplace; 11. Fireplace and chimney constructed in rich homes, guest rooms, or in the hallway (Fig. 8, Fig.16, and Fig.17)

A. Floor plans of homes listed in: Fig.2, Fig.3, Fig.10, Fig.15, Fig.19, Fig.22, Fig.26, Fig.33, and Fig.34, show that in the earth stove (1), turning on the fire is made from a small alcove space (6). This alcove, as we see from the figures, is connected directly to a relevant floor corridor. Starting the fire in the earthen furnace is made through a notch (8), open in the corresponding wall, to which the bottom cubic wall of the earthen furnace is scrambled. Usually from the same small alcove two earthen furnaces are lit.

B. from Fig.6, Fig.7, Fig.8, Fig.9, Fig.13, Fig.14, and Fig.16, we see that in the earthen furnace (1), fire ignition is done from the fireplace (10) or hallway respectively (7). Fireplace (10) has access through the hallway or garret [2].

So, from the above results that depending on the fact that the earthen furnace is lit from the small alcove (6) or from a fireplace (10), the general diagram of functional nodes (Fig.1.) is presented in two variations. The first variation has to do with the case when the earthen furnace is lit from the small alcove, as above, under A. The second variation has to do with the case when the stove is ignited from the fireplace (10), as above, under B. In both these variations, the central element is always the earthen furnace (1), placed in the introductory part of the chamber (2), and is functionally connected with the chamber - its main part (3), with hamamjik (4) and small alcove (6), or fireplace (10). In the room or in the main part of the room (3) the access is through the introductory section (2), in which the earthen furnace and hamamjik are placed. Lighting the fire in the interior of the earthen furnace is always done from the outside of the room, i.e. from the small alcove (6), or from fireplace (10). Stove's rational position in the diagram of the functional node enabled simultaneous heating of the room (3), hamamjik (4), and copper warm water boiler (5), which is installed at the lower bottom cubic part of the stove inside hamamjik. Therefore, from hamamjik, the use of hot water for cleaning was directly enabled, and Igniting the fire in the stove from the outer alcove allowing the room to be kept clean, without smoke, and likely to be turned on at any time without disturbing the guests or family members who stayed in the room was possible. In the above context, the concept of architectural structuring of compositional space, functional concept, are in a direct creative attachment.

Functional Concept and Architectonic Concept

In the traditional home of Kosovo the functional concept is not just a functional scheme, but is also a concept of compositional architectural structuring of these spaces and their functional elements. This means a functional concept with the concept of architectural configuration merging into an organic whole. In line with the general idea of structuring architectural spaces, the entrance of the room (2) is smaller and lower than its main part (3). The introductory part of the room, as well as its main part, are equipped in a standard way, and made entirely of wood elements beautifully framed, in conformity with the architectural concept and distinctive characteristic features, as in (Fig.4, Fig. 5.) and (Fig.23). In

most cases, as we see from the floor plans presented in Fig.6, Fig.15, Fig.16, Fig.18, Fig.19, Fig.22, Fig.26, etc..., [3], access to the room environment is done through a door with an angular position. The angular position of the door conditions a diagonal access into the room environment.

Diagonal approach

This particular angular positioning of the door allows for an inclusion of the entire space surrounding the room with a glance. As a result experiencing of interior architectural values becomes more powerful. The perception or experiencing of architectural values within the movement through the space of the room is driven by the functional architectural concept truly planned by popular Albanian master, with creative ingenuity. Experiencing of architectural sequences of a room interior is connected with a continued thread of movement in the space, in conformity with the idea or architectural concept of organization of space and movement through this space. With the opening of the door are in the introductory part of the room with lower rooftops (2), compared with the ceiling of the main room. At the same time, these two parts of the total space of the room stand for an organic interface in the context of interior elements architectural configuration.

Space Spacing

The introductory part of the room has access through a door of human proportions. Above this door, as seen from Fig.4, Fig.5 and Fig.23, appears the ceiling with height somewhat greater than that of a human body. Therefore, in the next sequence of movement in the room space appears the main part of the room with ceiling size, comparatively larger than that of the entry of the room. This gradation space causes the feeling of an immediate change perception of space dimensions. All this creates optical effects, impressing the observer. At the same time, this concept of spatial modulation within a single space results in the effect of an optical illusion. This effect creates the illusion in the observer of the main room space being much larger than what it really is.

Ideal of ancient harmony

In general, the interior of all the old town houses of Kosovo, including the most modest ones, is rich, and with a preponderance of organic harmony, elegance and full functionality. It should be noted that, in: Fig.4, Fig.5, Fig.23, Fig.24, Fig.29, Fig.30, Fig.31, Fig.32, only a small segment an altogether more upscale interior traditional home built in Kosovo has been shown. In this context, I would add that the interior of the guest room of a house built in Prizren, in the 18th century, as presented in Fig.24, has achieved the ideal of ancient harmony. So, from the whole composition of this interior one cannot add or remove anything. Genuine perception of these values of the interior is provided by quality lighting. This lighting quality is made possible by the formation of systematic windows located in the front of the room, especially in side walls of the room. As we were dealing with floor plans related presented in: Fig. 6, Fig. 8, Fig. 13, Fig.18, Fig.19, Fig.22, Fig.26, etc., this window system, with a contemporary concept, enables illumination of interior spaces, as well as a balance of internal and external lighting. Consequently, this feature allows for a combination of architectural interior space with the exterior, thus making the external environment of the green part of the traditional home interior Kosovo. In plans related with traditional houses presented in this study we see that the functional node is contained both in houses with a modest functional program, as well as those with a more developed program. Moreover, these houses belong to a certain typology of construction.

Functional node and traditional house typology in Kosovo

Plans related housing shown in Fig.6, Fig.7, Fig.8, and Fig.18 show that a good deal of these homes built in the town of Prizren belongs to a housing type with irregular shape architectonic structuring.

Irregular layout type of houses

Architectonic structuring of traditional houses with an irregular layout was conditioned by the urban context of parts of the city that were developed by a spontaneous construction and congestion. This spontaneity of the construction of neighborhoods of the city, in a broader context of urban planning, was, however, developed according to a systematic concept. Irregularity of neighborhoods as urban units, determined an irregular yard planning, and this constrained an irregular architectural structuring type of houses. Despite the fact that the traditional home contained one room, two rooms (Fig. 6), four rooms (Fig. 7, Fig. 8, and Fig.18), or more, it always in the context of functional program included a functional node with a full shape lineup. Architecture elements of the interior of these houses always excelled in a rich and rounded configuration. Urban unit architecture of this city is composed of wallpaper, light-shadow, and space. In light-shade are depicted irregular volumes of houses, with sharp lines, composed by a strong plastic creativity, thus creating an intense pace, rounded and colorful.

Houses built according to the type of an asymmetric composition concept

In the houses of this type, orthogonal layout, functional and spatial structuring is done by an asymmetric forming concept. The architecture of these homes is the product of an interactive creative process emerging out of the urban context and relationship and of the functional and spatial structuring of the house. As a result, the house built in the town of Gjakova, as shown in Fig.10, Fig.11, and Fig.12, is created in cubistic spirit. The provision of the house in the context of the plot is dictated by the approach, as well as its opening towards the yard and sun. A human usually and naturally perceives architectural creation from a height of about 1.70 m. From this height the author has photographically perceived the above-mentioned house. If closely observed, this photographic perception will result in the conclusion that architectural configuration of the house is known for a harmony between proportions and contours. Availability of home in the context of the plot, in relation to the entry in the yard, according to an online approach dictates under an angle that strengthens the perspective perception and emphasizes the three-dimensional plastics of the building. This same impression, even in a still stronger degree, is experienced in the house as shown in Fig.27 and Fig.28, as the semi-cylindrical garret (Fig.28), in the right side of the house, is depicted with its really impressive outlet. That house too is set in the same urban and architectural context as the above-mentioned house. Unlike features of other homes, created in Kosovo over the centuries, in which the preponderance of a clean and clearly defined function is evident , as in the house shown in Fig.10, Fig.11, and Fig.12, in favor of the proper configuration and outward harmony is sacrificed the functional purity of its contents. Spatial composition of the house is characterized with cubistic structuring of architectural volumes. The architecture of this house is known for an asymmetric composition of volumes, with a dynamic and harmonious rhythm. As such, this architectural work reflects a modern spirit for our time.

Creativity and Continuity

Plans related to objects shown in Fig.25 and Fig. 26, are not coincidentally given in a visual-comparison conjunction as between them there is a clear analogy. Fig.25 shows the layout of the Basilica of Constantine in Rome (308-312), whereas Fig.26 shows the layout of Sina's family home floor in Gjakova, built in 1839. Also, the layout of Basilica Urbana of Municipium DD, Fig.36, as well as the plan of the house floor of Kryeziu in Gjakova, Fig.37, have been given in a visual attachment, as the structuring of the layout of these objects carries also a clear analogy. Urbana Basilica is built in the 3rd-4th century AD, in Municipium DD, a Roman period settlement, near Socanica, Kosovo. It should be pointed out that even in the vicinity of the town of Gjakova the remains of a large Roman settlement are found. [4]. In the context of analogy between traditional house forming features of Gjakova and Constantine's Basilica in Rome, is also the home of the close semi-cylindrical garret type, shown in Fig.33. At this home we see its semi-cylindrical garret coming out of plan outlines with a main corridor axis extension. This same longitudinal extension, according to the axis of middle nave is also present in the apse in a semi-circular form of Basilica in Rome. Moreover, in the composition of the second floor rooms of the traditional house (Fig.33), parallel to the longitudinal axis, on the right of the layout, in all the length of the house, lies a narrow space ("AO"), which corresponds to the Basilica arcade (Fig.25 / "A"), which extends in all its width. From the above we understand that a good spatial structuring of semi-cylindrical garrets emerging powerfully beyond the outlines of the layout of the houses as listed in: Fig.26, Fig.27, Fig.28, Fig.33, Fig.34 and Fig.35, is a clear expression of implementation of analogy with the structure of spatial volumes of the apse of the basilica of the Roman period. If viewed in a comparative analytical context the layouts of Basilica Urbana of Municipium DD (Fig.36), and Kryeziu family house, (Fig.37), then one will see clearly that, between the morphology of these two objects an almost complete analogy is revealed. As we see from Fig.36, the spatial structuring of Urbana Basilica by a longitudinal concept, in terms of middle nave longitudinal axis on both sides, is formally concluded with two apses of different dimensions. The same concept of construction also includes the home in Gjakova, Fig.37. With this traditional home, the longitudinal corridor coincides with high nave of Urbana Basilica. Even the hallway, in a way analogous to the secondary nave of the Basilica, is formally concluded with two garrets also of different size. From the above, we can come to the conclusion that this analogy between the traditional homes of Gjakova with the Roman period basilica cannot be accidental. This conclusion is indirectly supported by the fact that, in Neolithic period, the house was not yet de-sacralized and it served as a sanctuary. Therefore, the architectural concept of the house is also carried over on sacral architecture, or in the first temples respectively, representing the home of the gods. In this context of creative continuity in time and space, we will be satisfied with the conclusions reached above, as this problem deserves a more comprehensive and deeper analytical study. It should be added that the construction of a significant number of traditional houses in the city of Gjakova of this type - with a semi-cylindrical garret, gave a distinctive character to the formation of the urban landscape of a certain part of the city.

Exterior is a result of the Interior

We see that Sine family home was built according to an asymmetric compositional concept. It is known for a contemporary forming concept. Truly, the architectural exterior of the house is an expression of genuine interior. So, in the architectural structuring of the house it is easily discerned that the exterior is always interior. Therefore, in the expressive language of architecture created by the ever popular master of architectural forms of the building one can easily read its function either as a whole or its constituent units function. In this house built by the popular master, not only is exterior architecture known for its great value, but at the same time for its interior as well, as we see from Fig.29, Fig.30, Fig.31, and Fig.32, as being very rich and known for great aesthetic values.

Houses built according to a symmetrical composition concept type

Almost the same features and architectural value, like those of the Sina family, are also included in the house shown in Fig.34 and Fig.35. Given that this home has access from its front (Fig.35), I think it should be defined as a symmetric type house. Of the same type built by symmetrical compositional concept, is the family home of Kryeziu, Fig.37, and Fig.38. The house floor presented in Fig.34 and Fig.35, an at the same time all the three floors of the house of Kryeziu, structured according to the longitudinal axis, come to a closing of garrets from both sides. Due to the structure of construction materials, the home garrets enjoy a polygonal circular layout. Meanwhile, plans related to the house floor garrets, Fig.34, are semi-cylindrical and stand for an impressive output of layout outlines of the house. This home, built in Gjakova in 1839, is depicted with its open garret positioned under the semi-cylindrical closed garret. Setting an open garret in the ground floor over the running water streamlet turns it into a very pleasant environment to stay during the warm seasons. Taken in its entirety, the house is known for its authentic architectural values. In principle, the compositional structuring of objects under a concept which applies symmetry diagram, gives an architectural work a monumental character. A monumentality spirit has depicted the Gjoni family home, built in Prizren, in the 18th century, Fig.19, Fig.20, and Fig.21. Architectural structuring and functioning of the ground floor and the floor of this house is created by a symmetrical concept with a clear functional definition. The same architectural and functional features are obvious in the Grazhda family house, built in Prizren, in the 18th century, Fig.22 and Fig.23. Both of these houses, for the past as well as today, are characterized by a rich functional program. The first house seen in the context of functional program includes 4 (four) functional joints on the floor, and two others on the ground floor. These values raise the traditional home of Prizren to a high level of residential culture in the Middle Ages. The floor plans of these houses, Fig.19, and Fig.22, show that the hallway (7) open garret (d), have a central disposition, structured along the axis of symmetry. From this hallway comes an access to all four rooms and two smaller service areas for fire ignition. The doors of these rooms, in layout positioned according to the trapezoid scheme, form two door formations, with three each. These doors, with a nice configuration and picturesque hallway depict a noble character.

Asymmetric volumes of objects forging an intense pace

In addition to the above-mentioned homes, the traditional house in Prizren as shown in Fig.15, Fig.16, and Fig.17, is also known for its great architectural and functional value and functional as well as for its very rich interior. It was built in the 18th century. In this home, the plastic composition of closed and open volumes in light-shade creates a powerful and scenic expression. Meanwhile, the dynamic structuring of these volumes has resulted in an intense pace.

Conclusions

Analytical reviews presented in the above result in a conclusion that the traditional residential architecture in Kosovo is known for a clearly defined typology. Building typology, regardless of the nature and scope of the traditional house, in its architectural complexity synthesizes the functional concept with the architectural concept in an organic harmony, thus creating a complete identity. The medieval house in Kosovo, except that it is characterized by great architectural value, it also reflects a high residential culture of the time.

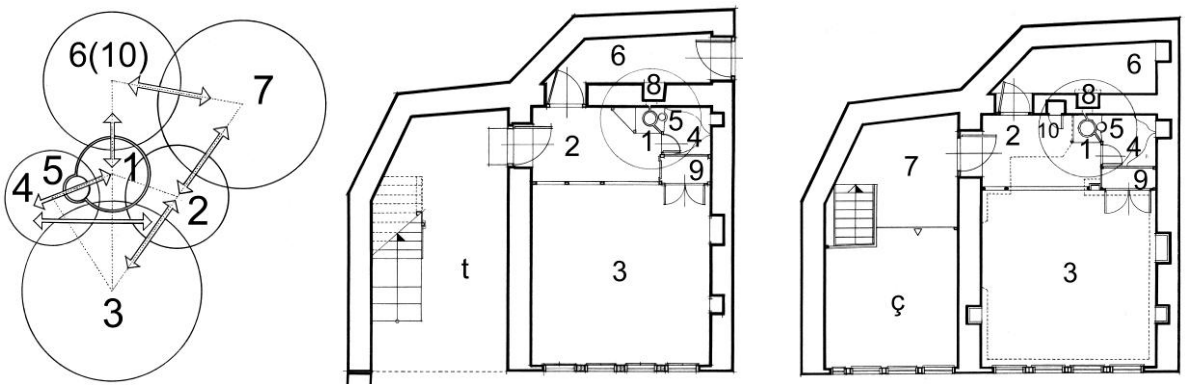


Fig.1. General Diagram of functional relations between composing units and functional node
Fig.2. Ground floor layout of the house [H-“R.K.”], built in Gjakova
Fig.3. Upper floor layout [H-“R.K.”], built in Gjakova

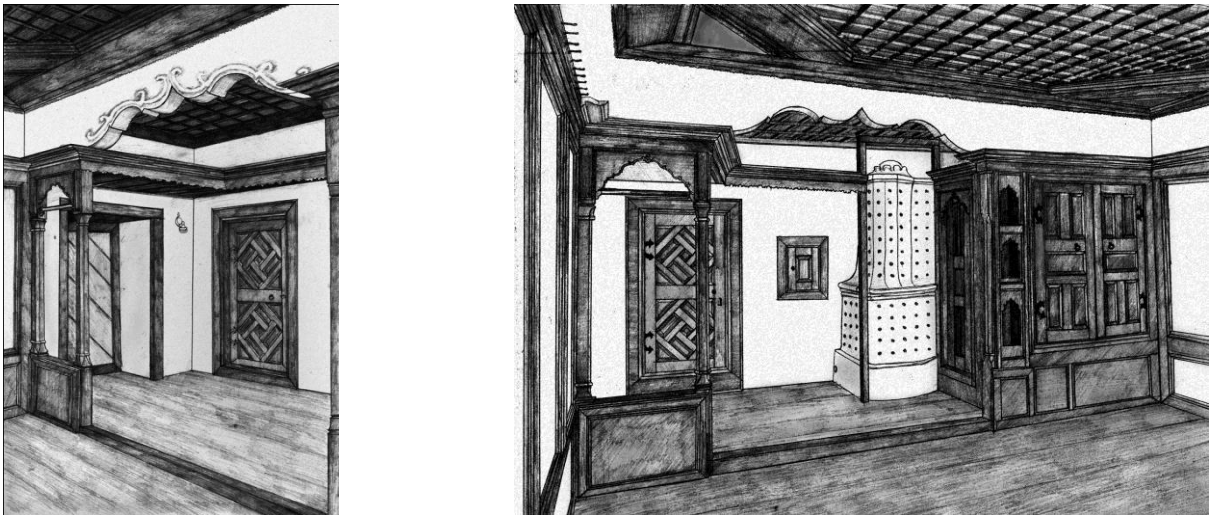


Fig.4. Perspective view of room entrance part [H-“R.K.”]
Fig.5. Perspective view of room entrance part [H-“R.K.”]

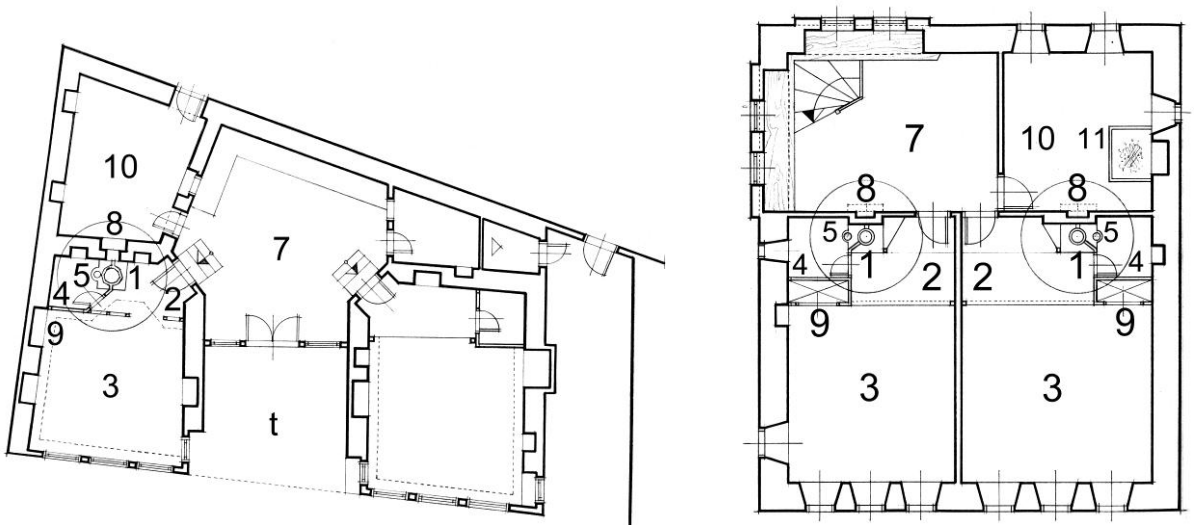


Fig.6. Ground floor layout of the house [H-“T.Ç.P”], built in Prizren
Fig.9. Upper floor layout of the fortified house, [H-“B.D”], built in Gjakova

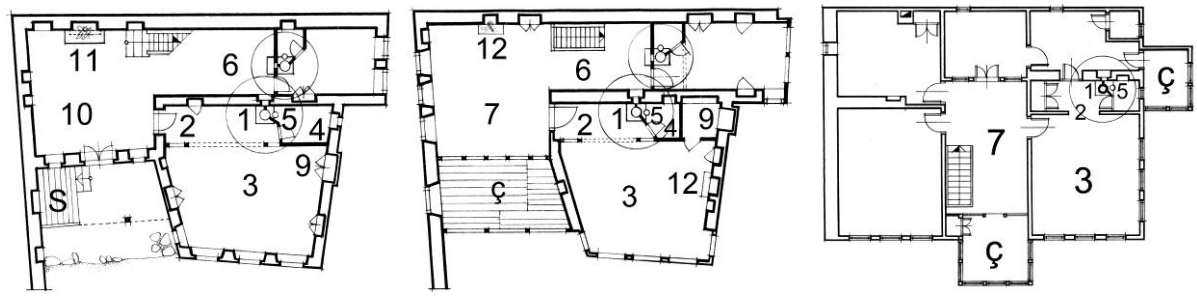


Fig.7. Ground floor layout of the house [H-“T.Ç.P”], built in Prizren
Fig.8. Upper floor layout [H-“T.Ç.P”], built in Prizren
Fig.10. House floor plan [H-“S.A.”], built in Gjakova



Fig.11. House perspective view, [H-“S.A.”], built in Gjakova
Fig.12. House perspective view, [H-“S.A.”], built in Gjakova

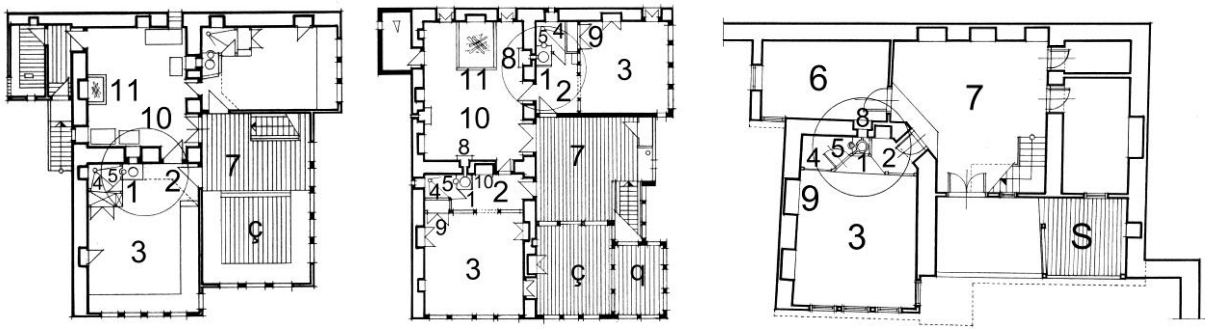


Fig.13. House floor plan [H-“M.S.”], built in Peja
Fig.14. House floor plan [H-“L.R.F.”], built in Peja
Fig.15. House ground floor plan, [H-“SH.Z.”], built in Prizren

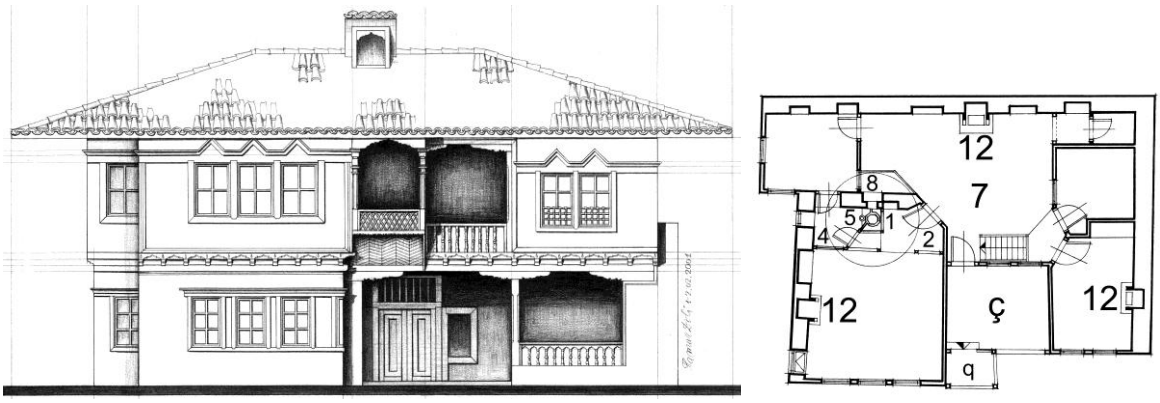
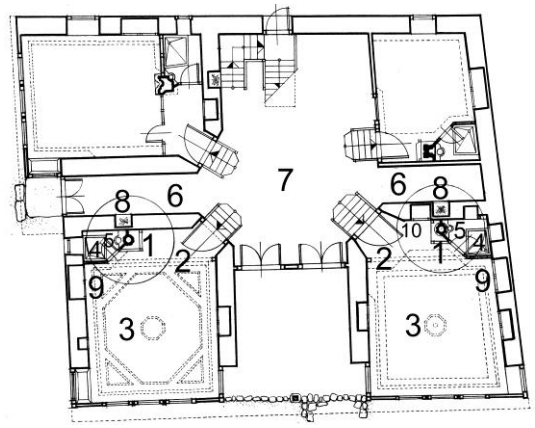


Fig.16. House ground floor plan [H-“SH.Z.”], built in Prizren
Fig.17. House front view, [H-“T.Ç.”], built in Prizren



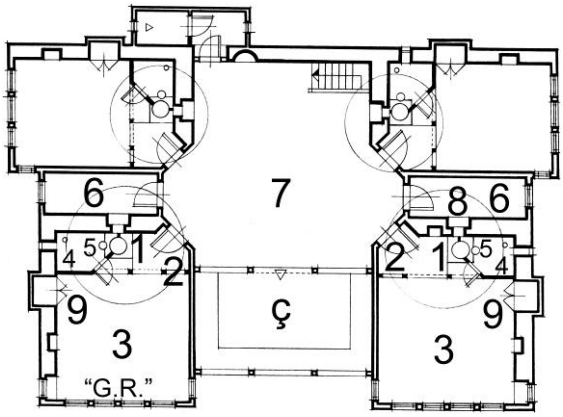


Fig.18. House ground floor plan [H-"SH.B."], built in Prizren
Fig.19. House floor plan [H-"A.a.GJ."], built in Prizren





Fig.20. House perspective view [H-"A.a.GJ."], built in Prizren
Fig.21. House perspective view [H-"A.a.GJ."], built in Prizren

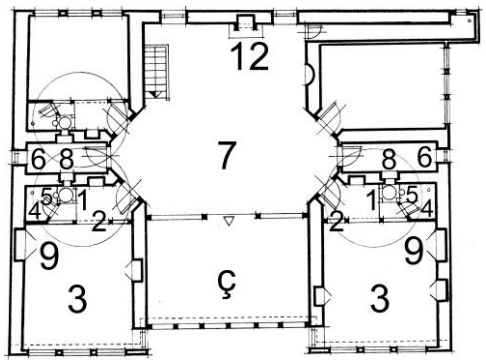




Fig.24. House ceiling view [H-"Z.K."], built in Prizren

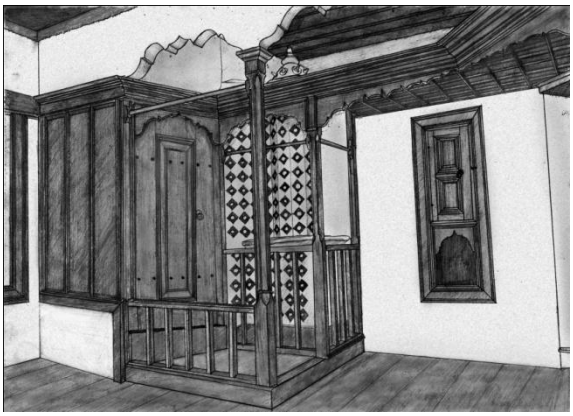
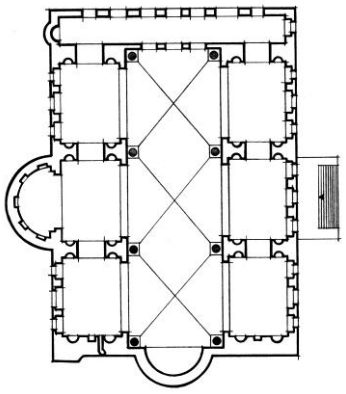


Fig.22. House floor plan [H-"F.G."], built in Prizren
Fig.23. House perspective view part – earthen furnace [H-"F.G."]



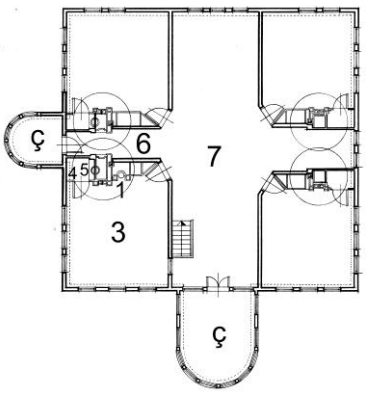


Fig.25. Plan of Constantine's Basilica in Rome (308-312)
Fig.26. House floor plan [H-"F.S."], built in Gjakova, 1839

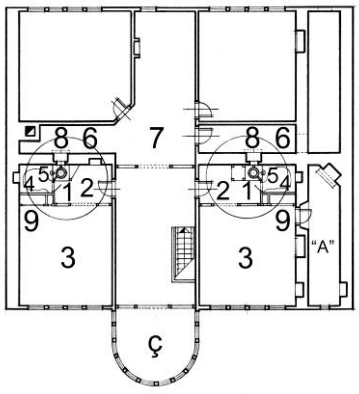


Fig.33. House floor plan [H-"XH.I.N"], built in Gjakova



Fig.27. House perspective view [H-"F.S."], built in Gjakova, 1839



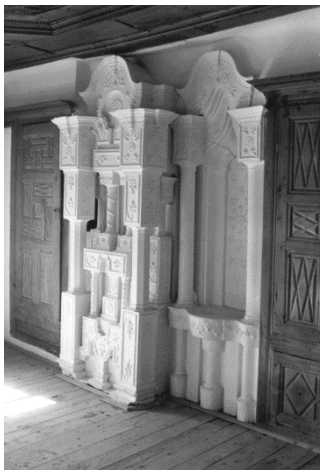




Fig.28. House perspective view of closed garret, house [H-"F.S."], built in Gjakova, 1839
Fig.29. Perspective view of house interior [H-"F.S."], built in Gjakova, 1839
Fig.30. Perspective view of house interior [H-"F.S."], built in Gjakova, 1839



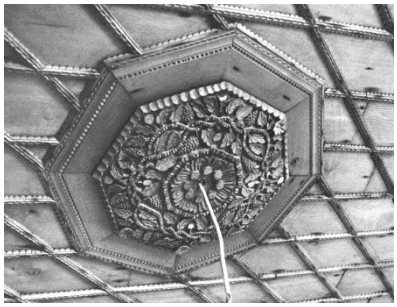


Fig.31. Perspective view of house interior [H-"F.S."], built in Gjakova, 1839
Fig.32. Perspective view of house interior [H-"F.S."], built in Gjakova, 1839

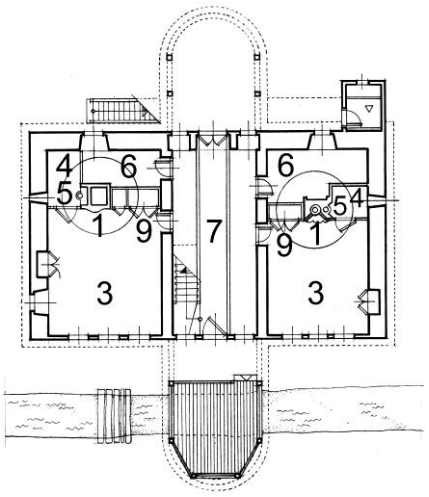
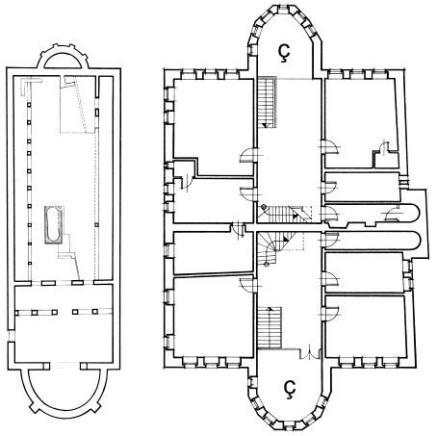




Fig.34. House floor plan [H-“M.A.”], built in Gjakova
Fig.35. House perspective view [H-“M.A.”], built in Gjakova



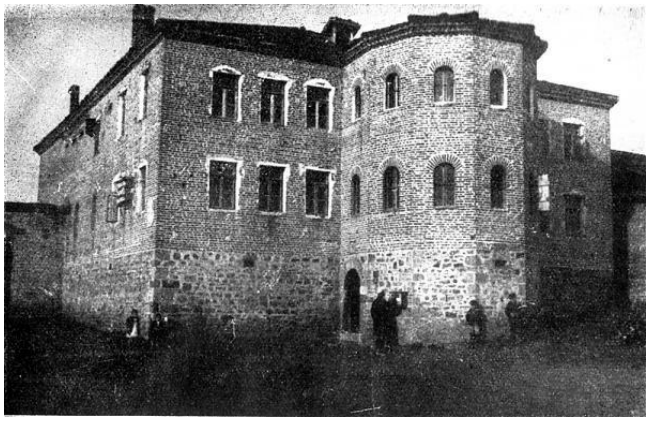


Fig.36. Plan of Basilica Urbana of Municipium D.D., 3rd/4th cent., Kosova
Fig.37. House floor plan [H-“T.B.”], built in Gjakova
Fig.38. House perspective view [H-“T.B.”], built in Gjakova

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[3] House layouts presented in this study have been redrawn by the author based on documentation – relevations from 1956, done by the Institute for the Protection of Monuments of Kosova (IMMK). Perspective views: Fig.4, Fig.5, and Fig.23, were done by Jetik DOLI, graduate student at the Department of Architecture, Faculty of Civil Engineering and Architecture, University of Prishtina. Pictures presented in Fig.35, and Fig.38, belong to IMMK, and others to the author made in 1991.

[4] Dr. ÇERSHKOV, Emil. Romakët në Kosovë dhe Municipiumi D. D. te Soçanica. (Romans in Kosova and Municipium D. D. near Soçanica). Prishtina, 1973. p. 38, p.128-136, p.150, p.245 - table XXI/2, Appendix V.

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MODULAR LOW-COST SCENERY FOR EVENTS: THE EXAMPLE OF THE CHURCH OF SAN GIUSEPPE DELLE SCALZE

Alessandra PAGLIANO,[1]
(1) Department of Architecture, University "Fedrico II" of Neaples, Italy , pagliano@unina.it

Abstract
Developed almost all around Europe, following the nowadays crisis, "recycling" culture helped to revalue all that already exists to limit the expenses. There are a lot of innovative and creative initiatives often created in Europe which cross the most traditional daily object and dressing up fields, touching also the neglected architecture, as like as historical places that nowadays "live" in decay, because they've lost their previous usance. The administrations too cannot help this. Not only because of the lack of resources available for restoration, but also because of the difficulties in giving them a sort of management able to give them back to citizens.
Empty places where people live and neglected churches have in common their being useless, their being not a total part of the town, their being such as an element that has lost his history. Buildings change radically in the places where they've been built: they're not considerer anymore active as before, but as unavailable spaces.
By the way, thanks to some spontaneous intervention a lot of buildings can be considered still "alive" and got once again their own place in the neighborough. The community, naturally, have to pay a lot to make it lasting in time.
San Giuseppe delle Scalze, at Salita Pontecorvo in Naples, is a clear exemple of the battle taken by the Forum Tarsia, an organization composed of persons able to revive such an amazing place like this. Meeting, shows, and exhibitions are the most are settled to show to the other what in 1980 an earthquake has not destroyed.
The project that we here present suggests the creation of cheap modular scenery, able to provide the church with a series blocks, called t*ancube*, to mounting shows, exhibitions and social meeting, based on the importance of the cultural place and so, always reversibly.
This work propose, the revaluation and the reintegration of the church in the urban environment, although the decay, hoping that the most complicated intervention could be planned and, finally, realized.

Keywords: Scenery, tan-cube, temporary events, design.

1. Temporary uses to stop the decay

Developed almost all around Europe, following the nowadays crisis, recycling culture helped to revalue all that already exists to limit the expenses. There are a lot of innovative and creative initiatives often created in Europe which cross the most traditional daily object and dressing up fields, touching also the neglected architecture, as like as historical places that nowadays "live" in decay, because they've lost their previous use.
Too often the administrations cannot help, not only because of the lack of resources available for restoration, but also because of the difficulties in ensuring them a sort of management able to give them back to citizens.
From empty houses to abandoned churches, a common feature of these spaces is their status, to be without any use: they are inactive elements, not integrated in the urban context, buildings whose original link with the city has been lost.

There is therefore a substantial transformation of the role played by the architecture in the social fabric which it is inserted, no longer active and functional but unknown, these spaces are not usable, even catalyst degradation in its various forms.
In the first place, the shortage of maintenance, the strong physical deterioration with the progressive decay of the building, whose quality deteriorates exponentially, makes them not only useless, but often unsafe and potentially dangerous.
All these situations affect the local quality of life: the presence of physical and environmental degradation not only make it impossible to use a space, but an abandoned building, no longer illuminated, becomes a dark space which is perceived as insecure and dangerous by local residents because can be used for a large number of different criminal activities, that need to take place in hidden locations.
However, it is remarkable that, in many cases, only through spontaneous actions of citizenship, some abandoned buildings have managed not to fall into the most absolute decay, even regaining a sense and a specific role into neighborhood: in those examples, non the Public Administration but the community ends up to take charge of the inevitable cost of maintenance.
Even without of public funds for the architectural restoration is necessary to investigate any urban residual space, their temporary uses, people who inhabit them, and observing potential strategies for employment and re-activation
Looking closely at some abandoned sites in various European cities, you can see that, in the absence of commercial development, many areas have become a field of experiments for new forms of art, music, pop culture, as well as the location of startup for social associations or for events entertaining, gardening, informal markets…..
It is important to accept their temporary nature of chance, opportunities, as places of transition from one state to another, in order to draw the attention of citizens and city authorities to the lost of city values and spiritual culture.
The revival through the attention and a new "points of growth" of urban life.



Fig. 1 - Juggling shows in an abandoned church



Fig. 2 -*Skalitzers Gallery*, exhibitions of street art in a Berlin's abandoned building



Fig. 3 - Heather Benning, Abandoned Farmhouse turned into a Life-Sized Dollhouse in Canada

2. *The neversquare:* the Church of St. Joseph in Pontecorvo and its neighborhood

The project we we describe in this paper is part of a wider field of research on low-cost stage sets and exhibition stands for smaller theaters or abandoned spaces and is based on a work carried out at the Degree Thesis in Architecture 5UE of Simona Scognamiglio, co-tutor prof. arch. Alfonso Morone .
The singular title, *The neversquare*, connotes the social need, strongly felt by the population living in the surrounding area to have a place in which to engage cultural and urban spontaneous aggregation. Despite the proximity to the large Piazza Dante, the urban fabric of the neighbourhood is very dense and characterized by steep slopes, which make strenuous to move even in the close proximity.



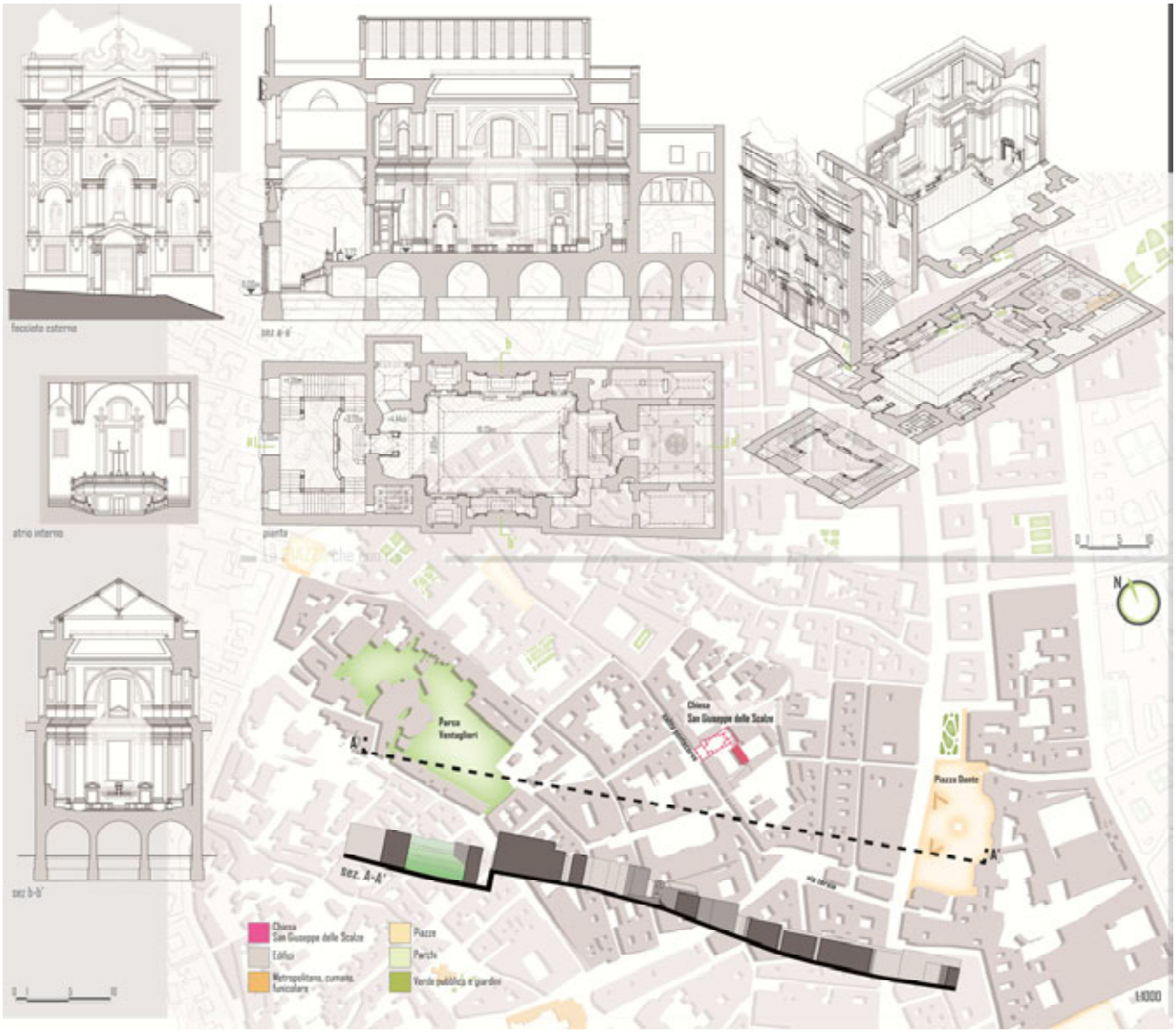


Fig. 4 – The Church of St. Joseph at Pontecorvo, Neaples, drawing of S. Scognamiglio

The *Forum Tarsia* is an association of citizens residents in the surrounding areas Tarsia - Pontecorvo – Ventaglieri, since 2001 working to protect the environmental conditions and to stimulate social and cultural activities. The association - which refers to similar experiences of "active citizenship" - aims to build communication channels and gatherings among the inhabitants of the neighborhood and tries to exert a pressure on the institutions to achieve greater efficiency in services . The *Forum Tarsia* fought together with other associations in the Park Social Coordination Ventaglieri for the redevelopment of the Ventaglieri Park and, in recent years, for the restoration and re-opening of the Church of St. Joseph of nuns and other religious buildings in the area Tarsia, tying always organization of cultural and social activities for a speech redevelopment of urban public spaces. It's the leader of a small network of associations (Archintorno, Taverna East, Mammamà, etc.).
So, the church of St. Joseph has become the symbol of all these battles, in order to revive the beautiful building of Cosimo Fanzago, organizing meetings, shows, dinners, exhibitions and conferences, opening the doors of what remains of the church, whose ceiling collapsed after the earthquake of 1980, determining the progressive deterioration and abandonment of the architecture.





Figg. 4-5-6: Recent cultural and social activities in the church

3. *Tancube: a modular low-cost scenery for events*

This project proposes the creation of a set design modular, modular, it can equip the church of flexible elements (*tancube*) for the staging of plays, shows, juggling, social dinners and exhibitions, guided by the principle of its full reversibility in order to respect the original spaces of the church and its enormous historic and artistic value. The main idea of this module is based on the fusion of the concept of *tangram*, as an object capable of generating variables schemes, and the concept of the cube as a solid characterized by the maximum degree of modularity.
Tangram is an ancient game of Chinese origin, which is obtained by dividing a square into seven parts called *tan*: a square, a parallelogram, and five triangles isosceles, two large, one medium and two small. By combining the pieces of the *Tangram*, you can get an almost infinite number of configurations and a large number of designers have recently experimented this concept in some interesting products.
Tancube is the elements we propose to provide the events to be organized in the church of a set of elements capable of taking the most suitable configuration, according to the happening to be set up. So, *tancube* can assume the shape of a chair or a table to set up social dinners, but also can provide temporary exhibitions of a flexible support to hang up panels and paintings.
In its close configuration, *tancube* can be used to create simple scenery elements for juggling shows, but its real expressive potential has been setting some theater shows to eventually take place in the church, whose emotional involvement of the audience is, at present, heavily penalized by the impossibility of setting the action in a real scene, although stylized and minimalist but engaging at a sufficient emotional level.



Fig. 7: Some examples of design products based on the cube and on the *tangram* concept



Fig. 8: Perspective studies to identify the most appropriate placement of the scenes in relation to the church altar

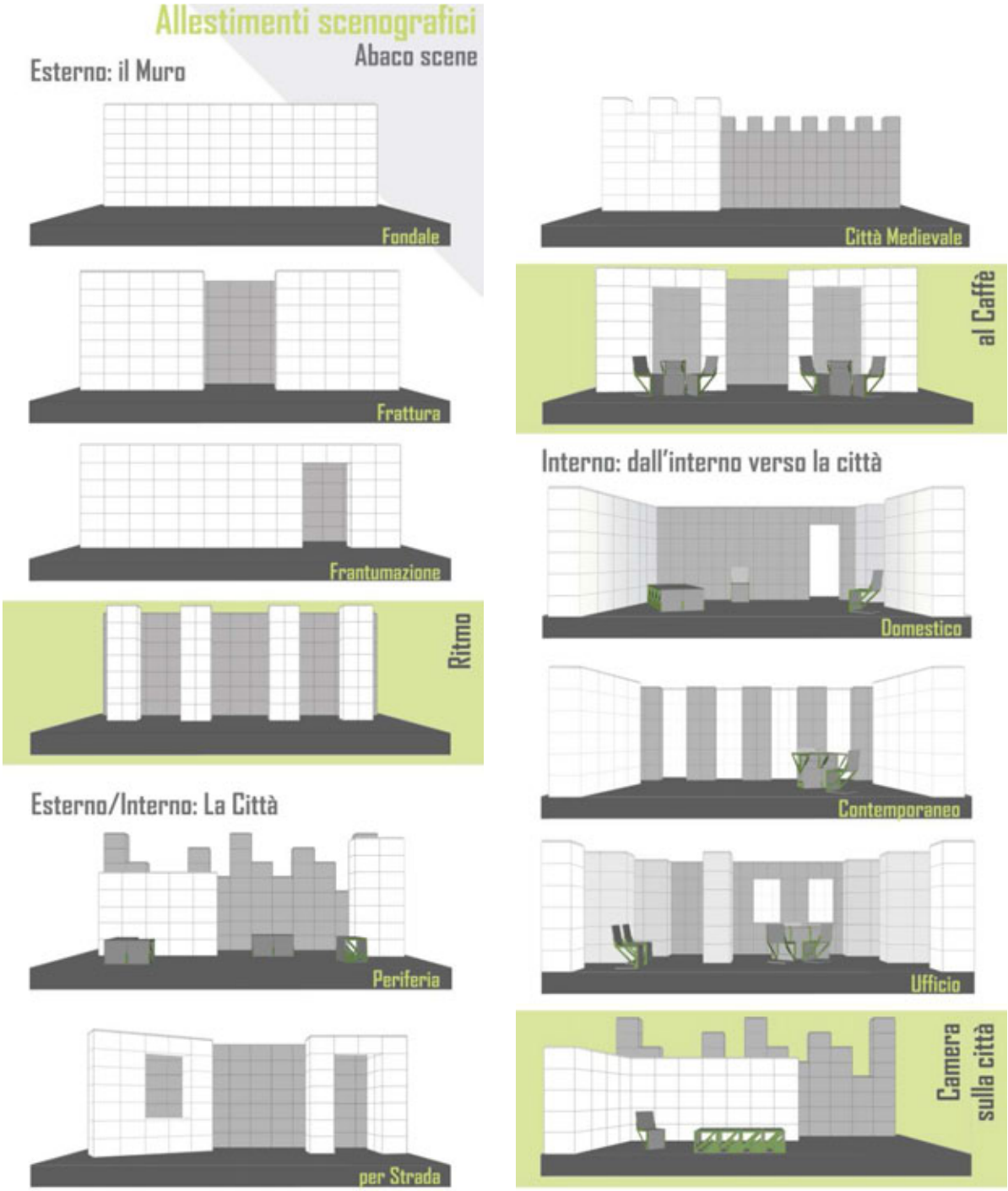


Fig. 9: Abacus of some possible stage settings by combining tancubes, drawing of S. Scognamiglio.

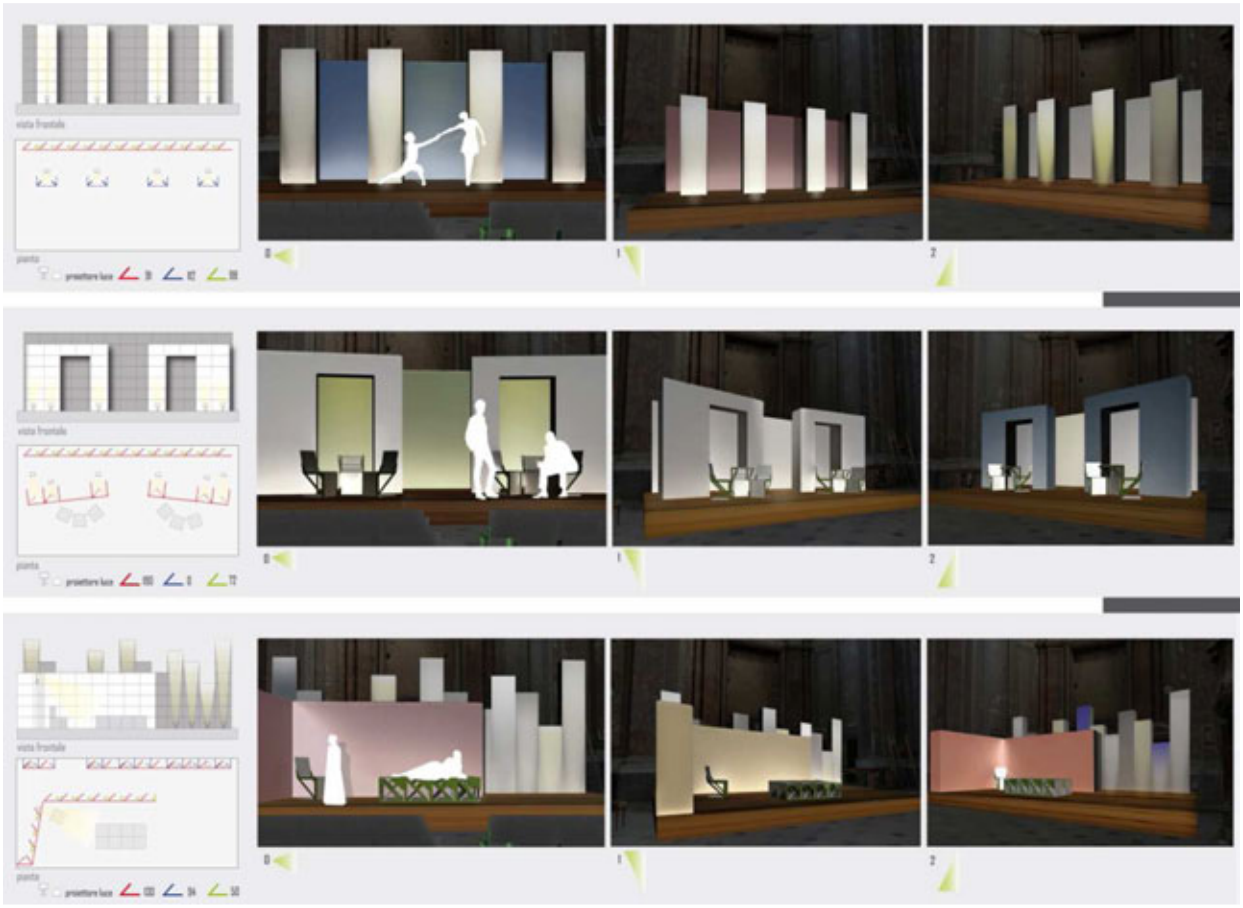


Fig. 10: Some possible stage settings, combining the modular *tancube* and lighting some elements with rear projections to easily change the neutral base color of the *tancube*, drawing of S. Scognamiglio.

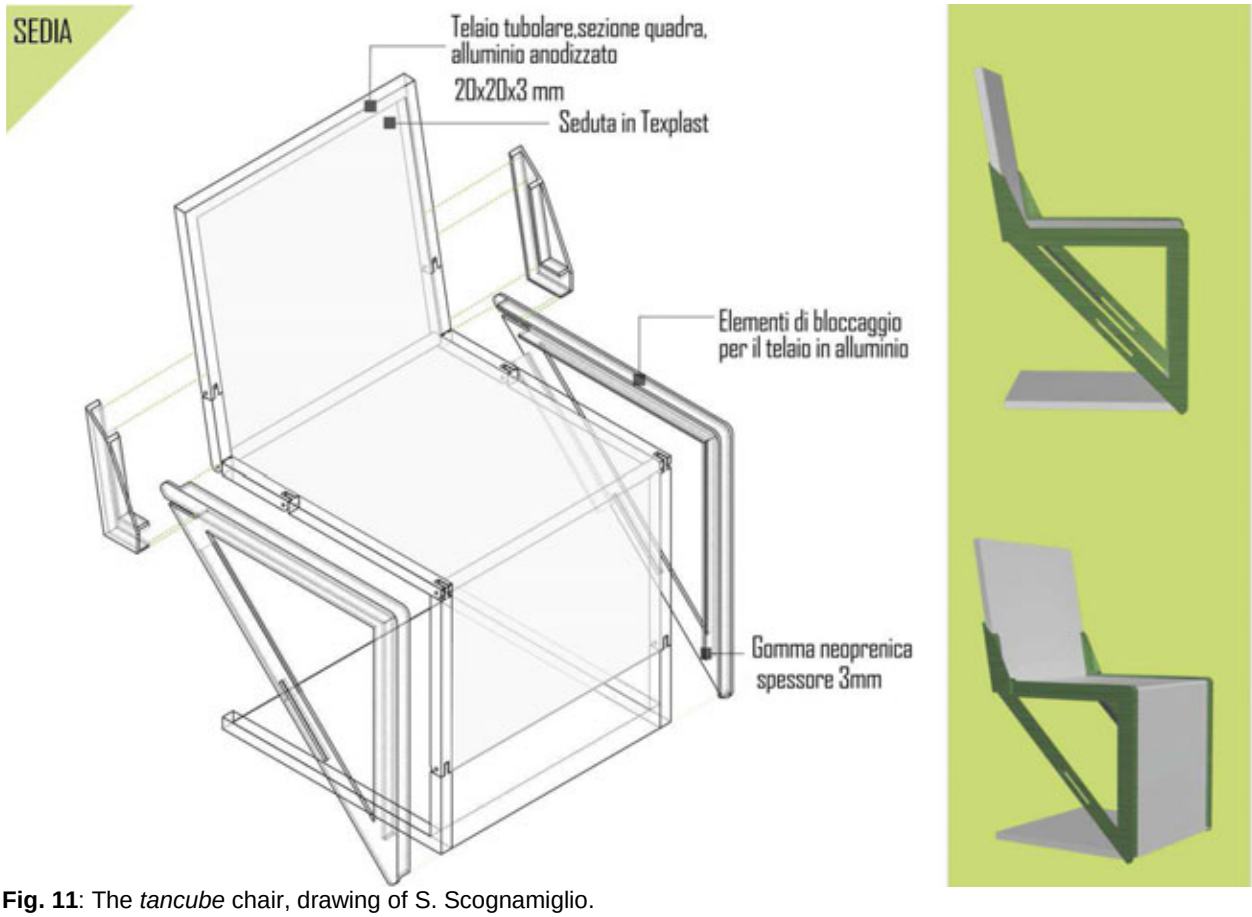


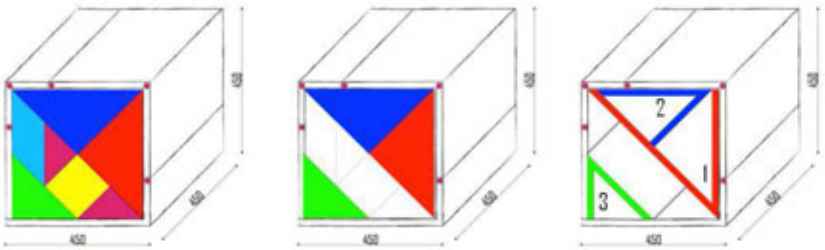
Fig. 11: The *tancube* chair, drawing of S. Scognamiglio.



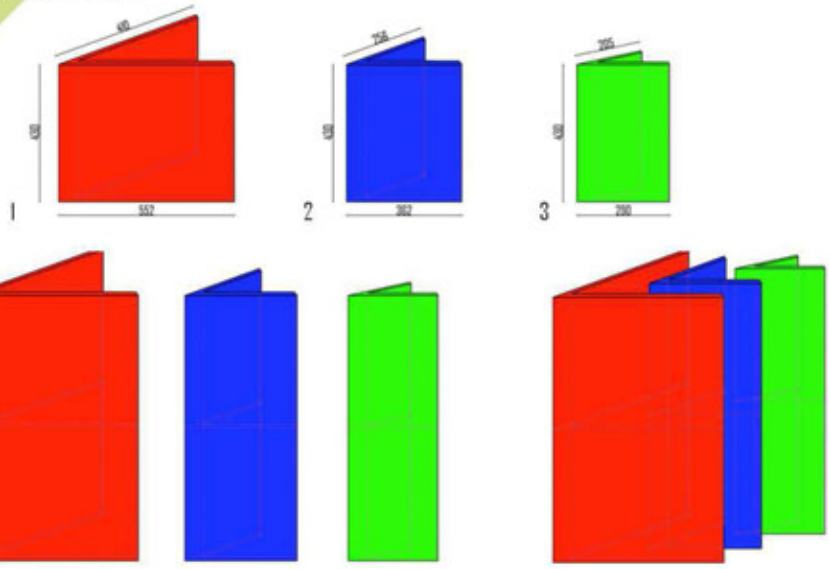
Fig. 12: Technical details: form cube to chair, table and totem, drawing of S. Scognamiglio.

Figg. 13-14-15: The *tancube* chairs and tables for occasional conferences, social dinners and juggling shows, drawing of S. Scognamiglio.





ELEMENTI DI SCENA



MODULARE

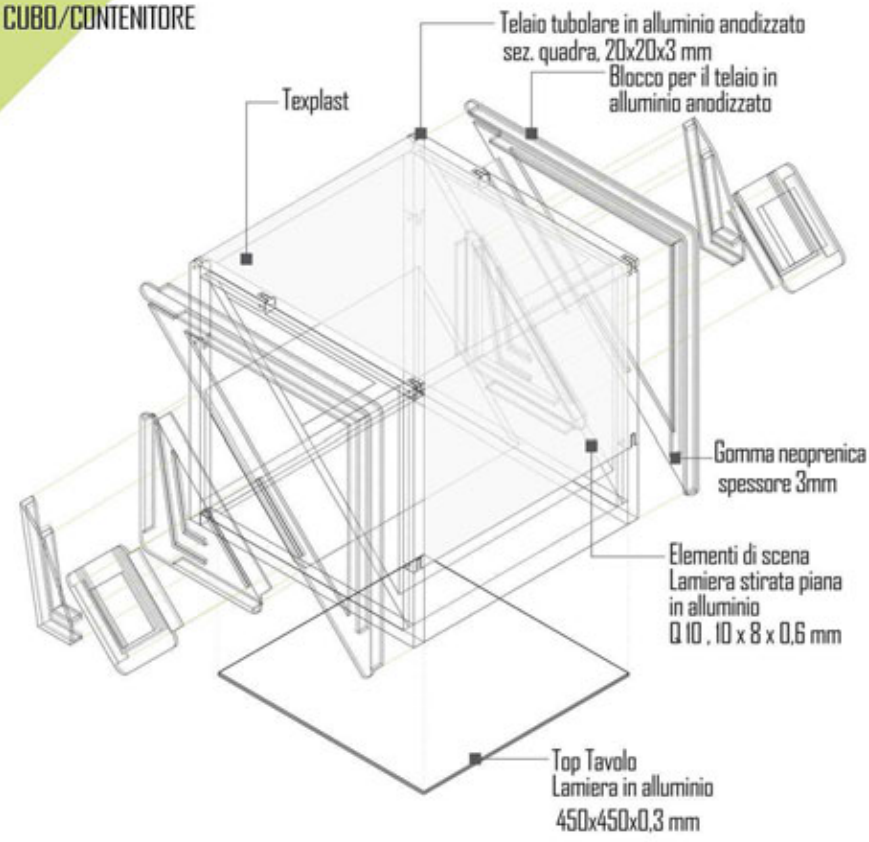
DINAMICO

MULTIFUNZIONALE

facilità di MONTAGGIO

facilità di RIMESSAGGIO

CUBO/CONTENITORE





4. Conclusions

The present work has illustrated a moderate, but in this historical moment essential, aim consisting in the revaluation of the church, its re-integration into the social and urban environment, despite its evident state of decay; meanwhile waiting (hoping) the most complex and expansive architectural restoration, these modules of scene could be, for the activities of the cultural associations that have adopted the space of the church, an additional tool to implement the quality of the events that take place in it, allowing operations to cash flow to contribute to the maintenance of the monument.
All proposed events could be staged at the estimated cost of only € 11.000,00 and the cubes could be set aside at the end of each event, in the appropriate spaces of the building, ready to be used again.

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Practice of reuse and recycle in retrofit interventions

Raffaela DE MARTINO[(1)], **Rossella FRANCHINO**[(1)], **Caterina FRETTOLOSO**[(1)],
[(1)] Dipartimento di Architettura e Disegno Industriale Luigi Vanvitelli (SUN), Aversa (CE), Italy
E-mail raffadema@libero.it, rossella.franchino@unina2.it, caterina.frettolso@unina2.it

Abstract
In the retrofit interventions, oriented to the energy-environmental rehabilitation of the existing built heritage, besides the problems concerning the specificity of the planning solutions to be adopted, for so long the delicate problem of the waste disposal by C&D is set. Waste includes not only the inactive materials of an architectural manufacture, but also its relative fittings characterized, in most cases, by a high level of heterogeneity. In fact the following improvement of the planning quality has brought to an improvement also of the energy efficiency of the fittings that have achieved a greater technological complexity. We got to a planning of the fittings, not only aimed at the energy saving, but also to the fittings recycling, referred to fittings of both traditional and innovative type such as the photovoltaic systems. The possibility of recycling materials and components, that is already examined closely enough for the building components, is examined not so closely for the fittings, because their aim at recycling finds greater planning and constructive difficulties. What it is said underlines that the real frontier of the sustainable fittings planning is that one of the design in the viewpoint of recycling (design for recycling). The adhesion to the principles of the design for recycling represents, therefore, a suitable answer, not only to the demands of sustainability, but also of energy saving.

Keywords: Retrofit interventions, C&D waste, plants reuse and recycle.

1. Residential buildings: the management of C&D waste in the "restructuring yard" (Caterina Frettoloso)
The interpretation of the concept of "waste" introduced by Law no. 178, 8th August 2002, has helped to promote policies for recovery and reuse of materials from C&D in Italy [1]. In fact, the widely opinion supported by legislation (Ronchi Decree) which considers a special waste any type of material resulting from demolition, construction and renovation, is now integrated with the contents of art. 14 (Law no. 178) in which the legislator clarifies that the definition of "waste" does not apply [1]:
a) if the same can be and are in fact and objectively reused in the same or a similar or different production or consumption cycle, without undergoing any prior treatment and without harming the environment;
b) if they can be and are in fact and objectively reused in the same or a similar or different production or consumption cycle, after undergoing prior treatment without requiring any of the recovery operations listed in Annex C of the Decree law n. 22."
In building renovations the fraction of materials from C&D, the so-called inert (concrete, bricks, scrap various), represents about 75% of waste from construction activities, in smaller quantities we find the wood (as packaging or as waste processing), and finally, plastic or paper with film (in packaging and, partly, in the pieces of plants). [2]
The identification of the type of waste, and the method of dismantling/deconstruction, is the first step of investigation if you decide to undertake a program to renovate housing unit or building in which sustainability is carried out and extends also to the dismantling phase. The evaluation of the type of waste is not sufficient to guide the choices of the designer but it should be complemented with a series of data about many aspects in order to assess the practical possibilities for reuse in technological and economic terms. The performance characteristics of the waste, before and after its removal, represent in this logic a particularly significant. To this end, the knowledge of the artifact will bring out a series of considerations on: the elements that can be reused, at the same time as, maintaining the original shape (thresholds, window frames, doors, etc..); the

waste that can be recycled by regeneration (wood, brick, stones, …); the materials that can be recycled by waste treatments plants, not least, it is important to identify any unwanted components that should be diverted from landfills. It is now accepted that the quality of the materials from C&D is strongly influenced by the more or less homogeneity of waste fraction obtainable after a specific activity, as it is evident that the building heritage currently more subject to a maintenance/restoration was done with technologies that do not make such activities easier. They didn't design to be " dismantled" or, in some way, "deconstructed".
Therefore, at a yard restructuring the dismantling phase will require special attention and it has to be considered as a selective demolition and follow a precise procedure that, in practice, is divided into the following phases:

1. removal of the external moving parts such as waterproofing and roofing, and of all the materials classified as dangerous, starting from the top;
2. removal of the electrical systems, heating and sanitary installations;
3. removal of windows and doors;
4. removal of interior floors and partitions in wood, drywall etc..;
5. demolition of structural parts and following storage in separate containers.

Each stage of demolition activities, listed above, has effects on the organization of the yard site, especially with respect to the areas of handling equipment and storage materials. These aspects, together with the characteristics of the materials produced and reusable components from phases of construction/demolition, are open issues about the management of C&D materials. Thanks to mobile waste treatments, today more efficient, it is possible to process in the yard the inert waste fraction. This means, on the other hand, increase the complexity of the yard and, therefore case by case, it has to be evaluated the opportunity to follow this procedure.
The main phases of C&D waste integrated management are: the separate collection for fractions, as homogeneous as possible; the waste treatment and recovery; the re-use of components; the appropriate disposal of non-recoverable waste, and related control activities on the environmental impacts of each transaction. This integrated approach can not ignore the first rule of a rational waste management, in a broad sense: reducing the volume of produced waste.
After identifying waste according to the EWC (European Waste Catalogue); after adopting the principles concerning selected waste production, separate collection and environmental protection during material storage, in order to accomplish the integrated cycle of waste management, mechanisms of demand and supply (materials and components) is needed activate. On this last aspect, despite several years is passed from the experimentation of the VAMP project aiming to build an innovative information system able to manage the waste flows produced by and/or recoverable in the construction and demolition sector, it is still one of the most interesting examples.
In particular, for the disposal and supplying of materials and components, the Valorisation Decision Support System (V- DSS) elaborated by VAMP researchers aiming to "*provide support for the environmentally friendly and cost effective disposal/ supply of C&D materials and components produced by any users. This system indicates which recycling / disposal sites of C&D goods best meet Vamp system environmental requirements: economic criteria: waste management must be convenient for Vamp users. The first coeffients introduced in it are the disposal and the transport costs; environmental criteria: waste management must be 'environmental sustainable' to achieve the aim of the system. The coefficient of environmental assessment introduced in the system is defined for each activity in it*." [3]
The introduction of performance criteria to determine the quality of the material from C&D or component recovered, is a significant step in order to their life cycle does not close but, on the contrary, open to new uses and project opportunities. Above all in the case of removal of plants, required to energy saving and environmental protection recommendations, the assessment of the individual elements is needed in relation to the possibility that these be made more efficient through some technical and functional upgrade. Obviously this application will be economically sustainable.

2. Reuse of plant components (Rossella Franchino)

The adhesion to the design principles for recycling in the building sector has been extended from the first researchers, who have individualized innovative results in paying their attention to sustainability and have involved other designers in carrying out the research practically, to corporate bodies involved in the governance of constructions in important territorial areas that, with their rules and guides, have begun to impose design lines for both recycling and disassembly preceding the former and making reusable the material to be recycled. The Department of Design and Construction of New York City has been mentioned among the first most important experiences respect to all this. In 1999, with its "High Performance Building Guidelines" [4] in the chapter entitled "Materials and Product Selection", such a Department expressed the addresses for a design that, besides the other technological characteristics, should consider the possibility to recover and reuse building materials and components. In 2000 also in Canada with the "HOK Guidebook for Sustainable Design" [5] a definite change was imposed in the design for recycling.

Nowadays the possibility of a future recycling, facilitated by a design foreseeing how to disassemble materials and components for their easy separation and reuse, is being already examined closely enough for the building components, while it is being less examined for plant components because their aim at recycling meets greater design and construction difficulties unless their particular modularity, sectionability and removability are invented. Certainly recycling plant components is on one hand more complex than recycling the other building components, by now consolidated, on the other hand it is easier if the plant, even being designed as a whole with the architecture and lay-out, keeps its own recognition within the building context. The pre-requisite for planning the plant systems for recycling is, therefore, a plant setting as a functionally integrated unit in the building envelope, but physically separated. Thinking of a functional integration and a physical disconnection of a plant system means to design it so that it gives a very good performance in relationship with the function of the environment built to be either cooled or warmed or energized, but that has got links and transitory supports with it, that can be easily removed for the reuse of their components.
The further effort that is required, besides, to the technical designers of the plant systems, from a recycling point of view, consists also and above all in having to reconcile the demand for reuse with energy consumption saving and use of renewable sources. In order to achieve this aim the plant system needs to have relationships with both interior and exterior environment. Architecture with a low energy intensity, submitting the attainment of the thermal comfort to the exchanges of natural heat, opportunely isolating the envelope, is its necessary presupposition. A greater possibility of recycling the plant systems happens, therefore, in the case of buildings with a low energy intensity, that is with very lower electric and thermal energy consumptions than the average and in self-sufficient buildings. Here their low consumption is given by essentially solar and geothermal renewable energy, resulting in a noteworthy simplification of both interior and exterior plant networks and allowing an easy reuse of the plant systems involved in such networks, as well. Besides, in the case of the solar energy that is the most widespread, the modularity of both thermal and photovoltaic captators must be added, that subsequently contributes to facilitation for recycling. In conclusion, the reuse of plant components and systems can be diffused, if they are conceived as simplified environmental networks, as designed by the designer as modular, repetitive and removable, that is concerning with "low-intensity" or self-sufficient models through the use of renewable energies. Recycling building materials and components is more and more diffusely considered as a factor of sustainability of architecture, especially if deconstruction is considered rather than demolition, being the former an activity aimed at separation for recycling, while being the latter a simple removal. From the considerations previously expressed, it can be deduced, however, that the real frontier of the sustainable design of plant systems is the frontier of the design from a recycling point of view (*design for recycling*). This design allows to carry out a plant system, so that the components can be recovered in their integrity and, therefore, reused with simple actions of disassemble and assemble.
Thinking of the reuse of the plant materials since the design let better carry out an eco-friendly architecture, careful to save energy uses and consumptions and to balance them with renewable natural resources, anyway. The adhesion to the design principles for recycling, achieving a high level of reversibility for the environment where the work is inserted represents, therefore, a suitable answer to the demands for sustainability. When an intervention of a building rehabilitation is carried out, they also intervene on the plant systems removing them or replacing them partly or completely with the aim at:

- either improving their performances;
- or adjusting them according to new standards;
- or replacing them for obsolescence;
- or changing their performances and their working,
- or changing their intended use,

or because it is not possible to preserve them in the building demolitions. In these occasions the removed material can be recovered and recycled, in a decreasing order of difficulty, both as a system and as a single component and as a secondary material. In the matrix the intersections have been coloured showing what type of reuse the intervention can carry out according to its aims.

object of removal	production material	reuse of component	reuse of system
performance improvement			
legislative requirements			
overcoming obsolescence			
change performances			
change destination			

Tab.1 - Matrix of removals usability

The removal for obsolescence can, for instance, allow only the recovery of materials, as components and systems, if obsolete, have not got a competitive functionality any longer.
If the plant system is removed for either its performance improvement, or a change of its performances, or a change of the intended use of the served building, it is possible instead to get production of materials, reuse of the component and reuse of the system. If the removal is determined by an adjustment to changed standards, then the recovery cannot certainly be recovery of system, but recovery of material or, at the most, recovery of components that are still in accordance with the standards.
Having spoken about a possible recovery, it is opportune to establish what it must be meant for possibility to recover, reuse and recycle the plant systems. Materials or components can be recovered singly, if the process of integration with the others allows to separate them without any dimensional, chemical or physical damage. They are also reusable when, with their separation, they have not lost their aesthetical or performing qualities and if they can be reformed or reinstated in their primitive capability of connection with other materials. Recycling can be defined the possibility to reuse the material that can be recoverable and reusable. It also depends on either the propensity or reluctance to reuse a certain material or component.
In the matrix that follows the requisites of maintenance of the plant material are highlighted according to the aim of recovery. In order to allow the recoverability in the intervention of removal of the building components, the chemical-physical characteristics of the material mustn't be altered; in the case of recovery of components, besides the preservation of their characteristics, their volume, their shape and their integrity meant as a whole of sub-components, it is made up of, must be preserved; finally, in the case of more components systems, the maintenance of the mechanical and electric connections among the components must be considered, besides what is applied to each of them.
If the aim of the recovery is the secondary material, the maintenance of the characteristics of the materials is enough; besides this, if they also try to reuse the single component it is necessary to preserve its integrity and its shape. If every possible reuse is wanted, they need also to maintain the connections among the components.
For the maintenance of the existing plant systems there are some performing and regulatory limits.
While also the old building work still offers the performances of the recent work, for instance it has got an envelope protecting from rain, warm or cold, the old heating system can't give the performances of a modern air-conditioning system.

	purpose of recovery		
preservation	production material	reuse of single component	reuse of a section plant
chemical- physical properties			
volume, shape and integrity			
mechanical and electrical connections			

Tab.2 - Matrix of recovery aim

Even more often it can happen that the plant system is not in accordance with the standards; standards always evolve quickly with the available technology and greater and greater requests of safety and reliability, for which in most cases the reuse of the old plant system is not possible.
The standards that mostly prevent the maintenance of the old plant systems are those of safety and energy and environmental performance.

3. Photovoltaic systems as a "double green" technology (Raffaela De Martino)

The sustainable design of building's plants must be aimed not only to reduce energy consumption, but also to the recycling plant systems, as well as those related to traditional or innovative type as photovoltaic systems. The exponential growth of photovoltaic installations pushes designers and manufacturers in recent years to deal with the delicate issue of the disposal of the modules at the end of life. Many components and raw materials of the panels can be, in fact, in order to saving resources, re-used through appropriate management and control strategies. Solar energy is an alternative source of energy, inexhaustible and clean as during the lifetime of a PV system, no emission of pollutants are (nitrogen and sulfur oxides) and "greenhouse gases" (carbon dioxide).
The photovoltaic energy production thus involves the undeniable environmental benefits over the traditional generation systems based on the use of fossil fuels. However, an analysis of the benefits can not be limited

to the use phase of the system, but must extend to the entire life cycle: which means to consider all environmental impacts associated with the various life stages of the product system, including the processing of raw materials, transportation, distribution, use, reuse, recycling and final disposal, using an approach called "from cradle to grave", according to the principle of the "Life Cycle Thinking".
Generally it is estimated that the average lifetime of a PV module is around 25-30 years; in theory, the lifetime of a PV system is potentially infinite since there are no moving parts, but because of the natural deterioration of materials may rupture phenomena of laminates with penetration of moisture and air within the modules and consequent oxidation of contacts and strips. These are the main causes of the decline of productivity, reduced yields and the consequent decrease in the overall efficiency of the system. At the end of its life cycle, these systems can be divested and subsequently disposed of in landfills. It is a shameful end, and especially in contrast with the main goal of energy production from renewable sources: a system in which the machine has produced clean energy runs the risk of becoming, at the end of life, in another of the many technological devices difficult to dispose of. Until a few years ago the problem of disposal was not considered, partly because of the young age of photovoltaic technology and the longevity of the modules. On the other hand, the start of the photovoltaic significant in many European countries (Germany, Spain) and the USA begins to be already "dated". For these reasons the industry, especially in Germany, has already begun to develop recycling methods thanks to the activity of PV Cycle, the European association for the voluntary collection and recycling of photovoltaic panels, founded in 2007 by industry of solar.
A traditional crystalline silicon photovoltaic module, for example, is composed of glass, used for the external and protection surfaces; of aluminium, used for the frames; of silicon and other metals, such as silver and copper, used in small amounts for the realization of the electrical contacts. Are all valuable materials that can be recovered for the production of new modules or other products.
All these considerations make it clear how important it is to close in a virtuous way the life cycle of a photovoltaic module, making this technology "Double Green", as the slogan of the PV Cycle. This way takes us to an approach called "from cradle to cradle" [6] through which materials and components recovered from the modules at the end of life (the wafers from the cells recovered intact and the high-purity silicon from broken ones) are reintroduced in a new cycle of production of the same product obtaining a considerable energy saving. In order for recycling to be truly effective and efficient it is necessary to enable such an approach from the earliest design stages of the product-system, designing the PV modules in a functional way for recycling.
PV Cycle is an association founded in 2007 to implement the commitment of the photovoltaic industry to set up a voluntary take-back and recycling programme for end of life PV modules. The purpose of this initiative was also to avoid the introduction of legislative measures by the European Community, which has, however, recently issued the new WEEE Directive. The WEEE Directive [7] on the Waste from Electrical and Electronic Equipment, regulates the proper treatment of such products and requires manufacturers and importers to secure the recovery and recycling at the end of the life cycle. In the scope of the first WEEE Directive the solar panels were not included, but from 2012 they were included in the list.
The directive does not need to be transposed by Member States until 14 February 2014. In Italy, meanwhile, manufacturers and importers of photovoltaic modules have, from July 1 2012, new precise requirements for the management of end-life phase of systems. And what a result of new application rules established by the Energy Services Operator needed to ensure the recycling of the modules. As is known, the cells of crystalline modules consist mainly of silicon, which does not lose the ability to absorb the incident solar radiation, and it is for this reason that the panels can be recycled and reused. However, this does not apply to thin films because they contain a very low percentage of silicon: their components are in fact only re-used metal ones.
The process to recycle a crystalline photovoltaic module consists of three main stages: removal of the frame and junction box, grinding and recycling in the line of processing of float glass. The fractions resulting from this process are ferrous and non-ferrous metals, glass, silicon and plastic with an average of recycling between 80% and 90%. The glass produced by the photovoltaic modules is mixed with standard glass and partly reintroduced in fiber glass or insulation products and in part in products for packaging glass. The metals, silicon and plastic may be used for the production of new raw materials.
Speech exception is made for photovoltaic modules based on materials other than silicon as the CI(G)S (copper indium gallium diselenide) and CdTe (cadmium telluride). Up to 95% of the materials used in these modules can be recovered for the use in new materials. To delaminate and separate the various components of the photovoltaic modules using chemical baths based tensides.
Among the few projects of photovoltaic systems modules with recycled it should be noted that the building of the International Solar Energy Research Center Konstanz, Germany [8]. The ISC is a research institute, specialized in the research and development of solar cells and modules with crystalline silicon, whose main goals are to make solar cells more efficient and reduce their production costs, thus encouraging the spread of a environmentally friendly technology. In recent years, the ISC also has examined in-depth research projects aimed at developing new technologies for the production of solar cells, the evaluation of new raw materials and finally the possibility of reuse and or recycling of the modules reached the end of life. This line

of research has found a practical application in the building housing the center. The southern facade of the institute has, in fact, brise soleil photovoltaic cells made of 100% recycled. Studies conducted by the institute show that the efficiency of the successfully competes with similar systems made, however, with new cells. The installation, overlapping the existing building structure, while not constituting an interesting application from an architectural point of view, is a exemplary case, particularly significant, of widespread culture of recycling in the photovoltaic field.



Fig. 1: The International Solar Energy Research Center Konstanz, Germany.

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Drawing for the analysis of architectural language: the case of Giuseppe Palazzotto

Eugenio MAGNANO DI SAN LIO[1], Mariateresa GALIZIA,[1] Cettina SANTAGATI,[1]
(1) Department of Architecture, University of Catania, Catania, Italy
emagnano@unict.it, mgalizia@dau.unict.it; cettina.santagati@dau.unict.it

Abstract
The research is aimed at the possibility to evaluate and comprehend, almost entirely through the disciplines of Survey and Graphic Analysis, the architectural language of a designer understanding the invariant features of his works.
As a matter of fact, in the absence of suitable historic documents and design drawings, the architectural text represents the basis for conducting the cognitive investigation.
As the subject of the research, the architect Giuseppe Palazzotto (1702-1764) was therefore selected. He was an artistic personality, a severe executor of a refined lexicon and a man of great formal coherence in the course of his long career.
A fundamental part of the research has been the creation of synoptic tables on which to start an immediate graphical comparison between similar formal solutions in different buildings, or parts of them. The drawing analysis were carried out on graphical representation obtained through careful surveys made with the same graphics rendering, aimed at an immediate comparison.
For cases of particularly complex geometric shapes we used 3D laser scanning to acquire a large number of metric information, necessary to carry out a graphical analysis based on reliable data.

Keywords: Giuseppe Palazzotto, Graphical Analysis, Drawing, Surveying, Catania

1. Introduction
Eugenio Magnano di San Lio

Giuseppe Palazzotto is one of the most representative architects of the eighteenth century in Catania.
In the reconstruction of the city after the earthquake of 1693 he designed or rebuilt many buildings, from the beginning of his activity in the fourth decade of the century until his death in 1764.
He had a coherent and personal style which is recognisable during the whole period of his prolific activity.
According to classical architectural orders he developed a personal language that influenced and was influenced by the other architects working in Catania in the same period.
For instance, he was probably the inventor and was certainly the major user of the typical vertical aggregation of architectural elements which is called "candle".
In this technique a continuous line follows and defines the profile of the architectural unit; the keystone of an arch becomes the bracket of the balcony standing above and the protrusion of a geometrical cartouche between the wings of a broken tympanum corresponds to the protrusion of the underlying window lintel.
Sometimes horizontal mouldings link together windows and balconies of a facade.
In aristocratic palaces the central gate and the overhead balcony with its windows, larger than the others of the facade, becomes a single unit, a tribune.
The question is if, through architectural survey and geometrical analysis, it is possible to recognise shapes, aggregations and formal solutions that are typical of Palazzotto's architectural language.

His masterpiece is the Palazzo Valle in Catania, usually attributed to Giovan Battista Vaccarini, but, according to the testimony of a 19th century historian and especially by an analysis of the architectural style, it can be attributed to Palazzotto.
In this building the characteristics of Palazzotto's language reach their peak of perfection.
Two examples of the comparisons - carried out through both the survey and the graphic analysis of Palazzotto's diverse works in order to identify permanent features in his architectural language - are included in the synoptic tables accompanying this paper.
In particular, two main themes have been identified with some variations in various buildings which were undoubtedly designed by Palazzotto.

In the first theme the subject matter of the horizontal frame of an architectural element, which, by one line going vertically and another going horizontally, finishes at the top of a second above-lying element thus merging them in one unit, is analysed.
It is to be found again, skilfully used by Palazzotto in the side gates of the facade of the Church of San Giuliano (1740), in the big gable window in the tribune of the Palazzo del Senato (1760) and in the loggia of the Seminario dei Chierici (before 1760), although the first clear use of this formal invention in Catania has to be credited to Vaccarini who used it inside the refectory of the monastery of San Nicolò l'Arena in 1739.
Another element is that of the gable end showing vases with flowers and stone flame vases, joined through willowy lines which stand out - or were meant to stand out - against the blue skies on the top of the buildings designed by Palazzotto.
In particular, they are the playful gable ends built over the second tier of the loggia of the Palazzo dell'Università in Catania, the similar gable ends on the sides of the facade of the Church of San Giuliano, the gable end – now walled up – of the tribune of the Church of Santa Chiara and the gable end which was meant to crown the southern facade of the Palazzo del Senato in Catania; despite having never been built, it can be seen in an etching in the work of Bova taken from a drawing by the same Palazzotto.



Fig. 1: The "candle" of Palazzo Zappalà in Piazza Duomo, designed by Giuseppe Palazzotto in 1760.

2. The theme of the vertical frames

Mariateresa Galizia

Architecture, like all the other arts, can be considered as a text that, both in its parts and its totality, bears the signature of its author. Through a careful survey and a detailed graphic analysis of the data collected it is possible to identify both the permanent and changing features which characterise the works of the architect.

The research on Palazzotto, whose work has often been overshadowed by his close collaboration with G B Vaccarini or has not been acknowledged by many scholars, aims to provide a detailed study of the stylistic/formal features characterising his architecture, which qualified him as 'architect of the city' in 1745.
His architectural language, with its simple solutions and syntactic accuracy, was learnt from and inspired by the texts kept in the libraries of the city, as well as from the close and fruitful collaboration with Vaccarini.
Unlike the latter, Palazzotto's limited possibilities to travel to see new places which could inspire his designs held him back from achieving originality and innovation, which were the dominant features of Vaccarini's work.
His formal solutions, on closer examination, are recognisable for their controlled and cautious originality. He used traditional elements (capitals, small balusters, tympanums) 'with no innovation or amazement', but with elegance and the accuracy of their harmonious connections, which made him famous in the history of Catania.
An example can be found in some design solutions used in the Palazzo del Senato in Catania, a building whose authorship is wrongly attributed to Vaccarini. By carefully examining the blueprint of the facades, with the additional aid of archival documents, the differences are clear. Here his favourite theme is evident, the frame which bends 90° without breaking and which would become the trademark of the designer himself. the architectural element revealing the authorship of his works.
The majestic central tribune, designed in place of the Romanesque gate, occupies the whole architectural element formed by two giant flat lesenes. Unlike the large windows of the piano nobile attributed to Vaccarini, the tympanum here does not break and turn outwards dynamically, but folds on itself by lying on the same plane.
Palazzotto prefers the continuity of the mouldings finishing off the formal appearance of the architectural element. Bare and smooth imposts, slightly rotated so as to find a solution from the point of view of perspective rather than from that of form, support traditional capitals from which flat triglyphs with slightly projecting guttae hang.
A simple trabeation supports the frame with its tiny mouldings which bends 90° thus interrupting the function of the dripstone so as to leave a rectangular area which contains a marble crest of the city. The two wings of the tympanum, which hold two female figures created by G. Orlando, complete the architectural unit.
The theme of the frame which bends 90° also appears in the windows of the mezzanine. At the top, to finish the facade, there is a bare, continuous frame which surrounds the single windows, as if to join the single parts of the architectural elements in one unit. The linear and thin mouldings bend around the large windows and, with no interruption, go over the lesenes thus representing a means of "connection between the parts" which finishes the architectural structure of the facade.
A similar formal solution of a folded frame, which underpins Palazzotto's signature, can be found in the loggia of the Palazzo dei Chierici. A small room contained in the piano nobile, in which the attention paid to architectural details makes it an example of harmonious beauty between the parts and the whole unit. The quadrangular planimetric structure, with two large pilasters lying in the middle which divide the area into four parts covered with domes on pendentives and with two groin vaults, is surrounded by lavish and decorated openings, niches and large windows overlooking the inner court.
All the single architectural elements on the facades of the structure are also here "tied" by one continuous frame which bends 90° exactly where the windows lie. A tripartite lintel supports the smooth frieze which, aligned with the doors/windows, contains a modelled shield with festoons and crown, the whole unit being framed by the bare and geometrical mouldings.
The folded frame, like in the tribune of the Palazzo del Senato, supports the two wings of the tympanum turning outwards which frame a rising flame in the middle.
A signature thus belonging to Palazzotto, who very skilfully uses the frame not only as an element to finish the structure but also as a connection between the parts, as a thread which sews together the interruptions of the single architectural elements.
The same theme of the folded frame can be seen in the side gates of the Church of San Giuliano. The frame over the gate folds in a right angle giving way not to crests or shields, but to a high and soaring fanlight window which lights up the rooms for the cult.
The solution becomes a means of "connection between the parts" here as well. The two distinct elements, the door and the window, become a single unit, an architectural syntagma which vertically flings the structure towards the sky, in a single "candle-shaped" element. The bare and rigid mouldings overlap in a continuous manner with the lintel of the underlying gate. Over the frame the two wings of the tympanum rise, recurring elements supporting modelled sculptures which represent little angels.
Such similar formal solutions, found in buildings different from the point of view of type and use, have been compared through synoptic tables, in which the 90° folded frame representing the constant feature of Palazzotto's architecture appears. A recognisable signature which the architect uses with coherence and designer skill.

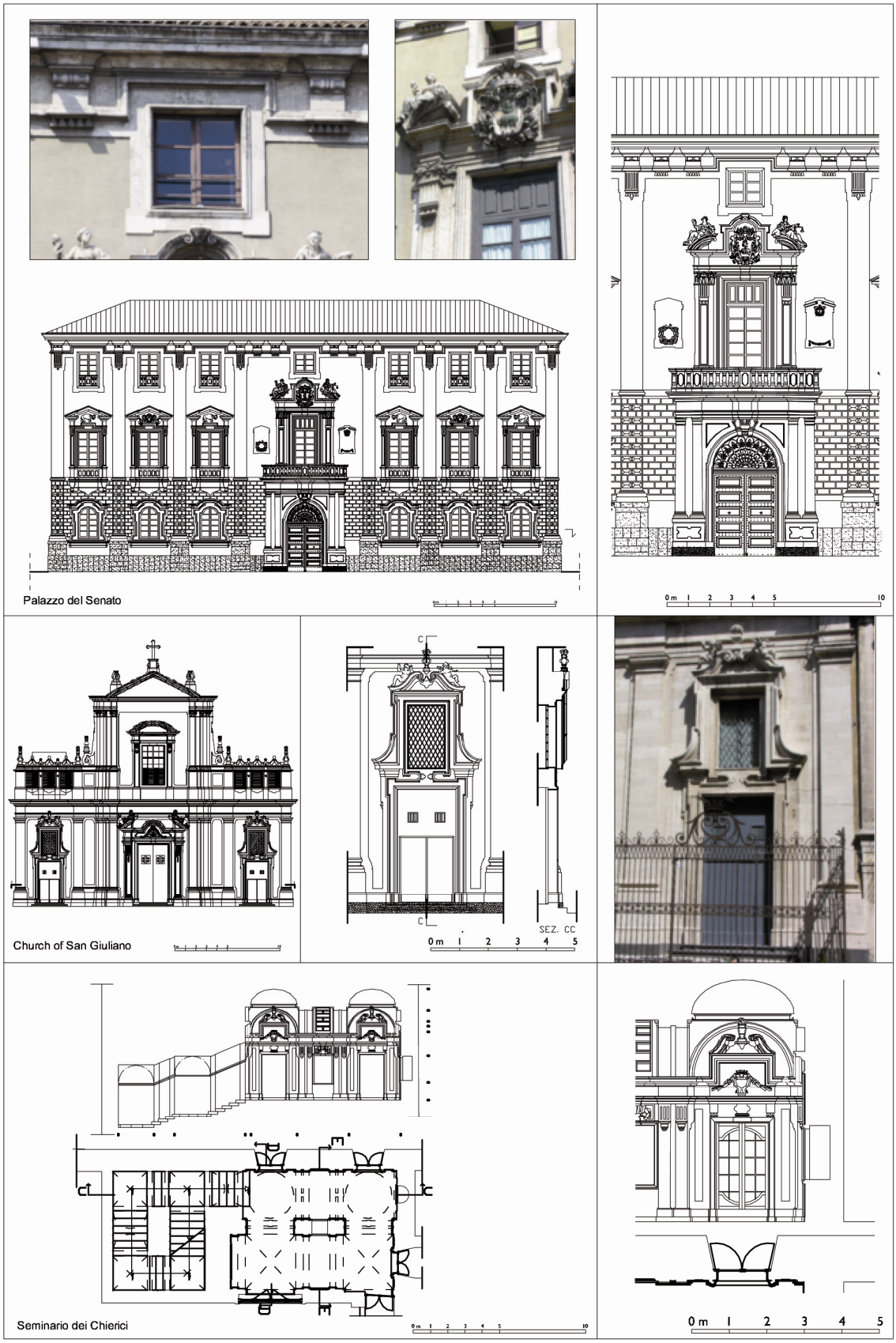

Fig. 2: The theme of vertical frames.

3. The theme of the crowning gable-end

Cettina Santagati

The methodology of study of the recurrent themes of Giuseppe Palazzotto's architectural lexicon by means of surveying, graphical analysis and documental validation allowed us to carry out an in retrospect critical lecture of its architectures and projects, thus detecting the elements that characterize its architectures and make readable its planning style.
Among those the theme of the buildings crowning gable-end stands out. Palazzotto often adopts this solution. We can find it both in civil buildings, such as the court of the Palazzo dell'Università and in the façade of the Palazzo del Senato, and in religious buildings like the lodge lantern of the church of San Giuliano and the church of Santa Chiara in Catania.
In 1747 Palazzotto replaces GB Vaccarini in the building site of Palazzo dell'Università. The first order of the portico of the cloister had been already completed and part of the second order was in a quite advanced phase of construction. To crowning the second order, Palazzotto designs a graceful and lively frieze in white stone that is rhythmic by the alternation of vases with flowers, placed in axis with underlying pillars, and soft double spirals, elegantly carved on the stone, that support towering vases with flames.
On the whole, the light and the shade effects caused by the carved stone gives ~~a certain~~ dynamism to the fancy and harmonic skyline of the cloister lodge.
A solution similar to the one realized for the Palazzo dell'Università is the one designed but never built for the top of the Palazzo del Senato. Indeed, it is possible to see that solution only in Antonino Bova's incision as an attachment to Arcangelo Leanti's book about the city of Catania.
Definitely, the gable-end of the Palazzo del Senato is characterized by the alternation of high verticality elements – vases with spheres – placed in axis with the underlying pilasters and lesenes that rhythmic the façade and of double spirals that embraces the entire span where they stay and support, once again, flames vases.
In this case, the greater highness of the elements in axis with the lesenes in respect to the ones in axes with openings gives more majesty to the façade layout. Furthermore, the treatment with very close horizontal lines in the frame inside the spirals creates a perceptive figure-ground effect that makes the geometric pureness of the shapes standing up.
The continuity of the frieze is interrupted at the central span where the element with double spirals enlarges itself in order to host the meridian clock and it is topped by an omega frame.
Dealing with the two religious buildings, the Church of San Giuliano and the Church of Santa Chiara, the attention of Palazzotto is mainly addressed to the dome. As a matter of fact, he experiments an innovative solution in respect to the contemporaneous realizations in Catania: the lantern becomes a lodge and involves in its inside the dome. Thus, having both an esthetic and static function. In both churches the frieze crenellations made by white stone invigorate the stability since they participate to the vertical forces resultant.
As regards the Church of San Giuliano, the gable-end solution is proposed again in the lateral sides of the façade as well as in the crowning of the lantern. Here the rhythm is more compact. The architectural element is framed between two flat lesenes and on the upper part is concluded by three mullioned windows closed by pot-bellied grills and topped by a frieze that once again alternates little flowered vases (placed in correspondence with openings jambs) and carved double spirals topped with spheres. The elegant ribs cut out beneath the openings sills balance the upper frieze.
Similarly to the frieze of the Palazzo del Senato, also in this case the double spirals are linked with continuity to the vases. However, here the ratio horizontal/vertical of double spirals is compressed in horizontal direction.
Finally the gable-end of the lodge lantern of the Church of Santa Chiara, nowadays walled in, refines the crowning to the sky of the building. Differently from the church of San Gi
uliano, here Palazzotto ties in a whole the lantern of the dome, with a dodecagonal shape, to the bell lodge in façade. Thus, the lodge and the frieze, in addition to a static function, have also an esthetic function of lightening the wall mass, otherwise it would be too much predominant.
The frieze swivels on the attic parapet alternating double spirals in the central span and slim vases in the pilasters. Compared with the solution adopted in the previous examined buildings, here Palazzotto doesn't play with light and shadow effects due to the overlapping of lightly projecting layers, but simply cuts a background inside the double spirals elements and commits the perceptive effect to materials two-colour print.
In all the examined examples we can appreciate the ability of the designer to develop, according to the needs, the theme of the crowning frieze with similar solutions but having different perceptive effects.

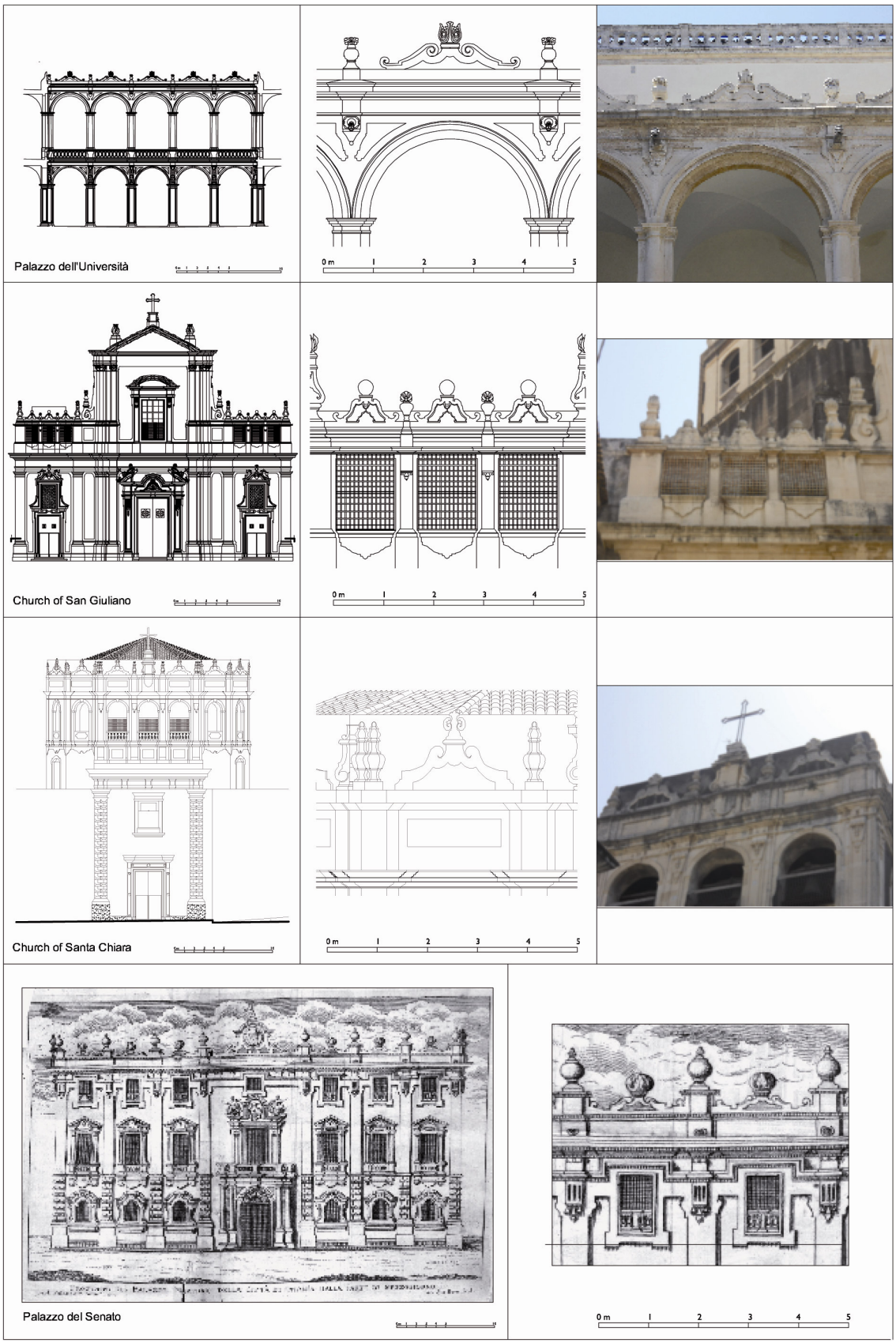

Fig. 2: The theme of crowning gable-end.

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Air Movement: From the Tradition Towards Innovative Experiences

Fosca TORTORELLI [1]Francesca MUZZILLO[2],
(1) archfo@gmail.com
(2) Dipartimento Luigi Vanvitelli, Seconda Università di Napoli, francesca.muzzillo@unina2.it

Abstract
The consideration of air as a real building material is one of the most innovative field of architectural experimentations. The sustainable approach implies that architects should consider mutable prevailing conditions of air movement which, with its dynamic movement, connotes morphological aggregation. Different mutable prevailing conditions are given by the nature itself of air, which is dynamic into aggregation. Historical net of architecture, with relation among patios and open spaces, and with variable composition of areas and interconnections, is what reminds this sensation of thermal wellness, due to air movements.
Some ancient architectures in particular can be the historical basis from which starting for air movement innovative technologies.
With a system of design methodologies it is possible to recreate a situation similar to historic configuration of Mediterranean Architecture, with continuous alternation of entrance and exit of air.
Innovative experiences are analized also with methodological indications for cooling and air movement.

Keywords: natural ventilation, Mediterranean architecture, chimney, innovative ventilation.

1. Ventilation systems in Mediterranean Architecture (Fosca Tortorelli)
Technological research is now increasingly deepening the themes of innovation in the field of natural ventilation. In this sector what stands out as innovation is often closely linked to the historical tradition.
Entering in the specific theme of the "chimney component", this is one of the oldest man-made "heat engines", which lends its name to the phenomenon known, in bioclimatic architecture, as the “chimney effect", associated to the natural ventilation of a building. The buildings behave like chimneys, in which inside the air circulates in function of the pressure differences, that are responsible for the natural ventilation of the building. It is fundamental for the air change of the environments and the thermo-hygrometric wellness of occupants. The use of such systems for passive cooling, and in particular for natural ventilation, has always been widespread in the Mediterranean countries just to deal with the difficult summer weather conditions.
In Italy, for example, it is possible to recognize some constructive archetypes, which use hybrid thermal control strategies, by means of the combined use of mass walls and chimney effect, enabled through appropriate openings on the building.
Unfortunately, the recent widespread building has underestimated the benefits obtainable from natural ventilation and passive cooling systems in general, relying on the system component for controlling temperature and humidity of indoor spaces.
However, it is important to know how, in different architectural references and settlements of the past, emerges the revaluation of certain environmental aspects since the initial design phase, through both the orientation of the buildings and from the atmosphere, either through an adequate internal distribution of the spaces and of the mechanisms of initiation and regulation of the flows of air and solar radiation, in order to facilitate the internal microclimate control without the use of technological systems for cooling, and in addition to guarantee the successful architectural integration of all devices to it functional.

The wind is one of the elements that represent an agent able to support the generation of the air flow, determined mainly by the fireplace effect (the hot air tends to rise upwards, creating a depression at the base that sucks the colder air from the outside). The vertical cross-ventilation system and that of the combined wind-chimney effect can coexist with obvious advantages as in Iranian wind towers and Qáa Egyptians. But back to Italy, just think of the type of construction of the Apulian Trullo, that probably began as a simple shelter, evolving over the years to become a comfortable home from the point of view of climatology / functional, economic and morphologically unique. The architecture of the Trullo has infact undergone various changes, just to make it more comfortable and functional, changing from a circular structure, to a square one (Fig. 1), until you get to form structures composed of several Trulli, with a large central room, where takes place the fireplace so you can well distribute the heat in different rooms. The external walls reach the thickness of one meter in order to obtain niches. The domed ceiling, covered with limestone slabs (the chiancole), has an inclination of 45 ° which promotes the drainage of rainwater and its collection and preservation through a cistern located under the same Trullo. The flooring is made of slabs of limestone (the chiancole), other than those used for the cover. The whole architecture of the Trullo is made according to criteria of common sense we now call "bioclimatic principles", with a single input place to the south, sheltered from the north wind, and with few windows positioned opposite one another, so as to create a natural air circulation. The thick white walls provide an almost constant temperature throughout the year, cool in summer and mild in winter

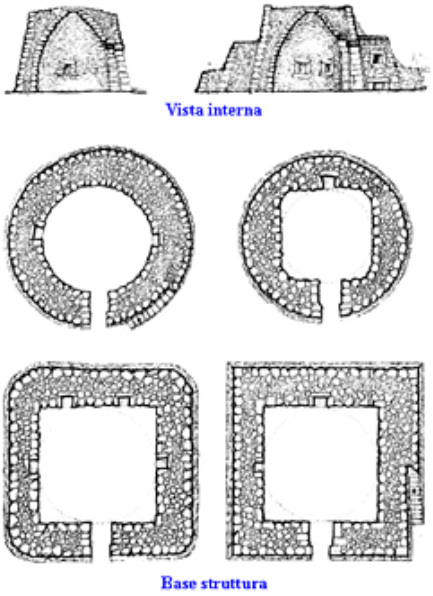

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Fig. 1: Trullo structure changes.

Very briefly the Trulli offers very good terms of adaptation to climatic conditions, ensuring a high level of comfort resulting from a guaranteed good ventilation chimney effect due to the conical shape of the section and to a certain permeability of dry stone walls.
An element present on the outside of many Trulli is the bower (fig. 2) of screws to high stalk. Very often it is also the arrangement of these plants along the main front. The usefulness of the bower is to create shadow areas near to doors and windows only for the summer period.

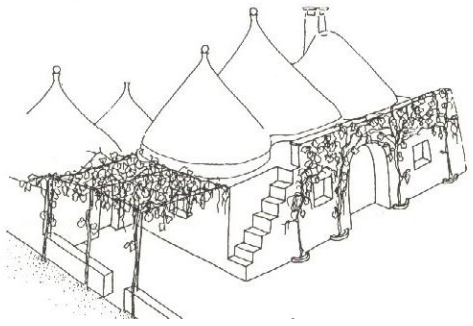

Fig. 2: The bower

In conclusion, the Trullo can be defined as an enclosure wall controller that does not exploit the climatic conditions, but passively protects the interior from the outside.
Further examples of technological and design solutions, aimed at obtaining the best climate comfort of the interior, are found throughout the traditional Islamic architecture that goes from the ninth to the twelfth century. In Egypt, Sicily, as in all areas of the Maghreb there are buildings and residences where the constructive culture in achieving those systems, that now are commonly known as natural air-conditioning systems of buildings, goes far beyond the simple empirical experimentation. The Zisa castle in Palermo, which is halfway between the Royal Palace - placed in the center of the city - and Monte Reale, where in a few years, from 1164, with William II was built the famous Abbey of Monreale.. It is designed as a large rectangular parallelepiped perfectly symmetrical, consisting of a ground floor, where the center is a noble straw embellished with a fountain, two upper floors for housing male and female and a terrace of crowning which was originally opened in the center, allowing rainwater to fall into the impluvio of three open spaces on the second floor and then be channeled into pipes made in the soffit of the slabs. Front of the castle there is a large collection tank water from the indoor fountain (fig. 3).

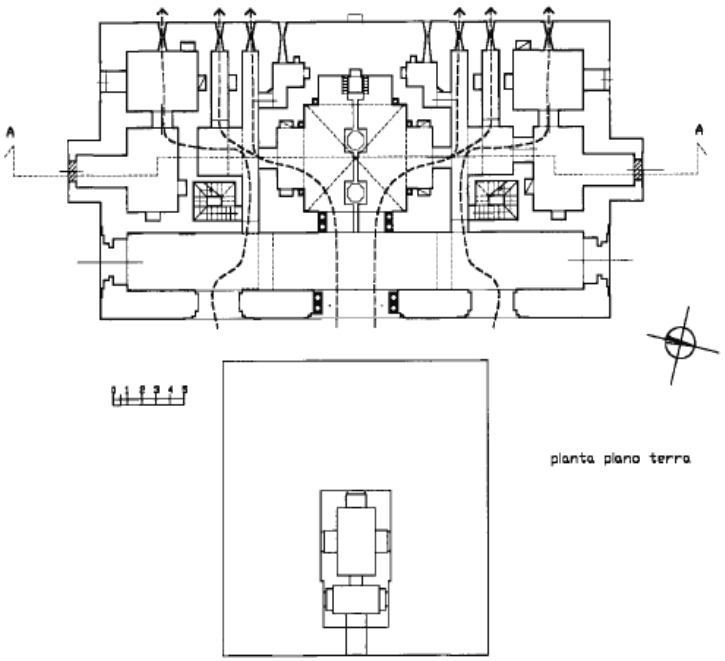

Fig. 3: The main floor of the Zisa

The main facade, changed over the centuries, was open on the ground floor with three large ogival barrel vaults, the central double height, and the upper floors of single and double windows arranged symmetrically with respect to the central axis, while the rear elevation appeared on the contrary more closed.
The volume of the building, which appears today as a unique " bio-climatic machine," was completed with two building's side, jutting out from the outline of the building, containing some real "ventilation chimneys" in response to all three levels of the structure and concluded on top of what today we might call a chimney uptake.
One of the first similarities that we find the current bio-architecture, in this second example, is the importance that the designers of the Zisa have given to the orientation of the building and with respect to the path of the sun, and especially compared to the incidence of the winds. The orientation of the main facade to the north-east of this and the presence of three large openings suggests the willingness of manufacturers to maximize the benefits of sea breezes. The conditioning fresh air inside the building was obtained through a mechanism that involved the operation of the five main architectural elements and furnishings: a large fish pond in the front garden, the fountain on the ground floor, the two ventilation chimneys and the presence of large wet towels placed under the ceiling of several rooms on the upper floors. The air coming up from the port of Palermo, was cooled in contact with the water in the fish pond, which, once it enters through the large entrance porch, was

further cooled by the presence of water that flowed from the central fountain. Even today it is not clear how this fountain is nourished. Among the assumptions made, there is one that sees the fountain fed by channels descending from the upper floors. Rainwater cold, because channeled into conduits stone running in the thickness of the floors, for their conformation "Low Heat Dissipation", poured into the tank of the fountain embedded in the wall maintaining the low temperature naturally. With each new influx of rain the tank is "recharged" water cooler resulting in a replacement of the masses of cold liquid preserved.
This first system was then integrated the two ventilation stacks. Two towers perfectly symmetrical and equal in scope to the position and shape.
The air cooled as well, as they warmed, began his journey to the upper floors aided by barrel vault of ventilation chimneys that sucked the hot air from the residential environment. The air movements were facilitated by mass walls of the chimney that do not overheat from the outside with the warm rays of the sun produced the vortices of air inside. The small vortices tendencies stirred up the ascent of the air. The air circulating in this way continuous cycle in all environments. The system was helped by the presence, above each door of the room, a small lancet window. This punching allow hot air to be drawn from depression, even when the doors were closed. The movement of air masses fed itself on the principle of convection. The system is even more refined, as the builders had also thought of the amount of hot air, say residual, which continued to stagnate in the rooms farther away through the expedient of large tents wet supported by beams, the slots which are still visible to the tax of the time that, acting as cold-heat exchangers, refreshing the hot air that had layered up putting it back into circulation.
Reflecting to the present days and the many design efforts aimed at development of heating and cooling systems based on passive technologies, it is clear that sometimes the events of history repeating, experimenting with design solutions for cooling and/or heat the rooms that seem new. The modern bio-architecture uses ventilation chimneys, greenhouses for the accumulation of heat, hot and cold air ducts formed in the cavities of the walls and floors, rainwater recycling systems for use even for the purpose of cooling .
The architects who designed the Trulli or Zisa, they were not driven by the need to save energy but rather forced to conceive cooling systems to meet the needs of a better climate comfort, so that was obtained by combining the intrinsic characteristics of some natural elements such as air and water, with the forms of the architectural same. Maybe is from this point that you should start.

2. **Air movement and building shape** (Francesca Muzzillo)

The consideration of air as a real building material encourages architects to reconsider first of all the other materials from a different point of view, giving special attention to their possibility of being flexible. The most emblematic example is the system of air ventilation in Villa Baizeau in Carthage in which the architectural idea of Le Corbusier seems to be founded on air ventilation.
Contemporary architecture has taken note of this idea and over and over again the consideration of air movement is at the basis of first schemes' elaboration and there is a figurative image for shaping the building with regard to air movement. The shape of the building rises together with the preventive quantitative relation between ventilation and the conduction medium. Naturally this preventive work should be very systematic, with relation to air and the medium in which it moves, also in relation to various considerations like the possibilities of having a better internal microclimate connected with various part of the building.i A general management system of natural components should be correlated to a list of requirements codified into very carefully organised and well researched valuations.
Different mutable prevailing conditions are given by the nature itself of air, which is dynamic into its essence. And it is also true that often historic net of architecture with patios and open spaces, with variable composition of areas and interconnections, is what reminds this sensation of thermal wellness, due to air movements. With a system of design methodologies it is possible to recreate a situation similar to historic configuration of Mediterranean Architecture, with continuous alternate of entrance and exit of air. Naturally this permeability involves takes up again, in a different way, a direct and mutual action process between air and architectural forms.
While passive cooling is easily achieved through high mass performances, a lack of flexibility into massive masonry structural system does not always allow introducing new fountains and basins as evaporative cooling strategies. Most of all, some technologies of sustainable design such as solar hot water heating, photovoltaic and even small wind turbines could operate with an interference on air movement.
Peculiar to the Mediterranean architectural paradigm is the passage through the building not only of air prevailing passages, but also of perceptive and sensorial axes which are bounded, directly or indirectly, to ventilation: light and sparks of greenery, which enter the building through the openings of the envelope. This characteristic stands in opposition to the contemporary mainstream bioclimatic

architectural strategies, produced by a continual, widespread and penetrable filter. So, the emerging data suggest an idea of continue communication between open and closed spaces.
Into recovery practice, if we don't replace the voids, this lack could facilitate natural air circulation in the indoor-outdoor relationship. In fact, in our quest for an alternative to mechanical ventilation, we could improve the bioclimatic behavior of an old architecture through cross-ventilation.
Moreover, as we know that indoor air is heavier than outdoor one, a quite common practice is to drive air movements through the chimney and the voids inside the building itself is a traditional system for wellness, being these movements in a certain way similar to what we today call "stack ventilation", as they are based on the temperature difference among the various air levels, with air going upward from a higher pressure to a lower one and finally towards the open air.
Particularly seems there should be a new need for chimneys, as they have new significances and also a new evidence into architecture. Obviously there is the problem that the height of the building should not be too low in order to obtain a sufficient buoyancy force.
Sometimes in the past a different system was used and an alternative strategy let air moving into architecture from top. The air movement was connected to different typologies: ascending, descending or partly ascending and partly descending. And also this system is today studied: «downdraught cooling is an energy efficient, and cost effective alternative to conventional sir-conditioning for new and existing building. It relies on the effect of gravity on a body of (relatively) cold air to create a downdraught, and thus circulate air from the source of cooling to the occupied zone within the building».
Moreover air movement into Mediterranean architecture had a different function during the day and during the night. Innovative systems, differently from the past, can be predicted exactly and air movements are knowable through dynamic thermal models with expected performance evaluations, considering during design phase alternatives among section choices, individualizing the best choices in order to encourage ventilation.



Fig. 4: Alan Short and Associate's School of Slavonic and East European Studies

Some projects descend directly from researches on air movements, as in the case of Alan Short and Associate's ones in London. In the School of Slavonic and East European Studies there are at the basis of design the passive downdraught cooled studies, with different strategies during summer and during winter. The chimneys are evident on the main façade, giving character to the architecture, which, with its thermal mass of brickwork, tends to use low standard energy.



Fig. 5: Stanton Williams' Central Saint Martins main entrance atrium

In the Central Saint Martins main entrance atrium, where the ventilation systems utilize natural air buoyancy, Stanton Williams seems to bound innovation and tradition in a space with old brick walls on one side and a new ceiling on the top. Here the presence of air vents is evident, in an effort for bringing architecture back to the origins.

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The everyday and the monument, a case study of two UNESCO World Heritage sites: the wooden churches of Vilupulli and Ichuac

Constantino MAWROMATIS[1]
(1)Department of Urban Planning, Facultad de Arquitectura y Urbanismo, Universidad de Chile, Santiago, Chile
E-mail: cmawroma@uchile.cl
E-mail: cmawromatis@gmail.com

Abstract
The tangible and intangible assets of a heritage site are recognized and valued from the disciplinary framework, nonetheless it is first local heritage and as such, a part of the everyday life. This raises an evident tension when facing the restoration of a living monument, being this the case of 16 wooden churches in the *Chiloé* archipelago, located north of the Patagonia.

In 2000 these churches were declared World Heritage by UNESCO, recognizing the architectural values of these temples as well as the cultural context they are placed in. The hard weather conditions, the scarce resources, the attachment to the land, the religion and the community ties give *Chiloé* its very own character and a special atmosphere that are part of the identity of its people, all of which has to be taken into account when restoring the temples. The task of incorporating the essential aspects of the every day life and the challenge of understanding the value of heritage in a broad sense are the inputs that have to be dealt with.

Vilupulli and *Ichuac* are two of these living temples that were restored with the mandate and purpose of recovering and maintaining the structures that had been in imminent danger of collapsing. Reconciling the material with the immaterial aspects, the humble with the monumental, and attending to the deep rooted pragmatic sense of a population shaped in the harshness of cultural and territorial isolation, were the main issues addressed.

Keywords: World Heritage – Wooden churches – Chiloé – Restoration – Woodwork

1. The archipelago of Chiloé, a distinctive local cultural setting in a global world
The particularities of a territory and a people certainly reflect unto the criteria of the restoration of a building, moreover if it is a declared a World Heritage site. Chiloé is one of those experiences that demands closer attention in this respect not only for its unique location but also for its distinct culture. It is a remote territory located over a thousand kilometers south of the Chilean capital, Santiago, just north of the Patagonia, conformed by approximately forty smaller islands and the Big Island. The archipelago is the last bastion of the Spanish colonization in Chile, and it is conformed by a rich multicultural mixture between the native peoples and the European immigrants that mingled together throughout centuries. In fact, the uniqueness of Chiloé is related to its geography and its cultural isolation, as well as to its population scattered in small rural settlements, mostly overlooking the calm inland sea, establishing a culture based primarily on the land and its resources. These conditions favored the preservation of a cultural milieu structured by small farms with subsistence agriculture that differs from the rest of the country, a reality which has been characterized by concentrated ownership in the hands of landlords, and more recently dominated by the agriculture and forestry industry.

The local population has to deal with harsh weather conditions marked by abundant rain fall, humidity and rather cold temperatures, especially during the winter season where occasional strong winds further increase the difficulties of the people in their everyday existence. Nevertheless, these

conditions have also contributed to the rich diversity of the native species of trees in a lush wooded landscape of rolling hills and winding coastlines that define the archipelago's topography of the inland sea. Wood is therefore the natural material of construction in the area. The local cultures have developed a particular building tradition based on timber, on the skills of their carpenters and on a close net of solidarity and mutual cooperation that has allowed them to manufacture a variety of wooden objects, from tools to ships, to houses, and their most significant architectural contribution, the wooden churches. These wooden churches also relate to another Chilotan historic aspect: the peoples' strong commitment to the catholic rites. With the arrival of the Spanish conquistadores and the subsequent action of the Order of the Jesuits who arrived in the seventeenth century to the area to evangelize the indigenous peoples, religion became an essential part of the local culture [1]. Current rituals and customs still in practice are related to the evangelizing work of the Jesuits, who instituted the tradition of the "circular missions" -or Jesuit Peripatetic Missions-.using the inner sea as a means of getting to all communities.

…the Jesuits organized in the course of the 18th century a fantastic spatial network with their "circular missions" which allowed them to consolidate aboriginal communities in settlements around a chapel that was visited once a year and whose religious duties were led for the rest of the year by a "fiscal" appointed from the community itself. [2]

The Chilotan church, which is typically placed in front of an esplanade, invariably appears as the main element that gives birth and direction to the villages, and the area around them. It is a site of religious ceremonies and a gathering place for the neighbors. The building itself is usually located in such a way that it can be seen from almost every corner no matter if you are inland or at sea. In fact these churches served as virtual lighthouses for the passing vessels.



Fig. 1: The town of San Juan with its World Heritage wooden church. The changing tides define the shores of the inner sea of the archipelago. (Photographed by the author, 2006).

2. The wooden churches; the constructive tradition in wood and its particularity

2.1 The material and the traditional timber craftsmanship

The constructive tradition in wood defines the timber churches of Chiloé in many ways as a unique case study. The knowledge of the variety of types of wood that conditions the construction and grants specific attributes to the diverse elements involved in a building, and the traditional craftsmanship that utilizes tools and materials in a very creative and unique manner, compensating the shortage of resources with ingenuity and joint work, are some of those aspects tightly related to the archipelago's vernacular architecture.

The richness of the native forest allows selecting different wood species that have different qualities, using thereafter, the right timber depending on the needs of construction: for example, hard timber is used for the structural elements, watertight woods for roofing shingles and exterior walls, and softer

woods for interior coatings and some ornamental elements. These woods are crafted using basic tools and are assembled as defined building elements through diverse wood joints that are originally firmly knit together by wooden anchors without the need of either bolts nor nails; joints like the so called *Cola de Milano, Rayo de Jupiter* and *Caja y Espiga*, are some examples of the ingenious ways of securing the timber without the need of other elements.

The building tradition also conditioned the construction characteristics of the churches. The main corpus of the temple resembles a rural shed with its gable roof and simplicity, and is usually the first part to be erected, whilst the tower represents a rather more complex configuration that is conceived as a telescopic succession of hexagonal or octagonal drums firmly embedded one inside the other in order to secure the firmness of the highest and most feeble part of the church. The entire building settles on stone foundations that typically date back to the eighteenth century, being these stones simple rocks placed on the terrain.

In spite of the ingenuity of the Chilotans in the erection of these churches, timber structures are exposed to different deteriorating agents. Profuse rain, humidity, strong winds, solar radiation and wood boring insects are a constant threat in the conservation challenges of vernacular architecture in the southern part of Chile. The locals acquired the habit of replacing the damaged parts of a church and in extreme cases letting it crumble while building a new one alongside recovering and recycling the timber from the old one. This shows a particular pragmatic attitude towards these buildings, far from the more conservative and nostalgic sentiment that is more ditrectly related to a scholar's point of view.



Fig. 2: Quinchao, one of the 16 UNESCO World Heritage wooden churches prior to the 2011 full restoration. Exterior and interior view. The extensive and severe decay of the strucutre threatened the building to collapse. (Photographed by the author, 2006).



Fig. 3: The decayed elements of a church comprises the exposed surfaces of the wood, to areas usually hidden to the naked eye. The putrefaction of a timber and the presence of wood boring insects can therefore place a serious threat to the stability of a main structural element.
(Photographed by the author: churches of Nercón 2009, Rilán 2006, and Quinchao 2006).

2.2 Global styles, local adaptation

Another distinctive aspect of Chilotan architecture is the ability of the craftsmen to adapt different styles and morphologies to the local capabilities given by the building materials and the existing tools available. The singular design and the image of the wooden churches in Chiloé are also directly related to the reinterpretation of an architecture that was brought from Europe, and introduced in both, civil and ecclesiastical buildings. Within the latter ones, there is a mixture of morphological influences converging throughout time with the vernacular local adaptation. In fact, a combination of the Central European tower-façade with the basilica configuration characteristic of the Latin tradition can be recognized in the Chilotan churches. There is also a harmonious combination of elements that belongs to the Gothic, the Baroque, the Renaissance and the Neoclassical among other styles that can be singled out from a rich melange of eclectic architecture. Thus, it is relevant to acknowledge certain common characteristics in the buildings' forms, materials and craftsmanship that show no significant changes over the centuries, and remain a constant regardless of the style and the sophistication in the designs, inferring that they are part of a truly Chilotan architecture.

The interior is organized by arcades that separate the main nave from the side aisles, and the exterior portico at the access, holds the tower that appears like crowning the horizontal volume. Most of the churches also incorporate a barrel vault ceiling in their central nave, a technique borrowed from the construction techniques used in the traditional wooden boatbuilding. A gallery overlooking the central nave also serves to access the inside of the tower.



Fig. 4: Achao, Chonchi, Tenaun and Vilupulli, four UNESCO World Heritage Chilotan wooden churches. (Photographed by the author, 2011, 2006, 2006, 2006).

3. The UNESCO distinction: an opportunity to share local heritage with the world

The vernacular value of the architecture in Chiloé was unknown to the rest of the nation and the world for to long. Its simple and even naïve buildings often have been unappreciated by locals and scholars for its humble characteristics. Though its value can be fully understood and appreciated when getting to know the richness of the local traditional woodworks and the involvement of a community that makes their temples be part of their everyday life. In that sense these churches are an exceptional testimony of the local customs and culture found nowhere else in the world. These wooden churches are scattered all over the archipelago, having each its own particularities but being part of the same traditional way of building.

After long years of academic work and research in the archipelago carried out mainly by the School of Architecture of Universidad de Chile with the participation of the local community, the significance of the traditional wooden churches of Chiloé has been brought to the limelight, first nationally and then internationally. In 2000, through the joint work of the Catholic Foundation of the Bishopric of Chiloé, professionals and academic faculty of the University, and the National Council of Monuments, 14 of these churches were presented and officially incorporated into the UNESCO list as World Heritage sites, on account of their heritage value and as a means of recognition of a broader family of timber structures and its relationship with the intangible values of the local people. On June 2001, two other churches were added to the list. These 16 sites were selected among about 60 traditional churches that still existed in the archipelago at the time, considering them the most significant and representative exponents of a model or type that recurs throughout the archipelago. These churches

were noted as possessing a significant artistic and architectural value of historical importance. In this selection the condition of conservation of the churches was also an aspect taken into account [3].

The official justification for the inscription described by UNESCO contemplated two main criteria:

First, that *"the churches of Chiloé are outstanding examples of the successful fusion of European and indigenous cultural traditions to produce a unique form of wooden architecture."*

And second, that *"the mestizo culture resulting from Jesuit missionary activities in the 17th and 18th centuries has survived intact in the Chiloé archipelago, and achieves its highest expression in the outstanding wooden churches."* [4]

The national recognition first, and later the international distinction opened a way to share the values of the wooden churches of Chiloé with the rest of the country and thereafter, with the entire world, furthering thereby an incipient but nevertheless growing touristic activity. This interest certainly constitutes an asset for local communities that can through it seize the opportunity to develop a sustainable tourist industry, while cherishing and nurturing their own traditions over the overwhelming development related to the commodities and big industrial enterprises that have been penetrating the archipelago for the last decades



Fig. 5: Interior of the church of Achao, UNESCO World Heritage site. (Photographed by the author, 2005, 2008).

4. Restoration of Vilupulli and Ichuac: two of the 16 World Heritage sites

Vilupulli and Ichuac, two typically Chilotan timber structures are part of the 16 mentioned churches which carry their own distinct particularities, but nonetheless are very similar in their construction tradition, materials and wood joints detailing; both underwent a restoration process of their tower-façade, their roofing and partially their nave in 2005, in an effort to recover their structural stability, commencing thereafter a longer process of maintenance and future further interventions that have had to be addressed considering the limited funding resources available at the time. Both churches clearly belong to the Chilotan traditional wood architecture; with their simple shed like horizontal volume and its elaborated tower-façade, they are gracefully placed in a rural landscape. Their main religious festivities seem to justify the oversized scale of both churches, located in an eminent rural area, serving not only the neighbor parishioners, but also an extended community that comes from adjacent agricultural settings. Once a year they celebrate the day of their patron saint, San Antonio in the case of Vilupulli, and Vírgen de la Candelaria in the case of Ichuac, ocassion when the community pays tribute to their faith.
The restoration criteria were similar for both churches, considering the technical challenges and the extension of the works first, and then the rural character of the building site.

Vilupulli is considered by many, one of the most beautiful churches of Chiloé, with its balanced proportions, its tall and slender tower -that rises up to approximately 20 meters-, and its location that is exalted by the natural conditions of the terrain and the landscape surrounding it. The very characteristic of its slim tower -its main recognizable feature-, has accelerated its structural instability, showing an advanced state of deterioration of its parts and representing a serious risk of collapse. The prolonged exposure to sun radiation, the strong winds and the abundant rain accelerated the process of wood decay and the proliferation of wood boring insects, compromising the stability of the tower's

structural system down to its foundations. The lack of appropriate insulation only aggravated this condition. Therefore, the restoration project had to consider intervening the whole tower-façade structure, dismantling it completely, piece by piece, discarding the rotten timber and reusing the elements that could be treated or recycled; mostly parts with lesser structural involvement. In addition to the tower-façade, the evident thinning of the roof and exterior wall shingles -from the original ¾“ to almost cardboard like thickness-, implied the complete removal and replacement of the roofing and some areas of the walls. Although having removed most of the shingles of the front and parts of the sides of the exterior walls, the inner wooden sidings were dismantled and reused, since they had not been significantly affected by the deteriorating biotic agents. This was also the case of the doors, the windows and their framework, as well as some minor structural elements of the tower-façade and parts of the portico area that were saved and reused. The decision of what element to discard, to reuse or to recycle was made together with the local carpenters, whose skills and experience are essential to maintain, promote and prolonge the wood building tradition over time.
A rather atypical feature of the church of Vilupulli is its flat ceiling over the central nave, that differs from the barrel-vault ceiling of most Chilotan churches; otherwise the interior spatiality and its architectural elements and ornamental works resemble the characteristic traditional wooden church.
As a way of reinforcing the sense of belonging of a scattered community, a small temporary exposition shed with the dismantled and recyclable parts of the restoration process was installed next to de church.



Fig. 6: Vilupulli, the restored church. (Photographed by the author, 2006 and 2008).



Fig. 7: Vilupulli, before restoration. Climatic factors and the wood boring insects had seriously damaged the structure of the building. (Photographed by the author, 2005).

The church of Ichuac is located on a poor smaller island and therefore represents a rather unsophisticated case in the framework of the 16 World Heritage Churches, but nonetheless it shows a elabotated ornamental work on its frontal façade as well as in its interiors. Its distinctive feature lies in the configuration of its short tower, owed to the lack of a second drum, a typical characteristic of the other wooden churches. The main problems it faced at the time, were the tilted state of the nave -due to the soft terrain-, and the extensive decay of the tower's diverse elements, the roof shingles and the wood siding of the exterior walls. The severity of the impairment and the extension of the damage represented in fact a critical case in terms of its conservation status. The structural deformations and a significant differential settlement that boded the eventual collapse of the nave and tower, had to be addressed simultaneously to the works on the tower-façade, so as to prevent further structural damage.
The particular concern *vis-à-vis* the restoration of this church, besides recovering the structural stability and improving the sealing of walls and roof, was to keep the collective memory of the community in terms of the image of the church, linking the people to the recovery effort. Due to the lack of information on the historic morphology of the church, one had to turn to the community for photographic records that could account for the buildings image, especially because of an earlier assumption that the tower originally was conformed by two drums instead of the existing single one. Finally, and after consulting with the older people of the small community of Ichuac, the decision was made to respect its actual image and proceed with the restoration project.
Similarly to Vilupulli, a small temporary exposition shed was built for the local community and for the increasing flow of foreign visitors that could get an inside of the traditional wooden craftsmanship.



Fig. 8: Ichuac, the restored church. (Photographed by the author, 2005).



Fig. 9: The barrel-vault ceiling of Ichuac, before and after restoration. (Photographed by the author, 2005).

The same way as all 16 churches included in the World Heritage sites, Vilupulli and Ichuac risk to be directly or indirectly impacted by the ongoing transformations that can be observed especially in the

bigger cities of Chiloé, changes that can also been seen on the shores of the inner sea caused by the salmon and seafood industry, that are said to affect the environment and the cultural identities. The restoration processes thus, have to reinforce the local identities in a sustainable way allowing the preservation of the intangible aspects of a heritage in such a sensible location that is undergoing rapid changes. The fact that these churches were declared World Heritage sites does not mean that they should stay frozen in time. They continue changing because they are part of a living community that also changes. The wooden churches of Chiloé are in fact the worship temples from which the entire pastoral and evangelizing activities of the Diocesan Church take place.

5. The local and the global in permanent tension

The restoration of a "living monument" faces the natural tension between the universal values of a World Heritage site and the local everyday uses; the scholastic purism and the pragmatic attitude; the global awareness and the preservation zest confronted with a living heritage that shelters the religious rites and everyday activities. This tension certainly demands paying special attention to the intangible dimensions that influence the restoration process. In fact, it is the intangible aspect of the local heritage, which has made it possible for these churches to be still standing today. This has to do with the community involvement in matters that affect their everyday life, as well as with the knowhow of the traditional wooden construction and the techniques that have been passed on from generation to generation.

The communities around the heritage churches value them not only for their significant edifices, but principally for being temples of worship and places of social gathering. This presents a dichotomy that Larsen and Marstein -citing Michael Petzet- refer to when stating that historic buildings are something more than just historic evidence; it is precisely this point where the tension between the local and the global centers. *To regard historic buildings as pure "historical evidence" is not to regard them in the full richness of their authenticity,* as pointed out by Larsen and Marstein [5]. As they recount, when considering a country church which has been carefully restored and painted, the fact that it shines and looks new, arouses the emotions of the local community who sees it as an honour to God, which should not be overlooked, but quite on the contrary, this sentiment and sense of belonging should be understood as a living value of an historic building [5]. Similarly, the wooden churches of Chiloé belong first to the parishioners and their deep religious devotion; and therefore the distinction that was given to the 16 churches that were included in the World Heritage list, should be understood as a reinforcement of the local identity and a recognition of the local traditions that ultimately will ensure the heritage permanence in time.





Fig. 10: The religious devotion of the Chilotan people and their close-knit community relates directly to their temples of worship. (Photographed by the author, 2006).

Within this predicament, the restoration process of the wooden churches in Chiloé, and specifically the cases of Vilupulli and Ichuac, seek not merely to replace a rotten timber by a new one, but also to guide the works within the traditional craftsmanship bearing in mind the delicate balance between the responsibility of intervening a World Heritage site according to the parameters and criterion suggested by the numerous international charters and specialized literature, and the very continuity of the local traditions. Therefore, it was the duty of the restoration of these churches to find a harmonious and participatory way to preserve and exalt the patina of time -wherever possible-, and at the same time to bestow a restored building that ensures its stability for a longer period of time, providing the

parishioners with a well detailed and finished temple for their rites and social gathering. Hence, it is essential to count on local carpenters that have acquired the knowledge and skills of their ancestors, promoting in this way the traditional craftsmanship, and thus preserving a fundamental part of the intangible heritage values.

Another aspect that raises conflicting points of view is related to the scale of the intervention. Unlike a monument where a permanent in house architect is assigned to carry out its maintenance and its systematic restoration -counting for it with a relatively stable budget within a given period of time-, in the case of the churches of Chiloé the scarcity of the resources and the uncertainty of being able to intervene the structural damages in a programmed way, determines fundamentally the restoration criterion. What is urgent to be addressed adds to the otherwise deferrable repairs; in this scenario the restoration project has to tackle the whole, not only the imminent, implying in some cases –like in Vilupulli and Ichuac-, the dismantling of the whole tower-façade down to its foundation, with the expected tension among some scholars. This is related to the need of responsibly ensuring the stability of a building in use, especially when the restoration project is in charge of professionals. In the case of timber structures decayed by time and by damaging agents, the damage occurs not only in the exposed surfaces of the wood but in areas usually hidden to the naked eye, affecting the critical parts of the tower, nave and roof with the consequent permanent risk of spontaneous collapse. Minor structures which present no immediate risk to the congregation and visitors can be addressed in a more conservative way, reparing and reusing parts that have no major structural compromise.

In the tangible aspect, the restoration of these churches is conditioned to their materiality and their building systems, taking into account their exposure to the harsh weather conditions. When replacing decayed timber or wooden shingles with new ones, the contrast is manifest, especially for those who are not familiarized with the local weather that speeds up the patina of a building. In fact, a newly installed timber exposed to the sun, rain and wind, blends almost totally with the older pieces of timber in a time laps of a few years. This is well known by the locals, but nevertheless places tension when harsh contrast arises. It is especially dramatic when having to exchange the roof or wall shingles that have become thinner over time needing to be completely replaced, as was the case in Vilupulli.



Fig. 11: Vilupulli after the 2005 restoration. The pictures were taken in October 2005, November 2005 and October 2009. The solar radiation, the abundant rain, the constant humidity and the strong winds accelerated the patina of time.

6. Conclusions

The restoration of the churches of Chiloé based on the local tradition of wooden buildings, presents a complex challenge that relates to the tangible and intangible characteristics of these temples and their cultural context. When facing a restoration project located in an isolated context, with a proud autonomous people who cherish their traditions, the expertise criterion and the collective imagery that the local communities have in regards to their churches not always coincides. In this context, the restoration is not driven by certain general laws, as it usually responds to the particular, not to the generic. The churches of Chiloé should not be restored for display purposes; it is not intended to exalt and recreate the old and the decaying. The objective is to restore their status as safe and dignified

temples for worship and social gathering, keeping true to their building tradition, improving poor structural aspects and seeking to do it with the full participation and involvement of the local communities, whose ancestors were the ones who gave birth to this living heritage. Hence, it is imperious to maintain and recover the skills of the traditional carpenters; only then will the process be sustainable in time. It is through this recognition of the traditional values and the skills of the carpenters that these churches will remain an intrinsic part of their communities, as well as part of the global heritage.

[The author of the present article was the architect responsible for the restoration of the churches of Vilupulli and Ichuac in the year 2005].

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HERITAGE ARCHITECTURE LANDESIGN
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The quality of bridge design in the general design process

Michele CULATTI
PhD at Department of Structure Engineering, Faculty of Engineering, University of Trento, Italy
michele_culatti@fastwebnet.it

Abstract
The design has a central role in the construction of road infrastructures, including bridges, in defining the form of the work. From its conception through to the 3D graphic representation, the bridge acquires an increasing level of precision through to the final project, however in general terms there is a deficit in the representation of the two extremes of the construction process. In the first extreme, there is no *design of the need* for the infrastructure, which is still too often deferred to a political choice that is not sufficiently backed up by analytical instruments to highlight the effect on the area. At the other extreme, there is no *design of the perception* of the work, i.e. no analysis of its use: to what extent is the work perceived? To what extent can it be understood and, therefore, recognised in its formal independence? Consequently the representation deficits upstream and downstream from the technical design show a lack of reflection on the meaning of an infrastructure in a location, which tends to generate a distortion of the highly sought after *Genius Loci.*
In this report, the "gaps" in bridge project representation will be outlined (from the need for an infrastructure through to the preliminary project), and a few ways that could be adopted to fill these gaps with reflections on the methodological approach.

Keywords: design, perception, landscape

1. The "gaps" in bridge design projects

In the public image, bridges often evoke opposite effects. There is the more widespread simplification of their forms, which involves the majority of our roads and motorways in the form of flyovers, and is shown in the series and weaves of "spatial species", as if they were gates to the city. At the other end we have the "urban scale sculptures", the virtuoso feats of the Archistars. However, between these two extremes there are, besides various historic bridges designed by architects of great structural and aesthetic sensitivity (to name just a few Zorzi, Morandi and Musmeci), vast ranges of examples of situations that are sometimes conflicting and others consistent with the landscape. However there are numerous design approaches to conceiving a bridge, the methods, trends, cultural references (or in the worst case scenario, lack of culture), and they have to confront the technical-legislative restrictions and the experimentation with new construction materials and methods. However, the final outcome often does not come up to expectations and there are several reasons for this failure based on three macro-reasons. The first is the constant lack of transport need design: often (in our country) the decisions regarding infrastructures by the local authorities lack any rational and strategic design that is able to foresee the effects on the workings of the area, (it should remembered that, to join two points in an area, road networks are used – which bridges are a part of – but this way areas are permanently separated and this fact is never taken into consideration). The second reason is the survey of the context and the technical design of the bridge, which is normally very precise down to the smallest detail, but also generally limited to the finished three-dimensional structure, and not extended to the area. The third reason is the lack of adequate representation of the effects of the bridge in perceptive terms.
If we consider the bridge project from the initial transport needs through to the preliminary phase, and if we trace a graph of the quality and quantity of data that should be returned through a design able to show the final result, we realise that the curve does not have a constant trend.

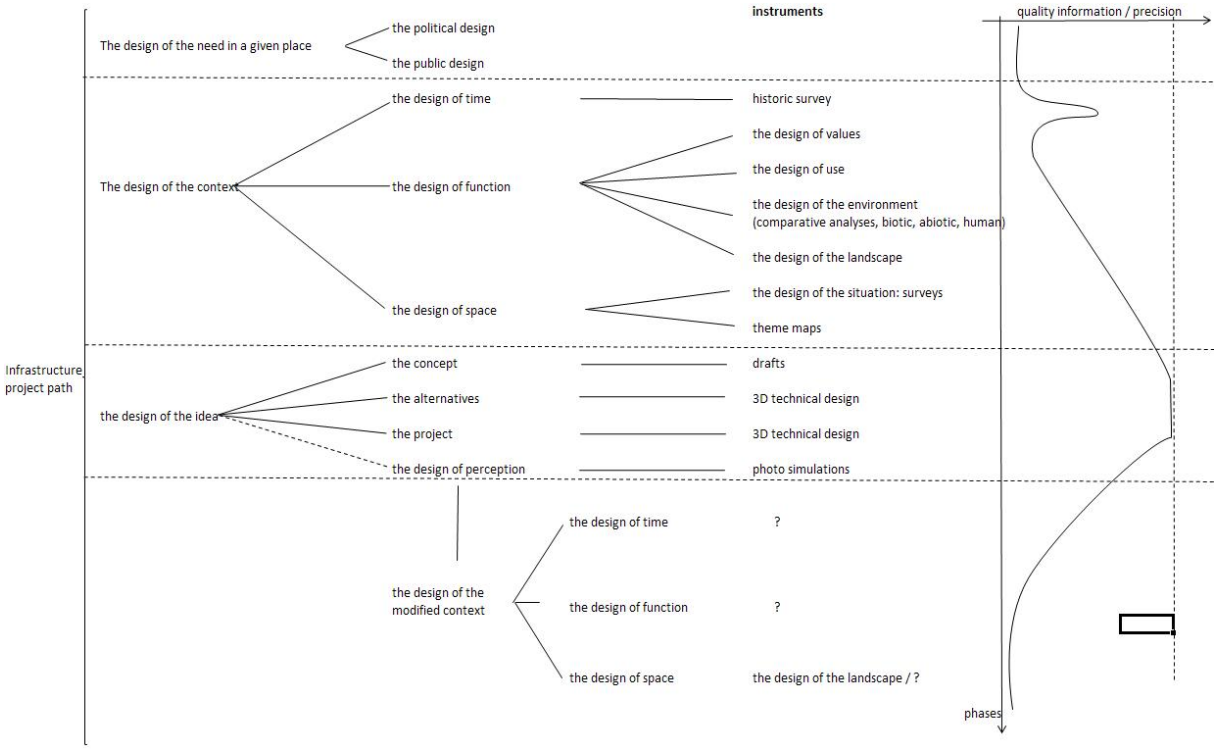

Fig 1: Graph of the survey quality trend and representation during the project phases (from the initial transport needs through to the preliminary project).

On observing the graph we can see that the political design, i.e. the modal and formal choice of the infrastructures by local authorities, basically is not represented. In fact, the political choice is rarely represented transparently through strategic maps that help understand the reasons and meaning of the choice.
However, in the graph the context has a sharp rise, in fact it is analysed in depth (even if for regulatory obligations) in its biotic components (flora and fauna), abiotic (soil, air, water) and human by means of the Public Works Regulations, with specific analysis (again imposed) of the landscape (DPCM 12/12/05, which is limited however in that it considers the relationship between designed work and context in terms of negative impacts *modifications* – if they are limited transformations – or *alterations* – if the modifications change the nature of the landscape and create "something else", but there are no remarks to consider transformations that improve the context). There is then the need to physically introduce the bridge into the context, which requires an accurate site survey that considers the various categories of restrictions defined in the local government planning documents.
However in the representation of the context, there is often no historic study of the location and, above all, no survey of the location's "function" intended as a space for human relationships that requires an anthropological approach.
On observing the graph, we can see the design of the idea, from the concept and gradually through to the photo simulations and 3D rendering, through to precision maximisation to then approach the *perception design,* i.e. represent the transformed context due to the bridge. Normally there is no need to consider perception apart from the theorised presumptions in architecture regarding the landscape and, in all events, leaving the final user the honour (or liability) of perception.
However, filling these survey gaps and representing unphysical facts, in particular the *strategic and perception design,* is increasingly important in the light of the growing need for quality use.

2. The strategic design

When making political choices, the decision maker's and the architect's cultural background are taken into account, because we have witnessed decades of scarce aesthetic culture in infrastructure design, however, special attention should also be paid to the *rationality of the choice,* because it helps determine a Genius Loci that is fundamental now to prevent that series of "gaps" of missing reflections, which often tend to reduce the idea of a quality bridge to the minimum.
All the necessary instruments are available, for example the correct use of multiple criteria analyses which, through extended analysis, i.e. beyond the geometric confines of the project, internalise the quality indicators to understand the location, exploring and evaluating the forms, functions and

meanings of the context. In this, if the context survey is returned as a graph of an organised system of signs, each sign must be correlated to the stratification of its relational, identity and historic values (according to the literature of M. Augè), moving from a graphic plane representation to a multidimensional representation. This way the context is observed from several viewpoints and therefore considered through conscience, and from its understanding both the territory, in its multiple physical and biological aspects, and the anthropological site as a seat for human relations, emerge.
Cognitive maps can also be considerably useful, as they are able to explain the cause-effect relationship between the various phenomena, for example foreseeing that the introduction of a bridge, with its relative transport network, does not isolate entire villages (which instead happened recently in the Po Delta area).
Mapping the rationality of the choice on one hand and the cause-effect relationships on the other, which is translated into expressing the forecasts, can help establish a strategic design that highlights greater reflection in the consistency between designed work and its context.

3. Representi ng perception

The importance of representing their perception, i.e. foreseeing how the work will appear to the public, is generated by detachment between the 3D view, illusorily realistic in rendering and photo inserts, and the spatial experience where the bridge is used to varying degrees until it is actually crossed, where the perception may, in certain cases, like footbridges, be amplified and transformed from a purely visual to an acoustic and tactile experience. In this perceptive journey the environmental variables and the way the bridge is approached condition and limit a use that is only “all-round” in the virtual images and, often, in unrealistic “aerial” views.

3.1 The subject of the project

The first reflection focuses on *what* is being designed, its extension in the project. In fact, apart from a few rare examples, engineers and architects alike focus on the subject which, first designed and then given virtual form, becomes a physical object. As previously mentioned, despite the land survey techniques, 3D modelling and photo inserts are able to give good results of the final outcome, the project subject remains the *bridge* which is what attention and creative forces tend to focus on. Thus, the result is generally the *contextualised bridge.* However, with this design approach not only is the landscape, a highly discussed topic in recent years with a general growing awareness, put in the background, but, no less important, also the *overall quality* that should be queried as *how the bridge functions* realising, as already mentioned regarding the context of the strategic design, how many and which ties the bridge manages to create with its context (historic, economic, functional, local and network, perceptive, cultural and of significance). Rather in operational terms, widespread where the bridge is contextualised, there is still no idea of the *transformed context,* i.e. the outcome of a design operation that considers the characteristics and vocation of the location and the site for the project, where the continuous symbolic exchanges between the bridge and context can be recognised, until the bridge actually becomes the context, as if had always been there and to which nothing can be added nor taken away. Consequently, by focusing design attention on the bridge and specifically interrogating the context, there is the risk of altering the location, of not going beyond that fine conceptual dividing line of the passage from “Contextualised infrastructure”, where the point of view of the infrastructure dominates, to the “transformed context” where the point of view is directed to the location, to the area overall that is used and affected by the relations. The result is that the bridge often is seen as an intruder, with the resulting public protests.

3.2 The quantity of perception

There are numerous variables that affect perception: the season, the type and quality of light during the day and night, when there may be artificial lighting, the light diffusion, and its intensity during the day and night, the orientation of the bridge with respect to its geographic position, any external observation points of the bridge, the speed with which it is crossed.
So, from *how* a bridge is sculptured by time, light and shade, we move onto ***how much.*** *How much* of the bridge do we perceive? Obviously the answer is subjective to each single case, and even though it is complicated to theorise analysis models that are generally valid, we can at least identify those components that come into play in perception and which enable measuring it.
One of the main aspects is *proximity.* A question of scale based on the relative position between the plane where the visible surfaces of the bridge stand and the observer’s plane. This means the view of the area *from* the bridge and *of* the bridge from the area, a continuing play of marquetry where perspectives and vanishing points are dominating factors. Elevation and central perspective dominate the scene we see if we observe a bridge in the distance on a scale with the landscape, which is

amplified in the reflected image if there a river running beneath it. As we get closer to the bridge, foreshortenings and gradual progressive changes in form accompany us until we lose the perception of the structure beneath us and are able to see it in detail. But if this path, this gradual change in scale, is read as continuity it is just as virtual as the 3D graphic models we mentioned previously. In fact, the problem of accessibility of perception arises. To understand this problem, it is sufficient to take one of the most glaring cases – the organisation of the areas around the tallest bridge in the world: Millau in France. Downstream between the two riverbanks a small temporary bridge had been built to enable the heavy vehicles to work on the bridge piers. When the bridge was finally finished, the temporary bridge was not demolished but was included in the new landscape layout as a viewpoint to admire the surroundings which, in this case, is this monumental construction. Apart from the unusual view upwards, the small bridge also offers the chance of understanding the size of the tallest bridge in the world and grasp its scale with respect to its surroundings. This case leads us to reflect on the modulation of the ratio of the "quality of the work" / "number of viewpoints" to observe it. Theoretically, the poorer formal quality of the bridge, the more we attempt to deny its visibility, hiding it symmetrically and with attempts of camouflage, also considering the valorisation principles in our "Cultural Heritage Code" – the greater capacity of being a "cultural heritage" the greater accessibility to perception it should have. If we move from the landscape scale to the urban and architectonic scale, the chance of getting a glimpse of the bridge is high, and from the perception of depth given by its width, which we previously saw, we now have the perception of depth given by its length up to the point where the bridge ends on the riverbank or landfill. The regular lines are distorted, the spaces between the horizontal lines of the planking and the arch holding the bridge become "triangoloid". There is a change in register a linguistic flexibility that should not be taken as a limitation but as expressive potential.

3.3 The everyday modellers: shade and time

Another aspect that comes into play in perceiving a bridge is *shade,* especially in our country where there are not many bridges with large or very large spans, which impose the use of suspended bridges, here the majority are deck bridges or deck arch bridges, where the structural frame is all or partially beneath the planking. Consequently, for the greater part of the day we are only able to recognise the design of the bridge, or structural architecture holding it up, in the half-light or with difficult backlights. This means that shade is also a component that gives depth and substance, but also the one that limits perception. Shade also helps to momentarily sculpture other elements in the context: the shade that the bridge throws when it is struck by sunlight, creating fascinating or invasive effects on the surrounding land.
The perception *time* is another "gap" which has been little explored. It is fundamental in the perception of a bridge and has two main ranges of variables. One is of moments, a few seconds or a few minutes we need to catch a glimpse of the slenderness of the structural weave or the convergent lines of a parapet, which, with the planking, sight other spaces and places. This is the time of the person who uses the bridge, crosses over it. The other temporal range varies from days to a lifetime, and mainly concerns those who live close to the bridge and experience, or suffer it, as part of their everyday life.



Fig. 2: Granatieri di Sardegna Bridge – San Donà di Piave (Venice) – example of an impressive bridge whose presence is softened by the colour of the arches, painted black, exploiting the shade beneath the planking.

Conclusions

In terms of perception, bridges offer *forms* of *functions* and *meanings* but, given the great variety of factors that come into play in perceiving them, a bridge should be observed in its initial design, in a cause-effect relationship not only of quality but also quantity, considering that it relates with the *forms, functions* and *meanings* of its surroundings. Reflect, design, survey, map and strategically plan *how many* portions of a bridge are perceived in everyday life leads all-round virtual graphic representation to a more tangible vision. In fact, *how much is perceived* helps understand the bridge. In *how much* is

perceived we can understand the formal construction-context consistency, and also *how much* (together with *what* of course) is used to evaluate the degree of interference and concentration of intruding elements in the context to determine the responsibility of architects and public authorities in altering the landscape. Therefore the amount of perception time, the play of light and shade of just a few seconds, the level of proximity and the foreshortenings that give us the measure to understand the bridge, enable us to grasp its identity and to distinguish it from other bridges.
In observing the *how much* in the distorted lines, in the *instant perspectives* a bridge gives us, we can find the true perception spaces and times of the bridge. “Times” and “spaces” that should be seen as tools to remodel and improve the initial design, governing the contraction and expansion of complex relationships between contained and container, between guest and host.
It is *how much* achieved through *what, why and how* that gives meaning to **where,** the only possible place to build a bridge. A degraded *where* hungry for improvement or a *where* in need of a new crossing or new transport symbol, but always a *where* that, in this time of scarce financial resources, requires being a *work of art* that belongs to the place.

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Historical centers in seismic area: methodology for conservation, prevention and reconstruction. The case study of Villa Sant'Angelo

Davide INDELICATO[1]
(1) Faculty of Engineering and Architecture and Motor Sciences, University of Enna "Kore", Enna, Italy
davide.indelicato@unikore.it

Abstract
In recent times, the recurrence of seismic events has suggested again to pay careful attention to the ways to intervene on the existing buildings whit the aim of increase their security requirements together with maintaining high levels in urban quality. In particular, it is a shared opinion that the conservation of historical city, especially in earthquake affected areas, should take into proper consideration the theme of seismic security. Nevertheless, this particular topic is confronted to operating methods which are still confused and often ineffective. This paper describes a methodology for the analysis of building aggregates of historical city, aimed at reducing their susceptibility to earthquake induced damage. This methodology has been applied to a block in the historical center of Villa Sant'Angelo, one of the towns near L'Aquila affected by the seismic event occurred in April 2009. The aim is to show that, even in situations of so high seismic risk, the deep knowledge of building constructions and of their environment is a basic condition in order to find operating solutions based on sustainability and cost saving principles. In this way, the restoration projects which spring from these principles, can find a good alternative to the easier but less sustainable solution of city delocalization. The methodology here proposed can be applied both in post-earthquake rebuild conditions and in the most advantageous prevention activities. In a period of so hard economic crisis, the lesson learned from last earthquakes imposes us to move our resources from emergency to prevention activities.

Keywords: conservation, prevention, reconstruction, historical centers, Villa Sant'Angelo

1. The research methodology
This study, based on part of a doctoral thesis, is structured on the basic concept of building aggregates. The complexity of urban historical texture is due to all its transformations, alterations, permanence, that makes hard the interpretation of constitutive nature of the buildings. The complexity of historical city is reflected on its seismic response. Buildings in historical centers, in fact, since they belong to a whole, are tightly reciprocally connected. So, the research proposes the building aggregates as a minimal unit to be analyzed and as an average component between the urban and the architectural scale. The building aggregates is defined as "a buildings group structured in time and connected by a historical self-regulation system"[1]. The components of building aggregates, by this aggregation procedure, acquire different features characterized by typical individual elements. The building aggregates is endowed with something essentially different from its individual parts which have an inner relation level permitting to consider it as a unique object. The research methodology here adopted is structured in three steps: the knowledge, the interpretation and the project. It is also developed on three scales: the urban scale (the city), the building aggregates scale (the city fragment) and the architectural scale (the building).

2. The knowledge phase
2.1. The earthquake of April 6th 2009 and the seismic history of L'Aquila
On April 6th 2009, at 03:32 AM, the district of L'Aquila was shocked by a strong earthquake with the main-shock magnitude 5.8. The distribution in plan of the shakes repetition shows that the area

involved in the seismic sequence, called “seismic crater”, is 30 Km parallel to Appennini mountain chain, in direction NW-SE. This first main-shock, on April 6th, was situated at the south-west of L’Aquila, near Tornimparte, Lucoli and Scoppito. The stronger aftershock, registered on April 7th at 19:47 (Ml=5.3) has involved the southerner area of seismic crater, near Villa Sant’Angelo, San Martino d’Ocre, Fossa, San Felice d’Ocre. On April 9th a third aftershock, with magnitude 5.1, shacked the northern area, near Barete and Pizzoli [2]. The study of the main seismic events which involved the area damaged by the 2009 earthquake, highlighted a constant and particular intense seismic activity. The strongest historical earthquakes which involved L’Aquila district (registered in Catalogo Parametrico dei Terremoti Italiani, 2004) happened on September 9th, 1349 (Me 6.4, MCS 9) and on February 2th, 1703 (Me 6.7, MCS 9). These two earthquakes were more powerful than 2009 events, however we can compare it whit other seismic events happened in this area in 1461 (Me 6.4, MCS 9), in 1762 (Me 5.9), in 1916 (Me 5.2) and in 1958 (Me 5.2), which damaged L’Aquila and its surroundings [3]. The goal of studying the seismic history of a specific geographic area is to recognize the hardest earthquake in relation with adjusting the consolidation project. At the same time, this study will allow to evaluate the efficacy reinforcement operations made after every post-seismic rebuilding, as a real time test.

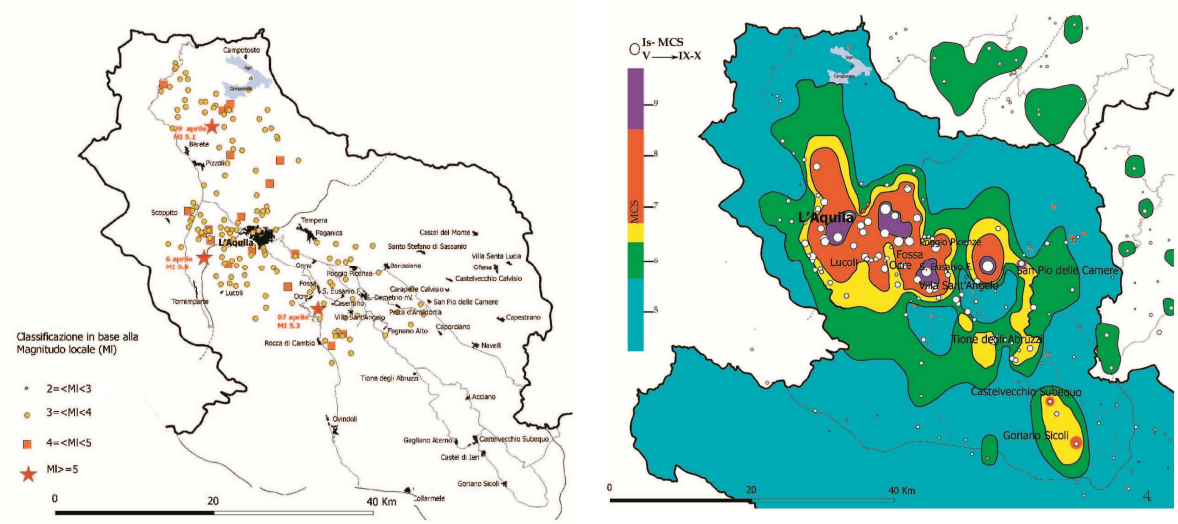

Fig. 1: Location and classification of L’Aquila seismic sequence from April to June, 2009.
Fig. 2: Plan of “seismic crater”.

2.2. Critical survey and damage survey

Villa Sant’Angelo is a typical hilly village of 5,26 square kilometres, at 570 meters above sea level. Only 436 people lived there before 2009 earthquake (ISTAT, January 1st, 2007). The village is composed of two built up areas: Villa Sant’Angelo, that is the administrative centre and Tussillo, a small hamlet. As a consequence of latest urbanization process they tend to connect themselves, but the two historical centres remain detached. The “villa” (rural area) is situated at the base of the hill; Tussillo is endorsed on the “Sant’ Petr’ “ mountain [4]. In this urban contest, the building aggregates considered as study case is representative of a typical damage condition of this area. This block is situated in the southern area of the historical centre of Villa Sant’Angelo, in closeness of the city entrance. The geometric survey has highlighted, amongst other things, a hard altitude gap between upstream and downstream level that influenced the architectural, morphological and typology features of the buildings. The collection of information on the structural relationship among buildings as well as on constructive techniques of each building is the so called “critical survey”, in which the buildings are examined in such a way to point out all the significant structural details, both at the scale of single buildings and in their mutual connections. The critical survey has carried out also observing the ruins with the aim to acquire information about constructive features of collapsed building to link, in the second step, at its damaging scenario. The evident collapse condition make easier the identification of constructive elements, of the walls juxtaposition, of the trace of historical passed away configuration, of historical anti-seismic aid. All this features were precisely annotated and drawn. In this step it was carried out a survey of damage and collapse status at two scales: at urban scale it was surveyed in swift way the damage and the ruins of all the building aggregates of the historical centres of Villa Sant’Angelo; at individual building aggregates scale it was analyzed the specific damage status.

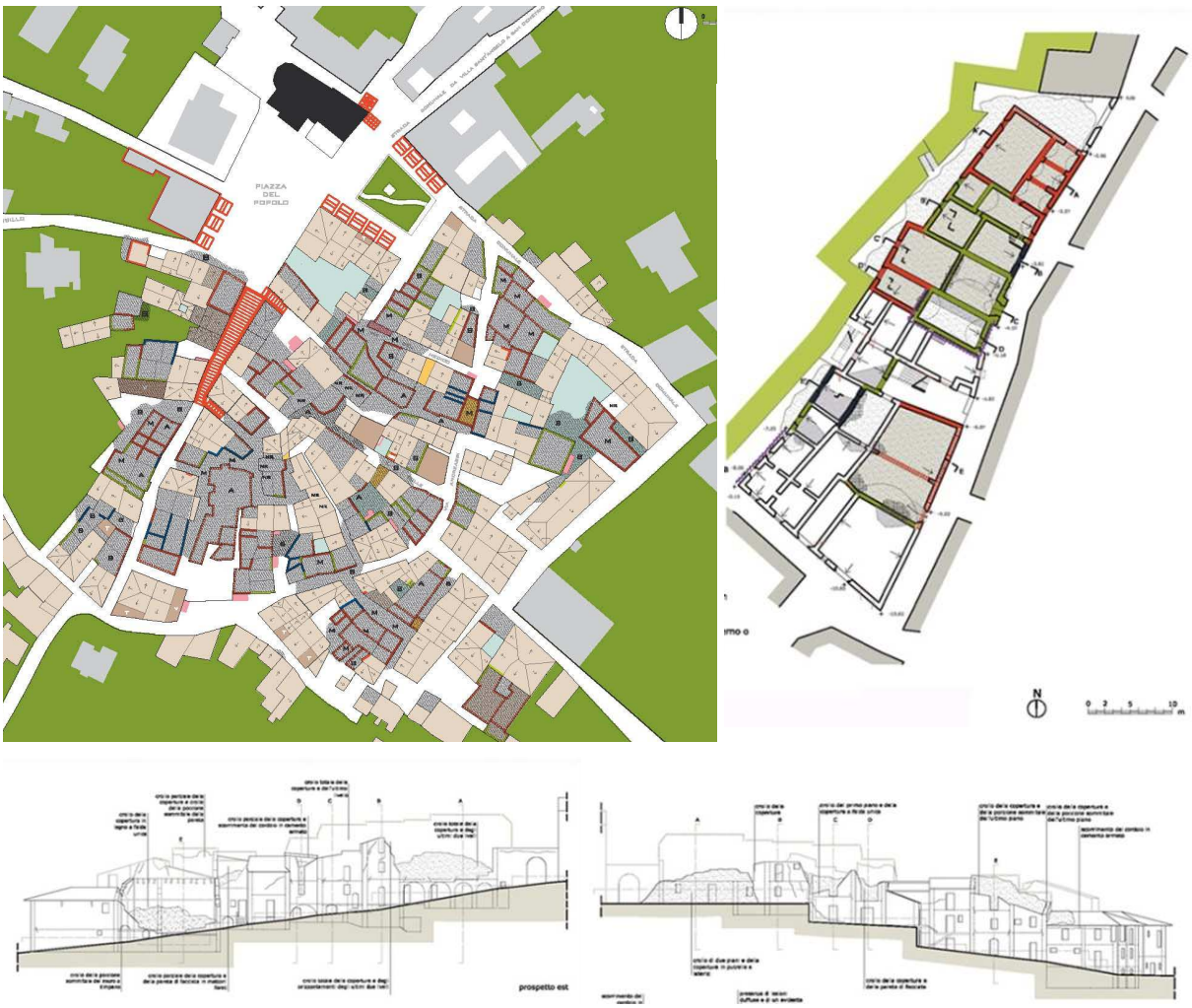

Fig. 3: Damage survey of Villa Sant'Angelo. Urban and building aggregates scale analyses.

2.3. Supposed pre-seismic configuration of the building aggregates

The critical examination of damage and collapse condition of building aggregates as well as of the ruins allowed supposing the pre-seismic configuration of the building aggregates. This hypothetic reconstruction is finalized to understand the reason of the buildings collapse or damages which can be strictly connected with their conservation status or constructive typology. Starting from the upstream area, it was supposed that the upper exstremity of the architectural unit could have three elevations: two elevations were in masonry, one elevation was in concrete brick. The roof was made of steel beams, hollow clay blocks and reinforced concrete slabs. The inner buttress walls of first level didn't continue in the other two levels, so two couple of steell beams were placed in support of the roof.

2.4. Origins and development of building aggregates

Supposed reconstruction of pre-seismic configuration of building aggregates is essential, amongst other things, to retrace backwards its origins and typological development process [5]. The sequence of building process is discovered by recognition of walls juxtaposition, by assign a related date to masonry and, in consequence, to corresponding buildings. The site occupation started contemporarily from upperstream buildings and downstream buildings. The upper extremity architectural unit is a one-celled building duplicated in the back. They originally had only one elevation and the cells ware separated. The following elevation and unification occurred in two distinct periods: when a staircase was inserted at the upper levels and when the floor was changed. The development of the block proceeded to the south direction, by occupation of east front towards main street, then by the occupation of the back space toward the country areas. The development of downstream area started with a barn and followed by other rural underground buildings, till rejoining with residential building of northern area.

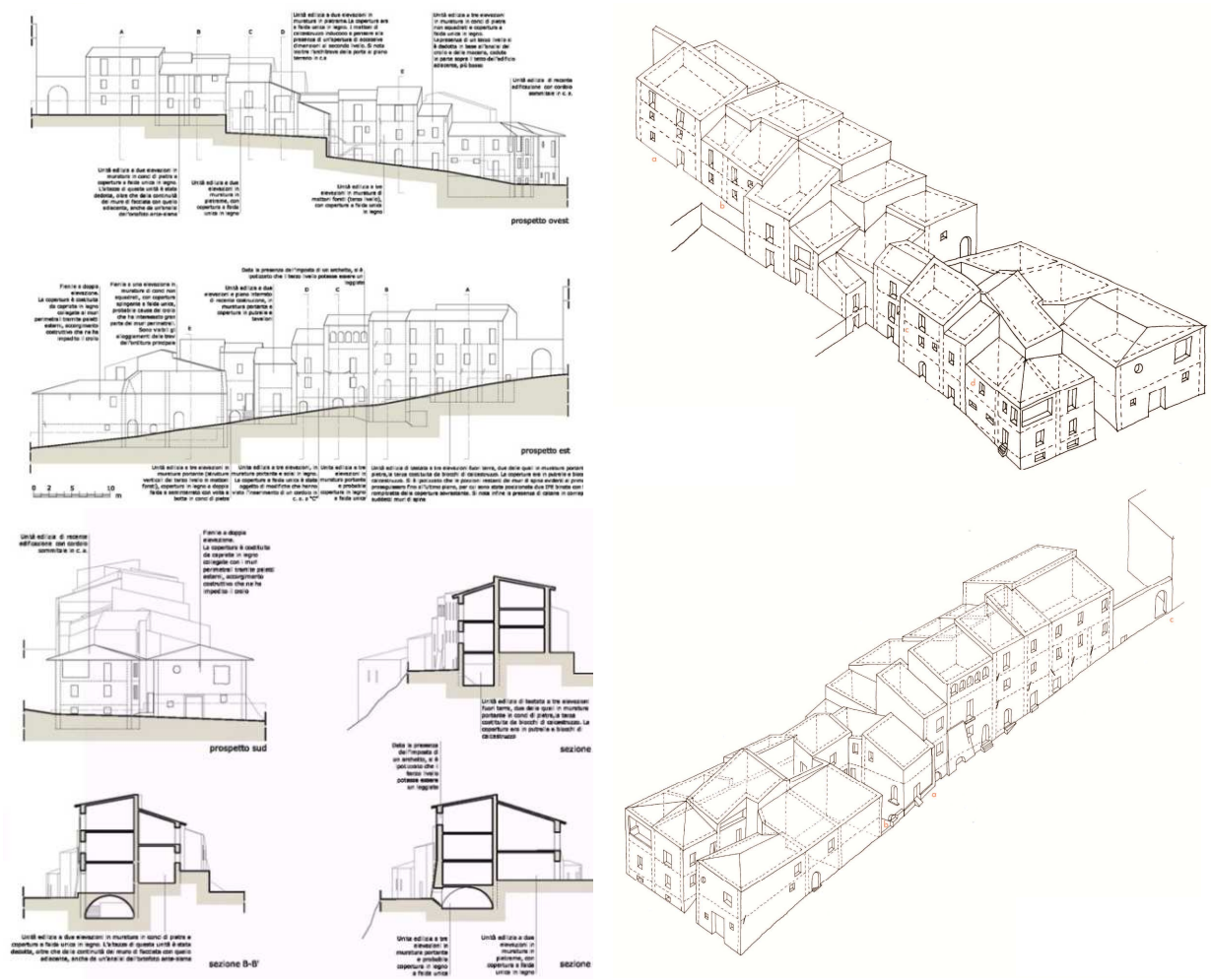

Fig. 4: Supposed pre-seismic configuration of building aggregates.



Fig. 5: Origins and development of building aggregates.

2.5. Constructive survey and local seismic culture

The Abruzzo district has been victim of many catastrophic events in all its history. So, local builder were induced to use particular devises in order to make buildings resistant to earthquake. This condition allowed to develop an historical anti-seismic constructive culture is still in progress and that we can understand by studying and careful observing historical buildings [6]. The building aggregates chosen as study case in the historical centre of Villa Sant'Angelo has many features of local constructive tradition and also the same constructive "alteration" that 2009 earthquake put to the test (for example reinforced concrete edging or roof). The evaluation of the various modern and historical constructive devises, in consequence of seismic effects, leads us to reflect both about the technical rebuilding manner and the way to reduce seismic vulnerability of the other buildings.

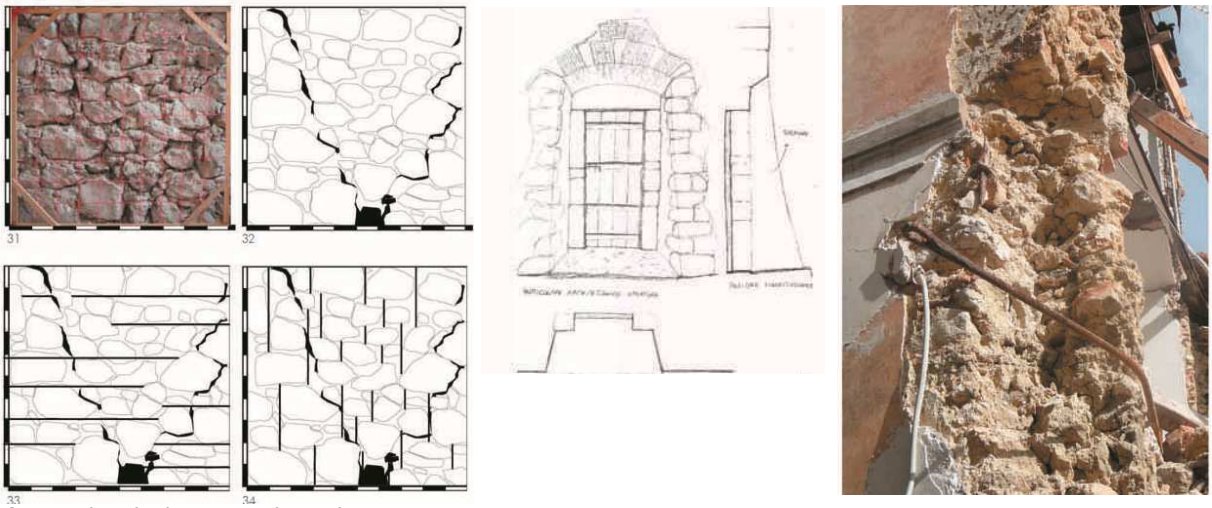

Fig. 7: Historical constructive culture

3. The interpretation: from analyses to project

3.1. Vulnerability and resistance seismic factors

In the interpretation step it was compared the reconstruction of supposed conformation of building aggregates before the earthquake with the post-seismic survey. This analysis allowed deducing the vulnerability and resistance seismic factors really existing in the building aggregates. Different kinds of vulnerability factors were identified: innate vulnerability factors (such as extreme horizontal and vertical thinness of masonry walls, pushing roofs, low quality of masonry walls…); alteration and interaction vulnerability (for instance deficiency of adjacent walls anchoring, reinforced concrete edging); position vulnerability (such as slender facade). Some of resistance factors detected in the studied block are, for example, the well anchored masonry corner, the wooden chains inside the masonry walls, the metal chains, the wooden trusses whit external anchoring.

3.2. Seismic damage scenario

Founding on previous analyses it was possible to suppose the seismic damage scenario happened due to 2009 earthquake and the individual unstable mechanisms of collapse [7]. The façade out of plane overturning collapse mechanism didn't affect the underground or ground planes but just the second levels. In lower levels there were often masonry vaults with metal chain and they resisted both when they were parallel to the façade and when they were orthogonal to the façade. Moreover the historical anti-seismic devises were particular efficient. For instance, the wooden trusses whit external anchoring in the barn prevented the collapse of external façades. Also the wooden chains inside the masonry walls and the metal chains were efficient, as we can know by observing the collapse edges. The same level of seismic protection was not guaranteed by modern anti-seismic devises in reinforced concrete. The detailed knowledge of the block and the accurate description of damages and collapses it has suffered are essential for identifying probable causes that led to the nature and extent of the surveyed scenario and, at the same time, recognizing structural solutions that could prevent even greater damages.

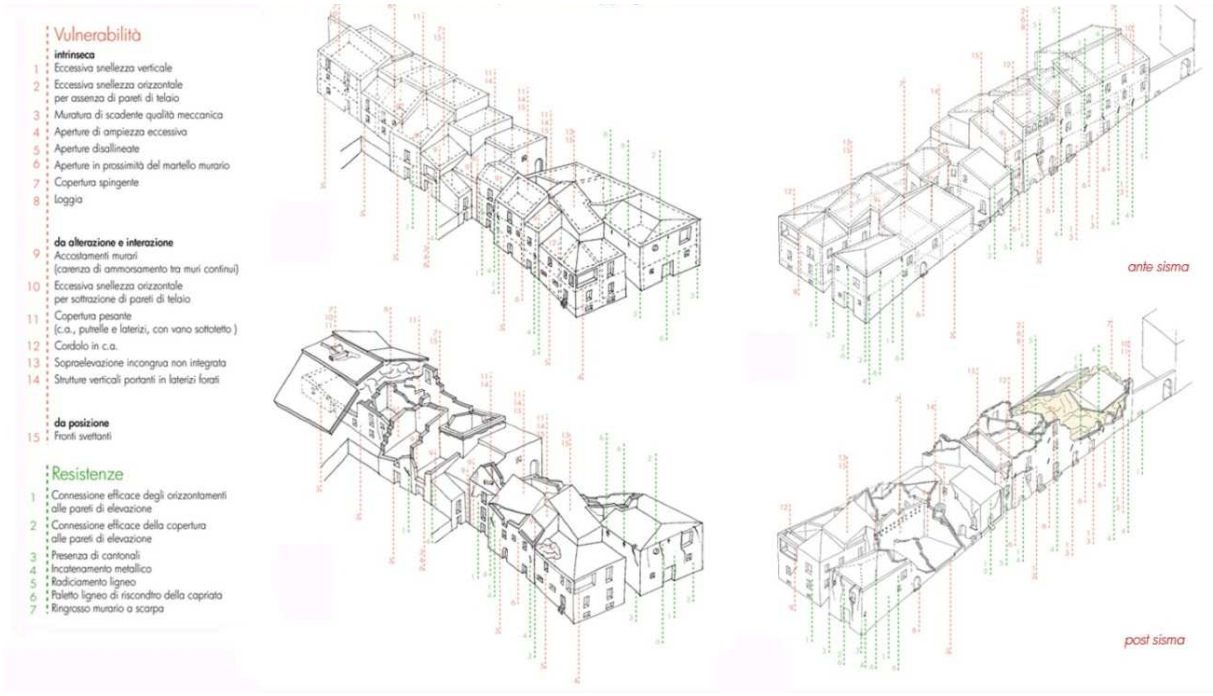

Fig. 8: Vulnerability (in red) and resistance (in green) seismic factors of building aggregates

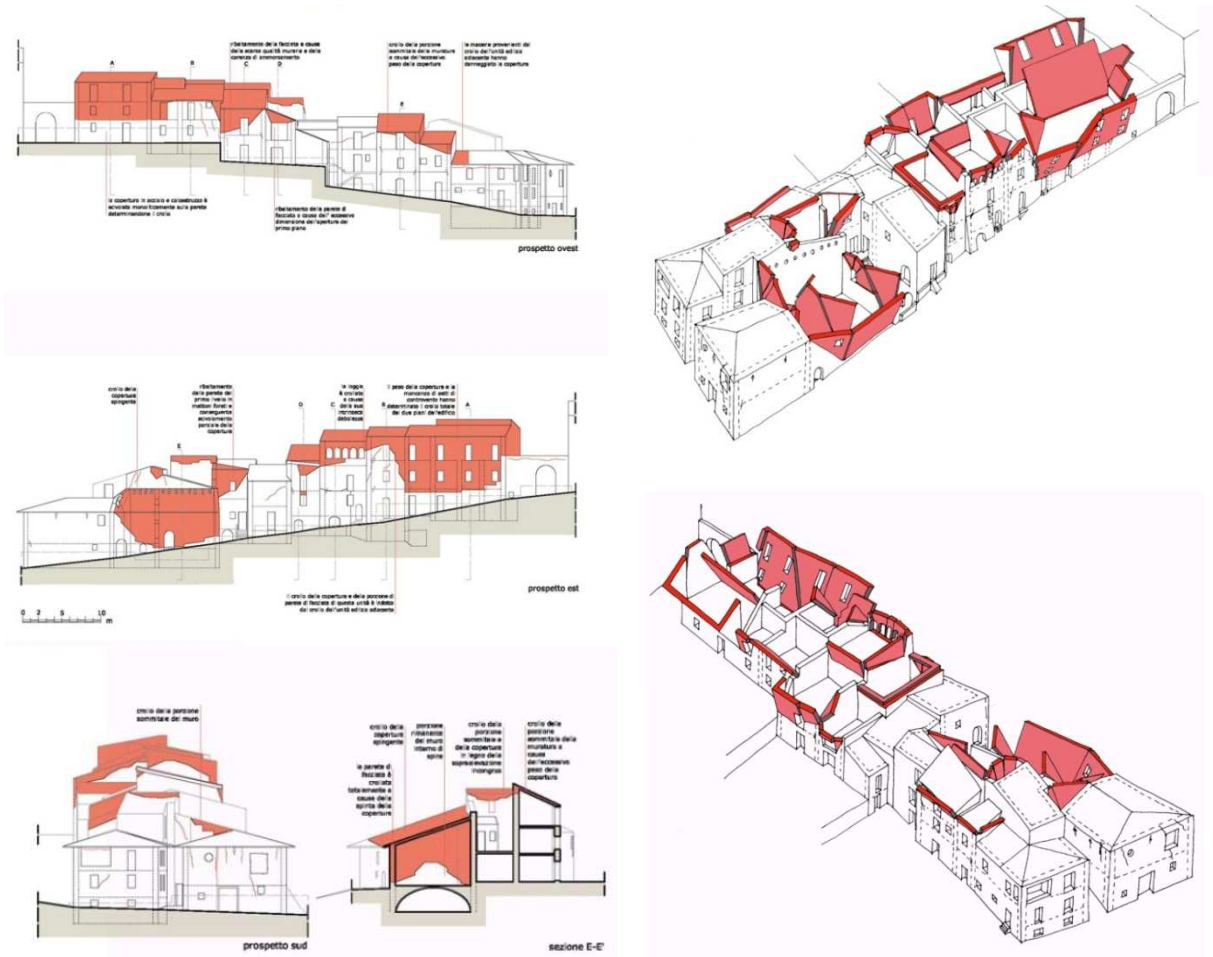

Fig. 9: Seismic damage scenario. In red the collapse mechanisms.

4. The project: safety and conservation design at urban, building aggregates and building scale

The third step of methodology is the project. It consists of a rubble removal plan and safety and a conservation project at urban scale, building aggregates scale and building scale [8]. The purpose of rubble removal plan is the conservation of what remains of Villa Sant'Angelo, avoiding widespread culling of the surviving portions, in order to not remove the traces of the ancient centre. So, the project considers some local interventions with minimal impact on surviving buildings, aiming at select what can be preserved and what we must renounce to guarantee safety and start rebuilding. The rubble removal plan combines together conservative need and safety need. With regard to the securing operations, these include various types, such as removing of unstable component of roof or balcony and the shoring walls. The need for the removal of only unrecoverable portions is motivated by the desire to minimize the loss of important cognitive elements. Some interventions are specifically aimed at the conservation of the surviving portions, for example the closing of "the edge of collapses" in order to limit the decay due to atmospheric agents, or the selection, cataloguing and storage of stones having an architectural value. This project is inspired by extremely conservative and environmental economic sustainable criterions, because it proposes the re-use of material rubble, trying to preserve what earthquake didn't destroy.

5. Conclusive considerations: from emergency to prevention

To engage a so extended damage level is a hard endeavour that could induce to considerate cursory and no social and economic sustainable solutions. The city relocation, for example, could create a great urban ruin and the establishment of new towns with no social and historical references. Also the extensive demolition is likewise inadmissible because it involves great economic resources and the removal of ancient city with no signs of the earthquake tragedy. This study proposes to intervene in gradually differentiate way to rebuilding the city, both whit creation of new architecture and conserving as much as possible.

This analyses method can also be applied in prevention way. Much consideration about the block damaged by the earthquake can be carry out in pre-seismic phase, whit prevention purpose [9].

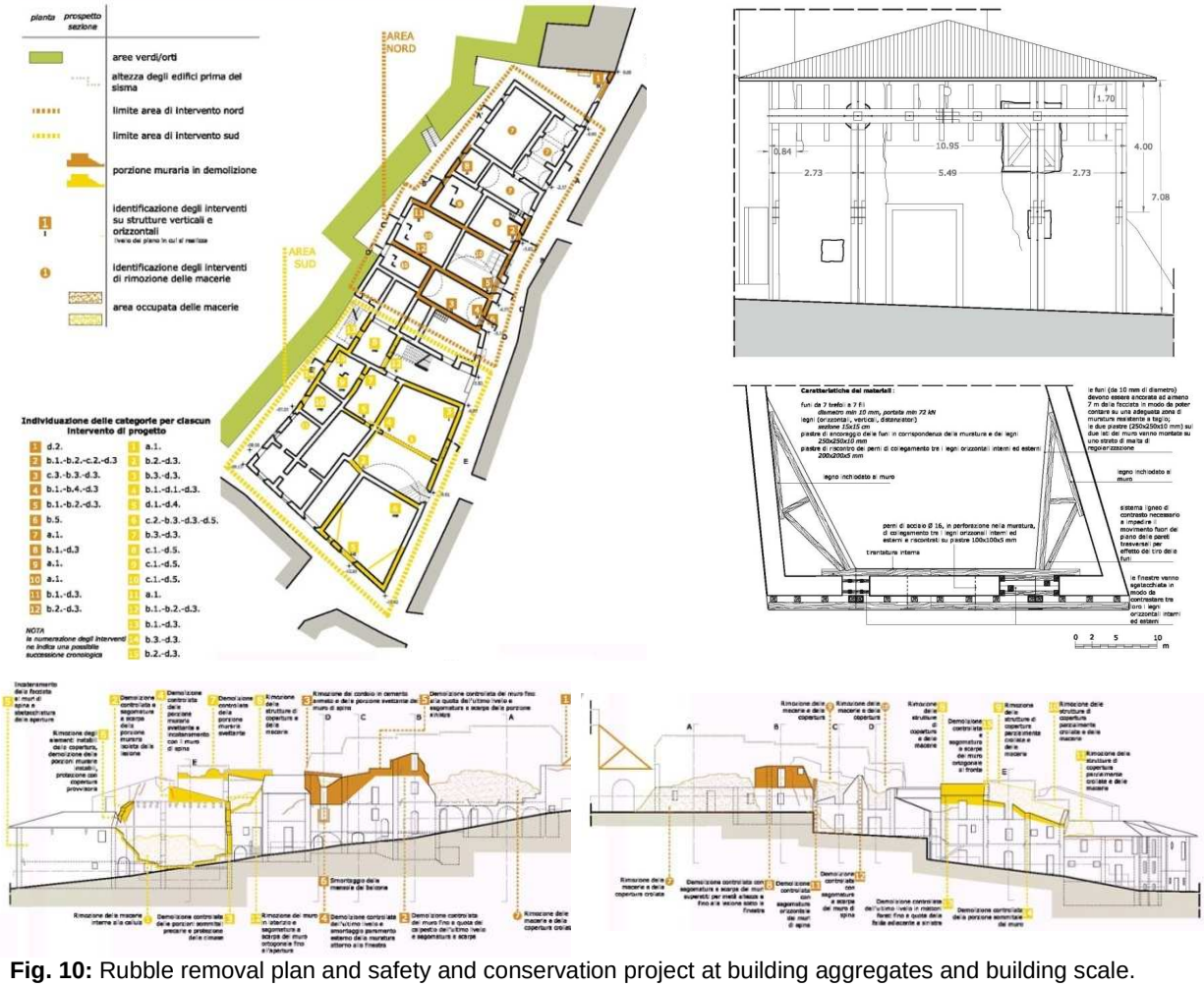

Fig. 10: Rubble removal plan and safety and conservation project at building aggregates and building scale.

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The roman amphitheater of Syracuse: a forgotten archaeological artifact

Giuseppe Di Gregorio [(a)]
Ricercatore Università degli studi di Catania
Dipartimento di Architettura
Catania, Italy
gdigre@dau.unict.it, giuseppe.digregorio@darc.unict.it

Domenico Giaccone [(b)]
domygia@alice.it

Angelo Monteleone [(c)]
monteleone.angelo@alice.it

The roman amphitheater of Syracuse: a forgotten archaeological artifact

«*Thinking that here it's represented only the lower part of the building, that is the most narrow part in this kind of building, it's possible to imagine how much large, high, stately and impressive it had to be. […] there is not risk to make a mistake thinking to it as one of the most extraordinary building never built*». This is what Jean Houel wrote in his diary "voyage a Syracuse" (1777 – Palermo 2003). The building described by the famous traveler was re-discovered only in 1839. It is a hundred and forty meters long and a hundred and nineteen meters large, and the most part of it is dug in the rock. Nowadays it is still possible to see two ambulatories covered whit a vaulted roof under the cave, and the superior ambulatories that allow to enter in the terraces of the various parts of the cavea. The amphitheater is in the *Neapolis* of Syracuse, near to the famous *Greek Theater*; for this reason the first is overshadowed by the second. Until 2012 the building was overwhelmed by a lush vegetation that make impossible the survey work. Tourist can't visit this area because of safety problems so that only few people know its existence. Its geometrical aspects and its dimensions have never been studied before now. The following work deal with the firsts results of a survey work made through the scan laser *Riegl – VZ400*. This instrument and its software are able to process also those points of the cloud-points partially hidden by vegetation.

1. Historical news and survey[(a)]

«Thinking that here it's represented only the lower part of the building, that is the most narrow part in this kind of building, it's possible to imagine how much large, high, stately and impressive it had to be.[…] There is not risk to make a mistake thinking to it as one of the most extraordinary building never built». This is what Jean Houel wrote in his diary "Voyage a Syracuse".
The northern part of the cavea is dug in the rock of Temenite hill, while the southern part is held up by walls.
The axes of the arena measure 69.30 and 39.20 meters, while those of the entire plant measure 140 and 119 m about. Nowadays it is still possible to see two vaulted ambulatories above the cavea, while in the superior part there are the ambulatories that allow to enter in the terraces of the various parts of the cavea.
In the cavea there are two fencing that divide it in three wedges. The two main enters were along the extremity of the longer axis, but there are also other secondary ones. In the middle of the cavea, nowadays, it is still possible to see a big rectangular basin with a pillar in the middle, linked to an aqueduct. Aldo Neppi Modona[1], in one of his work, writs that the basin was not used for water games, neither for naumachia.



Fig 1: The survey work: the first scan position

The podium wall was crowned with marble, with the inscriptions of the people to which the seats were reserved, and they date from the re-building of the 3° century b.C. The chronology of the building is debated, and this is believed to be realized after the deduction of Augustan colony, in the last decades of the 1° century a.C. The analyzing of the used building technique confirms this hypothesis. It must also be remembered that the amphitheatre has been re-discovered in the 1839 by the duke of Serradifalco[2]. Since the amphitheater is in the *Neapolis* of Syracuse, near to the famous *Greek Theater*; it is overshadowed by this, and until 2012 it was overwhelmed by a lush vegetation that make impossible the survey work. Tourist can't visit this area because of safety problems so that only few people know its existence. Its geometrical aspects and its dimensions have never been studied before now.
Below they are reported the firsts result of a survey work, not yet finished, made by a team, trough the scan laser *Riegl – VZ400*. The software used for this work, is able to process also those points of the cloud-points partially hidden by vegetation.
The survey was organized in twenty-seven scan positions, for twenty-nine scans. Eleven of them were in the cavea, nine from the superior part of the amphitheatre to the center, and the other nine along the ambulatories.
During the survey, when it was possible, the used resolution points was of 1 cm for 1 cm about.
The building features implied, both in the terraces and in the superior part, the presence of noise that made heavier the file dimensions. The following steep of working and processing of dates, made possible to investigate some aspects: the union of points, the building geometry, the processing of triangular surfaces and mesh.

2. Geometry[(a)]

Firstly the two axes of symmetry were drown. The major axis was drown manually, the minor from the middle point of the first, from half, and symmetrically, for the other half, and then it was verified the relationship with the real track. Same adjustments of precision were done, consisting of a micro-rotation of the major axis, the orthogonality of the minor one, the length of the axes.
Subsequently the ellipse was drown trough the two axes. The first results showed a difference from the real track of the plant. This different is the opportunity to make same considerations.

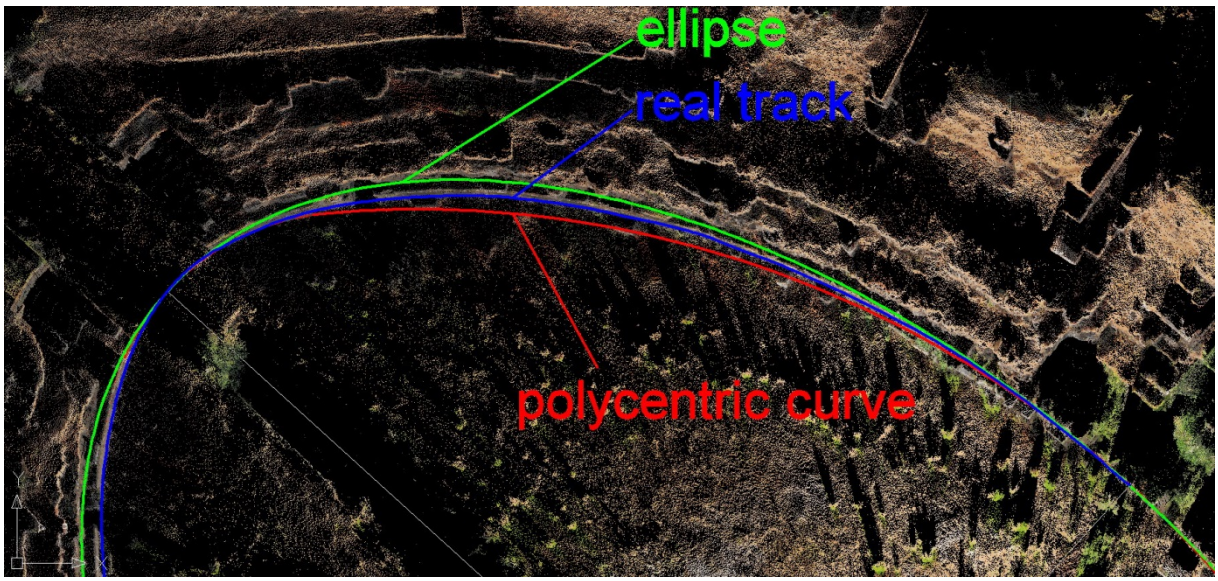

Fig 2: The deviation in plant between the real track, the ellipse and the arch from four centers.

The ellipse profile, faithful to the minor and the major axis, diverges around 7 degrees from the major axis and it reaches the maximum offset value of 56 cm around 24 degrees, then the track of the curve coincide with this of the plane at 70 degrees. To verify if the curve realized in the yard was due to an approximation, it was interpolated the semi-curve in the plane, having the major axis as extremes, then it was mirrored in relation to the same axis, and it was verified that the real profile mirrored coincides with the other after part of the plant. The same operation was repeated using the other axis. Also in this case the curve coincides with the profile of the plant.
So, it is possible to affirm that a double symmetry exists. It is possible to hypothesize that the plant was born from a defined geometrical operation. Now the question is what is this "geometrical will", and how much an offset of 56 cm can be accepted, that is considered a yard approximation?
Also the oval geometry was tried. Several constructions of the polycentric from four centers were tried, with their geometric variants, but however there is an offset in the plant. This result is in line with the studies on the geometry of amphitheatres, published by other researchers[3]. The polycentric from eight centers was tried too. It approximates better the real track of the plant but also in this case there is a little difference from the two curves[4]. The studies are in progress and new solution are tried to find.

3. Union of the point cloud[(b)]

To work on the point clouds, it was necessary to merge them into a single file *polydata* on which to perform the following editing operations.
Before that, a texture mapping and a recording have been done on the point cloud; the first to assign a color to each point; the second to relate all the clouds to the same reference system.
The texture mapping is executed automatically by the software that applies a color to each point using photographic images taken during the survey. The correspondence between points and their real colors is not always perfect because of the complexity of the object. The greatest error is refereed, above all, to the points that are furthest from the laser. More over photographs reproduce not only the object but also shadows that change according to the position of the sun in the moment in which dates are recorded. For this reason when two point cloud, surveyed in two different moment of the day, are juxtaposed, the final object has not the same chromatic homogeneity that features the single scans.
To align all the scan, that is to refer them to the same reference system, the software proposes two different solutions that have been used together in order to obtain the best result: the *course registration* and the *multi station adjustment*.
Firstly the *course registration* was applied to two scans at a time. To make that it need at least four pair of "corresponding points", that is easy to identify in each point cloud. The identification of these pairs is facilitated if point clouds are very dense. However density changes in relation both to the distance, and to the angle of inclination between the object and the laser.
For each alignment the software gives information about the maximum error obtained. The results have been collected and recorded.



Fig. 3: View of the cave of roman amphitheatre. It is possible to see the chromatic overlap of those point that are both in two different point cloud, and the shadow of the area in which the laser was during the survey.

course registration on 29 scans of roman amphitheatre	minimum error (m)	medium error (m)	maximum error (m)
	0.0067	0.0320	0.1011

Referring to all the twenty-nine scans, the medium error obtained with this process is 32,0 mm. This is a great value, considering the alignment quality, the investigated object nature, and its state of preservation when it was surveyed.
This value, however, is not meaningful of the whole project because, analyzing carefully the results, it is possible to find some values quite far from the medium one. As regard the scans on the cave and the terraces the medium error is 33.9 mm, while about to the scans on the ambulatories, it is 25.3 mm. The highest medium error is 40.1 mm and it refers to the scans on the superior part of the ambulatories.

course registration on 11 external scans	minimum error (m)	medium error (m)	maximum error (m)
	0.0130	0.0339	0.0547

course registration on 5 of 18 interior scans	minimum error (m)	medium error (m)	maximum error (m)
	0.0067	0.0253	0.0316

course registration on 9 of 18	minimum error (m)	medium error (m)	maximum error (m)

interior scans			
	0.0092	0.0289	0.0559

course registration on 9 of 18 scans on the superior part of the ambulatories	minimum error (m)	medium error (m)	maximum error (m)
	0.0124	0.0401	0.1011

The individuation of “corresponding points”, in archeological field, is very hard, and it is accurate and reliable only in relation to small spaces and pure geometries. Moreover the error is calculated referring to all points of the point cloud but a good portion of these is representative of the vegetation that is in the site.
The *multi station adjustment* is based on the individuation, by the software, of plane patch in the point cloud. Each patch is identified by a point that represents the center of gravity, and by a vector normal to the plane that represents its orientation in the space. While the search of “corresponding points”, which the *course registration* is based on, requires the active and selective participation of the researcher, the good result of this method is based on the correct selection of setting parameters.
Of course the nature of the investigated object still affects the good result of alignment, but in an indirect way.
The *multi station adjustment* has been applied: to two scans at a time, after each *course registration,* to improve the alignment; to groups of scans; to the final project with all the scans.
Also in this case the errors have been recorded in relation to the setting parameters values. The medium error is only 5.1 mm but, like to the *course registration,* it is not meaningful of the whole project.

medium error (m) obtained whit *course registration* on 28 scans	medium error (m) obtained with *multistation adjustment*	number of attempt	error reduction (%)
0.0320	0.0051	6	84.1%

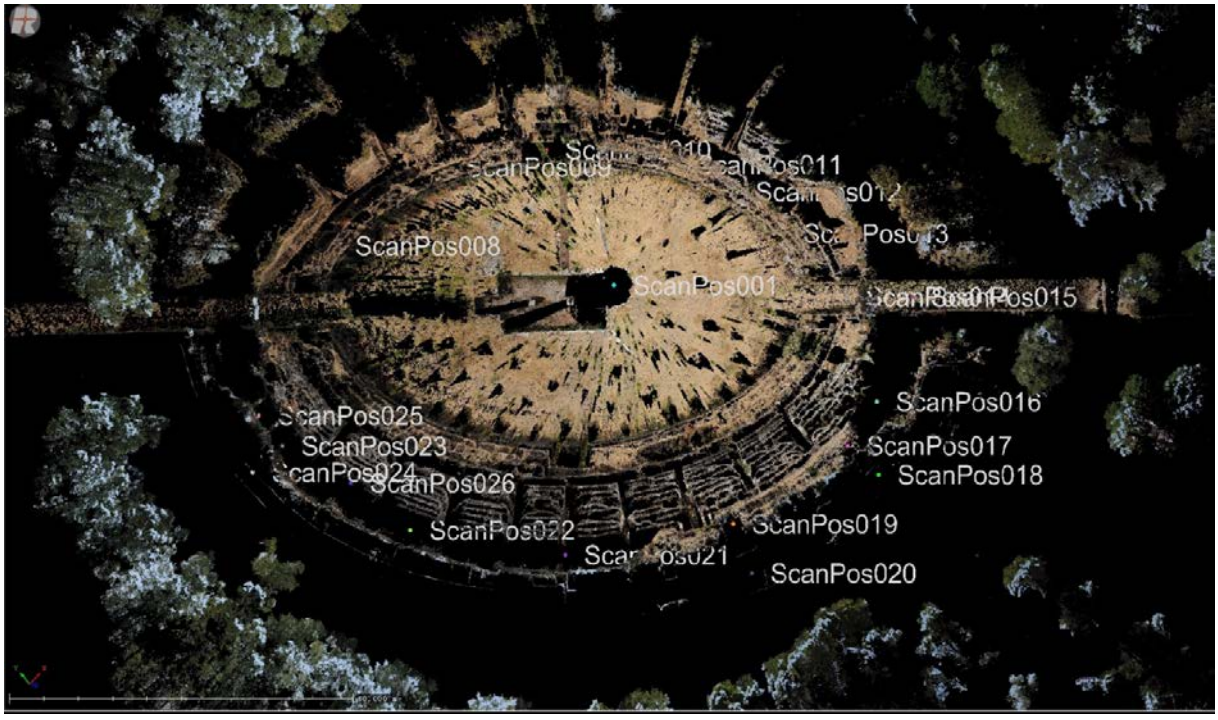

Fig. 4: View of all scans of the roman amphitheatre

Both *course registration* and *multi station adjustment,* are two iterative methods. For this reason the operation can be replayed more times until a satisfactory result is obtained, and it is always possible to improve it anytime.
Only who gives input can decide if the quality of the operation is good or not. This choice depends on the investigated object. In this case an error of 5 mm is allowable considering that the roman amphitheatre is a large and impervious archeological site.
After relating all scans to the same reference system, all *polydata* have been linked and a new one has been created on which performing the following operation of cleaning, thinning and meshing.

4. Mesh process and triangulation[(c)]

The software used has two modes of triangulation: *Polar Triangulation* and *Plane Triangulation.* The first is recommended for closed environments, such as tunnels, because it considers the mesh consists of triangles directed to an origin defined, such as for example the position in space of a scan position. The second type uses as reference a plane which is that of the current UCS view, therefore aims to playback of land, and from more than one mesh (defined by the software 2.5D mesh) can lead to a 3D processing by different point of view. It was necessary to carry out the preliminary operations for the purpose of obtaining good triangulations. A new polydata was created using the filter *Octree,* in order to work with point clouds better distributed. Then it was necessary to vacate the point clouds created by the presence of trees and other disturbances. The *Terrain Filter,* designed to extrapolate from the point cloud vegetation and anomalous points, proved to be a very valuable tool to perform a more detailed analysis on the data. Several attempts were made even adopting the polydata filter *Deviation Gate,* but it hasn't managed to achieve appreciable improvements in the elimination of unnecessary points as the scene was much disturbed. For the triangulation of the entire work has made use of both types of algorithm for mesh provided, to exploit the full potential of the software.



Fig 5: Identification of bushes through the use of *Terrain Filter*

The first method was adopted for the areas of the arena and bleachers. Preliminarily it was generated a polydata combination of the sun scans the exterior, i.e. the scan position 001, 002, 003, 004-1, 004-2, 004-3, 006, 007, 026, 027, 028, with filter *Octree,* by setting *Increment* the value equal to 0.03 and asking to cancel the algorithm points closer than 5% of the increase: the result was a cloud of points very well defined and fairly dense, where it was lost as little information as possible. At a later stage, the polydata was cleaned with the help of either *Terrain Filter* or manual selection mode. From this polydata ready for the process of triangulation, copies were made for triangulation respectively of arena, seats in the south and in the north, in order to act on data file much lighter. For ease of working with views, triangulation was carried procesing portions polydata, or by selecting the area to be treated and isolating it by clicking on *Show only selected area* in the menu bar. With a small set of points it was easier to carry out a more thorough cleaning of the through the use of *Terrain Filter* that the manual procedure, that is, trying to eliminate anomalous points selection by observing it from different views. Finally, the affected area was carried out by clicking *Plane Triangulation* in the menu bar. A frequent problem was to gather adjacent mesh separated by a stretch not triangulated, since the triangulations came from different views of the UCS. Consequently to saturate these spaces, the triangulation between different areas adjacent was broken up through *Remove Selected Triangles,* and then as a solution of continuity a new mesh was generated selecting the meshes with the points in the transition area. The result from the first tests with the *Plane Triangulation* was interesting*:*

- *Max triangle edgelength[5] [m]*: Good results were obtained by setting values such as 0.3, 0.5 and the value 1 in the worst case, when there were large gaps to internal of the mesh. It's a parameter that has been used with caution, because the highest values allow for closing the large gaps in the cloud of points gave distorted result, relevant to areas not plotted perfectly and which hadn't precise information;

- *Max triangle tilt angle[6] [deg]*: High values were used for this parameter, such as 150° and 160°, with which adopting a good view on to reaction from triangular, it was possible to create a mesh complete to a first attempt already, without necessarily having to change too many times the point of view for the purpose of obtaining the 3D reconstruction;
- *Min triangle angle[7] [deg]*: Lowering in the various attempts this value, meshes always complete were obtained, consequently in the final attempts this value was usually set equal to 0.00 °. In some cases, such as incomplete areas or with severe deficiencies of points, the value 5.00°was used, to avoid connecting points with other anomalous points;
- *Crop triangles outside polylines* didn't resulted very useful for our purposes because of the particular construction of the point clouds, and even with the automatic elimination of the triangles that were not enclosed by a polyline meshes with serious deficiencies were often obtained.

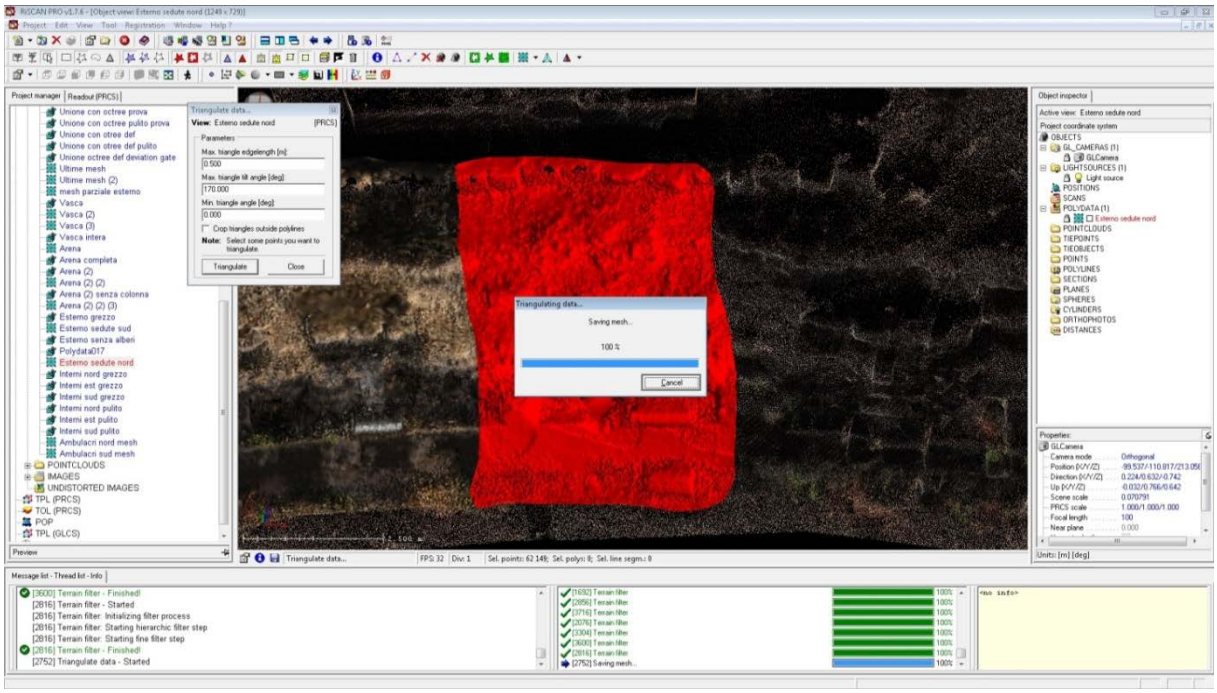

Fig 6: Generating a mesh of terraces by *Plane Triangulation*

The second method was used for triangulation of ambulatory and bath. For the reconstruction of the latter area a good reconstruction was obtained with the scans relating to positions 001 and 007, while the scans performed by the positions ranging from 008 to 016 were used for the ambulatories and the connecting areas with the external. Scans were generated with the respective polydata filter *Octree* and *Increment* values set at 0.01. Each polydata was released by vegetation and anomalous points using both manual selection and *Terrain Filter.* Triangulations were created using the data filter *Polar Triangulation,* imposing the following values:

- *Max. triangle edgelength [m]* = 1
- *Max. triangle tilt angle [deg] = 5*
- *Min triangle angle [deg] = 25*
- *Depth threshold = 0.050*
- *Depth factor = 8.000*
- *Center point* = the scan position related to scanning of origin.

The built meshes were cut profits by eliminating parts and eventually merged into a union created polydata with filter *All Data.* Completed the process of triangulation, it needs to adopt the *Smooth & Decimate* functions. The first algorithm provides for the levelling of the surfaces via the data optimization point, while the second works on the amount of triangles to maintain. The obtained tests showed the usefulness of these tools, even taking into account the necessary measures: in the first phase *Smooth* has been used simply by setting the mode of levelling *Windowed sinc smoothing* parameters, *Iterations 20, 0.086 Pass band* and *Feature angle 30°;* in a second stage it was possible to make the mesh more homogeneous using *Decimate* with *Target Reduction 0.1, 0.5 Absolute error, Feature Angle 30°.* Much of the information contained in the original colour scans was lost, because of the necessary steps to lighten the filter *Octree,* levelling and especially decimation, so undistorted

images were created using the provided option and then texturing meshes. Now what looked like a confused cloud of points in space took a look close to real.

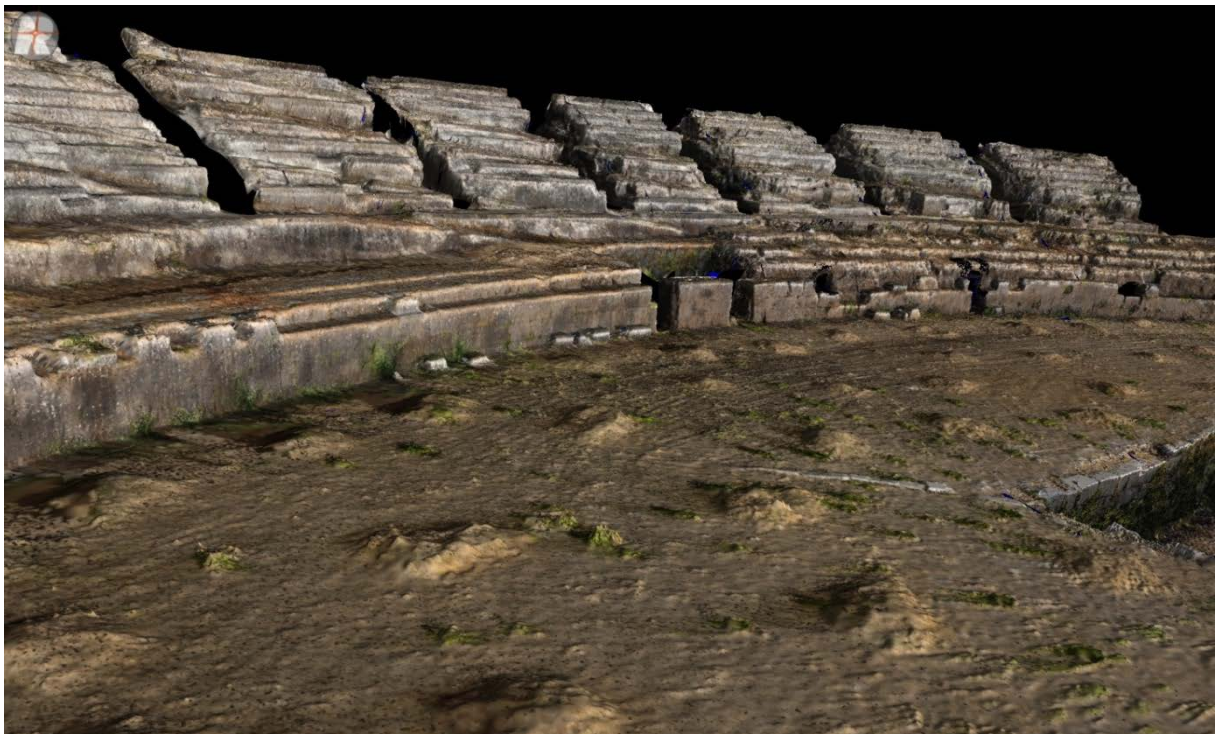

Fig 7: Result of the final mesh processed with the instrument *Smooth & Decimate*

Notes and bibliographical references

[1] Aldo Neppi Modona, *Gli Edifici Teatrali Greci e Romani*, Firenze, Leo S. Olschko Editore, 1961

[2] Domenico Lo Faso Pietrasanta duke of Serradifalco, literary man, architect, interested in archeology and in sicilian architecture. He wrote a lot of works dealing with the ancient and medieval monuments in Sicily.

[3] About the theme of the difference between the oval from four centers and the plane track af amphitheatres:

- Trevisan Camillo, *Sullo schema geometrico costruttivo degli anfiteatri romani: gli esempi del colosseo e dell'Arena di Verona. In Disegnare idee immagini Anno X n.18/19*, Roma, Gangemi Editore, 1999
- Casale Andrea, *Alcune ipotesi sul progetto e sulle geometrie del Colosseo. In Disegnare idee immagini Anno X n.18/19*, Roma, Gangemi Editore, 1999

[4] Riccardo Migliari, *Ellissi e Ovali epilogo di un conflitto. In PALLADIO Rivista di Storia dell'Architettura e Restauro,* Roma: Istituto Poligrafico e Zecca dello Stato Libreria Dello Stato, 1995, vol. 16, pp.93-102

[5] Option allows you to set a maximum length for the sides of the triangles that will make up the mesh.

[6] It indicates the maximum angle to keep, for the construction of the mesh, between the normal of any side of the triangle and the plane defined by the display adopted on the screen of the PC. The triangulation is not performed for those triangles whose arrangement would be to have an angle greater than that defined by the user

[7] Indicates the minimum angle that can take two adjacent triangles not to be removed during the construction of the mesh.

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The interlacing arches system in Salerno and Amalfi Coast

Barbara MESSINA
Department of Civil Engineering, University of Salerno, Fisciano (SA), Italy
bmessina@unisa.it

Abstract
In historic architectural panorama of the Mediterranean area, especially on the Amalfi Coast – also including in it Salerno – there are some built episodes of special interest: they are examples in which the recurring motif of interlacing arches draws flat or convex surfaces, with a typically taste of Arab-Norman matrix that, in the Middle Ages, strongly characterizes the architectural language of this territory.
Conceived, in most cases, to respond to some needs of structural nature, the twisted arches take on, over time, obvious aesthetic connotations, by virtue of an intrinsically geometrical coherence, capable of synthesizing, in a single physical model, reason and feeling. And so, in a gradual process of defining the architectural configuration, the pure geometric composition is transformed from abstract matrix in symbolic form.
So, starting from a reconnaissance of the Amalfitan structures in which the system of interlaced arches is used, the paper is intended to propose a geometrical and spatial interpretation to correctly understand the logic behind the conception of those forms, in which is expressed an architectural lexicon typical of the Amalfi Coast. For this purpose, using the digital modeling, and in general the graphical representation, it tries to decode the generative process of the interlaced arches pattern, thus revealing its true essence.

Keywords: Intertwined arches, geometric patterns, graphic representation, Islamic art

1. Knowledge and enhancement: architectural forms and signs in the Amalfi Coast
There are some places that leave indelible traces in memory, by imposing strongly the self-image. Places whose identity becomes a witness to a collective feeling, to the point that we identify in them, finding in their characteristic forms the familiarity of a something that has always belonged us. This happens whenever the space, be it natural or anthropic, it has a distinctive character, recognizable in its every concrete phenomenon.
This is what Norberg-Schulz summarizes into *Genius Loci*, when he states that "... the place is obviously an integral part of the existence ... [is] something more than an abstract location ... [is] a set made of concrete things with their material substance, shape, texture and color. All these things, together, define an environmental nature, which is the essence of the place" [1]. Recognize the signs and forms that contribute to define the atmosphere of a certain context, is the starting point to begin a cognitive process, aimed at awareness in the community towards an historical-artistic heritage, often overlooked. In fact, only when who live in daily contact with a variety of ordinary architectural manifestations becomes aware, it is possible to arrive at the valorisation of these shared cultural resources.
With reference to this complex issue, the present paper – that summarizes the outcomes of a wider research directed to the built heritage of Salerno and Amalfi Coast [2] – draws attention to a particularly significant territory, because rich in often unexplored episodes, in respect of which we should to start a rigorous process of cognitive appropriation.
Also, it is a reality that can explain the sense of 'represent to known': it is a unique environment in the world, characterized by peculiar aspects and signs, sometimes recurring in other cases distinctive, that connote all the built space, contributing together to define the identity of this landscape. A reality to be understood as a cultural resource to be protected and, as such, to be promoted in terms of knowledge, from the point of view of form, of geometry and of configuration. Only by providing the means to decode

the typical features of coastal architecture, it is possible to highlight this heritage, in a gradual process of awareness raising and appropriation by a community that, frequently, coexists with those testimonies without grasping the deep meaning. So, through specific graphical investigations directed to typical signs – and as such symbolic –, the study try to identify the compositive rules, and detect, therefore, the geometric and structural genesis as the pure essence, invariant and recognizable beyond the complexity of forms, with the aim of arriving at a their correct interpretation.

Retrace the logic underlying a stylistic language, today indisputably recognized as specific of investigated area, requires some preliminary considerations, necessary to identify deep and diversified cultural roots on which the coastal artistic repertoire has drawn. Just the extraordinary synthesis of Eastern and Western influences, appears as a distinctive character of the Coast's architecture, that Arnaldo Venditti not trivially defines "Norman" or "Tyrrhenian", but rather of "Arab-Byzantine style" [3]. Therefore, this syncretism is manifested in the Amalfi Coast's architecture, which properly reinterprets archetypes derived from other civilizations, even in the light of technical knowledge, and of local building practices. Leaving out a more detailed analysis of the numerous main characteristics of coastal architecture – as this is beyond the scope of this paper – is meant, instead, to draw attention to some of them, which, for elegance and evocative power, impose themselves to the observer, with greater force. This refers in particular to a number of architectural and structural elements which end up identifying with a completely original way to build, although the obvious reference to forms inspired by other civilizations. This is the case, for example, the so-called intertwined arches system, frequently used both on flat surfaces and convex, in which one sees a clear Islamic mark. Then, the chase each other's of the arches, often pointed arches, draws dynamic two-dimensional and three-dimensional wall surfaces, which reveal the propensity to the geometric shape, own of the Arab world. It is, however, a pattern that, in response to an essentially unchanged stylistic language, is both used for bearing elements as for simple decorations.

The geometry, in all its declinations, also connotes the purely ornamental repertoire of the aniconic coastal art, in general: composing elementary forms, in itself simple, we come to elaborated patterns, very strict but with strong aesthetic values. With reference to the construction techniques and to materials used for these elements, however, it appears a certain interaction of influences, derived from the Byzantine and Islamic culture. On the one hand, the use of *opus sectile* or of mosaic decoration is a clear reference to the Byzantine world, as well as the alternation of different left exposed construction materials – usually yellow and gray tuff – to chromatically embellish architectural or ornamental apparatuses. Other hand, the use of ceramics by bright and vibrant colors, that emphasize the most relevant parts for aesthetic and formal meaning – or even fully cover them – often combined with plastered and white painted wall surfaces, represents the echo of a building tradition derived from the Arab world.

In summary, the widespread and mixed use of all the described elements – both in civil and religious buildings – properly reinterpreted in the light of the skills of local workers, and based on the materials available on site, makes the built heritage of Amalfi Coast absolutely unique in the world, and lends it a recognizability that goes beyond time and space.

Among the elements that, with greater force, lay down themselves in the collective imagination as archetypes of coastal architecture, therefore, the system of interlaced arches [4] can be considered the most evocative of a built heritage, in which pure shape and symbolic meanings come together in elegant architectural compositions. In an attempt to unravel the symbolism inherent in this constructive system, of Islamic origin, and to understand the reasons which make it one of the hallmarks of coastal architecture, it is important to pay attention to the rules that govern its generative process, starting from the role of geometry, as sovereign tool that creates order.



Fig. 1: On the left: the portico of Salerno's cathedral. In the middle: a wall of the villa Rufolo's vestibule, in Ravello. On the right: an architectural element of Salerno's cathedral with mosaic decoration

2. Symbolic and ornamental values of the geometry

If, as noted, one of the most significant sources of inspiration for art and architecture of Amalfi Coast consists of the underlying Islamic culture principles, it seems appropriate, albeit briefly, to dwell on the ideological grounds inducing Islam to operate certain stylistic choices. Of course, what marks this civilization is the role played by religion, which far from being a doctrine of faith linked to the free will of the individual, rather assumes a totalizing meaning. For the Muslim faithful, the religion is the very life essence, and therefore invests the spiritual but also earthly sphere; Islam dictates the rules related to ritual practices, and at the same time establishes a set of standards of conduct that daily should guide the faithful. In this sense it is not only a religion, with reference to the technical meaning of the term, but is rather conceived as an orthopraxis, or as a set of precepts that govern the Faithfull's actions, so that they are judged as correct.

Leaving aside the more specific theological considerations, it is useful to recognize that the rise of Islamic civilization, in the name of a common religion, imposes a formal collective language which, going beyond any territorial limit, can translate, into clearly recognizable signs, a universal ideological and artistic feel. So, what makes the Islamic civilization very different from the others is the role played by religion, according to which can be precisely interpreted some of the innovative elements introduced in the field of art and architecture.

From the small object to the monumental building, each product of artistic creation shows, in a clear manner, the relationship between man and God. In Islam, however, the man is not the measure of all things; his being above many creatures depends, in fact, from the benevolence of God, rather than from on its merits. Hence the attitude of ascetic contemplation, the feeling of adoration and submission to God, that involves the architecture as well as the decoration [5].

Even the iconic baggage, to which the Islamic decoration relates, is in some way influenced by religious dictates: although in the Koran lacking specific prohibitions, Islamic art uses an aniconic language, tending to an abstraction of the forms that responds the need to proclaim the superiority of God's creation than that produced by the mind and by the hand of man. In this sense we explain some decorative choices, such as arabesque, intended as natural forms' stylization, or geometric textures repeated ad infinitum, explanation of the atomistic theories, or the use of a glitzy figuration, earthly compensation of ephemeral and transitory life, or the sense of horror vacui that pushes to cover all surface without leaving any space, as if the interrupted matter betrays the doubt of our existence. All reasons that become, over the centuries, the distinctive features of that art.

Therefore, beyond each technical specificity and every stylistic variation linked to local traditions, in the field of decoration three major figurative themes stand out, all aniconic, as already mentioned: a first type related to epigraphy, a second to vegetable world forms and a third inspired by the geometry. In particular, the geometric pattern originates from earlier artistic traditions. In this respect, it should be noted as every religion, belief or philosophy has identified an important figurative source in the geometry, by virtue of metaphorical meaning often associated with the form. Thus, for example, almost always the circle symbolizes the sun, but also heaven, spirituality and soul's immortality or – if in half divided – represents the struggle between good and evil. The square represents the earth, the solidity, the security, but it is also a salvation symbol, and the rhombus indicates the man. From the square, through the golden ratio's proportions, we get the golden rectangle, expressing a deep sense of balance: the rectangle's golden section was often used by the Egyptians, as a module in the temple's architecture or in buildings for burial, such as the *mastaba* and, especially, the pyramid. And yet, the equilateral triangle symbolizes stability, harmony of life. At pentalpha (a five-pointed star with central pentagon) Pythagoras already attributed the meaning of the harmony and brotherhood symbol, recognizing the central pentagon as the heart of the universal order. The hexagon evokes the heavenly army that, as shield, wards off evil spirits. Even the octagon is of remarkable allegorical interest, especially if it considers that for Neo-Platonics and Neo-Pythagoreans, whose doctrines also influenced the Islamic culture, the world's origin would be represented by a circle generated by two overlapping squares, of which one rotated of 45° relative to each other. The originated figure is just an octagon, one of the main esoteric symbols of Christian tradition and Islamic art: it embodies the concept of spiritual regeneration, being precisely intermediate between the square and the circle. As the latter two figures – respectively symbolizing the world and the sky – so also the octagon thus possesses an extraordinary evocative value, representing the world interposed between the circumference of the heaven and the square mass of the earth, the stopping point of the event.

While, therefore, widely used before of Islamic artistic apogee, thanks to this civilization the geometry assumes an even more evident expressive force. If in the past, in fact, it had been relegated to a marginal role and was mainly used in friezes and cornices, with the rise of Islam it acquires a more complex figuration, being present both in architectural decorations and in the structural elements. The sophistication of these elements consists in the grace with which certain motifs in it simple, such as lines and circles, are combined with each other, thus avoiding the rigidity of a purely abstract composition, and loading down, at the same time, with spiritual meanings. The artists reach this result skillfully by having recourse the symmetry, which is not only used as a rigid mirror image, but also as



Fig. 2: Geometric patterns in the plan and in the space. On the left: detail of a decoration of Salerno's cathedral. On the right: a dome of Villa Rufolo in Ravello

an indefinite multiplication of modular units, able to occupy all available space, in a sort of 'global symmetry', or more often as a symmetry with respect to a variable number of axes, around which the decorative motifs can freely develop. In some cases, as noted by Oleg Grabar, the axes tend to be a form of visual imagination; in fact do not exist in itself, but only thanks to the rest of the design [6].
Regardless of the possible two-dimensional or three-dimensional applications, the theoretical principle underlying the formation of geometric ornamental effects, which unmistakable made this artistic language, is what could be called the interlaced design aesthetics. One way to conceive the architectural or decorative element that, based on support's subdivision according to precise mathematical laws, draws the surfaces overlapping lines and shapes, with a similar logic of interweaving of tissue's weft. The visual impression of extreme complexity, then, reflects an extraordinary execution's simplicity, essentially consisting of three phases: identification of a starting path, definition of a grid, twine of forms. From the flat surface to the space is a short step: it is enough to consider the thus obtained drawings as a plane projection, by a point at infinitive orthogonal to this, and give them volume, with the third dimension, to get the spatial interwoven.
The origin of this system is therefore a specific configurative criterion that, in response to the mathematical-geometrical needs, also acquires a symbolic value as well as aesthetic; the figures generated by the intertwining of simple lines, repeated ad infinitum on surfaces virtually devoid of a center and borders, according to Massignon [7], seem to respond to the atomism's philosophical view, under which the world can be conceived as an unstable grouping of atoms, individual particles from which thicken depends the definition of forms. Exceeded then the idea of a static universe, the line's dynamism and fragmentation resulting from the interweaving of geometric figures, compel the viewer to mentally follow the drawing development, beyond the physical limits of the surface. It may be that the surface is annulled, as it were, by the explosive emergence of the ornament that prevails on this.

3. The weft's drawing on the Amalfi Coast: from the ornament to architecture

If the decoration for Islam assumes a prominent role, it is mainly due to its constant interaction with the architectural structure; far from being as simple decorative element – by assigning to this term a meaning related to the pure exteriority – the decoration, in fact, actively contributes in the development of architectural forms. This aspect, which come to be a hallmark of the Muslim artistic vocabulary, it is especially evident in three-dimensional structures, such as arches and vaults, in which technical and formal aspects come together inseparably.
The idea of designing these architectural structural elements such as ornamental parts had great success in the Arab world, in general, but also spread in Christian countries of the Mediterranean area, that had come in contact with Islamic culture thanks to frequent commercial traffics. Salerno and the Amalfi Coast were not exempt from this artistic exchange, as well as commercial, and while not directly undergoing Moors' dominion, they adopted typical signs and features of the Islamic art, still recognizable in many individual elements, however, almost always incorporated into more complex structures.
As already noted, particularly conspicuous is, within the investigated architectural repertoire, the presence of the interlaced arches system which, despite the great diversity of composition – in fact the arches have various profiles and are used on surfaces from different geometry – is as a *fil rouge* that links many architectural episodes of the Amalfi Coast [2].

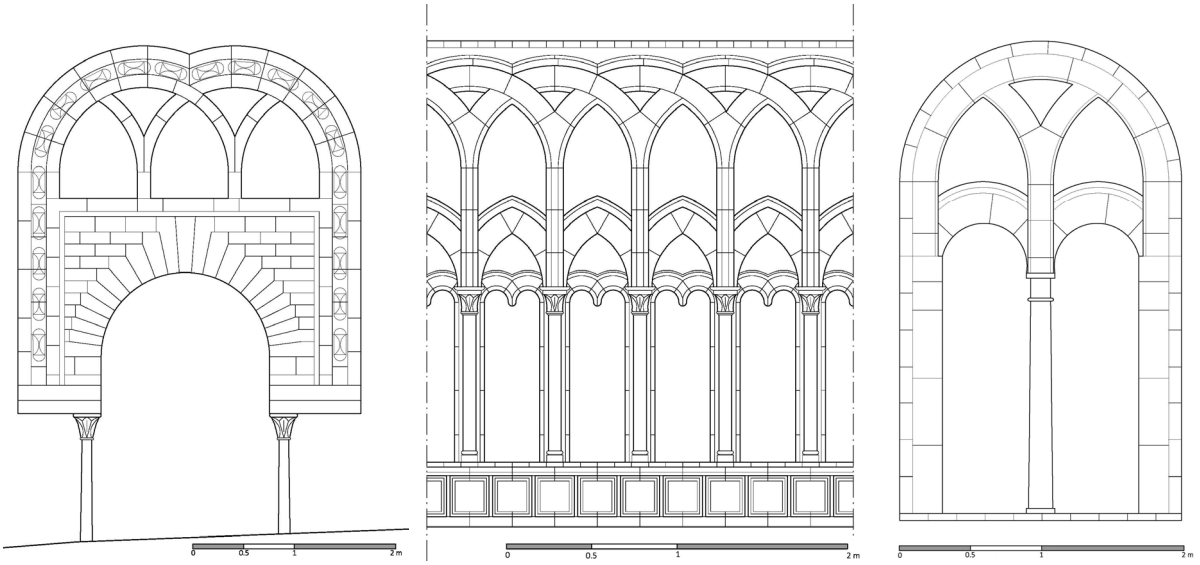

Fig. 3: Salerno, Fruscione palace. On the left: the main door. In the middle: the order of polifore. On the right: a mullioned window

With reference to the use of such a system on flat wall surfaces, interesting is the Fruscione palace's example, a building located in the heart of the Salerno historic center. The palace, built in the middle of the thirteenth century, it is surprising for the walls' formal richness; although transformed over centuries, to the point as to look, today, very different from the original, it shows clear traces of the Islamic influence, thanks to the use of that system. Firstly, the original portal of the palace, located in vicolo dei Barbuti, proposes the interlaced arches solution in the drawing of decorative frame that closes, at the top, the opening. Here a round arch, whose light corresponds to 2/3 of the whole, is symmetrically repeated at both ends of the frame; consequently, the two elements overlap in the central axis of the opening. The arches are further shifted, to right and left respectively, at a distance equal to 1/3 of the span, becoming generative matrices of a rhythmic sequence, virtually repeatable.
Equally interesting are the mullioned windows, now walled up, adorning both the prospectus in via Adelberga, is the one in via Santa Maria dei Barbuti. The opening's main structure is closed by a round arch that rests on gray tuff piers; the translation of this arch, in steps of 1/2 of the span, generates the main pattern's twisted weave. Added to this is a secondary arches system, again semi-circular, delimiting each obtained partition walls. Even more interesting is, at the third level, an order of polifore, forming a continuous arcade of interlaced arches, today closed and fragmented due to the presence of subsequently opened balconies. The arcade proposes the solution of the round arch, supported by two underlying columns, which the arch is connected by vertical struts. The arches sequence, obtained from such basic element, is then moved so that the second theory's columns of arches are disposed in correspondence with the key of the first. The result is a superposition of elements that, at the point where these overlap, generates an ogival profile, further highlighted from a second register of minor arches, directly put on the columns' capitals.
An interesting variation on the above described theme is obtained using an arc from the ogival profile, which elementary module that generates the overall design. Emblematic, because among the best preserved examples at least in terms of architectural integrity, is the Paradise's Cloister, part of Amalfi's cathedral, built between 1266 and 1268 as a burial place of famous citizens of the city. The cloister, rectangular in plan, has a peristyle around a central opened courtyard. The space is marked by slender and elegant coupled columns – four in the corners – that support a mix of pointed arches, taste very oriental. Motif, the latter, that draws the wall surfaces both outside of the courtyard, as within the four vaulted arcades that surround it.
The rhythm of arches that follow one another along the wall surface is, in this case, far faster than in the already treated examples, and the ogival profile suggests a greater sense mystical, ascentional. Everything in the composition betrays the meaning of a space whose function is itself full of symbolic implications. This seems to be confirmed by graphical analysis that, tracing the genesis of this configurative system – however, reduced to pure geometric form – shows how, actually, the elementary unit at the base of the overall pattern is still a round arch. The span of the latter, the width of which exactly corresponds to the diameter of the circle from which originates the entire graphics array, is then divided into seven parts. This choice does not seem random when you consider that the number 7 has a strong symbolic value: six are, in fact, the days of Creation, the seventh is the break (which in the Paradise's cloister is eternal rest). Defined the basic layout, the simple shift of original form, on excluding the key brick portion, creates the complex interweaving of the arches, white as well as the walls, with respect to which emerge thanks to a slight overhang.

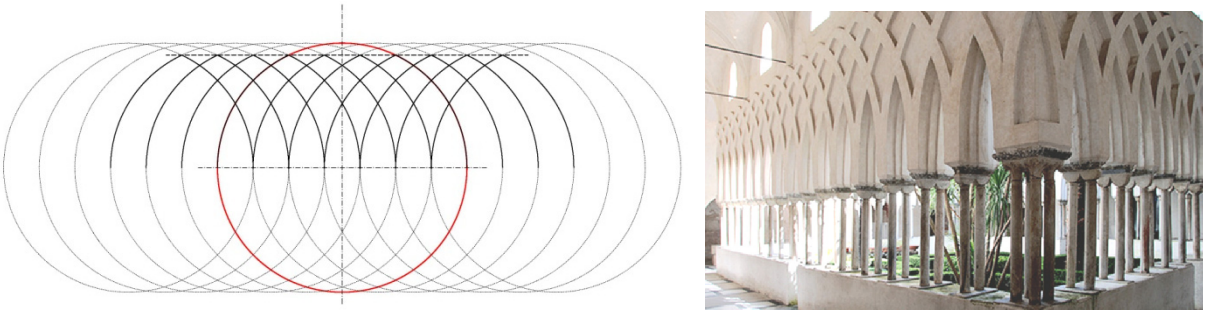

Fig. 4: Amalfi, Paradise's cloister. On the left: the geometrical representation of the drawing's matrix. On the right: the interlaced arches system

The lobed arch is instead the root of several other examples of coastal structures referable to the being investigated system. Typical of the Islamic architecture, and very widespread in Andalusia, the lobed arch, which fully affirms its aesthetic value with the Moors, seems to have been conceived by Oriental civilization. There is much discussion on the origin of a so complex and unusual profile, although the most accepted theory seems to be that proposed by Torres Balbás [8] and Georges Marçais [9]; according to them, this form may be generated by the intersection between the plane walls and the sculptural shells, often used in Roman and Byzantine times to cover the niches, and later taken up by Muslim artists. In the course of time the decorators, driven by the need to geometrize the designed shapes, would finally simplified the arch's drawing, subsequently evolved in numerous variants. Precisely because of their greater formal richness, these arches, twisted as a result of a translational motion, even more contribute to embellish the architecture in which they are used, sometimes as a purely ornamental decorative design, in other cases becoming real structure.
A mainly ornamental function is found in lobed arches system of the Villa Rufolo's courtyard in Ravello. Despite the many changes made in later centuries, yet it expresses that extraordinary configurative refinement born from the synthesis of different cultures that here have met. The courtyard, almost square in plan, is the focus of domestic life: in fact, overlook on it all environments that make up the real house, organized on three levels according to a schema originally with four blocks. In the upper of the east lodge, still completely preserved, a gray tuff arch from the three-lobed profile is the basic module of the system; this shape is shifted three times, in a steady and cadenced rhythm, thus defining a tangle of lines, sinuous like a delicate lace. An effect, this, made even more intense thanks to the ornamental treatment of the arch's profile, decorated with sculptural elements that evoke the drawing of leaves and natural forms.
In other examples instead, as in the church of S. Salvatore de Birecto in Atrani, the interlaced arches system defines an architectural space. In particular, we are referring to an open loggia that separates the church's interior from a space, probably an endonarthex, whose original features have been brought to light by recent restoration work [10]. This space, transverse to the axis of the church's three naves, is covered by three cross vaults, and is enhanced by the presence of what was, once, a perforated wall of Islamic reminiscence, now unfortunately almost completely walled. Its drawing is very similar to that of the Villa Rufolo's courtyard wall; in fact, a mixtilinear frame again draws a three-lobed arch, whose profile is slightly simpler than the Ravello's example. As well as simplified is the translational symmetry that marks the cyclic rigid motion described by the elementary module to obtain the interweaving of forms. In this case, the arch is moved of ½ of the span, thus tracing a drawing less dense, but just as elegant.

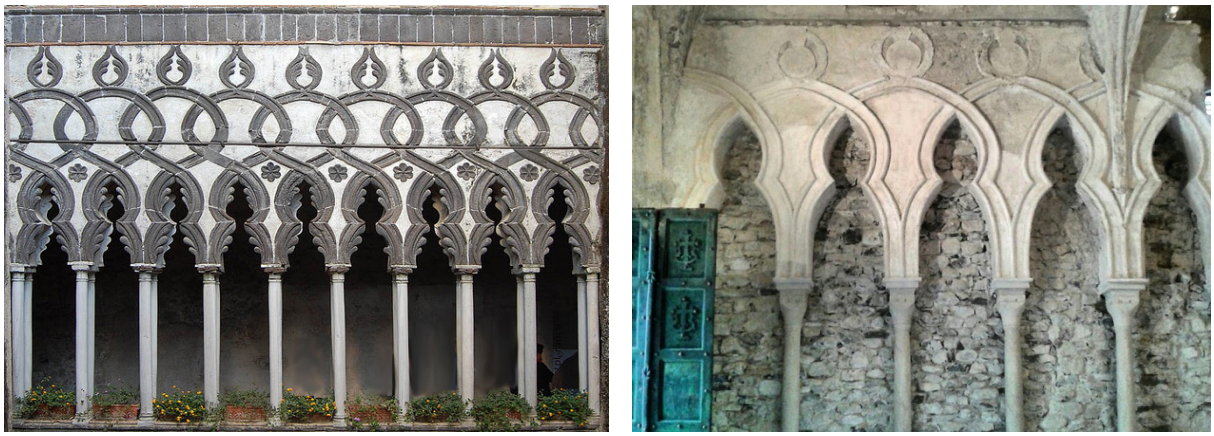

Fig. 5: On the left: Ravello, courtyard of villa Rufolo. On the right: the lobed arches of S. Salvatore de Birecto church

4. From the plan to the third dimension: interlaced arches in space

Therefore, the geometry, if wisely used, can charge a space of profound significance that goes far beyond immediately perceived shape, especially when overcomes the limits of rigid patterns to follow, and rather becomes a broader compositional tool. This is even more evident when the interweaving of the flat shapes conquests the third dimension, often exploiting the figurative values implied in spatial compositions, generated by the elementary module for rotational symmetry around an axis.

A good many examples, in Salerno and in the Amalfi Coast, show a drawing originated from the combination of simple Euclidean geometries, that evolve from pure two-dimensionality into intricate three-dimensional structures. Despite the interpretative option exercised on the primitive drawing, the final appearance of the so obtained structures clearly displays the basic geometric principles, which constitute its strengths.

In fact, the use of interlaced arches in three-dimensional systems has its roots in a cultural background of oriental matrix that had a lot of luck in the Mediterranean basin in general, but especially in Spain; here this constructive system reached sublime levels, as evidenced by the domes of the Islamic mosque in Cordova, likely prototype of a new way of conceiving the vaulted structures [11]. The surface enclosing the space is interpreted according to the logic of the diagonal arches, which expresses the Islamic aesthetics in favor of geometric shapes, rather than of the modeling of powerful physical volumes. So here are ribbed domes supported by arches plans that, generated by the composition of two-dimensional elementary matrices, cross the space intertwined as a kind of backbone. The result is an organism in which the ribs, designed to meet the structural requirements, reveal a preponderant aesthetic value, being rather "... the three-dimensional development of an abstract bidimensional figure, whose geometric reality comes before any physical implementation"[5].

Much has been discussed about the originality of this system: examples similar to those Andalusians have been identified in the East, particularly in Mesopotamia, as well as in some European countries and in the Maghreb, yet no one is earlier than the structures built in Cordoba in the middle of the tenth century. Among the closest to the Spanish ones, for shape and material, were frequently referred to some Armenian vaults that reproduce the system of interlaced stone arches, to draw wonderful spatial geometries. Some vaulted ceilings, yet inspired at the same constructive system, are also found in Iran, where however brick's arches are preferably arranged in a radial direction. In this case, unlike what happens in the domes in Spain, the arches have, however, a maintaining function rather than structural.

While remaining well away from the complexity found in the above described ribbed vaulting, the examples in Salerno and the Amalfi Coast appear referable to the same ordering principles, clearly showing an Arabic taste. However, what distinguishes the Amalfi's repertoire, above all, is the prevalence of ornamental component with respect to the structural function, also found in some cases. The interlaced arches are in fact the key element of the decoration of a series of architectural structures, generally bell-towers of buildings scattered throughout the area, which even in the variety of materials and colors, all show a similar geometric logic: the generation of the final configuration from the rotation of a single arc around a vertical axis. In this regard, we further highlight a significant difference, in terms of geometry, than the elements that define the backbone of the Andalusian vaults. While in Cordoba, and in examples of it inspired, the ribs cross the space, describing curves from the variable profile, but always plan because released by any other architectural element unless the orientation of the vertical plane which they belong, in Salerno's examples the arches must adapt to the curvature of the surface on which the ornamental matrix is developed. That, in a graphical reading process tending to abstraction of forms, is equivalent to the intersection between cylinders, of which, typically, the first – comparable to the structure's main body – has a vertical axis, and the second –

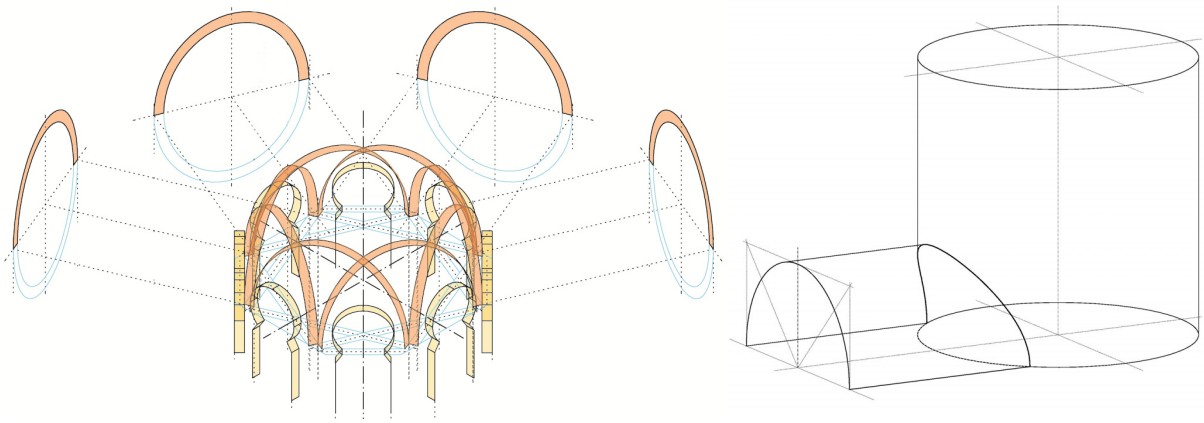

Fig. 6: On the left: a schematic representation of a ribbed vault of Cordova. On the right: a skew curve generated by intersection of cylinders

corresponding to the arch's geometry – has an horizontal axis. Consequently, the elementary module, generator of the overall drawing, is transformed from a flat curve to a skew curve, conferring greater sinuosity to entire structure.
Among the most important examples of the mentioned repertoire is the bell tower of Salerno cathedral, built, according to documentary sources, between 1137 and 1152. Resting on a strong cubic base with a 10 meters side – of which two-thirds form the underground foundation of the entire structure – the bell tower is developed in a total height of 50 meters, by superimposing five levels.
The layers are separated by cornices, and each one has, on its four faces, a mullioned window with central column. The tower is topped by a cylindrical masonry belfry, on which it is developed the interlaced arches' motif, the first example of this kind in Campania.
The drawing's basic module is, in this case, a round arch with alternating gray tuff blocks and bricks, which later became typical of the Amalfi Coast's language. Since this element has to go along the cylindrical structure, it is transformed from a flat curve – the theoretical arch profile from which we start – to a skew curve, which is then the result of the actual intersection between the two surfaces. The thus obtained curve, turning in space according to an axial symmetry, becomes weft's matrix of the tower's decoration. A second set of smaller round arches, this time flat because laid out on the faces of a dodecagonal prismatic block, develops between the columns supporting the interlaced system, while a two-colored stone fillet with six-pointed stars crowns the cylinder.

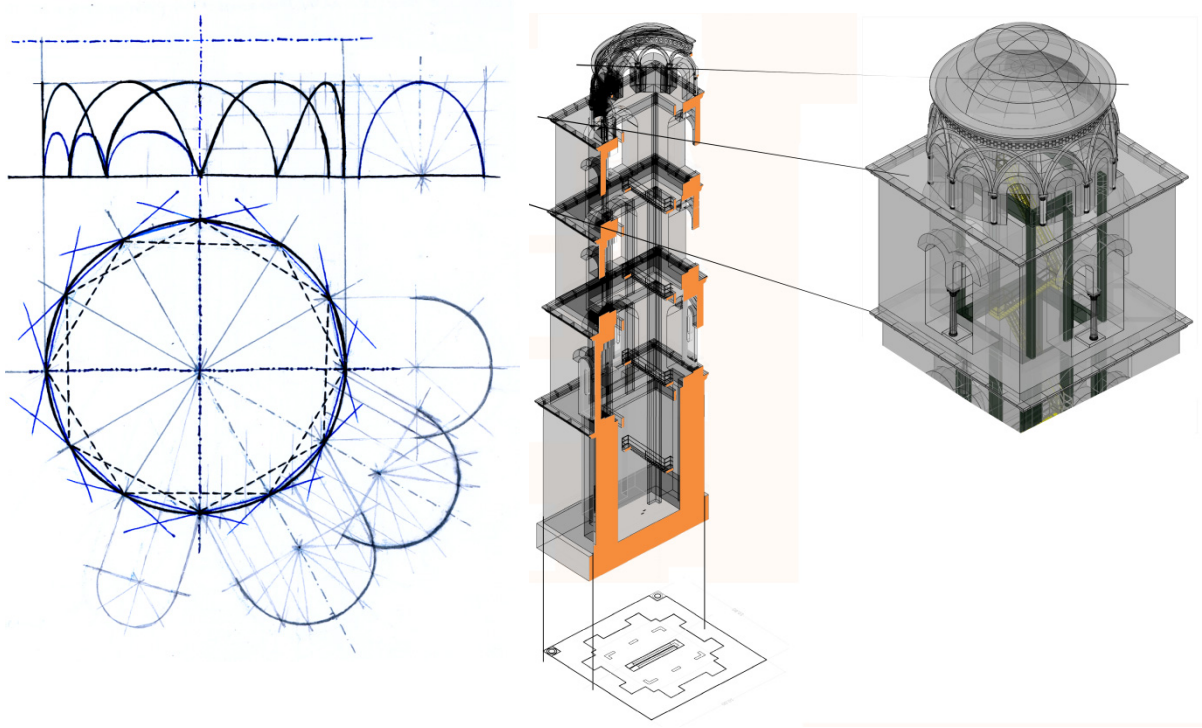

Fig. 7: On the left: orthogonal projections of the interlaced arches of Salerno's belfry tower. On the right: digital representation of the structure (3d model by C. Desiderio)

Equally significant and well preserved is the bell tower of the Amalfi's cathedral, which in many ways follows the same structure of Salerno's belfry. The construction works started in 1180, but was completed only in 1286. Today partially incorporated in the built-up area surrounding the adjacent square, the bell tower is designed as a simple volume, but very refined from a decorative point of view. The structure is geometrically similar to a square based parallelepiped, divided into three levels; on the walls, from bottom to top, are respectively opened single-light, mullioned and triple lancet windows with round arches. The belfry's crowning is much more complex: in fact, it consists of a right circular cylinder, in axis with the underlying body. Four other cylinders, smaller both in height and diameter, are matched to the first, in correspondence of the parallelepiped's corners. The central cylinder and those adjacent to it are finally surmounted by a conical roofing.
The decoration emphasizes the bell tower's richness, expertly combining materials and geometries that give an overall effect of great beauty.
In particular, yellow and green majolicas, combined into an alternating color rhythm, embellish the belfry, drawing the frames that surround the openings, the interlaced arches that encircle the volumes – still skew curves symmetrically turned around the tower's axis – and the decorative fillets in *opus reticulatum* under the conical roofs.

Less known, but equally significant for the purposes of this paper, is the church of San Giovanni del Toro, in Ravello, a private foundation created thanks to the tribute of several local families. For its construction was chosen an emblematic area, on the highest city's site, and as such, clearly visible; the building was also placed at the point of convergence of important trades. With regard to the geometrical shape of the space, it again proposes compositional schemes, related to the most common type of the Coast's architecture: a three naves basilica, concluded by a triapsidal transept.
Adjacent to the church is the bell tower, a massive square volume, decorated with twists of round-headed arches, made of yellow and gray tuff's ashlars. This motif is also repeated on the external surfaces of cylindrical apses, with the only variant represented by the transformation of the elementary module in skew curve.
The same interlacement of arches, declined in even more sumptuous shapes, is visible in what remains of the Sant'Eustachio church, in Pontone hamlet of Scala; also this building was founded on a private family's initiative. The building was built in the twelfth century on a rocky outcrop overlooking the entire valley; today it is almost completely destroyed, but a time it probably was the most majestic private religious construction of Amalfi Coast, moreover showing a certain formal analogy with the Monreale's church in Palermo. Both for features than by geographical location the church should express, in a tangible form, the political, administrative and economic power of the founding family, becoming at the same time spiritual emblem for the entire community.
Of the structure, almost certainly to three parallel aisles with apses, unfortunately remain the only traces of the outer northern wall and of the cylindrical surfaces that downstream closed the building. Particularly interesting are the apse's decorations, still visible, which, though only partially preserved, show a general scheme based on the now well-known system of interlacing arches, with alternating blocks of yellow and gray tuff. Despite the paucity of surviving elements, we can recognize a sumptuous composition that is unmatched in the Amalfi Coast's examples: here the interlaced arches system, whose profile is still a skew curve generated by the intersection of two circular cylinders, is repeated on each of the three orders of the structure's crowning.
The arches, supported by slender marble columns, revolve in space so that everyone is starting in correspondence of the keystone of the next. The same variety of matter and colours is also employed in the horizontal fillets which mark the transition from one order to the above: in this case, however, the geometric decorative motifs are obtained with a sequence of squares arranged in an *opus reticulatum* weaving.



Fig. 8: On the left: the belfry's tower of Amalfi. In the middle: the apses of San Giovanni del Toro church, in Ravello. On the right: wall ruins of Sant'Eustachio, in Scala

5. Conclusions

The brief *excursus*, albeit quickly, thus shows how ingrained it is, in Coastal area, the use of an Islamic-influenced figurative language, in which more or less complex drawings are generated the interweaving of simple elements. And this happens especially with reference to the interlaced arches system, a decorative choice which also actively contributing to the development of architectural shapes. Great attention has therefore been paid to the possibilities offered by the geometry, here as in the Islamic world understood as a fundamental tool to make order.
And facing such a spectacle, whose complex figuration is generated by simple original forms, "... it is as if a richly orchestrated symphony had been frozen in space. His themes and motifs, its dozens of

instruments are permanently available to analysis and meditation, and even the accomplished art work is always there" [6].
From the arches' interlacing on plan surfaces, to the three-dimensional evolution of the same decorative motif, everything, in the investigated heritage, shows the natural inclination for an eclectic taste, intended as an artistic translation of ethnic and cultural diversity typical of the Amalfi Coast. A reality, between East and West, in which the geometry take form through a unique language – properly Mediterranean – characterized by an extraordinary decorative strength who relies not so much to figurative expressiveness, but rather to the shape's beauty derived from a rigorous generative geometry. The use of geometry, therefore, from that which regulates the volumes to that used in the plan to guide the decor's development, it becomes the common thread in an attempt to reveal the pure essence of such a complex architecture.
Where order and beauty is, is God: and only being able to interpret the logic which governs that order we can fully understand the value of the heritage that us surrounds.

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Digital reconstruction of the Maritime Theatre in Hadrian's Villa at Tivoli

Alberto SDEGNO[1]
(1)Department of Engineering and Architecture, University of Trieste, Trieste, Italy
sdegno@units.it

Abstract
The research we present in this paper is about the geometrical analysis and the digital reconstruction of the Maritime Theatre in Hadrian's Villa at Tivoli, based on the comparative analysis of the interpretations given by Francesco di Giorgio Martini, Andrea Palladio, Giovanni Battista Piranesi, Pierre Jérôme Honoré Daumet, Luigi Canina, and some other important architects, but above all the description of Mathias Ueblacker, that in 1985 published a very interesting survey and hypothesis on the initial configuration of this architecture.
Inside the great place of the Hadrian's Villa, the Maritime Theatre has a very unusual form, because of the circle in which it is collocated, but also an unknown function, as we do not known what was the finality of this space, and considering that the name was given by the people that discovered the ruins. Realized probably between 120 and 125 a.C. it has a very rich geometrical configuration, with some specific forms inside the round enclosure of columns that surrounds the water pool.
The aim of the research was to redraw either the actual configuration of it and the hypothesis of reconstruction made by Ueblacker [1], in both cases with digital technology, in order to have a comparison between the two levels of representation. A final video and an Augmented Reality presentation was realized to show, in an explicit way, the results of the experimentation.

Keywords: architecture, representation, digital reconstruction, Hadrian's Villa, Maritime Theatre

1. Introduction

The aim of this research was the analysis of the Maritime Theatre in Hadrian's Villa at Tivoli, near Rome with digital instruments in order to have the virtual reconstruction of the building and to compare the actual configuration with the one proposed by Mathias Ueblacker [1], who studied it, in the past, in a very specific way. Only few parts are present now in the original state, and for the great part of it there are only ruins (Fig. 1); despite this it was possible to investigate the architecture and propose a virtual analysis of it with new technologies of representation. The first part of the research was done at the IUAV University of Venice, as a graduation thesis by Elena Corzato [7]. The research was then developed at the Department of Engineering and Architecture of the University of Trieste.
At the same time it was necessary to analyze also some of the studies made by relevant architects on this site, who tried to give a solution to the unbuilt aspect of the Villa itself, based mainly to the geometrical design of the plan. In fact we have a lot of drawings and surveys of it, starting from XV Century. Some of the illustrations of the Maritime Theatre were made by Francesco di Giorgio Martini, Andrea Palladio, J. Laurus, Francesco Contini, Pier Leone Ghezzi, J.R. Vulpi, Giovanni Ristori Gabbrielli, Giovanni Battista Piranesi, Luigi Rossini, Agostino Penna, Honoré Daumet, Luigi Canina, H. Kahler, H. Stierlin, ending with the one already cited by Ueblacker. Among them, we have to considered in a particular way the sketches by Palladio – for the idea of invention he represented in his works – the drawings by Piranesi – for the perspective representation of the ruins – the colored watercolors by Daumet – who offered the first hypothesis of detailed reconstruction in plan, elevation and sections – and of course the ones by Ueblacker, who gave the last and more defined solution of the first configuration of the building.
During the phase of analyzing it was necessary to visit the area and also to take a photographic survey, for having a visual catalogue of every single elements of the building. As it was impossible to

have a technical and instrumental survey, we decided to verify some measures of the building with a direct survey.
At the end, this architecture was selected also for some experiments in the field of new technology of communication applied to cultural monuments, trying to verify the best way to communicate the main themes of the present investigation. So we decided to construct the digital 3D model of this building, to render with the simulation of natural illumination, to prepare a video with the walking-through technology in order to visit virtually the building, and to analyze it in a virtual way using the electronic system of Augmented Reality (AR) for the presentation in real-time and for the dissemination of information during some public events, such as conferences and exhibitions.



Fig. 1: The Maritime Theatre from above.

2. The representation of the Maritime Theatre inside the Hadrian's Villa

The construction of the complex of Hadrian's Villa started in 177 a.C. in Tivoli, on an area where a preceding villa was built in the republican period. There are a lot of interpretations on the motivations for the decision to realize this great monument, in some ways, it could be considered as the foundation of a town, in which every construction is a single solution with a strict relation with some Greek buildings. It is known that Hadrian himself decided some architectural solutions, that some architects – such as probably Apollodoro – designed and constructed. Marguerite Yourcenar wrote in 1951 the novel *Mémoires d'Hadrien*, in which she makes the emperor remembering his past, sometimes referring to the places inside his Villa in Tivoli [6].
We do not describe all the buildings of the Villa, but we will analyze only the Maritime Theatre, remembering that either the name and the function are a truly enigma for the critics and historians who studied this architecture. In fact, the name was given in 1600 and it doesn't reflect the probable function of the space. Ueblacker told that it could be considered as an "emperor's studio", a place where the emperor stayed to rest and to satisfy his spiritual needs. The circle water pool was used, probably, not only to satisfy the view of the visitors, but also for swimming, protected by the wall that is placed all around it.
A relevant part of the analysis was dedicated to the collection of the drawings that architects did for studying this architecture. Some of them allows us to understand better the initial geometrical form and its three-dimensional development.
The first one was a plan of the Maritime Theatre drawn by an anonymous draughtsman of the XV Century, and conserved at the Albertina Library in Vienna. In this case the water canal was not

represented probably because it was hidden by earth. The columns were traced as small points on the paper, in the exact location where there are the columns.
In 1465 the architect Francesco di Giorgio Martini visited Hadrian's Villa and realized some scale plans, archived now in the Uffizi Library in Florence and redrawn for his treatise now at the Royal Library in Turin. One of them is to be considered as the first survey drawing of the Theatre, realized probably on site. Also in this case the water canal is not presented for the same reason we told before.
In 1547 Andrea Palladio visited the Villa and drew two drawings now collected at the Royal Institute of British Architects in London (Fig. 2). One was drawn as a sketch, not well defined graphically, and the other one was drawn in a geometric form. Both of them are quoted, and, although they did not represent a real configuration – because of the symmetry of the elements, that is not present in the actual state – it is derived by a survey created on site. In this case either the circular pool and the bridges to reach the internal island are represented. The number of columns designed by Palladio all around the pool are 81, otherwise the exact number of them is 40.
Pirro Ligorio treated this architecture in a manuscript he wrote in the half of XVI Century, but without any drawing inside, and we do not know if it was really done, or it was lost.
The first pseudo-perspective representation of the Maritime Theatre is the one realized by J. Laurus in 1612, but in reality it was an interpretation of it, because of the presence of some elements that are not present in the site. For example, there is a double porch all around the circular pool, a circular columned temple inside the central island, and some other buildings in the front.
In 1668 Francesco Contini published the first plan of Hadrian's Villa, realized thanks to a detailed survey made in 1634 by him, so we can see the development of the Theatre in XVII Century.
Another plan of the Theatre was realized probably in 1724 by the painter Pier Leone Ghezzi, and archived at the Biblioteca Apostolica Vaticana in Rome, but the drawing is not so detailed as the preceding ones. Then there was neither the water pool nor the circular colonnade, but only a simplified representation of it.
In 1745 J.R. Vulpi drew an imaginary section of the Theatre, to represent at the same time the internal and external view of it. But as the figuration is schematic, some elements are not signed, such as the pool, the bridges and the roof. All the Theatre is presented in the form of ruins, with a degradation of the walls, covered by vegetation.
In 1770 Giovanni Ristori Gabbrielli represented the complex of the Villa subdivided in single parts, as there was a subdivision of the property. The planimetric drawing was sided by plans and elevations of agricultural houses, realized to use economically the area.
Giovanni Battista Piranesi was very interested in the Hadrian's Villa, and he prepared a great plan in scale 1:1000, printed in six paper with a total dimension of three meters. It was published in 1781, by his son Francesco, after his father's death. The plan of the Theatre shows a configuration very similar to the present one (Fig. 2), with few differences (for example the number of columns all around the pool is 52, instead of 40). At the end of his life Piranesi realized some preparatory perspective drawings of the Villa, and we have some of them that showed the Maritime Theatre in the form of ruin, without the pool and wrapped by vegetation.
Some other representation of the Theatre were those by Luigi Rossini in 1826 and Agostino Penna who in his book *Viaggio Pittorico*, published in 1831-36, drew a lot of perspective views in which the building was showed in a situation of great deterioration.
In 1859 Honoré Daumet produced a detailed survey of the Hadrian's Villa and proposed a reconstruction of it, well drawn in some colored watercolors showing plans, sections and elevations of the architecture inserted in the natural context (Fig. 2).

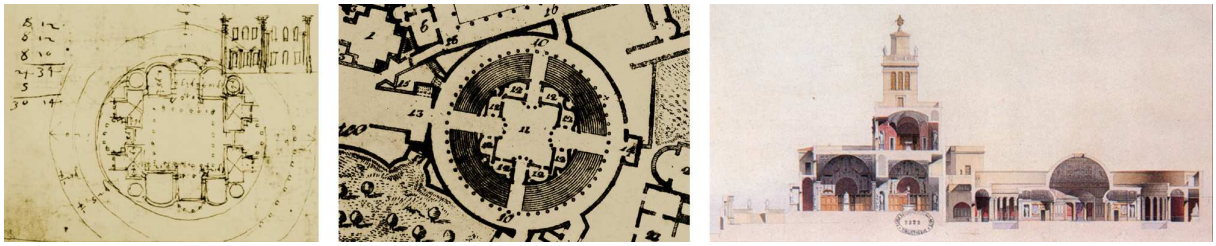

Fig. 2: Drawings of the Maritime Theatre by A. Palladio, G.B. Piranesi, H. Daumet (from left to right).

The representation realized by Daumet were perhaps the most interesting and exhaustive about the Villa. In these documents the Maritime Theatre is shown in a comparative figuration, that presented a section of the ruins of the Theatre and, in the same paper, the probable configuration, with a high level of interpretation, so that it is difficult to identify the single elements that are present in both drawings.
The drawings realized by Luigi Canina in 1872 reflected the representation by Piranesi, but he gave a personal interpretation of the Theatre, with some details regarding also the architectural order and the

capitals; a rounded monumental temple is in the center of the island with four symmetrical bridges organized along a cross.
At the beginning of the XX Century there was a scientific survey, organized by the research unit of the School of Engineering in Rome, coordinated by prof. Vincenzo Reina. The survey was executed with topographic systems and shows the actual state of the Maritime Theatre, the same that will be illustrated by Ueblacker in his drawings.
Some other representation of the Theatre were done by H. Kahler in 1950 [5] and by H. Stierling in 1984 [6]. They are basic and significant studies from which Ueblacker started for his 1985 proposal. The survey and reconstruction by Mathias Ueblacker is, without any doubt, the most precise and interesting one, because he collected all the graphical information about this architecture, did some new surveys and proposed a version of the original one that is considered the more reliable of all studies. The reconstruction was documented also with a scale physical maquette, to offer a three-dimensional visualization of the hypothesis.

3. The Geometry of the Maritime Theatre

As we told before there isn't any information about the function and the original name of this space. Probably it was a sort of shelter of the emperor where he could usually rest after his voyages, as the *ritus laconicus* required. For what concerns the proportion of this architecture, we can report the study of the module that Ueblacker identified during his research. The researcher found a module of 5 feet, that he found into the dimension of every relevant geometry of the Theatre. For example, the circumference of the exterior walls is 30x5 modules, that is 150 feet long; the circle that passes for the center of the columns is 24x5 modules, that is 120 feet; the circle of the stylobate of the peristyle is 10x5 modules, that is 50 feet (Fig. 3).

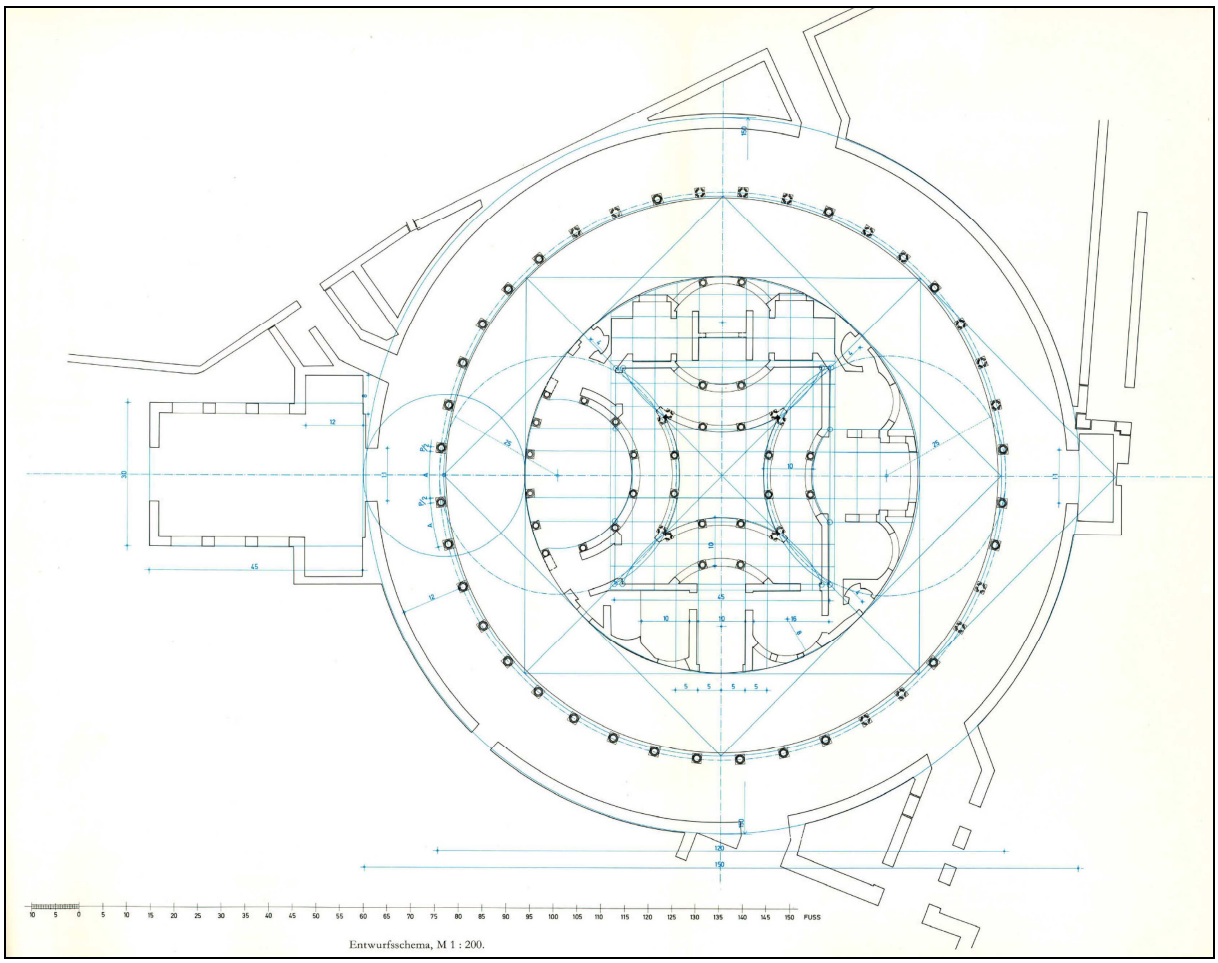

Fig. 3: Geometrical scheme traced on the plan drawn by Ueblacker (elab. E. Corzato).

So its complex geometry is based on the regular form of the circle, subdivided into a series of squares and other circles. Ueblacker described with great precision the way in which it is possible to draw the final configuration of this architecture. The first circle is the perimeter of the external wall, the second one is the circle of the axis of the columns; then you need to draw the square inscribed to the last circle, and then the circle inscribed in this square. This one is the limit of the interior island. Then the

procedure required the redesign of two circles and a squared in the middle. So it is possible to obtain the general configuration of the plan, from which we can start to draw all the other parts (Fig. 4).

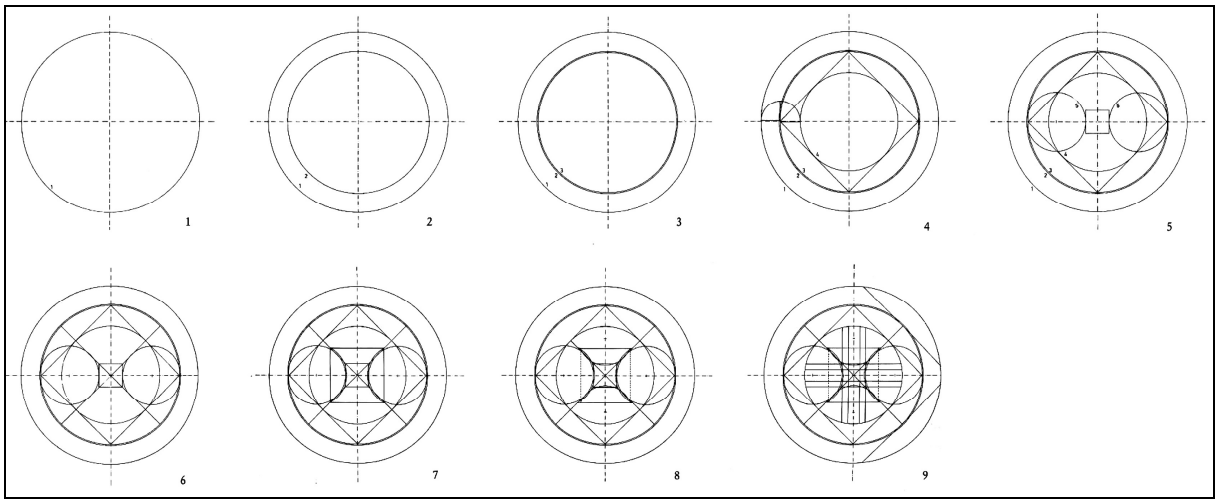

Fig. 4: Geometrical genesis of the form (elab. E. Corzato).

Then it is also very important to identify the spaces that are all around the Maritime Theatre, for analyzing the connections among this one and the others (Fig. 5). In detail they are: the Philosophers Room, the Criptoporticus towards the Stadium Garden, the Libraries' Garden, the Greek Garden, the external Exedra. This spaces are very useful to understand better the organization of the Theatre itself, although some of them are presented in the form of ruins.

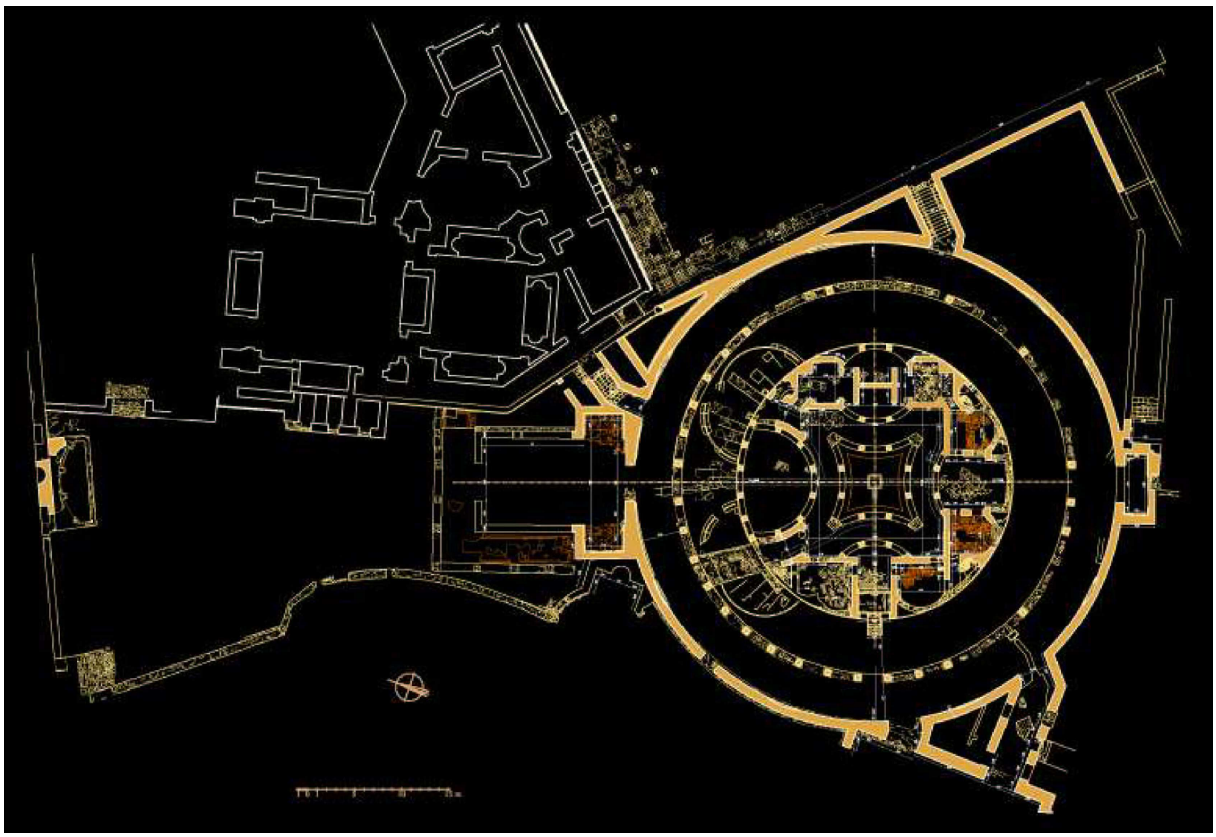

Fig. 5: Digital restitution of the survey plan by Ueblacker (elab. E. Corzato).

But the principal attention was dedicated to the comprehension of the single spaces of the Maritime Theatre. A large atrium is located at north, at the entrance of the building. Near the circular porch it enlarges into two rectangular niches covered with barrel vaults. The roof of the atrium was destroyed, but it was probably a pitched one. In front of the atrium and at west side there was an asymmetrical loggia, which is 12 feet large.

After having passed through the loggia and the atrium we arrive to the round porch, that is 12 feet large too, between the surrounding wall, which is 2.5 feet large and 17.5 high, and the limit of the internal plinths of the columns. This porch is covered with a barrel vault, which is supported by the wall and by the columns. All the columns of the porch are ionic ones. Then there is a round canal of water, which is 4.90 m large and about 1.50 m deep, probably decorated with a coloured mosaic. To cross the canal there were some swing bridges, probably 4, and it is possible that the wall bridge at west side was realized upon suggestion of Hadrian himself, for the difficulties to use the swing one.
The wall inside the island were realized in *opus testaceum* (made by triangular bricks with one point inside the concrete) because it gave to the structure more solidity in an high humidity context, such as the one of the Theatre. One of the main part of the island is the exedra, limited at south with a circular row of columns, following an arc of circumference with a ray of 4.82 m., and at north with another row of them following the circle of the canal. After the exedra there is a peristyle with a mixtilinear form, a rectangle with four concave arches in the axis, doubled internally to generate a court having convex arches as sides. In the middle of the court there was a fountain. All around the peristyle there are small baths complex, with latrine, apoditerium (dressing room), frigidarium, calidarium and the heating room, where the stoker fed the fire. At the east side of the island there is the library, with some small rooms, while at the south side there is the tablinum, with two triclinia at left and right.

4. The digital reconstruction of the Maritime Theatre

After having studied the whole architecture we started the digital reconstruction of the Maritime Theatre, following the information on the book *Das Teatro Marittimo in der Villa Hadriana* by Mathias Ueblacker [1].

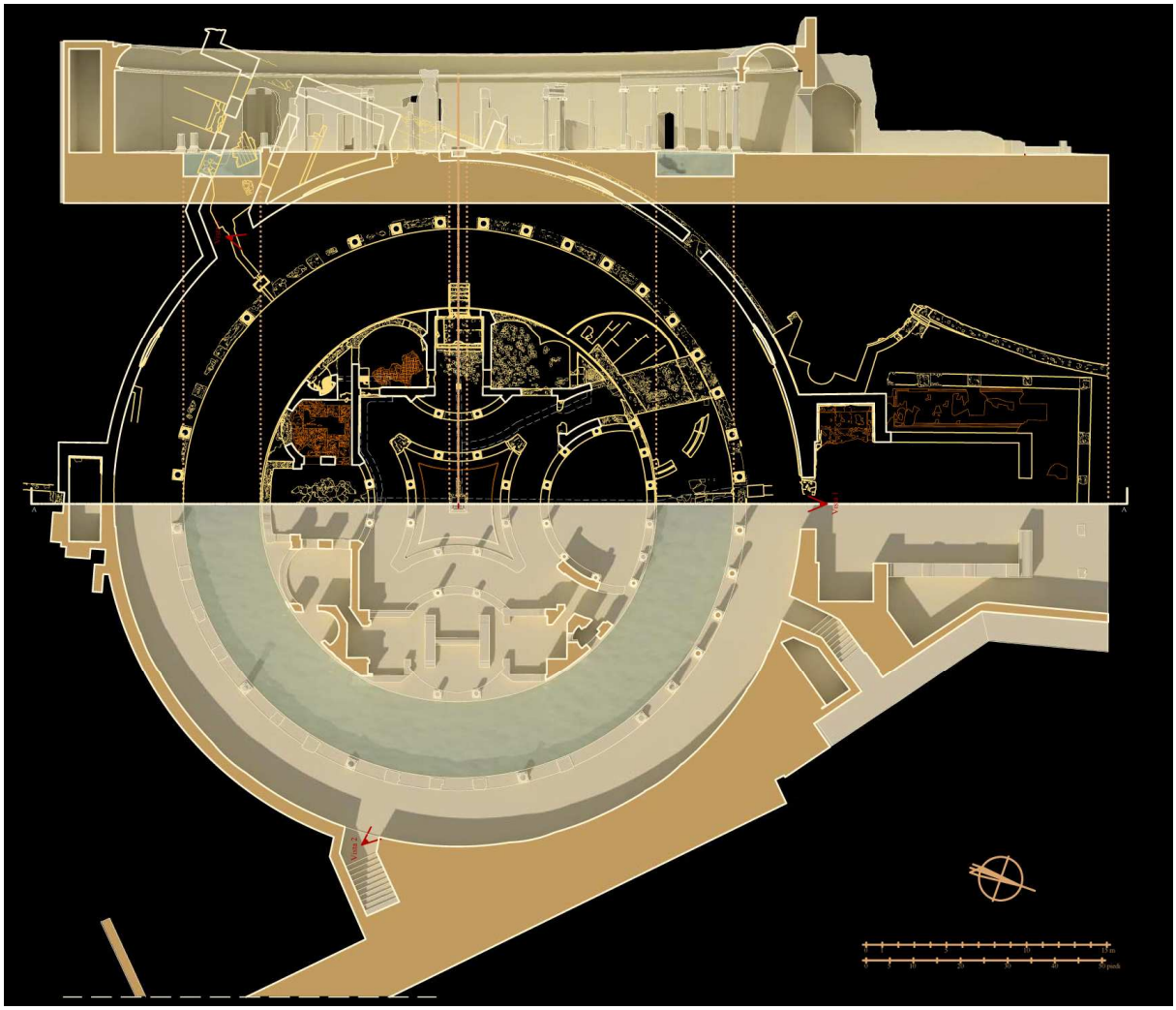

Fig. 6: Digital representation of the plan and section of the actual state (elab. E. Corzato).

In detail the geometrical procedure described above was at the origin of the generation of the form. In particular the aim of this research was to compare two models, the one which describes the actual

state and the other about the hypothesis proposed by the researcher; the digital models are used, in fact, as a sophisticated way to identify the relations between every single parts.
To realize the models we used a CAD software with Boolean primitives and advanced algorithms for extrude sections along a path modifying the perimeter of the section itself. These two procedures allowed us to construct every elements of the models. The first step was the digitalization of the plans, elevations and sections from the book by Ueblacker, and then we have to adjust this information with the numerical quotes in roman foot, traced by him. We have to notice that, as his drawings were done using traditional techniques, there are some simplified descriptions during the representation of sections and elevations. Due to the complexity of the building, in fact, the author decided to omit the elements in background, tracing only the parts in foreground. As in some points the sections by Ueblacker were not sufficient to understand the volume, it was necessary to use the basis of a direct and photographic survey we did to integrate the information from the book. Seeing the digital model it is possible to verify a correspondence between it and the real configuration, although it was necessary to simplify the model to represent the ruins and the state of degradation of the walls and of the columns (Fig. 6).
The second step was the digital reconstruction of the hypothesis made by Ueblacker on the original configuration of the Maritime Theatre (Fig. 7).

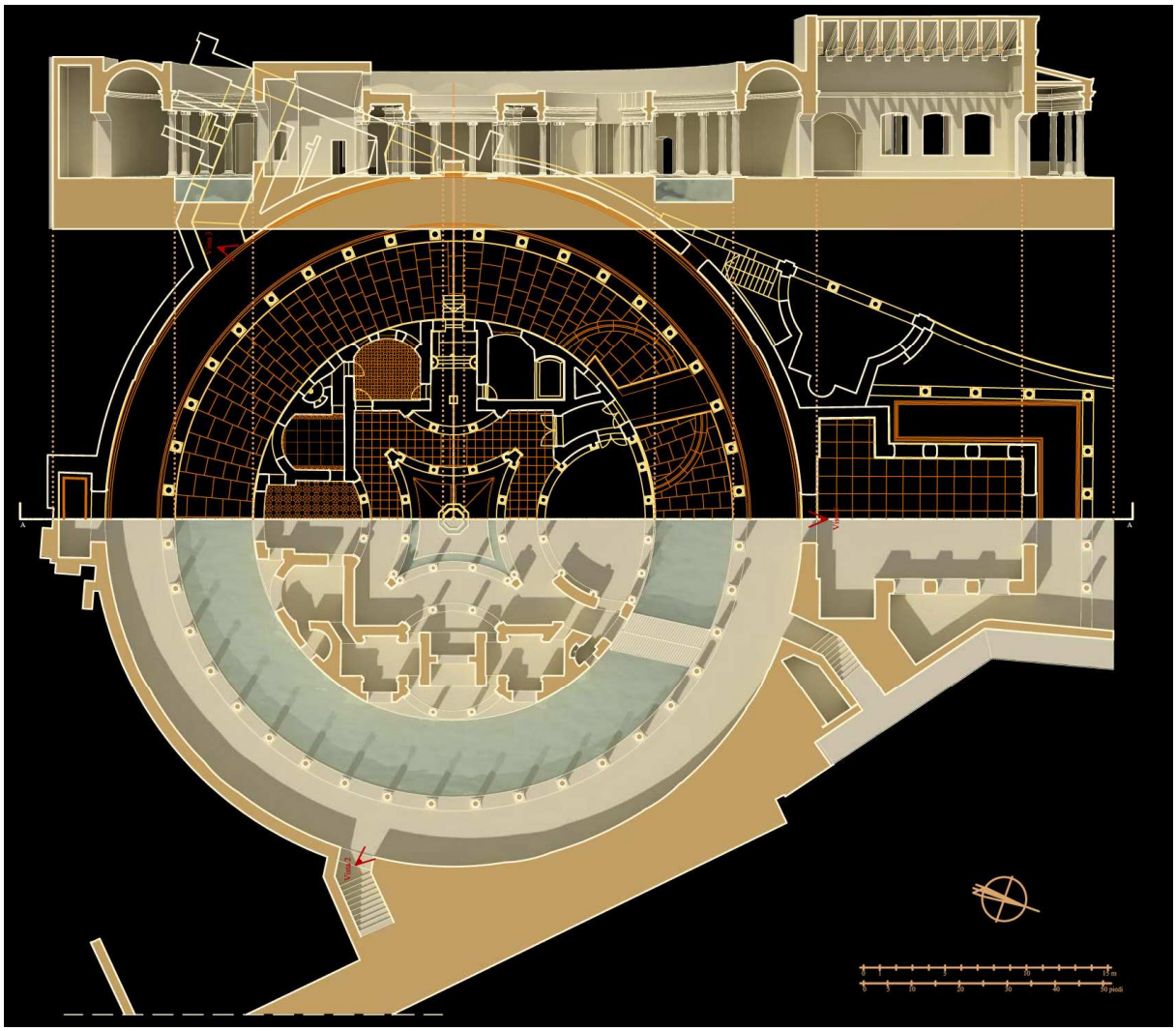

Fig. 7: Digital representation of the plan and the section of the hypothesis by Ueblacker (elab. E. Corzato).

In this case the main differences were based on the determination of the elevations, because in some cases there is only some information about them. Thanks to the presence of the barrel vault of the columned porch it is possible to conjecture the highness of the elements inside the island, covered with different typologies of roofs. The final three-dimensional representation gives us a volumetric visualization that allows to consider it in its real complexity.
The third step of the phase of reconstruction was the comparison of the two digital models in order to identify better the analogies and the differences between them. So we decided to use a similar

description of them - plan and longitudinal section - and a superposition of Ueblacker hypothesis on the survey of the actual state. The hypothesis of reconstruction was represented in wire-frame, while the ruins are shown with a rendering image, without materials and textures, but having only one colour (yellow) for the volume of all parts, a colour for the section (dark yellow), and a material for water (based on semi-transparent light blue), with shadows. We thought that the best visualization of this comparison was a cross-section isometric description. To complete the scheme we decided to add the drawing of the survey of the other part of the plan (Fig. 8).

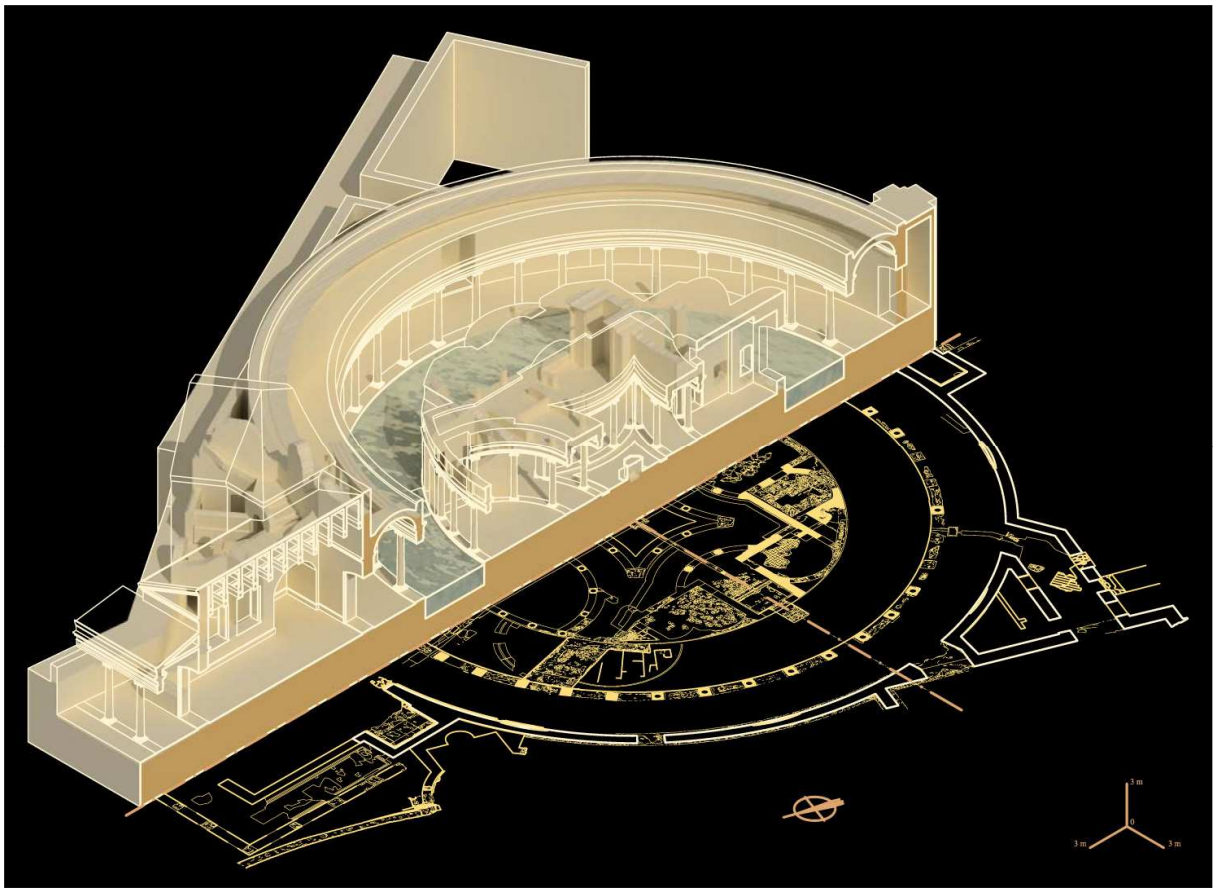

Fig. 8: Isometric representation of the Ueblacker's hypothesis (wire-frame) upon the actual state (rendering) (elab. E. Corzato).

5. Advanced technology for the communication of the Maritime Theatre

The final part of the research was dedicated to the communication of the results using new technology of visualization. In particular we decided to realize a video animation and an experimental application using Augmented Reality (AR).

In the first case the video was produced with the intent to make evident the two levels of comparison, which we said before. The virtual visit of the Maritime Theatre starts from the atrium and goes forward following a possible path of the emperor who wants to show us the building. The visit was conducted into the second model, reconstructed on the thesis proposed by Ueblacker. But somewhere a double representation shows, with a progressive fade, also the actual state of the ruins. So it was possible to understand the correspondence between the actual configuration of space, and the original idea of the project. The visit continues along the circular canal, stopping in some relevant points of the path, for example near the columns, across the bridge for entering the island, and inside the internal space, and showing, at the end, the volume from the top. We decided to use models without colors and materials – only a light yellow for all the surfaces, and the simulation of the water inside – to allow the visitors to understand the volumes and spaces, simulated with shadows. The number of frames of the video is about 2000 for a duration of 80 seconds, with a frame rate of 25 fps (Fig. 9).

The second communication experiment was dedicated to Augmented Reality, that is – as we know – a sort of inverse application of Virtual Reality (VR). As VR puts man in a virtual space, making the sensation to be in another context, different from the one in which he is, the AR inverts the impression, and gives the possibility to explore a model, rotating and slicing it in real-time, as if it were in our hands. In this case the digital model of the Theatre was converted in an AR ambient, associated with a target and analyzed and explored. The use of a small camera allowed us to simulate the behavior of a

visitor inside an exhibition, that virtually has in his hands a model of the Maritime Theatre, with a lot of details and information. This opportunity could be an interesting way to distribute virtual architectural models, with the intent to create a imaginary catalogue of maquettes. We have to consider also that the peculiarity of a digital model is also in the possibility to query it, for example asking to slice the volume to analyze the internal configuration, as a traditional model doesn't have this capability and it is impossible to investigate it, but only to see walking around it.

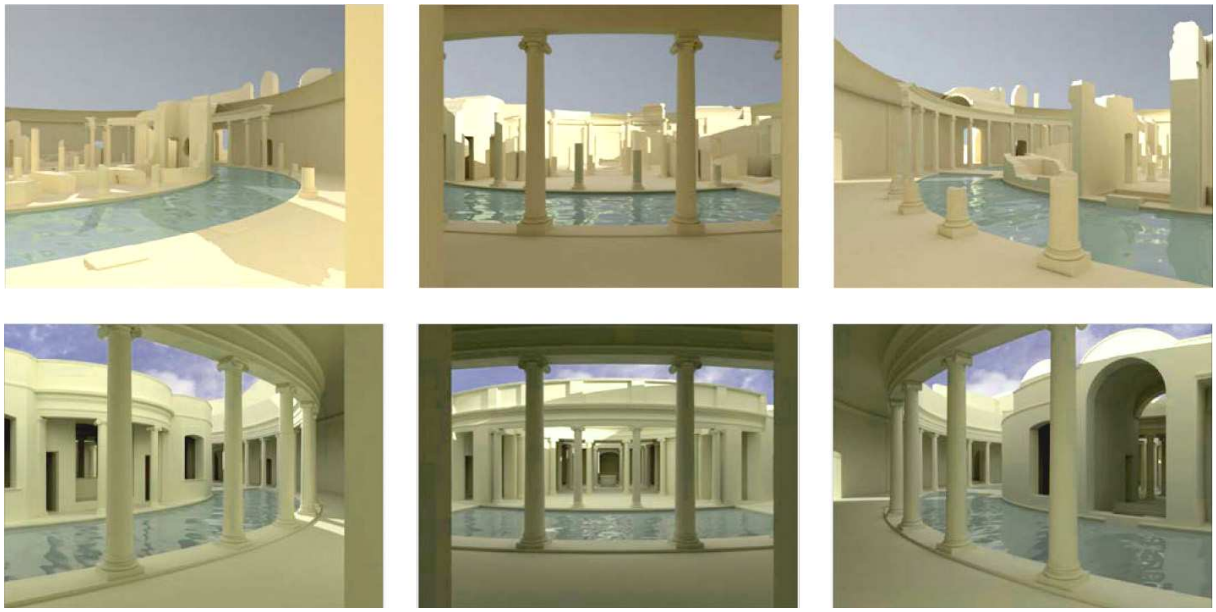

Fig. 9: Single frames of the video animation for the comparison of the models (elab. E. Corzato).

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HERITAGE ARCHITECTURE LANDESIGN
focus on CONSERVATION REGENERATION INNOVATION
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Le Vie dei Mercanti XI Forum Internazionale di Studi

In place

Maria Ines PASCARIELLO
Department of civil construction environmental engineering, School of Engineering, Federico II University, Naples, Italy
mipascar@unina.it

Abstract
One object is susceptible to many representations which are different one from the other: if, on one side, these have the task of analysing the space of the referent in its forms and structures, on the other they produce images which allow to establish a relationship of cause and effect between the drawer and the user of the image.
The representation, of the object, replaces it. It allows the observer of the image to be in the presence of the object, but without the object. It is the visual surrogate of the experience which is made clear through the Methods of Representation. We are called to make a mindful but also unbiased use of each method, making them topical, in order to produce images more suited to contemporary visions. This process is implemented and resolved in the identification of points, lines and surfaces, of their mutual relations and reciprocal intersections which the action of representing allows to define in the geometric-projective space: there is a formula for each line, straight or curved, for each figure, for each surface; there is an infinitely complicated formula, or perhaps concealed in its simplicity, which describes the motion of a point that describes a line which draws a figure that generates a surface.

Keywords: Survey, representation, database

1. The Representation, the object *in absentia*
It has become a well-established fact that the transformation of the communication system in contemporary society has represented a significant moment of reflection on the potential this system offers in the analysis, knowledge and work of enhancing cultural and territorial heritage. Language is above all visual, we speak by images, data is accumulated which is each time implementable and modifiable ad infinitum, continuously and suddenly updated. Data which is building a large archive of the global world, where the past, present and future seem to have no solution of continuity.
In actual fact, only the tools necessary to witness and document heritage and identity have changed; heritage, on its part, has increased as physical space has amplified and it contributes to defining that new concept of space which, going back to a well known definition of Douglas Engelbart, could call itself augmented space, to be exact increased space. The proliferation of perceptive, visual, material and immaterial levels of everything that surrounds us, according to the technological process and the consequent cultural transformation, represents a sector of particular interest which has emerged in recent years with ever greater clarity: the space of every time, the space of the city, of architecture, of territory, can be expanded by resorting to an appropriate manipulation of its physical dimensions; it can be expanded well beyond its tangible boundaries if it is intimately connected with a new space of information or virtual representation which amplifies the global flow of communication. Thus, each object belonging to the real world, each trace, each expression of our heritage can be expanded with an array of information which increases its definition and comprehension.
What is happening to our culture “could be [...] the result of the normal tension between generations, the old guard resisting the advance of the new; the established order defending its stance by accusing the emerging powers of barbarism. Nothing new here, a process that has repeated itself again and again throughout history. But this time it seems different, this conflict is so profound as to feel different. Usually the battle is around the strategic points on the map, this time it seems more radical, the aggressors taking on a more fundamental stance: changing the map itself. Perhaps they have already

changed it. It must have happened that way in those blessed years which, for example, saw the birth of Enlightenment, or the time in which the world discovered itself to be all of a sudden romantic. They weren't movement of troops, and not even sons who killed fathers. They were changes, which replaced a landscape with another and founded their habitats there". [1]
It follows that the landscape, whether it be the interior panorama which defines our thought and builds our memory, or the material and external panorama which surrounds our existence and composes our space, has already changed and, with it, also the way to define, document, communicate and represent.
The most immediate sense of representation of an object refers to the imitative iconic drawing of the optical appearances of the object itself, and it goes back to the idea of graphic image traced on a flat surface to surrogate the visual experience of the observer. In its geometric codification the representation poses itself as the Albertian window or, in any case, as a putting up of many windows, all recalling the specific nature of images as they appear to the visual world. All this can be traced back to the meaning of optical projection according to which representation does not achieve signs, but rather indexes understood as traces physically determined by the referent object.
One object, in fact, is susceptible to many representations which are different one from the other: if, on one side, these have the task of analysing the space of the referent in its forms and structures, on the other they produce images which allow to establish a relationship of cause and effect between the drawer and the user of the image. Point, straight line and plane, the basics of geometry, are the functional operators used to construct the images that represent a space; while the contents of the spatial experience, translated into graphic signs, form the object of representation. It is Geometry, understood in this sense as abstract science, that provides the methods and procedures to represent the phenomena; Geometry, in fact, at least the Euclidean kind, is the set of logical and deductive consequences and graphic operations which translate geometric figures into models of spatial objects; they reveal themselves as satisfactory models which closely correspond to their physical referent, but for their formalisation to occur, it is necessary to choose a space of reference and so a method of representation which allows to realise the spatiality of the object at the level of drawing.
The representation, of the object, replaces it. It allows the observer of the image to be in the presence of the object, but without the object. It is the visual surrogate of the experience which is made clear through the Methods of Representation. We are called to make a mindful but also unbiased use of each method, making them topical, in order to produce images more suited to contemporary visions. This process is implemented and resolved in the identification of points, lines and surfaces, of their mutual relations and reciprocal intersections which the action of representing allows to define in the geometric-projective space: there is a formula for each line, straight or curved, for each figure, for each surface; there is an infinitely complicated formula, or perhaps concealed in its simplicity, which describes the motion of a point that describes a line which draws a figure that generates a surface.

2. Surveying as a search for form

If it is true therefore that the space which surrounds us has made us used to and, increasingly more often, obliges us to customs and visions that move the interest of the observer from that strictly metrical and typological to the projective and topological kind, it is also true that the cultural, conceptual and imaginative enrichment of the contemporary world offers as a deadline a qualitatively differentiated product. So, when we approach the space to understand it and reveal it, and then to communicate it in images, we have the impression that we have not just measured that space, but even invented it, as if it had become real thanks to the work of surveying before and representation later.
Where there was only matter, it is now possible to lay a web of points, straight lines, angles, numbers.
To measure, means to trace a line where there has never been one. It means understanding that where there is space there are lines. And space exists where it is measured. "Space itself [...] a line from one point to the other, from the roof to the cloud, to the sun, and again to the roof. From the line points, from the surface lines and from the body surfaces, but that [is] not all. From there it is almost possible to see the subtle curve of the world". [2]
Reading and interpreting the space which surrounds us requires the use of different tools of investigation, comparison with different scales of reference, the contribution of various disciplines first among all surveying, a privileged tool of knowledge which allows to clarify a method of approach to space and an expressive language, the critical and cultural foundation of which is Descriptive Geometry.
This discipline contributes to making the observer's eye used to capturing the configurative characteristics and morphological aspects of the space in which it inserted each time, to understand the volumes and surfaces which compose space, breaking it down in the mind and putting it back together in the representation; to distinguish the intersections between the planes and surfaces which border the space; to identify geometric genesis and critically describe the significant elements.

For this reason the observer's experienced eye, the eye of one practicing the art of Drawing, the eye of who knows Methods and Rudiments of Representation, breaks down the architectural space and fragments it into representations which are often simultaneous or superimposed that help its investigation and comprehension; once the observer has taken possession of the space and its intrinsic characteristics he becomes designer and puts back together the fragments of architecture in one or more images which synthesise the space and express its forms and contents according to the logical and rigorous language of Descriptive Geometry.
The representation which follows from the survey, through the powerful synthesis of which it is able and the visual immediacy of the communication it generates, allows to obtain the object *in absentia:* in short, only the object remains, the forms of which are the sign of the place which contains it. The abstraction process which derives from it allows to interpret the object as foreign, detached, that is, from the context of which it was previously a part.

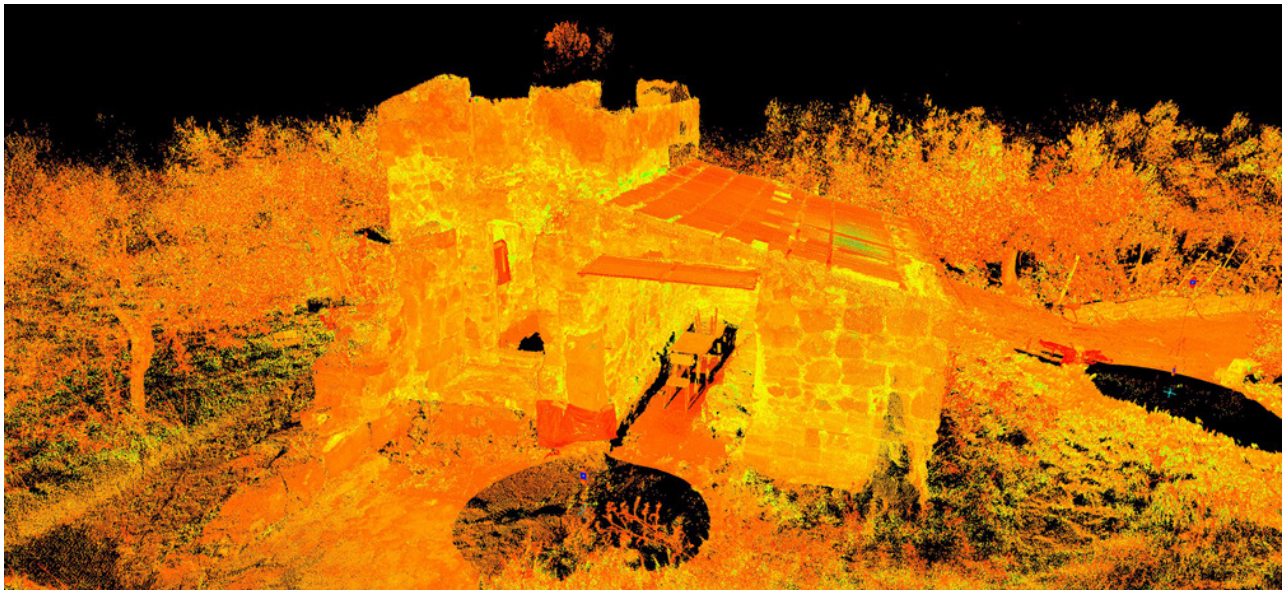
3. The placeless object

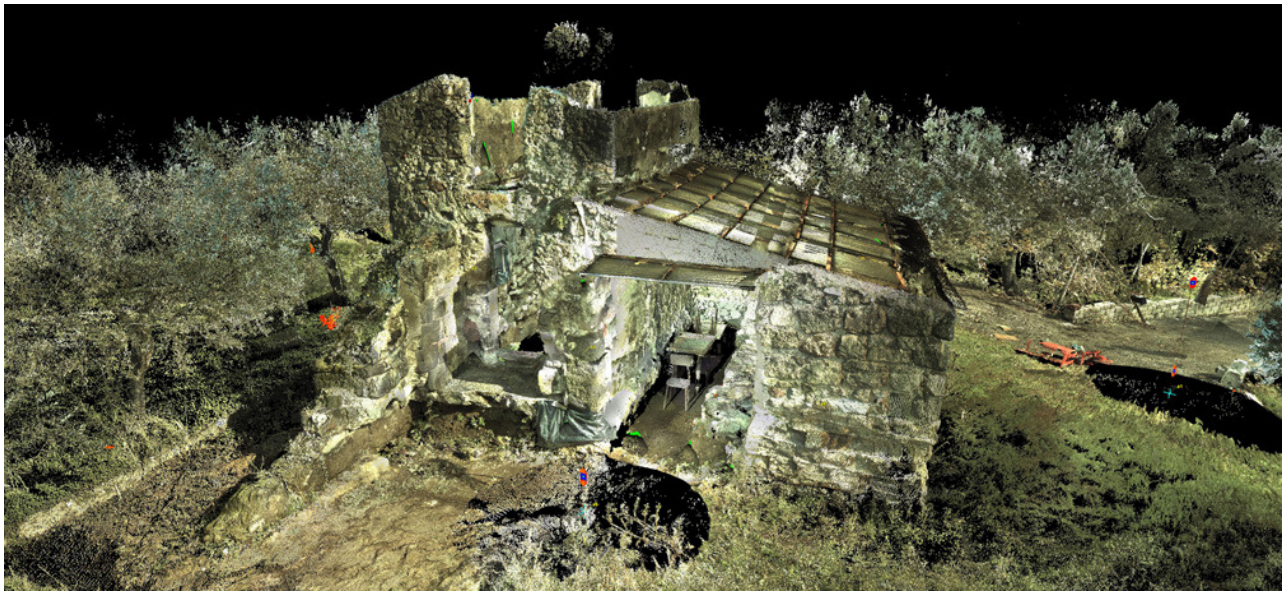
The transformation process which now influences every aspect of scientific research in the sector of Representation has led to a significant increase in technological needs, above all in terms of graphical choices. In fact, in this context, above all in recent years, numerous and diversified graphical models, able to reproduce real objects as faithfully as possible, have been experimented and assessed; in particular, the process of creating a virtual model, that is the graphic representation of a three dimensional object inside a software, has become gradually clearer over time through ever-diversified modelling techniques: from the use of primitive software which can be combined through subtraction, addition, through so-called Boolean operations, we have reached a sophistication level that succeeds in modelling objects of incredible complexity with the use of non uniform rational B-splines, or rather resorting to that class of geometric curves used to represent complex figures able to make models which are ever closer to reality and increasingly surrogates of reality.
With this type of technology geometric information becomes much more significant and precious compared to, for example, photographic mapping because it reproduces with extreme accuracy and three-dimensionally the topology of the object in a way which makes its interpretative reading extremely easy and enhanced.
By analysing the model created in this way it is possible to identify and study the object from every possible angle, be it topological or conservative, metric or type, putting forward also critical interpretations and formal readings. The great opportunity which current technology offers us is surely that of elaborating the three-dimensional model to various detailed scales, according to the type of use and goals we wish to pursue. The various levels of detail can also interact reciprocally to widen the range of possible applications. We must not forget that the software offers us the opportunity to navigate media space, examine its interconnections, to explore the model in real time; in this way, once again, there is a sort of complementarity in the representation, and this is of great importance: there is speed, convenience and interconnection, being able to access the objects in their virtual form, detached from the context in which they belong.
Experiments conducted on several examples of complex architecture, a synthesis of the results obtained to date are presented here, have led to the creation of three dimensional models of the objects which re-propose the architecture detached from its context but perfectly navigable and accessible as if the observer were in the presence of the object itself; each object-model forms part of the mosaic which will describe an open source digital archive, which is consultable by all and made available on a web platform.
To the question of the many who ask "What will remain within the visual universe of the large archive of the global world?"
Many answer History.

3.1 Database

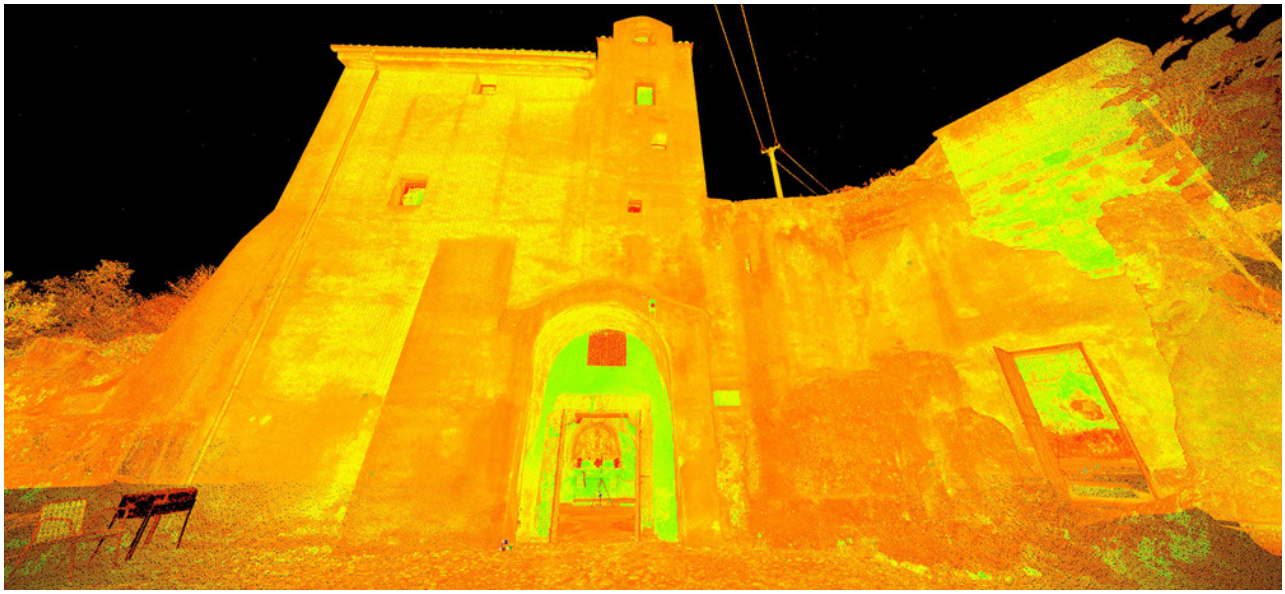
A story trough images and virtual models inspected and navigable anytime and from any location. The experiment enterprised in order to constitute the collection of placeless objects and the creation of a database: it summarizes here a sample of placeless objects created in order to make a database for the Archives of the Diocese of Sessa Aurunca that at the end of 2012 has taken the project of building a virtual museum, useful inventory of the assets of the Diocese and the disclosure of the same heritage. In this way you can see in real time the object, to assess the state of conservation, decide on actions to take, or simply to know the architectural heritage in the diocesan territory.
The images shown below are two case studies: the church of San Nicola, in the next page, and the church of Santa Maria in grotta, in the last page, both assets of the Diocese, and both explained in sequence of real image-survey 3d model-placeless object.













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Structural building information modeling of casale castello

Ingrid TITOMANLIO, Giuseppe FAELLA
Department of Architecture and Industrial Design, Second University of Naples - Aversa (CE), Italy
ingrid.titomanlio@unina2.it
giuseppe.faella@unina2.it

Abstract
This paper is aimed to providing knowledge and help in discovering types of buildings in Casale Castello, by recognizing and understanding their structural elements using B.I.M. technology.
The presented approach allows generating a recognizable digital spatial configuration of the main structural elements of buildings in Casale Castello village which is examined in this paper through the representation of its urban development. Under this perspective, analysis and representation of the city building logic and their wall types have a noteworthy interest for investigating the guiding principle of the town planning evolution through BIM methodology. It is carried out the analysis and cataloguing of masonry walls types that testifying the development and the reflection of the urban evolution based on the constructive techniques. Like for other villages Klaiber, Lavedan and Piccinato stated the difficulty to chronologically establish the various types of medieval settlement, as well in Casale Castello it's impossible to find historical documents on its develop. Using B.I.M. methodology it's easy to recognize the different structural element characterizing the buildings in Casale Castello. Through BIM method the digital representation became an efficient device for the catalogation and structural analysis of constructive elements. BIM is a building design methodology characterized by the creation and use of coordinated, internally consistent, computable information on building projects during the design and construction process. The structural elements behavior is analyzed by digital models. It is shown how, using building information modeling technology, the modern houses design has become more flexible, economic, fast and satisfying than traditional 2D drawing representation methods. The information may be refer on full life cycle building manufacturing, from design phase to that of use and maintenance, passing through the implementation phase.

Keywords: Structural elements, 3D modeling, Building information modeling (B.I.M.)

1. Introduction
Over the decades, in the fields of architecture, hand drawing has moved toward digital drawing for trying to create a more and more realistic computer simulation of designed buildings. From imagined reality it has gone to program reality drawn. The space of imagination through the drawing expresses itself, takes shape and configures the space.
The representative methods of Romanesque architecture and gothic style are different and so far from Renaissance drawings. Obviously, these latter methods are different to modern houses. Talk about the computerized drawing to describe the structural design of Casale Castello buildings means sinking tots in what has been the evolution of representative structural approach in the history of architecture.
The search of the fundamental expressive components of structural design of classicism is aimed at capturing, in modern experience some geometric–mathematical references upon which the digital design is also based.The principles used for digitizing structural drawings bring with to light the principles of the Renaissance survey.
The approach presented in this paper allows generating a recognizable digital spatial configuration of the main structural elements of historical buildings. The structural elements behavior is analyzed by digital models. It's about creating a digital model of houses capable of simultaneously contemplating various aspects of the building. This method is able to bring together building shape and structure in a single 3D model. In [Figure 1] it is possible to read a circular pattern on which is based the 3D

modeling. It starts from the knowledge of Casale Castello, through the diagnosis of conservation problems and feasibility of design buildings. So it aims to digitize the project template [1].

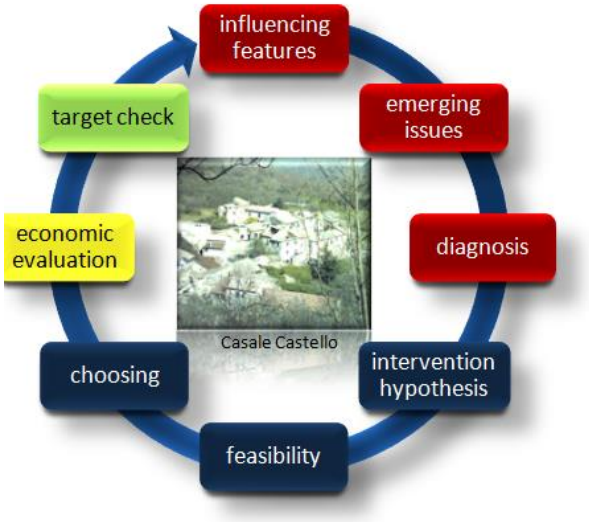

Fig. 1: Task sequence and analysis layout

2. Structural design: historical evolution

Romanesque Architecture is a style characterized by having similar issues that can be detected in all historical country [Figure 2], European architectures and local aspects that are typical and different from country to country. The fundamental traits of medieval religious buildings were the central nave and the lower aisles, built with very thick stone walls, cut and left on-sight. The lightening of lateral side walls of the nave was made with the endorsement of windows. The light and shade games facilities of structures were often entrusted to composite columns, cornices and niches. Cross and barrel vaults mainly dominate the aisles and different forms begin to develop, as the round ribbed vault that introduces the next Gothic period

Obviously, the structural advantage of the cross vault respect to the barrel one is evident. The loads were conveyed on four corner supports, rather than on two lines sets, allowing to reducing the wall thickness and making it to evolve more and more towards the thin lines of the next period. The houses of that period appear massive and of various typologies [2].



Fig. 2: Task sequence and analysis layout

The fundamental factor of the town's security is the town-wall, which became the main defensive system, where the towers, generally square plan, constituted the key element. However, it must be considered that in the medieval constructions type and stonework vary depending on the physical nature of materials and technical features closely linked to local materials and worker knowledge. In fact, the typological survey of masonry walls in use in western Europe during the Middle Ages includes

several stone masonries, both rubble and ashlar masonry, with different block sizes and coursing patterns.
Whatever may be the stonework, a main role in masonry strength is due to mortars. But few information and sure notes on medieval mixture are currently known. Anyhow, it is known that most mortars prepared in the Middle Ages consisted of a mixture of slaked lime, sand and water. Additionally, the medieval mortars often feature for larger amount of silica sand rather than clay that was typical of antiquity. However, although most chemical processes were based on empirical rules, the medieval workers manufactured good quality of mortar using special kilns, today almost all destroyed.
The constructive standard of foundations of medieval buildings remains virtually the same as those used in ancient time, regardless of the masonry stonework. It is very rare to find foundations constituted by masonry bed, covering all the surface of the building. The medieval builders sometimes utilized dressed blocks to build foundations, sometimes deep, but mostly made by debris mixed with baked clay and stones of different quality. In [Figure 3] it is possible to look at the collapse mechanisms occurred during the earthquake on the Casale Castello buildings.



Fig. 3: Modeling of possible damage to Casale Castello buildings

Gothic style was next to the Romanesque one. While the latter style created the dark spiritual environment opening very small windows, the gothic style opened to the brightness triggering the structure upwards. The problem of different proportion between vertical and horizontal structures required the introduction of ribs as buttresses. For private homes features remained those outlined above for the late Middle Ages [3].
The discovery of man as subject subordinated to the created, as fickle subject, consecrated the Gothic architecture expression ever upwards, towards the Divine. During this period develops an architecture that denotes height proportions much more pronounced than horizontal ones. The structural studies of sacred monuments were the first engineering experiments that experienced high inter-stories supported by slender columns. Graphically, there still was the simplicity of drawings which not only delineated very mystical decor also praised the slenderness of the buildings.
Renaissance began in the fifteenth century and inspired its principles on the Roman classical period traits, beginning a geometric, simplified and rational study, focusing on the plan distribution of buildings. Architectural perspective drawings of this era have their authorship in Filippo Brunelleschi [Figure 4] [4,5].
The courtyard houses were the recurring structural typology. Their outward appearance presented ashlar-work on ground floor. This kind of decoration heightened the structure and its contact with the ground, as a mark of strong static structure. Pilasters or architectural elements crossing throughout the high part of facade were also present [6,7,8].
Subsequently, string courses replaced the ashlar-work and gave the first signs of the presence of structures outside the building, alive and united with the formal appearance of buildings. The streets of the city were enlarged to delimit majestic palaces.

Renaissance drawings first introduced mathematical rules and correct proportions to architecture. Through the “golden section” structural elements and finishing elements were increasingly attempted to be harmonized in order not create imbalances and to make sure that coexist both within a single monument. The real mathematical rule combined with hand drawing can be found in this period [Figure 4].
Classical foundations rediscovered. Exaltation of the Greek and Roman era as a pioneer of a perfect proportioned, well calculated, with expressive capacity drawing really exciting.
The structural form of the Baroque houses preserved the courtyard house typology but extended its entry axis in longitudinal way to mark it much more, making penetrate the exterior to the interior of the court and creating the "H" plan buildings [Figure 4].
This style brought plenty of decorations that tended to cover and camouflage the architectural structure. The space was framed among leaves, flowers and statues; the sculptural traits were highlighted and the thickness of the columns was modified with precious marble facings.
Neoclassical Architecture (XVIII century) awakens the greek-roman architectural and formal principles but combines with the rationality of enlightenment. The historical period in which it arose was characterized by the industrial revolution. It was a period full of practicality and pragmatism. This current lasted many decades for its "trend" characteristic so it is not a real and defined style.
Neoclassical architecture rediscovered classics fundamentals: there was an exaltation of Greek and Roman era as a pioneer of a perfect, balanced, well-timed style and its expressive design capabilities become really exciting [Figure 5][9].

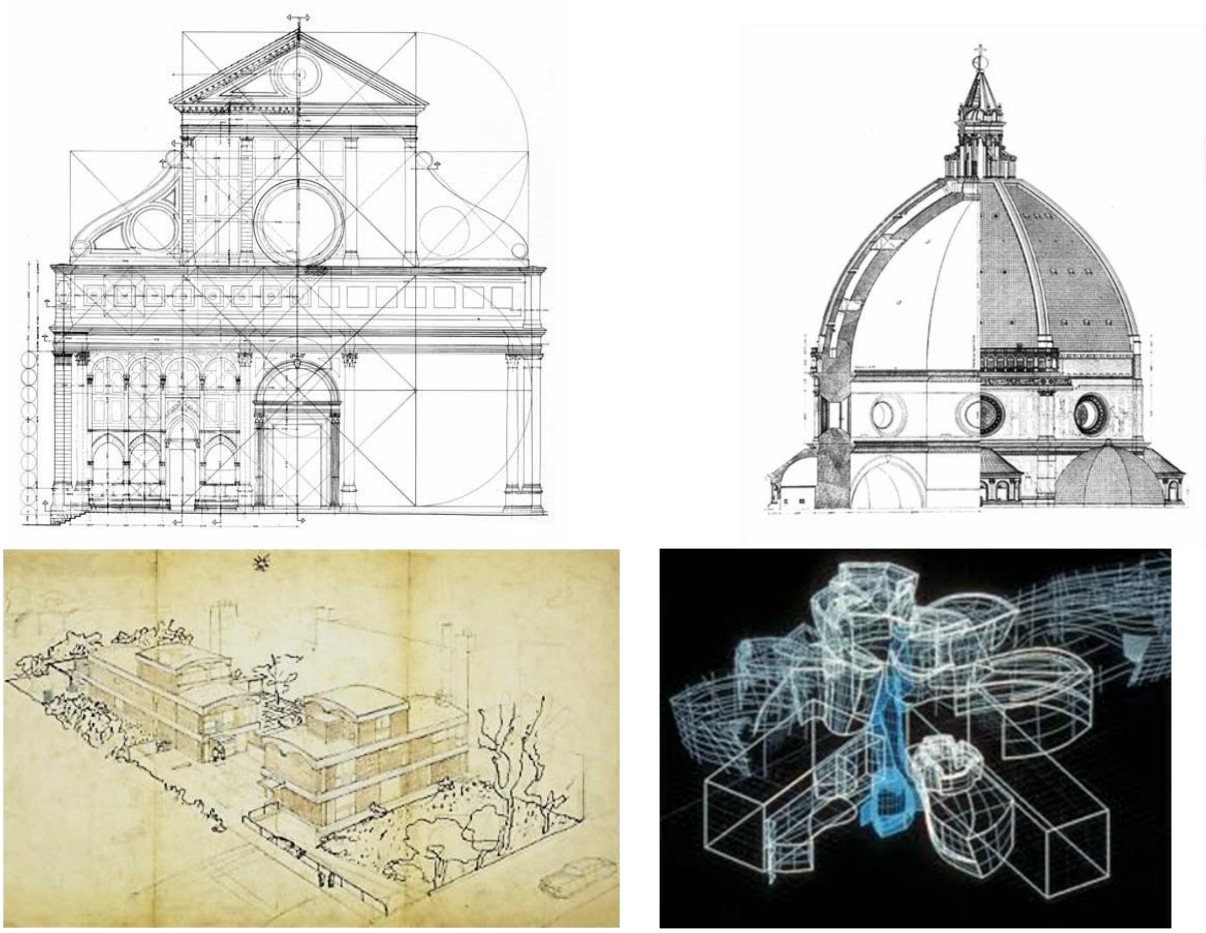

Fig. 4: Historical evolution of B.I.M.: From Leon Battista Alberti to Frank O. Gehry

3. Modern structural design

Modern movement born out of the idea and the innovative thought of world-famous architect Le Corbusier, who by his sketches brought forward the idea of his five principles to make architecture: pilotis, plan libre, garden roof, free facade and ribbon windows. His charts always show a man (“modulor”) as a proportional database. The house designed with a human scale and built on human proportions was his force point. The essential expression of the modern movement leaves the baroque plenty [Figure 6].

In this period, the exploded isometric splits used as representative methods were able to improve insight and intimate area of houses and to clear and enhance the view on furnishings. The man lives the house, in living rooms, in reading rooms. The “chais lounge” in fore guard are the frame of hand linear and clean drawings [10].
The birth of the International style and organic architecture was designed by Frank Lloyd Wright [Figure 7]. He was the most important protagonist of the architecture in the twenty-first century. He wrote "The good building makes the landscape more beautiful than it was before the building was constructed." The structural representation of his organic houses is immersed in nature and was nature [11,12].
The importance of a waterfall able to make a stunning foundation for Wright’s "house on the waterfall" was the foreshadowing of what was the rediscovery of a naturalistic period.
The same trees were able to replace the house porch with their trunks. Nature takes over. The necessity of being swamped by the scents of plants. The use of construction materials such as stone brick in structural construction in the twentieth century created a very strong symbiosis between man and nature. The organic structural design dispersed in nature, became light with dividing walls made of stone. The height of buildings tended to decrease in order not to invade and not impact on the surrounding vegetation. The plants are very large horizontal lines[13,14,15].

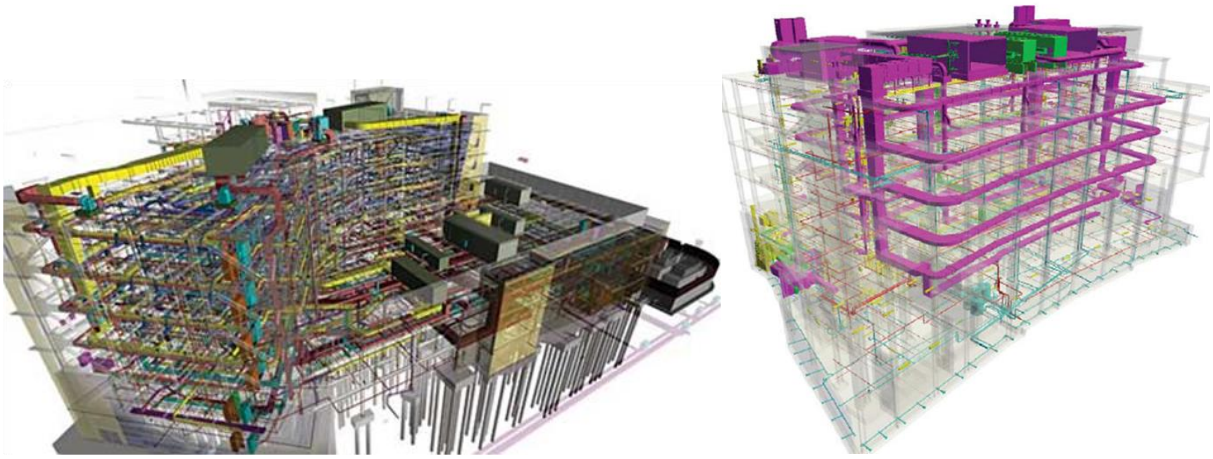

Fig. 5: Modern application of B.I.M.

4. From hand drawings to digital Era

The transition from hand drawing on paper to drawing based on the use of technological equipment has spread faster and faster. There was no longer need to draw by hand because with the beginning of the industrial era and the design of machines for product standardization, computer equipment have opened access to the issue of the representation of architecture. Also the structural analysis had a computerization and research process that developed increasingly sophisticated structural analysis software.
Nearly ten years ago Building Information Modeling was introduced to increase the performance of traditional 2D drawing. B.I.M. is a building design methodology characterized by the creation and use of coordinated, internally consistent, computable information on building projects during the design and construction process.
With B.I.M. it can image the future by creating virtual models in economics contextualized in environment. The process relies on the creative idea of the architect, who draws materially the design solution is straightforward and very simple procedure. It lies in the operator’s skill, in his intellectual and cognitive ability, to make with shadows, perspective and isometric split, the correct house structure, similar to the one imagined [16].
However, when the design project idea is entrusted to a computer and to its simulation software, the process becomes much more sophisticated. How many more are the data that is entered into the computer program, many more are the ability to create an image similar to the design idea. Being a computing machine, the computer processes the input through algorithms and determines the output.

Increasingly powerful processors and RAM memories make the structural analysis of complex architectural forms faster to analyze.
The modern architecture and the houses of 21th century strongly denounce the backbone outside buildings, becoming itself the shape house. In this case, the computer operator's ability to quantify the data input to be entered in the software becomes crucial [17].
Integrating the B.I.M. method capable of representing the structural model with a structural software, a complete view of the evolution of the structure in terms of effort, cost and energy input is allowable.
With this reliable digital representation, it is possible to follow the house project, making decision from construction planning and performance predictions to the cost estimates. B.I.M. methodology can keep information up-to-date and it's accessible in an integrated digital environment. It can immediately and quickly compute the quantities characterizing a technical element also (i.e. the surface of a plaster). The various information contained in building information modeling is: geographical location, geometry, material properties and technical elements, the phases of construction, maintenance operations.

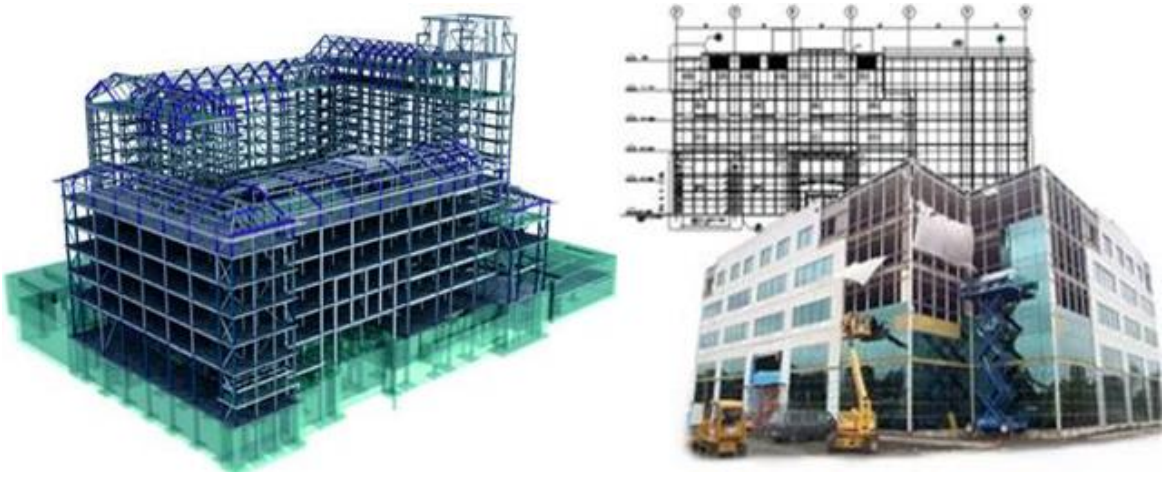

Fig. 6: B.I.M. Process

5.XXI sec. with Building Information Modeling (B.I.M.)

The transition from 2D to 3D computer design was more or less straightforward and simple. The graphic project of houses in the twenty-first century found in many architectural software vendors a simple worldwide spread.
However, from some years there is a growing CAD develops. A new computerization of architectural design concept is spreading. It generates elements such as columns, walls, complete in all their features (geometric, stratigraphic, material, volumetric / spatial). It is a generation of software capable of drawing the building structure not as a set of lines, arcs, and polylines but as a set of comprehensive and cooperative elements. Example of this type of computerized generation of structural models is the Building Information Modeling or B.I.M. With this method, buildings are designed entirety in all their component elements. It follows the work construction with its processing costs calculation and ends the life cycle of the generated model with the investigation of maintenance costs. In the last decade, the important issue concerning the relationship between housing and energy saving is also recognized by using B.I.M. [Figure 6] [18,19].
By creating a B.I.M., it is possible to fully orient a building by entering the coordinates detectable with GPS antenna and calculate the exposure during the year. Also the calculation of the amount of a material present, for instance, on the house floor is very easy with the B.I.M. computational analysis.
This kind of digital representation is not limited on drawing simple graphics (lines, polylines, circles, arcs) but it allows designing technical drawing of the building components (walls, structures, windows, doors) that contains component data, such as geometry, constitution and spatial position. B.I.M. was promoted to reduce waste and inefficiency in building design and construction [20].
Results show the high quality of houses design in the 21th century. They have not historic importance but have more structural efficiency than traditional constructions. It is shown how, using building information modeling technology, the house design in the 21th century has become more flexible, economic, fast and satisfying than traditional 2D drawing representation methods.
The information may be refer on full life cycle building manufacturing, from design phase to that of use and maintenance, passing through the implementation phase [21].

6. Conclusions

The B.I.M. is not merely the structural representation used to digitally display the house of the 21th century. It is much more. Building Information Modeling combines the design look to the structural aspect. It is able to work together different competences on the same digital platform greatly reducing costs. For designers, to support his architectural idea by a computer software such as B.I.M. is a big step forward for the entire process of creation.

For example, in Casale Castello, in a few steps it goes from the project idea to the evaluation of the processing and production costs. A single worksheet on which bring out the preservation and create a working table on which to develop innovative and functional solutions [Figure 7] [22].

The multi - disciplinary approach that was not known during the industrial revolution (in fact during the 18th century there was a separation moment between engineers and architects), is now celebrates by B.I.M. because it is able to integrates different competences. But, what is the B.I.M. is still difficult to define clearly. Although the first scientific topics of research about it date back to about 2007, it can conclude that this mode digital structural representation of buildings is much more than that which developed in the field of industry.

The B.I.M. is both a software for digital development of architectural design, a viewer of structures, a prototyping, a simulator, making possible to calculate the cost of construction and maintenance work. The significant process of B.I.M. can be seen in the possibility that gives to the designer to know the budget and evaluate right technological choices in order to monitor in a balanced way the realization of the architectural product.

To draw the avant-garde houses structure by B.I.M. is essential and crucial to reduce manufacturing costs and to respect the original idea at the base of the project. The artistic avant-garde movements are reminiscent of Dadaism, forms of abstract art and get rid of classic lines. The buildings are also structurally forms that profess themselves ahead of the modern movement, aimed at breaking the classical geometry of canons, anarchist. Never, as in these cases, the use of information technology in architectural field enables model B.I.M. manage the unconventionality increasingly extremist forms of avant-garde architecture. The house as a political poster, highly personalized by its author and that requires a particular intuition of the B.I.M. user. The avant-garde architecture computerized helps run the genius and author's alternative[23].

The results presented in this paper are based on work developed with Giuseppe Faella, Full Professor of Structural Engineering at the Second University of Naples.

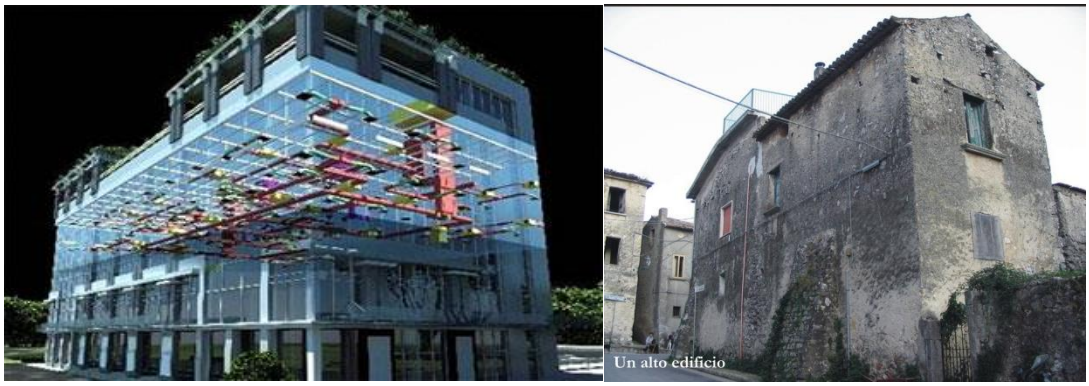

Fig. 7: Hypothesis of retrofitting of Casale Castello building by using B.I.M.

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Le Maisons Jaoul di Le Corbusier

Proportional tracks of S. Maria Novella facade by Leon Battista Alberti

S. Maria del Fiore a Firenze dome - Brunelleschi – section / prospect

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Functional recovery and structural refurbishment of disused industrial buildings: an integrated approach.

Ingrid TITOMANLIO[1], Giulia MATERAZZI[2]
(1)PhD student, Department of Architecture and Industrial Design, Second University of Naples, Aversa (CE), Italy.
ingrid.titomanlio@unina2.it
(2)PhD student, Department DATA, University of Rome "Sapienza", Rome, Italy.
giulia.materazzi@uniroma1.it

Abstract
In the last decade, due to the processes and the changes that took place in the field of industry, with special reference to the most developed countries, primary industrial activities (steel, chemical, mining, etc..) moved to countries in the developing world. This process made available a number of industrial buildings no longer used. The recovery of these buildings is a problem of great interest and importance, because of the obvious impact on the related economic and social opportunities and represents an unavoidable challenge for the sustainability of the urban development.
In this paper a methodology for the rehabilitation of buildings that fall into the disused industrial areas is proposed. It makes use of a support tool proper of the project management, the graph of logical sequence (GLS), in order to identify the concatenation and the logical sequence of activities that make up the building process of recovery.
Both the architectural and structural features are considered in an integrated way.
The proposed methodology leads to the definition and use of suitable indicators, which represent in summary the information that is transmitted between the various logical blocks that make up the graph. An example of application, consisting of the proposed recovery of abandoned industrial building, belonging to the former Falck area in Sesto S. Giovanni, helps to clarify the practical application of the procedure.

Keywords: disused industrial buildings, remediation, reallocation of use, seismic safety.

1. Introduction
In the last decade, due to the processes and the changes that took place in the field of industry, with special reference to the most developed countries, primary industrial activities (steel, chemical, mining plants, etc..) moved to countries in the developing world. This process made available a great number of industrial buildings no longer used. The recovery of these buildings is a problem of relevant interest and importance, because of the obvious impact on the related economic and social opportunities and represents an unavoidable challenge for the sustainability of the urban development. The optimal solution of this problem requires the integration of the synergistic skills coming from the fields of architecture and structural design to guarantee the satisfaction of functional requirements for the new use and the structural safety.
In some cases the adaptive reuse of older industrial buildings may not be feasible due to insurmountable structural problems mainly related to the static and seismic performance. In fact several times the seismic and structural design proved to be the most expensive part of the refurbishment project. The alteration of features and spaces that characterize a building should be avoided, as each building is expression of its time and place. Deteriorated features, finishes, along as construction techniques or valuable craftsmanship that characterize an industrial building should be preserved in their essence and properly analyzed and considered during the refurbishment activity.
This paper is aimed at presenting the first results of a joint research developed by the DATA Department of the University of Rome "Sapienza" and the Department of Architecture and Industrial

Design of the Second University of Naples. In particular, the Sapienza University dealt with the architectural and the technological issues of the study and the Second University of Naples dealt with the structural safety problems. This integrated methodology has been applied to a well known case study, the former Falck steel production plant in Sesto San Giovanni, Italy.

2. Issues related to the recovery of disused industrial buildings

The recovery of disused industrial areas today is in Italy a problem of considerable interest and importance representing an opportunity for the sustainable urban development, as it reduces the need of using new space to build new constructions.
The main issues related to the recovery and redevelopment of brownfield sites are three: the pollution of soil and groundwater, the structural safety of buildings, with particular reference to their seismic behavior, the conditions of the infrastructure and network services.
During their production the industries that were present at the site in question, such as steel mills, mines, chemical industries, etc.. released in the soil and in the groundwater, both superficial and deep, contaminants, in principle harmful to the human health.
To this end the Italian Ministry of the Environment clearly distinguishes contaminated sites from National Interest Sites (SIN). A disused site is considered as contaminated when the values of the harmful chemical species exceed stipulated alert levels. The limit values of pollutants are determined by a specific code [1], which indicates the corresponding, risk thresholds, expressed in terms of concentration.
Disused contaminated sites need, therefore, a remediation procedure before they will be reused.
The National Interest Sites (SIN), however, are those areas of particular environmental value, in which the contamination of soil and water is a risk to assets of historical and cultural interest of national importance. The Italian code indicates some criteria to locate the sites:

- the remediation procedures must affect areas having special environmental value;
- the health and environmental risk derived by the exceeding the threshold levels must be particularly high;
- the socio - economic impact, caused by pollution of the area, must be relevant;
- the contamination must be a risk to assets of historical and cultural interest;

In Italy, the National Institute for Protection and Environmental Research (ISPRA), according to the above criteria, identified 57 SIN, which include brownfield sites, in progress of conversion or still active, areas affected by mining activities and production of asbestos, ports, areas that were subjected to accidents involving the release of chemical pollutants, former mines, former quarries, landfills that do not comply with legislation and illegal dumping areas.
In the case of National Interest Sites, remediation is the responsibility of the Ministry for the Environment and for Land and Sea Protection, which uses for this purpose ISPRA, Regional Agencies for Environmental Protection of the Territory (ARPAT) and National Institute of Health (ISS).
So the process of requalification is very complex, because many skills and complicated legal and planning procedures come into play.
In all other cases - the polluted sites not declared to be of national interest – the remediation, however, is in the responsibility of the author of the pollution.
The areas object of the recovery action usually contain significant heritage buildings, once used for the productive activities.
The abandoned buildings, like the areas in which they are places, have lost their original function over time, becoming only "skeletons" or shells in memory of the industries to once they belonged.
These "memories of the past" usually show structural unsuitableness, due to ageing of materials, to the enhanced requirements related to the progress of scientific knowledge in the field of structural safety and to the higher attention to the seismic problems.
Paying the proper attention to state of preservation of both architectural and structural elements and to the related restoration work, existing buildings may live and change their use in a new one, more appropriate to the new requirements of the area and the community.
Another no less important problem is the extent and status of preservation of the infrastructure system and of the networks of services networks.
In fact the area, before it was abandoned, was equipped with a connection system of tracks, water lines, sewer pipes, electric and telephone nets, which served as support to the original function.
For example in a mine the rail connections had the function of transporting raw materials to the factories that change it.
With the change in the intended use of buildings and outdoor spaces as a result of recovery, the primary infrastructures are almost always inappropriate for their new role, becoming useless even if, they can become strong points for the entire area with due attention to their refurbishment.

3. Proposal of a method for the recovery of disused industrial buildings

3.1. General consideration

The proposed methodology [2], uses a working tool taken from the project management, the flow chart or the graph of logical sequence (GLS), in which a comprehensive and assisted reading of the activities that compose the building recovery process is given.
The graph of logical succession is a tool for representing the sequence of the activities of a manufacturing process. Through the logical sequence of the various activities is shown. The tasks are represented by icons, and their logical sequence is indicated by unidirectional arrows. For example, if from the A activity departs an arrow that connects it to the B activity, it means that the latter can not be executed before the A activity is completed [3].
In the present methodology the graphic is composed of three bands of activities, each one developing in the vertical direction. The first level describes the design of the building works, the second one the site planning and, eventually, the third one shows the remediation project.
In this paper, the attention is focused on the building design.
The GLS can also be read by horizontal bands. In this case it highlights the mutual relations between the three areas of design mentioned above.
This methodology leads, naturally, to the identification and the use of proper indicators, which represent in a summary form the information that is being transmitted between the various logical blocks that make up the graph.

3.2. The indicators, as a tool for the recovery of disused industrial buildings

According to Noll [4] the tool of the indicators was first applied in the mid-sixties by the American Space Agency (NASA) in the field of social sciences to identify and anticipate the side effects of the space program on American society.
It was probably Raymond A. Bauer, the director of the project, who invented in 1966 the term "social indicators" as "*statistics, or set of statistics and any other form of data that allow to assess where we are and where we are going with respect to our values and objectives, and to evaluate specific programs and determine their impact* ". [5]
From this definition, the Author derived three classes of indicators: the first one cognitive, the second one predictive and the third one evaluative.
In this work, the indicators are applied to the field of architecture and engineering. Indicators can be classified in more macro-ambits, which contain several ambits and lower-ambits.
In the proposed methodology the macro-ambits are those that describe the condition of buildings, the objectives to reach and the performance actually achieved. The ambits include the indicators that represent the urban quality, the architectural quality and the structural quality of buildings and, finally, the lower-ambits make supply the information needed for the design phase and for checking the results of the refurbishment process.

3.3. Architectural and functional issues

The starting point of the proposed methodology is the development of an in-depth knowledge acquiring activity to gather the most extensive information as possible about the buildings undergoing intervention.
It leads to the definition of indicators related to the macro-ambit of the condition of buildings [see figure 1]. Inside it is possible to identify three different ambits: those related to the urban quality, to the architectural quality and to the structural quality. The first ambit may, in turn, be divided into two lower-ambits: the first one is related to the reorganization of the buildings and the second one to the allocation of the functional mix available in the surrounding areas.
In the lower-ambit of reorganization of the buildings two indicators can be found. One of them identifies the currently building owners (indicator 1.1.1) and the other one identifies the possible presence of public incentives, provided by the government to increase the building capacity (indicator 1.1.2).
In the second lower-ambit the current allocation of the functional mix present in the surrounding areas of interest to the building is established. It is useful to identify the requirement in terms of housing areas (indicator 1.2.1) and services areas (indicator 1.2.2).
The second ambit, the one of the architectural quality, can be divided into two lower-ambits: one that represents the general characteristics of the industrial buildings and the other that supplies their specific characteristics.
In the first lower-ambit two indicators are present. The first one shows if the building is subject to architectural constraints under the Code of Cultural Heritage (indicator 2.1.1). The second indicator specifies the quantity of occupied territory compared to the surface available in the site (indicator 2.1.2).

The second lower-ambit, the one of the specific characteristics, consists of two indicators: one that establishes the integrity of the vertical closures (indicator 2.2.1) and the other that shows the integrity of the horizontal closures (indicator 2.2.2).

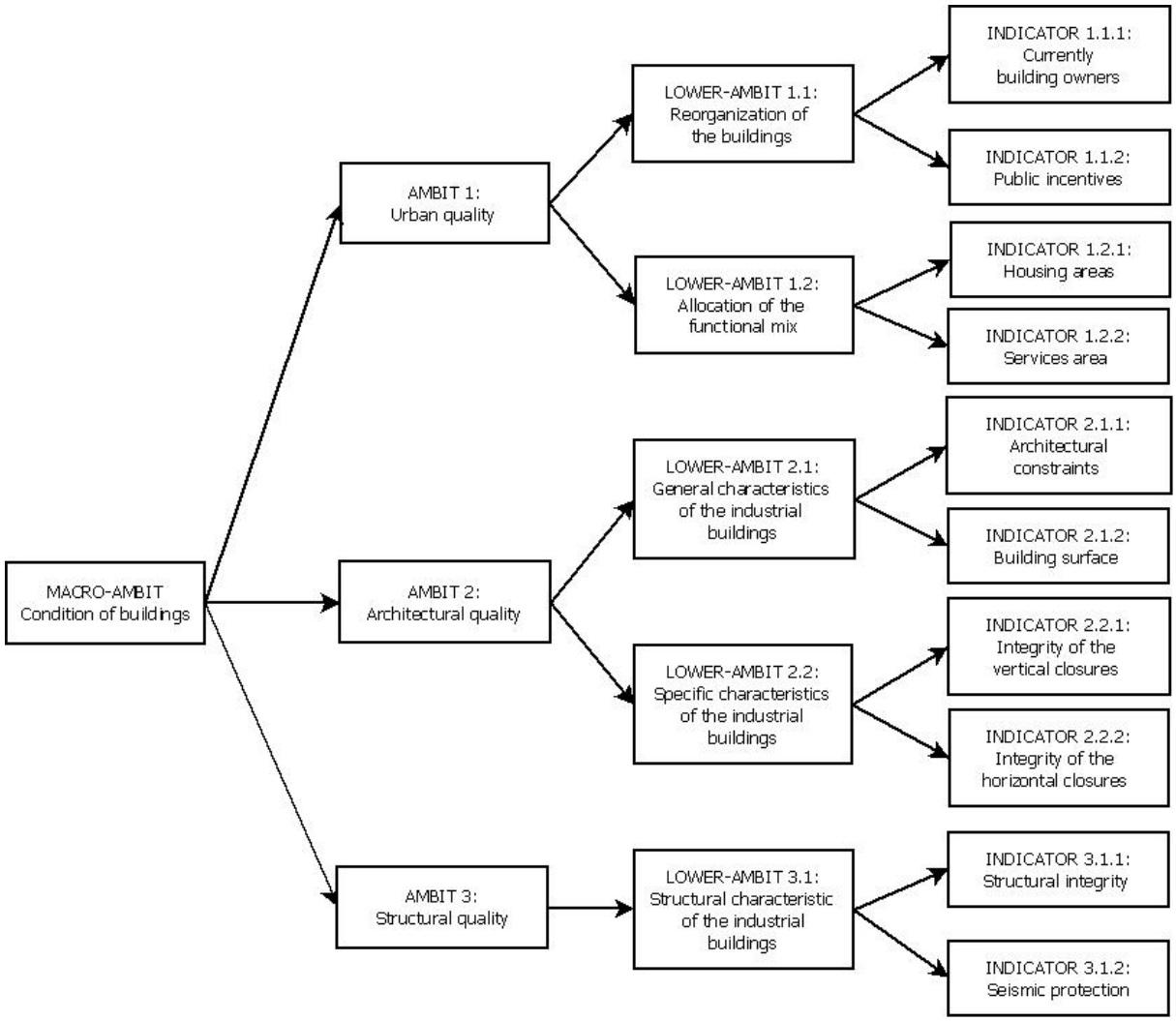

Fig. 1: Classification of the indicators used in this study.

Pointing the attention on the activities carried out on abandoned industrial buildings in Italy and worldwide, several types of functions were assigned to them. Thanks to the cognitive and social analysis the functions to be inserted in the former industrial building under study can be determined.
After having verified the actual presence or absence of the closures and of the roof, and their recoverability, the actions required by buildings are closely related to the implementation of safety both from the structural and from the environmental points of view.
There are several possible solutions for reuse. The first concerns the reuse of the building as a container of similar or different activities, like a sort of a “Russian doll" that is composed of pieces of different sizes, each one can be inserted into one of larger size. The building belonging to the industrial archeology becomes the "mother" and the function that will it will host inside will be the "seed".
Another possible solution extensively applied in the Ruhr area in Germany or in the Marche region in Italy can be considered. It is the use of buildings as museums of themselves, where their history and the area around them is commemorated and the visitor participates to the life of the former factories and can “breathe the smells” of the hard work of the industry.
The skeletons of the buildings can also act as spaces for public events, religious and sports events or they can host playgrounds for children or adults. This occurres, as an example, in the Parco Dora in Turin, where the remains of the foundations, transformed into storage tanks for rainwater, host new functions and allow for the irrigation of the gardens that have been created using the spaces surrounding the buildings themselves.

Then the historic building can be kept alive, making it become an attraction itself, only guaranteeing its preservation over time. The building becomes an attractive monument in memory of his role played in the past.

3.4. Structural issues

The structural issues form part of the status quo macro-environment, and, specifically, they are in the third area (structural quality). This field contains the sub-domain of the structural characteristics, where two indicators can be identified: the first one is structural integrity (indicator 3.1.1) which describes the state of conservation of the structure; the second one detects the level of seismic safety that the structure is capable to ensure with reference to the performances required by the Code Requirements (indicator 3.1.2).
For all the structural types of disused industrial buildings, the knowledge of their state of conservation and maintenance is a priority, as provided by the technical provisions in force.
The corresponding phase of knowledge leads to the building condition and maintenance specification. In particular, it is essential to know in-depth technologies and materials used at the building time, as well as the reconstruction of the historical transformations undergone by the building during its life.
The structural safety under both vertical and seismic loads is evaluated by applying the present methods and rules, as well as the current loadings, and not, as it might seem erroneously reasonable, the rules used at the time of the original design. In fact, the currently in force technical provisions contain, almost by definition, the latest topics and approaches concerning the structural safety.
During the study on the seismic vulnerability of buildings, the knowledge phase allows to assess the level of seismic protection that can be ensured, and then decide whether to undertake seismic retrofit or strengthening [6].
Following this method, it is possible to optimize the available financial resources through the systematic comparison between intervention costs and obtained benefits, in terms of increased building safety and, more simply, in terms of resulting lower costs of the recovery planning.
In order to evaluate the structural safety, qualified investigations that include the following activities are required:

- Analysis of foundations:
  geometry survey and assessment of the mechanical properties by visual inspection and localized digs, also to identify any underground facilities, structures and cavities. In this phase, the state of conservation of the nodes between the reinforced concrete foundation and steel structure is also to be examined.

- Analysis of the main vertical and horizontal structural elements:
  for metal structures, the identification of construction technology and the assessment of the status of the material conservation, verifying severity and depth of any corroded layer through in situ and in the laboratory tests. These include the evaluation of the material mechanical strength, the measure of the corrosion potential and the magnetometric tests aimed at inspecting the welds.

- Analysis of the floors and roof:
  execution of static loading tests aimed at evaluating deformability and capability of floors to withstand the vertical loads without inelastic deformations.

The assessment of structural safety, under dead and live loads as well under seismic forces, can be performed according to the European or to the Italian seismic code, that require to firstly evaluate the "levels of knowledge" (LC) on the basis of the deepening of the in situ investigation, as described above. Obviously, the optimal condition, although not always reachable, is the one corresponding to the best "level of knowledge", which allow maximizing the material and structure performance.
Once the knowledge phase is completed, the subsequent one is the identification of possible restoration/retrofit project, essentially finalized to achieve structures capable to satisfy the 100% of the code safety levels at the ultimate and the serviceability state.
In order to identify the optimal structural solution from the point of view of performance, in addition to the economic one, several traditional and innovative intervention techniques must be taken into account. A preliminary analysis should compare the performance achievable by the use of different strategies, taking into account the implementation easiness, which significantly affects timing, durability and increase in expected seismic performance.
In this perspective, priority will be given to interventions characterized by a substantial decoupling function of vertical and horizontal loading resistant. Doing this, the seismic retrofit of structures is extremely easy and inexpensive, since the interventions mainly involve the seismic-resistant part only.

Finally, it has to be recalled the possibility to install energy dissipation systems, as high damping bracings, seismic isolation systems, and, more generally, system devices able to alter in a favorable manner the dynamic behavior of the structure under earthquake (passive control, active control, hybrid control systems) [7].

4. Case study: an industrial building in Sesto San Giovanni (Italy)

4.1. Introduction

As a case study is considered the area of the former Falck steel production plant, located in Sesto San Giovanni, in the hinterland of Milan. It is one of the most important National Interest Sites in Italy.
The interested area is the one that until 1995 hosted the “Acciaierie and Ferrerie Lombarde Falck”, comprising a surface of about 143 hectares.
The Programme for the Government of the Territory (PGT) of the district of Sesto S. Giovanni has divided the area into two areas of strategic transformation (ATs). The first one, the ATs1 includes some buildings of the factory (the Union, the Concordia, the Plis, the Trai, the Vittoria A, the Vittoria B and the Transider areas) while the second one, the ATs2, includes the railway site [see Figure 2].
In the whole area there are still seventeen industrial archeology buildings, most of which are contained in two areas: the Union and the Concordia areas. In the first section, there are seven buildings of historic archeology, while in the second one the industrial buildings are five.
In this paper, the issue of the functional and the structural recovery of one of these buildings will be faced.
The building in question is located inside the Union compartment and it once hosted the rolling mill train [Figure 3].

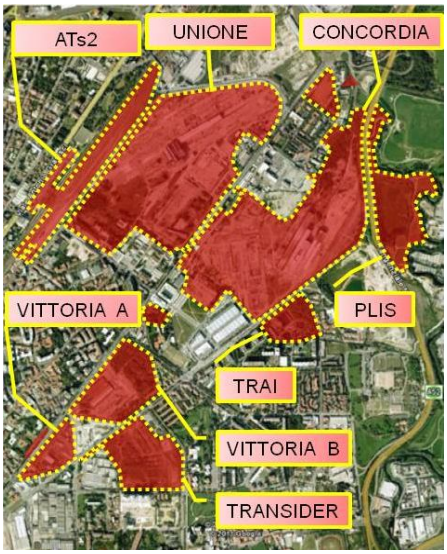

Fig. 2: Plan of the former Falck area.



Fig. 3: The building "Rolling mill train" - Block A.

4.2. Architectural and functional perspective

The building under investigation dates back to the ‘30s. The indicator 1.1.1 informs that it was originally privately owned by “Acciaierie and Ferriere Lombarde Falck”. It hosted, in particular, the plant of the hot strip mill. Currently it is still privately owned, but by a real estate company that does not use it for any function.
It covers an extremely large space, divided into two parts: the block A still has the original roof, cleaned from Eternit (the brand name of a type of absbestos-based insulating elements), 239.44 m long x 29.70 m wide over an area of 7110 m^2; the block B is smaller, it no longer has its roof, only retaining the steel columns, and is 58.60 m long x 29.70 m wide, over an area of about 1174 m^2. The amount of the surfaces is specified by the indicator 2.1.2.
The building structure is composed of steel frames having a span of about 28 m, placed at the interval of 13 meters, growing to a height of about 20 meters.
The block A maintains the integrity of the horizontal closures, but no longer has the vertical walls, while the block B lacks of both types of closures (2.2.1 indicator and indicator 2.2.2).
The building may take advantage of a volumetric incentive granted by the Programme for Government of the Territory, which allows increasing the covered volume by 15% (indicator 1.1.2).
The industrial warehouse is protected as an historical building by the PRG 2004 (see indicator 2.1.1).

According to the integrated program of action (PII), the function allocated to the rolling mill train building is that of sport and education container [see figure 4].
Inside the historic building will be realized, therefore, a new building, disconnected from the existing one. It will inherit all the values and requirements supplied by the knowledge acquisition phase.



Fig. 4: Recovery of the "Rolling mill train" building. Plans.

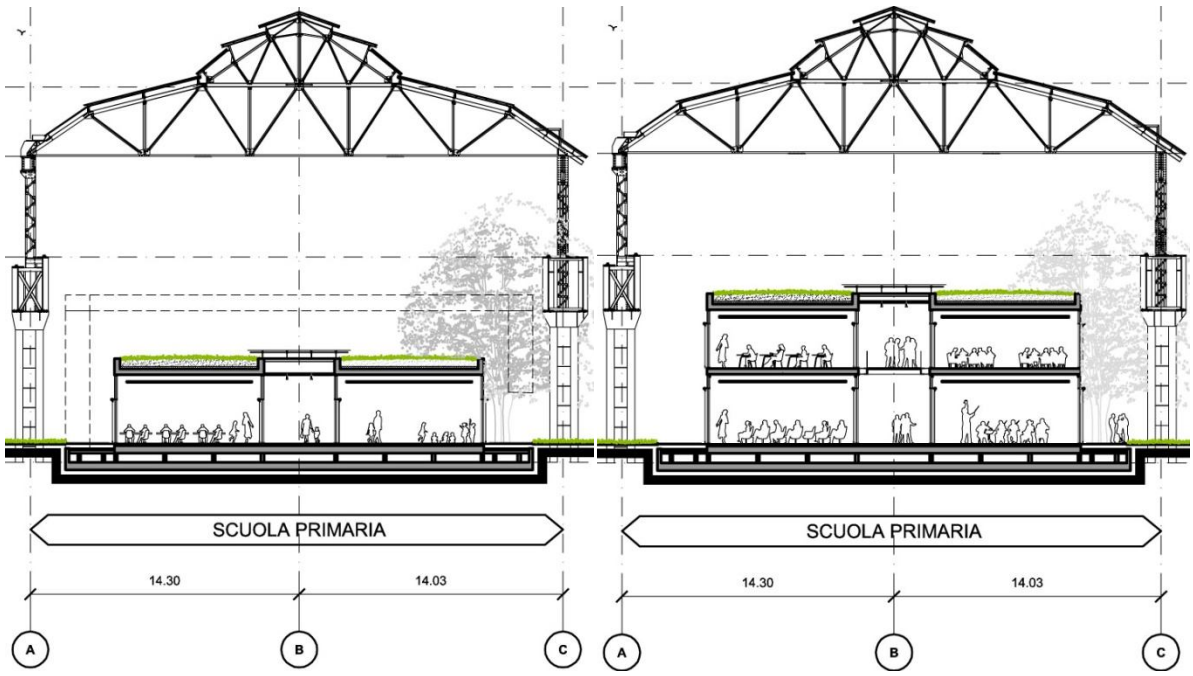

Fig. 5: Recovery of the "Rolling mill train" building. Sections.
The new building is divided into two blocks, as the existing one: the first block has the function of pre-school, primary school and secondary school, and the other one is devoted to the sporting center, including a space for the swimming activity.
The new features are developed within the existing building. The new construction reaches the height of about 10 m.
The roof of the new building is partly organized as a green roof, assuming the function of space dedicated to the football game [see figure 5].

4.3. Structural issues

The most important requirements to be satisfied, for what concerns the structural safety, are the structural integrity, that is as the ability to withstand the dead and live loads (see indicator 3.1.1) and the level of seismic protection that the building can ensure (see indicator 3.1.2). Generally, it should be noted that at the time of the design of the " rolling mill train " building, the structures were calculated using the allowable stresses method, whereas the current codes require to verify the structures at the limit state, with reference to both the ultimate and the serviceability ones.

In this regard, the fulfillment of the serviceability limit state may be more onerous than the ultimate limit state one for metallic structures, such as the ones at under consideration, because of their high deformability. This is particularly relevant if the architectural design foresees the installation of vertical closures in glass, particularly sensitive to deformations.

Regarding the seismic safety, it has to be observed that the examined building structure is located within a non-seismic area. Nevertheless, the social role that the building will play makes reasonable to obtain also a seismic protection against low seismic forces (reference to low seismicity area), mainly referring to the preservation life limit state. Furthermore, for this type of structures, the seismic action should be more onerous than the wind one, certainly considered at the time of the original design [8].

The fulfillment of the seismic requirements can be obtained by arranging high dissipation bracing in the existing structure, in order to optimally absorb the horizontal dynamic actions.

With regard to the new building structure, which will be realized within the existing one, steel material will be adopted, because it makes easier and more natural to combine the new part with the existing one. Even in this case, the fulfillment of the seismic requirements is not a minor issue, also in consideration of the large loads to be applied on the roof and of the very great ratio between building length and width in plan. Finally, the foundations of the new building will be necessarily independent from the ones of " rolling mill train " building and will have the same base level. The knowledge phase will provide the foundation type [9].

5. Conclusions

In this work a methodology has been proposed for the refurbishment of buildings falling into disused industrial areas.

It makes use of a project management support tool, namely the graph of logical sequence (GLS) or flow chart, in order to identify the concatenation and the logical sequence of activities that make up the building process of recovery.

Problems are considered in an integrated approach both the architectural and structural features.

The proposed methodology leads to the definition and use of suitable indicators, which represent in summary the information that is being transmitted between the various logical blocks that compose the graph.

the indicators relevant to the issue of rehabilitation of disused buildings are then identified and classified, critically discussing their characteristics.

An example of application, consisting of the proposed recovery of an abandoned industrial building, once part of the former Falck area in Sesto S. Giovanni, helps to clarify the practical application of the procedure.

In particular, as regards the architectural and functional aspects, the hypothesis of reuse of the "Rolling mill train" building is proposed creating inside it a building devoted to sports and teaching.

As regards the structural aspects related to the existing building, the relevant methodologies to the evaluation of its safety under both static and seismic actions are recalled and innovative solutions are proposed in both perspectives. With reference to the new building steel is adopted as construction material and solutions are proposed to guarantee the level of seismic protection require by the Italian building code.

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HERITAGE ARCHITECTURE LANDESIGN
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CHALLENGES IN THE FIELD OF HERITAGE CONSERVATION IN THE DEVELOPING WORLD: A CASE STUDY OF BIHAR, INDIA

Kamini SINHA, Shailendra Kumar MANDAL

Department of Architecture, National Institute of Technology Patna, Patna, India

kamini_nitp@yahoo.com, vastumandala@yahoo.com

Abstract

Conservation includes everything starting from academic inquiry, historical research to policy making, planning uptill specific physical intervention. But, many a times the intervention becomes somewhat disconnected from this broader field of conservation. Decisions about what to conserve and why are often taken independently from those dealing with how to conserve, and vice versa.
This problem is more obvious in the developing world. The state of Bihar in India is very rich in terms of architectural heritage, its capital Patna being the site of the ancient capital of Patliputra. Their value ranges from local to international level. But integrated conservation becomes tough to achieve as the active intervention loses sight of the interconnectedness of treatment with the preceding activities.
Growing awareness of the stakeholders in the present time is resulting in various activities on the part of both Government and public. This pressure has resulted in various policy decisions on the government level. The government has created a committee under the Department of Urban Development to assist the government in taking up the activity of conservation on a war footing.
The paper analyses the efforts of all stakeholders using a combination of qualitative and quantitative research methodology. It concludes the challenges in the path of integrated conservation.

Keyword: Architectural Heritage, Ancient Patliputra, Stake holders, Integrated Conservation, Policy making

1. Introduction

Indian civilization being one of the most ancient civilizations of the world, the country, today, is one of the richest countries in the world in terms of architectural heritage. But, it being a country of 1.22 billion population with a per capita income of just about Rs 50,000/- heritage has not been able to place itself high on the priority list. Its awareness comes only after our material needs are satisfied which is tough to achieve in the given conditions.
The architectural heritage of India is of diverse nature and the cultural fabric of the settlements gives them a unique nature. But the fast pace of change due to rapid urbanization in the past few decades have placed this heritage in a problematic situation. The planning systems of India have been unable to lay enough emphasis on the heritage which could have facilitated their protection. However certain initiatives are being taken by different governmental organizations like the National Urban Renewal Mission, Ministry of culture and the Ministry of Urban Development, Government of India. The implementation of the decentralized governance enacted in the constitution in 1992 is also providing the required framework for laying emphasis on heritage conservation

1.1 Existing framework for Heritage conservation in India

The first major effort by the administration of the country in the field of heritage conservation was the establishment of the Archaeological society of India by Alexander Cunningham in 1861. The activities of ASI include maintenance, conservation and preservation of protected monuments and archaeological sites and remains of national importance. It works under the provisions of the Ancient Monuments and Archaeological Sites and Remains Act 1958 and the Antiquities and Art Treasure Act, 1972. It is an attached office under the Department of Culture. For its administrative convenience it has divided the entire country into 24 circles which together protect a total number of about 3700 heritage components. These belong to different periods ranging from the prehistoric period to the colonial period. They include temples, mosques, tombs, churches, cemeteries, forts, palaces, step-wells, rock-cut caves, and secular architecture as well as ancient mounds and sites which represent the remains of ancient habitation. Apart from the archaeological society of India, are the state archaeology departments working under the state governments which protect an even lesser number of heritage components. In certain cities even the municipalities are making some contribution in the field of heritage conservation. There are also a few number of non-governmental organizations working for the conservation of heritage. The largest organization among these is the Indian National Trust for Art and Cultural Heritage (INTACH).It is an autonomous non-governmental Indian NGO that seeks to preserve Indian Art and Cultural heritage. It was founded in 1984. Its headquarters are in New Delhi and has chapters in 117 Indian cities as well as chapters in Belgium, the UK and the United States. Some of the state governments have also established state heritage committee to further assist in conserving the heritage. Bihar is one example among them where the Heritage Development Committee has started working since 2011. Further the Universities also run some courses where the students are taught various aspect of heritage conservation. Heritage Conservation is not yet a mainstream vocation and is taught only in School of Planning and Architecture, New Delhi and Centre for Environmental Planning and Technology, Ahmedabad at the Post Graduate level. It will still take a long time to be fully established at the professional level.

The total effort of all these bodies put together has still been very little, when compared to the rich heritage of the country.

This can be explained by taking up an example of the state of Bihar which is ranked comparatively low among all the states of India in terms of development achieved so far while can be considered rich in terms of the architectural heritage that it possesses. The heritage comprises of both individual structures as well as historic areas. In the given scenario, the important task of heritage conservation becomes a very difficult task to achieve. On one hand is the infinite number of valuable heritage and on the other is the endless list of issues in the field of heritage conservation. The challenges in the field of its heritage conservation can be enumerated as follows:

1.2 Social awareness towards the cause of Heritage Conservation

The basic lacking in the field of Architectural heritage conservation is the social awareness and the emotional connection between heritage and society. Besides trained specialists, heritage conservation



Figure 1 Remains of the Great capital of Patliputra at Bihar, India

needs the collective efforts of all citizens and authorities. This is tough to achieve as the process of spreading social awareness is still in its nascent stage. There are many reasons behind its late awakening. When the western world was awakening to the cause of conservation in the 17th to 18th century, India was a bunch of small kingdoms, which were either independent or under the central rule at Delhi. The political conditions of these kingdoms kept swinging between stability to instability. This continued for a long period in history until the country became a colony of the British administration. This led to the long struggle for freedom. Under such conditions heritage could never gain importance. It was more so for the state of Bihar which ranks low in terms of literacy rate or development as a whole. The social awareness is closely linked to the literacy rate which is about 60% in the present time while it was even lower in the past decades. There has been an effort only since a decade or two towards the cause of spreading awareness. There is also a serious crunch of well trained professionals in the field. The general society is unable to connect itself with heritage conservation as most of them consider it to be the rich's hobby. For the state of Bihar, with its rich diversified legacy the task of heritage conservation is very long. As an issue of wider public and professional concern, it is still very nascent. Also there is a lack of knowledge among the people who are genuinely concerned about the heritage. Again, the initiatives that are being taken by the concerned bodies are not targeting the general public or the younger population. These programmes are generally among the researchers and people working in the field. This process will either take too long to make the state aware or it might just not be able to spread the required awareness. To get the required results initiatives at the levels of education, communication, and mechanisms for public engagement to inform people about the values of heritage places, how to care for them and how to provide for the public's active involvement in the process needs to be taken. A positive initiative in this direction has been taken by the newly formed Bihar Heritage Development committee which has involved history students from all universities to collect the initial information regarding unrecorded heritage in their own areas.

1.3 Absence of duly formed laws backing all conservation related decisions and works

Though the practice of conservation in European countries was already effectively institutionalised by law by the mid of the nineteenth century, Indian scene still lacks a properly drafted law for the field of conservation. Moreover, though quite a number of European countries were already aware and were working in the direction; this issue became an international concern only in the recent decades. India is still struggling to get a proper law in support of architectural conservation in place. But the problem is that the process is still trying to derive from the western definitions and experiences, which is somehow hampering the process of indigenous experiences. In the absence of properly formulated legal framework, the initiative taken by the concerned bodies mostly meet with failures. There is also a gap between the genuine worker of the concern and the administration which is concerned with law formulation. At the city or municipal level, mayors and political decision makers play a leading role and can potentially define and implement policies that will drive the city's approach to its heritage, its conservation, how it is interpreted, and the role conservation plays in the city's or urban area's future



Figure 2 Map of Bihar, India



Figure 3 Map of India

development. In this scene, the law which may get formulated in the near future will by all chances lack the indigenous requirements.

1.4 Insensitive Planning Actions

The threats to historic urban areas generated by modern urban planning are one of the major concerns of the field of conservation. Their conservation has so far received very little attention inurban development policy. Though, it has been addressed to some extent in the western world, it is tough to give it a priority in the developing country like India.For eg, the historic Patna city which has developed over various historic layers and which is estimated to be the location of the historic city of Patliputra, the centre from where Ashoka the Great ruled the whole of "Bharat varsha" is being dealt by the Planning Department in the same way as planning proposals for a newly developed area. Instead of giving this heritage its due importance, its conditions are rather being considered as limitations in its development. This is leading to neglect of the area contributing to its degeneration. Conserving this historic urban environment is currently one of the most urgent and challenging cultural heritage conservation issue. But in today's scenario, Conservation practices are isolated from the city's processes. The planning process of the city does not give proper priority to the aspect of conservation. The planning decisions majorly consider the size of the city to conclude planning needs and potential solutions, whereas the diverse nature of the cities needs a case to case solution. A typological categorization of the cities would have given a better understanding of the issues related to conservation and better and apt solution to the problems. There is a broad recognition by heritage professionals of the need to better integrate heritage conservation into the broader planning and city management framework, however there is a lack of knowledge about how to achieve this. Conservation is isolated or confined to the realm of monument conservation, the resulting lack of integration into the general urban planning framework limits success. Furthermore, heritage conservation professionals and departments are located at levels in municipal institutional hierarchies and so their influence is meagre as they do not have direct access to the decision-making paths necessary to influence good conservation outcomes. Conservation professionals and urban planners have been located in separate areas of the city governance. Weak or poorly implemented legislation and policy, or a lack of policy guidance is also exacerbating this situation.

1.5 Lack of inter-departmental functioning

The lack of coordination between the multidisciplinary professionals and departments is one of the major reasons behind the poor state of conservation in the state. Since there is no proper co-ordination between all the departments connected with the governance of the areas, each has their own set of rules and goals. These many a time work out to be contradictory, creating deadlocks and confusions in work implementation. Improper allotment of power and designation of areas hamper the basic aim of conservation of heritage. For Eg, while the Department of Urban Development is taking decisions for the historic core of Patna city (Capital of Bihar), the Department of Archaeology or the Archaeology Survey of India have their jurisdiction limited to individual structures. The State's requirement may be fulfilled by formulating a separate Department of Conservation under the State Government which can function in coordination with the other Departments.

1.6 Effect of Social Conditions

Bihar is still a traditional society, and the conservation of heritage or its elimination is an important issue in defining the nature of development. The past century has been one of unprecedented change in terms of impact on the urban environment. Different pattern of changes are observed in the different parts of the cities. While the comparatively newer areas are growing through rapid urban expansion and increased density due to immigration and population growth, the old historic cores are suffering from emigration resulting in obsolescence, abandonment and/or stagnation. This dual nature of change has its own sets of effects on the conservation scenario. These need to be properly managed to get the required output but in the absence of a proper management system, this is hard to achieve.

1.7 Lack of proper information Management system

The information management system of the state is another big challenge for the conservation of heritage. Since there is no transparent system, there is repetition of work at most of the sites. This is also due to overlapping of jurisdictions in the historic areas. The state also needs to assess the state of information available to practitioner and to identify the needs in the conservation of historic cities and urban settlements.

The Right to Information Act has been passed in the country in 2005.Under its provision; any citizen may request from a public authority any information which has to be replied expeditiously or within thirty days. The Act also requires every public authority to computerize their records for wide dissemination and to pro-actively publish certain categories of information so that the citizens need minimum recourse to request for information formally. But this proper management of records and their availability to one and all is still to be achieved and so poses to be an issue in present times.

Different types of information lie with different department with most of them lacking proper information management system and transparency of information. The work done by the agents are not published regularly, as a reason of which important data get lost and many a time work gets repeated. In such conditions Conservation projects are seriously hampered.

1.8 Narrow Definition

The definitions that are guiding the agents in the fields of conservation work in the state of Bihar are still very narrow. While on the international scene, the definitions have grown out from the concept of monuments to the concept of historic sites and further from the concept of conservation to the concept of management, the state still works in terms of monuments and their development, where this "Development" is many a case becomes anti to the concepts of real conservation. The need is for area rehabilitation and revitalisation approaches, which can maintain the urban tissue and the essential qualities of the historic areas and of the life of the communities residing there. It can also adapt the physical structures and activities to some of the present requirements which may otherwise get abandoned, for e.g. the various *havellies* of the *nawabs* spotting the urban fabric of the city. The monuments need to be seen as part of the conservation areas, and their sustainability and revitalisation will be most feasible if they are integrated into new concepts of use.



Figure 1 Havelli of Sir Sultan

1.9 Lack of Finances

Bihar is a state which is struggling to develop in the present times. In this state where the state is concentrating on developing basic sectors like roads, education, electricity, health and industries, the requirements for heritage conservation has taken a back stage. Fund allocation for the cause is limited which restricts the conservation related activities. In the condition of very little social awareness to the cause of Heritage conservation, funds from any other source are also limited. Attracting private investment to facilitate municipal needs is inevitably a priority for many local governments, and as national funding declines, cities are increasingly required to become financially self-sufficient.

1.10 Lack of Manpower

There is a lack of manpower who can contribute towards the conservation of the architectural heritage of Bihar. The Patna circle of Archaeological Survey of India encompasses an area which includes three states viz. Bihar, Jharkhand and Parts of Uttar Pradesh. Its manual strength is very less in comparison to the actual requirement. The total strength of resource persons that it has is very small in comparison to the duties that it needs to deliver. Similar is the case of Department of Archeology, Government of Bihar. There is no other governmental or Non-Governmental Body, neither any individual professional who is doing any serious work for the conservation of the heritage. The newly formed Bihar Heritage Development Committee is also a small body in its initial stages of working. It members are either dual charge holders or people who are not trained in the field. This committee need an inception period when it can be set on the right tracks of work. In such conditions, the heritage is losing time and if things do not change fast for the positive some of the most valuable heritage of the state will be lost forever.

1.11 Lack of proper designation of responsibilities

The responsibility of conserving the heritage must be shared by all. Each player has a different and specific role in the management of the historic urban environment. The relationship between the actors is also critical. Roles and responsibilities need to be clearly defined and well understood by all the actors and processes for dealing with conflict must be clearly identified.
In Bihar, it still needs to be understood as to who the main stakeholders in the field are, and who would be the main players. Decision makers are not usually trained in the field of heritage conservation and they rely on the city's various technical departments to manage urban development and conservation. Politicians often perceive heritage conservation and management as an impediment to development and economic advancement and so there commitment to the cause is much less than the requirement. Conflicting objectives between different levels of government further complicate both the decision making process and the implementation of heritage policies.

1.12 Lack of interconnection between the different players of the field of Conservation

Proper Conservation of heritage can be achieved only if all the required steps, right from academic inquiry, historical research, policy making and final intervention are properly interconnected. But this is a serious issue in Bihar as each step has a different set of player where the interconnection is lacking or quite weak.
The major agents working in the field are the Archaeological survey of India and Department of Archaeology, Government of Bihar. Apart from these Bihar has a chapter of INTACH. All these three bodies have been working on a limited list of monuments. ASI being a central government has a considerable working force and finances at its disposal. So it has been able to look after the monuments in its list in a comparatively proper way. But due to the limited resources, its list itself is quite limited.

The Department of Archaeology, Government of Bihar has a serious crunch of all types of resources, which has limited its activities to a great extent. INTACH has not been able to deliver much in the direction of active conservation of the heritage of Bihar.

The fast rate of globalisation in the past few years and the developments on international scene of conservation has together contributed towards raising the awareness in the society of Bihar. This has resulted in certain major steps being taken by the government of Bihar for the betterment of the scene of architectural conservation in the state of Bihar. But the bottom line is that in the absence of interconnection between all players, the initiatives taken do not attain the targets set for them.

1.13 Continuously changing Political Condition

The rapid cycle of change that occurs at the political level, creating and maintaining a robust and effective administrative structure becomes difficult. In the given scenario, the state requires establishing and retaining professional conservation expertise within the core of an urban area's planning and management system. Its absence is posing to be another hurdle in the path of provision of a continuous and dynamic conservation process which continues from planning to implementation.

1.14 Insufficient courses pertaining to Architectural Heritage and Conservation

Current architectural education offers little in the way of training about historic urban environment, historic buildings or conservation. Global architectural approaches currently pay little heed to local context and rarely recognize the local distinctiveness that comes from historic fabric. Moreover, the state has very little number of institutions providing architectural education. Basic education about historic building materials, building conservation practices and particularly conservation practice for historic urban areas has become a postgraduate educational activity, which at the moment is not provided in any institution in the state.

2.0 Conclusion

The general picture today is not encouraging. The scene of Conservation of Architectural Heritage in Bihar, India presently needs serious thought and quick decisions backed by devoted actions. And most important is the transparency and interlinking of all activities taken by all players devoted to the cause. In aiming for an integrated approach, however, the responsibility needs to be shared beyond the conservation practitioner. Each player has a different and specific role in the management of the historic urban environment. The relationship between the actors is also critical. Roles and responsibilities need to be clearly defined and well understood by all the actors and processes dealing with conflict must be clearly identified. What can emerge in the process is a totally Indian context in the field of Heritage conservation.

In Bihar, the act of conservation, unlike that of the west, would in fact play a central role in development processes in the coming times. It would help re-establish the identity of the state. As the conservation movement has started very late in Bihar, it has to go fast to be able to catch up with the international scene in Conservation or with the attitudes, institutions and practices that have taken several generations to evolve in Europe. But then, if the state does not act immediately, it will have to bear a drastic loss of its historic build environment and the associated cultural heritage.

Cities are living environments that must change and adapt to the evolving needs and aspirations of their inhabitant. The challenge is to manage these changes in a way that balances the seemingly opposing, but often allied forces of conservation and development. Realistically, none of the conservation community argues for total preservation of everything that is old in a city nor any one of them would be against attempts to improve sanitation and water supply, reduce overcrowding, or otherwise improve the living conditions in older housing areas. Such improvements do provide a more satisfactory environment. But a better environment also implies a satisfying of social and cultural life for those who make use of the environmental resources. It is the human inhabitants who create and constitute the socio-cultural and economic systems which give life to the physical environments.

Destruction of the historic centres, of old housing stocks and of monuments continues either by active policies of clearance and replacement or by passive policies of doing nothing to halt the slow deterioration and decline of such areas. Whatever efforts that have been made uptill now have been small scale efforts, often focussed on the most “profitable ‘projects, such as historic areas with tourist potential. The lower –income residents have been ignored or pushed out by existing renewal policies.

With such practices there is a danger for the future that in these cities of the developing countries, only fragments of their urban heritage will remain.

The focus of revitalisation and rehabilitation of historic centres, therefore, has to be on whole areas, not just individual buildings, and on social communities, not just the physical environment. These older housing areas, typically in the inner parts of the city are often home for lower-income families and they have physical, social, economic and cultural values different from, and beyond the perceptions of bureaucrats or planners.

Advocates of rehabilitation policies emphasise the importance of a comprehensive and integrated approach to planning for older areas, and especially the need to consider complete conservation/rehabilitation areas, not just individual buildings. Of course, particular buildings of special historic and/or architectural interest should be preserved as part of the overall scheme. But the real focus is on the activities and uses of the buildings taken as a whole, and the need to upgrade selectively and adaptively.

Cultural and political awareness are the key to the battle to preserve the valuable heritage. A strong governance and legislative framework; policies that provide guidance on and trigger actions that implement the legislative framework are the need of the hour. In contrast to different players performing different task with the same goal but no interconnections, an integrated system of conservation needs to be drafted and followed. The whole circuit of education, researches, policies

and projects needs to be completed so that the state does not have to bear the irreparable damage of its valuable heritage. Economic instruments and tools that address market failures and secure conservation also need to be adopted for a positive result. What is also required is the change in the attitudes of the professionals, of economists, architects, planners, developers and the administration. It is necessary to create a changed political environment in which historic centres are rehabilitated in their true value and where policies and practice of government are modified accordingly. Institutions need to be developed, and economic and administrative instruments for control and promotion needs to be worked out.

Civic authorities need to pay attention to rehabilitation and re-use of old and historic properties which are not under government protection and use. These properties need to be listed and their rehabilitation and re-use need to be promoted. Those under public ownership can be brought to appropriate community or private-sector use.

There remains great opposition to such changes towards area conservation and rehabilitation. Landowners/landlords, speculators, government administrators, big construction companies, and many public agencies have vested interests in re-development and so, will fight to protect their stakes for modernisation. These groups have their political allies as well. Unfortunately, the people are large, and especially the people living in historic city centres, have yet not developed a sufficient sense of self-identity and community purpose to allow them to fight back. This can change, and indeed must change; if anything is to be done about the sustainability of urban heritage. But it will not be easy. And time is rapidly running out.

Priorities and interests between different levels of government are not always shared, further isolating conservation practice from the city's process. Strong local leadership is key to insuring the integration of conservation planning needs with other strategic planning demands, to establish official conservation mechanism that meet various governance requirements, to engaging with the population and other entities that can affect conservation outcomes, and to securing and directing the necessary resources to implement actions that will serve as a catalyst in the conservation process

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Decoding a merchant town: photography, history and survey

Antonella SALUCCI[1]
(1) Department of Architecture, School of Architecture, University "G. d'Annunzio" of Chieti-Pescara, Pescara, Italy
E-mail: a.salucci@gmail.com

Abstract
The focus of this paper is on the cultural heritage of a small city in the Abruzzi region, with the aim to highlight the identity of a merchant town, preserving one of the first evidence in the Abruzzi residential social housing, a 'case study' especially in the field of sustainability.
The research is oriented on the knowledge of the architectural evolution of Lanciano (Ch), it was a flourishing commercial site, across an ancient main trade route, connecting Marche, Abruzzi, Puglia and Napoli; this routes have shaped the landscape and developed interwoven networks across the urban settlements.
By reading the original text documents and the iconographies, and by making a comparison with the present status – involving both the integrated use of different surveying methodologies and photograpy – it is possible to give an additional contribution to the documentation, preservation, safeguard and management of environmental and architectural heritage of central Italy.
By observing the city, it is possible to detect some characteristics that provide the historical centre of Lanciano with a foremost quality and uniqueness: an extraordinary harmony has been governing for centuries the adaptation of the urban settlements to the morphology of the territory, strongly characterized by relief and depressions. The four main districts are naturally arranged along the crest lines, converging in the ancient 'curtis anteana', a place of transit and stop, the market place. This urban void is the fulcrum of the city, from where, at the end of the nineteenth century, the well-organized structure of the Fiera district – the object of our study – started and expanded eastward.

Keywords: Heritage – Photography – Preservation – Sustainability – Survey

1. Objectives
The work presented here offers a summary of the results of a study of Drawing investigating the evolutionary dynamics of an Adriatic merchant town, since its ancient foundation a site of important commercial activities. As part of a cognitive investigation of architectural and environmental heritage in the Italian region of Abruzzo, the research pursued the objective of representing the urban complexity of the inland Adriatic City of Lanciano, in the province of Chieti – situated along the band of hills between the Maiella Mountain and the Adriatic coastline – through a survey of its twentieth century urban fabric, in particular the district of Prato della Fiera.
This objective was realised through the integrated use of diverse methodologies of both survey and photography, considered the privileged medium for investigating and interpreting architectural and environmental heritage.
The following notes, accompanied by a selection of images of early results, summarise a phase of investigation involving the gathering of archival documentation – graphic, cartographic, iconographic and textual – and morphological-dimensional data of the state-of-the-art.
The direct examination of original drawings of plans for the town – prepared at the end of the nineteenth century and more recently during the 1980s – and their comparison with surveys of current conditions, allow for a number of interesting reflections on the image of the city. This contributes, if only in part, to the construction of an archive of 'minor' heritage in the region of Abruzzo from the period between the two World Wars.

The observation of the city of Lanciano presents diverse elements of recognisability that render its historical centre a space of unique quality. This uniqueness is the result of a centuries-long process of adapting urban settlements to the morphology of a topographically and morphologically heterogeneous terrain of hills and valleys.
The landscape of Lanciano is comprised essentially of four principal districts – Lancianovecchia on the Erminio Hill, Borgo atop the Pietrosa Hill and Civitanova-Sacca on the Della Selva Hill – each laid out according to the natural form of the ridgeline. These urban agglomerations converge toward the ancient Corte Anteana (now Piazza del Plebiscito). This space of transit and fulcrum of the town gave rise to the ordered fabric of the Prato della Fiera district that expanded eastward at the end of the nineteenth century in accordance with a plan from this period.
The diverse buildings comprising the district of Fiera include the first examples of social housing in Abruzzo; the programme for the modern expansion and reorganisation of the city, designed in 1879 by Filippo Sargiacomo, served as the base for the "Project for the Construction of a New Social Housing Estate in Prato della Fiera" drawn up by the engineer Luigi De Cecco in 1921. [Salucci: 2011]
An important characteristic element within the fabric of Fiera – comprised of the system of historical streets developed along an orthogonal grid that reflects the structure imposed by the nineteenth century plans – is the tower-lighthouse by Aldo Rossi. The fulcrum of the pedestrian spine of the district, it was conceived by the renowned Italian architect in 1987 and constructed in 1989, in the wake of academic and professional interest in this part of the city during the 1980s.

2. Evolution

An analysis of the urban structures and buildings generated by the activities of trade that connoted the territory of Lanciano – public squares, markets, fairs, shops – reveals the complex and open vocation of a region that, during the centuries prior to Italian Unification, notwithstanding its position along the margins of the Kingdom of Italy, geographically distant from the capital of Naples, served as an intermediary with Rome and the Papal State.
While a frontier town with respect to the limits of the Kingdom, Lanciano's geographic position made it in some way central to the Italian Peninsula. The town became a space of transit, relations and communication, serving as a bridge between Northern and Southern Italy, and between the Adriatic Sea and Rome. (Fig. 1)
Investigations into the origins of trade fairs in Lanciano confirm the town's ability to configure itself over time as a multifaceted reality, a hub, a space of transit and point for the exchange of consumer products of varying types. This condition dates back to the thirteenth century when, under the protection of Venice, the town assumed the role of a threshold for the entry of its goods toward Southern Italy. [Bulgarelli Lukcas: 2006, p.11]
It is still possible to recognise diverse elements that make the historical centre of Lanciano a space of unique quality: for centuries an extraordinary harmony governed the adaptation of urban settlements to respond to the morphology of a territory of hills and valleys.
A synchronic reading of plans for the expansion of the historical centre developed over the centuries reveals an adaptation of settlements to the morphology of the terrain and a chronological synthesis of the evolution of the urban fabric. Early settlements arose on three hills: the Erminio, the ridge along which developed the axis of Via dei Frentani and the district of Lancianovecchia; the Pietrosa Hill, home to the Corso Roma and the Borgo district; the Selva Hill, with the axis of Via Garibaldi and the district of Civitanova-Sacca; the new axis of Corso Trento e Trieste developed to the south-east, in the area of Prato della Fiera. Running parallel in a south-east direction is the system of 'Corsi' (Boulevards) and the large public square of the Fiera district (5,6,7). The object of study includes: Corso Trento e Trieste and Via Monte Maiella (6); Corso della Bandiera (5); Via Vittorio Veneto and Viale della Rimembranza (7), which crosses the void of the Piazza della Vittoria. It is around this space that the first nucleus of social housing was developed – the first in Lanciano, and in the entire region of Abruzzo. [Salucci: 2012, pp. 97-114] (Fig. 2)
The evolution of the urban fabric from the tenth to seventeenth centuries reveals the complexity of trade relations involving the town of Lanciano, which gradually assumed an important position, even if in alternating phases, in commercial trade relations in the Mediterranean. This was due both to its peculiar geographic position, and its morphological structure (Fig. 3).
Lanciano, the ancient settlement of Anxanum, appears on the Tabula Peutingeriana. It was an important centre of trade since the era of the Frentani. It existence as a 'colony' and 'municipium' during the Roman Era is demonstrated by the Bridge of Diocletian that consents a connection between the inhabited city and the plateau of Prato della Fiera.
The natural configuration of the Erminio Hill, situated between the two depressions of the Malavalle Valley and the Pietrosa Valley, offered adequate protection for the heart of the Roman settlement that developed along the ridge of the hill, the Via dei Frentani. This axis of connection with the Via del Mare lead to the coastal settlements of Ortona and Vasto, situated along the important Adriatic tratturo that continues south toward the region of Puglia.

During the Middle Ages the town was a Lombard gastald and in the eleventh century, under Norman control, the town expanded toward the other hills, erecting new city walls with nine new gates: S. Biagio, S. Antonio, S. Nicola, Porta della Noce, S. Chiara, S. Angelo, Porta di Pozzo Bagnaro, S. Maria la Nova and Diocleziana.
Since the fourteenth century all of the urban streets that structure the three districts converge in the area of the former Corte Anteana, currently Piazza del Plebiscito. This space serves as the political, religious, commercial and social heart of the city, the fulcrum of the settlement and a connection via the Bridge of Diocletian, toward Prato della Fiera.
The town's commercial vocation favoured the progressive definitive organisation of the Fiera district under the House of Anjou and the House of Aragon. Following the improvement of connections with the coast – in the wake of the war with the nearby city of Ortona, which hampered the use of the coastal centre of S. Vito – Lanciano gained its natural connection with the Sea.

3. Filippo Sargiacomo – Luigi De Cecco – Aldo Rossi

The current configuration of modern Lanciano – referable to the Fiera district studied here – is the work of the architect and engineer Filippo Sargiacomo (1830-1922). A native of Lanciano, he earned his degree in engineering in 1854 from the University of Naples. His professional career with the municipal government of Lanciano spanned more than ninety years.
Sargiacomo is the author of the urban expansion of the ancient city from the Corte Anteana toward Prato della Fiera: an articulated programme at various scales of urban transformation – from mobility to sewage networks to building systems – implemented in accordance with minute and detailed projects, beginning in the mid-1800s.
The expansion of the city occurred as a series of variations of Sargiacomo's plan, implemented by the municipal government. The sale of public lands in Prato della Fiera to private investors gave rise on the one hand to the modern construction of the city and, on the other hand, determined the migration of the bourgeoisie and commercial activities from the ancient part of the city.
The first Master Plan for the town dates from 1879. Its structure was based on a visual survey drawn up 70 years earlier, the "Pianta topografica di Lanciano levata ad occhio da Nicola Talli (ingegnere civile laureato) in aprile 1809" (Topographical Map of Lanciano Visually Surveyed by Nicola Talli (Graduate Civil Engineer) in April 1809), ink on paper; 27x20 cm. Archivio Storico Comunale di Lanciano (hereinafter ASCL) (Fig. 4). Using this document, Sargiacomo drew up his plan of the city at 1:2000, on a 75x100 cm page. This document was completed by a list of streets, churches and fountains.
Prior to the planning of the new district, between 1880 and 1881 Sargiacomo developed solutions for connections between Prato della Fiera and Piazza del Plebiscito; an open space, in the form of a 'saddle' closed on two ends, situated at the point of convergence of the three districts of Lancianovecchia, Borgo and Civitanova-Sacca. It was also fronted by the Cathedral and the Bridge of Diocletian, the only element of connection with the area of expansion prior to the turn of the century.
The project, which included diverse solutions, managed to reduce the level change between the two areas, facilitating the connection between the inhabited area and the space of the market.
The shifting of the new axis of the Corso with respect to the original project is evident in a plan illustrating the project for the new Corso, with respect to the plaza and the bridge: "Pianta della località del nuovo corso in Lanciano. Scala 1:100. Lanciano, 1 settembre 1907" (Plan of the Area of the New Corso in Lanciano. Scale 1:100. Lanciano, 1 September 1907). Ink on trace paper, 64x32 cm. (ASCL cat.X, b.34, fasc.757) (Fig. 4).
The urban plan for Lanciano was drawn up by the municipal administration in the wake of the laws and master planning studies developed by all large towns following Italian Unification.
On 10 August 1878 the town published the manifesto for a national competition for the "Piano Regolatore della Città di Lanciano e dei progetti relativi per la sistemazione delle strade e piazze interne" (Master Plan for the City of Lanciano and Relative Projects for the Organisation of its Internal Streets and Plazas); Sargiacomo was the sole figure to present a proposal by the established date.
The first true and proper urban planning tool for the city, this plan pursued the twofold objective of remedying the town's infrastructural shortcomings and identifying the axes of urban expansion toward the south-east.
The first axis of the Fiera district is the narrow passage alongside the north-east flank of the Cathedral: the orientation of the 'corridor' leading to Prato della Fiera would constitute the reference for Sargiacomo's development of the 1879 Plan. This document identified the two axes for the primary expansion of the city to the south-east, toward the district of Fiera and to the south-west, beyond the Viale dei Cappuccini in the Borgo district.
The report attached to the "Piano regolatore della città di Lanciano. Lanciano 31 luglio 1879" (Master Plan for the Town of Lanciano. Lanciano 31 July 1879) reads:
"The new district of Fiera will be the enlargement of the existing area along the aforementioned corso, establishing in precedence a large plaza measuring 102 by 52 m, decorated with a central fountain. It

will be formed in three parallel lines of buildings with two regular streets, one of which is precisely the current Corso della Bandiera, and two external streets, one to the north, the other to the south. It should be noted that this latter would constitute the much desired entrance from the other side of the Cathedral, in light of the insufficiency of the sole passage from the plaza, via the Corridoio, in occasion of the town's crowded weekly markets, and Fairs". [Sargiacomo: 1879].
The Corridoio (corridor) refers to Corso Trento e Trieste, realised by filing in part of the Pietrosa Valley according to the project drawn up by Sargiacomo in 1901 - "Progetto del Nuovo Corso tra Piazza Plebiscito e il Prato della Fiera. Planimetria. Scala 1:1000. Lanciano, 2 settembre 1901" (Project for the New Corso between Piazza del Plebiscito and Prato della Fiera. Plan. Scale 1:1000, Lanciano, 2 September 1901). Pen on trace paper, 74 x 400 cm. (ASCL cat.X, b.21, fasc.424). The report accompanying the project reads:
"the creation of a direct communication between the central square of the city and Prato della Fiera, the point of arrival of goods shipped by rail and transported by road from the stations of S. Vito and Fossacesia has been desired by many for some time, given the clear necessity for an immediate and comfortable means of transit from outside to inside the town and to its principal centres such as Piazza del Plebiscito, during the crowded weekly markets and renowned fairs".
Running parallel to Corso della Bandiera, the first in the system of road axes and the ancient line of expansion toward the south-east, the new Corso Trento e Trieste unites the town's two centres, both sacred and profane: the ancient city and Piazza del Plebiscito with the Cathedral on one side, and the modern city, with a large plaza in front of the railway station, on the other. [Salucci: 2007, 177-203)
These plans can be identified in a drawing by Sargiacomo from 1900, illustrating a concept for the realisation of the Sangritana Rail Line between 'San Vito - Lanciano - Castel di Sangro'. His plan – pencil, pen and colour on trace paper, 49 x 66 cm – illustrates the terminus of the new Corso Trento e Trieste and the sinuous line of the railway that wraps a large public square-park, identifiable in the area currently occupied by the hippodrome.
The new urban settlement was developed according to a regular grid of broad streets whose rational layout recognised and expressed the desire for affirmation and self-referentiality of the emerging class. The land divisions of Prato della Fiera were drawn up between 1920 and 1926. Lots were sold to private investors for the construction of new multi-storey buildings, aligned with the grid of blocks redesigned by the engineer Luigi De Cecco in accordance with Sargiacomo's guidelines on 17 November 1921 – "Progetto per la costruzione di un nuovo rione nel Prato della Fiera per case popolari" (Project for the Construction of a New Social Housing Estate in Prato della Fiera). Plan. Scale 1:1000. Black, red and blue ink on pounce paper.
De Cecco's plan consented the realisation in Fiera of the buildings owned by the Ente Autonomo Case Popolari (Autonomous Public Housing Institute, currently ATER) and the scholastic building on the large open plaza: Piazza della Vittoria, crossed by the broad axis of Viale della Rimembranza that runs parallel to Corso Bandiera and Corso Trento and Trieste, all the way to the Hippodrome; the project report stated:
"This boulevard occupies the most desirable position beginning in the north-west at Piazza del Plebiscito and running south-east to the railway station and thus all the longitudinal streets of the new district run in the same direction. Set normal to the Viale Trento and Trieste is a 270 m long boulevard that, beginning at the Sangritana Railway Station, terminates at the grand boulevard of the new District, parallel to Viale Trento e Trieste. At approximately the midpoint of this boulevard is a new rectangular plaza. All of the other streets of the new district are parallel or normal to the aforementioned main boulevards and coordinated with the existing streets". [De Cecco: 1921]
The new social housing estate featured large blocks, with courtyard types and three storey buildings atop a podium, for almost exclusively residential use. It was constructed as part of the Fascist regime's social programmes, with mortgages from the Cassa Depositi e Prestiti in favour of the Associazione Nazionale Mutilati di Guerra. (Salucci: 2011)
In 1989 a requalification and recovery plan was developed for the system of public spaces inside the Fiera district. Guided by Aldo Rossi, the design team was comprised of: C. Di Carlo, S. Di Giuseppe, S. Fera, M. Ricci, F. Spaini, M. Brandolisio, S. De Vito, C. Ghezzi). (Fig. 10)
Prior to the implementation of this portion of the plan, in 1987 the same work group participated (third prize) in the competition for the "Project for the Redesign of the ex-liceo classico, plaza and Pietrosa Valley in Lanciano". [Renzetti: 1989, pp. 35-60]
The drawings of Aldo Rossi's project presented: a site plan, perspectives, elevations and plans of the public spaces of the Fiera district. [Ricci: 1991, p. 219]
This programme included the realisation of the pedestrian complex of Via Monte Maiella, the elevated pedestrian axis that, on the one hand features the perspectival backdrop of the dome of the Cathedral, on the other presents the specific element of the unmistakably Rossian masonry tower-lighthouse with its hexagonal plan:
"The landscape and open spaces have been designed for commercial uses linked with shops or existing locales. The construction of the setting is directly linked to a system of monumental references

that include a stair set between two high walls clad in stone (main passage between the lower and upper town) and a three-tiered brick tower, conceived as a panoramic outlook and a landmark for the tourist office below". [Ferlenga: 1992, p. 90]

4. Sharing – Conservation – Complexity

Representation can be considered an indispensable medium for documenting, understanding, safeguarding, conserving and managing architectural and environmental heritage. Contemporary means of expression valorise representations of the complexity of reality and amplify the possibilities for its fruition. This consents the diffusion, sharing and above all the "open" documentation of information using interactive means of visualisation that make it easier to control and comprehend complex thematic models of reality.

The comparison between the graphic, iconographic and cartographic material discovered during preliminary studies and the urban framework and the configuration of the complex in plan and volume made it possible to fix the relationship between the object of investigation and its context, with particular reference to its particular orographic conditions.

A preliminary 'surveying project' was then developed to plan the methodologies and procedures of a more cognitive investigation. The survey of the urban setting is the result of the integrated use of direct and indirect methodologies.

The phases of indirect surveying included a laser scanning campaign using a Photon 120 scanner: range 0.6-120 m; speed of measurement: 122,000-976,000 points/sec; visual field of 360° in the horizontal and 320° in the vertical; class 3R; power 20mW; 5 sphere-scanning – coupled with a Nikon D300s camera recording on a dedicated hard disk. (Fig. 5)

Photographic documentation was gathered with a twofold and complementary objective: on the one hand as the evidence and interpretation of the principal spatial, formal, morphological and chromatic characteristics of the area's buildings in their current condition, using both general and detailed images; on the other hand, to document the instrumental phases of the surveying process (photo-straightening, laser scanning). (Fig. 5-8)

The survey of the Fiera district allowed us to retrace the principal morphological and typological elements, as well as critical elements resulting from the neglect of the area.

The geometric and architectural survey, at various scales, was accompanied by a selection of thematic analyses related to both the representation of the colour and the condition of decay of the façades, with the aim of re-tracing important values to be reinforced and critical elements to be resolved, resulting from the current state of building conservation.

The experimental quality of some of these buildings makes them examples of a specific quality of dwelling that, by embracing principles of sustainability hoped for and pursued in current building practices, become an occasion for rehabilitating traditional building materials and techniques.

Similar to numerous other examples from the same period found in many Italian cities – in the span of two decades entire districts of social housing were realised across Italy as part of social assistance programmes promoted by the Government – these building types are connoted by specific elements worth of study. These studies may be carried out by exploiting the expressive potentials of Representation, in relation to the safeguarding, recovery, conservation and sustainable development of architectural and environmental heritage. [Salucci: 2011]

Representing the complexity of this merchant town assumes, among others, a twofold meaning.

On the one hand it signifies valorising Italian architectural and documentary heritage, offering greater information about a key aspect of the evolution of 'minor' architecture in the region of Abruzzo between the two World Wars, apparently far removed from the challenges of modernity being faced at the national level.

On the other hand it signifies observing these buildings as the expression of the political and cultural evolution of an 'open' merchant town that conserves, almost unaltered, one of the first examples of public housing in Abruzzo. It is the expression of a public project with an experimental vocation, a sort of 'model district' from which to draw valuable information, above all in relation to the theme of sustainability.



Fig 1: Lanciano (Ch). Present-time: aerial view towards the Maiella Mountain; aerial view towards the Adriatic Sea; aerial view of the Piazza della Rimembranza; Perspective view of the pedestrian route of Via Monte Maiella towards the Cathedral; detail of the Aldo Rossi's Tower.

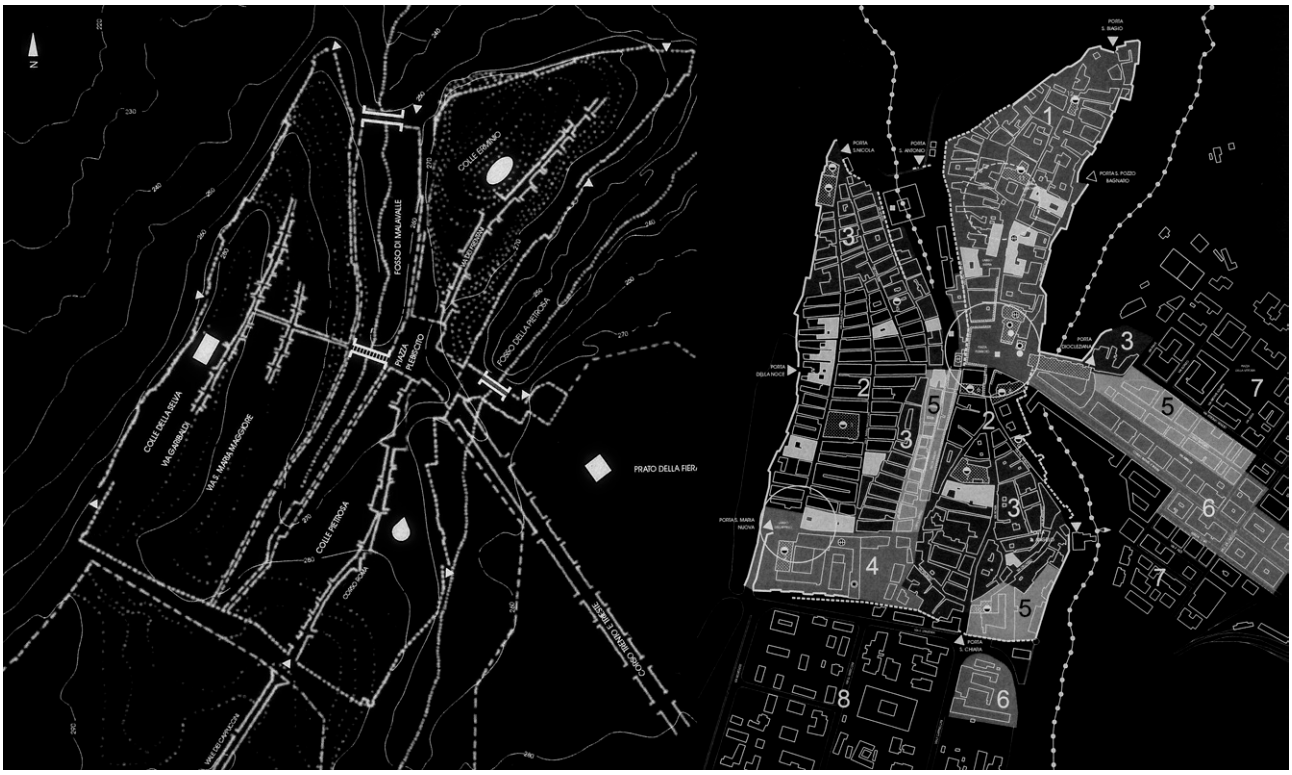

Fig. 2: Lanciano (Ch). A synchronic reading of plans for the expansion of the historical centre developed over the centuries reveals an adaptation of settlements to the morphology of the terrain and a chronological synthesis of the evolution of the urban fabric: (6); Corso della Bandiera (5); Via Vittorio Veneto and Viale della Rimembranza (7). (Branciaroli: 2012)

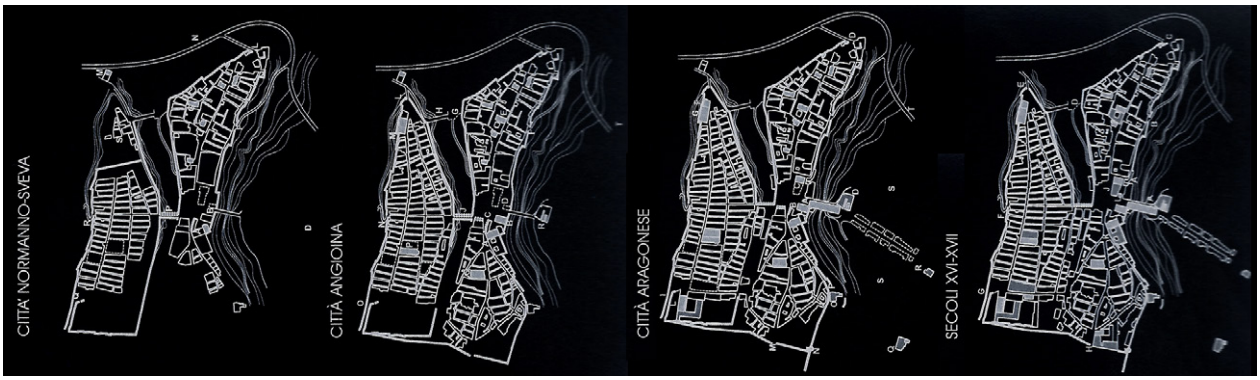

Fig. 3: Lanciano (Ch). The evolution of the urban fabric from the 10th to 17th centuries. (Branciaroli: 2012)

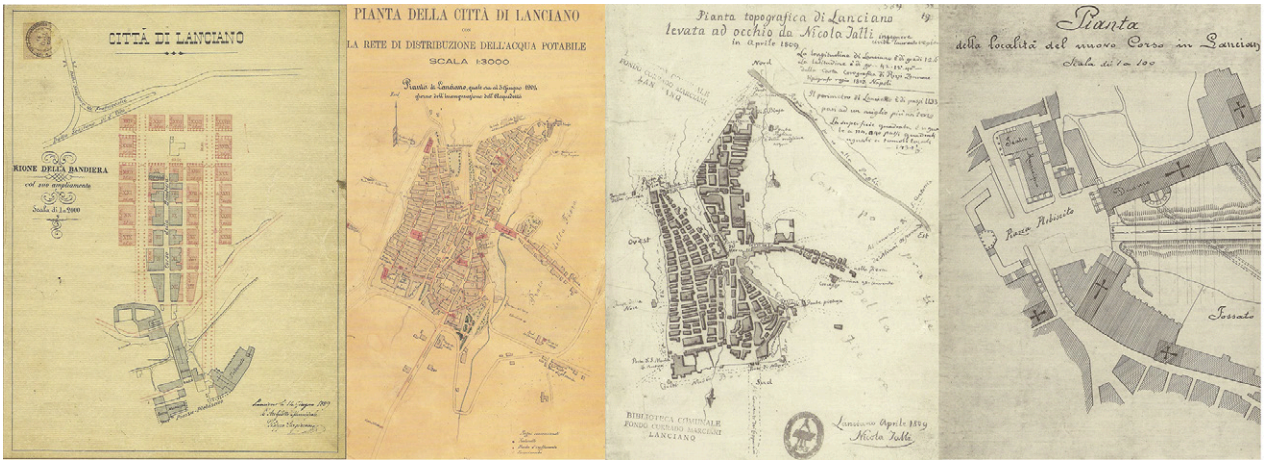

Fig. 4: Drawing by Filippo Sargiacomo. «*City of Lanciano. Della Bandiera Distict Expansion Plan. Scale 1:2000. 1889*». Ink on trace paper, cm 28x36; Topographical Map of Lanciano Visually Surveyed by Nicola Talli,1809. Ink on paper; 27x20 cm; Plan of the Area of the New Corso in Lanciano. Scale 1:100, 1907. Ink on trace paper, 64x32 cm (ASCL).



Fig. 5: Surveying the Fiera District. The phases of indirect surveying included a laser scanning campaign using a Photon 120 scanner coupled with a Nikon D300s camera recording on a dedicated hard disk.



Fig. 6: Surveying the Fiera District. Photo-straightening: via Monte Maiella and corso Trento e Trieste, both sides.

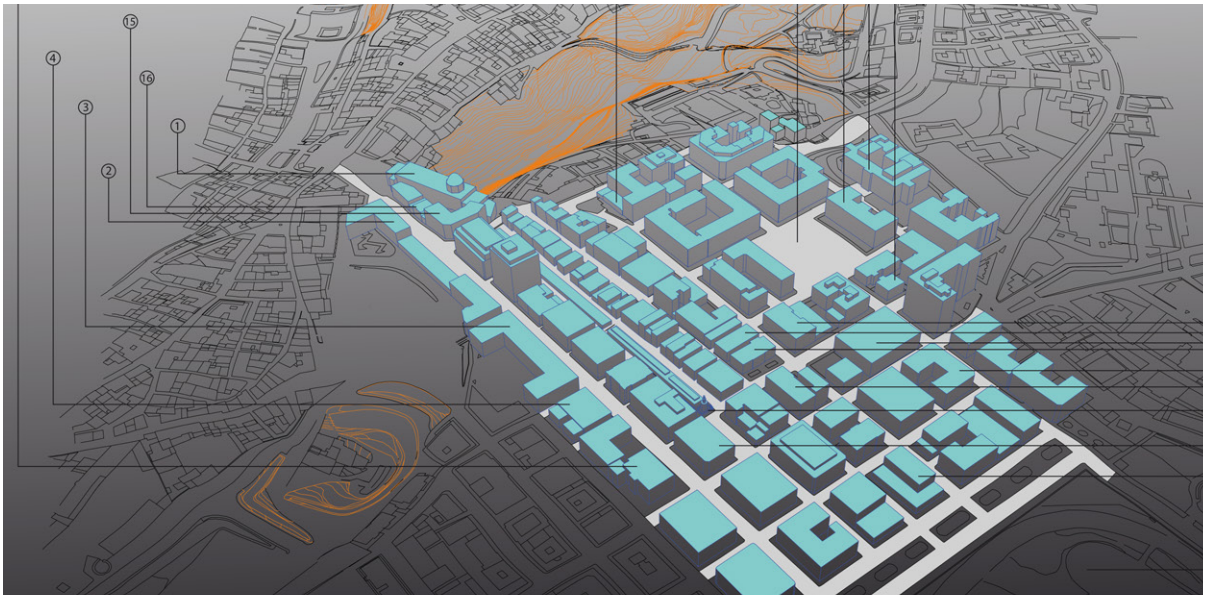

Fig. 7: Surveying the Fiera District. (Elaboration: Falcione 2012)

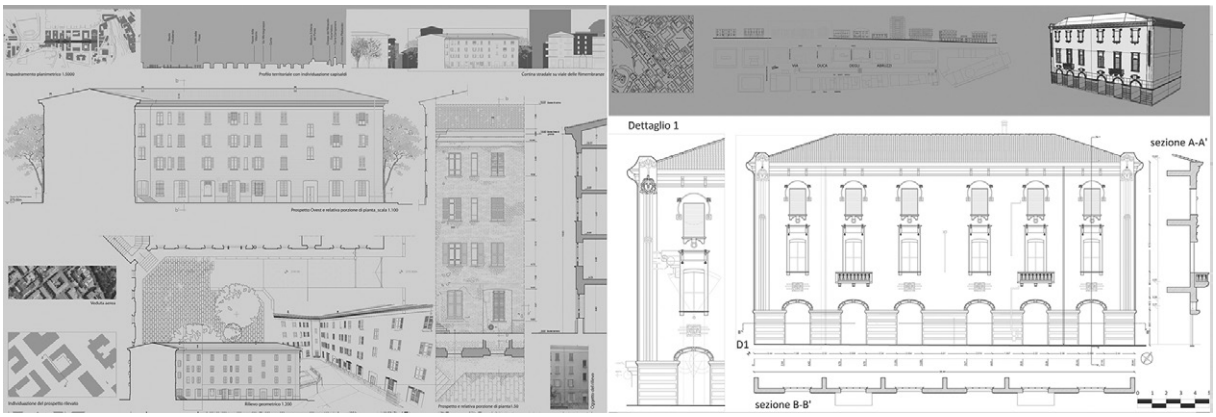

Fig. 8: Surveying the Fiera District (Elaboration: Iacobelli-di Muccio, 2010; deLuca-Martini-Tucci 2012)

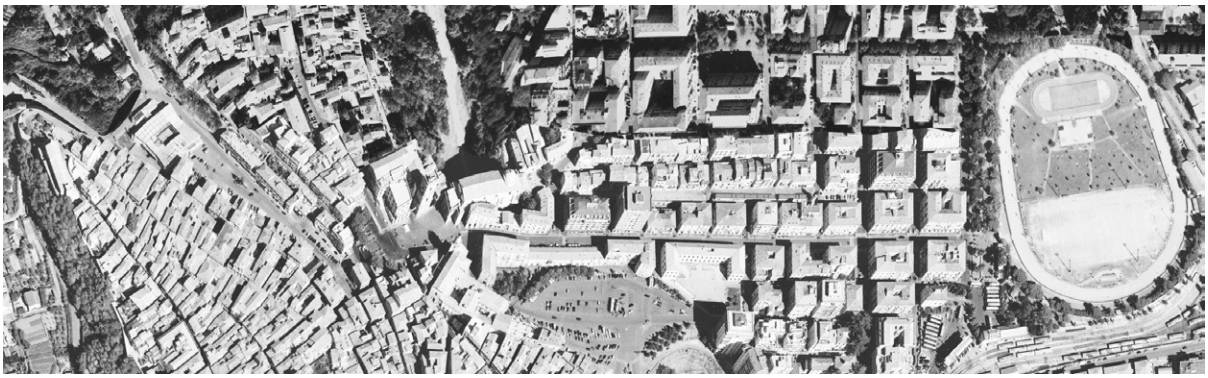

Fig. 9: Lanciano (Ch) present time. Fiera District. Piazza del Plebiscito; corso Trento e Trieste; the hippodrome.

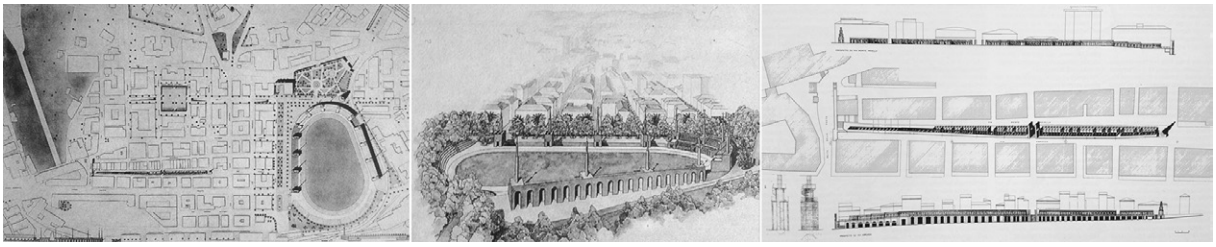

Fig. 10: Drawings by Aldo Rossi (et. al.) 1989. Requalification and recovery plan developed in 1989, for the system of public spaces inside the Fiera District in Lanciano (Ch). (Ricci: 1991, 219)

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HERITAGE ARCHITECTURE LANDESIGN
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Le Vie dei Mercanti XI Forum Internazionale di Studi

The historic fabric of Naples
Via Banchi Nuovi between regeneration and conservation

Daniela DE CRESCENZO, Carmela FRAJESE D'AMATO
Department of Architecture, University of Naples Federico II, Napoli, Italy
daniela_de_crescenzo@hotmail.com
carmela.frajesedamato@unina.it

Abstract
The reflection on the three sensitive topics proposed by the forum suggests considerations on the processes of transformation and evolution of architecture and the city, of the tangible and intangible "things" that make up the environment in which we live. Regeneration, conservation and innovation are issues that lead attention to a common question: whether it is necessary to modify a given condition. The city, understood as a complex and changing body, in which each architecture retains its history, is subject to constant change. However, there are places that do not seem to be subject to actions for change, parts of city so firmly anchored in themselves that appear to be immutable. The historic city is an example.
The area under study covers a portion of the historic fabric of the city of Naples, via Banchi Nuovi, which is among the old route greek to the east and the sixteenth-orthogonal structure of the spanish district to the west. This area, with its strong consolidated urban structure, has almost completely unchanged the relationship between plant and settlement, form and function, city and architecture, creating a place with a specific, and very defined, individual character.
The reflections that arise from this study are as follows:
What does it mean, and how to enable a process of re-generation in a portion of the city so layered? How are important, within this process, the memory, the conservation and the identity of places?
Knowledge, through survey and representation, becomes a moment of research and testing, continuous discovery and confirmation.

Keywords: historic city, memory, individual character, conservation

Via Banchi Nuovi is one of the few examples of medieval structure at Naples remained almost unchanged in its morphological characteristics, despite the successive transformations during the sixteenth century. It presents a urban articulation unique within the historic fabric of the city and very different from the old route greek.
This road is part of a route - the "antico borgo di Napoli" - which connects two important streets, via Monteoliveto and via Mezzocannone and cuts the ancient center of the city in a series of open spaces and squares: from west to east, largo Santa Maria la Nova, largo Ecce Homo, piazzetta Teodoro Monticelli, piazza Banchi Nuovi, and largo San Giovanni Maggiore. The construction of these spaces has often been linked to the history of the near palaces and places of worship; some of them, far from being randomly determined, were strongly promoted by the religious orders, who planned the construction.
It is between the XXVI and XXVII century that occur the most significant changes in this part of the city. The historical maps of the period, in particular the two perspective views of Duperac - Lafrery (1566) and Baratta (1679), in fact, show the fundamental steps of such changes. Natural disasters, including floods and earthquakes, and private decisions, including sales and transfer by the ecclesiastical authorities, mark the urban settlements of via Banchi Nuovi.
This urban area is situated on a not flat land and the jump in share established between via Banchi Nuovi and via Sedile di Porto below, the ancient boundary of the lower town, is quite significant. This large "terrace", which ran through the city from east to west, linked the "upper part" of the old center at

coast. “Pennini” and “calate”, usually long and narrow streets with steps, made it possible to overcome this difference. [1]
It is possible that, long before the medieval period, at the time of “Neapolis”, the sea was not far from the border, which was to pass to the south of the basilica of San Giovanni Maggiore, heading west, right up to the settlement of Santa Maria la Nova. The settlements belonging to this part of the city, the formation of which originates from the topography of the area, have preserved much of the original characteristics. There is no doubt that the morphology of the insula has been one of the main components, we might say "design" component; it should certainly be added other reasons, not independent of the collective decisions, whether religious, economic, social.
Some important news concerning the history and the settlement processes that have affected via Banchi Nuovi are reported by Celano in a collection dated 1692, entitled “Notizie del bello, dell’antico e del curioso della città di Napoli per i signori forastieri” that contains interesting informations about the birth, the building and the transformations of the religious and the private building, as well as the events that saw as protagonists many important noble families of the time. By reading this text you can follow, step by step, all the street that connects via Monteoliveto and via Mezzocannone. [2]
We have to say that via Banchi Nuovi represents only a part of this route, it touches piazza Banchi Nuovi and extends to the east with via Candelora , while at the west continues with via Ecce Homo, and then bifurcates, on the one hand in via Donnalbina and on the other in via Santa Maria dell’Aiuto before, and via Santa Maria la Nova then.
It is evident that the topography of the area is strongly linked to the names of the religious complex and of the public buildings. The same applies to the public open spaces.
In head of this “y” path there are two important and ancient settlements: Donnalbina and Santa Maria la Nova. The first has been the site of a Benedictine monastery; the church, which already existed in the ninth century, was rebuilt in the seventeenth century, and was then subject to further amendments.


Struttura viaria principale
Connessioni interne
Salti di quota
Piazze e larghi
Larghi su Via Banchi Nuovi
Piazza Gesù Nuovo
Complesso di Santa Chiara
Piazza S. Domenico Maggiore
Piazza Bovio
Piazza Giacomo Matteotti
Via Guglielmo Sanfelice
Via Medina
Corso Umberto I
Università
Via Banchi Nuovi
Via Roma
Via Monteoliveto
Via Mezzocannone
Via Santa Maria la Nova
Via Santa Chiara
Via Ecce Homo
Via Donnalbina
Via Candelora
Via Benedetto Croce
Via Settembrini
Via Costa di Mezzo
Via Duomo
Via Tribunali
Via San Sebastiano
Piazzetta Nilo
Largo Giovanni Maggiore
Largo Banchi Nuovi
Largo Ecce Homo
Largo Via Duomo
Largo Via Tribunali
Largo Via Costa di Mezzo
Largo Via Mezzocannone
Largo Via Santa Chiara
Largo Via Santa Maria la Nova
Largo Via Benedetto Croce
Largo Via Settembrini
Largo Via Donnalbina
Largo Via Candelora
Largo Via Ecce Homo
Largo Via Banchi Nuovi
Largo Via Monteoliveto

The religious complex of Santa Maria la Nova is well known since the thirteenth century, when the "new" church was built, replacing the previous church of Santa Maria ad Palatium, that was initially located in the place where it is today Castel Nuovo.
Continuing east, the route follows a bayonet, which contrasts with the regular system of the ancient city, further evidencing the medieval origin of the path.
Along this street is the church of Santa Maria dell'Aiuto, that Celano describes as "bella e bizzarra", built by Dionisio Lazzari (1673) and dedicated to an image of the Virgin that had bestowed graces during the plague of 1656.
The religious building is slightly set back from the road, this retreat has allowed the creation of a small square. On the piazzetta Ecce Homo faces "Case Alvino Pappacoda", which is separated by the Pendino di Santa Barbara from the famous renaissance Palazzo Penne.
After piazzetta Ecce Homo a short road leads into piazzetta Teodoro Monticelli. To the right is Palazzo Penne, built in 1406 by Antonio Pens - the only of durazzesca age well-preserved - and on the opposite side is Palazzo Palmarice of sec. XVIII built by Ferdinando Sanfelice.
At this point begins via Banchi Nuovi , where is Palazzo Casamassima that preserves the sixteenth-century implant; then there is piazzetta Banchi Nuovi whit the church of Santi Cosma e Damiano, the old loggia of the merchants.
Is this a case of an open public space built as a result of a natural event, the flood of 1569; at the same time, it was also open a narrow road with steps, parallel to pendino di Santa Barbara, the current calata dei Santi Cosma e Damiano, which clearly takes its name from the church. [3]
This space is very interesting because connects via Santa Chiara and calata dei Santi Cosma e Damiano, as a hinge between two paths that cross the city from east to west and north-south.
Interesting is also the functional transformation of this area: by place of trade at religious space, and today a space without function. The church of Santi Cosma e Damiano is in fact closed for years, as well as the nearby church of Santi Demetrio e Bonifacio, which has its entrance on piazzetta Monticelli.
The urban area that extends from the church of Santa Maria dell'Aiuto up to calata dei Santi Cosma e Damiano was in the past part of the complex of San Demetrio. The monastery of San Demetrio, over the centuries, was sold to various noble families, including the Orsini, who bought in the seventeenth century a part, which then became Palazzo Casamassima.
After piazza Banchi Nuovi, via Candelora leads to largo San Giovanni Maggiore where is, on the right, the sixteenth-century Palazzo Giusso (built by Sanchez de Luna, then Filomarino, now the seat of the Istituito Universitario Orientale) and, on the left, the chapel of San Giovanni dei Pappacoda, founded by Artusio Pappacoda, the noble of seat of Porto.
The basilica of San Giovanni Maggiore facing the homonymous square is one of the oldest and most important of the city. Founded around 555-560 by Bishop Vincenzo, on the ruins of a pagan temple, it was rebuilt in 1685 by Dionisio Lazzari and reconstructed again in 1872-88.
The history of the formation of largo San Giovanni Maggiore is very attractive. It consists of an area on which stands the basilica, and another to the north of via Candelora, opened to connect some parts of the historic fabric of the city.
Celano in fact writes: "Perché questa casa non haveva dritta la strada che tira alla Strada di Nilo, il Cardinale con ispesa grande fe' buttar giù molte case e ne formò la piazza, che tira su."
Going away after via Candelora, in the place where once stood the Porta Licinia, you come in via Mezzocannone, a major artery connecting the north-south direction.

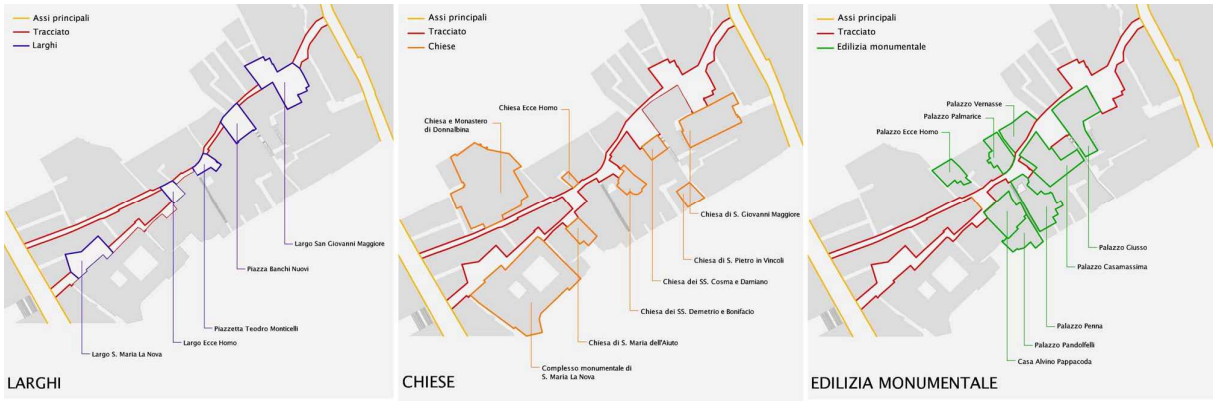

Fig. 2: Study of open public spaces, churches and monumental buildings along via Banchi Nuovi.



Fig. 3: Piazza Banchi Nuovi and calata dei Santi Cosma e Damiano.

Each of these places, each of these spaces, as we have seen, has its own history, and the history of urban paths in this case is closely linked to the history of the settlements, regardless of the nature of the causes that have set in motion the processes of transformation of the urban fabric.
There is no question of urban "holes" but of autonomous places, with a specific individual character, not of residual spaces in the service of building but of autonomous entities that deserve to be treated independently, the construction of which can only be understood with a 'thorough historical research and with a careful analysis of the overall principles of interpretation, and of relationships encoded by design, and of relationships by perspective-visual and proportional. [4]
Each fragment has its value, and acquires even greater value if considered within an overall system, of which is necessarily part, and wherein the logics of the concatenation and correlations between the elements make possible to better understand the functioning of the whole system.
Each "episode" has to be studied carefully because each one is different from '"other", but they are part of a path, which is not only a road network, but is a historical, perceptual, social route.
Through these spaces we can have a privileged point of view for the study of urban development, of the urban planning and architecture, of the artistic expression and of the symbols and ideology, but also of the relationship between plant and settlements, form and function, city and architecture.



Fig. 4: Via Candelora and via Banchi Nuovi.

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CHARACTERIZATION OF UNCERTAINTY AND APPROXIMATION IN DIGITAL RECONSTRUCTION OF CH ARTIFACTS

Fabrizio I. APOLLONIO,[1] Marco GAIANI,[2] Zheng SUN,[3]
(1) Department of Architecture, School of Engineering and Architecture, University of Bologna, Bologna, Italy
fabrizio.apollonio@unibo.it
(2) marco.gaiani@unibo.it
(3) zheng.sun2.@unibo.it

Abstract
The progress achieved in the area of IT, applied to CH, hasn't always been accompanied by a proper development of the research for understanding the practical challenges that it posed. If nowadays it's possible to use 3D model as interface for the localization and querying data associated with it, the pair physical objects / documentary, sources base for the digital reconstruction, are characterized by different degrees of uncertainty and irregularity.
Within an Architectural Cognitive IS it becomes evident the need to prepare an exhaustive documentary base covering the whole process of research related to the creation of digital content within the reconstruction, that can be qualified through a full transparency of the methods of analysis, surveying techniques and the criteria used.
In this paper we present some experiments carried out as part of the virtual reconstruction of buildings just designed or no more existing. Through the semantic structuring of digital models and the use of Real-Time Rendering (RTR) techniques we attempted to develop a process of acquiring knowledge able to point out and let understandable and reusable analysis of preliminary data and interpretation criteria used in order to validate the whole process, giving the ability to visually assess our level of knowledge, with its flaws and lacunae, and to carry out comparative operations on the set of data and information held, allowing the compatibility of the digital model with alternative modes of representation.

Keywords: 3D modeling, semantic structure, architectural heritage, cognitive system

1. Introduction

Over the last year architectural representation and surveying techniques have known important evolutions with the development of new tools and methods for 3D data acquisition, documentation and dissemination of information related to architectural-cultural heritage. Such rapid progress has led to a drastic transformation of the way in which data are collected, processed, represented and spread such information. The hyperdimensionality that characterizes today's digital media, represented by their interactive nature, is not only constantly improving, but also it is transforming the way we acquire, process and spread the information. In order to describe univocally an artifact (eg. material, style, time related indications, etc.) we need more than traditional triplet of geometrical co-ordinates (x,y,z), if we wish to view the artifact as more than a purely geometrical object. Models of artifacts act as “spatial metaphors” enabling the distribution of pieces of information in time and space [1]
The development of new and more effective digital technologies, such as real-time rendering of 3D models, multimedia techniques, animations and simulations has opened the possibility of new scenarios for reading and interpreting architecture, where all the information are made available in a visual and integrated way. Digital systems introduce, in fact, the possibility of interchangeable media able to offer multiple nodes of access to a given term or object, and enable a multidimensional approach to knowledge on several levels.

The digital display allows to activate, in fact, types of surveys previously unthinkable in the fields of archiving and accessing data, spatial analysis, simulation of unbuilt projects, etc... It proposes, ie, new meanings of the concept of architectural representation, adding an extra dimension, the temporal (diachronic and synchronic), which in turn allows to know that artifact not only in its evolution and transformation during its life cycle, but also through the analysis of its composition and geometric-formal matrix.
Wide is, in fact, the series of reconstructions works of design hypotheses and drawings that, as early as 1990 [2] have used three-dimensional digital modeling techniques.
Koller et al., in the resettlement of the general framework of the challenges and opportunities offered by 3D models digital archives related to cultural heritage, recognized the need to make visible the traceability of all additions, subtractions, and changes to 3D models, in order to let understandable the calculation and display of differences between 3D models of the object/artifact [3]. Gabellone, following on the principle 7 of the Charter of Seville, has focused attention on the full transparency of methods, techniques and documentation in supporting a project of virtual reconstruction (in archeology), the only tool able to validate the results of any reconstructive study and guarantee future generations a review of the results without needing to restart the job from the beginning [4].
Within this context, a huge number of studies have resulted in order to define new protocols for processing (acquisition, manipulation and management) spatial data, resulting in the development of new methodologies for the study and openness to further research scenarios.
An important contribution in this field have come from Blaise e Dudeck who begun introducing, in example, the genesis of an informative modeling methodology [5] in which the representation of architectural objects is used for information search and visualization, letting them able to define some methodological approach in order to increase la intelligibility of 3D models' informative contents. Therefore, 3D or 2D models may distribute pieces of information in time and space, aiming to meet a dual need (a) to make architecture a spatial and temporal filter through which layers of heterogeneous information can be brought together, such as measurement and documentation, and (b) to use digital models as iterative information/visualization tools, constructed and reconstructed from day to day, and aiming to be what the map is to the representation of territories [6]. Aiming to improving the comprehension of the complex and discontinuous process of knowledge acquisition, Dudek and Blaise [7] also introduced a generic formalism of information integration that lets the researchers to gather indications step by step, and allows them to visually follow up the knowledge acquisition process. They demonstrated how graphical simulations of the morphological evolutions of edifices, produced along the investigating process, can be used as graphic interfaces in which architectural objects are located in time and space. Their objective has been to support reasoning tasks in heritage architecture with graphics enabling analysts to visualize and share their understanding of how, from a given set of information, alternative scenarios or evolution can be inferred [8].
In the field of architectural heritage, we very often faced with the combination of 3D physical objects / 2D and textual documentary sources in which both elements are subject to uncertainties and inaccuracies. The three-dimensional nature of the object itself has led, however, to seek to exploit its same representation for displaying information related to it, as well as the development of visualization techniques able to make manifest the latent uncertainties.
Zuk et alii presented an application that enables integrating and visualizing the temporal uncertainty for multiple 3D archaeological data sets with different dating. They introduced a temporal time window for dealing with the uncertainty and review various visual cues appropriate for revealing the uncertainty within the time window. The interactive animation of the time window allows a unique exploration of the temporal uncertainty [9]. Strothotte et alii proposed non-photorealistic rendering styles for encoding such additional information in a visualization of a 3D model which goes over and above the geometry. They then applied this concept to visualizations of virtual reconstructions of ancient architecture and described the prototypical system ANCIENTVIS which represents an approach to visualizing models with uncertain features [10].
De Luca et alii described a methodological approach to let usable existing iconographic corpus for the analysis and the 3D management of building transformations. The aim was to establish a relation between the iconography used for the hypothetical reconstruction and the 3D representation that depends on it. This approach relates to the idea of using 3D representations like visualization systems capable of reflecting the amount of knowledge developed by the study of a historic building [11]. In a recent paper, De Luca and Lo Buglio addressed the issue of the review of the methodological aspects concerning the collection of information that describes an architectural object in order to measure the benefit in terms of information provided by the document, with reference to the requirements and the means employed. [12.], offering an approach to the creation of representation systems that articulate the digital instance with the geometric/semantic model.
Recent work included within the series of fruitful experiences of reconstruction of an entire project from partial sketches [13], put some significant innovations with regard to:

a) the verification of the hypothesis of drawing to be the original project for the first nucleus of a palladian villa, during the century widely reshaped) [14];
b) the use of a semantic construction of the digital model, not only as a means to look for a building such a system cognitive;
c) the use of interactive technical reference - typically real-time photorealistic rendering for the visualization of three-dimensional model and the use of variants snapshots managed by an iconic for illustration using the method of comparison and guided reading of model's characters of the steps taken.

In this paper we present some experiments carried out as part of the virtual reconstruction of buildings just designed or no more existing with the aim to propose new and more robust solutions to the 3D modeling from 2D drawings construction for CH artifacts. Through the semantic structuring of digital models and the use of RTR techniques we attempted to develop a process of acquiring knowledge able to point out and let understandable and reusable analysis of preliminary data and interpretation criteria used in order to validate the whole process, giving the ability to visually assess our level of knowledge, with its flaws and lacunae, and to carry out comparative operations on the set of data and information held, allowing the compatibility of the digital model with alternative modes of representation.

2. 3D modeling semantic structure

The use of a semantic structure in digital modeling becomes, not just a tool to look at a construction as a system cognitive [15] [16], but especially a technique to make clear the relationship between the architectural object and the documentation base (drawings, text and more) from which the model is reconstructed, identifying the characters, the limitations and inconsistencies of those drawings, the reconstructive conjectures adopted and not documented in the same drawings, the reconstructive solutions more likely, and the relationship between project and landscape in which it should be added, giving back self-representation to the same instrument.

Three-dimensional modeling based on structured semantic principles is, in fact, a useful tool in order to (a) obtain a decomposition of the building in various constituent elements, identified through the analysis of their geometry and aggregation between them according to precise compositional/logic rules, (b) adding to the models geometric reconstruction linguistic information related to the recognition of the signs and of a shared architectural language, (c) identifying a further connection between the three-dimensional model rendered and information stored in data-base linked to it, for the purposes of a full documentation relating to that particular architectural element.

The advantages that this type of data structure, according to the criteria of semantic organization, allow are multiple. Preserving this structure, even after the phases of polygonization and translation into interchange graphics file formats, is possible to obtain models as cognitive system, that can be used as an preferential interface for browsing between the different contents of the same DB. The semantic structure allows us (a) to manage 3D models in multi-resolution and divide them into subsets hierarchically consistent, (b) to efficiently manage the metadata related to the models themselves, and with them the ability to view and represent data relating to (c) reconstructive uncertainty, (d) the level of accuracy / precision guaranteed, (e) as well as the control of the different versions of the models, (f) to facilitate the comparative analysis between the parties or sets of architectural works, and (g) to evaluate different reconstructive or analytical conjectures, or assuming the chronological development of a building over its life [17].

Starting from the 'shape grammars' adopted one can define the tree structure that governs the 3D modeling, giving a logical and orderly structure that can be analyzed and manipulated as a whole or in parts, depending on the level of interest.

The resulting structure gives rise to a classification which is defined by a series of information which, in turn, refer to:

- the type of architectural / construction element;
- the position of each element relating to a reference system for the single artifact: level / altitude, interior / exterior, side / orientation;
- sequential numbering used to distinguish elements that belong to the same type, to the same reference position / orientation.

The semantic organization of a 3D digital model of a building can be defined taking into account the definition / identification of the nodes that make up the single element, the identification of the origin of geometric architectural elements and construction of the relationship between the elements identified and their groupings into macro-groups. The building is then decomposed by a morphological, compositional and constructive point of view, defining elements organized on several levels.

The number of typological / morphological units and elementary units depends on the criteria followed in the distinction of the minimum units and their subsequent combination, which can be identified according to the change of material, the recognition of type elements, morphologically homogeneous

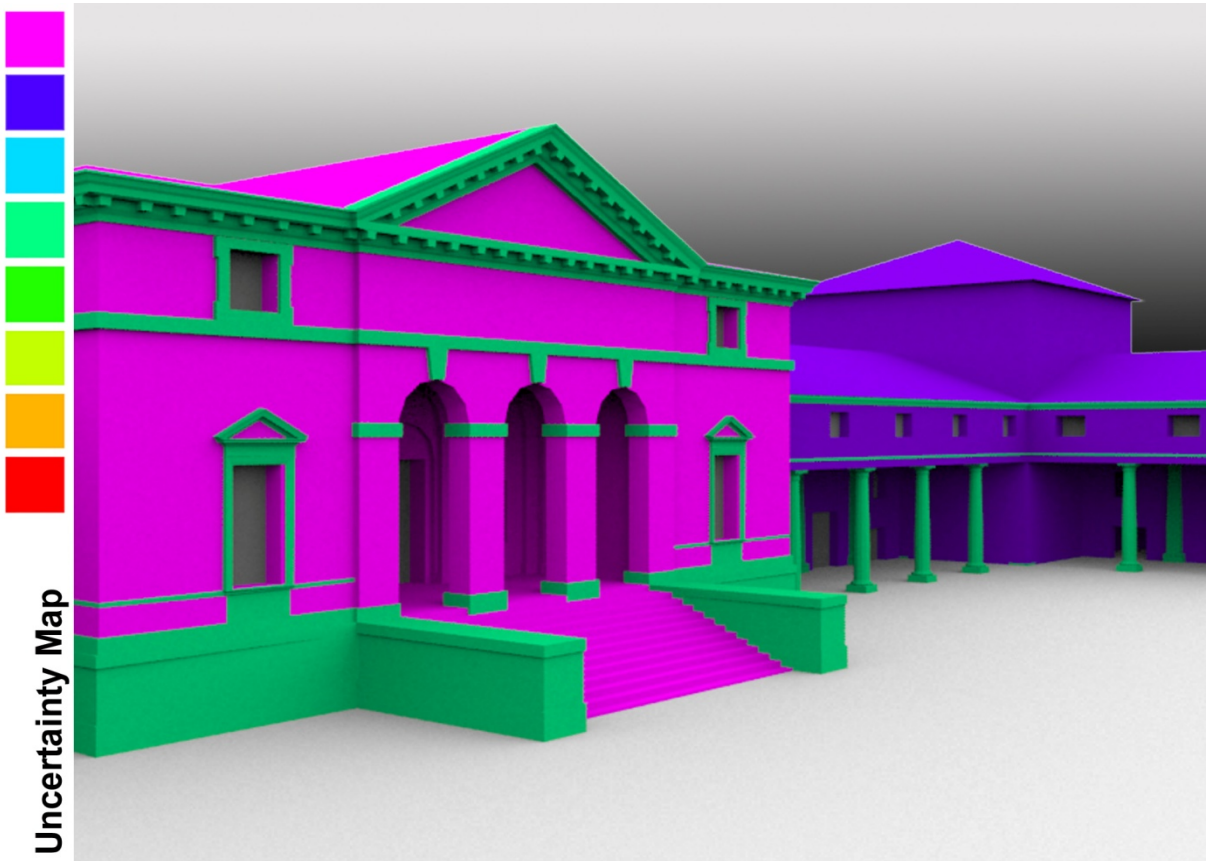
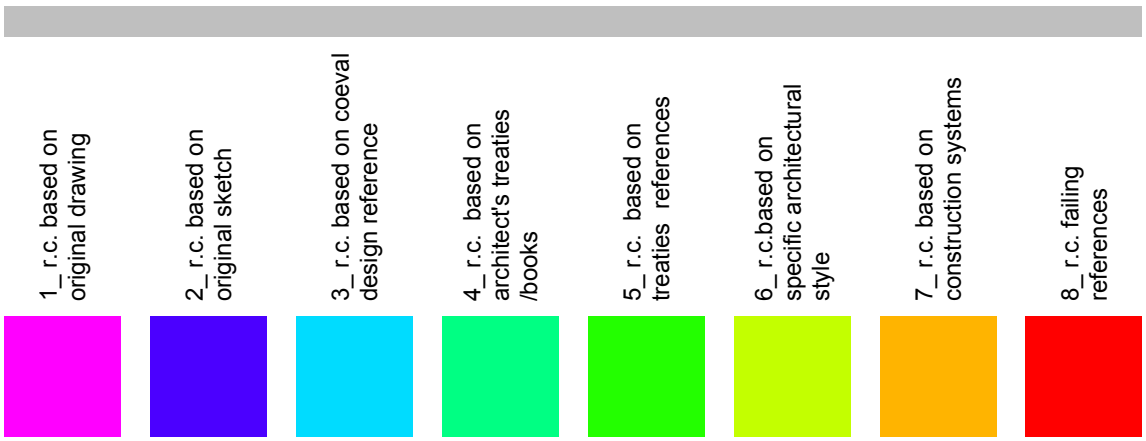


Fig. 1: A. Palladio, Villa Saraceno, 3D modeling reconstructive conjecture uncertainty map

(eg. frames windows, moldings, capitals, etc..), whose boundaries are defined by geometric transitions in the presence of the same element on different levels of the building.
A first major example of semantic methods is the 'shape grammars' described by Stiny [18], Stiny and Mitchell [19] built of 3D parametric descriptions and rules based on full-scale materials and material assembly. These construction rules do not determine appearance; instead, they define assemblage of physical objects in 3D space. Alternatively, a design rule for a shape grammar builds shapes and shape relationships for visual evaluation; design rules tend not to provide functional or structural information for the manufacture of objects. Along the same development line Larry Sass [20] illustrated a method where rules for a shape grammar that generates physical information for machine manufacture demonstrate the need for more information and more illustration when rule building. Our method deal with Sass method; the main difference rely on the fact that ours refers to the real built object whereas his method refers to its project. Therefore, in our proposal not only the schema but also the constructive rules can be identified, highlighted and discussed. Secondly our method deals with a wider gamma of objects that range from a simple brick or bas-relief to a whole building, and not only architectural objects.

3. Displaying the uncertainty

In order to qualify and authenticate products of scientific research within the field of documentation and study of architecture, it is necessary that the 3D geometric models relating to AH - the structures of primary information to be stored in repositories 3D you want to index - will be implemented with the corresponding text metadata (catalog, commentary and bibliography) that allow transparency of information to users, in a manner similar to what happens with the notes, comments, and the bibliography in traditional publishing. A second fundamental requirement is that 3D models will be demonstrative of the solutions adopted to meet the uncertainties and the lacks.
Many of these 3D models are, in fact, reconstruction of buildings just designed or no longer existing, nor fully documented; therefore, it is inevitable that such reconstructions contain a small or large number of hypothetical elements, characterized by their specific degree of uncertainty.
This is due to a number of clear factors: the need to make up for the missing parts in the today structure, the need to implement hypothesis in the reconstruction of a 2D drawing in a spatial shape, the temporalization of the various layers to decide an original state or, most simply, the different conformations in time.



Tab. 1: Uncertainty gradient color code

The reconstruction work from a given set of drawings requires a process/pipeline of construction, of analytical type, based on a semantic system, because all the information necessary for completing the model are not always obtainable in a unique and unambiguous way from data or by drawings that we have at our disposal.
Therefore, it is necessary to define a series of preparatory and operational phases, complementary between them, in order to investigate the sources and integrative design references that are able to provide useful information to model the project, even for those parts not explicitly or comprehensively documented.
It is vital, therefore, that informative/cognitive systems facilitate the evaluation of the documents relating to the uncertainties inherent in models reconstructed, and which may be related to:

- architectural / structural elements;
- size / geometry;
- stylistic / formal;
- temporal correspondence;
- building materials.

Such type of information may be conveyed through (a) a new 3D symbology (eg. a series of glyphs 3D), (b) animation techniques / display, (c) rendering techniques or (d) a combination of text metadata and 3D visualization.
In this way it is possible to define a modelling structured procedure, based on different levels of interpretation, characterized by a progressively increasing level of uncertainty:

1. reconstruction based on original design or survey drawing;
2. reconstruction based on sketch, therefore affected by a low level of dimensional accuracy
3. design reference dated to the same period of the drawing or building studied and which have significant stylistic similarities (eg, coverage, type of roof, gutter frame, frames, roof, basement, or the openings and decorative system) with that drawing/building;
4. reference to treaties, books or architectural guideline written by the architect, author of drawing or project studied;
5. reference to treaties or manual to which the architect has or could have used as his own reference (eg measurements of the rooms, stair design, detail design and equipment, the architectural orders, if any, as well as for the definition of the height of the internal doors or types and sets the height of the time);
6. interpretative hypotheses referring to specific architectural style;
7. interpretative hypotheses more thrusts, referring to the construction systems at that time in order to achieve solutions constructively plausible and compatible with the project, by which, however, is not always possible to reach conjecture or univocal solutions;
8. reconstructive conjectures failing references.

The uncertainty display uses a density slicing color code - a variation of pseudo color - that divides the rendering objects into a few color bands, corresponding to each level of interpretation/uncertainty (see Tab. 1).
Such needs are particularly felt in the case of Palladio's work characterized by a large number of realizations or other assigned to him, but also by many studies and projects unfinished and some 'transcription' made the same architect of his most significant works, gathering them in the second book of his treatise, or to compare the fidelity or less between the theoretical assumptions, e.g. relating to the shape and size of the architectural orders, and items used in the works.

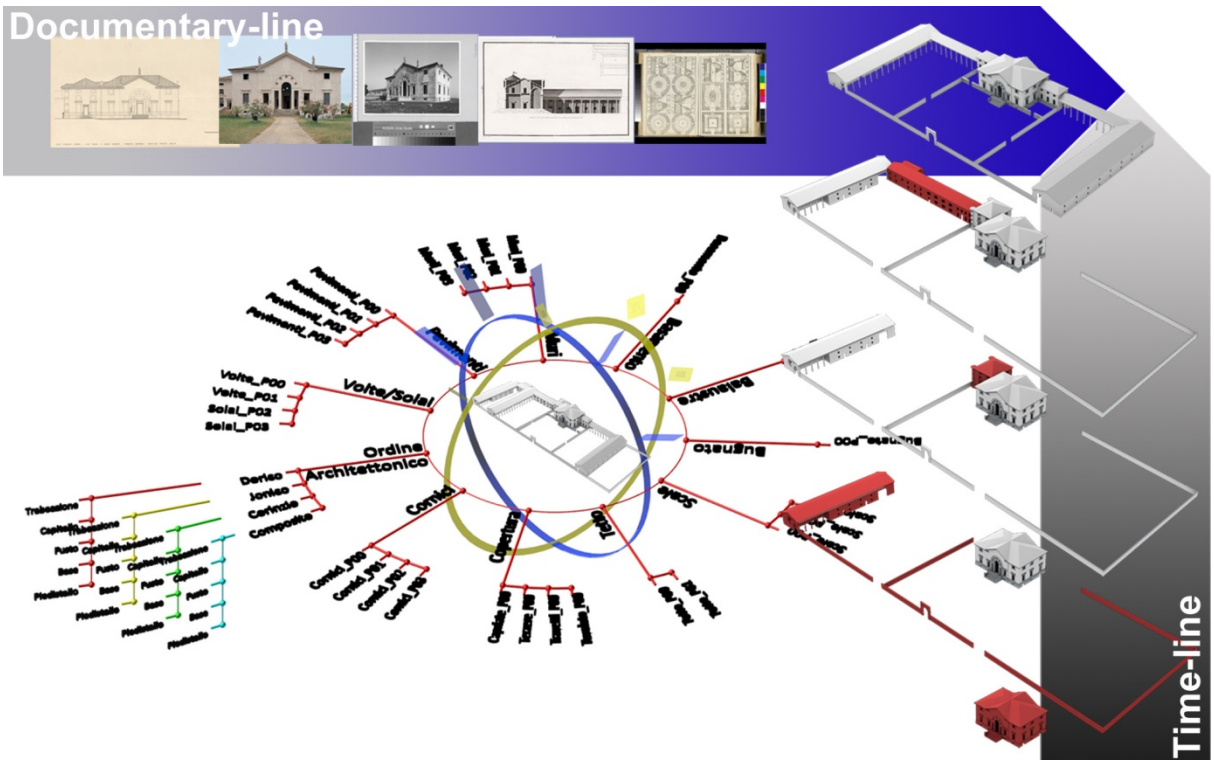


Fig. 2: A. Palladio, Villa Poiana, Cognitive graph

Beyond the analysis specifically conducted (ex-post), digital systems allow, in fact, the collection and systematization (ex-ante) of operations in order to determine the geometry of the elements that contribute to the definition of an architectural work, becoming in fact themselves explanatory values of the geometric-formal genesis of that edifice. The possibility, in fact, to examine the collection of data containing large amounts of records, such as geometric analysis and semantic characterizations of artifacts, offer new approaches to the classification and the comparison.
The research in this area should seek, therefore, to the use of data collected and processed for the purposes of their use in the areas of documentation, management, conservation, communication and dissemination of knowledge of the architectural/cultural heritage.

4. The cognitive graph and the structure of information

Systematizing geometric-formal information relating to a building with those relating to the data available that have allowed the formulation of a reconstructive its hypothesis requires the need to taking into account uncertain and heterogeneous information, able to considering the evolution of our knowledge, producing 2D/3D dynamic graphics, and adapting our practices to the specific realities of the heritage field, where uncertainty should forbid graphic assertions, highlighting what is unknown, rather than hidden it.
Studying and displaying evolution of an artifact (or ensemble of artifacts) requires introduction of two additional dimensions:

- temporal;
- documentary.

Temporal dimension allows to distribute pieces of information in space and in time: in a certain position; at that time of the study; at that moment of the history.
Documentary one allows to display, or let understandable and evaluable, the methodology used in analyzing the architectural evolutions of that artifact, based on interpretation and comparison of various types of documentation.
3D model representation, as metaphor of cognitive system related to architectural corpus - the basic physical forms of the building - do not show us the “real” object, but how we understand it: different pieces of documentation in relation to architectural elements could become a browsing tool, allowing to mediate between the information to be handled and users able to investigate sets of data or information element by element.
The result is a cognitive graph, as visual metaphor of case study, which aims to restore the hierarchical structure that governs the geometric definition of the 3D model and gives access to documents about that studied artifact. Due to the relationship between each document in a data set

and its corresponding element of the artifact (edifice as a whole, parts, details, etc.) information structure could be visualized and retrieved inside a 3D model/interface that combines the metaphoric figure of cognitive system, based on a kind of "Armillary Sphere" that encompass the artifact itself, and its visualization, represented by the 3D model.
Through this structure, exploiting the semantic graphic codes, representation is able to:

- underline inconsistency in the documentation or its analysis;
- indicate the level of incompleteness concerning the investigation;
- provide an updated visualization of our knowledge on an object.

Visualization of such system by means of an arrangement using high quality RTR techniques, joint with the use of interactive consultation techniques to obtain fully 3D interactive comparison and interpretation method guided by the 3D model features and step taken, allows to let clear the interpretation of 2D drawings and its 3D shaping.
The model is made browsable in real-time according to three different reading levels, recallable indifferently at all times, that allows:

a) comparison between the original drawing and its 3D model;
b) analysis of the geometric characteristics of the model, through the use of patterns and diagrams that facilitate the reading of correspondence and/or anomalies detected during the analysis of the drawing, or the criteria of ratio adopted in the determination of its parts;
c) photorealistic rendering of reconstructed project within its hypothetical/original context, as well as matching any hypotheses alternative to the shaping of some of its parts.

This solution open many doors and could introduce new and meaningful innovations to the architecture interpretation methods and techniques, along two different paths.
The first involves proposing photorealistic images obtained using simulated global illumination rendering techniques. It is, obviously, a further development of Renaissance representation advancements and a new step of the desire of fifteenth and sixteenth-century artists and intellectuals to use drawing to investigate the world and the nature.
The second concern a truly interpretative work, obtained from the simplification operation, inherent the schematism embedded in the concept of 'model'. This simplification allows to create visualizations of the real more interpretative tan philological or perceptually correct. In this case reconstruction means a desire to explicitly describe and represent a whole story: not only a "re-drawing" to understand but a "re-interpretation" to communicate.

5. Case of study: BIM modeling and visualization of Palazzo Barbaran and a bottom-up process

Palazzo Barbaran da Porto was designed in 1569 by Palladio and built between 1570 and 1575. It is the only great city palace that Palladio succeeded in fully executing during his life. Commissioned by Montano Barbarano, a Vicentine nobleman, Palladio was asked to coordinate the new design and the existing houses belonging to the family of the client. Palladio contributed a set of masterful proposals with a central atrium and symmetric façade with 7 bays. Following the completion of the drawing, Barbarano acquired an adjacent house in the west, which eventually resulted in a façade with 9 bays.
We applied a BIM-based modeling approach to establish a library of architectural elements cataloged semantically [21].
A basic unit that composes the façade of Palladio's Palazzo (Fig. 3) is usually articulated with four rules:

a) a pair of pilasters whose capital could be either Ionic or Corinthian, shaft either cube or cylinder, height dominating either one floor or two floors (Chart. 1);
b) a window with top molding's cornice either triangular or curve. (If the pilasters dominate two floors in rule one, then a rectangular window is added either above or below the window on the noble plan);
c) a balcony with cornice and an array of balusters;
d) two segments of entablatures on the bottom and top of the façade unit.

In this case, we set only variables in the first and the second rules, while keep the constants in the third and fourth rules. The second rule is articulated with a "If, then" sentence. The result of the first rule determines whether the part after "then" will be executed. The application of the first rule and the second rule lead to the generation of façade's unit.
If we keep in mind that the options listed in each of the four rules are in essence parameters of dimensions, visibility and substitution, we realize the Bottom-Top process from semantic nodes to the whole façade. As Revit Architecture enables interactive data transfer between the main model and database, users can create database (Microsoft Access, Microsoft Excel, or ODBC database) via DB

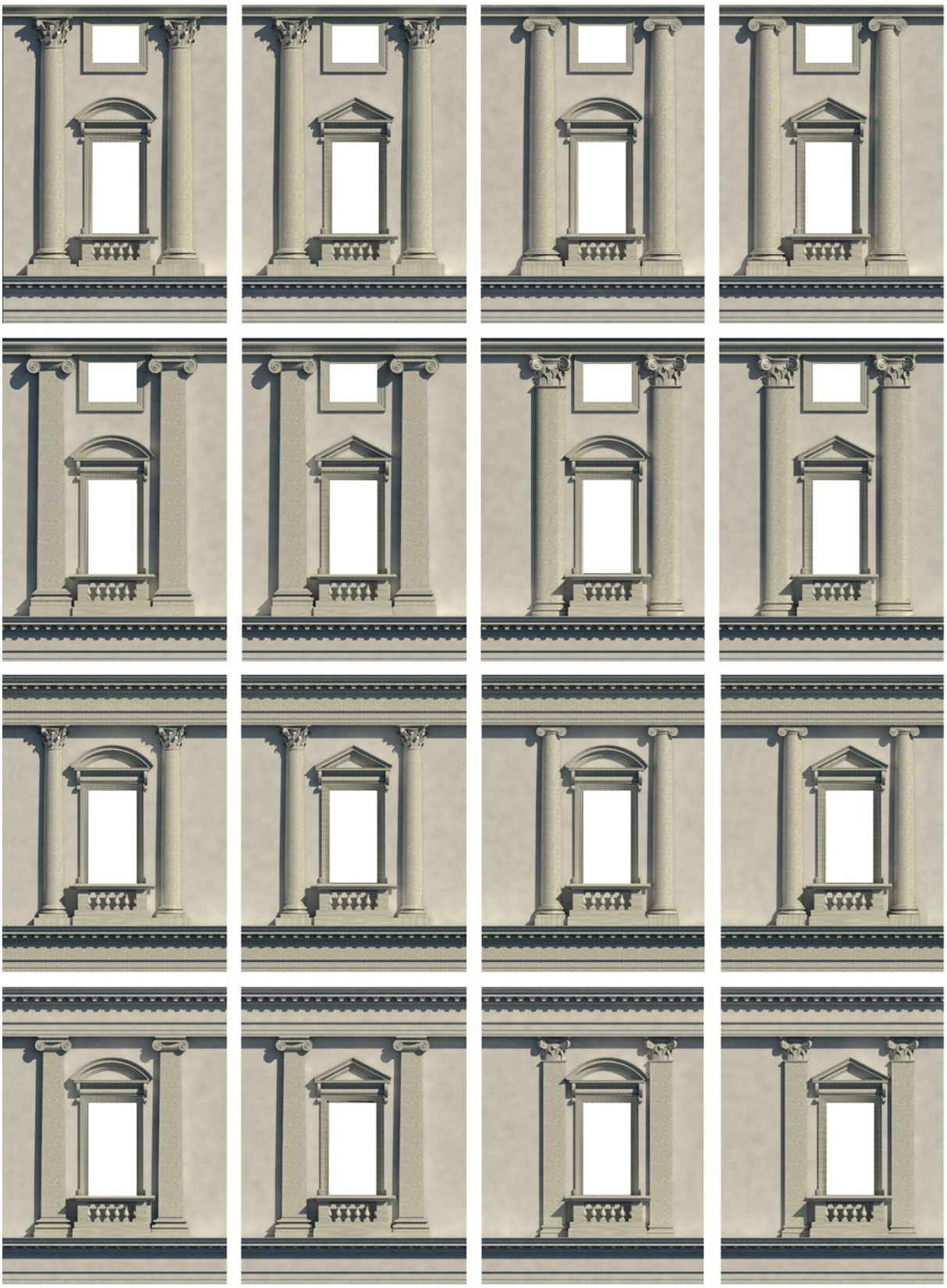


Fig. 3: Re-group of façade elements based on four variables including two options: Capital (Corinthian, Ionic), Shaft (Cube, Cylinder), Height (One floor, two floors) and Window cornice (Triangular, Circle)

link and modify the values of parameters. Modified values in the database would cause update of data when importing to the model. As metadata of model are cataloged semantically with optional parameters in the database, it provides user with interfaces to make modification of dimensional parameters (values with number) and Boolean (values: yes or no) parameters. In this way, the Bottom-Top process could be realized via data modification in Excel or Access.

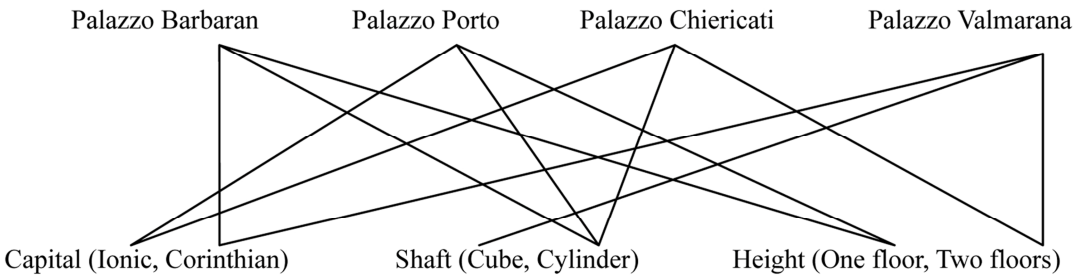


Chart 1: Options of rule 1 applied to Palazzo Barbaran, Palazzo Porto, Palazzo Chiericati and Palazzo Valmarana

BIM's semantic structure enables multiple data enrichment and filter according to various analysis need. Also, multiple data is enriched in different levels of category, family, type and instance out of different motivations. It gave access to potential simulation by sharing data among various platforms.
Therefore, the centralized BIM model serves as a sustainable dataset comprising comprehensive information, and provides access to life-cycle management and potential simulations of various disciplines. In the future, a number of works will be developed:

- Exploration of automatic generation of complicated architectural geometry in BIM.
- Integration of knowledge extracted from the treatises and real life data captured from image-based survey and range-based survey, as well as its interoperability among various platforms.
- Customize the application of BIM in heritage management via Revit API. Revit API enables users to add external command and external application by scripting in Microsoft Visual Studio.
- Establishment of web-based data repository interactive with GIS.

RTR visualization could allow quick understanding and in-depth using mainly visual categories.

6. Conclusions

The work presented here tries to combine a rendering high level of accuracy, available thanks to the current computer technologies, by means of representation form able to introduce an increase of cognitive contribution. On one hand, the photo-realistic images, obtained with rendering techniques simulating global illumination, are, of course, an evolution of the Renaissance achievements in the field of representation and, in a sense, a continuation of the desire of artists and intellectuals of the Renaissance to investigate the world and nature through drawings. On the other hand, a real work of interpretation, obtained according to the process of simplification inherent in the schematic of the 'model', allows us to create views that refer more to a vision of interpretation than an accurate reconstruction of the object created today.
The use of analytical mechanisms for reading and interpretation within a reconstructive process expresses the desire to enrich the cognitive model and demonstrate their level of knowledge with the aim of using the representation as a tool for scientific evaluation. Not only, therefore, a 're-drawing' to understand, but a 're-interpretation' to communicate, a desire that emerges in full reminiscent force also for the ability to avoid of being the final synthesis, unique and immutable, but the first step of a wider and complex discussion..

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HERITAGE ARCHITECTURE LANDESIGN
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A synergy of addends for the definition of a charter of protection

Giacinto TAIBI[1], Rita VALENTI[2], Mariangela LIUZZO[3]
(1) Special Educational Structure of Architecture, University of Catania, Siracusa, Italy
giacinto.taibi@gmail.com
(2) Special Educational Structure of Architecture, University of Catania, Siracusa, Italy
ritam.valenti@gmail.com
(3) Faculty of Engineering and Architecture, University of Enna "Kore", Enna, Italy
mariangela.liuzzo@unikore.it

Abstract
The quality of urban reality that arises from studies made in our city can be, sometime, an indicator of environmental imbalances that tend to affect deeply human beings, causing a particular sense of disorder in them.
Understanding a place means also foreseeing suggestions for its modification; so we need to focus on an eco-sustainable development of the territory.
Adding together relevant studies on urban realities of the Mediterranean area, such as Catania, Enna and Siracusa, it is possible to trace a logical-deductive way inclined to a complex and perceptually reasoned representation able to convey the sense that the community gives to the place, giving to it a symbolic meaning and identifying it as a figure.
In this sense, cultural operations aimed at the study and deepening of the "Knowledge" and the recovery of a balance threshold – also through complex procedural systems - must be directed in harmony with an all-desired "*Charter of Protection*", in full compliance with the environmental complexity and peculiarities of a shared sustainability, which takes its cue from natural resources of the *topos*.

Keywords: Perception, Mediterranean, Urban Spaces, Stratifications

1. Introduction: A Sample Survey On Mediterranean Places *(Giacinto Taibi)*

Today we look with ever growing optimism at the Mediterranean basin as a driving force for the planning of economic development with a future perspective of enhancing the vocative quality of the entire cultural heritage of the past, on the value of which the potentials of the present should be based.
The geographical area of Sicily, for its intrinsic strategic importance, is considered as a bridge between the diverse cultures of the neighbouring Mediterranean countries. These intend to promote themes which highlight common routes and strategies for the development of long-term joint projects.
Within this scenario it should also be taken into account the exchange between the urban fabric of the past and more specifically the architectures which identify cultures whose development, although different at source, can be channeled into pathways of mutual exchange.
These routes, planned with a broader scope, allow for a democratic development that involves, equally and specifically, places seemingly distant, but in fact, parts of an unsteady and ever changing equilibrium.
We are increasingly stimulated by the observation of urban sites. We venture into the maze of urban fabric and enter into its physicality in order to be able to read, understand and appreciate the most intimate significance of that particular place.
Our task usually involves defining the cultural opportunities that the urban scene offers when we attempt to read and understand areas of civic agglomeration characterised by intrinsic peculiarities. Our attention is completely drawn towards understanding the morphological complexity which deepens the intrinsic qualities of the *topos*.



Fig. 1: The survey. Places in the Mediterranean.

In a systemic framework of comparable cultural interests - referred to significant urban complexities gravitating around a broad area overlooking the Mediterranean basin - it becomes much more interesting and of great value to be able to relate, in strategic terms, urban areas which are significant for their inner vocation.
If the identity of places is the result of the processes of memory, traditions and ancient wisdom, as well as the material memories that determined their present form, then it is also true that the studies on urban agglomerates - in bringing back to light manifest or latent enactments of the past, seen through a process of optical oriented intuition – can clarify strategies of allocation of spatial volumes which are most suitable to an appropriate fruition of that particular place.
A complex task such as the in-depth knowledge of the sites which gravitate around the Mediterranean area requires a cultural commitment of a large group of operative sectors, diverse in quality and competence, which are able to secure a success through an appropriate investigation into the nature of the issues being raised.
Then it is revealed that it is the very essence of a place itself that triggers the type of analysis to be conducted, analysis and in-depth knowledge that contribute to the understanding of the place.
In this respect, the techniques presented here, aimed at the "*Factory of Knowledge*" and set up through complex procedural systems, must necessarily, in a synergy of their constituents, be part of the dictates of the "*Chart of Safeguard*", with total respect for the places that are the subject of study.

2. A Perceptual Reading Of An Urban Area Of Catania *(Giacinto Taibi)*

The study focuses on an urban area of Catania part of the eighteenth century structural grid of the city which was rebuilt after the catastrophic earthquake of 1693.
It is within this Baroque grid that the research revolves around and find its nourishment, moving in harmony with synergic lines and with the whole systemic process of project intuition.
The fabric of the past, full of complex volumetric and material expressions, with obvious emotional charges, engaging and intriguing, testify the consistency of architectural and historical textures and offers, in some ways, parts of a constitutive system which is spatially articulated in a sort of cryptic form.

The volumetry of the whole urban area if put in relation to areas of planimetric expansion, seemingly simple and trivial, are such as to raise hypothesis of reasoning - in some cases latent and in others more or less manifest - which might have inspired the working mind of the architect who devised that setting.
The proposed scientific survey - if the void understood as space of manifest absence within the fabric of the city, represents more and more an opportunity for experimenting the intrinsic nature of the urban form - focuses on existing relationships between systems of the urban scene that, in some way, play a role of strategic importance within the context under scrutiny.
The work is a reflection on the meaning that can be attributed to connectivity as a means of knowledge for reading and composing an image of the spatial context which highlights its dual aspect *of place of dynamic perception and place of connectivity*.
For a survey that places particular emphasis on the return to perceptual values, it is considered particularly appropriate to focus on Via Crociferi as a privileged crossing route which aggregates and fuses together, within a Baroque context, the connection between San Francis Square and the Via Sangiuliano.
This place is a centric element of particular significance as it succeeds scenically in making the visitor the protagonist of a theatrical space within an architectural backdrop in evocative tonal correlation with the Baroque layout.
It is a place where the altimetric articulation becomes a cornerstone of intuitive reasoning in essence.
Veiled architectural surfacing, stairways stretching out to the road and curtain walls, all elements defining the well-delimited architectural space, are intentional evidence provided by the designer of that spatial environment.
In reality we are faced with a number of facts that, together with the effects aroused by the intensity of the tonal context, set in motion complex sensory and emotional states.
The slow ascent, which characterizes Via Crociferi when crossed from south to north, slows down the pace as if to give the viewer the necessary time to enjoy the whole scenario of the baroque theater in which the churches of San Giuliano of Saint Benedict and Saint Francis Borgia play the role of catalyst visual elements. The scene is physically perceived in terms of heaviness of breath or breathlessness, muscle aches and sweating. As skillfully planned by the artist, the rising stretch of the road seems to intentionally delay the pace of the viewer so as to give enough time to understand that something particularly interesting is about to happen and this manifests itself within a unique temporal frame.
On the contrary, the slow declivity (the slope) of Via Crociferi, when crossed reversely from north to south, due to its intrinsic downhill nature, seems, for some intention only hinted, to accelerate the pace of the visitor whose heart quivers in great anticipation for something that is about to happen and that is being announced through:
• the steps of the church of San Giuliano stretching out onto the road;
• the surfacing of the architecture on top of pre-existing buildings, evidence of a strong cultural interest;
• the presence of well delimited architectural space, a forerunner of a phenomenal reality of particular composure.
The Supreme is announcing the complex articulation of a place that skillfully combines all parts of a well devised theatrical setting.
In such a sequence the scene defined by a short hallway leading into the enclosed architectural space, a place of convergence of various roads, implies the becoming of a space culturally full of architectural interests, not yet manifest but engaged in a mutual dialectic relationship.
A vertical boundary - delimited by the presence of the body of the building, placed transversely to the road on the arc of Saint Benedict – physically delimits this architectural space providing a meditative opportunity and an understanding of the value of the urban environment and its surroundings.
A constructed reality whose vision takes place through a cognitive process which - applying the transposition of the three-dimensional architectural reality versus the two-dimensional retinal image – triggers a mental process that can deconstruct and reconstruct data, news and information, identifiable through a set of situations and experiences acquired within its own cultural context. The chromatic quality helps to see with the eyes of the heart and the emotions. But the eye is also guided by the illusion of perspective.
In this formulation of conceptual thought, the artist continuously moves the viewer's ever evolving eye and brings into play phenomena related to the process of encoding and decoding of figures, based on well-defined rules of transformations. The images, through anamorphosis, are thus disguised and objects are deformed in such a way that the actual shape of the original can be reconstituted only from a particular view point. In this way distortions are recomposed and images assume again their original proportions.



Fig. 2: Study of timbric contrasts and tonal chords in reading Via Crociferi in Catania, in a sequence that is articulated from south to north and from north to south. (*Images of Tiziana Patanè*)

"*It is, on the whole, the opportunity to bring back architecture to the notion of a controlled space but also a possible way to rediscover, through the creation and the conscious use of an unreal and oneiric space, the conjugation of type and model to ensure that form returns as form if substantiated by ideas*." [1]
This controlled space is subjected to the constraints dictated by its creator who wanted to arouse perceptual and sensory effects which are decisive in shaping the expectations of the viewer engaged in the fruition of the urban scene.
Then behind the articulated planimetric geometries and long straight trajectories, a careful and wise director will have intended to put into perspective those places with an anamorphic deformation - I would say subconsciously intuitive and spontaneous - and, almost certainly, that urban scene will have been proportionate to the way in which it would be seen and perceived by those engaged and captured by the overwhelming impact of the architectural appearance either veiled or manifest.
The place that we perceive as well-proportioned is, in fact, an urban area that has been designed with prearranged anamorphic distortions, so as to make that space look harmoniously concluded.

3. **A reading of an "*island within an island*": Enna, a place in the centre of Sicily**

(Mariangela Liuzzo)

Enna, founded by the Sicani in the heart of Sicily, on a rocky calcarenitic terrace that - for its central geographical position and elevation of almost a thousand meters above sea level - visually dominates the Sicilian territory in all directions, has acquired, over the millennia, the role of *umbelicus siciliae*, drawing from it the genetic identity that has always distinguished it.
Impervious by nature, for many centuries it has maintained its reputation of a sought after military outpost and unassailable stronghold, becoming subsequently, as a result of a new policy based on military-strategic coastal defense, a safe and productive centre of agricultural production throughout the region.
"*Island within an island*", but far from being isolated in its perched position, Enna has always been an inevitable junction and stop-off connecting, through the valley gorges of inland Sicily, the inland villages and the main city ports on the three banks of the Tyrrhenian Sea, the Ionian Sea and the Sea of Africa.
Thanks to a consequent inversion of commercial trade, the city took part in all key phases of the various rulers of the island and of the unstable relations with its neighbouring Mediterranean countries: "*for many centuries Sicily with its capital Siracusa which overlooks the Ionian Sea, had gravitated around the Greek area, from the Middle Ages onwards the island with its capital Palermo which overlooks the Tyrrhenian Sea, gravitated around the cultural area of Western Mediterranean countries*" [2]. As a result, a changing flow of men, goods, ideas and cultures from all three coastal areas and from different areas of the Mediterranean basin converged in it.
Presences and influences from the past that play an active role in the identity of the modern city, full of traces overlaid and blended together over the centuries. It is still possible to find these today in the stratification of the urban setting and in the language of architectural elements, its toponymy, its myths and traditions handed down to the present day.
If "*the city, over the centuries, instead of stratifying and expanding itself, must have been as if" pulverized "almost" blown away "by the continual erosion of many exogenous agents, wind, rain, snow and frost, that ' have flagellated it relentlessly, especially in its most exposed areas* " [3], then it becomes a priority to preserve all the physical traces of its heritage, but also to search for intangible traces, images and narratives of a past that is important to hand on.
Thus, for example, thanks to the hymns of the ancient poets and to the many images, mostly stereotypical, created by the culture of eighteenth and nineteenth century European travelers, Enna is still known, despite the absence of significant physical evidence, for being a city of ancient classical memories, the abode of the myth of Demeter, goddess of grain and crops, and of her daughter Kore, goddess of the underworld and the afterlife as well as the changing of the seasons.
A destination for cultural tourism, Enna offers visitors traditions, works of art and monuments, but also a vibrant mixture of past and present, natural and anthropogenic, that comes alive while walking down the narrow alleys of its medieval city center, and in the discovery of unexpected panoramic views onto the airy natural landscape that surrounds the city.
The ongoing research of interpretative *ad hoc* models for the articulated reality of Enna intends to reclaim the most suitable cultural and technological tools in order to detect the *unicum* of the urban and rural landscape on one hand, and to analyze, in a correlated manner, architectures, traces, elements, details, on the other, with the aim of understanding and conveying the *genius loci* of the city which is the result of a complex identity made of a number of interacting dynamics with multiple connotations, some obvious, some hidden or partially compromised.
A first significant investigation has been carried out on *Strada Maggiore*, now Via Roma, the backbone of the *forma urbis*. Over the centuries, the most important urban works have focused along its sloping path, and have appointed it as the main privileged public place as well as the military, religious and

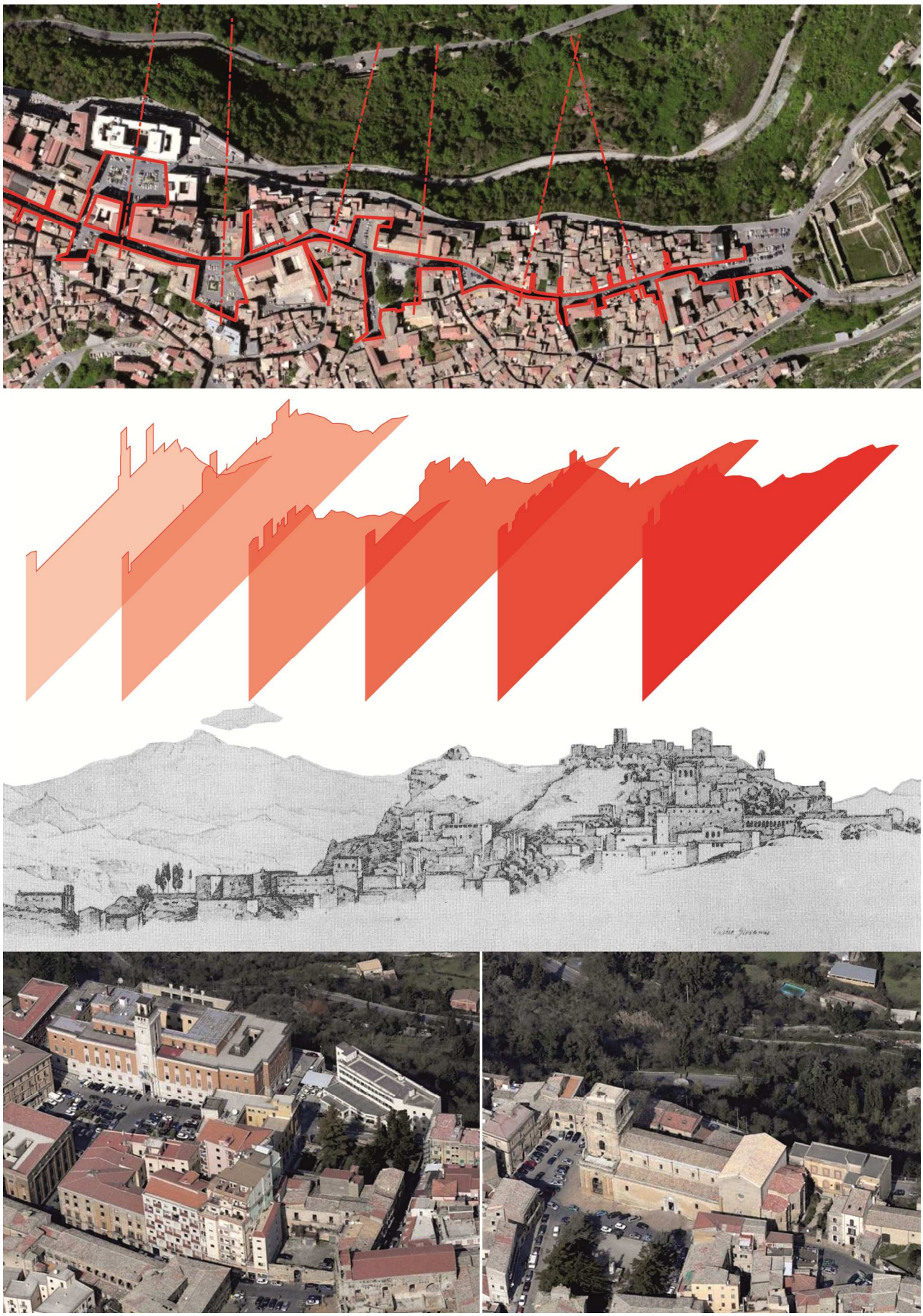

Fig. 3: Orography of the place. Spatial diagrams of the analyzed area and evolutive sections of the scenic sequences.

civic architectural landmarks of the city. In fact, the visitor's understanding of Via Roma and the surrounding urban areas coincides with taking a sedimented and responsible perspective towards that place, so as to be able to review the cultural heritage of Enna, as if browsing a fascinating book for the deep understanding of which it is indispensable to have adequate and subtle interpretative tools.
Two imposing structures of the city military defense, which mark the beginning and the end of the street, stand as primary landmarks: the castle of Lombardy, on the north-east *limen* and the octagonal tower of Frederick, on the south-west. An urban space connecting the oldest hub of the city, on the eastern ridge, and the more recent development on the western, is the square of the so-called *Balata* (from the Arabic *al Balat*, or slabs of stone), a public meeting point founded by Muslims which, for over a millennium, has retained its name and function up to the present day.
Closely connected to the axis of the main road on the north-east, is the old mediaeval town, with its meander of narrow and winding streets of clear Islamic influence, which, constrained by the irregular and sinuous boundaries of the natural precipices, seems to replicate, in the overall vision of an apical image, the orographic contours of the mountain on which it stands.
In this sense, it is of key importance the reading of the interrelations and the fabric of the place in its entirety defined by the historical context of its materic volumes and, primarily, in a reciprocal relationship of volumetric masses, if seen through significant openings onto the bottom of valley.
Over a period spanning from the fourteenth century until the recent fascist period, on the same fabric just adjacent to the main axis, great urban spaces and buildings of religious and civil power were built by remodeling new open spaces and creating completely new ones.
The spatiality of the road Maggiore has in this way progressively changed, emphasising in time planimetric and altimetric variations, within an uninterrupted itinerary, due to irregular breaks with significantly wider pauses in plazas and squares built adjacently and due to the acmes of architectural manifestations placed in crucial positions.
These architectures, remarkable for their size, architectural quality, function and symbolic meaning, over the centuries have shaped the look of the city, if seen closely, by determining the character and destiny of the urban settlement, and from the distance, by marking clearly with their towering silhouettes the urban skyline, so much admired and so cleverly described by many travelers who visited Enna from the eighteenth century onwards.
This scientific study stands as an inquisitive eye and an attentive observer of a historical document with a rich scenography and encourages, at the same time, a consideration on the value of the road as a means of knowledge and as a central figure for reading and constructing the image of the area, by placing emphasis on its dual dimension of place of dynamic perception and place of connection.
The theme of the road as conjunction and essential element in shaping the landscape provides an opportunity for an insight into the meanings of its surroundings, and a vantage point from which to observe the whole area.
This new dimension of research is inevitably enriched with different perspectives, result of the culture of *lay man* and of *higher knowledges* that must find necessarily a point of equilibrium: the descriptive techniques of the scenery then become strategic in an increasingly dynamic horizon.
The backdrops of the urban scenery in relation to the free flowing meanders of the urban margins around declare the prominence of visual perception.
The value of the past and anthropogenic-natural interactions are elements not always adequately recognized and appreciated, that today as well as in the past, identify Enna and confer to it its *genius loci*.
The process of knowledge carried out, besides being innovative, will, therefore, provide a valuable encouragement in supporting the cultural recognition that, especially in the current situation of uncertainty and crisis, must be seen as a valuable resource for the territory which must be protected and, at the same time, supported and encouraged.
Indeed, it seems more timely than ever, though still rejected, what Carmelo Severino anticipated at the end of the last millennium, "*in a context of uncertainty, Enna is heading towards its fourth millennium of existence: a huge mural* [...] *depicting a modern reading of the "myth of the land and the seasons," seems to communicate that Enna, linking past and present, will find in the value of its history sufficient energy to withstand, in an Europe of localisms, in a period of rediscovery and valorization of minor historical centers and their social, economic and cultural diversity, the challenges of the new millennium, recovering its raison d'être as a city, place of business, innovation and culture*" [3].

4. The Ortigia case. The reading of the place and of its semantic transformations

(Rita Valenti)

In line with the scope of this survey, Syracuse is one of three bordering areas of what is historically known as the Val di Noto.
The relationship with the place is, here as well, one of the indicators of the planning of historical sites within our urban areas. Preexisting structures, in particular, symbols of their history, represent a constant term of comparison we relate to in our daily lives. The safeguard of these areas, intended as

a synergy of conservation and development through sustainability, especially socially, reflects the quality of life in an urban area whose essence depends primarily on the quality of its public spaces (streets, squares), *the commons.* These play indeed a strategic role in a policy of regeneration.
The void between buildings has often undergone changes due to various urban interventions, more or less planned, that makes its specificity a sort of *connective tissue* worth of being investigated from both a perceptual and a qualitative point of view and also put in relation to its use and the effectual flow of life.
In regenerating urban areas, with the aim of safeguarding their past, an aesthetic approach is not enough. It is a must to seek and share visions based on assumptions that, though stemming from individual interests, are viable for the scope of a proper development. Safeguarding is in fact carried out through a kind of exploitation of the cultural and economic potential of the historical sites and plays a significant role in identifying the underlying dynamics which are expression of widespread views.
According to these assumptions, and in order to manage complex areas, the *scheme of the perceived structure* and *perceived distances,* identified by Kevin Lynch in his writing about the immature arts of City design, is of great help. [4]
We mustn't forget, however, that '*the present does not contain but the past'*, so if we accept the concept of time developed by the great nineteenth century philosopher Henri Bergson, that there is a real inner duration which is an uninterrupted qualitative growth and has, as its essential feature, the emotional experience, we are able to explain the apparent paradox of *an ever changing conservation* which, in essence, highlights the significance of memory preserved in a strongly historicized anthropic-geographical landscape.
Therefore, a pure perception without support of memory is likely to return a partial knowledge of reality which can be expressed totally only through a perception, in this case particularly, which fuses matter and memory together.
With reference to the complex issues surrounding the historical sedimentation of the urban landscape we cannot disregard the polysemy of the same, in the sense that the unified perception of a stratified historical background stems from the multiplicity of symbols that the same holds in a more or less explicit manner; through their relations and intersections these symbols constitute a language in which the place is expressed and reveals itself to the researcher.
Any perceptible trace of the past in a historical urban landscape, both emotionally and symbolic as well as materially identifiable in its reference to history, testifies the crucial importance that the community has indirectly attributed to the historical and cultural value of the areas they belong to.
The decoding of signs, the semantic and interpretative reading, all belong to a field of research which sees, through observation, a shared tool of analysis capable of endorsing methods and approaches of study.
In this framework, the study applied to the urban context of the island of Ortigia, an island connected to the main island and located in the heart of the Mediterranean sea, as well as a decentralized heart of Syracuse, aims to provide a *representation*, an image of a series of perceptual relationships which arise from the ostensible signs of the relation the urban area has towards its history.
An urban landscape, in this case, layered and contaminated by various arrangements made over a period of time and considered as a single physical and emotional entity in which each part, although a fragment, contributes to the formal and functional balance of the whole. A *monumental unicum* seen as an architectural whole which has been restructured over time, a living entity whose qualitative performance cannot be investigated only as a sum of its outward features, but must include a set of tangible and intangible constituents that have determined its true identity.
In particular, the constant transformation of the city, also due to planned changes, has led in some cases to perceptual misinterpretations which, being highly subjective, have consequently implied the formation of a mental image congruent with the individual sphere.
With reference to some of the key features of the urban fabric of Ortigia we can find a peculiarity that goes beyond the pitfalls of a usual perception of an urban setting. If we assume that the *form* of a place must have characteristics of clarity and readability, so as to be flexible to the feelings of the individuals that move within it, we quickly realize that, when an urban area suffered deep lacerations, it dissociates itself from a congruent reading due to an abrupt disruption of its connection with the past.
The analysis of a specific portion of the district of *Spirduta*, with the imposing presence of Montalto palace, encourages us to reflect on the relationship between *continuity* of marginal elements, due to the works of the first half of the '900, and the unmodified nomenclature of the places which, despite the present arrangement, allows us to perceive the formation of the square element. As if memory, despite the changes made by its decision makers, wishes to preserve the clear evidence of a tissue of labyrinthine structure whose unconcealed traces can be found in correspondence with vicolo dei Tintori and whose testimony remains alive in the Ronco del Pozzo and in the name of boundary roads that do not give way to recent memory.



Fig. 4: From above:

- Dynamic perception of the flows of life;
- Dynamic perception of approach to place;
- Cartographic and photographic analysis;
- The tale of the history through its semantic expression.

As a matter of fact, the name of the district *Spirduta* is very ancient and already appears in a document of 1481. According to Dufour the name " *is, after all, very expressive of a typical labyrinth structure of this district*." [5]
The square we perceive and that Syracusans themselves identify as a gathering space, recently renovated, in reality has no proper name; actuality has not conferred to this urban emptiness an identifying nomenclature that corresponds to the image consciously elaborated by its users.
In this context, the urban landscape presents itself, on one hand, as a gap arising from the compact tissue of the historical town, on the other hand, as a space which has been adapted to a role of public space for aggregation.
The study on the perception of the dynamic flows of life determined not only by the presence of the school complex which was built following the works of demolition, but also by everyday life, has highlighted the deconstruction of the notion of identity which can be reconstructed through a holistic process. Under these terms a methodological approach, in this key of reading, analyzes the phenomenon of formation in its semantic traits, trying to grasp the global meaning independently from the sum of physical unitary components and memory.
The sense of *place* is to be found then in the constant interaction between that which comes from the historical memory and that which comes from what the collective memory preserves in terms of matter and symbols; this is precisely the peculiar trait of this analytical introspective approach in the study on *Spirduta*. It is an interaction made explicit through a suitably organized knowledge and an attentive narration.
The stratification of the signs, due to the various urban interventions, can hybridize and confuse the flows of interactions between the parties, therefore, the complex analysis focuses its interest on the definition of new layers and new forms of relationship against the preexisting structure.
Within the same line of investigation we approach the study of the late nineteenth century urban transformation that led to the creation of the Archimede square in Ortigia, wanted by the municipality during the process of modernization and built after the fire of the Church of St. Andrew: *the elegant lounge of Ortigia*, which today has unfortunately taken on the role of road junction.
The rediscovery of its original identity passes undoubtedly through the analysis of cartographic and photographic documentary sources which confer to this planned urban void the same meaning attributed to the historical plane of the cathedral: a second large open space for the city social life that was changing its purely medieval appearance and quickly becoming modern.
The buildings surrounding this space reveal their history from the most recent to the oldest. Palace Lanza Bucceri, the oldest among them, occupies an angle of the square and projects into one of the historic roads Via Amalfitana.
It is clear that in such a complex urban landscape, with deep historical roots, each process of corrosion, sedimentation and even disintegration as a result of absent interest or resources, like natural phenomena, records and interprets such choices. History, its semantic as well as perceptible unfolding, is a confrontation paradigm, almost an inner analytical necessity, in relation to the planning of a more recent future that is, in turn, destined to become history.

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Multidisciplinary team activity using BIM and interoperability. A PhD course experience at Politecnico di Torino.

Anna OSELLO, Andrea ACQUAVIVA, Anna PELLEGRINO, Elena CANDELARI, Giacomo CHIESA, Daniele DALMASSO, Matteo DEL GIUDICE, David ERBA, Kamila MANNANOVA, Iasef MD RIAN, Michel NOUSSAN, Edoardo PATTI, Marco PIPPIONE, Alessandro SERRA, Rajabzadeh SHAGHAYEGH, Riccardo TOMASI

Politecnico di Torino, Turin, Italy

anna.osello@polito.it, andrea.acquaviva@polito.it, anna.pellegrino@polito.it, elena.candelari@polito.it, giacomo.chiesa@polito.it, daniele.dalmasso@polito.it, matteo.delgiudice@polito.it, david.erba@polito.it, mannonochka@yahoo.com, md.iasef@polito.it, michel.noussan@polito.it, edoardo.patti@polito.it, marco.pippione@polito.it, alessandro.serra@polito.it, Shaghayegh.r@gmail.com, tomasi@ismb.it

Abstract
Building Information Modeling (BIM) provides a framework for collaboration, a multi-disciplinary environment that brings together all the parties of the Architectural, Engineering and Construction industries (AEC). The aim of this experience (an interdisciplinary PhD course based on the BIM methodology used in the Smart Energy Efficient Middleware for Public Spaces – SEEMPubS – FP7 project) was to investigate the team work sharing and the use of interoperability between software, to test the opportunities offered by BIM process applied at existing buildings at the campus of Politecnico di Torino. Two architectural parametric models were realized (one concerning a new building –Classroom I– and one concerning a historical building recently renovated –ISBM offices–) and imported into software for energetic and management analysis using different formats like IFC and gbXML. Several lessons have been learned from these processes in order to optimize the quantity of data that pass from one software to the other ones both for type of data and for format of exchange. This indicates that actually, there is a possibility to better the BIM process, but a support from software houses is required based on the real use of common standard.

Keywords: BIM, Interoperability, Energy assessment, Augmented reality.

1. Introduction
Significant benefits to be gained from the interoperability of BIM software have generated considerable recent research interest. BIM is not only the software, but it is the collaborative process, which integrates different fields of design, construction and management to obtain the optimal result in entire process of building life cycle. It is fundamental that *bim* (building information model) are shared and accessible in open and interoperable fashion in a way enabling data and meta-data available in *bim* to be accessed, pre-processed and mapped correctly with different applications. Many researchers have addressed the problem of interoperability, but there remains a need for an efficient method that caneasily transform data into different formats like IFC and gbXML for structural, energetic and management analysis. The purpose of this study is to examine and describe the teamwork sharing, interoperability between software and the opportunities offered by BIM process applied at existing buildings at the campus of Politecnico di Torino.

2. Methodology
During the course, as we had two Buildings to analyse and 12 participants from different fields and background (Architects, Engineer expert on ICT, Energy, Building and Management), we have divided all the practice activities into 5 main parts as follows:

- Building the model in a BIM software and sharing information using worksets and Central Model in Dropbox;
- Building performance and energy analysis using several software for a better interoperability;
- Feasibility of interoperable BIM and IoT system;
- Building lifecycle and management using BIM;
- Tablet application to show the different data by Virtual and Augmented Reality.

2.1 Building the model in a BIM software and sharing information using worksets and Central Model in Dropbox

For simulation and computer modeling of the buildings Autodesk Revit software was used, which is specifically programmed for BIM and provides a proper environment for interoperability by presenting the possibility of offering different workspaces, which allow each member of a group to work on specific part of modeling. Worksharing is a design method that allows multiple team members to work on the same project model at the same time. When worksharing is enabled, a Revit document can be subdivided into Worksets, where Workset is a collection of building elements (such as walls, doors, floors, stairs, etc.) in the building. Only one user may edit each Workset, all other team members may view this Workset, but are unable to change it, preventing possible conflicts in the project. Team members adding and changing elements in Worksets can save their work to a local file on the network or their own hard drive, and publish work to a central file whenever they choose. Using the Dropbox folder we attempt to solve the problem of sharing Central Model information; which worked in the beginning, but after several synchronizations from different team members at the same time, the Central model stopped responding and obviously synchronizing.

Another problem that we faced while building a model of a historical building was the complexity of the construction: former railway repair yards (OGR), freed by the railway, was behind the premises of Politecnico di Torino, this building was build between1885 and 1895 and reconstructed in 2000 for ISMB. Although, all the parametric objects forming a building exist in Revit Databases (families), there were many difficulties to model an existing building, because to accomplish the best result, all the details and components should be modeled the same as constructed in the building. A balance between the level of the details in the central file and local file was another problem we faced during the modeling. After synchronizing the model of main trusses with the central model, elements became invisible because detail scale of default view was normal while most of the structural elements are signified just in medium or fine detail-scale view.

We have elaborated the architectural model and tested the parametric approach to typologies of elements (wall's layers, thicknesses, materials) and connections between elements itself and planes. Moreover, we have tested the interoperability using the Revit model in different software. In particular, it is possible to export from Revit to 3dStudio Max using different formats. Firstly, we tried to use *.3ds files but, even if it was possible to open the file in 3dMax, we identified several problems in localization of geometries and in number of objects per layer. Secondly, we exported to 3dMax using *.dwg format and no localization problems occurred. Unfortunately, layers and geometries were decomposed into single elements and there were some conflicts between 3ds materials and Revit ones. We also tried to export Revit geometries into Ecotect and, after several attempts, we used a *.dwg file, imported in 3dStudio Max and exported as *.3ds in order to correctly position geometries in Ecotect, but several problems occurred. Firstly, all the geometries were condensed in only one calculation zone without any reference to layers, secondly, the file was very heavy and CPU consuming, thirdly, objects and surfaces were decomposed into triangles and in some cases duplicated. Finally, we tested the interoperability with Rhinoceros 4.0 and we have discovered that using *.3ds files the geometries lose their layers and every element is decomposed into triangles. Using *.dwg files it was possible to preserve layers, but the importation could be effective only if the file would be previously opened on CAD and then imported to Rhinoceros. We tried to reduce triangles and meshes by using Grasshopper Mesh Union tools and the results were good.

2.2 Building performance and energy analysis using several software for a better interoperability

The energy performance is among the key aspects of modern building design, and the limits imposed by current regulations require a careful calculation of the heat losses and energy system efficiency. The development of this sector has led to innovative solutions for thermal insulation and increase of energy efficiency of conditioning systems. The software available for energy performance analysis is in constant progress, with an improving accuracy of calculation and the integration of 3D building design in heat losses evaluation. However, there are still some

limitations in interoperability with usual 3D modelling software, as the import of 3D-models in energy software lead sometimes to compatibility issues.
We have investigated the interoperability between the 3D model of an existing building developed with Autodesk Revit and two Energy performance tools: Autodesk Green Building Studio and Design Builder. The first is a web-tool developed for primary energy evaluation in preliminary design-stage, providing global building performance with minimum user input. The second, on the other hand, is a state-of-the-art software tool for energy and sustainability analysis in building design. The file format used for model import and export is gbXML (which stands for "Green Building XML"), which is an open schema designed to facilitate the transmission of building properties stored in 3D building information models to engineering analysis software. The export of the BIM model to Green Building Studio was completely successful, and no errors were detected during the operation. The software has calculated the energy performance of the model, but not all the parameters have been transferred to the energy analysis tool. The materials used for walls and windows needed to be re-defined by the user. Moreover, there are some possible combinations for HVAC system choice, but the user cannot define custom parameters. The main inaccuracy related to energy system has been the approximation regarding the primary energy consumption, as district heating was not included between the options listed in the software. Thus, a natural gas boiler has been chosen.
The interoperability with DesignBuilder has lead instead to major import issues, which made impossible an energy analysis. The whole building was recognized as a building block, but all the information about the components and the windows has been lost. Only the external shading surfaces were imported correctly. This issue could be related to the definition of custom building blocks, but there is a need of further investigations.
Furthermore, for the energy simulation of a Revit model Autodesk recommends to export the model to 3dStudio Max and from that to Ecotect. Since this way had already been verified by Autodesk, we decided to test new possibilities with other programs. EnergyPlus was chosen as an open source software on energy simulation produced by the U.S. Department of Energy. The only format that can be imported to Energy Plus is idf: this is a format exportable from DesignBuilder Software Ltd, a software not open source, which in fact is a graphical interface for building the model. However, there is a plugin called Open Studio that allows to run the simulation through SketchUp. So, the goal of our work in this case has became the interoperability between Revit and SketchUp. The reason why we preferred SketchUp and not Design Builder was the desire to focus on open source software. In fact, we believe that in a world where there are dozens of different software with similar functionality, file exchange between designers can be facilitated by the use of open source software as a medium. SketchUp can import three-dimensional models with the following file extensions: 3ds, dwg and dxf. When you export from Revit, it is important to be on a three-dimensional view. If you export from the plan view, only two-dimensional plan is exported. Alternatively, you need to add a façade view to the plan view. In SketchUp the model is imported with the same layers as in Revit.
The interoperability between 3D-modelling software and energy analysis tools appears to be a key issue for the diffusion of BIM technologies. The possible benefits are interesting, in terms of accuracy and modelling time. However, further steps need to be done in improving the compatibility between different software.

2.3 Feasibility of interoperable BIM and IoT system

The Internet of Things (IoT) is an emerging computing paradigm where any physical object, enriched with electronic identities, processing and communication capabilities, becomes part of a dynamic, distributed, global network of heterogeneous devices that interact autonomously with the real/physical world and participate actively in business, information and social processes. In IoT scenarios, applications become "pervasive" and must be designed to interact with digital and non-digital objects with different roles and belonging to a large number of different object classes. For such reason, applications must undergo a paradigm shift: from custom-made applications working on a "closed" set of inputs towards context-aware applications working on "open" sets of inputs. The main challenge to achieve this paradigm shift is interoperability: object must in fact be able to interact with each other seamlessly and easily retrieve information about the environment where they are deployed.
Building information models (bim) potentially represent a precious source of data for pervasive IoT objects operating in buildings. For such reason it is fundamental that bim are shared and accessible in open and interoperable way enabling data available in the models to be accessed, pre-processed and mapped correctly with IoT applications.
In order to enable IoT/BIM interoperability, the following challenges must be solved: interoperability with any available "legacy" BIM models must be possible; software interoperability between components adopted for IoT applications must be possible (e.g. remote access via web-services

or availability of library bindings with the programming language in use); interoperability with any external service useful to pre-process BIM data to serve IoT applications must be possible.
To evaluate preliminary feasibility of interoperable BIM and IoT system, a simple use case has been implemented i.e. the extraction from BIM of the topology of the walls to evaluate theoretical connectivity between different devices installed in the building. In order to achieve the results we have followed several steps: we analysed the state-of-the-art open products and selected the most suitable set tool to adapt towards the available BIM model - Solibri model viewer, BIMServer, IFCOpenShell, Blender. Conversion of the main Revit model to different formats (e.g. IFC), to assess the correctness and the conversion and identify possible issues related to the BIM format chosen for adaptation was our next step that showed that IFC format gives opportunity to validate and visualize the model through Solibri Viewer. Furthermore, the model was correctly accessed though BIM server and evaluation of its main functionalities through simple queries via web and via the SOAP interface showed that the available APIs allow simple querying on components of the model. Extraction of the Wavefront geometry via IfcOpenShell, import in Blender and verification of the IFC identifiers in the blender model, addition of connectivity "Targets" and simple evaluation of connectivity through a Python-based framework resulted in correct exportation in 3D non-BIM format; objects identifiers were kept in the 3D model, so to enable future retrieval of BIM information even if the meta-data is temporarily discarded in this phase.
Although no best-in-class solution is available yet, open BIM tools are rapidly developing, providing useful instruments to support interaction with BIM models. Such tools provide interesting advantages concerning debug possibilities and extensions through inclusion of other open components. The performed developments, although extremely simple, demonstrate through a basic use case the possibility to query simple BIM models externally, providing positive inputs about the feasibility of a BIM/IoT interoperability layer. During the work also a number of possible future challenges have been identified. Not processing operation on complex BIM models are computationally heavy, so possibly in the future, solutions will be needed to simplify and partition the models and manage more efficiently memory-heavy structures. BIM interoperability did not cause major problems, but it is expected to be more problematic working with legacy models: with more complex entities relationship queried by IoT objects might depend on the design "style" of the BIM, and thus not easily integrable with "open" applications.

2.4 Building lifecycle and management using BIM

One of the areas of greatest importance in the world of construction is the field of management of buildings and Real Estate. This sector employs a very diverse set of tools to achieve the goals. The field of Facility Management is very complex due to the many factors that distinguish it and therefore the use of appropriate information tools may allow greater control of all the variables. BIM tools can provide valuable assistance in this field; tests and analyzes performed during the PhD program have been oriented to understand how to transfer information between different applications and especially how to handle all this information inside Revit applications.



Fig. 1: Overview of scattering information.

As the information contained within Revit and about the model can be exported to other software or other databases, the question was if it was possible to add information into the model by actors not involved for oneself on the same model such as suppliers, manufacturers, insurers etc. Such information includes, for example, the production characteristics of a product or guarantees of a particular element. COBie standard, short for *Construction Operations Building Information Exchange*, a framework for organizing data developed and accumulated during the course of a building project for delivery to facilities owner and operators involved in lifecycle management. COBie is an American standard, which enables different stakeholders in the construction process; through excel worksheets extracted directly from Revit, to enter into single shared document information in their possession. The result of this operation is ability to use a single simple tool, to collect uniquely the data regarding the model. The standard is organized in 16 worksheets, containing some standardized heading information and used in the building industry,furthermore project team can decide to add any kind of information regarding design, construction, management etc. Not all COBie data are, or can be, developed within the Revit model in fact only 8 worksheets of 16 contain information that can be develop inside Revit (for instance information regarding spaces, types, zones, components, systems etc.). In this case, we used a specific tool made for Autodesk called COBie Revit toolkit (v. Revit Architecture 2012) which assists project teams to provide automated data export from Revit to COBie spreadsheet.

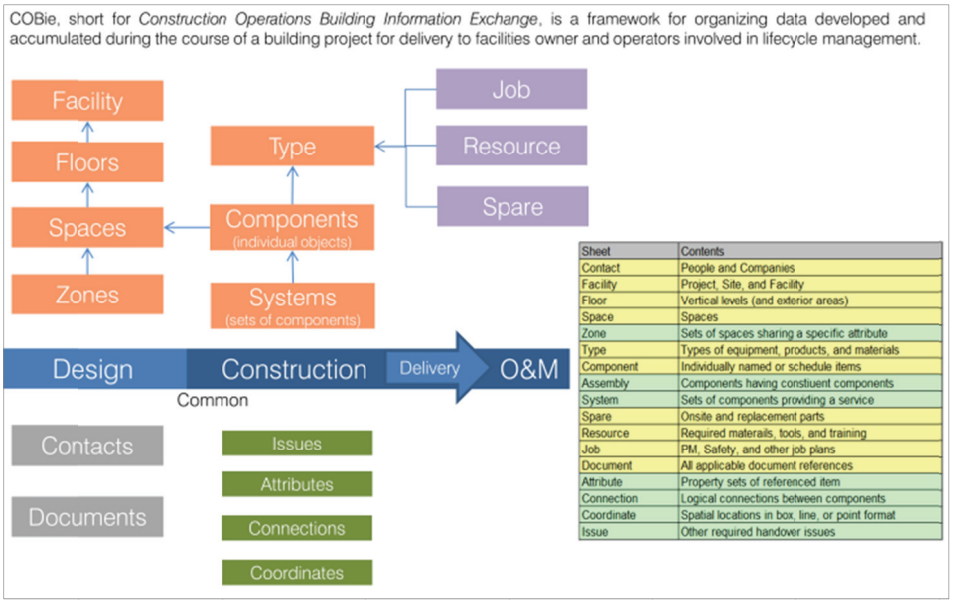

Fig. 2: Overview about COBie standard organization

The tests conducted, however, have revealed some problems related to the use of the standard, the most important of all is that the excel worksheet, containing the information, cannot be imported into Revit and consequently the final result is to have two separate operational tools. Nevertheless, this kind of approach, with precise and organized information represents an excellent way to reach the final goal to have a unique set of information without replication. In order to solve this problem (re-import in Revit) we have tested another solution: transfer information from Revit to individual operators through the adoption of DBlink that is a toolkit that allows creation of a bi-directional informational flow and can replace COBie worksheet which does not consider bidirectionality yet. This operational tool works within Revit and allows extracting, in this case in an Excel spreadsheet, the information contained in the Revit model. In this case the DBlink has been used because it is very dynamic, allowing the selection of the fields of Revit that it is necessary to extract and accordingly is very useful in case of shared parameters.
Using Revit DBlink two clear advantages are available: the first one is that extracting data in excel format allows non-expert Revit users to understand the information contained in the model and then make changes or validate it. The second one is that the excel file can be easily imported back into Revit, allowing an update of the information.
Operating in this way there is the certainty that the information remains always unique, without creating a multiplication of the same data that are difficult to manage and secondly allows a greater control on all transactions relating both to the design and the management.
The management of the building can also be enabled via 4D BIM. Its role is to add the time to a 3D CAD model, as the fourth dimension, and this allows the various participants of a construction project (from designers, contractors to owners) to visualize the entire duration of a series of events

and display the progression of construction activities over time providing an intuitive interface to project team and other stakeholders to easily visualize the assembling of a building over time. 4D modeling enables construction simulation during preconstruction to evaluate various options and identify critical aspects. Also, 4D storyboards and animations make BIM a powerful communication tool giving architects, builders, and their clients a shared understanding of project status, milestones, responsibilities, and construction plans.
Tangible benefits offered by 4D BIM are: Savings in cost and time; Risk mitigation; Conflict detection; Improved productivity; Enhanced quality.
Meanwhile, intangible benefits are: Improved communication among various division; and Visual communication to non-technical stakeholders and get their buy-in.
To investigate and verify the full interoperability of software for parametric modeling (BIM) with software for the control of projects in order to build a single 4D/5D model which can be integrated with ERP (Enterprise Resource Planning) systems and integrated platforms for management of construction and logistics like Archibus we used following software: AutoCAD Revit Architecture 2012 for BIM modeling; Autodesk Navisworks Management 2012 as 4D modeler in order to maintain as much as possible homogeneous application platform; MS Project 2010 for resource planning and control; MS Access 2010 and SQL Server 2008 as databases for data storage.
As a result of the process represented in Fig. 4 our objective was to create a single 4Dmodel for both the control and monitoring of the project.

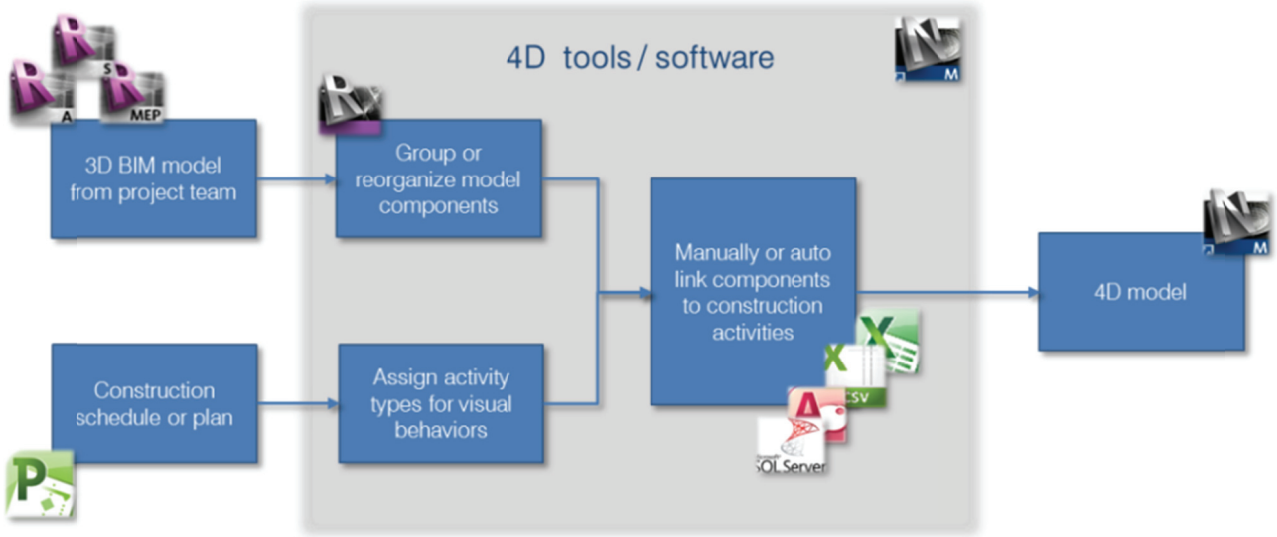

Fig. 4: The process of creating a 4D BIM.

During the import procedure of data from MS Project to Navisworks were added in the project only two attributes of all the activities, the dates of beginning and end of the project, meanwhile were not imported all other attributes such as the resources involved, precedence of the activities, constraints, project milestones and issues raised by the Critical Path Method. Also, once imported, the project is not in fact a true 4D model but only a BIM with a timing phase and the progress of the construction activities. For this reason the integration between the two environments cannot be considered a true and complete integration between the two environments because of absence of the key attributes for the control of the project. Furthermore, the exchange of information between the two environments is manual and not bi-directional: each change on the activities of the work plan (GANTT) must be turned in Navisworks model and connected to the phases of work and at the same time any change in the BIM model to be exported and connected to the working plane.

2.5 Tablet application to show the different data by Virtual and Augmented Reality
In order to increase the building awareness and to enhance any possible maintenance works, an Android application has been developed at Politecnico di Torino as task of the Smart Energy Efficient Middleware for Public Spaces (SEEMPubS) project and here tested, to provide building information exploiting both augmented and virtual reality. The end users of this application are the Building and the Energy Managers. The purpose of this solution is to overcome the limits related to the 2D visualization, presenting a 3D environment populated with building informations. To obtain the results firstly, we modeled the building using Autodesk Revit application through which architectural, structural, mechanical, electrical and HVAC models are merged to allow visualization, simulation and analysis of the building's energy performance. Thereafter the

architectural model has been integrated with sensors' models in order to allow observation of the temperature, humidity and lighting conditions of premises in real time. We modeled the parametric families of each sensor trying to make them likely, in this phase, particular attention was paid to the geometric and technical characteristics. In addition to the real sensors' modeling each room, some fictitious objects were inserted in order to allow the virtual navigation in the rooms. The next step was to export the building model created in Revit in .OBJ format and in this case, .FBX files were used because the geometry of these elements was not particularly complex.
As regards the materials, they are preserved in the passage from Revit to 3DStudio Max, however, the problems related to the subsequent conversion between .OBJ and .MLT files exist. In fact, most of them are lost and random materials are associated to the elements according to the layer to which they belong in 3d Studio Max. To overcome this drawback the materials should be reassigned to the objects through the material editor. Before proceeding with the exportation from 3DStudio Max, the geometry must be converted in mesh objects through the modifier "Edit Mesh". If this operation is not performed, the files .OBJ and .MLT do not contain any element. At this stage, it is important to verify that the exportation files do not contain geometric errors, in fact, it is possible to choose the method of approximation of the elements: triangulation, quadangulation, polygonal.
In order to ensure a fast maps loading in Android environment it was decided to perform a final files conversion from .OBJ to .JMF, exploiting the *Bonzai Engine* tool. Finally, through our application called *BIM Manager*, each .JMF file was loaded in the *BIM Server* in order to allow the virtual netsurfing of each room by tablet.
.MLT formats to be used for navigation by tablet.OBJ file contains the geometrical information of the model, while .MLT file contains the related materials. However, data exchange is not direct; in fact, the models must be imported in 3D Studio Max and exported after some modifications according to the formats required. Firstly, the model was exported from Revit using the .FBX format, subsequently, it was decided to use .DWG format due to some problems related to the geometry complexity. Using the CAD format it is possible to choose the type of solids that will be exported. In this case, ACIS geometry was used in order to drastically reduce the number of polygons that make up the various elements. During this procedure, the model has been broken down according to the types of elements. Furthermore, this choice is supported by the loading typology of the model allowed in the Android application, which specifically provides the subdivision of the model to improve navigation from a performance and methodological point of view.
The importation of the model in 3DStudio Max can be done in two ways: by creating a link to the source files through the Manage Links tool or as real importation of the source files. The link between files was chosen because with the direct importation the items were made independent from the file to which they belong. However, the second procedure, in fact, the nesting of the elements was lost voiding the process of rationalization followed during exportation. Importing .DWG formats allows to indicate the origin's source of the file while, using .FBX files, it is possible to choose the methodology for elements recognizing (depending on the material associated therewith, on the membership category or the family type, depending on not being combined entity or as a single object) and their subsequent grouping. During this process, some important information is altered: the units of measurement, the scale of representation, materials and the nomenclature of the elements. The units of measurement must be correctly set during the exportation from Revit, moreover, the option "rescale" must be checked and the units of measurement must be chosen again during .DWG files importation in 3DStudio Max.
The nomenclature of materials is automatically implemented with information related to the category of the element and the family type to which they belong. This represents a problem for the sensors and fictitious objects, which need to maintain their original encoding to be recognized. The problem can be solved in two ways:

- By renaming the objects concerned, but this involves a double work by the operator and a quite long procedure if those elements are numerous.
- Exporting these objects by .FBX format.

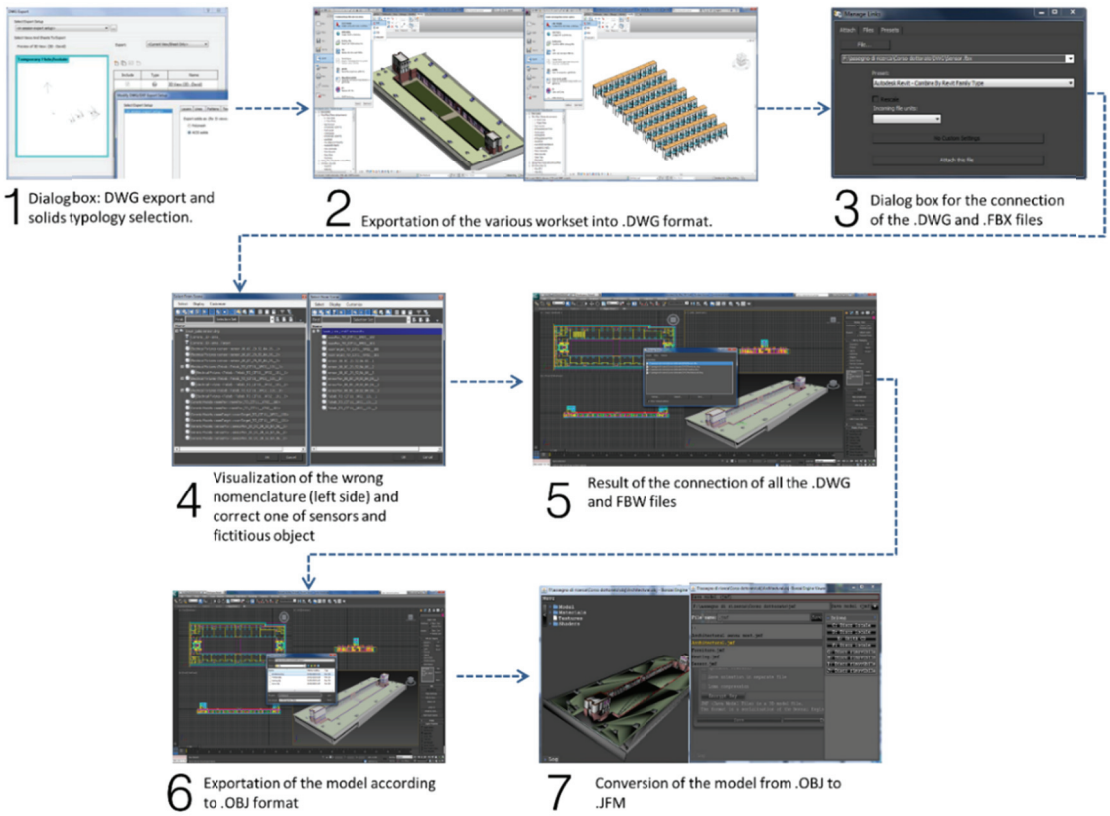

Fig.5: Operational step from Revit model to Android application.

In the following two images, there is an example of the Android App Graphic User Interface (GUI), where a 3D parametric model, described above, is shown using a tablet. The user can select information about: i) Architecture, ii) Furniture and iii) different systems such as Electrical, Heating and Ventilation. Moreover, these systems have been modeled using different colors (e.g. yellow for Electrical, green for Ventilation, etc.), as shown in figure below.

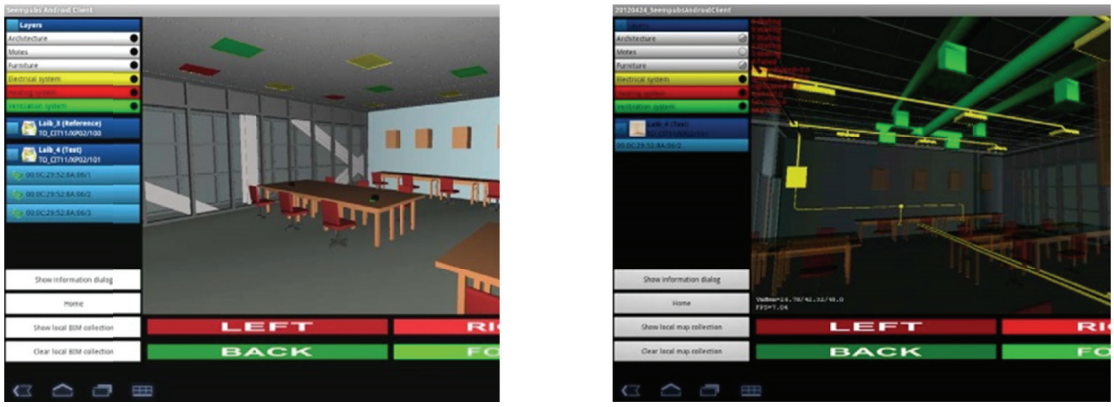

Fig.6: Visualization of the architectual model using a Tablet and of each system using different colours.

Finally, exploiting the augmented reality the Android App can provide information about rooms simply scanning its corresponding QR Code deployed into the building, as shown in figure below.

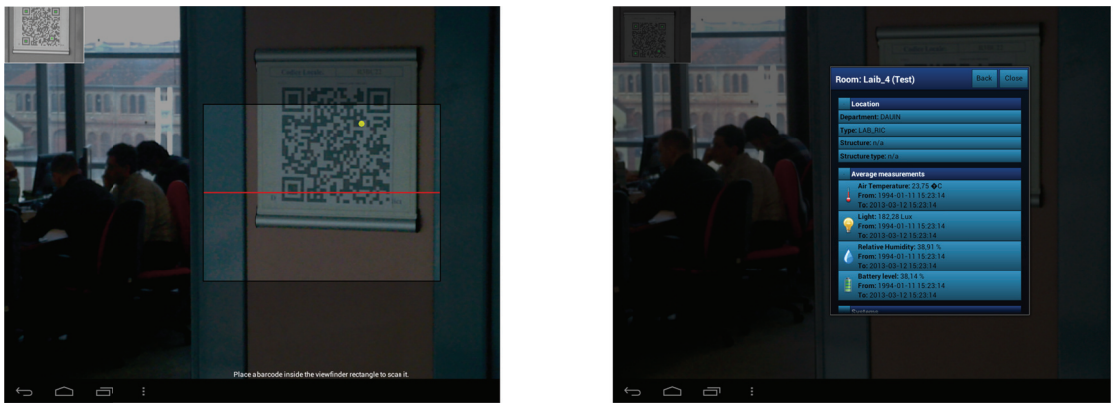

Fig.7: Example of room's information shown via Augmented Reality.

The general procedure can be summarized through the steps in the following picture summary.

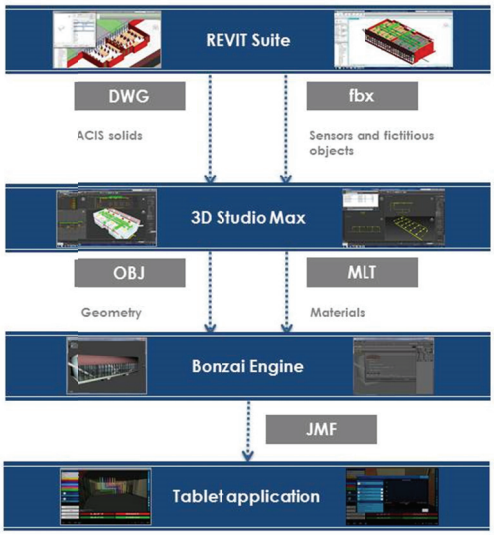

Fig. 8: Layout of the procedures followed.

3. Results

Although no best-in-class solution is available yet, open BIM tools are rapidly developing, providing useful instruments to support interaction with BIM models. Such tools provide interesting advantages concerning debug possibilities and extensions through inclusion of other open components.
The table of interoperability below is the result of the study we carried out during this course from different fields of study and different background. Of course, the table must be considered in progress as there are a lot of possibilities to use BIM software and for different compatibility processes.
Moreover, in this study, we evaluated the interoperability between BIM and tools for monitoring and control of projects with the expectation to create a single 4D model that would allow two-way exchange of information between the parametric model and the models created to monitor the progress of the project and the use of resources.
Tests have shown that, unfortunately, the full interoperability has not been achieved for a number of reasons:

- The model that is generated in Navisworks does not allow a bidirectional exchange of data and is not suitable to represent a 4D model itself, but only allows to visualize graphically the progress of a construction project;
- Data are not exchanged automatically between the software instead they must be exported and imported several times, with the risk of generating errors and inconsistencies;
- There is no integration SOA (Service Oriented Architecture) with ERP platforms like SAP, JD Edwards, Infor10, Microsoft Dynamics;

However, it must be said that there has been researched interoperability between software from different manufacturers and different technology 32 bit and 64bit; using Vicosoft software as 4D model generator and databases and software of the same by the same manufacturer (Oracle DB, BEA Weblogic, Spring, or SQL Server, MS Dynamics, MS Project Server) could be achieved a greater interoperability.

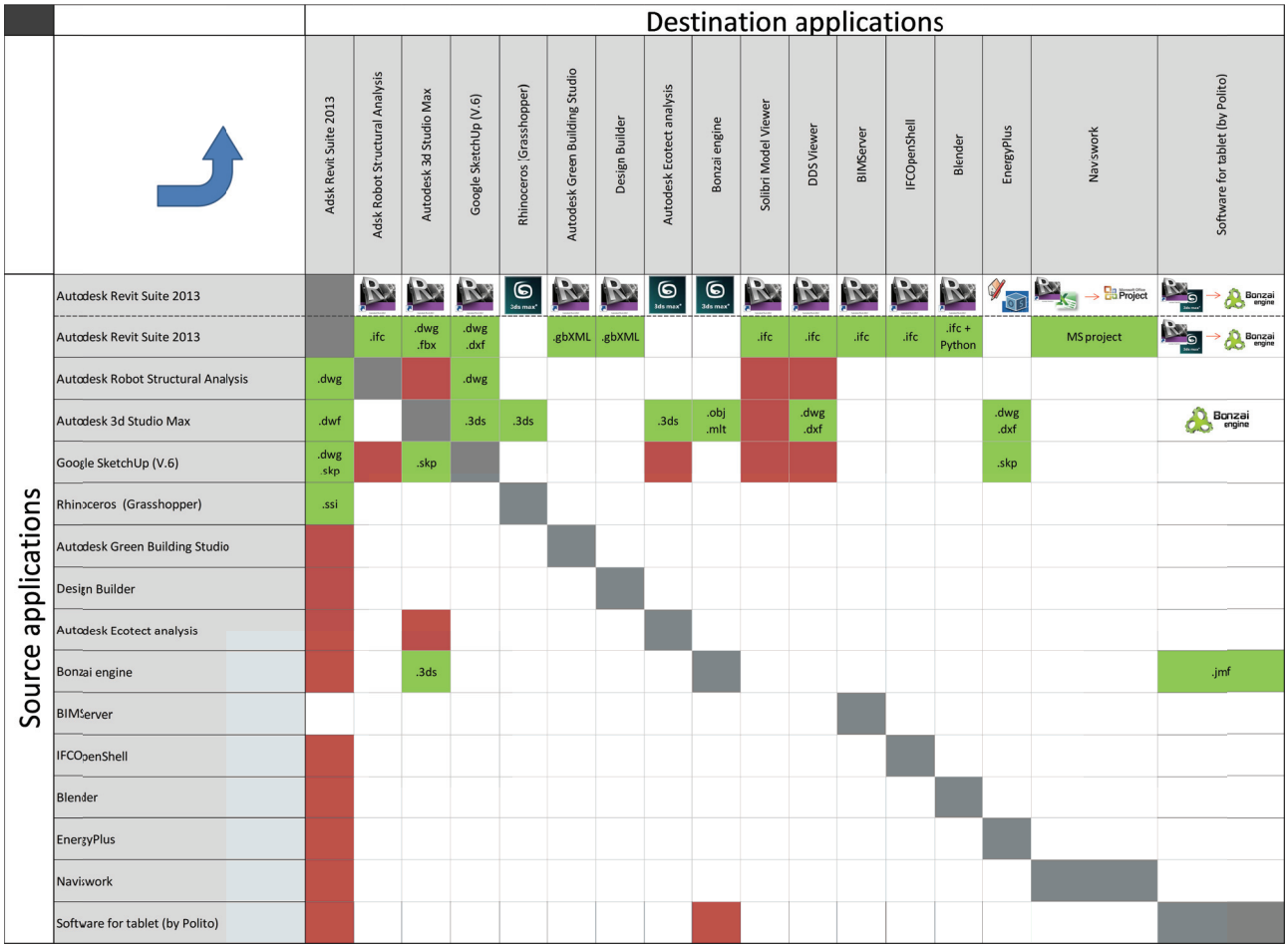

Fig. 9: Table of interoperability: Green Boxes- show the (best) possible solution to convert, Red Boxes- not possible to export from one applicatiom to another, White Boxes- cases under test.

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[5] REVIT http://www.autodesk.co.uk/adsk/servlet/pc/index?siteID=452932&id=14645193

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[7] TRNSYS 17 http://sel.me.wisc.edu/trnsys/

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[10] SHARED PARAMETERS http://wikihelp.autodesk.com/Revit/enu/2013/Help/00001-Revit_He0/2760-Tools_an2760/2979-Paramete2979/2980-Shared_P2980

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THE ARAB-NORMAN CIVIL ARCHITECTURE IN PALERMO: ENHANCEMENT STRATEGIES

Irene TRENTO[1] , Liboria Laura ZABBIA[1]
(1) Faculty of Architecture, University of Palermo, Italy
E-mails: irenetrento@libero.it, laurazabbia@hotmail.it

Abstract
This contribution aims to deepen the knowledge of a historical and artistic heritage of the city of Palermo, i.e. the Arab-Norman civil architecture, yet not adequately utilized, despite its importance as a 'World Heritage Site'.
Within the three royal parks (the Old, the New and the Genoardo), the Norman kings built the palaces of Maredolce, Zisa, Cuba and Scibene, always accompanied by water, both as a lake or as a fishpond, whose purpose was primarily hedonistic as well as productive.
The transmission of the architectural heritage to the future presupposes its promotion through the creation of an appropriate strategy helping to spread its knowledge and enjoyment. For example, Sicily has few cases of interactivity, that is virtual reality applied to the architectural heritage through multimedia resources in order to "modernize" the cultural offer and the communication with all targets of audience. In many cases indeed, a monument is soon forgotten when it is restored but not integrated into the municipal system. A new interpretation is therefore proposed, based on the relief together with the story of the restorations and the understanding of the building within its urban context, which is compromised by an idea of protection limited only to the emergency.

Keywords: Arab-Norman civil architecture, World Heritage.

1. Introduction

The study of the Arab-Norman architecture in all its forms is the research area of the working group coordinated by Professor Renata Prescia within the Faculty of Architecture of the University of Palermo. For some years, indeed, attention was paid to the Sicilian factories of the twelfth century through the research carried out in degree thesis and during conferences and study days. The project aims at a multidisciplinary cataloging of historical Arab-Norman evidences, starting from an historical-critical analysis performed on accurate surveys, with high attention to the history of the restorations integrated with the identification of authentic materic-constructive values. The aim is therefore to study such architectures no longer as a mere work of art, isolated and out of context, but rebuilding the relations between the different skills required for their fuller understanding, also with reference to the original urban surrounding (in the preserved residuals) and to the current one.
The Arab-Norman architecture can be classified into two categories: the religious one and the civil one. In particular, this paper aims to be a census of the civil architecture of public initiative in Palermo, on the basis of a renewed ‘awareness’ of its current conditions by the community, in order to develop a concrete proposal of multidisciplinary archiving for a "networking" of the factories. This analysis is essential in order to ensure a real enhancement through targeted communication strategies using means of knowledge able to attract the greatest possible number of users.

2. The census of the factories

Among the civil achievements of the Norman age, the Royal Park extended in the Plain of Palermo and the buildings built in it, the so-called *sollazzi*, are among the most complex and original creations of civil art and architecture. Built as places of rest and stop in the hunting grounds, they were characterized by fishponds and tanks while their typological peculiarity consisted in the presence of

iwan[1] inside the main building. The development of the Royal Park is divided into three periods from which three different names are derived: the Old Park, the New Park and the Genoardo Park.

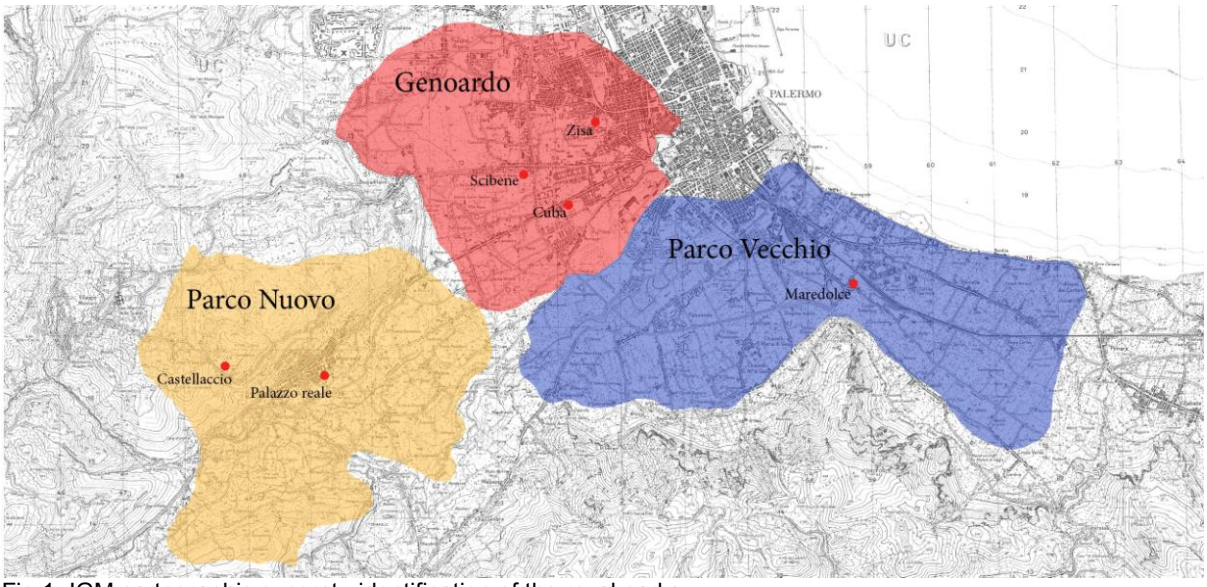

Fig.1: IGM cartographic excerpt , identification of the royal parks.

- **Old Park**: existing prior to the coming of the Normans, it is the first one among the Norman suburban parks in Palermo. It stretched from mount Grifone to the north, up to the city walls including the river Oreto. It housed the palace of **Maredolce**, whose construction supposedly dates back to around 1015, probably wanted by the Kalbid emir Gia'Far (997-1019), and now incorporated within the suburb of Brancaccio.
The restoration work recently carried out by Palermo Superintendence of Cultural Heritage and Environment, which only covered the building and part of the edge of the ancient fishpond[2], was an extraordinary experience of conservation and development performed through participation.


Fig.2: View of the Castle of Maredolce and the lake basin.

[1] The term *iwan* indicates a room closed on three sides by walls, usually covered with a barrel vault, and entirely open on the fourth side. In Arab-Norman *sollazzi* the *iwans* had a fountain.

[2] Scognamiglio M., Corselli D'Ondes G. 2000-2005 - Scognamiglio 2010-2011

In effect, the Parterre project (sponsored by the Department of Architecture in Palermo in partnership with other cultural and social components) promoted activities of intervention by residents, aiming at the enhancement of the building of Maredolce through its use and knowledge[3].
The general plan for Maredolce complex is not finished to date. Expropriation measures are still being performed on buildings overlooking the edges of the fishpond, aiming at restoring the entire basin according to the plan drawn up by Palermo Superintendence of Cultural Heritage and Environment.
The basis of the proposal, certainly praiseworthy in its intent, although not fully acceptable in its final choices, is a significant attention to the close relationship between the constituent elements of the complex and the landscape, as required by the culture of Arab gardens before and Norman Royal Parks later. The presence of the garden, survivor of the massive urbanization in which the area incurred, turns out to be, in fact, something of inestimable value. The Maredolce complex therefore represents a valuable historical and environmental survival, direct testimony of the so-called "Gardens of Paradise", because of the harmony between vegetation, water and architecture.
Along with this, the single system is created by the still existing relationship between the same vegetation and the other items originally ascribed to the *sollazzo* (the arches of St. Cyrus, the church and the caves of the Giants), now separated by the Palermo-Catania motorway which has severed the former unity of the complex.
Action is, however, still required to improve accessibility, such as the pedestrianization of the area in front of the Castle and the creation of a square providing a direct view of the Castle, now hidden by precarious and abusive buildings.


Fig.3:The square in front of the Palace and Giafar street.


Fig.4: The palace of Maredolce today.

- **New Park**: built as an extension of the Old Park in a wooded area, it stretched from porta Mazzara following the trail of a dirt road, today called Via Brasa, until reaching porta del Giglio, in Altofonte, and then continuing towards the Fig valley[4]. According to the descriptions given by historians, given the presence of many wild species the park was used as a hunting reserve.
- **Genoardo Park**: latest landscaping creation, it stretched between the city walls and the mountains beyond. Made during the reign of the two Williams, it represented the point of contact between the urban gardens and the surrounding countryside. The *sollazzos* of **Scibene**, **Zisa** and **Cuba** were built inside it in the twelfth century.
The palace of **Scibene** was built as a summer *sollazzo* in an earlier period than the construction of the Zisa [5]. The plant consisted of a fishpond, the Chapel, and a pavilion on several levels in which a cross-shaped room with *iwan* served as the center[6].

[3] R. Prescia, D.Trapani , The place of Maredolce. A paradise in Brancaccio. Strategies to qualify the industrial area of Palermo, in “Examples of architecture”, on line magazine, September 2012; and R.Prescia, The Norman “sollazzo” on the search for a new paradise, i, a. XXIV, n. 3, lug-set. 2012, pp. 18-22.

[4] Buda A., The castle of Maredolce between preservation and enhancement, supervisor: Prof. R. Prescia; University of Palermo, Faculty of Architecture, A.A. 2011-2012.

[5] Spatrisano G., *Zisa and Scibene of Palermo*, Palermo 1982, p. 63.

[6] The study of the Scibene has been addressed in the Laboratory of restoration of monuments maintained by Prof. R Prescia. The contributions graphs below were made by studentes Guarnuto, Pirrera and Tarsia.

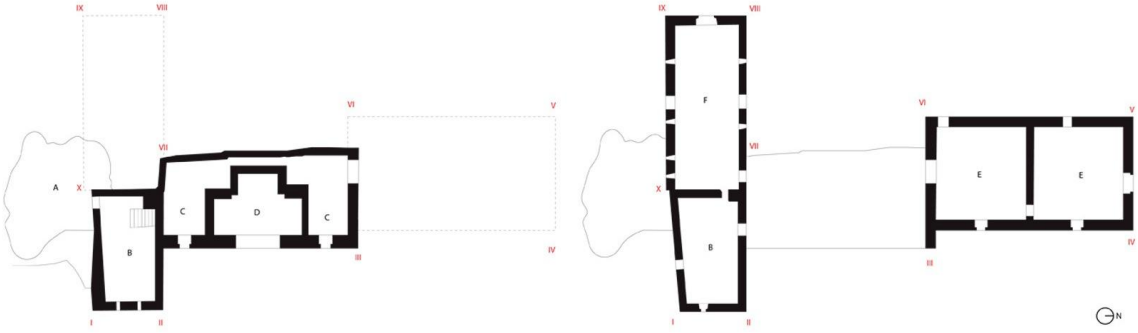

Fig.5: The Palace of Scibene. Plan of level I and II.

Currently incorporated within the Fondo de Caro, it is abandoned and in a state of advanced decay. The system of the front basin and the garden is, in fact, made unrecognizable by private buildings, while the structures of the upper floor, iwan and chapel, are in conditions of severe deprivation.



Fig.6-7: Aerial view and indication of the palace of Scibene.

The last restoration work on the building date back to the first half of the twentieth century, designed by Francesco Valenti in 1929, and Mario Guiotto in 1938. In the first case, the interventions involved the structural consolidation of an opening of the west façade and of the roof of the church with a single nave. In addition, following the example of Patricolo in St. Mary of the Admiral, Valenti predicted the inclusion of a toothed belt, made of more or less prominent blocks, indicating the ancient presence of the tower. The intervention of Guiotto was merely an integration, made with bricks, of gaps in the masonry of the south façade of the church. Since then, the lack of attention from the community and of a conservation planning has resulted in the state of extreme deterioration the complex faces today.

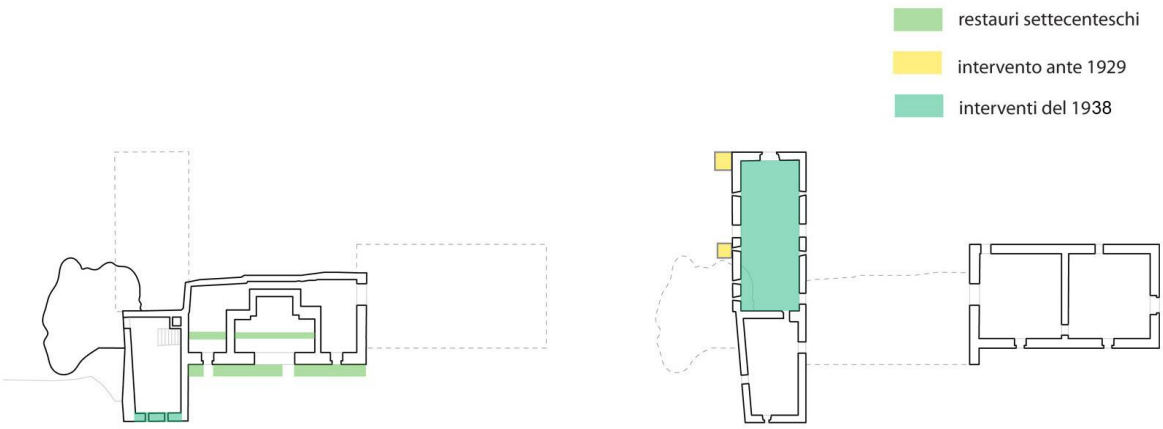

Fig.8: The palace of Scibene. Indication of restorative interventions.

The enhancement of this factory practicable from its recognition requires early action that should contain a program of interventions in three phases: prior acquisition of the palace to State ownership, subsequent restorative intervention and, finally, insertion into a tourist route allowing an easier use of the complex.
The palace of Scibene is currently part of the itinerary *Royal Art of Norman Age: The sollazzi and the royal park*, proposed in the publication *Sicilian-Norman Art* edited by the Department of Architecture of the University of Palermo in 2004[7].
Built by William I in 1165 and completed at the time of William II probably between 1175 and 1180, the palace of **Zisa** stood near an aqueduct and a spa facility dating back to Roman times. The complex was formed by a garden and a building on three levels with a rectangular plan and two towers at the center of the smaller sides. The rooms are arranged around the central hall with iwan, whose fountain was connected to the outside fishpond through a raceway.
Used between the fourteenth and fifteenth century as a fortified farm house, it was transformed into a manor in 1635 by the family de Sandoval, undergoing numerous changes. In 1951 it was expropriated and handed over to the Regional Demanio.


Fig.9 The palace of Zisa and the park.


Fig.10: The iwan

Following the collapse of the North Wing[8], which took place on October 12, 1971, the restoration works of the palace were initiated, and completed in 1991. What lacked, however, were subsequent recovery operations putting the building in relation with its context and especially with the elements that made up the complex of the Norman *sollazzo* (the chapel of the Holy Trinity at Zisa, the fishpond, the gebbia). The different properties, indeed, have not made possible a real dialogue between the parties, effectively depriving tourists of the possibility of using, and therefore fully understanding, the entire system of *sollazzo*. It is therefore desirable to design a real link between the palace and the garden, for example, through one of the *dammusi* facing the palace: and a link, according to an idea of restoration connecting modern monuments and ancient ones, with the "Cultural cantieri at Zisa", today at the center of the cultural events in the city of Palermo, thanks to the Museum for the exhibition of works especially created by young artists, called ZAC (Zisa Contemporary Art) and inaugurated last December. The "Cantieri" were set up in the Nineties in the halls of the twentieth-century Ducrot factory, south-west of the palace.

[7] AA.VV., *Sicilian-Norman Art*, Palermo: Kalòs, 2004.

[8] STAACKE U., *Un palazzo normanno a Palermo: La Zisa*, Palermo: Città di Palermo, Assessorato beni culturali, 1991.



Fig.11 Aerial view.

The *sollazzo* of **Cuba**, finally completed in 1180 by William II, consisted of a large pavilion at one level, surrounded by a fishpond. The small Cuba (also called Cubula), located in what remains of the garden of Villa Napoli, and the Tower Alfaina, also known as Cuba Soprana, whose Norman remains are now incorporated in the Villa, were part of the complex too. Even in the case of Cuba, as for the complex of Maredolce, the importance of the context assumes a fundamental role.
The site has been affected by many changes dued to the different intended uses that have followed one another over the centuries:


Fig.12. Aerial view.


Fig.13 The Cuba.

The building was, in fact, used as an isolation hospital (1575) and barracks (1860) before being reacquired by Palermo Superintendence of Cultural Heritage and Environment (1921), which has taken care of its several restorations. It's now time for a major redevelopment of the buildings erected on the edges of the original fishpond, which don't allow the use of the monument in relation to its immediate context, and the inclusion of the monument, as already proposed for the Zisa, in a journey including the adjacent monuments of the Norman church of Victory and the Royal House of Fools[9].

3. The Unesco application

The "Convention on the Protection of the World Cultural and Natural Heritage" was enacted in Paris on November 16, 1972, obliging the participating States (Article 4 of the Convention) to ensure the

[9] Sgrò R. *La difesa della cultura : dalla Cuba alla Real Casa dei Matti alla Caserma della Vittoria: un percorso storico per il recupero urbano,* relatore: Prof. M.T. Marsala, co-relatore Prof. R. Prescia; Università degli Studi di Palermo, Facoltà di Architettura, A.A. 2008-20*09*

identification, protection, conservation, development and transmission to future generations of the cultural and natural heritage situated in the territory.
For this purpose, UNESCO (United Nations Educational, Scientific and Cultural Organization), established in 2002 that the inclusion of new sites on the World Heritage List was necessarily conditional to the establishment of a "World Heritage Committee". On the basis of the data provided by each participating State, it was commissioned to design, update and spread a "World Heritage List" (WHL), a listing of the world heritage assets considered to be of outstanding universal value. Subsequently, the Committee had the task of drawing up a list of endangered monuments, indicating the goods which needed protective interventions and maintenance works and for which a Dossier of application and a Management Plan were required.
In the preparation of the Management Plan for "Arab-Norman Palermo and the cathedrals of Cefalù and Monreale" (2012) recently presented by the Regional Department of Cultural Heritage and Environment, the instructions developed by the National Commission UNESCO World Heritage Sites and by Local Tourism Systems of the Ministry of Heritage and Culture were taken into consideration.
The knowledge of a good is the first level of protection: to know is to document and its documentation is an essential support for the protection of cultural heritage.
Therefore, the application of Arab-Norman architecture to UNESCO is undoubtedly an important tool for increasing its knowledge, ensuring its preservation, enhancing tourism and enriching the process of management of proposed monuments within the route winding between Palermo, Monreale and Cefalù.
The monuments of Arab-Norman architecture, object of the Management Plan, are twenty three but only eleven were selected for the establishment of the Arab-Norman itinerary, as the only ones fully retaining artistic and architectural components and showing good conditions, enjoying appropriate protection measures.
The choice then fell on the Royal Palace, the Palatine Chapel and the treasure guarded inside it, the Church of St. John of the Hermits, the Church of St. Mary of the Admiral, the Church of San Cataldo, the Cathedral, the Palazzo della Zisa with the adjacent chapel, the Cuba, the Bridge of the Admiral, the Duomo of Cefalù and Monreale and their outbuildings cloisters. These monuments selected according to the criteria established by UNESCO, so because of their conditions of integrity, authenticity and good preservation, marked the route nominated for World Heritage Site.

4. Conclusions.

The monuments excluded from the Management Plan, although presenting features of authenticity typical of Arab-Norman architecture, suffer from both problems of preservation and, consequently, of fruition at the same time, as we have shown above.
We believe that their "sponsorship" through the inclusion in bibliographic and historiographical routes, of which this paper is intended to be a small part, and in virtual tours, through the creation of multimedia tools dedicated to them, can serve to urge the required restorative interventions.
We also believe that thinking of fruition processes to exalt their relations with other evidences of modernity, rather than freezing them in their compromised or lost native configurations, putting them back into current socio-economic dynamics, can serve more to their conservation through the recognition by the community in a more involved use of the 'cultural heritage' as <<that complex of man's works in which a community recognizes its particular and specific values and with which it identifies>> (Krakow Card 2000).
The need to document through new distribution channels <<cognitive information useful for the management, enhancement and use>>[10] of the monuments is essential to optimize the cultural offer and communication with all audiences. Despite the gradual spread of information technology[11], the application to cultural heritage in Sicily is uncommon. In fact, the Arab-Norman heritage doesn't have a support based on devices of augmented reality or geotagging.
Currently, on its website, the Superintendence to Cultural Heritage and Environment provides video describing the history of the factory and of the restorations of the Cuba and the Royal Palace, without giving the user a chance to interact with information. The Sicilian Regional Assembly (ARS) has created a virtual tour of the Royal Palace, where it's possible to explore environments without,

[10] Fiorani D., Restoration and technologies in architecture, Roma: Carocci publisher, 2009, p.98.

[11] One of the first cases of computerized documentation, made during the restoration work on Michelangelo paintings in the Sistine Chapel in the Vatican, dates back to 1986. Since then, the multimedia techniques have been used both as a support to the restoration site (through the use of GIS) and with tourist and educational purposes as in the case of the main museums.

however, any historical support. Finally, the Department of Cultural Heritage and Sicilian identity, Sicily UNESCO Sicily heritage foundation, has produced a CD Rom where it's possible to find information about the application of the Arab-Norman route and charts on its monuments. These, however, while providing data on the history and indicating a territorial scope of reference of the factories, are lacking in the communication of materic-constructive values, use and membership.
Object of this paper is therefore proposing a new type of archiving of monuments, starting from the setting provided by the cataloging of the factories for the Management Plan of the Arab-Norman route, in order to put the focus on cultural values unfamiliar to the users of the service.
The typical chart presented provides an "identity card" of the *sollazzo* of Maredolce accompanied by graphics and thematic maps[12]. In addition to the "standard" information such as the location of the complex, legal data or the description of the plant, special attention is paid to the history and, in particular, the history of the restorations, that historical process letting us understand the transformations of the factory such as additions, alterations or interpolations through a critical formation of a history of architecture aimed at restoration and enhancement.

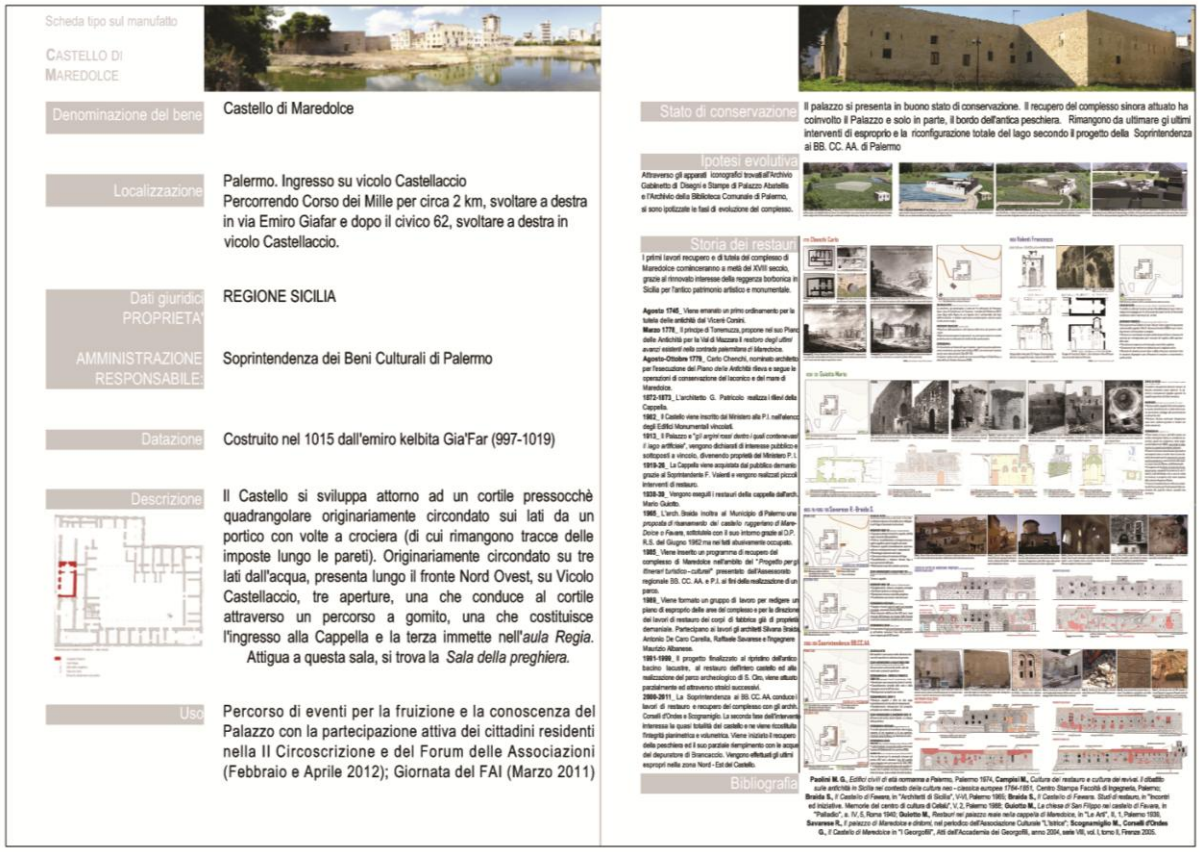

Fig.14: Example of a typical chart

[12]The chart has been drawn on the basis of the processing carried out by the architect Alessia Buda.

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Cultural Heritage and "Freedom of Panorama" Representing Italian Identity

Enrica Bistagnino
Department of Architecture DSA, Polytechnic School, University of Genova, Italy
E-mail: enrica.bistagnino@arch.unige.it

Abstract
What is the image of our country's cultural heritage?
Unfortunately it seemingly shows an image which is still fixed by taxonomic categories which, by forcedly separating cultural areas, products and actions, break up the unitarity that, even in local specificities, pervades our culture.
In this regard, we should attempt to provide a fresh image, trying to regenerate it in the knowledge of that transformative process which, over time and in particular productive, socio-cultural and territorial contexts, has played a role in widening the very concept of cultural heritage. It is a question of adopting a change in perspective leading to actions addressed to shaping an image with which to enhance the parts and the whole, to form a cultural panorama that depicts places in their wide range of forms, expressions and productions. This can therefore provide the people with that sense of identity from which emerges the respect for cultural differences characterizing contemporaneity.
The primary condition to depict this type of image may clearly be ascribed to the concept of freedom. Freedom to address different themes, genres, products, areas, events and so on, in a cataloguing mix that paints a picture where identity is also deduced from strong contrasts, from apparently incoherent light and shade.
"Freedom of panorama" to be able to choose, represent and interpret following the standard norms, but irrespective of field restrictions and implemental prescriptions, even the highest expressions of cultural heritage.
This paper intends to recommend some working hypotheses to paint the identity picture of some territorial areas by freely selecting, representing and interpreting the related tangible or intangible cultural heritage.
A contemporary picture that also takes into account the multiculturality as central and unavoidable in describing cultural heritage as an open, living system.

Keywords: Heritage – Representation – Identity

1. Cultural Heritage and "Freedom of Panorama". Representing Italian Identity

It is conventionally accepted that the complex description of a country's cultural identity must refer to the evolution of its way of thinking and the articles it produces, but also to those forms of self-expression that have delineated its image over time, often driven by representation in all of its different mediums and declensions.
In other words, according to this vision the process is less about examining only material and immaterial data that, with regards to the definition of identity, already constitute an incredibly vast repertory of elements (not always clearly linked to a unitary vision) useful to study, and more about identifying, selecting and 'agreeing on' diverse forms of self-reflection. Forms that, over time and as part of an incessant flow of cultural perspectives, have demonstrated the complex and often contradictory vision and attribution of meaning with respect to events.
Hence in this scenario, where, as Bauman writes, identity resembles "a cluster of problems rather than a unique question" (Z. Bauman, 2003), representation once again appears to be the privileged vehicle for attempting to trace a few signs of contemporary identity. In fact, as thought-form, representation

becomes one of the principal actions for establishing and clarifying the meaning of fragments of research. It renders them recognisable in their temporal evolution, as well as updateable, implementable, immediately accessible and available to the transformations generated by cultural evolution. Thus, in the end, always contemporary in their consistency and, above all, in their image as a source of identity.
However, if representation is the medium for attempting, between units and locales, to delineate the numerous modulations of Italy's contemporary identity, and in so doing assuming almost a dominant role with respect to real data, what forms of representation must be imagined? Toward what facts, what elements of cultural heritage must we turn our attention?
It is clear that we are dealing with a semantic question. Establishing what to include within the framework of representation and fixing a point of view comports an intentional attribution of meaning that belongs more to the elaborative than to the descriptive sphere of identity.
Having said this, if we turn our attention toward the overall image of Italy, and simplifying things to some degree, we notice that the 'genre' of cultural heritage most often considered, together with the principal means of describing them, on the one hand reflect an interest that remains strongly directed toward 'traditional' cultural heritage and, on the other hand demonstrate an attention toward diversified and up-to-date theoretical-methodological researches that, however, appear to remain substantially autonomous from one another in their language and aims.
On one side we can consider the countless 'informative' representations whose formal reference to procedures of inventorying typical of methodological unification, functional to activities of institutional cataloguing and documentation [1], propose didascalic images that substantially sacrifice an author's freedom of expression. These representations, whether graphic or photographic, analog or digital, static or dynamic, on-line or off-line (to use some of the most common antinomies able to evoke the conceptual and technical-methodological complexity subtended by the theme of contemporary representation) conserve the role and aesthetic of the documentary image: referential, informative and intentional. They can thus be considered representations 'hardened' by the analytical-descriptive model structured by classification, which transfers a schematic and hierarchical taxonomic structure to the image.
From another point of view, which observes and operates from beyond this documentary vision and within a substantially autonomous perspective, we find subjective images transmitted by an apparatus of signs that, in conceptual and technical-methodological terms, are freely defined within an incredibly vast repertory of genres and techniques. They are precious images that, despite their documentary non-intentionality and thanks to their value as a mirror of reality (György Lukács, 1963), favour an understanding of the data represented and the formation of an anthropological conscience. In other terms, a progressive aesthetic renewal allows a voluminous and powerful body of often heterogeneous images to transmit several distinctive traits of the continuous transformation of cultural identity.
One example includes photographs of architectural, artistic and landscape heritage. We can also consider the countless and often under-evaluated 'styles' of photography, such as that related to the world of tourism: by searching for themes and points of view with the intent of creating emotional suggestions, they implicitly declare a propensity, on its own positive, toward the development and management of a country's cultural and landscape resources, also in economic terms. This consideration can be extended to traditional pictorial representations that, between views of the landscape and depictions of interior spaces, reveal natural and cultural forms and speak of the public and private dimension; we can consider the signs of graphic design employed by modern and contemporary communication, whose powerful innovative importance is both technical and, above all, linguistic; we can consider all those images whose evocative dimension makes them independent of their intrinsic meaning, 'involuntary' icons of moments that have marked our history and our cultural, social and political identity; we can consider, what is more recalling the highly negative effects images can produce, the mosaic of mass media images, in some cases kitsch and stereotypical that, in a popular and pervasive dimension, distort reality and push Italy towards the grotesque; to conclude this brief and partial list we can consider the incredibly vast articulation of specialised images and, on the contrary, the marvellous myriad of representations that use different signs, forms, techniques and means to give voice to any individual or social group desiring to participate, often employing a textual and visual slang, in an emotional, intellectual, cultural process of sharing.
Hence it is immediately evident that the two fundamental macro-categories of representation synthetically listed above – tied on the one hand to institutional, codified and regulated representation, and on the other unrestricted, free and subjective – unite images that, speaking separately of cultural environments, products and actions, deeply fragment representation as a source of identity and its communication. Successively, for the codes employed, this process implicitly turns to diverse groups of spectators-actors and produces a further 'parcelization' of information.
In light of this condition it would seem important to test an updated image that is capable, between textual citations and free interpretations, to consider and indicate a renewed panorama of cultural

assets that can be deemed comprehensive, also in apparent contradiction with the very concept of the asset. In this sense, we must first of all recall how the comprehensive process of transformation generated by continuous cultural, socio-political and economic dynamics has contributed over time, in some cases slowly and progressively, in others rapidly and discontinuously, to expanding the territory of Cultural Heritage, welcoming what may have appeared lacking in dignity, value or even meaning only a short time earlier. It therefore appears important to adopt a change in perspective, extending attention from an aesthetic dimension towards an ethical dimension of the asset to generate representations inclusive of their multiple, even contradictory themes. They can be used to model a cultural fresco that uses innumerable signs, expressions and productions to speak of place. This change in perspective sheds light on values, in addition to documenting forms of deterioration, dramatic events, indifference and civil, social and cultural violations, with the objective of reading facts within their implicit dimension of memory and value.

The principal cultural asset to be protected and valorised is thus our comprehensive history, assumed integrally and without distinctions between light and shadow. The contemporary representation of Italy must be a truthful story that intends to procure a sense of identity. An identity that may later produce the respect for cultural diversity characteristic of our contemporary era. This must be a collective project, not only in its forms and 'individual' channels of management, but adopted also in institutional environments and part of instruments for the conservation and valorisation of Italian heritage. Examples include the procedures adopted by the Regional Cultural Heritage Information System (SIRPAC), which consents a participative web-based cataloguing of cultural heritage.

Thus the construction of an image as a source of identity that takes form here can be linked to two primary key themes: 'respectful criticism' and 'freedom of panorama'.

'Respectful criticism' (K. Popper) toward all that is traditional, toward the past, toward conventional forms of representation, in order to recognise material of value, but also in order to retrace the limits and, through opportune actions of research and experimentation, to seek to further develop tradition.

'Freedom of panorama' [2], in other words, the freedom to represent and re-semanticize public buildings, projects and sites, without violating an author's rights. Hence a form of representation that, while it embraces reality, is presented as an autonomous aesthetic subject of reality itself, free to reconfigure it according to intellectual visions. For certain aspects, in the field of representation the concept of 'freedom of panorama' recalls an approach to design of radical memory: an approach that interprets the "continuous movement of thought […] in the eternal attitude of man […] to incessantly redesign the image of the world" [3].

Thus 'freedom of panorama' is also the freedom to overcome the concept of delimiting the image and, earlier still, the concept of genre, in order to unite, or better yet integrate heterogeneous and apparently/truly incoherent themes in a single open image.

This means expanding our point of view to broaden the field of representation with the intention of 'annulling' the concept of delimitation, substituting it with a notion of continuous extension. In definitive terms this comports a fundamental conceptual leap that shifts the objective of representing cultural assets and identity from the image, as the demarcated and primary data of communication, to its elaboration, as the founding process of the search for identity.



Fig. 1: *Freedom of Panorama* 01: Ugo Carrega, *La Natura Fragile del Dio movimenta la forma*, 1987; Emanuele Luzzati, *Genova Regine*; Brigate Rosse, release; Ente Nazionale Industrie Turistiche (ENIT), tourist brochure, 1940.

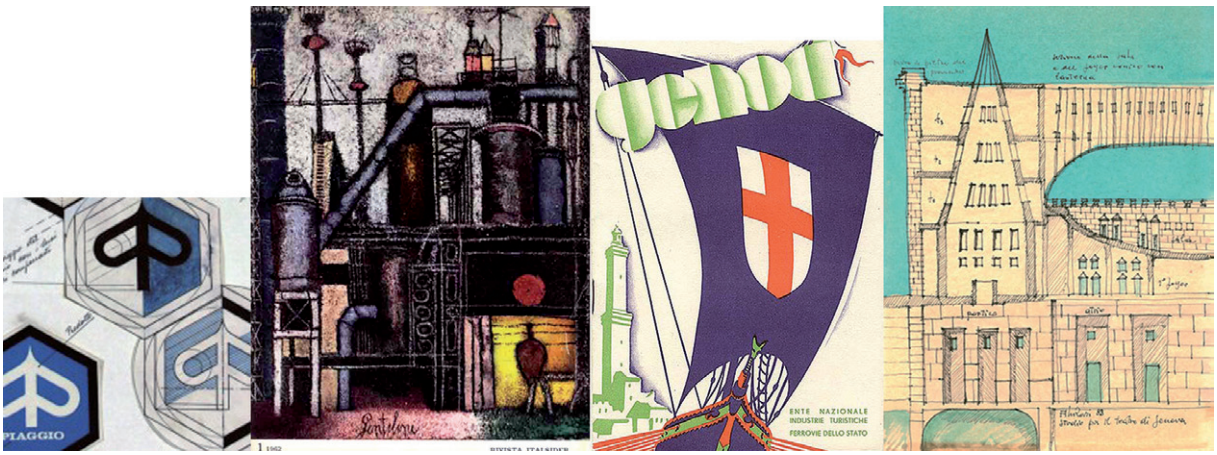

Fig. 2: *Freedom of Panorama* 02: Piaggio, study design of the mark; Franco Gentilini, *Ricordo di Cornigliano*, cover of the newspaper "Italsider", art director Eugenio Carmi, 1962; Ente Nazionale Industrie Turistiche (ENIT) and Ferrovie dello Stato, tourist brochure, 1932; Aldo Rossi, study design for the Carlo Felice Theatre, Genova, 1989.

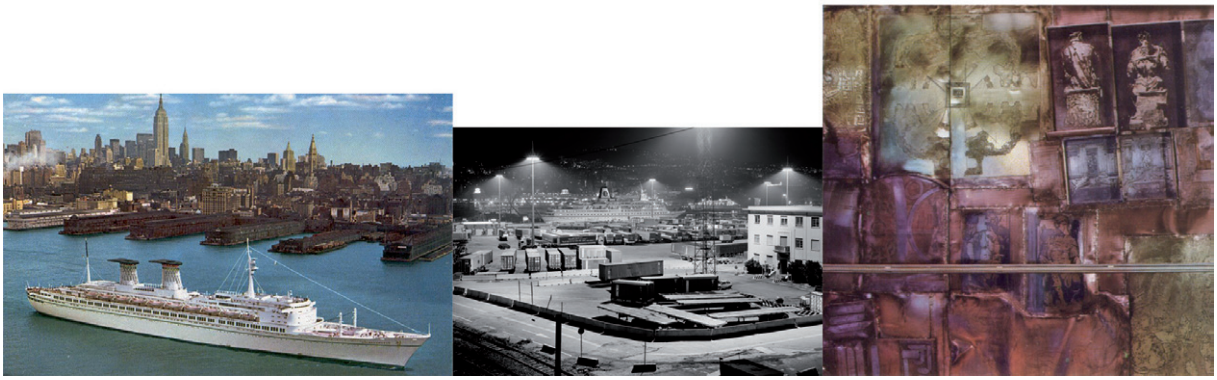

Fig. 3: *Freedom of Panorama* 03: the Michelangelo in the port of New York; Gabriele Basilico, *Genova*, 1997; Massimo Ridolfi, the Michelangelo (Italia - Società di Navigazione), metal panels, dedicated to the study and work of Michelangelo, for coating the walls of a tunnel link between the bar area and the residence halls, 1965. Gio Ponti wrote: "*An italian ship is a piece of Italy, it must represent the higher aspects of the most prestigious of italian taste, culture, arts, crafts [...]. The visitor must learn Italy on the ship*".



Fig. 4: *Freedom of Panorama* 04: Giorgio Bergomi, *Genova alla finestra*, 1977; Gruppo A12, *visions for Genova*, 2013; Raimondo Sirotti, *Mattino*, 2012; Franz Prati, *La scrittura della città*, 1987.

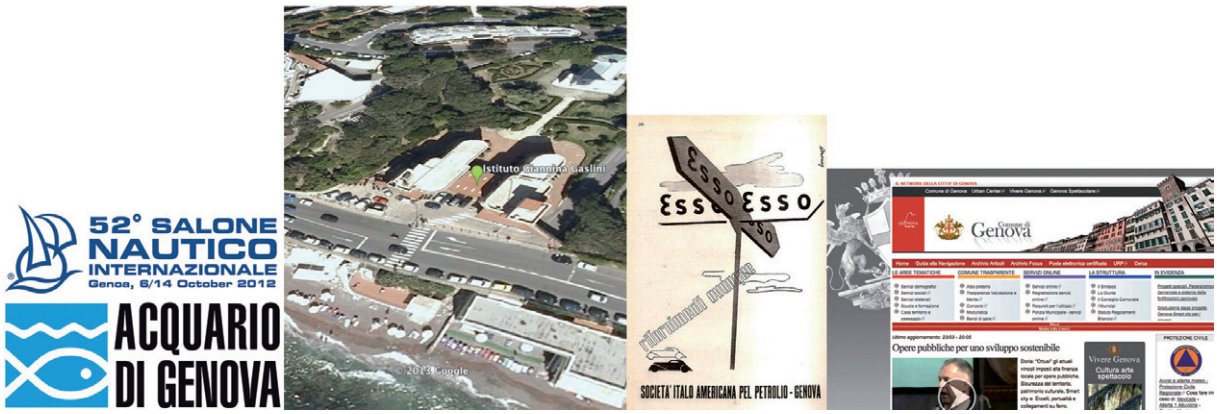

Fig. 5: *Freedom of Panorama* 05: Acquario di Genova, mark; Salone Nautico Internazionale di Genova, mark; Istituto Giannina Gaslini, Istituto Pediatrico di Ricovero e Cura a carattere Scientifico, google earth, 2013; Dario Bernazzoli, advertising image for ESSO; Town of Genova, homepage.



Fig. 6: *Freedom of Panorama* 06: Genova, *Gozzi*, 2012; Genova, clashes during G8 period, 2001; Carlo Emilio Gadda e Giuseppe Ungaretti at the thermal power plant of Cornigliano (Genova), in "Civiltà delle macchine", 1953.



Fig. 7: *Freedom of Panorama* 07: *Mi ritorni in mente*, catalog (ed. Corigraf) of the exhibition organized by the municipality of Genova about twenty years of music in Genova, 1997; "Monello", n. 43, 1979, cover with Beppe Grillo; Renzo Piano, *Biosfera*, sketch, Genova, 2001; Camallo of the port of Genova; Fabrizio De André, *Crêuza de mä*, Genova, 1984.

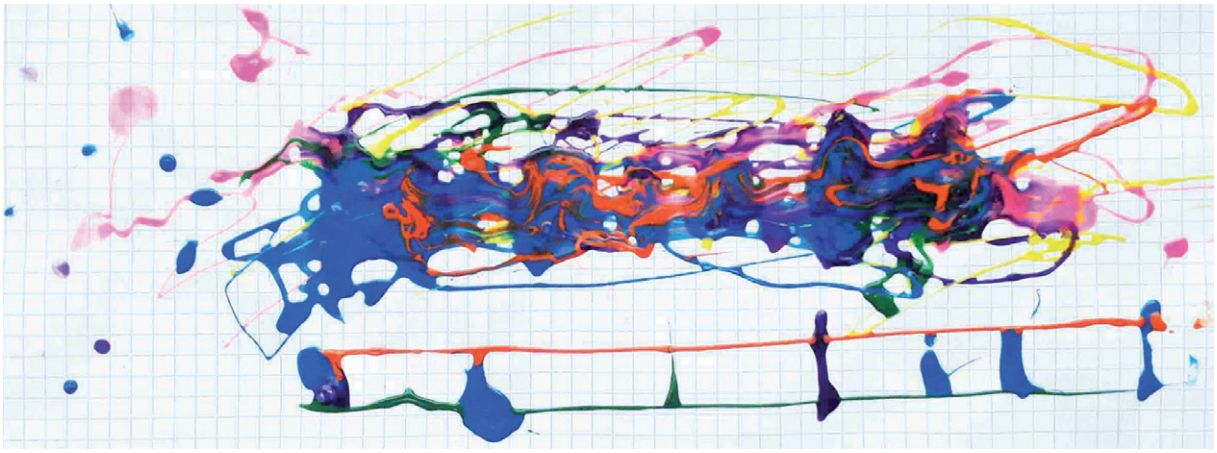

Fig. 8: *Freedom of Panorama* 08: *Senza titolo*, Alberto 5 anni.

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[1] As examples I mention the documentary apparatus realised as part of the cataloguing activities promoted within the Italian Ministry of Cultural Heritage (MiBAC), by the Central Institute for Cataloguing and Documentation (ICCD, instituted in 1975 with the aim of continuing the activities undertaken in 1969 by the Central Office for Cataloguing instituted by the Ministry of Public Education) and aimed, principally, at the archiving and conservation of cultural assets as a result of art. 13 of Presidential Decree n. 805 from 3 December 1975, as follows:
"The central institute for cataloguing and documentation explicates functions in the cataloguing and documentation of cultural assets of archaeological, historical-artistic and environmental interest and, among others, in particular:
1. elaborating programmes of the general cataloguing of assets and establishing methodologies;
2. promoting and coordinating final activities of cataloguing and documentation and managing the unification of different methods;
3. constituting and managing the general catalogue of assets listed above;
4. editing publications inherent to the activities described above;
5. managing relations with foreign, public and private institutions, and with international organisms interested in the cataloguing and documentation of cultural assets".

[2] Freedom of panorama refers to a limitation on authors' rights that consents the realisation and reproduction of photographic images of buildings, sculptures and other art located in public spaces without infringing copyright.

[3] Manifesto of "Alchimia", on-line at www.alchimiamilano.it [10/2007].

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Between anti-museum and interactive museum: the case study of "Paolo Orsi" in Syracuse, Italy

Alessio CARDACI[1], Antonella VERSACI[2], Luca FAUZIA[2]
(1) Department of Engineering, University of Bergamo, Bergamo, Italy
(2) Faculty of Engineering and Architecture, KORE University, Enna, Italy

Abstract
Set up in 1884, for collecting the eastern Sicily's antiquities, the National Archaeological Museum of Syracuse has evolved during the time following the implementation of collections and the transformations of the concept of the museum's role in society. Initially based on a nucleus composed of a few objects and some private collections, it was gradually enriched during a period of almost fifty years of intensive excavation and research undertaken by Paolo Orsi. Benefiting from the rigorous scientific requirements indicated by Luigi Bernabò Brea, the museum started a new life when it moved to Villa Landolina's area where a new structure was conceived by the architect Franco Minissi, a personality already well known in the museography's field. The building and the exhibit design were studied by Minissi to ensure the maximum flexibility. The idea was to create a museum in movement or an anti-museum able to adapt to the scientific progress and new archaeological discoveries. Conceived by its creator as a vital center for research and cultural promotion, the museum, thanks to virtual reality technologies, can today found new capabilities. Starting from a careful "reading" of the building and its environment, made by integrating surveying methods, this case study intends to contribute to the definition of a new approach to the museum visitor experiences through multimedia.

Keywords: Museography, Interactive museum, Cultural heritage, Franco Minissi, Syracuse

1. Origin and development of the National Archaeological Museum "Paolo Orsi"
Following the creation of the Kingdom of Italy, the need of conveying and reinforcing the new united nation through the recognition of a common cultural and artistic heritage, resulted in the transformation of the management of cultural institutions in the former states, placing them under its exclusive control. Italy maintained initially unchanged the homogeneous legislative body of the pre-unitary states in the field of protection of heritage, even due to the obvious difficulties dictated by the opportunity of reconciling the liberal ideology with the public interest resulting from the preservation of cultural goods. During the first years of the young Italy, the legislation in this sensitive field was therefore characterized by the persistence of a territorially differentiated discipline and by the freedom of private owners to make indiscriminate use of "their" works of art, including their alienation abroad. This, with the only exception of the Kingdom of the Two Sicilies where this practice had already been banned by the Bourbon government, also admitting the possibility to expropriate the monuments belonging to individuals, whether in ruins because of neglect [1].
More concrete protection activities in favor of artistic heritage in the new state will begin, however, only in the last two decades of the 19th century with the establishment of the *national museums*. It was the first attempt of gathering the small private collections also by virtue of an artistic and cultural heritage's legal status, by then recognized as a public good with collective purposes. We still have to wait until June 12, 1902, so that the first law of protection was promulgated and the *catalogo unico dei monumenti e delle opere di interesse storico, artistico e archeologico di proprietà statale* established. However, the Kingdom of the Two Sicilies, well in advance of the rest of the peninsula since the end of '700, had felt the need to bring together the artistic and archaeological heritage allowing its access and knowledge to the scholars and the whole community.

1.1 At the beginning of the protection of the archaeological collections in Syracuse

In the city of Syracuse, the objects that foreign travelers came to admire had, until that time, been protected by a few families, notable art collectors. One of the oldest collections was that accumulated by the archaeologist Vincenzo Mirabella, who gathered in his great building opposite the church of *San Tommaso Apostolo*, in Ortigia, a number of "*endless scraps of weights, mosaics, granite and marble*" [2]. It is although to 1780 that the origins of a museum institution date back, when the Bishop G. Baptist Alagona, brought a small collection together in the library-museum of the Seminary, located in *Piazza del Duomo* [3].

At the end of the century, the creation of a city museum combined with a cabinet of natural history was requested by the poet Tommaso Gargallo. He raised the issue of gathering up in a single collection "*simple homelands objects, both cultural and natural value*"; i.e. whether those were in possession of some collectors or those coming from the new excavations undertaken by Landolina's family [4]. For the first time, the need to establish a native museum came to light. Certainly, times were not ripe yet but this proposal became stronger following the discovery in the *orto Bonavia*, in the ancient district of Arcadia, of the statues of Asclepius (7 December 1803) and of the Venus Anadyomene (7 January 1804) by Saverio Landolina, the *regio Custode delle antichità delle due valli Demone e Noto*.

Landolina will vigorously carry forward the purpose of creating a museum. This intention seemed even more necessary in light of the fact that those exceptional discoveries have had a so high resonance to make stronger the interest of antiquarians and travelers against "*Syracuse buried antiquities*" [5,6]. According to his idea, the city museum would have to collect not only the discoveries of new archeological excavations but all the material scattered in private collections in order to offer to scholars and visitors, a complete overview of the archaeological heritage of the town.

In addition, the discovery of Venus, while it had increased the interest of scientists to local archaeology, on the other hand, had attracted the attention of the Royal Court, which could solicit its transfer to Naples under the pretext of the lack of a proper seat in Syracuse. A request that will be advanced several times but always been circumvented by Landolina. His frantic search for locals where to accommodate the new museum will finally succeed in September 1809 when the Bishop of Syracuse Filippo Maria Trigona will offer some rooms in the Seminary to form the first city museum. The initiative was quickly approved by the king and the museum opened on April 20, 1811. The organization of the museum was ensured by Mario Landolina (his father had meanwhile withdrawn because hit by a paresis) but it was not an easy task. The collection was made up of precious Greek and Roman monuments, ceramic materials of different nature, inscriptions, lamps, Christian's clay pots, paintings, urns and charnel houses but museum's spaces were limited. It was precisely for this reason that a discussion on its extension will be launched [7].

1.2 From the establishment of the first premises to Paolo Orsi's activities

It is following the discovery of the *sarcophagus of Adelphia* on June 12, 1872, during the research carried out by Saverio Cavallari in the caves of *San Giovanni* [8], that we can assist to a new impetus in order to give better placement to the civic valuable works of art. In 1876, an agreement was signed between the Central Government and the Town Hall for the construction of a new building for the museum that was originally supposed to rise in the place of the Post Office building. This hypothesis was therefore abandoned in favor of the church of *San Giovanni di Dio*. In the meantime, however, the civic museum, temporarily located in the premises of the Seminary, next to the Alagonian library, was declared a *Regio Museo Archeologico Nazionale*. In December 1880, the demolition and transformation work designed by the engineer Luigi Mauceri and concerning the church of *San Giovanni di Dio* and the annexed *Fate Bene Fratelli* hospital, begin [9]. The work was interrupted for two years and restarted only in the summer of 1882, under the direction of Luigi Spagna. The building was completed in 1885 and the museum officially opened on 11 April 1886.

The establishment of a state museum in Syracuse, a few years from the Italian unification, was a very important political act, also in relation to the place it stood, an area inhabited since prehistoric times, later become the center of the religious life during Greek colonization with the sanctuary of Artemis and Athena. The new structure was born in order to preserve the archaeological material coming not only from Syracuse but from whole Eastern Sicily, as had already been in Western Sicily, by virtue of the construction of the Archaeological Museum of Palermo. The first director of the fledgling National Archaeological Museum was Francesco Saverio Cavallari, who was arrived in Syracuse one year before, after having been the *Direttore delle Antichità di Sicilia*. The technical report made by Luigi Spagna on 10 July 1879, states that on the first floor was placed a small library and that the museum had five halls: the hall of epigraphy and of the Christian sculptures from the catacombs, the hall of statuaries, the hall of the Greek-Roman fragments, the Tribune of Venus, the hall of the ceramics. But it was thanks to the contribution of the archaeologist Paolo Orsi, that the contents were remarkably enriched with new discoveries that gave more and more scientific character and prestige to the organization of the museum. Named in 1888 as inspector of the state museum, the young archaeologist Paolo Orsi (Fig. 1) became in 1895 its director, in place of Cavallari, maintaining this



Fig. 1: The Archeological Museum in Piazza del Duomo's premises (left) and some objects from collection (right).

role until 1934. Welcomed, not without suspicion, in the Royal Superintendent of Syracuse, he was immediately attracted by the Greek origins of the city and by the charm of its many archaeological remains. He then immediately began an intense series of field investigations and collections that enabled him to draw the first systematic historical study on the original cultures of the Sicilians, the pre-Hellenic Sicily, the famous Sikeloi. The activities carried out by Orsi were not therefore only limited to the issue of island's origins. His researches on Greek civilization in Sicily, and especially in Syracuse, were highly profitable. The studies that he undertook about the Athenian still represent a real scientific breakthrough. His interest was also directed towards the discovery and the knowledge of sacred places and public buildings, such as the Greek necropolis and the Olympian Zeus of Syracuse. He personally accomplished very daring explorations to the necropolis of Pantalica, Cassibile, Megara, Castelluccio, Thapson, Licodia, Valsavoi [10].
It was the growth of artifact collections and documents coming from the large excavation expeditions mainly conducted by Paolo Orsi - in a methodical, for the time, rigorous and advanced manner - to lead to the need of designing new spaces for the museum. Already in 1916, Paolo Orsi had complained to the Directorate General of Antiquities and Fine Arts in Rome, the lack of space. The museum's collection already included in the early 20th century, numerous items concerning the prehistory of central and eastern Sicily, architectural terracottas, simulacra, small statues found in the tombs and sanctuaries, painted vases representative of all periods, ceramics, and the main pride of the museum, a large coin collection. A repertoire so vast that Guido Libertini in the introduction to his guide at the museum of Syracuse said: "*Faced with this wealth of materials we understand how space could now be lacking and therefore how the various collections, packed in different environments while waiting for a desirable forthcoming enlargement of the premises, are not always arranged in a strict chronological order* "[11]. But an extension will be possible only many years later.

1.3 The methodological rigor of Luigi Bernabò Brea for a re-foundation of the museum

At the end of 1941, when Luigi Bernabò Brea moved to the Department of Antiquities of Eastern Sicily, following a fascist measure by which the State officials from the North were transferred to the South and vice-versa, other major renovations were undertaken inside the museum, of which the archaeologist itself became director in 1942. Since his arrival in Syracuse, he had to struggle with the problem of protection of the collections from the danger of bombing, hiding them in the Akrai caves and in the Galleries of Euriaolo Castle. In the summer of 1942, the museum was hit by a bomb, damaging the Christian room. The coins, however, were temporarily transferred first to Rome, then to the Abbey of Montecassino and finally to the Vatican, before returning to Syracuse. The Venus Landolina was kept in the basement of the museum. At the end of the war, he activated immediately for the reopening of the museum. Then, he began to recover the material from air-raid shelters and made a review of inventory starting, when necessary, the restoration of the pieces that, stocked in insalubrious places, had been affected by degradation phenomena. Bernabò Brea organized furthermore, an intensive program of research in the field.
In 1948, through a letter to the Ministry, he announced the reopening of the museum. To get an idea of the problems he faced, it can be cited the fact that most of the windows were shattered, and since he did not have the money to buy new ones, he replaced them with cardboard wrapping. It was only thanks to his tenacity that the problem was solved. An outstanding financement followed the visit undertaken in 1950 by the then President of the Italian Council of Ministers, Alcide De Gasperi.
Luigi Bernabò Brea also succeeded in the '40s in the establishment of the first expansion of the National Museum with the reorganization of the material from Orsi's excavations, at that time massed

in the premises of the museum. The artifacts were exhibited according to an appropriate reorganization based on the exact archaeological chronology, especially in regard to the two major Greek colonies in Sicily, Syracuse and Megara Hyblaea. He proposed, in addition, for the new rooms of the museum, a particular solution which consisted in integrating to the traditional display, underlying drawers shielded by glass in which fragmentary finds from the excavations were placed. A museological solution that reflected the desire for comprehensiveness in the presentation of the objects [12]. The most innovative aspect in Bernabò Brea's approach to the museum consisted, however, in his strong desire to transform it in a place accessible to the public, no longer a "museum temple" or an "exhibition hall" according to the conception of 18th-19th centuries, but a place changeable, adaptable, flexible on which to make the visitor, the true protagonist of the exhibition.
Despite the new museum, Bernabò Brea was aware that an intensification of the excavations in the archaeological sites of the island could lead to significant amounts of exhibits that would not have been possible to accumulate exclusively in the museum of Syracuse. So he decided to set up a series of local museums having an independent coordination and acting as "introduction" entities in the archaeological areas and working as strategic bases for the elaboration of the excavation data and the presentation of the artifacts discovered in the respective sites.
The current location of the museum of Syracuse had, however, become inadequate to host the collections and all the other functions necessary for the proper functioning of the museum. In recent years, moreover, depositories and laboratories were moved to other buildings, creating some obvious inconveniences to the smooth running of the structure. The modern museological criteria, the advancement of technology for a better use of the museum and the reduced availability of spaces not large enough for a "logic" exhibition of the archeological finds, made it necessary, in the late '50s the finding of new premises. Strongly attached to Piazza Duomo - a place which he considered as the symbolic heart of the Greek colony -, convinced as he was of the importance of maintaining a close relationship between the building and the contents, and being at the same time an enemy of the "modern", he initially proposed to purchase two historic buildings in *Piazza Duomo*: *Palazzo Beneventano del Bosco* and *Palazzo Arezzo della Targia*. The idea was to make them become part of an *ante litteram* "widespread museum".
To this solution, it was, however, preferred the construction of a building much larger, far from the courtyard of Ortigia: a new structure that "*would eliminate the shortage of space, giving a qualitative and quantitative answer to the update required by the scientific progress*" [13]. To this end, it was chosen an area situated not far from the Greek theater and the excavations in *Piazza Vittoria*, adjacent to the catacombs of *San Giovanni*. The new archaeological museum "Paolo Orsi" was, therefore, located in the park of Villa Landolina and the project entrusted to Franco Minissi in 1967.

2. From the design to the building of the new Archaeological Museum (1960-1988)

For the design of the new museum, Bernabò Brea had initially contacted the architect Giuliani, charging him to draw up an initial schematic diagram of which, however, does not seem to be a trace. Later, he turned to Vincent Cabianca and Franco Minissi - both well known for their work in the field of museography - entrusted them with the architectural project. He will, also, be their main contact from the initial concept to the inauguration on 16 January 1988. His role will be crucial, since it will help to provide the methodological approach of the museum, also taking care of the drawings in scale of 1:10 of all the pieces included in the collection, in order to proceed with the exhibit design. Even in 1978, when he had already left the assignment of superintendent and the work for the construction of the new museum restarted after a long break, he will contribute to the work of Giuseppe Voza and Paola Pelagatti aiming at the reassessment of the immense amount of material to be selected for the display.

2.1 The reorganization of the museum in the area of Villa Landolina

Thanks to the contribution of the *Cassa del Mezzogiorno*, the Ministry of Education took over the vast area of Villa Landolina for the creation of the new museum. The scientific program developed by Bernabò Brea for the organization of the museum primarily related to the historical and topographical background during well-defined periods, so that each section would represent a clearly defined and circumscribed historical or historical-artistic period and provide as complete a picture of Sicily as possible, for any given period. It would, therefore, have to be structured in accordance with the creation of a first section on prehistory, a second dedicated to the history of the Greek colonization of Sicily, a third to the Roman conquest of Syracuse, a fourth picturing Sicily during the late Hellenistic period, a fifth dealing with Sicily during the Roman Empire and, finally, a Byzantine-Christian section, representing Syracuse and eastern Sicily from the late Empire to the Arab conquest.
According to Bernabò Brea, some current difficulties in the arrangement of the archaeological museums derived from the two conflicting requirements necessarily had to be satisfied at the same time. The need of a rigorous selection for the general public "*with only a small number of exhibits presented in the most attractive possible way*", whereas scholars wanted to see the largest possible

amount of material in its proper setting of which it formed part being "*often bitterly disappointed when, having travelled a long way for the special purpose, they find some magnificent pieces superbly presented but have the greatest difficulty in obtaining access to study material which, for their purposes, is often also of major interest*" [14].
In the opinion of Bernabò Brea, this kind of problem would be solved by attaching to each section on the ordinary visitor's circuit, other rooms specifically conceived for specialists. These would be arranged on a completely different basis, with the accent laid on clarity and thoroughness of documentation rather than on its attractiveness layout. This would reduce, at the same time, the actual storerooms to the bare minimum, leaving them to serve exclusively for material not lending itself to the exhibition because of its quality or its excessive quantity.
The architects were so invited to plan the museum's interiors as a single space to be subdivided as the requirements of the archaeological material to be exhibited demanded.

2.2 Minissi's project for the creation of an anti-museum

The task of designing the new Paolo Orsi was certainly not casually assigned to Franco Minissi and Vincenzo Cabianca, whose role in the field of museography had already been widely recognized. In particular, the work of Franco Minissi, resulting from vast and diverse cultural relationships, ranging from the inputs of the Modern Movement and the wealth of principles, methods and criteria coming from the Italian Central Institute for Restoration, was already at that time (and still is more concretely nowadays) a reality of great importance in the framework of activities for the conservation and valorization of artistic heritage. Advocate of a rethinking of museography, which he rightly considered, as a branch of the restoration discipline, he carried out its activities according to the values of innovation, experimentation and quality, declining in architectural form the Brandi's concepts related to preventive restoration. A task that the museum must perform, creating the conditions to preserve and, in visibility, transmit the works of art to the future generations.
In the case of "Paolo Orsi", the architectural plans and the display design were studied by Minissi in order to ensure the highest ductility. The idea was to create a "museum in movement", a kind of anti-museum (as the superintendent Voza said at the inauguration [15]) able to expand with the incrementing of the collections from excavations and the progress of scientific research [16]. It was to obtain this "flexibility" - furthermore explicitly required to the designers - that a centrally-based scheme was chosen. This would allow the didactic sections to be grouped together at the center, from which - spreading out like the petals of a daisy - the sections containing the exhibits could be followed in logical sequence. Moreover, the architectural plans were founded on the modular principle of an equilateral triangular mesh, to which even the didactical equipment and the display cabinets adapted. In this way, all rigidity would be eliminated, allowing the visitor to choice of making either a complete and organized visit or a partial one during which he could freely go to any of the sections of particular interest to him, without having to follow the general itinerary.
The museum, designed to establish itself as a "*living center for research and promotion of culture*" [16], was set on three floors (including a basement) for a total area of 12,000 square meters, perfectly integrated with the surrounding natural space, showing the clear influences from Frank Lloyd Wright's organic commandment. Once again, as required by the "client", each section was composed by a historical-didactic section, an exhibition of what might be called "first selection" material, an exhibition of "second selection" material (i.e., works and references of particular interest to researchers), and a storeroom.
After several hitches, work interruptions due to the lack of funds, changes during the construction phase and unavoidable maintenance interventions, the museum was opened to the public in 1988 (even if only the sections on the ground floor had been staged), benefiting from a wide internationally resonance.
In May 2006, the pavilion D on the third floor of the museum was inaugurated in execution of a project delivered in 2001, while the set-up of E and F sectors is expected in the coming months. The area devoted to medals, the last transferred from Piazza Duomo, was opened in 2010 and is located in the basement of the museum.

3. Towards an open and widespread fruition of the "hidden" heritage

The intensive archaeological research conducted in Sicily in the last decennia, the richness of excavated sites and the large amount of discoveries, have required over time, an adjustment of the museum spaces in order to accommodate the new archeological items. The structure retains today an immense number of objects, many of which, not finding a place in the exhibition halls, are collected in the depositories located in the basement of the structure in spaces that, in Minissi's plans, were not designed for this purpose. The greater amount of the objects did not find accommodation in the glass cases exposed to the public, but are contained in "boxes" kept in rooms accessible - albeit with the understandable organizational and administrative difficulties - only to a fortunate few scholars.

This heritage discovered but still "hidden" in some cases has not been adequately studied yet (kept for many years in sometimes inadequate containers and without having verified its conservation status), but in many others, cataloged and restored, it will perhaps never find location within the permanent installation, since the integration of all elements would require an enormous amount of space and resources. In addition, the cultural purpose of the museum is the collection of knowledge and its transmission. Acts that operate through the presentation of works chosen from among the best maintained examples of greater or historical/artistic value; the exhibit of fragments and/or minor works of art, although often of fundamental importance for the scholars, is of little interest to the generic user that does not have, in general, the necessary cultural background to fully understand and appreciate their value.
The fruition and the valorization of this hidden asset is nevertheless possible - apart from the construction of new exhibition spaces (probably useless if the "physical" consultation of many minor works is of interest to a few scholars) - through the network and the use of digital technologies. Electronic catalogs, whose first applications to cultural heritage had purely documentary purposes, have experienced in the last decade an evolutionary process that promoted them from simple databases to interactive multimedia systems, turning their function as a simple tool for cataloging to efficient machine for disclosure. The network "*has become a privileged environment for the consultation and the sharing of knowledge, to facilitating the work and the integration of the bodies in charge of documentation and the protection of cultural heritage, but also for its use by a wider audience. The goal today is no longer that of cataloging the single good but also its relationship with the cultural context, while from informatics point of view there is a tendency not so much related to the definition of uniform standards, but rather to the interoperability between systems born with characteristics and for different purposes, but all useful to the increasing of information*" [17] both in a national and supranational dimensions.
The Sicilian Region, through its *Department of Culture and Sicilian Identity* has started a few years ago and through its website, an online consultation of digital publications, videos, photos, virtual and dedicated sites of the largest regional museums and archaeological parks [18]. This tool is, however, limited to a general aim and to touristic purposes, as the contents are more simple presentations of the areas of greatest interest - though widely documented - or educational projects, than a true scientific instrument aimed at the enhancement of the hidden heritage. In addition, the platform does not interface with other systems and it is closed on the outside, making it difficult to update the data and impossible to include new contributions from third parties.

3.1 From the integrated survey to the interactive and virtual museum

The case study here presented intends to show the early stages of a pilot project launched by the *Laboratory of Restoration of Architectural and Cultural Heritage of KORE University* in collaboration with the University of Bergamo. This research began with the need to answer to some planning needs that, colliding with the hard "reading" of the edifice because of the many changes and adaptations of the premises (not documented), asked for an in-depth historical analysis and the realization of a complete survey (metric, geometric and material) of the building and the area surrounding it. The acquired data, subsequently integrated with other elements of detail, also revealed themselves as an important *database* for the establishment of a multimedia platform at differentiated levels of accessibility, firstly useful to the museum's administration to the appropriate need for control and maintenance but that could easily also be opened to scholars and tourists, with a view to create an interactive or a virtual museum.
Here is that the project has been developed starting from the idea that in order to correctly understand an architectural organism, its critical observation cannot be disregarded. It is, actually, important to detect what the building generously shows but especially what it jealously hides. This twofold recognition allows making the essential breakthrough for the planning of any following intervention (restoration, rehabilitation, redesign, reuse, etc.). In particular, the survey made by integrated methodologies (traditional, advanced and innovative), led to the creation of the fully navigable 3D digital model of the museum. Organized at various levels in order to make clear the form and the architectural structure, it has allowed the understanding of the entire building: a vast system based on a hexagonal geometry that found in the interaction between the environment and the constant change of heights, its most interesting spatial character. It could, however, also offer the opportunity to "virtually" visit the museum from the park outside of the places currently inaccessible (Fig. 2).
In this study, the first approach to the sites was accomplished through free applications available on the net - such as Google Earth – allowing the view of satellite images and aerial photographs, with a very high detail. This platform, in addition to the visualization of multi-scale mapping and free access to GIS information, permits a single user to enter additional information in the form of links to be shared and made accessible to other users. Links that, in the case of “our” museum, from its geographical identification might refer to detailed information, such as the site plan and other data, connected, for example, to the altimetry and to the pathways.

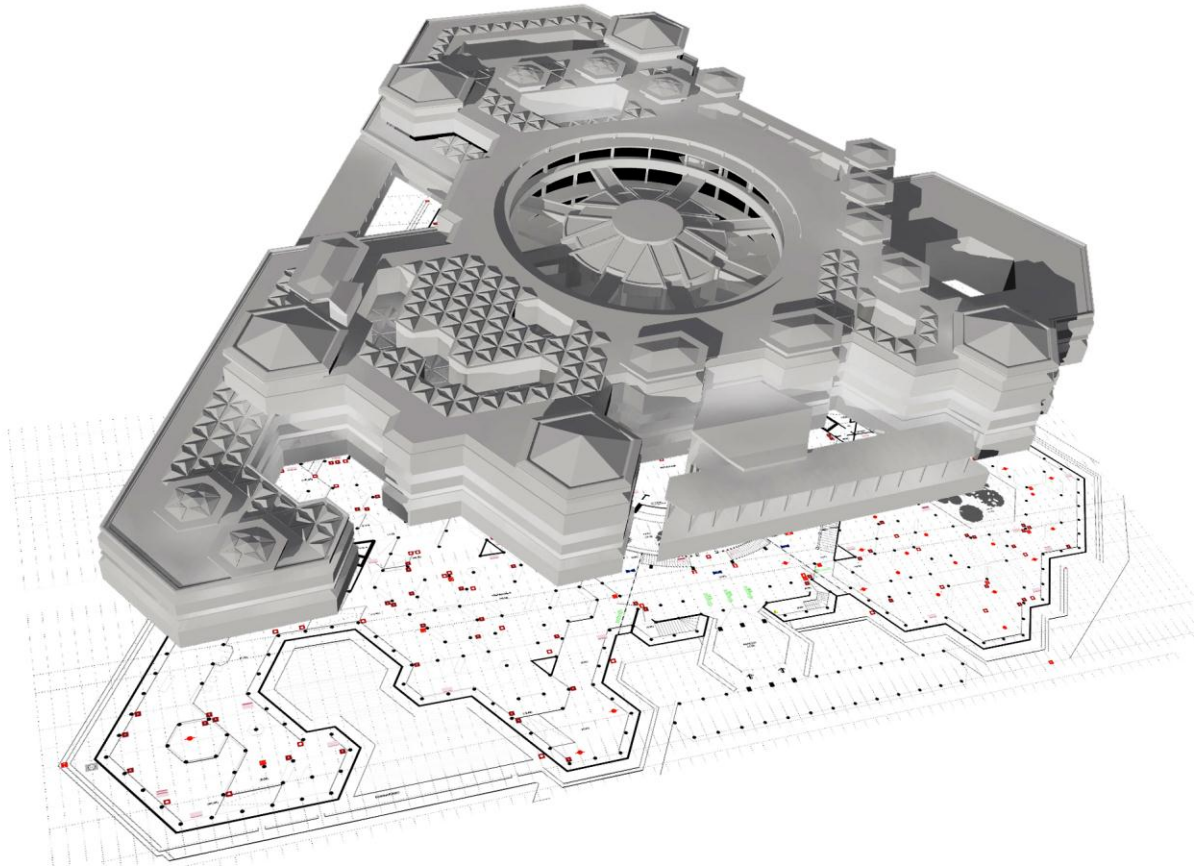

Fig. 2: The 3D model of Museum “Paolo Orsi”.

The combined use of GPS instrument and total station for the overall understanding of the building, even in relation to the urban environment - georeferenced both through coordinates acquired from satellite network and by means of a topographic polygonal used for the "forced centering" of scans performed with the terrestrial laser scanner - has allowed to acquire a large amount of data and useful information (Fig. 3a, b).
Moreover, it was produced, with a specific application and only by way of example, a virtual tour allowing visiting the park of Villa Landolina and the burial path situated outside the museum. This tour, applicable to the entire museum complex, could be accessible, via web or remotely, through mobile devices such as smartphones and tablets (Fig. 3c), so offering the opportunity of conducting an immersive interactive experience whose purpose is to approach the real visit of the place, both in terms of visual quality and emotional perception, especially if supplemented by the inclusion of multimedia elements (text, audio, videos, maps) [19].
Finally, the possibilities offered by the creation of "pages" containing information within shared multimedia platform, have been exploited as a tool of diffusion and dissemination of archaeological studies as well as of the activities of the museum. To this end, "dynamic" procedures have been studied in order to create models of data sheets related to the archeological objects exhibited or not, including their 3D visualization, acquired by using a high precision laser scanner and/or digital photogrammetry (Fig. 4a, b).

4. Conclusions

During the last two centuries, the concept of *museum* and its role in the society has changed dramatically. Museums are no longer sacred and untouchable. On the contrary, they have been (and still are) subjected to a wide process of rethinking, that has requested an intense examination of the values and meanings they imply, the aims and the nature of the services offered, as well as of the relationship between them and the people they wish to serve: the public [20]. The museological research has been enriched by new technical acquisitions and wider methodological horizons that have fundamentally transformed the concepts of display and collecting [21]. The vision of the museum as a static entity has definitely been overcome by a new idea based on the establishment of dynamic platforms [22, 23].The fast development of digital technology and of computer graphics has revolutionized the visitor's approach to the museum by creating interactive experiences throughout a museum, as well as remote experiences for those who cannot get there.

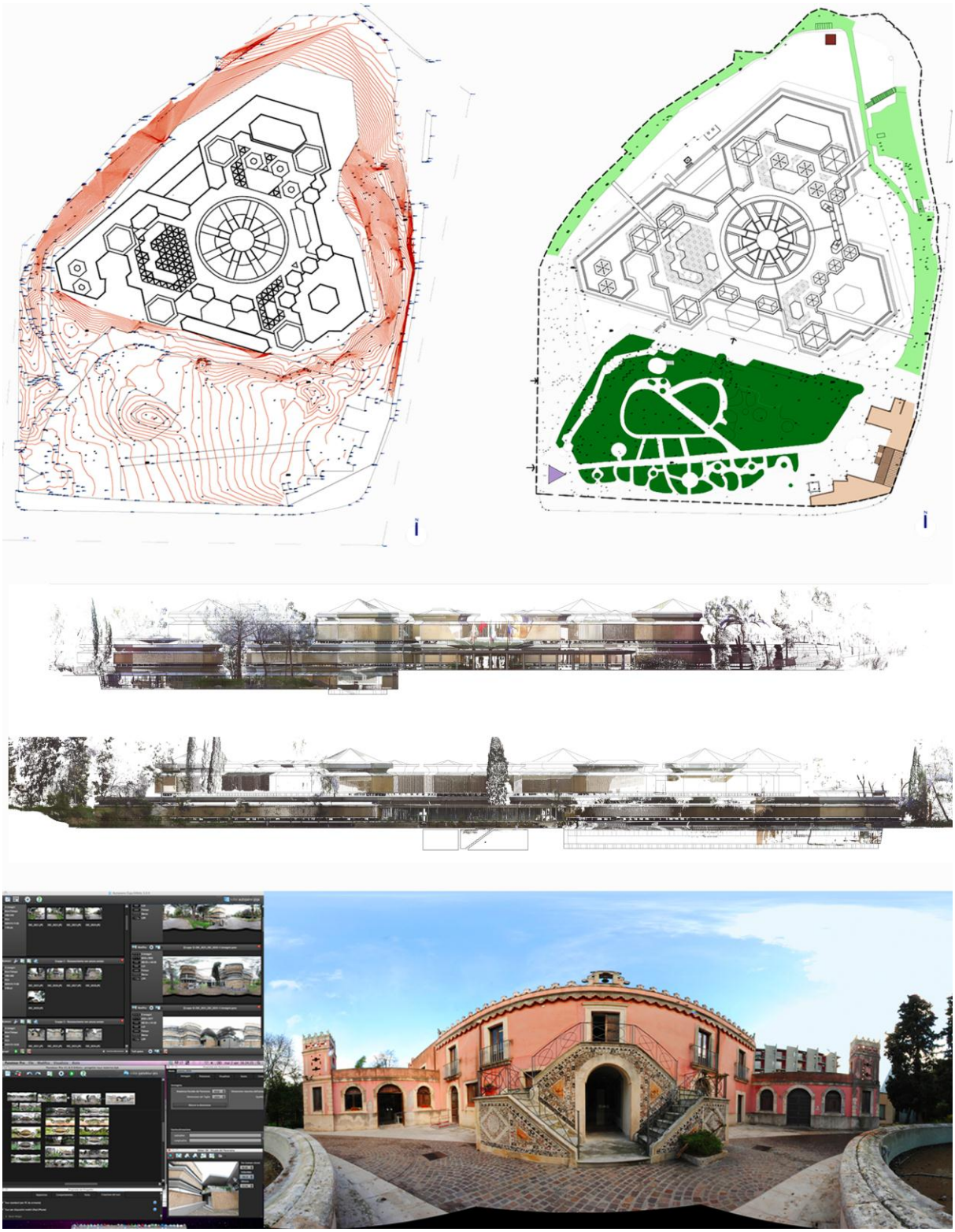

Fig. 3: Images from the integrated survey: urban plan acquired by GPS (a), orthographic projections obtained by 3D laser scanning (b) and panoramic virtual tour realized by photo sticking (c).

The numerous projects already accomplished in this field (the main museums in the world have developed web sites that are more and more advanced in order to promote their collections and activities [24]) show how the virtual reality can help, for example by complementing a real visit to the place, in case it had stimulated a special interest or an intellectual curiosity; or by encouraging users to go there after having obtained through the web an overview of what the museum can offer.
This case study shows how digital technology could overcome problems dictated by the shortage of space and the presence of logistical constraints, restoring or enhancing the original spirit of the *knowledge sharing place* that Bernabò Brea and Minissi envisioned for the archeological museum of

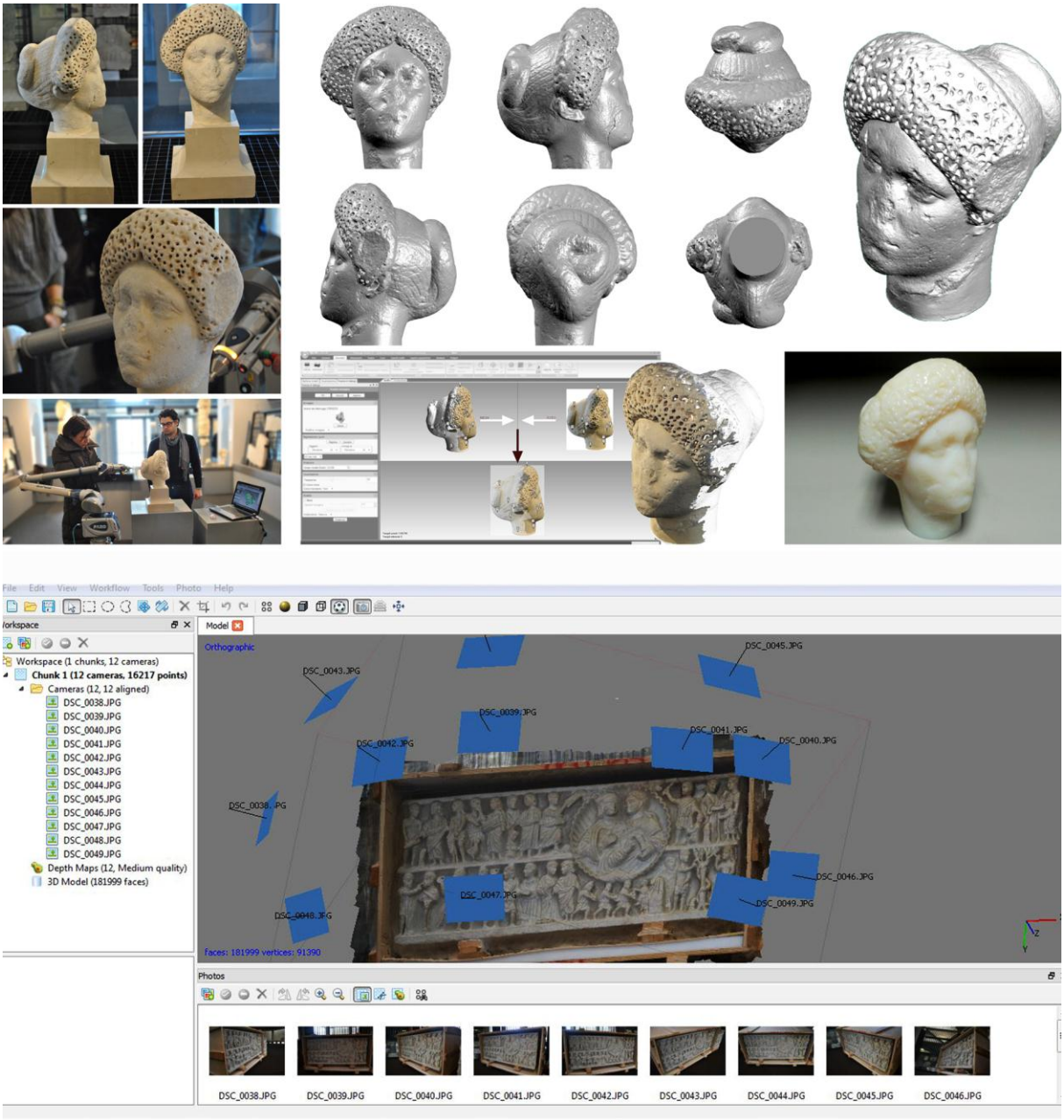

Fig. 4: 3D model of a roman head obtained using a Faro arm with laser scan head (a) and 3D model of a sarcophagus acquired by automatic image matching (b).

Syracuse. We are sure that taking the road of innovation will allow this priceless heritage to express its full potential by promoting an "open and widespread" concept of culture. The ideal thing (perhaps a utopia...) would be to establish a museum where the motto is: no doors, no guards, no wall, and no limits.

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A NEW REPRESENTATION OF AN ANCIENT MONUMENT – LA PISCINA MIRABILE –

Name SURNAME RAFFAELE MARTINELLI
Position, Affiliation ARCHITETTO, DOTTORE DI RICERCA, DOCENTE A CONTRATTO FEDERICO II FACOLTA INGEGNERIA ICAR17
City, State ANGRI (SA) ITALY
Mail address arch.raffaelemartinelli@gmail.com
Other contacts (not mandatory) 328/0380689

Abstract
Survey is knowledge and knowledge is the tool to decrypt messages that the past has sent us in the form of monuments.
Some, few, have maintained their own function, others changed it over the centuries. These monument crossed the centuries always equal to himself and for that little or not studied.
This work fits into the history of the monument trying to give some new answer and especially proposing a representation of it that for the first time tells something new about its life, its function, its history.
This opens a new way to the understanding, the formulation of hypotheses and testing of other through the decoding of ignored details and through the reinterpretation of the sources.
It offers a new understanding of the position of the monument in the landscape and about the role covered by this as an essential part of an ancient infrastructure, the Augustan aqueduct of the Serino.
This Work is a part of end course work about PhD in Scienza del Rilievo e della Rappresentazione dell'Università la Sapienza di Roma XXIII group 2008/2011, and explore only one of the considerations made around this ancient monument.

Keywords: Survey, Archeology, Point Cloud

1. Introduction

"Hoc est vivere bis, vita posse priore frui"
"Knowing how to live with pleasure the past is to live twice"
Marziale, Epigrammi (X,23).

This aphorism it's particularly significative to understand and describe the goals and the results achieved in this study
Knowledge, whether of the world or of themselves, has always been a strong stimulus to the research and understanding of the diverse issues surrounding the mind and human thought.
The past, which Martial calls, is itself being investigated at various scales and in various fields of interest, but with survey and analysis of what material comes from the past, it becomes conceptual and speculative for recovery of information lost in a memory that no longer retains traces of itself, but that was the basis on which to build the present or, more simply, of which this is an evolved version.
In this ancient monuments are silent witnesses of the past, but if asked, they respond by providing information that can afford to live with greater awareness of our present, fully understanding what we are delivered from the past.

From the past comes architectures, functional spaces, squares, structures that could not adapt to the changing of the culture that created them, and when they did, they have lost their initial connotations becoming something different, altering their appearance, changing substance form and function.
In some rare cases, this mutation has not occurred, and this has meant that these monuments would become simply obsolete, unusable or simply forgotten.
The analysis and study of ancient monuments therefore poses special problems, requires an abstraction from modernity and a realignment to the culture that created them, we have to understand the changes brought about by time, know as much as possible the story, or listen stories that all around are told lost very often between myths and reality.
Knowing how to read a monument allows to discern on what, how and when, or at least critically framing the problem in order to find a consistent path of inquiry.

1.2 Survey as tool for knowledge

Now some questions: what are the methods and tools that should be used in specifically, which the levels of analysis and definition of the information?
From my point of view, survey is the main tool to deal with this investigation
The survey as a tool of knowledge, which does not end with the metric acquisition phase, but also includes the acquisition of all the necessary information to reconstruct the history and projectual genesis of monument that is being analyzed.
The reverse process of the project, survey, is not a linear process, and the only way for really know it, is to be able to pause, just the time to take a measure, on its surface, on the traces that time, weather, nature or man left on and that from time to time tell small fragments of a common history.
The ancient monument becomes cultural one, taking on a meaning of representative element that contains useful information for the understanding of modern culture, and this makes it even more difficult to intervene because the risk of unconsciously delete relevant information is behind the 'corner.
On it focus a number of issues ranging from operational practice to historical research, to its representation understood as choice of the most effective way to draw, in relations with the goals, and the steps of reading the architectural text .

1.2 Representation and drawing

The representation holds a fundamental importance. The act, which is basically the act of drawing, requires a discretization of the information acquired, discretization critical but limited as often related to the ability of the designer to transfer on a bidimensional plane tridimensional information and their perception.What you can imagine is often much more than what you can draw and the ability to transcribe these intuitions in design is not for everyone
The reduction to a bidimensional plane is itself limited to the cognitive possibilities inherent in the real object, and the tools available to the designer are themselves the limit beyond which no one could run.
These instruments in the last few decades have seen a strong evolution, dematerializing from the paper forms which were bound and transforming itself into binary information processed by computers.
As is known, this has literally created a new world with physical space but concretely non-existent, a virtual space in which you can develop and build a model of the real object.
According to me, this world has as its current limit, but it is only a temporary condition, pattern perception still through the projection on a plane as that of the various types of monitors or viewers that once again reduce the perception of a bidimensional plan .
Obviously, this perception is now dynamic, interactive, multimedial but is based on a concept still opposed to the spatial perception of real structures, is not the observer in moving, but always the object to be rotated according to the observer meaning as observer the human user and not the virtual avatar, of course.
In turn, the instruments themselves for survey have suffered and are suffering a strong evolution, linked to the economic aspect that binds their availability.
I refer in particular to various photogrammetric techniques, which with the image digitization has opened a new and more flexible field of investigation, but also the possibility of laser scan of the real object.
The discretization by points to a real structure gives to the operator a benefit that no one else in the past has never been able to have.
The so-called "point cloud" returns immediately volumes and metric information as well as complex surfaces with very short time simplifying the metric operations and delegating the interpretation of the data which can be followed by a pluriform possibilities of representation. The model for the virtual space, or at least its structure is created immediately, the real object is deprived of its material

substance becoming immediately transmittable and accessible remotely remaining now included in a space that not existing physically can exist anywhere .
Remains separated from this operation that wiich at first was a necessity, the observation of the object to be displayed and the focus on specific point becomes an independent operation that is always necessary.
The fruition of the monument itself takes on a new aspect, by the necessity to touch the monuments during "Grand Tour to a remote exploration of large monuments which on one hand allows a greater circulation of information, on the other hand transmits only information filtered by the model which by its nature is not reality and not able to repeat its suggestions.

2. The Piscina Mirabilis

Object of study is the Roman monument known as the Piscina Mirabilis site north of Naples, in the municipality of Bacoli in the area known as the Campi Flegrei.
It is an ancient cistern of impressive dimensions by planimetric development of 66 x 25 m and a height at key of the coverage vault a little more than ten meters.The interior space is underground for about eight meters and is divided into five aisles longitudinal and thirteen transverse. The central one, the seventh, has a bottom surface less than about 1.50 m which is configured as a Cella Limaria suitable for the storage and expulsion of impurities in the water.
The existing access is through a staircase located on the North side of the structure, corresponding to one of two old entrances . The old access points were two, one corresponding to the present, the other corresponding to another set of stairs on the south side and currently-no longer usable due to the rising of the roadway outside.
The intersection of these spaces is identified by forty-eight pillars which cross section assumes a cruciform appearance to the height of eight meters from the bottom floor.
Actually the structure its roled by the Central Office of Naples and Pompey that has property and manutention.

2.1 Survey

This monument, always known but little studied, presents a series of specificity which allow to sketch a repertoire of problems which arise in similar contexts.
It’s one of those monuments that are not changed their essence but that this is no longer compatible for use and function, with the modern culture.
His analysis is guided by the fact that it is configured at the same time as a cultural asset, underground and never reused.
This has led to the first problem set out above: Always known and always equal to itself, lost his memory about its purpose and its operation, so the research has tried to frame the structure in the cultural field that build it in the attempt to improve its knowledge.
Regarding the analysis by the survey, the monument presents great many operational problems related to the size, spatial distribution, elevation, relationship with the outside not easy to solve, therefore, has been a valid field of investigation for the application of the techniques relevant consolidated and the innovative ones.
The results obtained during the analysis of metric data allowed to advance a new thesis about the possible functioning of some structural parts of the Piscina as well as to test the hypothesis concerning its operativity.
The choice of laser scan of the entire monument has allowed the realization of bidimensional draw never processed before which difficulties of implementation was related to the shape and nature of the monument.
The fragmented space of the floor plan has always hindered the full understanding of the good, the horizontal layers that make up the structure had not been fully investigated as well as the reciprocal relationship between the parties not in sight, and this has been possible by creating a point cloud model and the section of the same with reference planes containing the researched information.
Hence the identification and study of significant details has allowed an in-depth, through new technologies and the creation of complex surfaces from point cloud, enables a new representation
The volts have been subject to independent investigation, has been analyzed in the structural behavior and has been created surface model designed to study the problems of static arrangement.
The individual detail have been the subject of in-depth layout , geometric, metric, material, in order to identify a repertoire of models relevant to an understanding of the overall architecture, as well as verifying possible assumptions by management of the building in its past operating conditions.
The goal was to complete a cognitive gaps, by the use and integration of acquisition technology , identifying congruent descriptive strategies for use and management.

3. A new iconographical representation

As it is logical to assume, this monument has already been represented in the past, but the novelty of this article is a new iconography that come out from the use of modern technologies of laser scanner survey and it's only one of the observation reached during the research.
The geometry of the structure and the difficulty of the measurement, have in fact significantly limited its drawing by focusing the attention of scholars on the development planimetric losing the changes in shape that occurred at different elevations.
The parallel i want to make here is the only valid metrical survey ever run on the monument that is taht's of Paoli published in 1768.
The scholar produces a plan of the Piscina Mirabilis, which was for centuries the only reference for almost all the subsequent works.
The representation of the piers has become an axiom to indicate Piscina Mirabilis inextricably linking structural and functional interpretation giving the impression that there was nothing new to say and becoming, quite by chance, a wrong tool for the study of monument.
owever, Paul realized a sort of isometric cross-section of the monument, represented with the taste of the eighteenth-century picturesque rather than the metric coherence , but it is in this section that we have the point of contact between the studies.
In the section, Paoli explain the survey method used for work.
A man on a ladder stretching a tape measure using a cane until it touches the top of the vault, another men tends the tape while two gentlemen seem to check the length of the strap tight. On the ground you can see a tablet, perhaps a praetoria tablet, and a tool that could be a baculo or simply foot removable tablet.
This drawing shows the operational correctness of Paoli but also denouncing the limitations he encountered in the execution of the graph seen as difficulties in survey operations.
From here the parallel or rather the idea of a working continuity with the past beyond the limits of the survey with the technology at our disposal.
The possibility of using a laser scanner Leica C10 has allowed the creation of a point cloud of high density and so to overcome the limitations imposed by the height of the monument.
The result has been the ability to dissect the Piscina Mirabilis in all dimensions desired and then the identification of a section plane that in addition to relating the outside with the inside, allowed a new representation of the Monument.
Dissecting beyond the elevation of the sets of arcs connecting the transverse and longitudinal aisles, the shape of the monument changes, structure changes, they disappear the pillar become dividing walls and start a new way to study functional and structural monument.
The trasversal aisles are no longer connected to the longitudinal, space is fragmented into smaller rooms that are explained in the operation of the monument.
Imagining now the Piscina filled with water, it is evident that the fractionation of the naves transverse operated a mechanical filtering action to the impurities brought from the aqueduct and who remained on the water.
Once emerged within the trasversal aisles floating impurities remained blocked in the section and could be removed by normal cleaning carried out through openings in the roof .
From the structural point of view completely changes the interpretation of the monument and in particular appears now evident the warping of the covering system that was not so clearly decodable by planimetry at a lower level.
In this sense, therefore, the investigation through a new instrumentation has led to a new and more meaningful representation of the Piscina Mirabilis that arises in the logical continuation of a project begun in 1768 and supplemented in 2010 by filling the gaps left open and opening new ways to hypotheses and investigations
All the goals reached with these study, well be soon available in a specific publication around the Piscina Mirabilis.

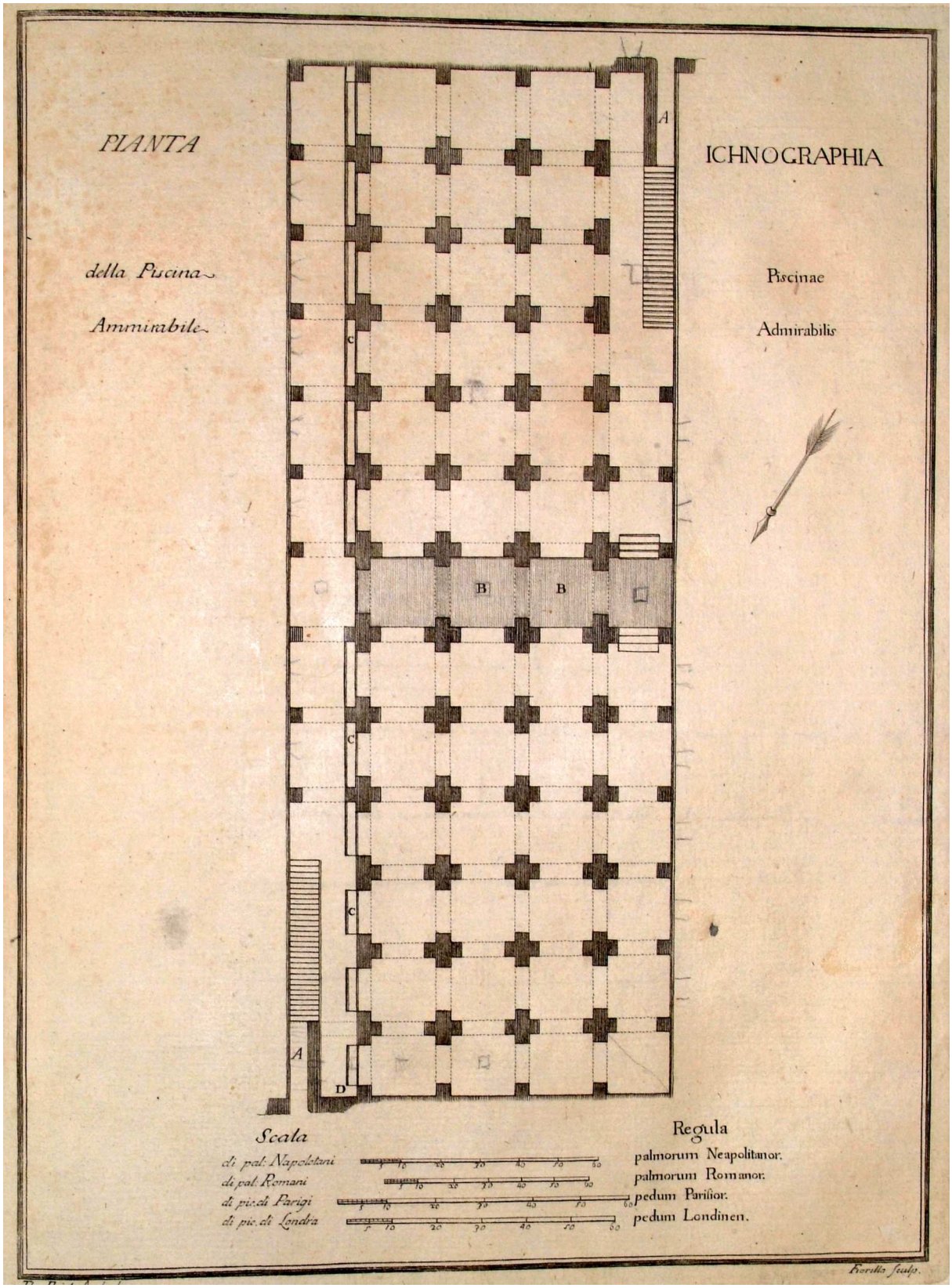

Fig. 1: ***Plan of Piscina Mirabilis – Paoli 1768***

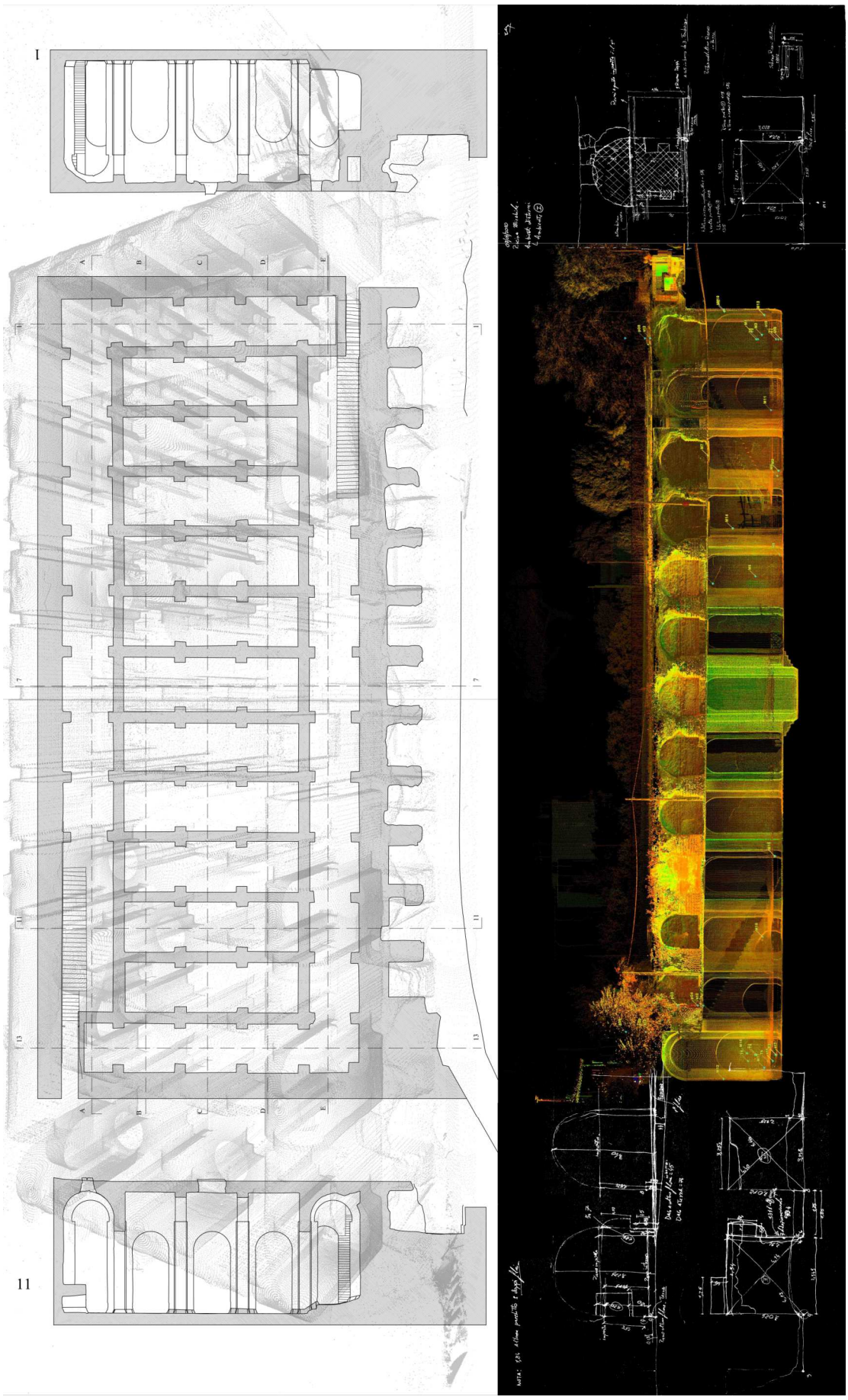

Fig. 2: ***Plan of Piscina Mirabilis at 8 m from lower floor***



Fig. 3: Assonometric Section – Paoli 1768

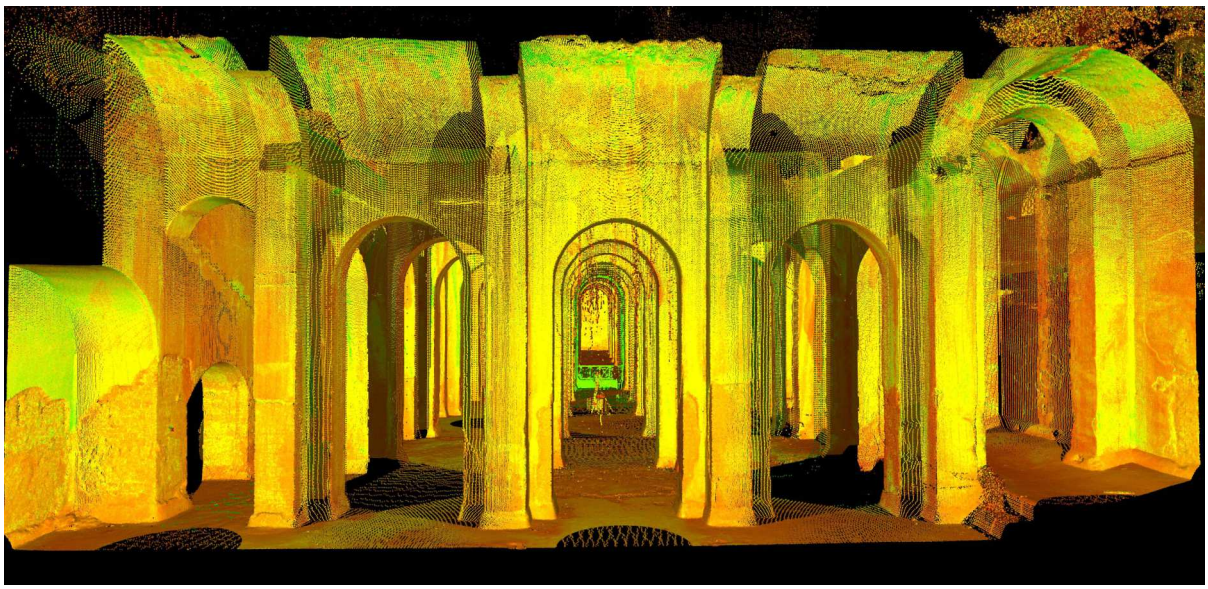

Fig. 4: Point Cloud section

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HERITAGE ARCHITECTURE LANDESIGN
focus on CONSERVATION REGENERATION INNOVATION
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The oval cloister of Santa Maria alla Sanità Church: a virtual representation of the original destroyed shape

Emanuela LANZARA, Roberta MONTELLA
Architecture, Federico II University, Neaples, Italy
emanuela.lanzara@libero.it
robertamontella@libero.it

Abstract
Promoting the diffusion of treasures which are considered to be part of the precious architectonic heritage, not always known and, more than ever, underestimated, protects a community's cultural memory together with that of its place, increasing its value.
The aim of the intervention is the rescue, protection and the transmission of cultural value and social identity of a place.
The bridge of Sanità, named also "red carpet between two palaces", has not only destroyed some parts of the artistic heritage of the town, but is also considered to be an outsider and, at the same time, a symbol of this place.
A very important intervention that, on one hand means a division for the neapolitan town, as regards the urban and social point of view, while on the other hand , become a sort of limit helping the definitions of original contributes, by mixing old and new together.
Santa Maria la Sanità in Naples, is a church situated in a place where history and traditions are at the base of a project linked to the Paleochristian Age, thanks to the catacombs of San Gaudioso. His mannerist oval cloister, designed by Frà Nuvolo, is crossed by two piers, limiting it from its completeness.
Purpose of the survey, together with analyze and a graphic revision is a sort of communication, through a virtual regeneration of what has been lost, of the artistic heritage. This help us to obtain a major consciousness of the identity and to know the real value of places, not only clear for those who live them, but also for those who "walk" in them.
In particular the survey propose to verify the plan of the cloister: it's not sure, in effect, if it has an oval or an elliptic shape; taking it in a 3D way able to give back a complete vision of the original plan. That's just to let known, even though is not useful anymore, what's hidden back this urban intervention.

Keywords: preservation, regeneration, innovation

1. Oval/Elliptical cloister in Santa Maria alla Sanità District
Sanità, in San Carlo all'Arena, is one of the most ancient and characteristic district of Naples. It's located at the foot of the hill of Capodimonte, in the north of the old town. A lift connects two different floors of the city together: the so called bridge of Sanità in Corso Napoleone and the Sanità district. Santa Maria alla Sanità church, also known as san Vincenzo alla Sanità, is situated in Sanità Square. This second name is due to the Holy Vincenzo Ferreri, a famous Dominican friar considered the protector of the district. The name Sanità is due to the historical healtiness of that place that was located outside the city walls. In that area miracles and healings occurred near the tombs of several African bishops, including St. Gaudioso, there buried. So Sanità became a place of worship. During IX century bodies of saints were brought into the city, and these burial sites were slowly abandoned. Floods plastered the area with mud from Capodimonte hill. In 1569 a violent storm brought to light the

ruins of the early Christian church and the ancient catacombs which were after recognized as S. Gaudioso's.
Here, there was found what is still considered the most ancient image of the Virgin in Naples.
In 1577, as a result of this discovery, Dominician friars began to buy lands and decided to realize a new church dedicated to Santa Maria alla Sanità. A panel of experts chose the project of the Dominician Giuseppe Donzelli, also called Frà Nuvolo, He completed the religious complex between 1602 and 1613.
The complex of Santa Maria alla Sanità is one of the most realistic details views Baratta where parts are also represented at that time (1629) had not been completed. The image is of particular interest because it documents the complex splitting into two distinct parts, placed in two different dimensions: Church and cloister ovate in the lower, the real convent with the adjacent big cloister, now lost, at the top. Fra Nuvolo planned a second cloister, smaller than the first, giving him a very original shape, defined by the century, as oval/elliptic. Giuseppe Nuvolo is one of the most interesting authors Neapolitan XVII century, with the Church of Santa Maria della Sanità. With this project, he reveals his interest into the Bramante's project of San Pietro, trying to re-elaborate it in a more complex greek cross map, integrated in an extended square.
Inside the Church, Frà Nuvolo responds to the need to preserve the existing Paleochristian Church of San Gaudioso: he erects the chancel of the new one by setting the altar above the catacombs and the crypt.
During the XIX century, French sovereigns started in Naples some of the most relevant urban modifications which were important for the future of the town: there were made some improvements in the communication routes and in the re-organization of the already existent plans. In this way there were highlighted what is nowadays considered the neapolitan underground system.
The expected interventions faced the biggest difficulties linked to the many obstacles presented by the town, that is to say the continuous following of Posillipo, Vomero, Camaldoli and Capodimonte hills.
Expansion and development of the town included a "fan" system going through the most important areas of the town. Corso Napoleone, which now corresponds to Via Pessina, Santa Teresa degli Scalzi and Corso Amedeo di Savoia, must be considered the most difficult intervention in Naples.
Finished in 1809, the street was due to the will of Giuseppe Bonaparte, because of a sort of a faster link with the Royal Palace and the Palace of Capodimonte.

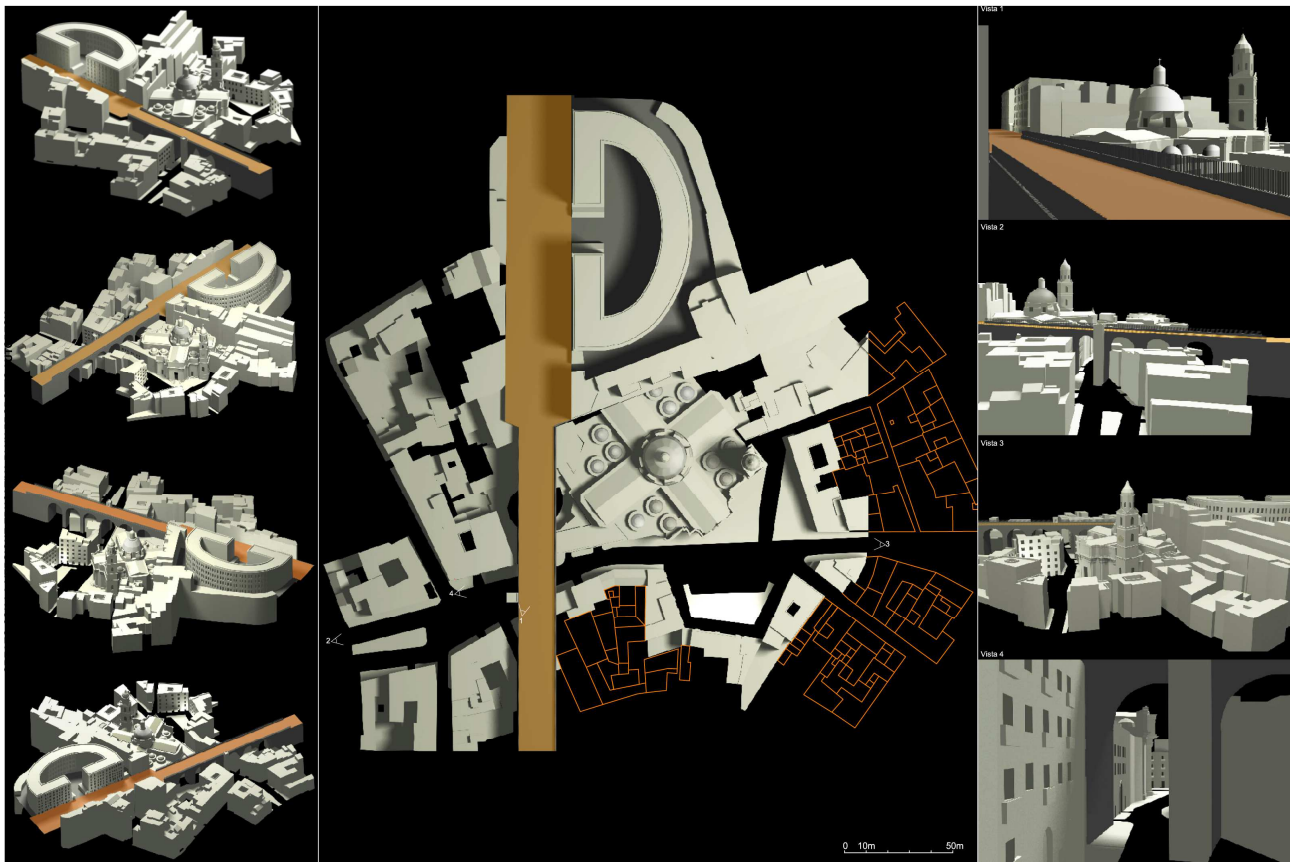

Fig. 1: 3D model representation of Sanità District. Differents point of view and bridge highlighted in orange.

Closer to the social alienation, District presents a lot of potentialities and cultural and historical richeness, about which residents are fully aware.
Some voluntary social and cultural associations were there formed with the intent to implement initiatives and improvements to the site, and provide citizens with social redemption opportunities, better living conditions, stimulating the civic sense. The bridge, in this revival attempt alive offers to the inhabitants of creative inspiration: became logo for the district and starting point for the realization of artistic and cultural activities. From limit, the bridge becomes opportunity, integrating perfectly with new architectural achievements: the portion of the bridge that invades the B&B of the former convent, is adapted as wall for the kitchen.
The construction of the bridge allows a different, abnormal vision of the whole, as well as the district, which can then be observed even at the level of the dome of the Church, offering an original idea for an alternative reading of the urban fabric, made at different levels and from completely different points of view.



Fig. 2: Pencil sketch realized on the bridge watching the church.

1.1 Relief and geometric survey

Two pylons of the bridge invade the cloister, dividing it into three parts. The observer loses the global perception of the original shape redefined through the relief and 3D representation. The cloister presents a curve arcade with cross-vaults surrounding an inner area defined by arched pillars with Ionic pilasters, garlands and capitals stand in piperno stone. On the vault and on the lunettes of the arcade, there are still traces of monochromes graffiti painted by Giovanni Battista Di Pino in 1624: they represents stories of the Dominican order. Transverse arches of the arcade bind internal pillars with the wall of the arcade: the pilasters, facing the environment, are on opposite sides of the stucco wall where there are niches.
The relief of the cloister is not based on mere investigation of metric type, rather on original quality analysis of global composition. The planimetric oval shape of the cloister is a singular example in Neapolitan architecture. Frà Nuvolo was the first to use this shape in Naples.
The primary output of the survey carried out within the cloister was to locate the actual geometric shape of the plans: the historical and cartographic sources show conflicting opinions by defining a plant indistinctly oval and elliptical. Ellipse and oval are both elongated circular profiles with double orthogonal symmetry: characteristics that create confusion between two different shapes and open debates about the nature of formal discovery architectures.
The pylons of the bridge break the original shape of the cloisters, allowing not an easy formal interpretation. So, was essential an accurate geometric analysis.



Fig. 3: Interior image of the arcade of the cloister.

A first step has led to critical reading of historical maps: Frà Majorino's project design, the Duke of Noja, the plan of Ferraro. All them represent an elliptical cloister in which the main axes are oriented in the same direction of the axis of the Church. The survey graphic, derived from this first reading has justified the choice of locating of the main axes, following the results derived from direct relief. Assuming the existence of a generic curved continuous profile both inside and outside the arcade, have been taken into account the points that return in the profile of the pillars identifying the inside perimeter of the arcade of the cloister. The curved profile has been verified through direct relief of the plant of the pillars with trapezoidal profile characterized by two curved sides: above all those of the interior arcade and those facing the center of the cloister, as well as the performance of the walls of the arcade. Also the profile of the pillars is indeed shrinking from the area towards the central area.
The graphic check of juxtaposition of polycentric curves and ellipses on the plan, denote that polycentric curves are constructed in way to approximate their profile to that one of the ellipse. This is the demonstration that it's difficult to recognize the curved shape in question, also with the Pascal's theorem.
On the bases of the number of centres and their location, the arches of circumference which generate the curve from the oval profile can be differently compounded generating different profiles.
The interest of Renaissance architects for the elliptical and oval shapes is documented by a rich variety of iconographic sources contained within the several treatises of the time.
The discussion of the topic, argued by Ornella Zerlenga in her text *La forma ovata in architettura*, is fundamental to choose suitable geometric constructions to verify the profile of the cloister, obtained as a result of the relief operations.
Though Pascal's verification estimate the inadequacy of an elliptical shape of the cloister, the elliptical formal verification of the cloister is made. Have been verified: geometric construction published by Sebastiano Serlio in 1545 that draws the ellipse to points once the two diameters; the construction of the ellipse for three data points, considering as a starting point for the construction of three known points derived from tracking operations of pillar stands.
The same verification process was conducted for the oval shape. Targeted selection of geometric constructions is given by considering similar ovals, for formal tracking, to the profile derived from the junction of points obtained as a result of the relief. Polycentric curves built four or more centres were considered.

In book I of Sebastiano Serlio's *Treaty of Architecture* is the first treatment formulated and shown on the geometric trace of the oval. Serlio considers four different methods to draw the oval shapes.
The geometric construction published in Bosse's Treaty is innovative respect to Serlio's one, because it differs through the assignment of the dimensions of the axes. In this case, the object of formal research, the position of the axes is expected intuitively from a direct observation of the plant detected and therefore of its shape. Then, set the position of the axes of the hypothetical figure and its dimensions and consequently it brings, the four centres are determined by their respective arches of circumference of which the curve consists.
Then geometric construction of Breymann was choosed to draw a half oval similar to the ellipse. Formal research of oval profile is so deliberately referred to a geometric construction that was as much as possible like the elliptical one, in order to exclude any possibility to attribute a probable elliptical shape to the cloister.
It looks so interesting, as necessary, with the same size and position of the axes, compare and overlap between their formal outlines, different kinds of curves, drawn in different ways.
Polycentric curve looks definitely better suited to describe the shape. Elliptical profile have a smoothly varying curvature, while the polycentric curve presents greater variation of curvature near the point of contact between the arches of circumference. This variation is due to the intrinsic properties of the circle that admits constant curvature variable with radius. Therein the main difference between these formal profiles lies, which in this case decreed, as a result of the dispute-oval ellipse, that cloister plant profile is approximated at the oval, rather than elliptical.

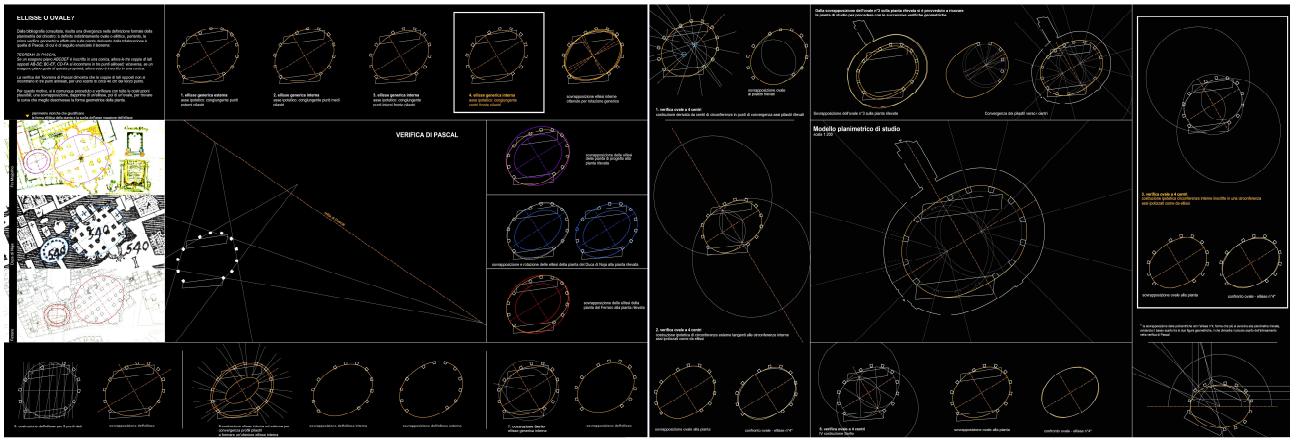

Fig. 4: Geometrical check: elliptical on left and oval on right.

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Le Vie dei Mercanti XI Forum Internazionale di Studi

GEOCONSERVATION ANALYSIS AT ACKENDOWN, JAMAICA DEFINING GEOARCHITECTURE

Patricia Elaine GREEN,[1] Sherene Andrea JAMES-WILLIAMSON [2]
Department of Geography and Geology, The University of the West Indies, Mona Campus, Kingston 7, Jamaica, W. I. [(1)]patgreen2008@gmail.com
[(2)] sherene.james02@uwimona.edu.jm

Abstract

Plasters and mortars from historic buildings have been considered useful on style, formulation and cultural provenance where several transformations and stratifications have taken place over time. On the Caribbean island of Jamaica with its culturally diverse heritage holding Aboriginal, Spanish, African and English legacy, the former Ackendown Estate contains a cluster of buildings that convey this. Of significance is an 'Old Castle' that has received concurrently16th century Spanish, 18th century British, and 19th century Scottish dating.

This paper presents aspects of an on-going Historic Structures Report for Ackendown with scientific techniques to determine appropriate analysis for mortar composition. The aim is to investigate how historic mortars and the geology of architecture may become a useful instrument, which can contribute to the identification of different building phases to establish provenance within historic periods. A comparative analysis of heritage mortar and geology across the island having established dates from archaeology and primary documentation is being developed to facilitate interpretation.

The results will inform conservation techniques and restoration principles in hot humid tectonic environments. Outcome of this work is the launch of the concept 'Geoarchitecture®' embracing the multi-disciplinary approach of architecture with the science of geology in Geoconservation.

Keywords: archaeology, geoscience, mortars, preservation, tectonics

Introduction

Christopher Columbus landed on Jamaica during his second voyage of exploration in 1494 claiming the island for Spain. He returned twice during his fourth voyage in 1503 and was shipwrecked on the north coast for one year. He encountered an Aboriginal Taino population of 600,000 although it is argued that this was an exaggeration and may have been 60,000 [1]. Within five years of his departure, the Spanish founded two towns, *Sevilla* as the principal on the north coast where Columbus has taken refuge, and *Oristan* on the south coast [2]. In the ceremonies of possession, houses and forts marked the occupation of a place or territory [3]. These Jamaican towns were established by ca.1510 with the erection of a stone fort-house, and other stone houses [4]. By 1513 the Aboriginal population had diminished and Africans were being imported into the island for enslaved labour [5]. These Spanish Jamaica towns were relocated inland from their coastal founding sites ca.1519, and a third town, *La Villa* (now called Spanish Town) was founded ca.1520 [6]. *Sevilla* and *Oristan* were officially abandoned in 1534, and *La Villa* survived as the principal and only Spanish Jamaica town [7]. The island remained as a Spanish colonial settlement for over 146 years until it was conquered in 1655 by England, and remained under English rule until it gained independence in 1962.

Whereas archaeology has established evidence of the Spanish Jamaica town of *Sevilla,* the footprint of *Oristan* has yet to be exactly defined. The 2011 archaeology report of Ackendown states that Taino and Spanish history and culture in Jamaica are still to be explored, pointing out that there are large numbers of Taino sites along the south central and south west coast that testify to their presence; further that the work on the Castle site at Ackendown gives the opportunity to examine this

issue, as this building may have belonged to a Spanish regional commander and head of the Spanish Jamaican province of *Oristan* [8]. It is highly possible that the south coast property of Ackendown may hold some clues to identify *Oristan* [9].

Research on Ackendown included a chain-of-title conducted in the Jamaica Government Archives (JGA), the National Library of Jamaica (NLJ), family memoirs of earlier proprietors; and archaeological investigations in 2011 with surface and underground work that built on previous investigations during the 1980s. This has shown that the historic name on the property titles, estate maps, and legal representation in the JGA, the NLJ, and Colonial Papers lodged in the United Kingdom is Ackendown. Yet contemporary maps call the area "Auchindown." Therefore, this paper uses the historic property name of Ackendown.

Ackendown is situated on the south coast Parish of Westmoreland, Jamaica. The property containing approximately 116 hectares (287 acres) is bounded southerly by the Bluefields Harbour and extends northwards into the adjacent hills. Sandals Resort International (SRI) owns the property. The area containing the historic ruins is concentrated on the hillock overlooking the Harbour, with the south-coast main road separating it from the coastal stretch that has been developed into an all-inclusive beach-front hotel. SRI desires to restore the historic ruins as the 'Ackendown Heritage Park,' and for this, the firm Patricia E. Green Architects was engaged and conducted a Historic Structures Report. The JNHT declared one of the historic structures, the Ackendown Castle ruin as a national monument on December 21, 2006 [10].

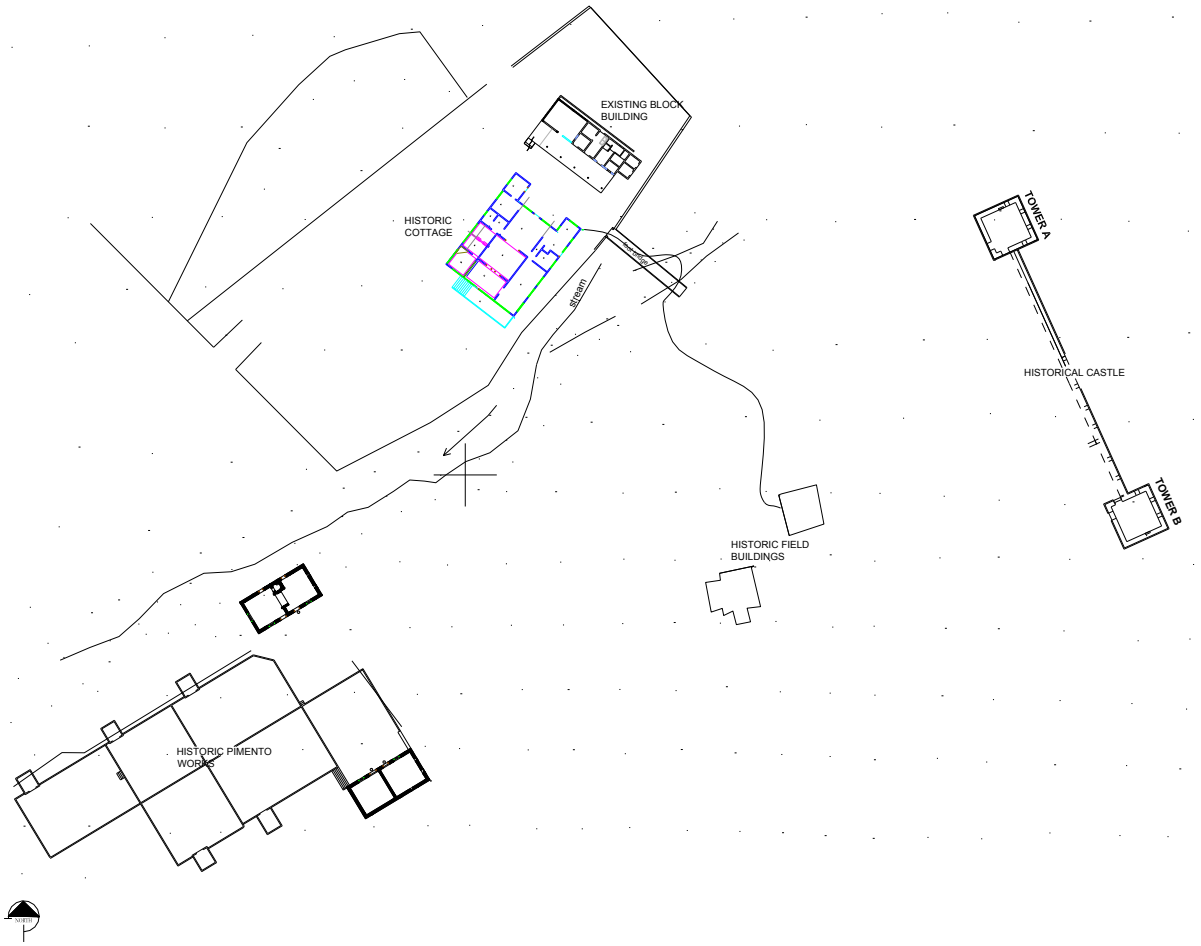

Fig. 1: Ackendown Heritage Park Layout (©Patricia E. Green Architects, August 2011)

An area of approximately 15 hectares (6 acres) has been fenced off to offer security protection for the Heritage Park, which contains the shells of four historic masonry ruins situated contiguously on a gentle slope. These all form a quadrangle along cardinal points, termed commonly as (1) Castle, situated northerly; (2) Pimento Works, southerly; (3) Field Buildings, westerly; and (4) Cottage, easterly (Fig. 1). Colloquially, the Cottage is sometimes called 'Overseer House.'

Set apart northerly from the Cottage is a ruin termed Block Building. This has been modified extensively during the latter part of the 20th century. Historically this would have been the original location for the kitchen, servant quarters and 'other offices' (latrines) for the Cottage. Adjacent to this

building on the north are the foundations of yet another structure that was used over the years as a stable and later as a garage. Archaeology during July 2011 has unearthed certain shards that suggest that a blacksmith workshop may also have been a part of this building. Analysis shows that a covered link-way would have connected these buildings to the Cottage.

The Cottage retains a cedar shingle steep-pitched hip roof, but all the other structures have no roof covering. Grey slate roofing material is strewn around the Castle ruin. A dry-bed stream meanders alongside the Cottage and separates it from the other ruins. The Cottage has landscape evidence of a sunken garden with low retaining walls contoured along the slope of the land.

In 2011, geologists at the University of the West Indies joined this work to assist in the analyses of mortar and material samples to guide conservation strategies. However, these heritage buildings have proved to be a resource for additional investigations on seismic strengthening of walls. Significantly, the geoscientific analysis has the potential to help provenance and cultural appropriation of the various parts of the historic structures. Therefore, to assist efforts to locate the buildings of Oristan, this work has now been extended to include comparative geoscientific analyses at the archaeological sites of the historic Spanish Jamaica towns of *Sevilla*, and *La Villa*.

Investigations at Ackendown and at comparative sites are on going, and have begun to assume various levels of scientific engagement. This paper briefly shares the early findings of the analyses, with an introduction to its comparative work with *Sevilla*. It is presented as an overview of the (1) Ackendown geology; (2) Natural Hazards and Disasters (3) Ackendown history; (4) historic structures; (5) geoscientific analyses; (6) geology of the heritage; (7) conservation findings; and (8) geoarchitecture conclusions.

This paper introduces the emergence of a thematic definition 'Geoarchitecture®' that combines heritage architecture with the discipline of geology. It outlines the multi-disciplinary approach being employed in the analyses of the architectural heritage using geological science, to help address provenance issues, to emphasize construction interventions for disaster risk mitigation, and to link geoconservation techniques as a support in historic preservation principles.

1. Ackendown Geology

Geologically, Ackendown sits on sections of the Montpelier Formation, Coastal Group of Jamaica. The Montpelier Formation is a white- to tan-coloured limestone with chert bands and is of Miocene age [11] (Fig. 2). The land slopes gently towards the coast with large limestone boulders strewn at the base of the property. There are two small perennial stream that take excess run-off from the slopes and drain the property. The area surrounding the Ackendown property shows karst topography, and the site itself rests on the seaward face of a rounded limestone hill.

The Heritage Park contains a diversity of geologically derived material, both local in-situ, or imported from other Jamaican areas as well as from overseas. For example there is clastic material imported from different areas in Jamaica. Imported material is found in some 'Gabian baskets,' rectangular mesh screens filled with cobbles that are strategically installed around one of the streams on the property to redress erosion. Historic slate roofing tiles found on the property are imported from overseas.

2. Natural Hazards and Disasters

Jamaica falls within the Tropical belt that historically has felt the effects of these annual seasons. From 1780 to 1786 there were five hurricanes that passed within 100 kilometres (100 miles) of the South Coast of Jamaica [12]. Additionally, the island itself is dissected by a number of faults that feature Quaternary left-lateral offsets associated with the Gonave micro-plate, which is demarcated by the Oriente Fracture Zone to the north, the Walton and Enriquillo Fault Zones to the south and the Cayman Spreading Centre to the west. Further, in western Jamaica the topography is influenced by the South Coast, Spur Tree and Montpelier-Newmarket faults that exhibit large downthrows to the south and west, respectively [13]. Historically, there was the 1692 earthquake where two-thirds of the infamous Buccaneer city of Port Royal sank into the sea, and the 1907 that resulted in the enactment of the first building laws in Jamaica [14].

"…About 200 earthquakes are located in and around Jamaica per year most of which are minor, having magnitudes less than 4.0. The most seismically active areas are the Blue Mountain block in eastern Jamaica and the Montpelier-Newmarket belt in western Jamaica. Other areas of notable seismicity include the near offshore south-west of Black River on the south coast, and offshore Buff Bay on the north–east coast…" [15]. The Ackendown heritage site on the south coast may bear testimony to these impacts, based on their ruinous condition and signs of structural movement.

There is evidence of environmental deterioration on the historic ruins, however this may be considered 'moderate'.

3. Ackendown History

The property was described as woodlands on the Early English Plat and Patent Books on deposit at the GAJ having 324 hectares (800 acres) patented to Dr. Richard Herne on August 18, 1674 [16]. By May 30, 1733 the earliest mention found to date with Ackendown is recorded in a dispute resolution document of a conveyance for 'Strathbogie' with estates or plantations called respectively 'Ackendown' and 'Retrieve' along with some uncultivated lands belonging to John Hayes and his wife Jenet who conveyed them to Peter Beckford that gives the following account [17].

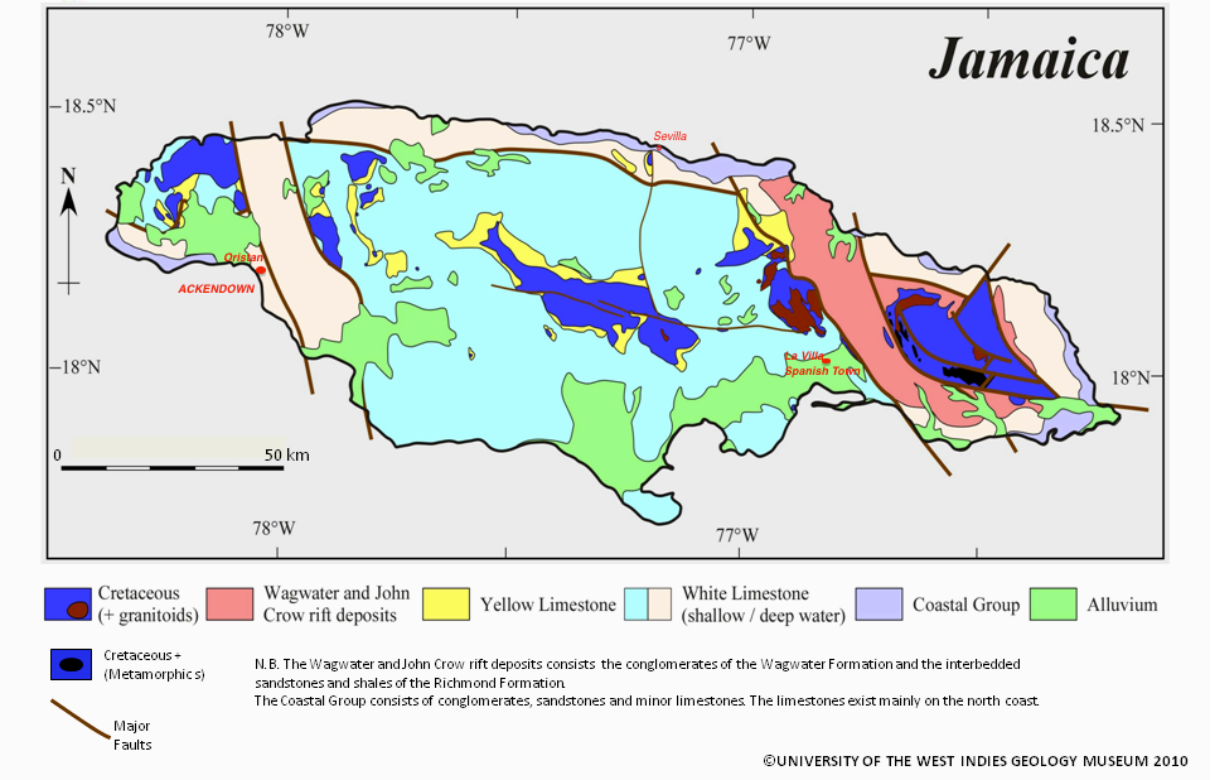

Fig. 2: Geology Map of Jamaica with insert of Ackendown, *Sevlla (north coast), Oristan (south coast),* and *La Villa* now Spanish Town (south central).

In 1734 John Haynes died intestate and these properties passed to the widow Jenet Hynes and her children. In 1742 Francis Sadler becomes the proprietor with his new wife, the widow Jenet Hynes. On his death in 1735, Peter Beckford passed these properties to his sons Nathaniel, William, Richard, Julines, and Francis to be equally divided between them. By January 1743 on account of mortgage entanglement, these parcels were transferred to William Beckford son of Peter. William died in 1770 leaving them to his infant son William and executors until September 28, 1781 when William turned 21 years. The Scotsman John Campbell is listed as proprietor in December 19, 1788 and attempted to convert the property from an 'estate' into a 'pen' resulting in disputes about whether this change was beneficial or prejudicial to the mortgages.

William Beckford became Lord Mayor of London, and the richest man of his time with his wealth stemming from holdings in Jamaica that passed to his son, William Thomas Beckford who was an illustrious traveller and author. Peter, William, and William Thomas were all absentee proprietors and never visited Jamaica [18]. William Thomas Beckford erected the ca.1800 mansion called Fonthill Abbey in Wiltshire, England that was designed by Architect James Wyatt and styled by the Royal Institute of British Architects as 'Georgian eclecticism' [19]. Two keystones on the Pimento Works ruins at Ackendown carry the inscription, "WB1776" and "WB1777," suggesting that these buildings were erected under the proprietorship of William (Thomas) Beckford.

Ackendown appears in the Jamaica Gazette of 1816 as belonging to John Graham Campbell with 132 'slaves' and 326 livestock [20]. After the 1834 Emancipation of slavery, in the 1837 Campbell was listed as having 331 apprentices [21]. By 1912 Ackendown was mainly rented to tenants as a cattle pen that also supplied wood, and consisted of 581 hectares (1,436 acres) in the proprietorship of I. O. Crooks and A. S. Aguilar and Brother [22]. In 1930, Crooks was removed off the title [23]. Various subdivisions took place, so that by December 2, 1971 the Urban Development Corporation owned approximately 267 hectares (659 acres) [24], from which Gorstew Limited became proprietors

in October 1992 of approximately 116 hectares (287 acres) containing the Heritage Park and the resort hotel was developed on the beach [25].

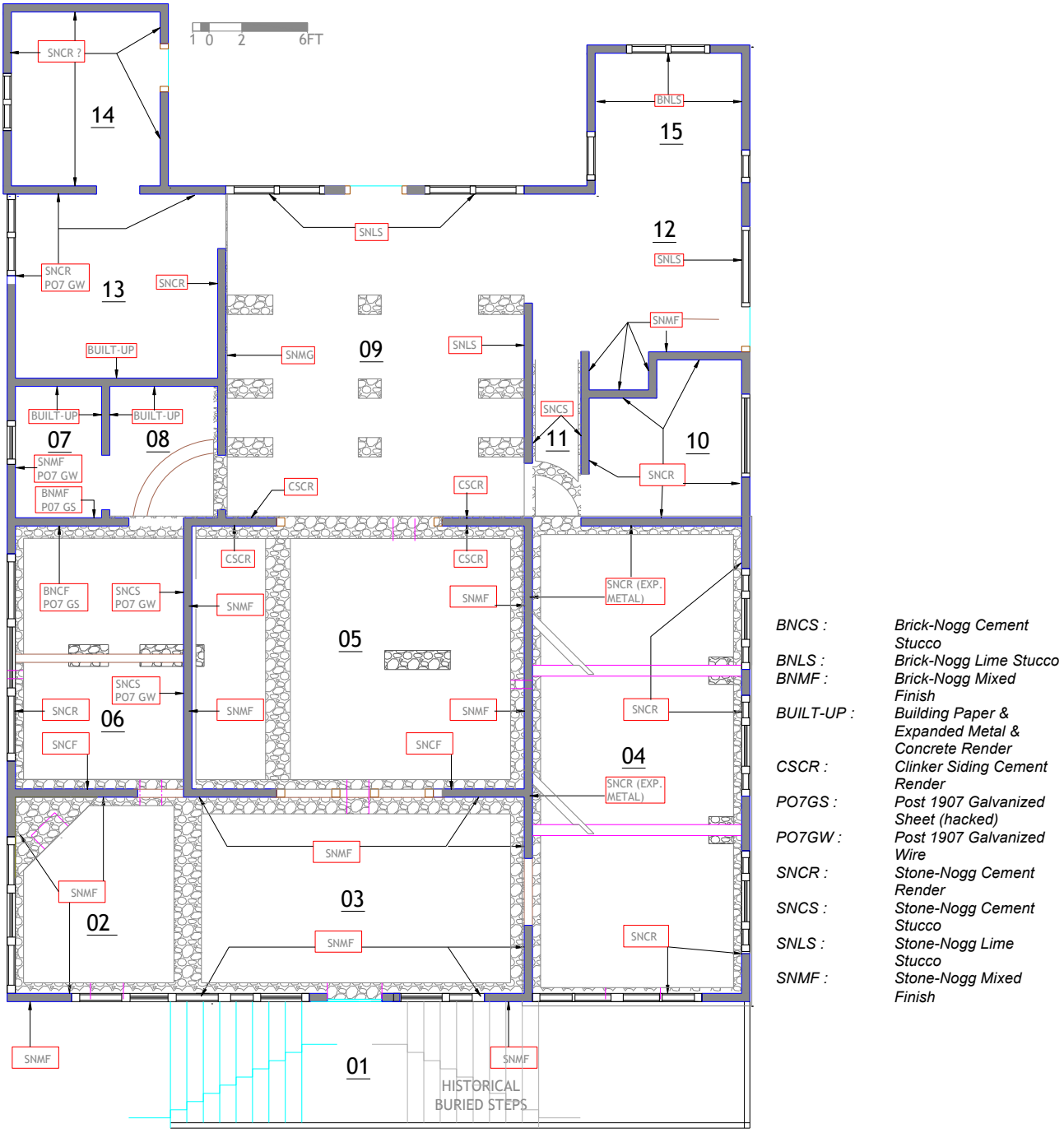

Fig. 3: Cottage Floor Plan showing random rubble foundation walls below with eleven types of upper wall construction (©Patricia E. Green Architects 2011 August).

4. Historic Structures

The Castle ruin comprises the outer walls of two double-storied Ashlar masonry 7.5 metres (25 feet) square towers with varying heights of 7.5 metres (25 feet). There are sub-floor levels on each tower. A low wall about 43 metres (141 feet) spans between both towers, with an interconnecting tunnel associated with this wall. There is evidence of upper timber flooring supports, also fireplaces and chimneystacks.

The Pimento Works are two structures each with a partition wall evenly placed. Each footprint measures 6 metres (20 feet) x 12 metres (40 feet). A five-bay barbecue with associated stone store-sheds separates each building. The barbecue overall measures 26 metres (86 feet) x 58 metres (190

feet.) The principal facade is of Georgian design with a 4-bay elevation and gable roof pitch measuring about 6 metres (20 feet) at the apex. The east structure carries two keystones over the doorways, on which is written WB1776 on each keystone. The west structure carries WB1777 on one of the keystones over the doorways, however it appears that the other doorway may have had the same but weathered. The west structure has a fireplace in the partition wall.

One Field Building has a one-roomed structure, and the foundations of the other outline two room. Both structures average approximately 6 metres (20 feet) x 6 metres (20 feet).

The Cottage contains a covered rectangular building with a veranda having an area of approximately 246 square metres (2,700 square feet). This building was occupied until about 2004, and was immediately vandalized after it became vacant, thereby revealing a wealth of geoarchitectural information. Twelve wall types are identified. One wall type is the random rubble perimeter wall foundation that provided a suspended floor. The above-floor walls are eleven different types of timber-framed construction with masonry infill. These are termed 'nogg' construction [26]. Four of the wall types are varieties of post-1907 nogg walls.

It is supposed that this building spans five centuries, 16th, 17th, 18th, 19th, and 20th centuries. On the basis of the analyses of these walls, a hypothesis was developed to ascertain the construction evolution of the Cottage (Fig. 3):

i. The sub-floor foundations that may have been a 16th century two-roomed stone house would be sections 05 & 06. The area of this equates with one of the Field Buildings.
ii. The sub-floor foundations that may have been 17th century are sections 02 (with a fireplace) & 03 also 09 added to 05 & 06. The area of this equates with the footprint of a Castle tower.
iii. The 18th century alterations would have coincided with the 1776-1777 Pimento Works improvements where section 04 would be added as a foundation and the house then spanned over sections 02 & 03 & 04 & 05 & 06. An outdoor section 01, the steps would match 09 as another outdoor space.
iv. The 19th century had the addition of sections 07 & 08 & 13 as one room, likewise section 10 & 11 & 12 as one room to the 18th century sections of 01 & 02 & 03 & 04 & 05 & 06. The outdoor space 09 would remain.
v. The 20th century had the extension of section 14 on the east, and section 15 on the west. Also the outdoor section 09 was enclosed, and the east and west rooms were subdivided into 07 & 08 & 13 also 10 & 11 & 12 respectively to create indoor bathroom and kitchen facilities. Section 01 was integrated into a veranda.

5. Geoscientific Analyses

The techniques employed in the analyses of the building material used at Ackendown are geological methods that have found wide usage in Archaeology particularly for pottery, mortar, plaster and paint [27]. The techniques used throughout this project include hand specimen descriptions, petrography, insoluble residue analysis, neutron activation (NA) and X-Ray diffractometry (XRD). Each technique provides more information than the previous and as such a systematic approach has been taken in the study of the material. The techniques also increase in cost from hand specimen descriptions to X-Ray diffractometry.

Petrography deals with the description and classification of the rocks by microscopic examination, where thin sections are made from small slabs of a rock sample mounted onto a glass slide (~1 inch by 2 inches), and then ground to a specified thickness of 0.03mm (30 microns). In the case of mortar, the samples are first impregnated with resin, then mounted and ground. Neutron Activation is a method of identifying isotopes of an element by bombarding them with neutrons and observing the characteristic radioactive decay products emitted. Different elements produce different 'signatures' of the sample in the induced radiation, which makes determination of their concentration in the sample. X-Ray Diffractometry is one of the primary techniques used by mineralogists and solid-state chemists to examine the physico-chemical make-up of a sample.

These analyses largely form part of the provenance studies to determine the source area for the lime used in the mortar and the clay used in the brick as well as assist in distinguishing possible construction phases of the buildings.

At Ackendown, various samples of rock, mortar, stucco, plaster, brick and slate have been recorded and sampled for analysis. Thin section analysis has revealed very interesting textures; insoluble residue has indicated that the mortar is made primarily of carbonate with a small percentage being twigs and charcoal. The NA and XRD analyses are being conducted and compared with *Sevilla*, and *La Villa*.

6. Geology of the Heritage

The limestone on the historic ruins is used as cobbles or fieldstones, and block forms, as well as utilized in mortar, stucco, and plaster. It appears to have been derived from in-situ boulders on the

property or strewn fieldstones from loose blocks such as in the streams with a limestone basement, as well as from the material in-situ along the rocky coastline now housing the resort hotel development.

Constructed from hewn limestone blocks, the Castle material is also micritic, (fine-grained limestone) in texture. The tool marks can be seen on individual blocks. The tunnel is made from rounded to sub-rounded limestone cobbles. They appear to be about the same size as those used as blocks except they were not shaped into blocks.

The two primary buildings at the Pimento Works and its storehouses have a mixture of limestone cobbles and crudely-shaped limestone blocks. Red bricks are used inside the eastern building for an oven and a fireplace. Some repairs especially on the partition walls have been done using Portland / Carib cement.

The Field Buildings are composed of bits of chert cobbles in limestone cobbles with limestone blocks for the foundation and quoins.

Summary showing Geology for Architectural Masonry of Ackendown Heritage Structures

	Primary Architectural Masonry	Primary Geology	Primary Mortar
CASTLE	Ashlar	Limestone blocks	Lime (similar to that of the Cottage 2nd phase)
CASTLE ROOFING	Slate	Overseas imported slate	None observed (slate strewn on ground)
PIMENTO WORKS	Ashlar	Limestone blocks + limestone cobbles + red brick	Lime (renovations in Carib cement)
FIELD BUILDINGS	Rubble with Ashlar quoins and foundation	Limestone cobbles + limestone blocks + chert cobbles	Lime (renovations in Carib cement)
COTTAGE	Rubble	Limestone cobbles + red bricks	Lime + Lime & Carib cement + Carib cement
COTTAGE BLOCK BUILDING	Concrete	Concrete blocks + red bricks	Carib cement
COTTAGE GARDEN WALLS	Rubble	Limestone cobbles + clastic cobbles	Lime

On the Cottage, limestone is predominantly used, and from preliminary analyses is locally derived having micritic (fine-grained) limestone cobbles in the foundation and lower walls. Red brick is found also for a fireplace at the foundation level. The rocks at this location appear to be cobbles collected and used in the construction rather than hewn rocks. The mortar on the later-staged construction is coarse-grained, and has lime as binder with limestone fragments up to 1 mm in size as aggregate. Other walls above the floor level are of various geological combinations, some only made with stone cobbles, or with timber framing filled with stone cobbles generally called 'Spanish walling', or timber framing filled with red brick.

7. Conservation Findings

Other historic material examinations for conservation included timber samples from the frames, windows, doors, and roofing as well as metal samples of nails, hinges, and straps. However the analyses for these involve other types of equipment and technology outside of geology, such as carbon dating that is envisioned. The nail analysis is assisted through the dated collection at the Archaeological Division of the JNHT.

Early stages of the geoscientific analyses have revealed the following:

- At the Castle, the mortar is medium-grained, similar to the designated 17th century hypothesis of the Cottage. It consists of limestone, wood fragments and charcoal fragments mixed in with the relatively fine-grained binder. Showing shrinkage cracks, these are indicative of insufficient burning, thereby when rehydrated and combined it would dry out quickly forming the cracks [28]. The tunnel mortar was less generously placed in this area than on the blocks of the towers. The material is firm, however may be easily scraped away from the rocks.
- At the Pimento Works, the mortar was predominantly of lime. The lime mortar was grey- to light-brown in colour, very soft, and disaggregated easily between thumb and forefinger. It shows burnt wood and charcoal fragments up to 5 mm in size. This mortar appears to have a high aggregate to binder ratio with the binder being very fine-grained with limestone fragments up to 2 mm in size as aggregate.
- At the Field Buildings, the mortar has chert and limestone fragments ranging in size from 10-15 cm used to infill the mortar between blocks. This decorative mortar is found only on the east wall, and on no other structure.
- At the Cottage, inside the sub-floor foundation level hypothesized as being 16th and 17th century, the limestone is chalky and sub-rounded in shape. These foundations and lower walls

showed a tight packing of cobbles with soft, white-grey, powdery lime mortar smeared over the rock-to-rock connections. This mortar is very fine-grained. The lime mortar appears to be created only from very fine-grained lime binder and aggregate less than 1 mm in size and used to hold small rocks in place as well as spread on the surface as stucco. There are charcoal fragments in the mortar. This application appears very crude compared to applications at other structures on the site. The arched openings within this sub-floor foundation area have been closed off with limestone cobbles, and the mortar is of similar texture and consistency. The mortar in this area is similar to that on the Castle.

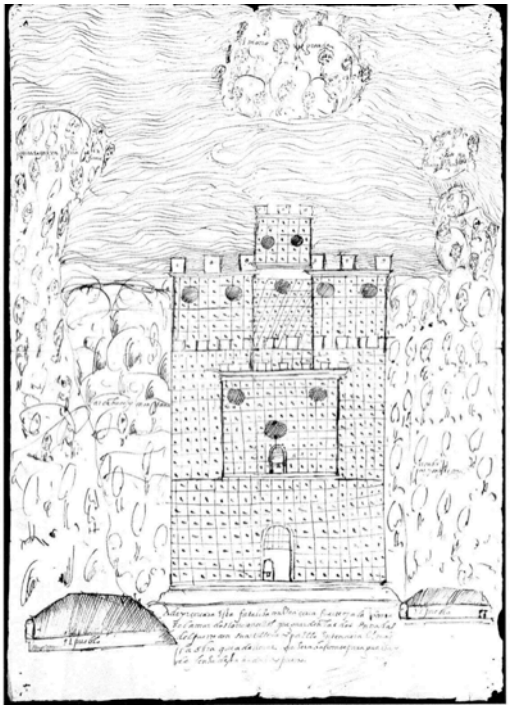
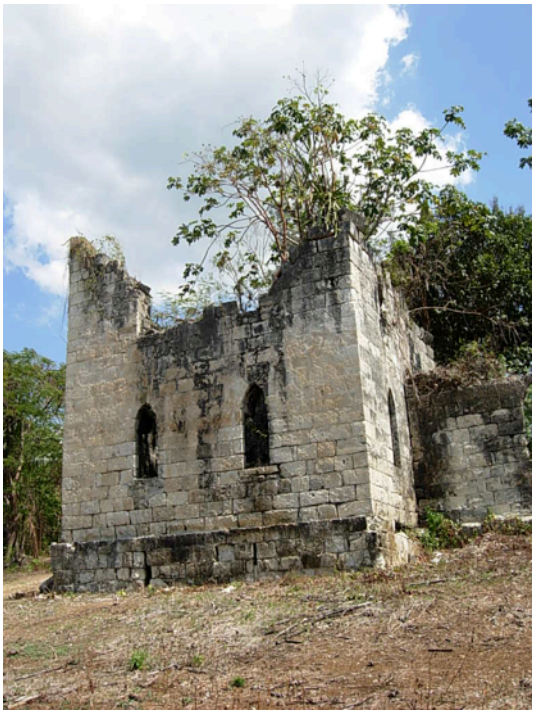

Fig. 4 & 5: 1573 Illustration of Panama Port of Santa Maria showing Fort-house *[Puerto y Fortaleza]* and settlement *[un pueblo]* of small houses (source: *Archivo de Indias, Sevilla*, Spain, MP Panama 4); and Ackendown Castle.




Figs. 6 & 7: View of Port from Ackendown Castle with Pimento Works ruin in foreground, and hotel resort development on the beach; and one of the Ackendown Field Buildings.

8. Geoarchitecture Conclusions

The early findings of the geoarchitecture have already begun to confirm aspects of the construction dates of the heritage structures. It is recognized that the Cottage has been continuously inhabited into the 20th century, and show evolving construction techniques with developments in earthquake resistivity. The earthquake resistant construction is part of the Jamaica Vernacular Architecture [29]. It is common practice of the local community within the vicinity of Ackendown; therefore traditional restoration skills reside locally.

Parts of the Cottage compare with that of the 18th century Pimento Works carrying keystone dates of 1776 and 1777. Yet the geoarchitecture of the Pimento Works with its Georgian architectural detailing suggest that the Field Buildings with its decorated inset mortars are of an earlier date to the

Pimento Works. This type of decorative mortar is found on the 17th century Old Gaol building in Port Royal, one of the few architectural survivors of the 1692 earthquake.

Significantly, the geoarchitecture is characteristic for the Castle and the Cottage sub-floor foundations, and it may be concluded that these have the same construction timeframe. The Castle may have been a 16th century Spanish fort house and the Cottage sub-floor foundations a Spanish stone house as a part of the Spanish Jamaica town of *Oristan.* Making contemporaneous associations of the Ackendown heritage with early Spanish settlements in the Americas, the 1572 illustration of Santa Maria in Panama bears similarity (Figs. 4, 5, 6, & 7). Spanish Jamaicans helped founded Central American Spanish colonies [30]. Settlements in Panama came after those in Spanish Jamaica [31]. The 1692 earthquake may have destroyed the Castle likewise the stone house, over which the Cottage was subsequently constructed.

Geoarchitecture has far-reaching effects for multidisciplinary research. Even with these early geoscience results at Ackendown, the geoarchitecture seeks to help enhance cultural heritage tourism linkages between Jamaica and Hispanic heritage. Commonality of the geoarchitecture of the Ackendown Heritage Park with that of the wider local community would thereby engage them for sustainable conservation.

Acknowledgements

The authors wish to thank all who helped to make this investigation possible with special mention of Sandals Resort International as the proprietors and developers of the Heritage Park, the Jamaica National Heritage Trust for providing access to archaeological heritage sites under their purview for comparative analyses, the consulting firm Patricia E. Green Architects, Jamaican Archaeologist Roderick Ebanks, and the Office of the Principal University of the West Indies at Mona for the provision of a 'New Initiative Grant' that has helped to facilitate these investigations.

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HERITAGE ARCHITECTURE LANDESIGN
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BUILDING INFORMATION MODELING. AN INSTRUMENT OF KNOWLEDGE FOR THE FORTIFIED ARCHITECTURE.

Luigi CORNIELLO[1]
(1)Dipartimento di Architettura e Disegno Industriale "Luigi Vanvitelli", Italy
lcorniello@libero.it

Abstract
The research is focused on the analysis of patterns of information, the creation and management of model information Building Information Modeling (BIM) applied to the study of Ticino fortified. The study proposes a knowledge and appreciation of the site of the historic and natural landscape through the relief, the representation, the reading of images and archive documents. You can define BIM process asan analysis of multidimensional models generated digitally by means of tools, a representation of a data model related to different disciplines that define it. A BIM can contain any information relating to an area and its parts. The most commonly informations collected in a BIM relate to the geographical location, geometry, material properties and elements. The development of the route is contained in the following three stages: the first concerns the perception of places and architectural presence of the landscape and the urban environment. The second segment of the research develops the comparative study of documents of different age and origin, whose expressive language offers pictures comparing the area and the current reality, both played with the scientific discovery of things and places. The third an interpolation to achieve knowledge of the first two and finaline to conserve with the necessary protection of places as a resource to be developed.

Keywords: Building Information Modeling, representation, fortified architecture.

1. The systems of fortified architecture
This itinerary offers different view of research and interpretation in the context of multidimensional methodology adopted in the various fields of investigation: from the history of architecture to landscape, from architectural design to restoration, from urban planning to archeology, from the sign to the drawing. This scientific aspect was mainly related to maps, plans, graphs, references available in archives and private collections such topics innovative research focused on emotion perception. The analysis of patterns of information about the creation and management of information BIM model applied to the study of fortified architecture of the three castles in Bellinzona. The study proposes a knowledge and appreciation of the site, historical and natural landscape through the architectural survey, the representation, the reading of images and archive documents. The development of the route is contained in the following three stages: the first concerns the perception of places and architectural presence of the landscape and the urban environment to capture these images and capture the historical value and the current reality in the visions of reality in architectural reports with the shapes and colors of the social structure. The second segment of the research develops a comparative study of documents of different ages, whose expressive language features compared images of the area and of current realities, both played with the scientific detection of the architecture and places. In addition, this course outlines a collection of visual images documented by representations analyzed in comparison. The third route to achieve interpolation knowledge of the first two is to be conserved with the necessary protection of places as a resource to be developed. The overall image of the castles of Bellinzona is mainly linked to their role in the late Middle Ages, when it served as fortifications to protect the Duchy of Milan. Residual traces of Roman and early medieval military installations are available on the archaeological plan, while other defensive works of the middle centuries of the Middle Ages are incorporated into the Ticinos' fortifications and appear in isolated form, such as the Black Tower and White Tower of Castel Grande. Those examples of

Bellinzona are military architecture, often found in the valleys of the southern alps that offered considerable differences in level topography for defense purposes, the walls and sloping connection with their narrow parapets and steep stairs.

2. The patterns of information Bim applied fortified architecture

Considering the BIM a process analysis of multidimensional models generated by digital tools, we can see that they are a representation of a model different data related to the various disciplines that define it. A BIM systyem can contain all the information about a territory and its parts. The most commonly collected concerning the geographical location, geometry, material properties and elements.

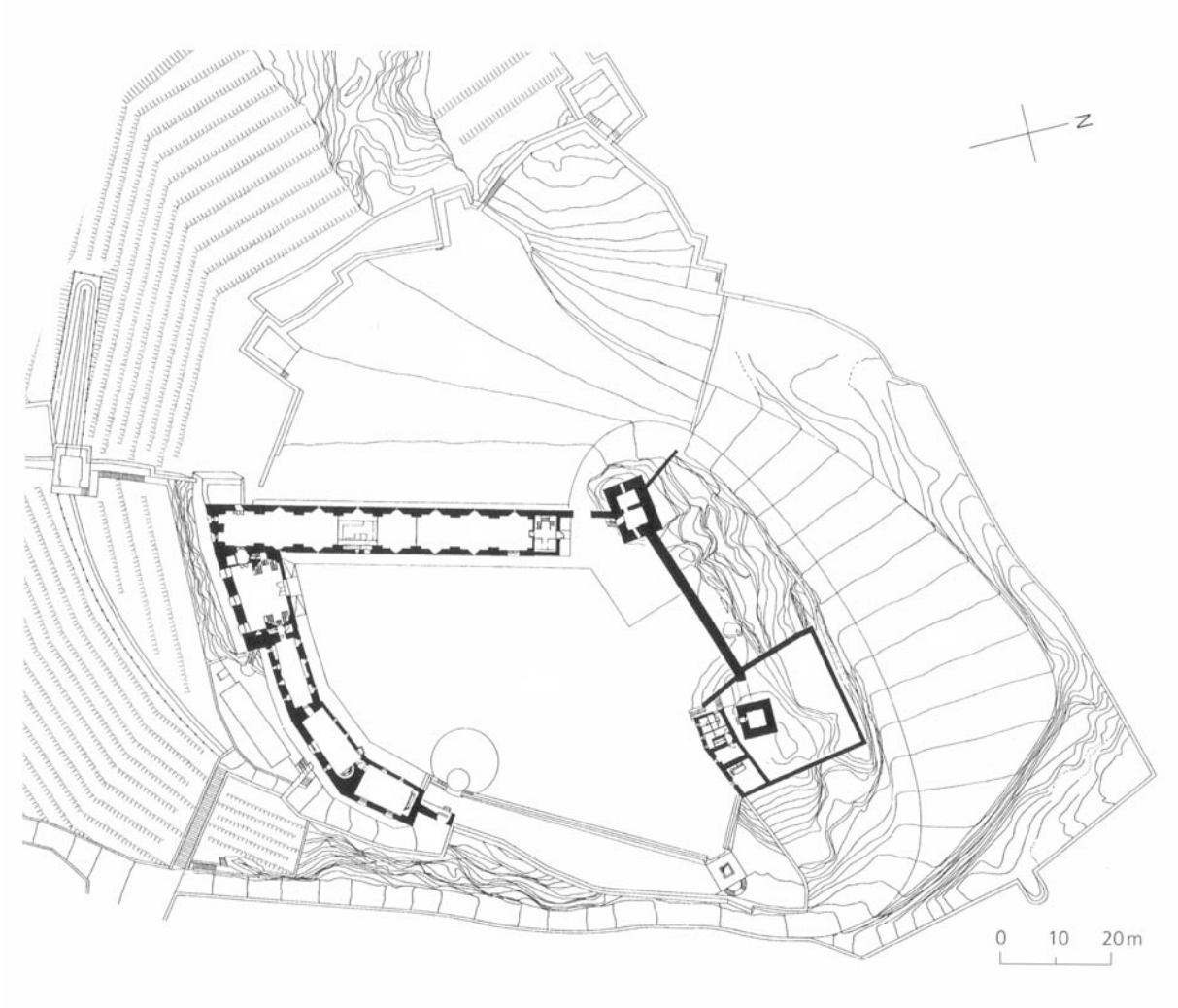

Fig. 1: The Castel Grande in Bellinzona. Plan.



Fig. 2: The Castel Grande in Bellizona. View of the entrance.

2. The architectural presence in the urban environment. The Castel Grande in Bellinzona

The huge rocky outcrop of Castel Grande forms the natural center of the "closed Bellinzona." Of the oldest settlements (prehistoric and Roman) are barely visible archaeological traces, even the meager remains dating back to the middle centuries of the Middle Ages. Most of the factories can be placed between 1250 and 1500.These are witness of a very eventful story building, marked not only by restructuring, expansion and strengthening interventions, but also by war damage, periods of neglect and demolition. The broad summit of the hill, protected by rocky cliffs to the north and to the south by almost vertical steps less steep but difficult to access, is presented as an open space terrace with a diameter of 150-200 m. Its configuration has meant that in every epoch the defense works were to follow the natural edge of the rocky outcrop, the late medieval town still exists, therefore, rests largely on the same foundations of the Roman walls. These, found during archaeological investigations in the south wing of 1967, are made of rough stones. Today the vast inner surface offers the impression of a big empty space. Many buildings were destroyed in the fifteenth century. The nineteenth-century buildings of the arsenal, however, were almost all demolished in the course of the restoration works of the twentieth century. The sources and archaeological evidence shows that the height of the Middle Ages Castel Grande was to include a number of buildings much larger than anyone can imagine now. Several buildings were dismantled in the fifteenth century under the Dukes of Milan. Aim of the intervention is presumed was to get rid the inner surface, divided into three large courtyards, huddling for temporarily military contingent in case of need. Under Milan domination, the efforts to improve the defensive structure of the complex is concentrated on peripheral parts during the fourteenth century and especially in the fifteenth century it was provided in stages to elevate and renovate the walls, adding courtyards and auxiliary's towers of arms. The western segment also was radically restructured with the connection to the wall. In the late Middle Ages, it was entered in Castel Grande from the south through a gate in the city walls located halfway up the hill, after passed about 100 yards of arms embattled south of the city, we finally reached the main gate of the castle, which is open in the southeastern part of the walls. Since the fifteenth century, as said, the interior of Castel Grande is divided into three large courtyards with walls arranged radially from the Black Tower. This square tower, located more or less in the center of the castle, was built in the early fourteenth century and probably raised up in the fifteenth century. Further in the east lies the complex of buildings at the center stands the tallest building of Castel Grande, the slender white tower, probably built in the thirteenth century. As evident from the preserved parts of the city in the northerncourt there had to be buildings as well. In this area, defended by the sheer rock, the need to build a protective wall was warned between1300 and 1400. In the years 1982-2000 the fortress was the subject of a major restoration and transformation project of the architect Aurelio Galfetti, aimed to the revitalization of the castle. The project, conceived on a regional scale, emphasizes the public nature of the complex, strengthening its ties with the city and the landscape. A striking passage in concrete, carved into the rock, at the square of the Valley to the south-west of the square of the Sun, is a new direct access to the castle and its park. The southern wing of the fortress now contains the museum spaces divided into two sections. The historical-archaeological, accommodates several archaeological finds in site and a valuable collection of coins sixteenth century. In the historical-artistic section there are a series of drawings in tempera, the Body of factory west of the castle, built in the 1820s as arsenal, has been completely restored and turned instead to new uses.



Fig. 3: The Castel Grande in Bellinzona. The Murata.

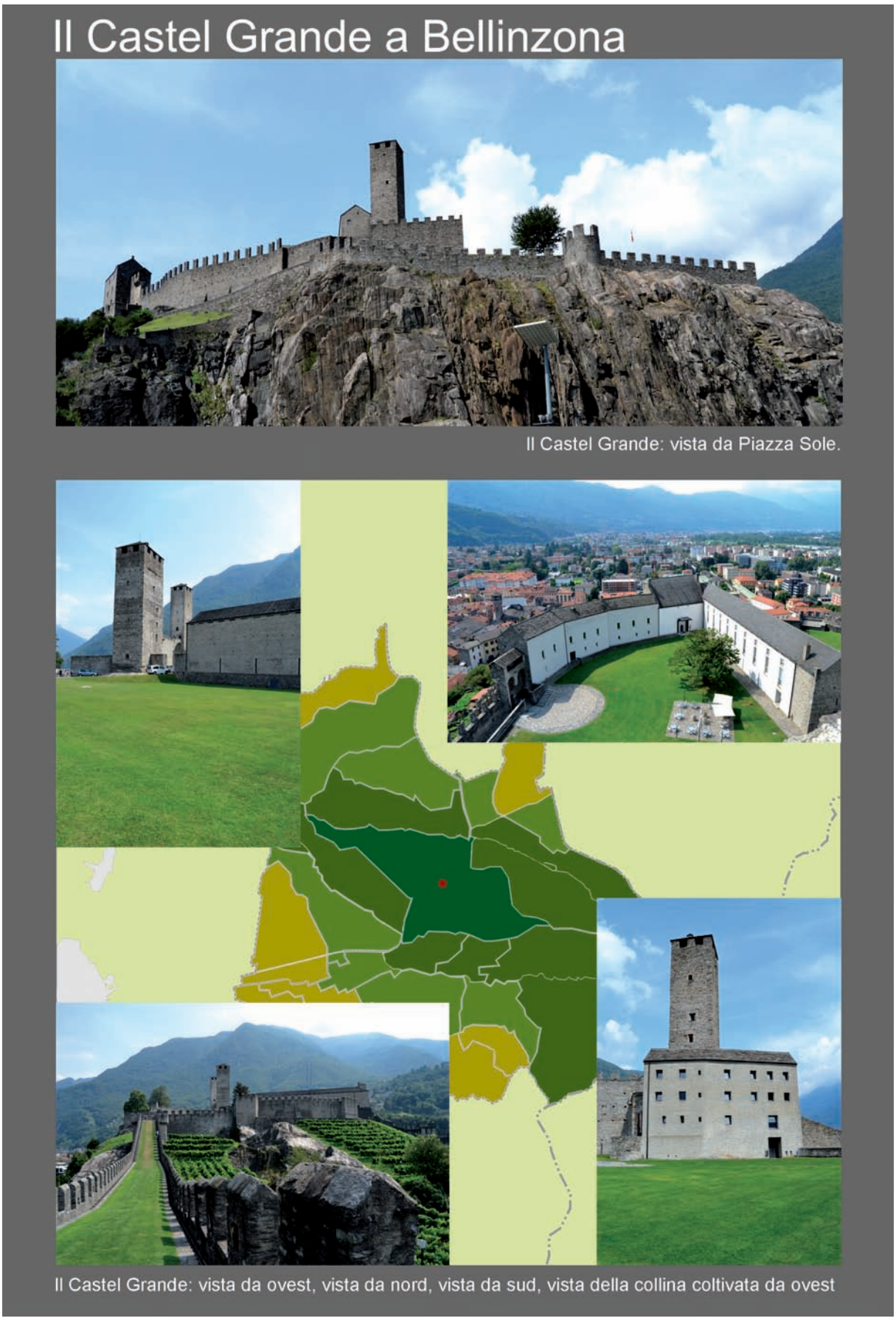

Fig. 4: The Castel Grande in Bellinzona.

3. The architectural presence in the landscape. The Castle of Montebello in Bellinzona

The impressive complex of Montebello (also said in the fifteenth century Castel Piccolo) stands on a rocky outcrop to the east of the town center of Bellinzona. Its origins date back to the thirteenth century. The castle was probably built by the Rusca's, relevant family from Como, and from them it passed to the Visconti's in the fourteenth century. After an initial phase of expansion (in the middle of the fourteenth century), at the beginning of the fifteenth century there was a period of decay. Around 1460, the buildings do not satisfied the technical - defensive "closed Bellinzona." Successive enlargements between 1462 and 1490, transformed the old building two - fourteenth century fort complex that characterizes the castle today. Left to decay in the nineteenth century, the work of consolidation and completion, completed in 1903, we read in the interventions in site, clearly readable, in courses of red tiles that separate the new parts from the original ones. The access to the hill where the castle stands is relatively easy from all sides, but especially from east. Unlike in Castel Grande, to prevent the enemy to approach it was necessary to dig deep ditches. The plan of the building looks like a rhomboid, obtuse angles are connected to the arms of the northern and southern walls of the village. The present building are readable the three main stages of the development of Montebello: the original and the two fortified city walls that surround it, built respectively in the fourteenth and fifteenth centuries. It dates back to the founding (XIII century), the main fortress: a fence uneven, slightly oblong, divided internally by more walls. It is not clear if the buildings that exist today on this website correspond to the original plan: open windows in the wall, now facing one of the two courtyards, would indicate changes in the structure plan. It is not excluded that the bunk, covered by a hipped roof and situated in the northeastern part of the fortress, is a reconstruction due to the restoration in 1903: the old illustrations show here only a building of four floors, with a pitched roof only inward. The overall plan of the fortress follows a pattern common in southern alps valleys: a high and robust wall huddled, inward, residential buildings and commercial vehicles. Part of this scheme the entrance to the fortress at the top on the west side and today reached by an external staircase. Presumably in the middle of the fourteenth century the fortress was built around a fortified by irregularly shaped, 7-15 m away from the original complex and crowned, straight flush to the wall, with battlements Ghibellines. The reveal of the remains in the boundary is constructed in a second time (fifteenth), both in a smaller building west of the central core. To the east, the castle complex thus expanded is protected by a deep moat, over which was thrown a drawbridge and the door - opening round arches in the southeastern part of the city walls - is set in a fifteenth-century tower. As shown in the oldest parts in the city of the fifteenth century, even then the plateau east of the outer moat had to be included in the fortifications. Massive interventions between 1462 and 1490 mainly interested the perimeter of the fortress: Harnessing the fourteenth-century walls it erected a new one, more robust, which in essence still determines the external profile of the castle. In the east land of the moat is a ornament terminating at an acute angle with the outer door, adjacent ditch and parapet fitted with trap doors. The moat oldest is closed to the north by a parapet, to the south by an auxiliary pentagonal tower, open at the back, which is the starting section of the junction with the southern arm of the walls of the village. On the site of the port in fourteenth-century the city is a port-projecting tower, with supportive function. The corners of the boundary rise auxiliary towers, open towards the interior and free of platform; at northeastern part is instead leaning on the inner side with a construction platform. An open door in the southern section of the city, with a drain reflects the original situation of the fifteenth century. The walls includes various service rooms for the use of sentinels; slits and gratings of the wall and towers were designed for crossbows, muskets and mouths of small caliber. The terrace is bounded to the west of Montebello, on the side facing the city, by a crenellated wall with semicircular auxiliary turret. In the fifteenth century Montebello was considered among the castles of Bellinzona, the most suitable to the defense all over the field in case of war. The free space within the main fortress and advanced fortification works could meet the need of sudden accommodate troops and war material. The keep houses the Civic Museum and archaeological, built in the years 1971-1974 by the architects Mario Campi, Franco Pessina and Niki Piazzoli.



Fig. 5: The Castel of Montebello in Bellinzona

4. The architectural presence in the natural environment. The Castel of Sasso Corbaro in Bellinzona

Approximately 600 m southeast of the city, at the highest point of the rocky outcrop where are located the fortifications of Bellinzona, stands the fort of Sasso Corbaro. Unlike other works of defense, integrated from the thirteenth to the fifteenth century in a single defensive system, this castle stands in a completely isolated. In the second half of the fifteenth century it was fortified the summit, to fill a void in the defensive system of Bellinzona. Work began only after 1478, before he built the rugged northeast corner tower of the future complex, then ran to the other parts. The work continued until around 1481-1482. In times of peace, the fortress was used as a prison. Repeatedly damaged by lightning in the sixteenth and seventeenth centuries, around 1900 Sasso Corbaro was a ruin. The consolidation work did in this century have made substantial architectural remains unrecognizable. The rock forms a square of about 25 m per side, from the north-east and south-west corners where rise four-sided towers of different heights. The fortress - whose walls have a thickness between 1.8 m to the east (front of attack) and about 1 meter elsewhere - it was designed for a defense on all fronts: on all sides developed a parapet with embrasures and battlements Ghibellines, also present in the watchtower on the south-west angle. The entrance to the courtyard of the fortress - on the west facade, facing the valley - it still shows traces of a gate made of bars, the south and west sides of the courtyard are occupied by two floors wing housing, along the wall boundary, a time covered by a gable roof that began under the parapet walk. The powerful bunk on the northeast corner, evidently built before the other parts, now comprising four floors. To the south and west of the core are the remains of arms of courtyards and minors buildings. The last restoration took place in the years 1998-2006 by the architect Paola Piffaretti.

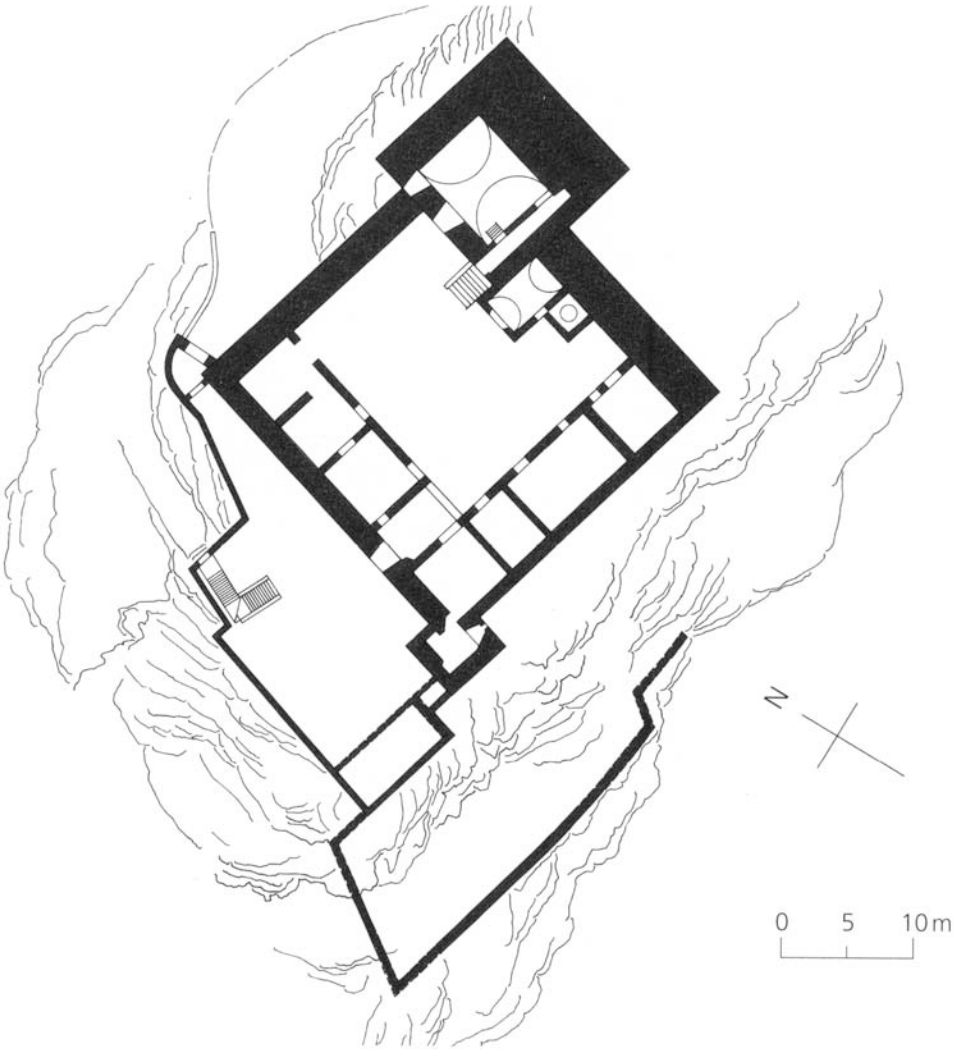

Fig. 6: The Castel of Sasso Corbaro in Bellinzona. Plan.

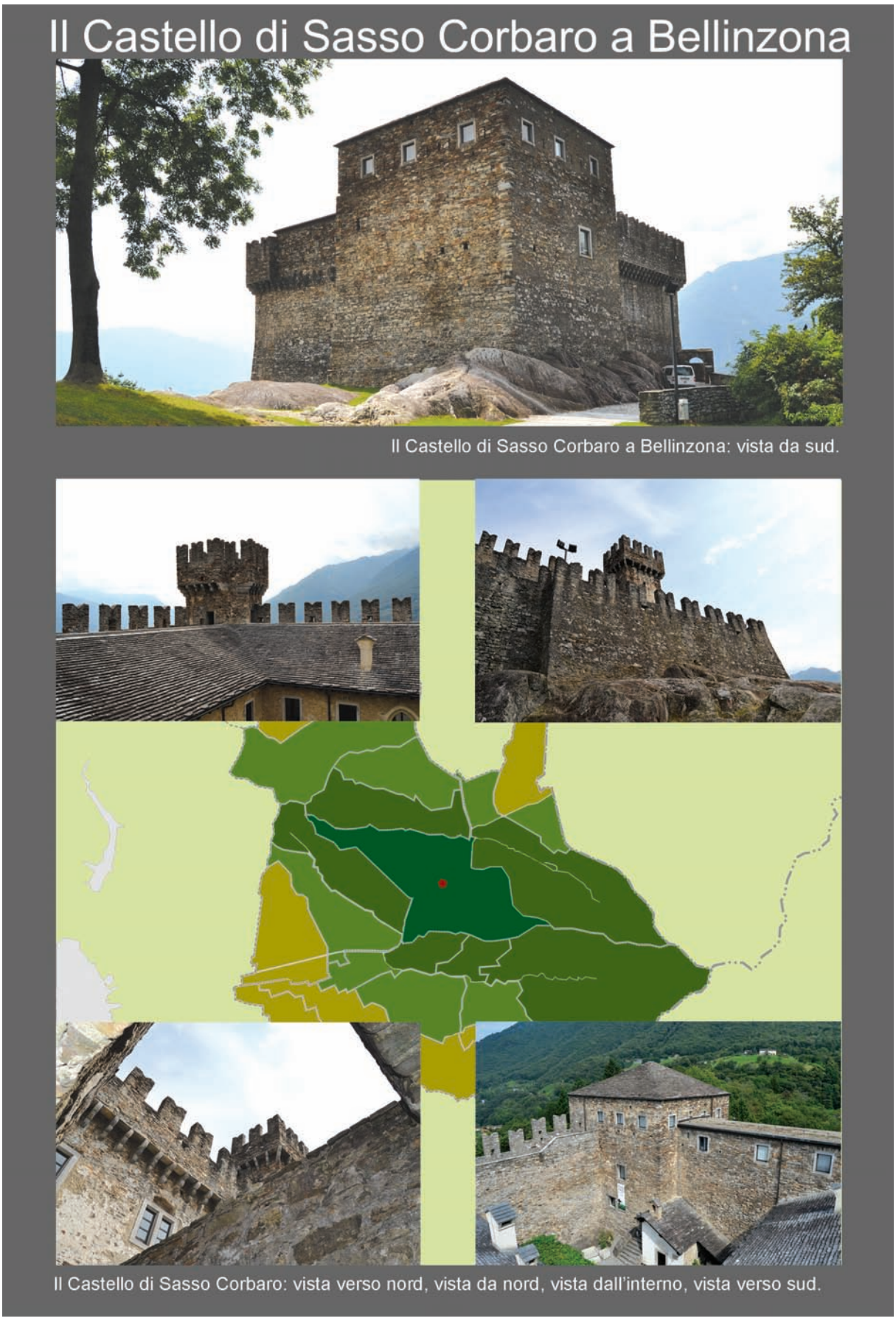

Fig. 7: The Castel of Sasso Corbaro in Bellinzona

5. Images of the area and the reality aimed at the preservation and protection of places

Knowing a city and its territory means to review the history of its people and its urban fabric or acquire social structures and architectural features of the present and the past, and with more attention to what remains of the architectural heritage to be protected as a powerful sign of knowledge. The research, based on the action of protection and enhancement of the fortified structures, cannot be separated from an activity based on the discretization of multidimensional knowledge and measurement of assets through the use of BIM systems. The study consisted of the reading of the territory, aimed at the understanding of all the complex aspects that contribute to determining the form, not only as the outward appearance, but also as a carrier of tangible and intangible assets related to the history, culture and traditions which over the centuries have marked their signs to the environment. The investigation is focused on the knowledge of fortified Ticino's architecture, focused on the study of the chromatic inscribed in the UNESCO World Heritage site since 2000. To outline a possible path of observations for urban environments is useful to focus on some general considerations with thoughts based on multidimensional study starting from the perception of the elements of the environment related to their spatial position and the synergy with the intervention of BIM knowledge on the site.



Fig. 8: The City of Bellinzona. View.

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Control and reuse of the rainwater in the urban context

Rossella FRANCHINO,[1]
(1)Department of Architecture and Industrial Design, Second University of Naples, Italy
rossella.franchino@unina2.it

Abstract
Within a correct and sustainable urban development, the control of the flows of rainwater to the ground is particularly important. When the balance of the rainwater at a territorial level is meaningfully altered because of the ground changes, implementations of infrastructures of water collection are often necessary and they are expensive from both the economic and the environmental and landscape point of view. It is evident, therefore, the necessity to check the process of water collection at the origin replacing or placing side by side to the traditional infrastructures the so-called "green infrastructures", as suggested by the United States Environmental Protection Agency.
The aim of this research concerns the use of the principles of the nature as a model of management of the rainwater stimulating the hydrological potentialities not developed by the site. The final result consists in the individualization of "green" technologies both passive, only natural, and active with small engineering, allowing to carry out an urban micro-basin self-ruling the meteoric waters picked up to the ground in the area that is object of study according to the logic of "design for water conservation".

Keywords: infrastructure networks, rainwater, water conservation

1. Introduction
In the last decades the environmental worries have been prior among the greatest worries of the contemporary man. The environmental issue has conditioned in a very marked way study, application and management of both innovative and simply evolutionary new technologies. That's why the analyses of convenience, only oriented by the necessity to save resources, have become analysis of compatibility that have added to the purpose of saving also the purpose of mitigating the environmental impact, both seen in their incidence on the residual availability for the future generations and on the possibility to still enjoy a not completely degrading habitat, even having it submitted to repeated transformations.
Currently one of the most important environmental problems consists in the territorial management of the infrastructural networks that, in some cases, has produced situations of real emergency. Within a correct and sustainable urban development, the control of the flows of rainwater to the ground is particularly important.

2. Water-use integrated cycle networks
At a territory scale, the integrated cycle of the waters se provides different phases. From its point of origin, water reaches individual users through primary and secondary distribution and after whatever use it is put to, is discharged as waste water into the sewage system, which conveys it to where it will be finally treated [1] .
Since any intervention within a territory gives great importance to the correct environmental design of a water-supply network, examining the network as a whole, instead of looking at its single elements, will provide a more general overview that will then allow us to make recommendations as to the re-use

of this resource. Water is, in fact, an extremely valuable resource and therefore the over-riding aim of the entire cycle of use must be how to save and how to recycle it whenever possible.
The typical water-cycle is made up of: procurement, storage, use and disposal. Procurement may be from a spring, ground-water, freshwater supplies (rivers, lakes), and only in a few cases also rainfall and seawater. The latter two resources are used in special cases and for isolated areas of use, being constituted by holding-tanks for collecting rainwater and desalination processes for seawater.
In the other, more commonly-known cases there are collecting tanks and drainage channels for obtaining water from springs, artesian wells or wells for groundwater and plants which use river water and lake water from source. Once having collected the water, a fundamental element for its use is naturally its quality, from an organic-oriented, chemical-physical and bacteriological viewpoint.
Depending on the eventual use of the water, in most cases it is absolutely necessary to resort to a series of drink ability measures, which might consist of neutralising certain pollutants that may be present, reducing their strength, modifying their ph value, disinfecting them etc … The water that has been drained off is collected in special holding devices where the necessary treatment takes place and it is from here that the flow begins for the various uses of water, which has to be supplied proportionately in order to satisfy current and possible water needs.
Generally this phase of the cycle consists of a process of heat transfer to the water which is mainly channelled, under pressure, but also in some cases, in the open air, to holding tanks situated in the proximity of end-users. These holding tanks have differing sizes and typologies in relation to the type of use, the topographical features of the catchment area and the type of function required.
The most common types are buried or above ground, depending on whether the area to be supplied contains natural elevations or is completely flat. The size of the tanks, besides being obviously dependent on the number of users, is also determined by the characteristics of the community and flow-rate coefficients required. From the holding tanks a distribution network is developed which must deliver punctually the necessary quantity of water required by individual users. This network is usually a mesh type since it is subjected to considerable variations in flow-rate and with this type it is possible to ensure the greatest flow to specific points. It would be pertinent to note the difference between the heat-transfer network which is proportional to average flow-rate required by users. The function of the holding tank is precisely that of receiving water constantly at an average rate of flow and delivering the required flow rate instantaneously.
Subsequent to water use is the discharge of waste water, in quantities conventionally set at 80% of that supplied, which takes into account those amounts of water which are not discharged into the sewage system but used for irrigation or external flushing. It should also be noted in the water balance that water supply is generally equivalent to a maximum of 60% of the water that is drained since a considerable amount is lost in the conduits or from pump overflows and tanks. The waste water is transported through sewage conduits which take it to its final destination, following purification treatment. The sewage system may be of a mixed or separate type, depending on whether it collects rain water. The network elements should allow for, whenever possible, not only the discharge of waste water from all possible users, but also the distinction between runoff water and sewage water so that runoff water may be reused after treatment for watering green areas and street-cleaning, while sewage water is transported to purification plants where it is thoroughly treated.
In some cases, once the principal pollutants have been neutralised, the recycled water may be delivered to homes, through a system which is separate to the drinking water system, and used for WC flushes. It is also important that rainwater, which contains dust and pollutants of various kinds in solution, is separated from this recycled water through overflows and sent into the sewage system for subsequent purification treatment.
The final purification treatment takes place in plants which deal with the neutralisation of the main pollutants contained in the waste water so as to enable it to be sent to a final body of water. In order to protect the delicate equilibrium of the aquatic eco-systems of the receiving body of water it is important that the effluent form the purification plants does not contain residual pollutants. Traditional treatments for purifying water are of a physical kind (sedimentation), of a chemical-physical kind (adding chemical reagents) or of a biological kind (active mud) and produce the so-called “purification mud” which has to be specially processed (in the past in special waste disposal sites but now in incinerators).
The location of these treatment plants is also of great importance since they represent sites of high environmental impact. This impact may be reduced through the use of tunnel plants or covering the tanks and taking steps to treat the air through deodorising scrubbers. Where possible, this deodorising treatment can also be carried out with deodorising aerosol systems.
Traditional purification systems, in small-scale cases, might be bolstered or even replaced by natural treatments which greatly reduce the content of artificial elements and the amount of energy consumption. For example, instead of constructing concrete holding tanks, particularly in naturally, humid areas, water flow can be, to all intents and purposes, implemented by gravity.

Such natural treatments can, in certain cases, be sandwiched between the pre-existing purification system and the final receiving body of water, in such a way as to neutralise the residual organic content and to protect the environment in case of malfunction of the pre-existing system.
To achieve purification of water without resorting to mechanical means, which have high environmental impact, purification systems can be used, in small-scale cases, which are based on natural processes such as reed-bed purification.

3. Controlled process of rainwater management

In the previous paragraph the integrated cycle of use of the waters has been analysed starting from the point of water sampling up to reach its depurative treatment and its reintroduction in the final delivery. Just because the water is a very precious resource, the whole cycle of its use has been analysed from its saving point of view and all the possibilities of its reuse have been considered.
Beyond these considerations, in addition, the territorial scale is very important to check its origin the process of collecting rainwater through a controlled management that can be done by determining the contribution of rainwater and their possible recovery and reuse, infiltration in the soil and the entries in the natural water bodies.
In the urban context the continuous increasing of impermeable surfaces has often determined great problems of erosions and flooding besides altering the hydrologic natural water cycle damaging the balance among precipitation, evaporation, groundwater recharge and surface outflow. It is evident that it is imposed, therefore, a change of attitude in the water management in urbanized territories that must follow the natural cycle.
The study of the hydrological balance at the regional scale, involves the characterization of the flows of precipitation, runoff, infiltration and evaporation.
When the balance of the rainwater at a territorial level is meaningfully altered because of the ground changes, implementations of infrastructures of water collection are often necessary and they are expensive from both the economic and the environmental and landscape point of view. It is evident, therefore, the necessity to check the process of water collection at the origin replacing or placing side by side to the traditional infrastructures the so-called "green infrastructures", as suggested by the United States Environmental Protection Agency according to the logic of the Low Impact Development (LID) [3]. It is an approach to the development of the territory that uses principles tending to recreate characteristics of the natural territory in order to carry out a functional drainage of the site, so that the rainwater can be considered as a resource and not as a waste. There are many systems that can be used for adhering to these principles such as: drainage systems and permeable pavements, rain gardens and green streets. They are "green" technologies both passive, only natural, and active with small engineering [2], allowing to carry out an urban micro-basin self-ruling the meteoric waters picked up to the ground in the area that is object of study according to the logic of "design for water conservation".
For implementing the LID principles, the water can be managed so that they can use the principles of the nature as a model of management of the waters, stimulating the hydrologic potentialities not developed by the site. Applied on a wide scale, the LID systems can contribute to reinstate hydrologic functions and, with particular devices, also ecological functions of the whole aquifer. The interventions of transformation of the human-made territory, in fact, must be interested, among the other aspects, also in the ecological aspect for the maintenance of the biodiversity in order to protect the natural processes that are at the basis of the ecosystems survival.
In the United States of America there are many important experiences of implementation of green infrastructure according to this logic as the experiences of: Seattle e Olympia (Washington), Portland e Wilsonville (Oregon), Philadelphia (Pennsylvania), Emeryville, Santa Monica e San Jose' (California), Chicago (Illinois), Alachua County (Florida), Stafford County (Virginia) e Lenexa (Kansas) [4].
The following are two examples of green technologies for the recovery of rainwater particularly significant. In both cases the water is collected from the roof of the building.
In the water reuse cycle, the building represents the central element of the network: it is able, in fact, to join the resource use exigencies with the same reuse ones, in an optic of sustainable environment.
In the first case the water collected from the building is sent towards a rain garden (passive system), in the second case to a system consisting of tank, pump and filter (active system).
The rain garden is a depression in the ground where rainwater collects. The top layer of soil, which are also planted the plants, making a natural filtration of rainwater before returning to the underground stratum (Figure 1).



Fig. 1: Schematic rain garden

A system for recovering and re-using rainwater for buildings (Figure 2) is set up in such a way as to allow for the collection of water from roofs, terraces and pavement gutters and to re-use it, after appropriate treatment, for various uses such as: WC, car washes, washing exterior pavement areas, watering kitchen gardens, lawn and green-area irrigation, reintegration water for anti-incendiary use and even for some electrical appliances like washing machines, appropriately fitted.
The system involves several phases, the first of which is collection. All impermeable surfaces are suitable as areas for collecting rainwater. Obviously, the greater the area for collection, the greater the amount of rainwater that can be collected for re-use.
The next phase is that of filtration. A filter is fitted that permits the removal of those elements which deteriorate the quality of the water in the water-tanks. After this, storage is required for the water in tanks.
Some of these are fitted with a system that slows and regulates input flow in order to prevent the disturbance of sediment that collects on the bottom. The tanks can be positioned below ground outside the building or in basement spaces or storage spaces inside the building. Those tanks which are placed outside have the advantage of being hidden from sight and protected from accidental damage while, those place inside have the advantage of not requiring any tampering with the external system for their positioning and therefore eliminating the risk of damage to the main system apparatus. The system also includes a pump, which through a control unit passes the water into the recovery system.

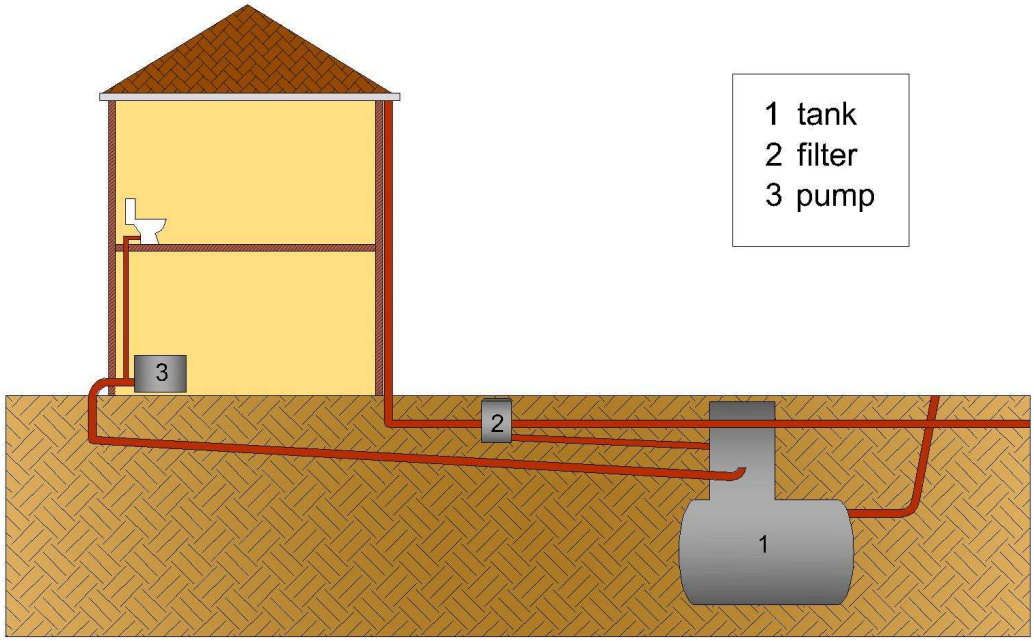

Fig. 2 : System for recovering and reusing rainwater for building

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Standardisation of the design process using BIM software

Saverio D'AURIA[1], Davide BARBATO[2]
[1,2]Department of Civil Engineering, Faculty of Engineering, University of Salerno, Salerno, Italy
[1]sdauria@unisa.it, [2]dbarbato@unisa.it

Abstract
The progress of computer technology applied to the architectural, structural and MEP design is revolutionizing the working methods and the relationships between the various stakeholders in the construction industry.
As in the 80s of last century, the diffusion of CAD software changed the way of drawing (considerably speeding up the phase of realisation of the technical drawings) so does nowadays the increasingly widespread of parametric and multi-functional programs – such as BIM – that are revolutionizing the design and realization process of the work. With them, working groups with different skills and experience are able to interact minimizing misunderstandings and disturbances that are always cause of low productivity and poor quality.
However the BIM software and methods are still not adopted by small and medium design studios and by the vast majority of construction companies, especially in Italy. One of the reasons for this scepticism is the lack of guidelines and standards that would make it easier to approach the building information modeling.
This paper intends to present the international state of the art of BIM design process standardisation, making reference to Finland, Canada and Australia, leading countries on these issues; it, additionally, introduces with a case study a workflow of a structural design realised complementing one of the most common BIM software with a software for modeling and FEM structural analysis highlighting its potentiality and criticality.

Keywords: building information modeling, BIM standards, parametric design, interoperability, BIM workflow.

1. Introduction
The traditional way of design is rapidly transforming - or, in some cases, it has already completely transformed - thanks to changing of socio-cultural scenarios, to the always more demanding clients, to the new technological frontiers and to the renewed possibility for the architectural, structural, engineering and energy sectors project. If on the one hand the construction industry is going through a period of decline due to the stagnation of the economy that involves almost all industrialized countries, on the other hand this phenomenon is one of the promoters of the renewal of the entire construction industry. The demand for high quality works in the shortest time possible and with very low budget, has led designers, builders and owners to establish different relationships, based on a high degree of specialization and on the rapid and correct exchange of information between the involved parts. In such a context of continuous and rapid transformation it is no longer possible to look at design in the same way it was done in the last century, when a single team was able to manage large projects, because of the long time and the favorable economic conditions they could count on.
Nowadays, it is essential to work with an heterogeneous team made up of at least one expert for each areas involved in the project. They can no longer exist spatial and temporal boundaries that slow down the creative and constructive process. Big architectural firm hire structural engineers living thousands of miles away, as well as mechanical and electrical engineers who speak different languages or manufacturers with different know-how.
Communicating, in the technical field, without misunderstandings and loss of time, allows to maximize the productivity while minimizing costs and interferences still not compromising the high quality of the

project. Like in a chain of causes and effects, this architectural planning 'revolution' is supported and nurtured by computer science that, for more than thirty years, has been speeding up and improving many of the design and technical calculation (structural, engineering, energy, etc..) procedures. One of the last outcome of this research is represented by the BIM (Building Information Modeling) software. They are changing and improving greatly the design methodologies.
The latest BIM software for architecture and engineering have, in fact, allowed a significant improvement by methodically organizing and simplifying the integration of the different skills required in the design process. The new computer science tools, in this way, are able to easily integrate the different roles and skills of designers, manufacturers and builders. This is possible because this software creates parametric three-dimensional models with all kind of information needed (physical-mechanical specs, energy, materials, economy, maintenance, etc.). Therefore, the infographic model is not just a simple virtual rendering, but it is a manipulable system that it is able to simulate the hypothetical real behavior of the building during its definition process.
The diffusion of BIM is not being as fast as it was, for example, the one of the CAD. This is basically because the CAD was a change in the instrumentation. It consisted in the switch from the drawing table to the so-called ‘electronic drafting machine’ with immediate results in terms of productivity of the drawings. For the BIM, instead, we need a change in the entire structure of the building process, as well as in the relationship between the participants in it. That is why only the major architectural and engineering firms and the biggest construction companies are totally 'converted' to BIM and exploit its full potentiality. The change was possible for them because they had the adequate economical resources and the courage to make such a great change in the professional method. It should also be noted, however, that in many cases, there is a very limited knowledge on this issue, and there are no guidelines and protocols that facilitate the approach to this new design methodology.
The change should be encouraged by the institutions, public and private, involved in the world of construction. Countries that invest more in research, development and dissemination of the BIM methodologies are also those that invest more in big infrastructure projects. They are the United States, Canada, United Kingdom, Scandinavia, Australia and a few other. After ten years the BIM was presented, there are still few nations equipped with organizations (governmental or not) who bet on the new technology of building information modeling. Over the years, these countries provided themselves with vademecum, guidelines and standardisation protocols; in some cases they made mandatory the use of them, in order to reduce errors and especially misunderstandings in the delicate stage of the data transfer between the technicians.
This paper will first provide an overview of the spread of the BIM in the world by analyzing the technical documents compiled by the different countries using the new methodology; then it intends to deal with the degree of interoperability that a BIM can have with a software for the structural analysis. To this end there will be proposed a pertinent case study and an appropriate workflow.

2. BIM standardisation protocols

There are several European and non-European countries that invest in the spread, in the use and in the development of BIM methodology, applying them to the entire construction industry. Public and private organizations, universities, professional associations and companies show an increasing interest in this issue that, in some cases, as we shall see, affected considerably the efficiency of the design, production and construction process. The saving, both in time and economic terms, is remarkable if you consider the significant reduction of errors and misunderstandings in the sharing of information between the various participants in the building process. The National Institute of Standards and Technology (NIST), the U.S. Federal agency that works with the principles of the industries to develop and apply new standardisation protocols, estimated that nearly $16 billion is the annual cost the building companies pay to cope with the lack of coordination and with the errors made in the design composition (Fig.1) [1].

Stakeholder Group	Planning, Design, and Engineering, Phase	Construction Phase	Operations and Maintenance Phase	Total
Architects and Engineers	1,007.2	147.0	15.7	1,169.8
General Contractors	485.9	1,265.3	50.4	1,801.6
Specialty Fabricators and Suppliers	442.4	1,762.2	—	2,204.6
Owners and Operators	722.8	898.0	9,027.2	10,648.0
Total	**2,658.3**	**4,072.4**	**9,093.3**	**15,824.0**

Fig. 1: Costs of inadequate interoperability by stakeholder group, in $millions (Source: GALLAHER, Michael et al. 2004).

European excellence in the field of BIM (Fig. 2) are the Scandinavian countries and the UK. Presently, they are high sensitive to the concepts of building information modeling and interoperability. For several years in Norway, BIM has been using for the entire lifecycle of public buildings. Thanks to the thrust the Norwegian Directorate of Public Construction and Property puts in this standardized methodology, they have reached very high levels in this field. To the point that, from 2010, it is always required the use of an 'open BIM' parametric software for the design and the management of any public building. This result in the use of a singular IFC file, importable without interference in the most common BIM software on the market, that make easier to manage and maintain the buildings. This was possible thanks to the publication of the *Statsbygg BIM Manual* [2]. It became a reference point for all the agencies and the designers who want to adhere to standard BIM demanded by the public corporation of management of the building.
The approach provided by the Norwegian manual is based on all levels of planning in order to optimize the flow of information between designers, the customer and the public administration. Uniformity of the data, an higher quality of the products and of the materials used, plus a significant reduction of the management and realization cost, are only some of the overall benefits.
In Denmark, the first attempt to introduce the BIM dates back to 2006, when the *3D Working Method* and *3D CAD Manual* were published. They focused on how to create, exchange and reuse the three-dimensional models in the different project phases. An additional contribution to the spread of the BIM method has come from three public corporations that own immovable property: the Palaces and Properties Agency, the Danish University and the Defence Construction Service. They imposed the use of the parametric design with the IFC format, consequently affecting the entire real estate market.
Finland is one of the first European countries to widely experiment the BIM for big public works. The Senate Properties is its government corporation that, from 2001, deals with these issues. It recently published the series *Common BIM Requirements 2012* [3], that is the result of an extensive research project on the topic of BIM, strongly demanded by building contractor associations and by building materials producers. This in fact helped to standardize design processes and, above all, to encode the data exchange method between the various participants in a project.

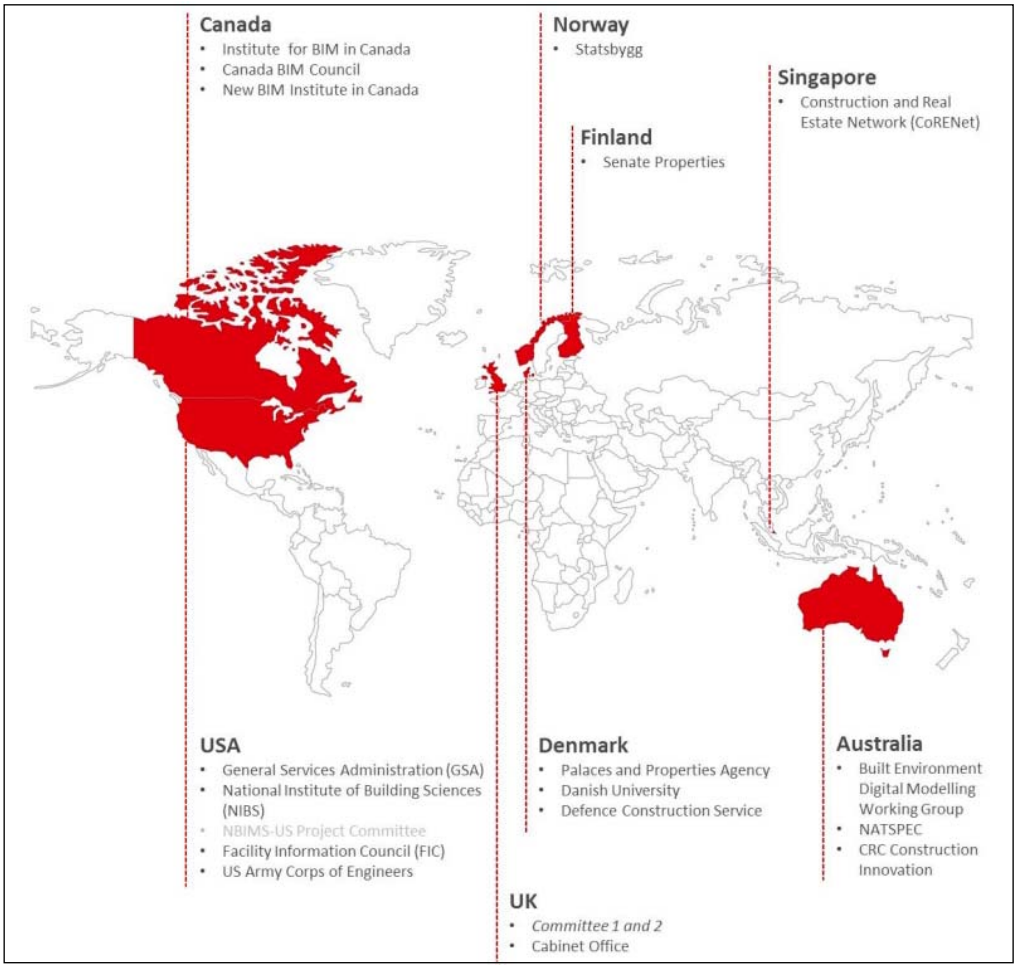

Fig. 2: The main entities involved in BIM development and standardisation (Source: OSELLO, Anna. 2012).



Fig. 3: Some of the most important documents about the spread and standardisation of BIM methodology in the world.

Since May 2011, the British Government has launched a full program of works on the organization and the management of the entire construction industry in order to obtain not only a significant saving of resources, but also an increased quality of the products and of the services generated by the parts involved in the construction sector and in the related fields. The National Building Specification (NBS) is a UK-based system of construction specification used by architects and other building professionals to describe the materials, standards and workmanship of a construction project. One of the initiatives promoted by the corporation is related to the development of a database of BIM objects for the construction industry, with free access for all professionals in the construction industry. The *National BIM Library* contains thousands of IFC files (windows, walls, partition walls, foundations, boilers, etc.).
They were put online by the producers as a means of advertisement. This give exposure to the products and at the same time facilitate the work of the designers who can avail of computerized model of the architectural objects having all the features of the real objects.
Overseas, the United States of America are a point of reference also in the field of parametric modeling, so it is not by chance that there lies one of the largest software companies in the world that produces programs for the AEC.
For more than ten years, various government and private organizations have been involved in the spread of the new BIM methodology thanks to the drafting of guidelines and standards. Some examples are the General Services Administration (GSA) that since 2003 regularly update the *BIM Guide For Spatial Program Validation* [4], and the National Institute of Building Sciences (NIBS) that has developed the *National Building Information Modeling Standard* [5].
The aim is to improve the process of planning, design, construction and maintenance of the buildings by using a standardized computer model containing all the useful information for the entire lifecycle of the construction that is readable by all those involved in the building process.

3. A case study: interoperability between BIM and structural analysis software

In the habitual professional practice the data exchange between the different participants in the design process can cause inconsistencies, loss of information and misunderstandings that lead to loss time, unproductiveness and, in the worst cases, to design errors.

Traditionally, the workflow is sequential - architecture-structure-systems - and involves professional figures working mainly on bidimensional computer elaborate created with the CAD software. When you need to make changes to the plan, no matter how small they can be, a considerable amount of resources (in terms of time, energy and money) is required. Consider, for example, the case where we have to rotate a pillar and, as a consequence, to move a window, a hole or a partition wall is necessary. What may appear to be a quick correction operation becomes, instead, a complete revision of plans, sections, views, schedules, estimates, etc.

The use of the BIM software would nip this problem in the bud because all the informations regarding physical, constructive, computational characteristics of the computer modeled elements would be stored in a single database, so that the change of only one of these elements would automatically cause the change of all the other, directly or indirectly, connected to it.

Unfortunately, it is very unlikely that engineers and architects will work with the same software. However through the interoperability between BIM software and traditional software and with the implementation of a correct workflow it is possible to improve the quality of work in terms of time and precision, drastically reducing errors in the coordination stage and, later, in that of realization.

The examined case study, the design of a small house, shows how to work with a BIM software (in this case Autodesk® Revit Architecture 2011) plus a software for the FEM analysis (in this case the CDSWin, 2010 release, by STS®) used to calculate the reinforced concrete structure. The intent is to show the workflow used to made both tools efficiently communicate, under the architectural and structural aspects, thus ensuring a profitable interaction between different professionals who do not use the same software.

To ensure interoperability between the two examined programs is essential to follow a design 'protocol' so as to ensure, on the one hand, the data input speed and, on the other hand, probably the most important aspect, a reduction of redundant elements. Working with Revit Architecture 2011, the building is three-dimensional modeled from the architectural point of view: you define the type and the quality of materials, the physical and mechanical properties, the colors and everything is essential to realise, for example, schedules of environments, schedules of window frames, energy assessments, economic estimations, etc. (Fig. 4).

For the modeling of the structural elements and for the realization of the architectural model, always using Revit, you need to define grids and levels: the grids allow to identify unambiguously the position of beams and pillars in the horizontal plane XY, the levels set the quotas of Z of the floors. The intersection between the grids and the levels generate the nodes that, within any FEM software, represent the points of connection of the pipes and, therefore, the basic elements of the matrix analysis.

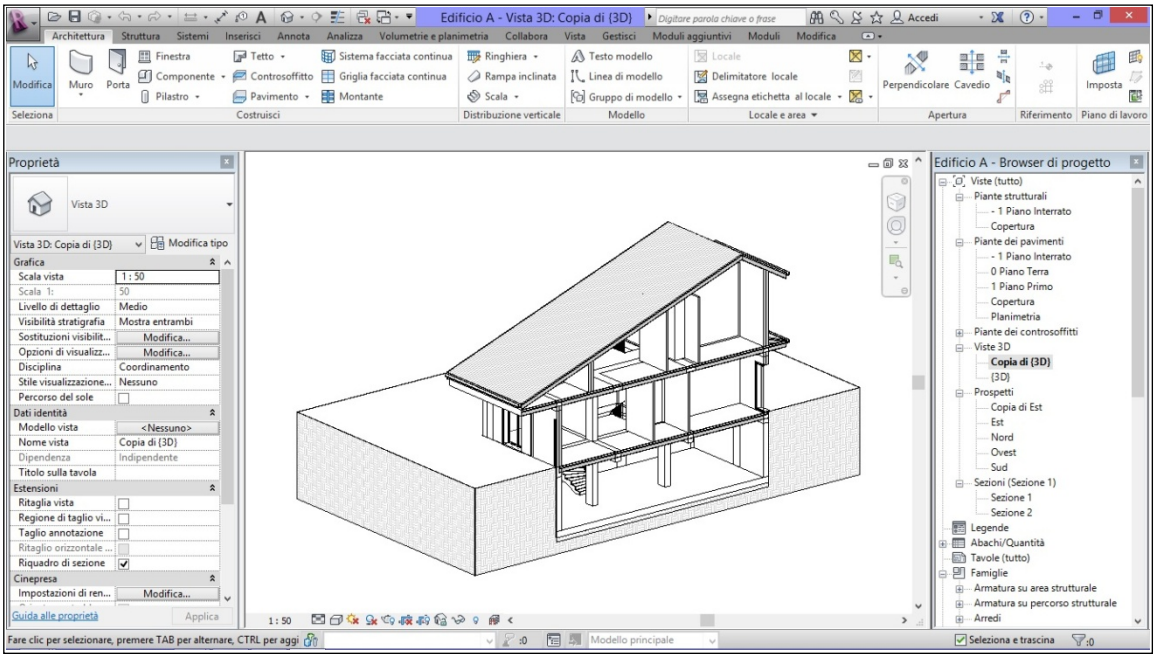

Fig. 4: Axonometric section of the architectural model in Revit.

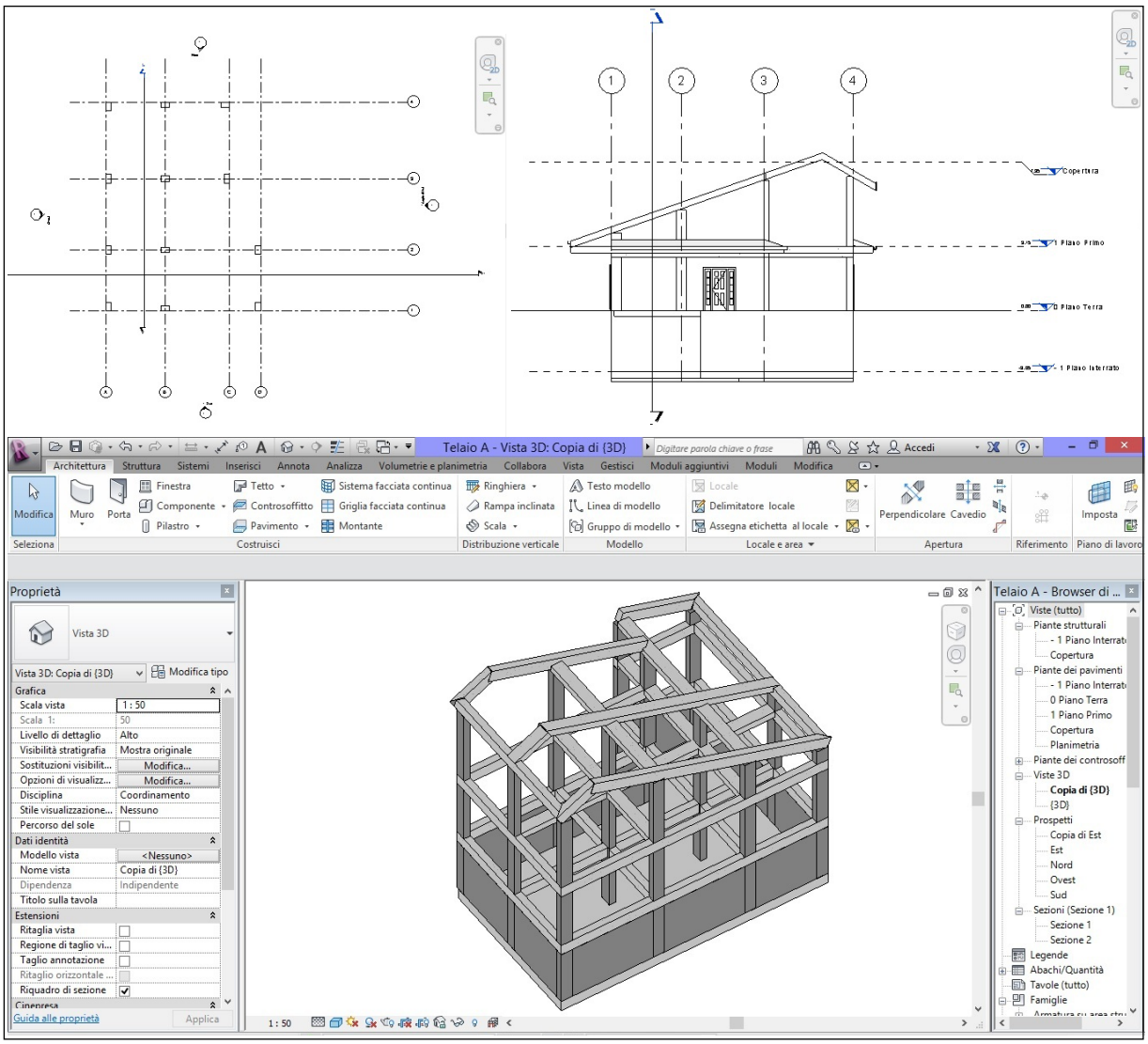

Fig. 5: Input of grids (at the top left) and levels (at the top right) for the structural modeling (on the bottom) in Revit.

Since this stage it is possible to notice any possible interference between structural and architectural choices that can be easily and immediately solved. The following step consist in the three-dimensional modeling of the structural elements (columns, beams and floors): in the case of traditional structures, it is advisable to proceed by levels because often the joists of a building are repeated identically at every floor, and to speed up the input, you can proceed with simple copy and paste operations (Fig. 5).
In this way we obtain a complete 3D model both from the architectural and structural point of view. Although there are several Revit plug-ins to make the calculation and the analysis, we preferred to hypothesize a workflow to make interface two different software and exploit their dialogue ability based on BIM language. They are, as said before, CDSWin by STS® and Revit Architecture 2011 by Autodesk®. The STS® produced some plug-in that are able to import files from BIM software and, from these, to generate the structural scheme suitable for the calculation program.
When exporting, Revit generates a .txt file. that CDSWin is able to implement and discretize because it recognizing all objects with a structural function used in Revit. The technician can filter out the desired elements through a very intuitive window for the data interchange. After this step, CDSWin automatically generates the structural model, retaining the quotes of the floors and the dimensions of columns, beams and joist without loss of data. From this point, the step of real calculation can start (Fig.6).
The flexibility of this design process lies in the fact that the designer can, at any time, make changes to the new model that is imported without any constraint. He can insert or delete elements, or can make other modification to the sections or to the materials. This method turn upside down the traditional approach but the effort made to cope with such drastic changes is well balanced by countless improvement such as an easier and clearer exchange of information and a reduced possibility of error.

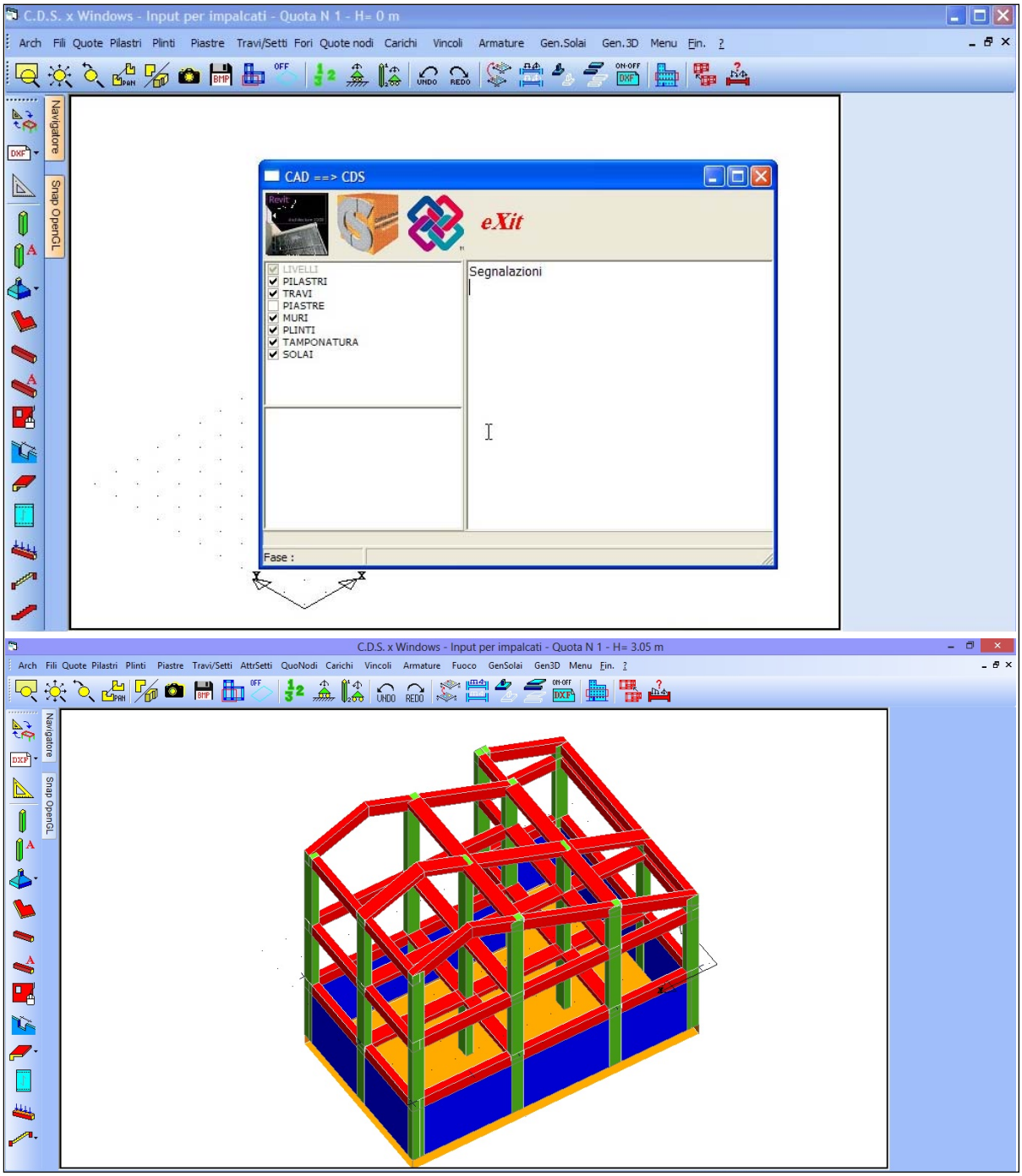

Fig. 6: Import of the structural model from Revit to CDSWin.

The traditional process, instead, involves a preliminary step of design and analysis based on the reading of the architectural design. This means, inevitably, the creation of multiple and uncoordinated models that affect the productivity, the efficiency and the quality.

4. Conclusions

The growing worldwide adoption and implementation of BIM for its powerful data-based modeling, visualization, analysis and simulation capabilities represents the start of a transition to an integrated digital information infrastructure that will ultimately revolutionize almost all aspects of the construction industry [6]. For this reason it is essential to identify specific actions: the construction industry have to become the driving force for the diffusion of BIM methodology, the institutions have to adopt new softwares, the software house have to simplify the interoperability between the different commercialized products and research institutions have to sensitise students and professionals. A radical reform is needed.

The proposed case study shows that even small projects can be treated with the BIM method and it also shows how it is possible to make professionals with different know how interact. Unfortunately, the spread of BIM through small and medium design company is limited by several factors such as the initial onerous investment in buying the software license and the long time needed for the professional education of the team). Due to the economic crisis we are undergoing, the inclination to make changes and innovations is lowering. It is clear, however, that the transition to this method may turn out to be just the solution to this stagnation as it can be seen as an important opportunity to work with high profits and shortly regain the initial investment thanks to the high efficiency that this method would ensure.

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HERITAGE ARCHITECTURE LANDESIGN
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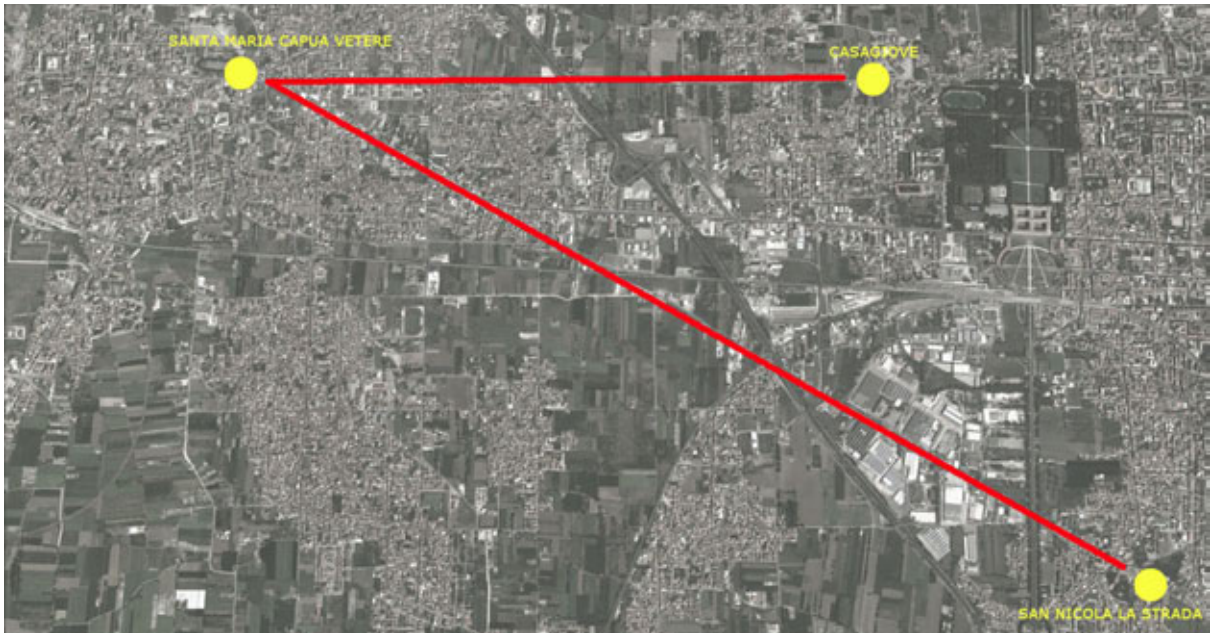
Rural and urban courtyard houses in Campania region- Changes in the education and planning of architecture in public and private sector

Massimiliano RENDINA
Department of Architecture and Industrial Design "Luigi Vanvitelli", Second University of Naples, Italy
massimiliano.rendina@unina2.it

Abstract
In a few years the edifices built at the edges of the countryside and close to downtown have been transformed from a series of demolitions and reconstructions. The thick buildings, which took the place of the rural courtyard houses, are very close to each other at times, other times are distant like they staggered in the skyline of the roads in the city suburbs. Straight roads are full of two floors tuff stone houses, which often include old courtyards. This have create a wide variety of ideas, which were never or badly used in the current building practice, and which can and must become the basis for a reflection on the construction of a new kind of urban suburb. Using first, as source of inspiration, some pictures which underline some critical issues of the cities and then using as source the results of a PhD research and a model of a project in the same field, we tried to draw the attention on the environmental problems about which society is more and more concerned. Furthermore, we carried out two lab tests on the same subject, which outline the didactics from the 80s till today (1_many patio houses together in little districts, 2_ one single house with a courtyard made by putting together different pavilions). Finally, we made two buildings responding to the theme of the courtyard space and of the peristyle in Campania. Briefly: if people slowly become aware of the importance of the environment, builders must safeguard both.

Keywords: house, courtyard, anthropic, tradition, contemporary



Location of the three places object of the project in the area of Caserta

1. Build up anew

This part of the work is intended to be a short study on which kind of houses, cottages, apartment houses and settlements are more common in the rural and suburb areas in Campania. The study has been carried out by sampling, using the logic of the single event or even through tests on a little piece of land, heritage of old methods and of urban planning in renovation. The result is that nowadays residential buildings and new built-up areas, filling empty spaces or improperly replacing existing ones, are unconsciously writing the chapter of the 'real estate speculation', which has spread settlements everywhere in almost sixty years [1]. Reinforced concrete and innovation, as well as the demand for new houses, have contributed to the consumption of the territory, which today means 'wildfire' construction.

Besides, the responsibility for the choices that were made, improperly described as strategic and shared between politicians and planners, has made the action of time irreversible. The settings chosen for the examples and which are illustrated through pictures, drawings and sketches, focuses on suburbs and countryside areas in the province of Caserta, which were ruthlessly rebuilt or just analyzed in studies. The first place we studied was S. Maria Capua Vetere and the edges of the Sant'Erasmo district. The area is full of big tuff stone houses with a central courtyard alongside narrow streets where generations of hemp farmers (then tobacco farmers) used to live and where newly built two floors houses are slowly replacing the old buildings. Many state that these are very sporadic cases, but they actually know that dozens of new concession will soon be approved, some others justify the buildings staying way behind the street line by claiming questionable regulations on the distances; there are even those who wish the spreading of the phenomenon so that streets will at least be bigger. The truth is that everything happens without a proper urban planning, or at least an idea of the appearance the city should have. Even though it's necessary to impartially asses the demand of the real estate market and recognize that multiple houses in small towns are almost built using terraced houses and in-line houses, the general description provided from the following pictures is almost worrying and predict a chaos which would barely be controlled.



Insertion of reinforced concrete on one side of an old building along a road of the rural suburb in S. Maria C.V

.

1



2



(1_partial view of the road; 2_close view)

I example of a break in the row of rural tuff stone courtyard houses with a new building standing way behind the street line – three floors reinforced concrete apartment building with in-line constructions – S.Maria C.V.



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II example of a break in the row of rural tuff stone courtyard houses with a new building standing way behind the street line – five floors building reinforced concrete apartment building with in-line constructions – Santa Maria C.V

1



2

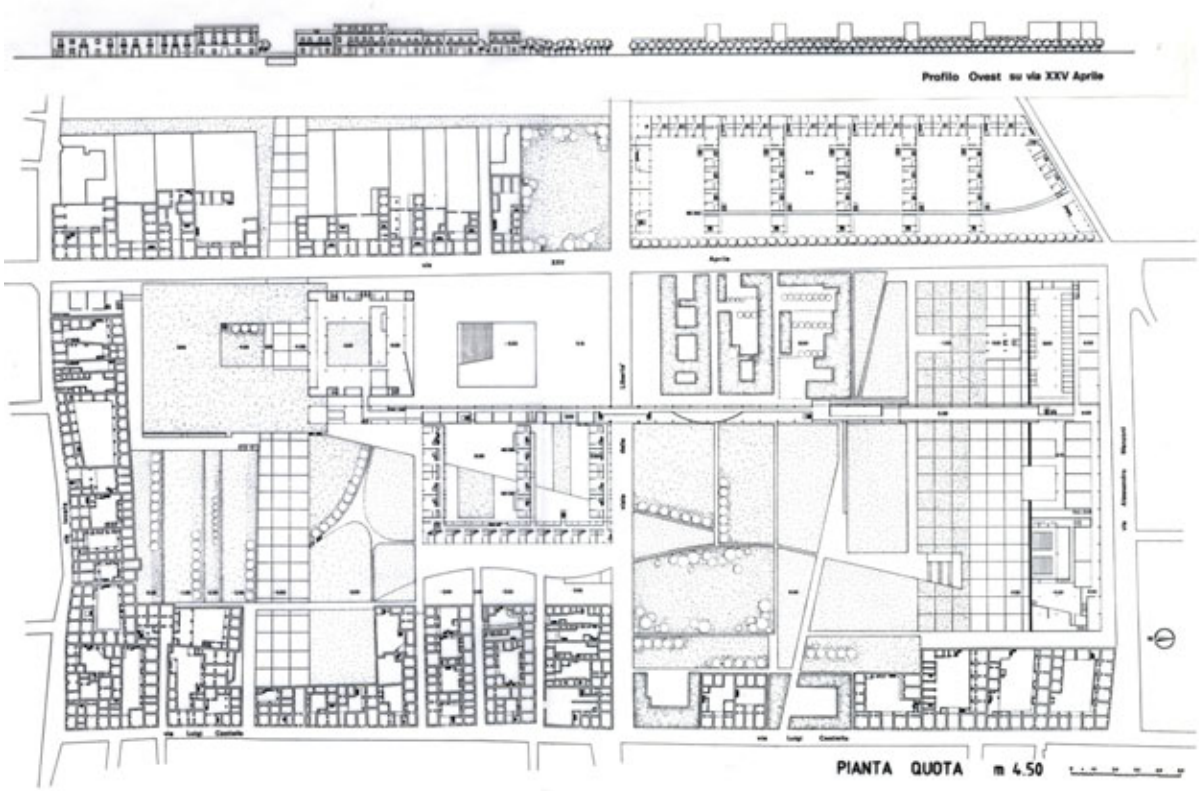


(1_partial view of the road; 2_close view)
III example of a break in the row of rural tuff stone courtyard houses with a new building – two floors plus garret reinforced concrete apartment building with in-line constructions – Santa Maria C.V.

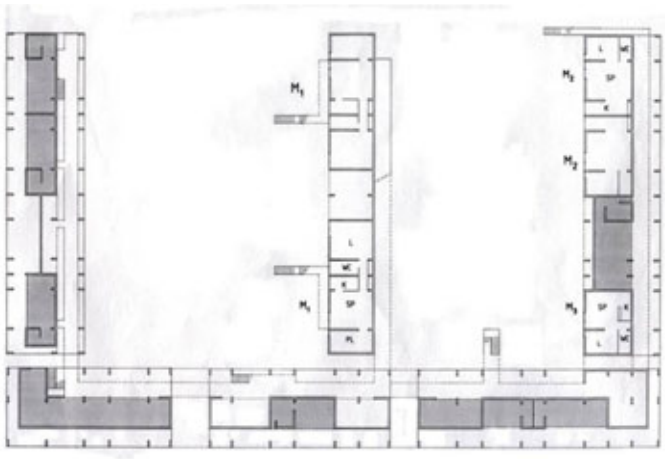


New building with no reference to the location – piece of land with terraced and in-line houses overlooking a green space between Capua and San Tammaro-Santa Maria C.V.

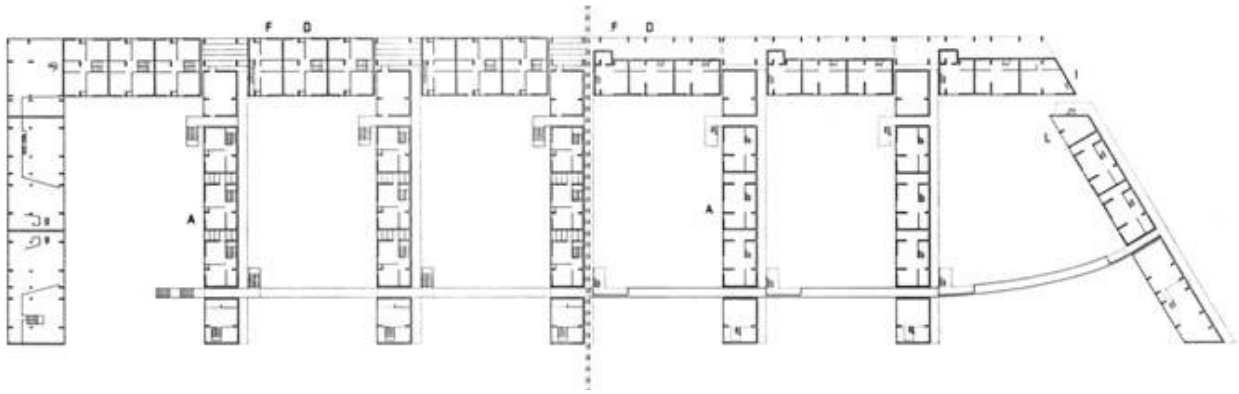
The second stage of the study was made on an old street in Casagiove, which lead to a little part of the city that some years ago was the topic for a study on the urban characteristics of middle cities the area of Caserta [2]. This area, which is made of a series of courtyards iso-orientate [3], was chosen for a study of urban analysis and which inspired a study for completing the edge of a town, along the axis of the old city of Capua. The results of the study were quite interesting, but even more interesting was a project of modern courtyards, adapted to the dimensions of the old ones.



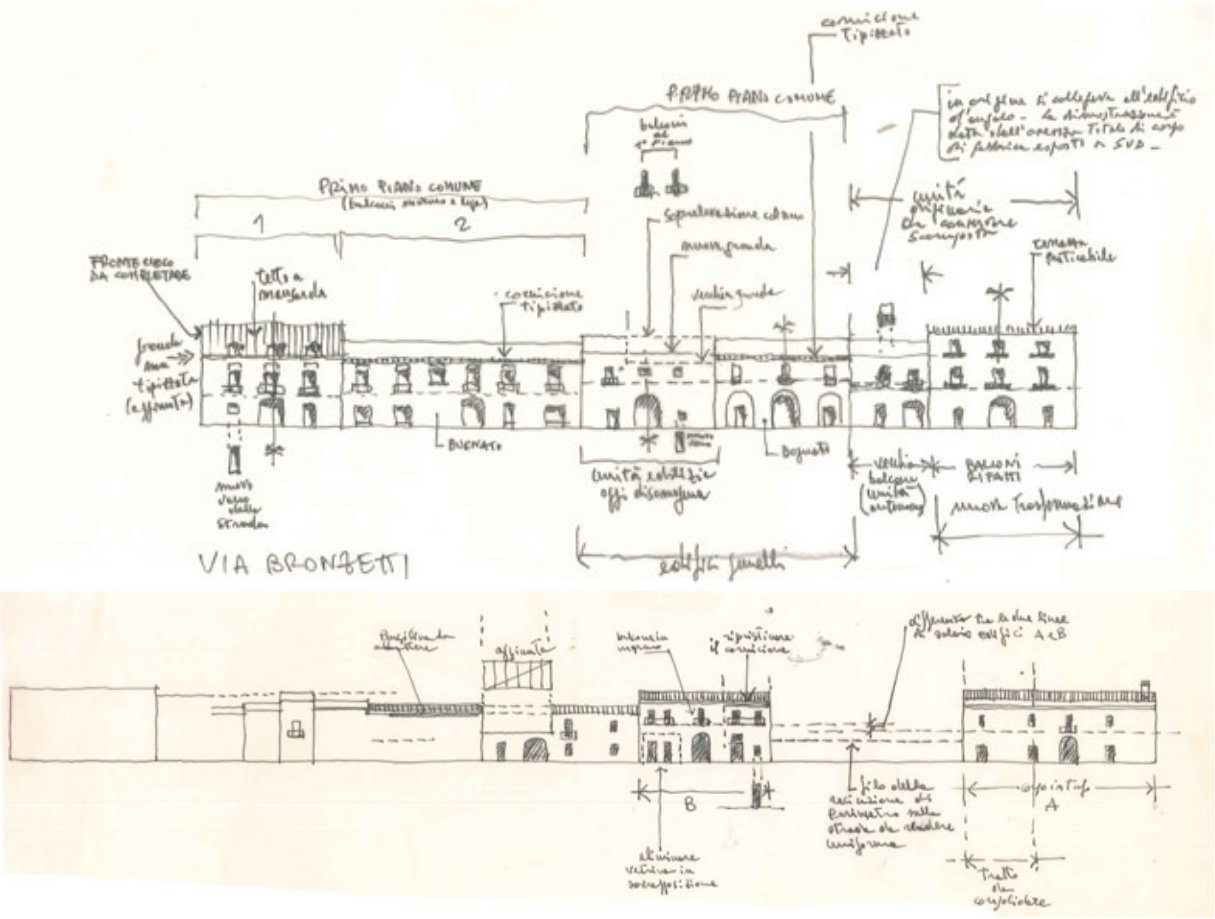
Casagiove: couryards in via Castiello and project of completion



Casagiove:
big modern courtyards which follow the pattern old courtyards in the project



The third place we stopped by was San Nicola La Strada, which describe, through some sketches, the approach adopted for the program for the recovery of one of its areas [4]. Even if it has never been truly implemented, the project highlighted the changes that needed to be done in order to better arrange the disorganized clump of courtyards on the street; even by considering partial or substantial rebuildings and volume.



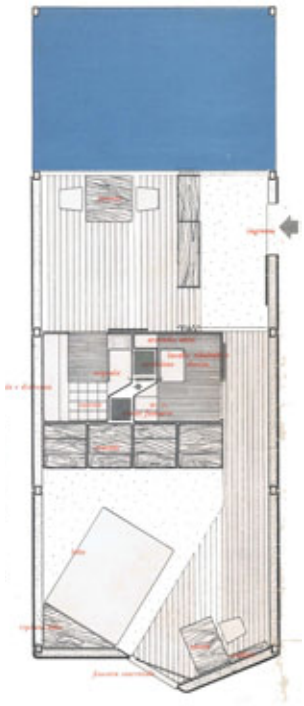
San Nicola La Strada: preparatory work for a recovery project

2. An in progress research

After having analyzed the examples in the images, the attention is focused on the didactics and on how, if energies of the past wouldn't be wasted, the situation could easily change through the effort of the school. We have a very wide repertoire of words which are the very basis for builders with a conscience, which is alignment of walls, superficial and profound relations, building integrated to the nature, sense of the private, aim of communal areas, predominance of vegetation, structure of settlements; the same principles that were part of the past and which were never, or involuntarily used in the current building practice. The problems in the structure in the districts plentiful of courtyard houses are linked to two didactic topics which were often dealt with during architecture planning lessons in recent years (1_at the Federico II: Sbriziolo, 2_at the SUN: Rendina). The work were done in many years: the first one was developed using a modular prototype of patio houses in order to build little districts of council housing [5]; the second was developed by creating a single or multi-family house as a sum of different spaces which included a communal courtyard [6]. The open space included in the house is a common topic for both and represents a very remarkable characteristic. The difference is in the dimensions of the spaces, which vary from 5x5 metres of the first one and 20x20 metres of the second one, the same dimensions of the rural courtyards.

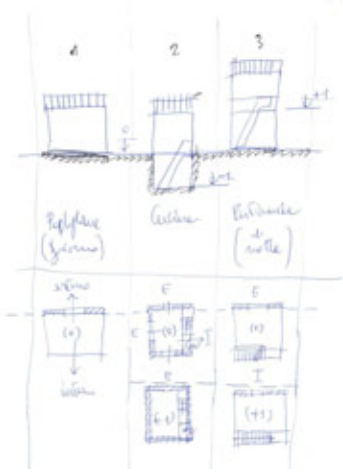


Service module and aggregation of the patio house.

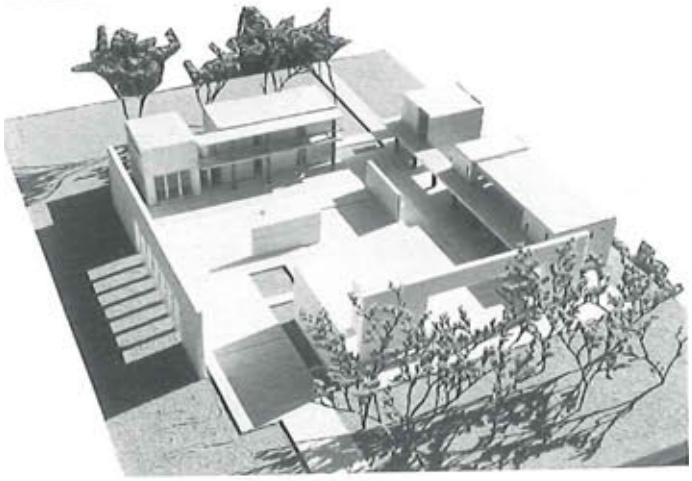


Arch. Luigi Fratini – extensible house
from Domus 214/1946

The roots of the patio of the modular home go back to some thousands of years ago when it rapidly spread into the Mediterranean area and in Greek. It is intended as an outdoor extension of the indoor (living room, bedroom, etc.), a kind of filter between the street (or small balcony) and the house, which can solve the problem of light of the buildings, allowing to blend the outdoor with the indoor. The courtyards, around which the pavilions of the second study are installed, have the same origins of the patio in the first study, however very similar to the peristyle in Pompei and the abbey's courtyard. In the first type the parts are assembled together, living area, service module and patio. In the second one, which has a big court yard at the center, three buildings are put together, each with a different aims and different dimensions. The first one has only one floor with a living room, the second one it's a two floor house with outdoor stairs and with a sleeping area and the third one with the kitchen, indoor stairs and basement.



Oulline of the three pavilions
dell'esercitazione di laboratorio

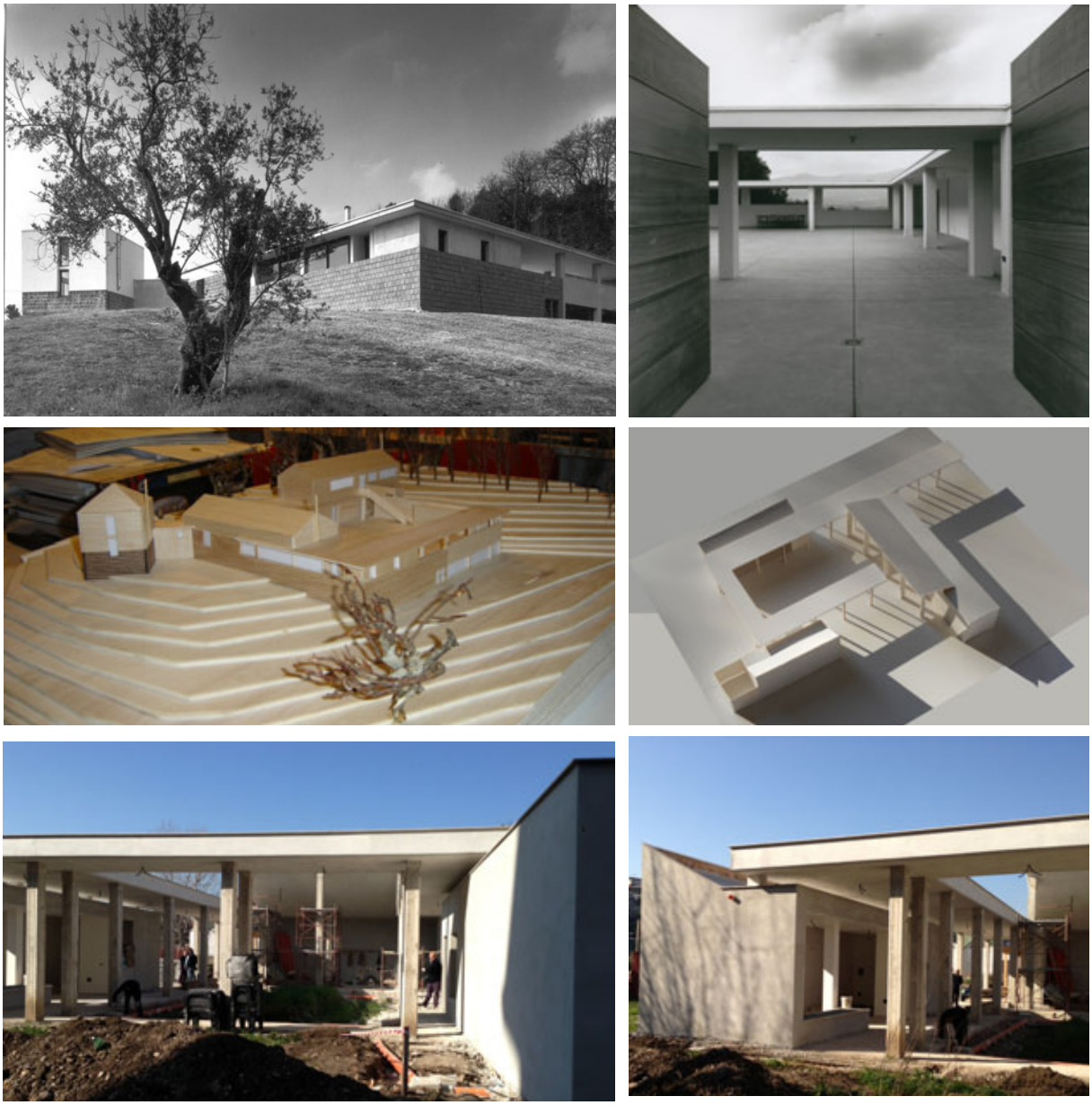


study model of a pavilion house
(allievo Gianluigi Zarro a.a.'98 - '99)

We carried out three lab test, one for each pavilion, plus one for the entire final composition of the house. As in recent years the researches concerning the functional potentials of the house with its own courtyard has made progresses (see Le Corbusier's Immeuble Villas made in 1992, or Ludwig Hilbersaimer, who in 1931 writes: "we can give the possibility to live in an open space area even to those who doesn't want or can't have a little house with a garden") till the vertical forest of Stefano Boeri, today we need to carry out new studies on the districts full of big courtyards in the rural periphery which are going to be dismantled. Besides, we should find new solutions to a new kind of building which feet the demand of the real estate market without distorting those parts that are typical of urban spaces.

3.Two coutyard houses in Campania

The following images show the results obtained by realizing small plastic models set between tradition and contemporaneity and which were compared to each other. The topic is quite the same of the previous studies: a central empty space, with colonnades and pavilions defining the dimensions. The first one it's a private house in the countryside, while the second one it's a communal space for young and old people in a public garden in the popular district in Sant'Agata in Capua.



Courtyard and peristyles in Ruviano and Capua

Note

[1] compare igm tables of 1957 with those of 1984

[2] referring to my PhD thesis of 1992, with the title “The area of Maddaloni, S. Maria Capua Vetere and Capua: identity and recognizability of the places in the architecture planning” focused on the interpretation of the territory, on the pre-planning analysis of the rural courtyard house in Casagiove and on the urban project of completion

[3] Gianfranco Caniggia, in his works on domus primaria he would have surely catalogate as complex summations of *tabernizzazioni* and *insulizzazioni*

[4] from the plan of urban redevelopment of the B zone in S. Nicola La Strada that I coordinated

[5] didactic examples – unity and variability of the home space (selection of the examples of didactic projects during architecture IV-C) – Coordinator prof. Alfredo Sbriziolo - 1984

[6] Architecture Planning lab I (C), a.a.1998/1999 - Seconda Università degli Studi di Napoli – supervisor Massimiliano Rendina – a.a.1998/1999

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The museum of the territory. Notes for active conservation

Efisio PITZALIS
Dipartimento Architettura e Disegno Industriale Luigi Vanvitelli, Seconda Università di Napoli, Aversa, Italy
E-mail efisio.pitzalis@gmail.com

Abstract
Recent contributions, efforts and programmatic indications have identified in the heritage of archaeological sites and monuments of our country, one of the most extraordinary "outdoor museums" in the world. It is becoming increasingly urgent to make an ongoing commitment to environmental protection and conservation, but also useful to consider the enhancement and development as an authentic cultural resource and economic importance especially for the South and the islands.
In this projection, one of the main themes, which focuses the activities of the various sectors concerned, is the provision of planned infrastructure projects and services necessary to develop the territory, according to an economic impact with a tourism/cultural application. In this sense, some Community action programs – such as the Treaty of the Union – aim to reconstruct the complex mosaic of goods considered essential to Europe in order to reclaim a common cultural heritage. Similar programs, envisaged under the cooperation between States, promote an exchange of knowledge both from a technical point of view as well as with regard to the use of human and financial resources. An interchange between research institutes is responsible for cataloging the most appropriate use of the different technologies as well as considering employment opportunities in the field of restoration, rehabilitation and preservation.

Keywords: heritage, monument, museum, archaeology, resource

1. Section
The main purpose of scientific research in the preservation of archaeological and artistic contexts consists in the formulation of a useful vocabulary to verify the consistency of the project interventions in areas of particular historical value. Through the paradigmatic works, the different technologies of intervention are compared, from the technical, structural, and linguistic aspect, with the aim of establishing a classification tool of the techniques and materials used in the various European realities. Thus, reference is made to issues that have as their main objects:
1. the adaptation of new structures on pre-existing monuments and archaeological sites;
2. the problem of discontinuity between "new" and "old";
3. the question of an integrated intervention but recognizable.
Elements are therefore aimed at promoting an active use of the archaeological remains from a pedagogical and museum point of view, in order to correspond the demand for tourism and culture, more and more present, especially in Mediterranean area.

The Italian tradition of museology.
Since World War II, the museological phenomenon marks the national and international architectural debate through the experiences of Albini, Gardella, Scarpa and BPPR. A phenomenon in Italy - in contrast to what occurs in other European countries (for example in Germany, where the museum is a real typological paradigm) - is accompanied by the restoration of parts of great archaeological value. In the modern conception of the kind of museum, it is worth remembering the important distinction

between collecting and active experience. A distinction introduced in Italy in 1949 by Giulio Carlo Argan recalling concepts of English and American origin expressed by Herbert Read and, in particular, by John Dewey in Art as Experience (1934). Concepts that have an idea of museum activity oriented according to a pedagogical perspective and according to a civil and democratic engagement able to counter the pure and ecstatic contemplation of the object. A teaching vocation which is accompanied by the issue of a restoration that should not distract from the contemplation of the museum subject.

Problems and methods of intervention.
In the speeches of protection and preservation of the archaeological remains, it is important to verify the figurative, formal and technical methods to find the solution of the main problem: the coexistence of the old and the new. This verification must consider some issues related to the finding of the typological remains. The main issues include the following:
1. the problem of a more appropriate architectural language (historicist, domestic, impersonal);
2. the structural issue: timely elements, continuous elements, elements in suspension, moving parts;
3. the theme of the base in relation to the variation of the different historical stratigraphy;
4. the way of overlapping in relation to the physical discontinuity;
5. the issue of large roofs and transparency;
6. integrated intervention but recognizable;
7. the modeling of the topography in non-urbanized areas;
8. coexistence with the urban structure.

Case-Study
The project, presented as a demonstrative example, is a thesis developed by Marco Russo within the Planning Workshop at the Department of Architecture and Industrial Design Luigi Vanvitelli. It is a "Centre for Underwater Archaeology" located in Baia (Napoli), and is constituted by a volume of coverage place as protection of archaeological underwater remains.



Fig. 1: General plan Centre for Underwater Archaeology, Baia (Napoli)



Fig. 2: Territorial framework - Project area

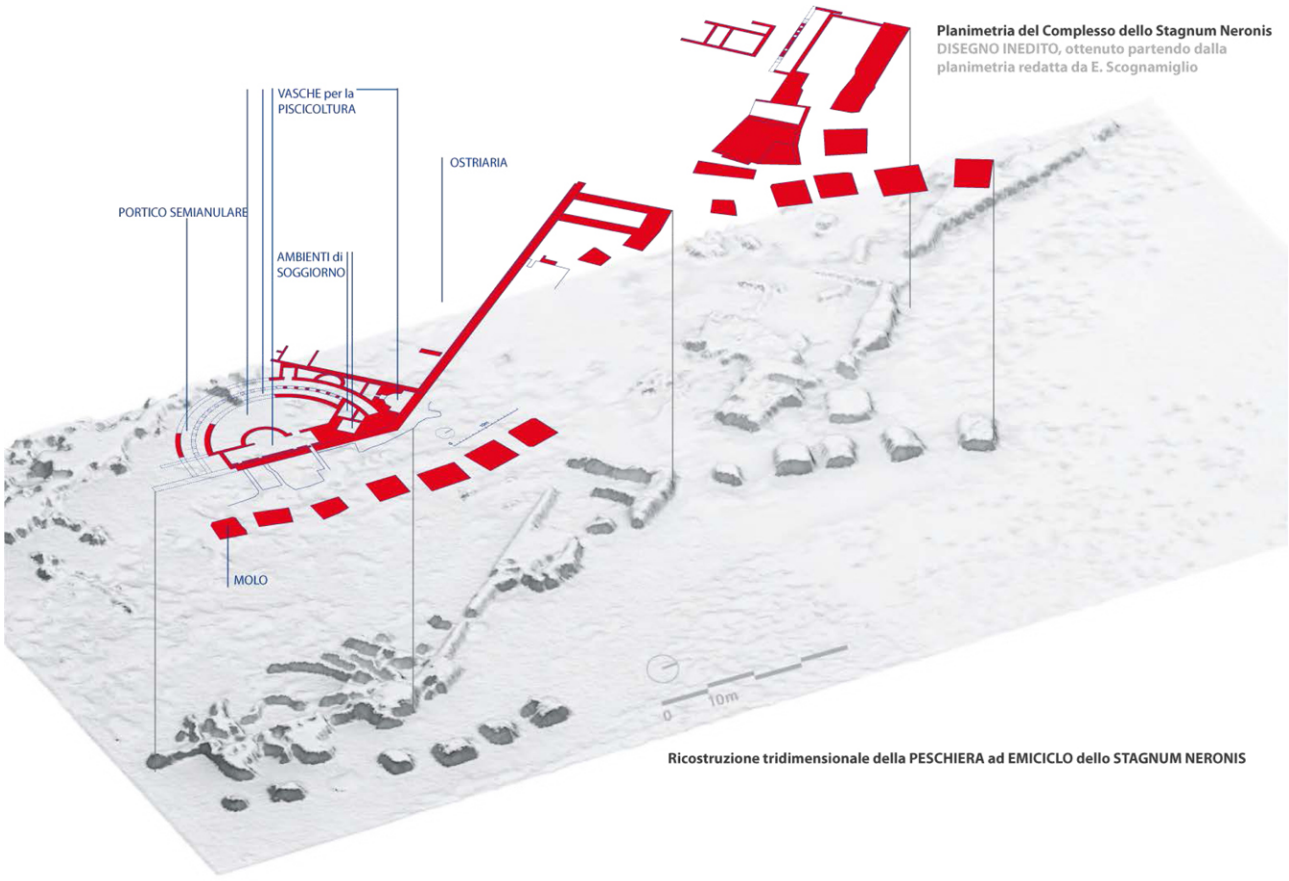

Fig. 3: Plan Stagnum Neronis

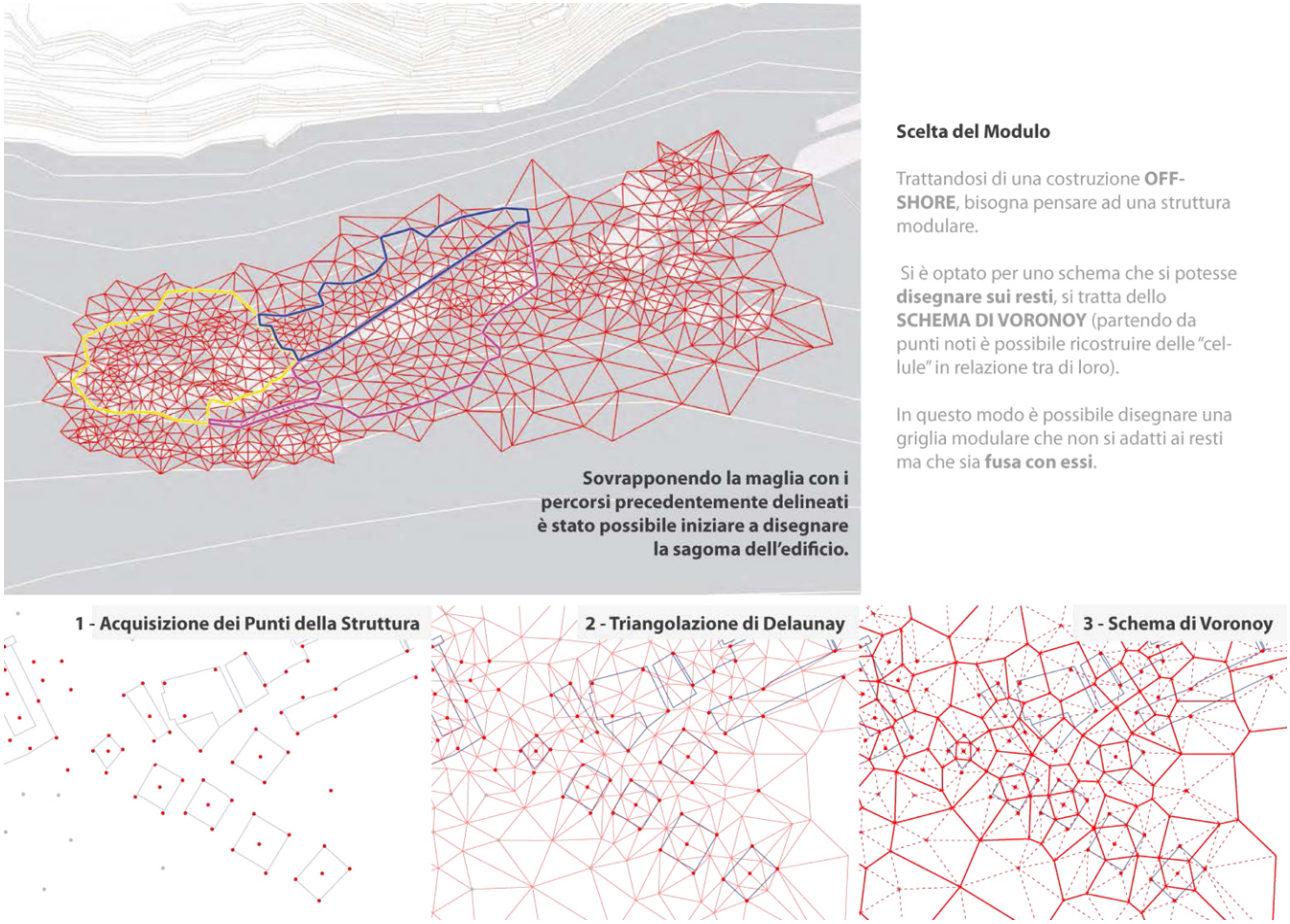

Fig. 4: Processing module project



Fig. 5: Cross Section

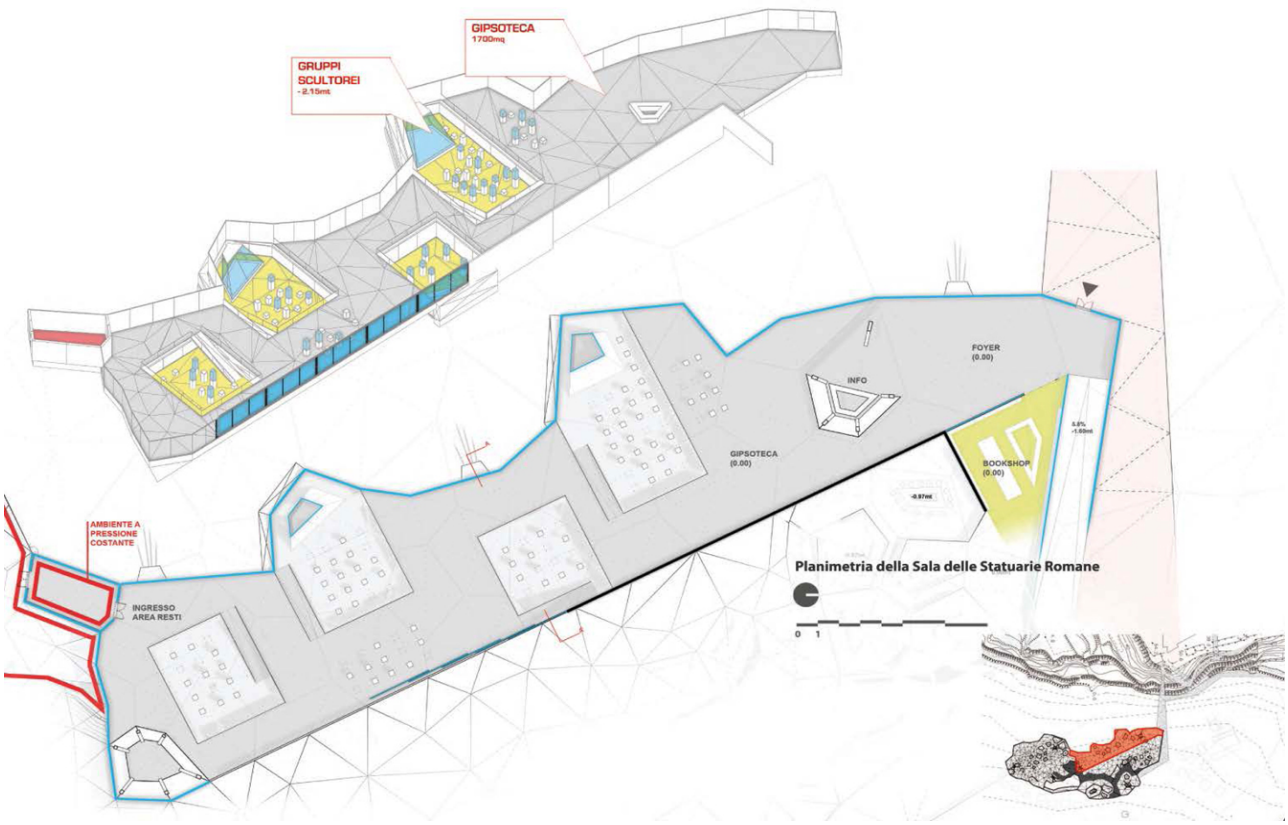

Fig. 6: Roman statuary hall plan

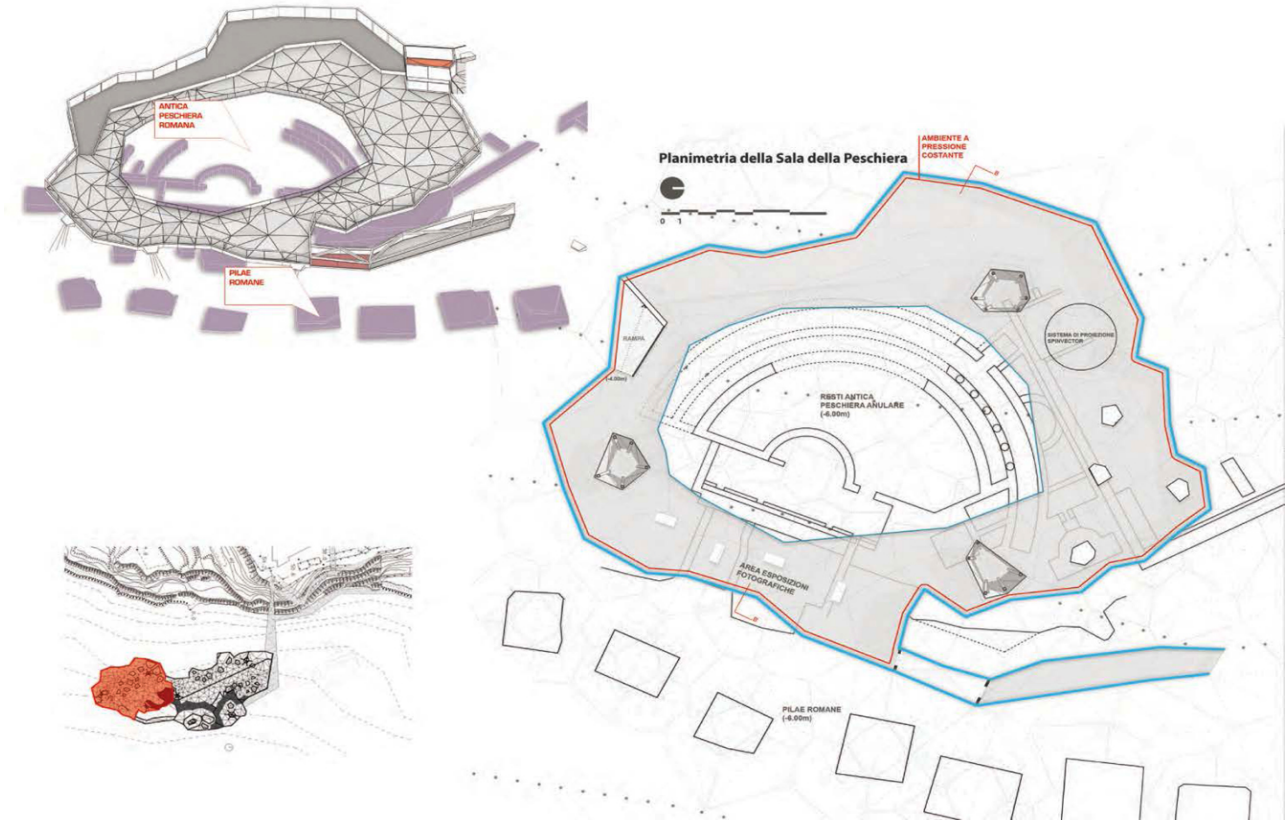

Fig. 7: Room plan of the fishpond



Fig. 8: Plan teaching area

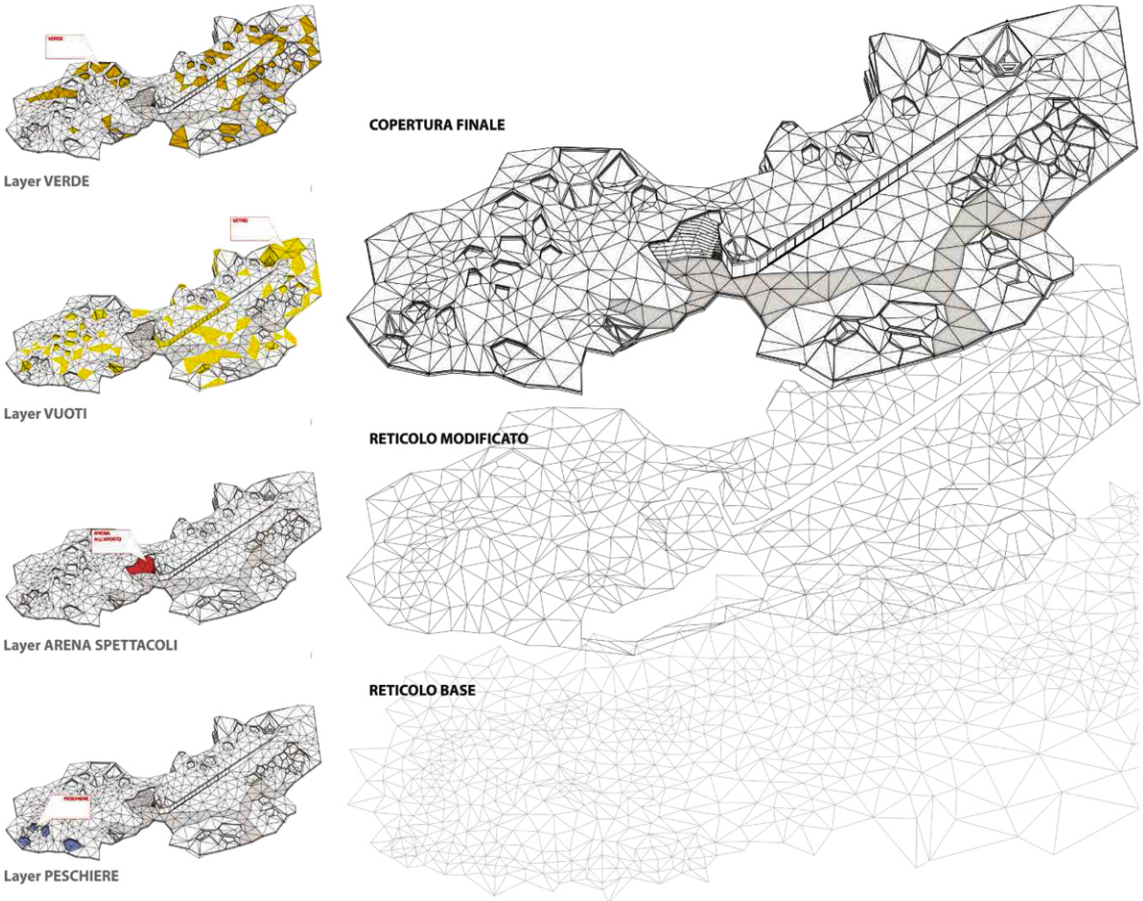

Fig. 9: Roof plan

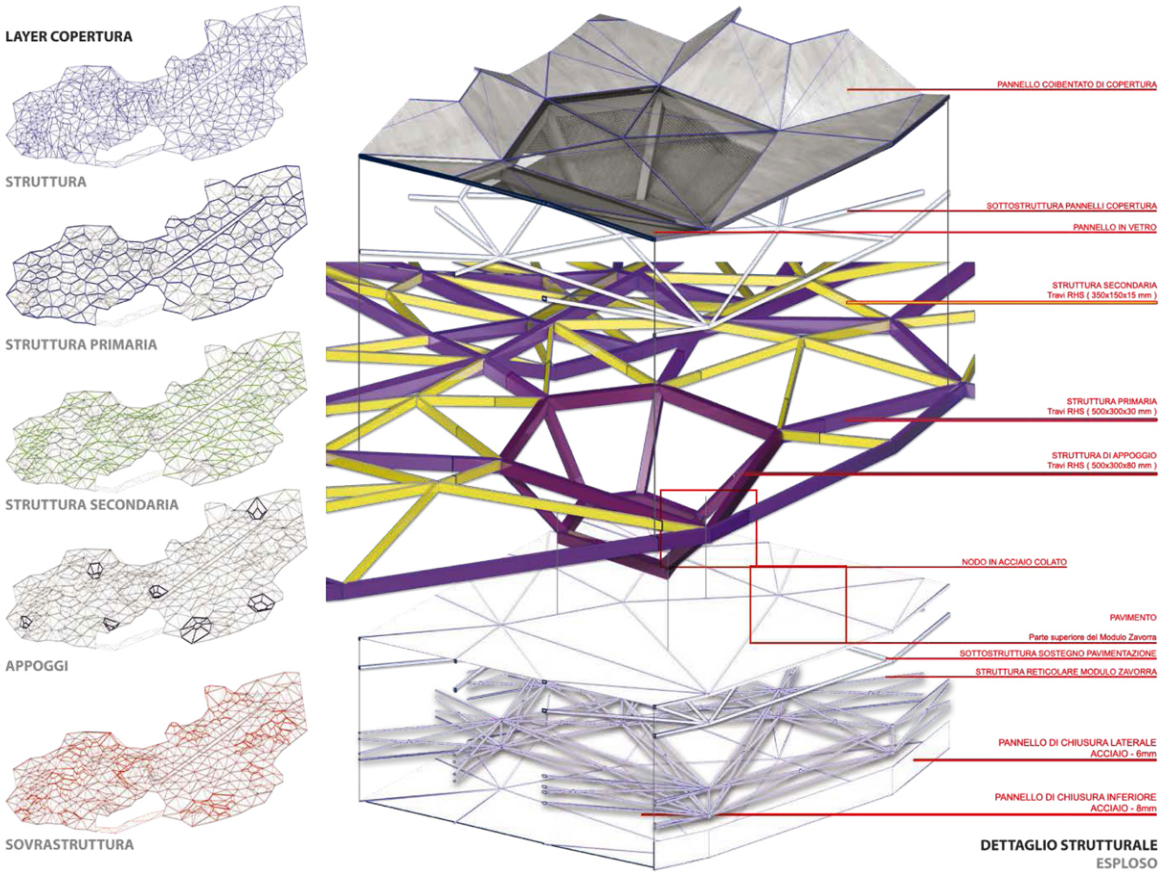

Fig. 10: Structural detail

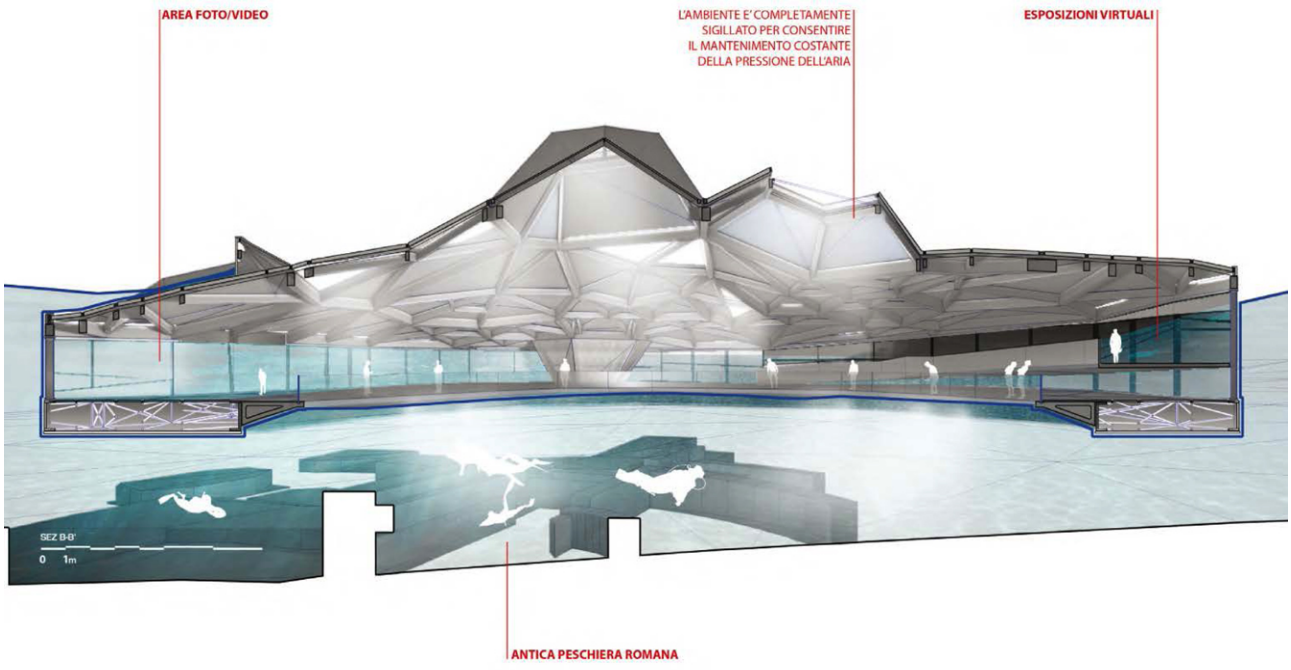

Fig. 11: Cross Section

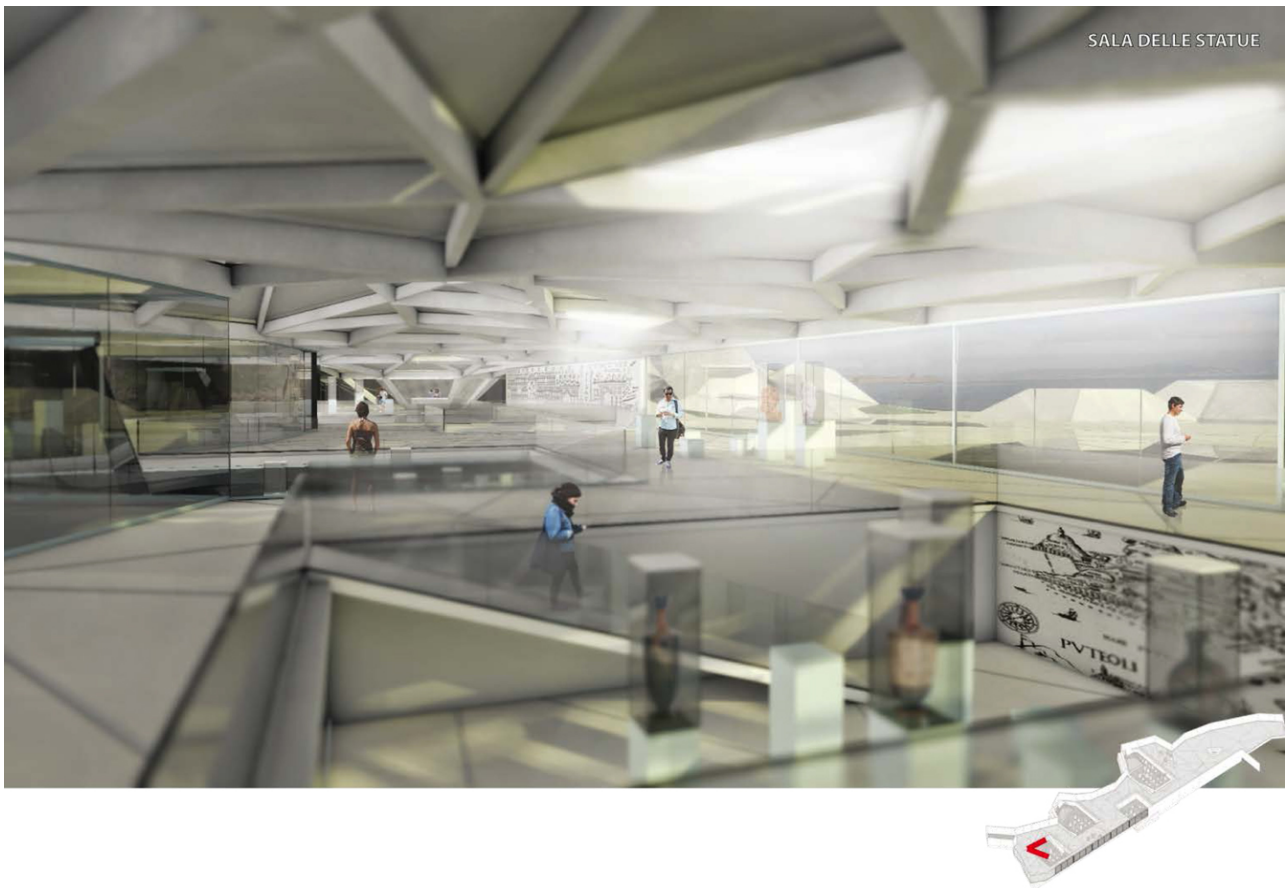

Fig. 12: Hall of statues

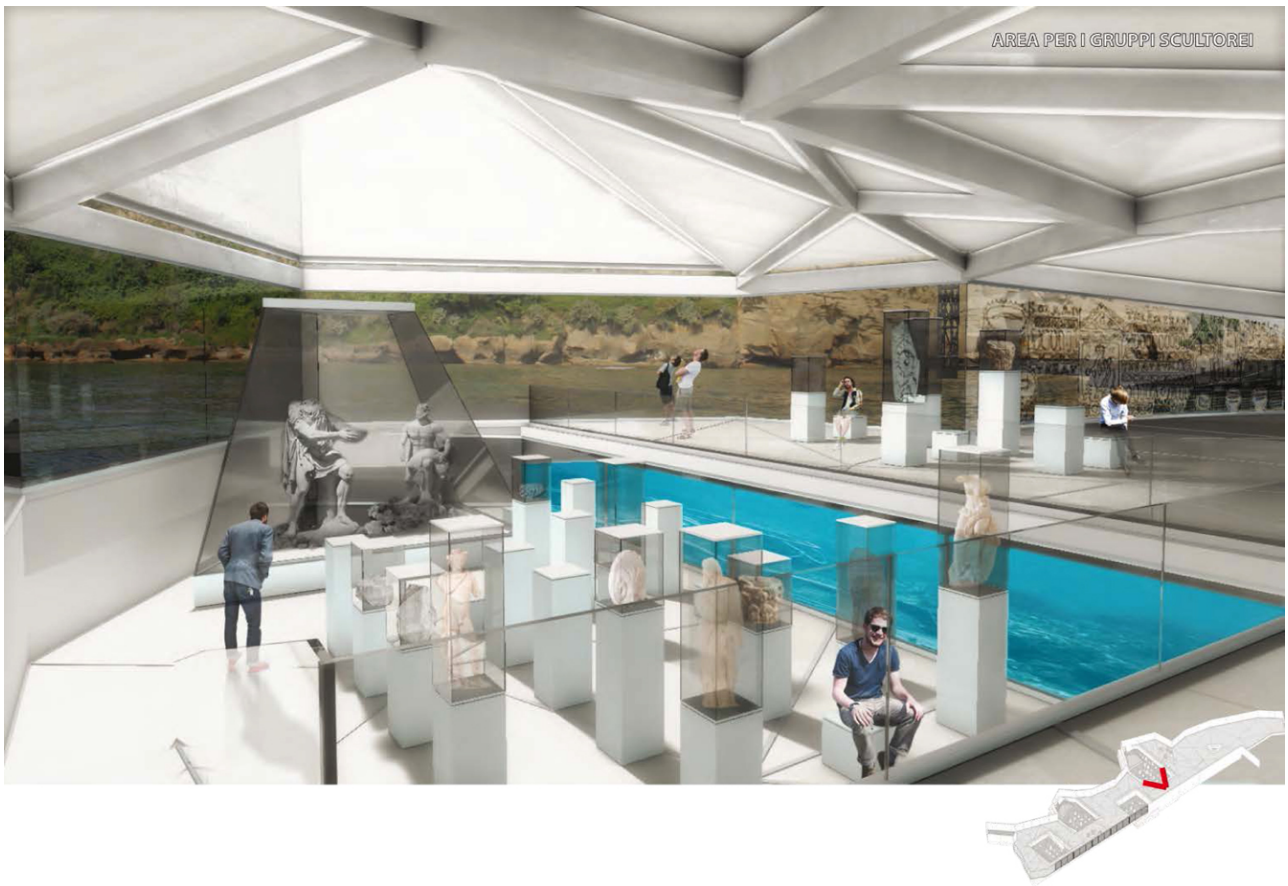

Fig. 13: Sculptures Area



Fig. 14: Observation lounge pisciculture tanks



Fig. 15: View old pier Stagnum Neronis

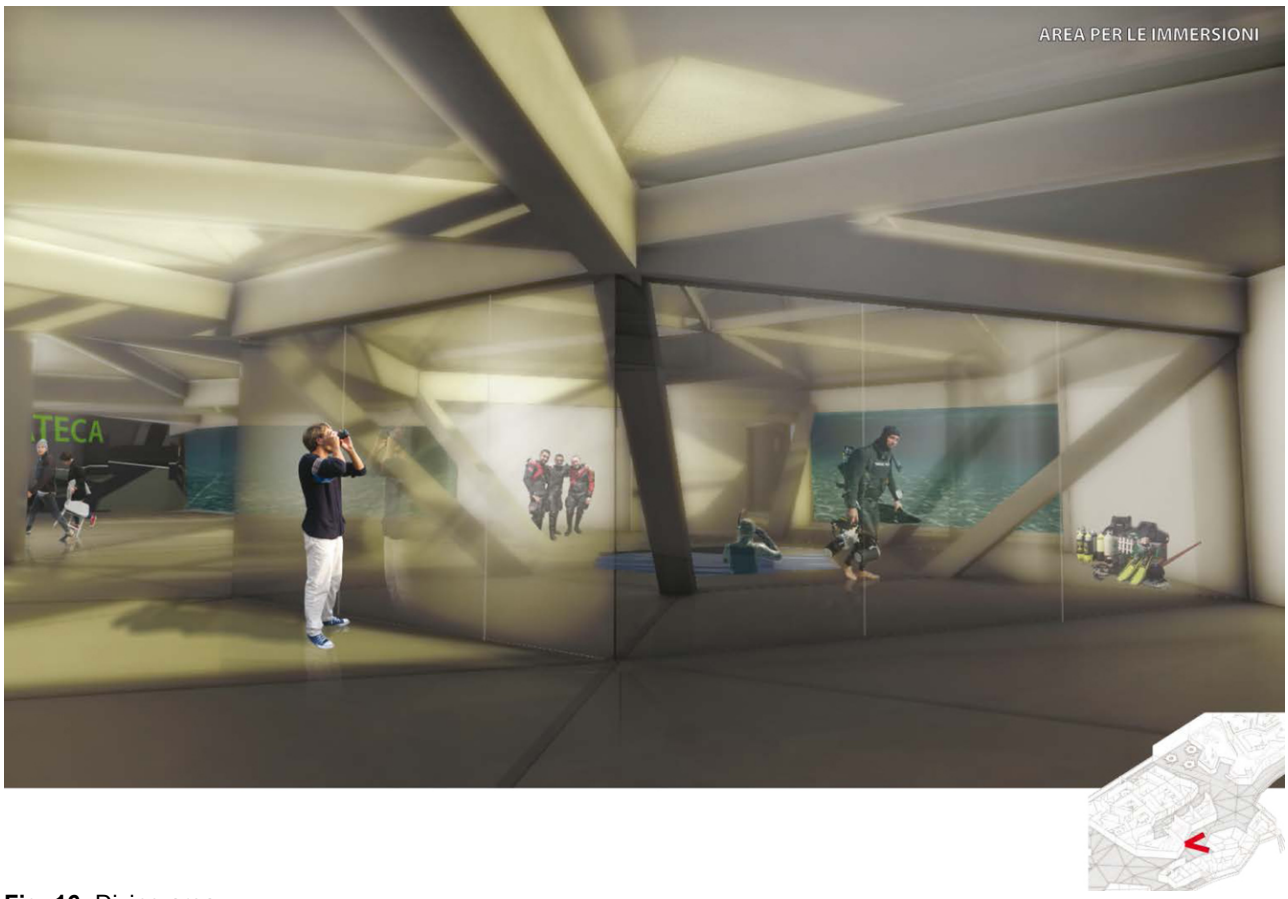

Fig. 16: Diving area



Fig. 17: View from the beach below the Castle of Baia

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Design of multimedia archaeological park in the Mediterranean area. Survey, modelling and communication. The case of Leptis Magna.

Chiara SCALI, Andrea MANTI, Domenico TOSTO
Department of Architecture and Territory, University Mediterranea, Reggio Calabria, Italy
E-mail chiara.scali@unirc.it – andrea.manti@unirc.it – domenico.tosto@unirc.it

Abstract
Presentation of an overall project of reutilization the archaeological site of Leptis Magna (Libya): virtual reconstruction, design and communication of the archeological park for entertainment and a guided tour of the site.
The project is an integrated action program for the revitalization of one of the most important Unesco sites in North Africa, result of an extensive study on archaeological sites in the Mediterranean area conducted in the Final Laboratory of Degree in Architecture.
The study of these sites was the scientific and methodological basis for a two years Master's program in "Design of multimedia archaeological sites in Mediterranean area. Detection, modeling and communication."
The aim is to develop knowledge of an interdisciplinary nature with the specific objective of merging different experiences and skills for the design of multimedia archaeological parks.
The research aims to form a common language between archeology, architecture, computer science and environment, in order to achieve better coordination in the professional field between different disciplinary expertise, in reference to the knowledge and enjoyment of the vast archaeological heritage settled throughout the Mediterranean basin including through new systems of education and communication media and virtual.

Keywords: Architecture Survey, 3D Modeling, Visual Communication, Archeological park, Web App.



Fig. 1: Ancient ruins of Leptis Magna.

1. Design of multimedia archaeological park in the Mediterranean area. The case of Leptis Magna.

(Chiara Scali)

A deep transformation in the cultural heritage has produced in recent years a gradual opening and a different consideration to the places of culture, considered not only as an heritage to preserve but also to highlight and revitalize. In this perspective, new trends in architectural and urban regeneration have been oriented to the use of innovative methods and instruments in the fields of conservation and reuse, as well as demonstrated by the argument of the General Forum.

According to these themes, the studies conducted for several years by the research unit of Prof. Francesca Fatta are focused as part of the survey aimed at re-use and enjoyment of archaeological sites. In particular, the research examines the multitude of historical sites in the Mediterranean area, and especially in North Africa, whose historical importance is in some cases underestimated and enjoyment by the public remains often superficial.

To this end we conducted more in-depth analysis on the ancient city of Leptis Magna, Libya, studying new possibilities for the use and knowledge of an archaeological itinerary.

The ancient Leptis Magna, founded at the beginning of the first millennium BC, was one of the oldest Phoenician colonies in Africa and established, together with Oea and Sabratha, one of the main ports of the ancient region of the "Emporia", also known under the greek name of Tripolitania (just "three cities"). Declared as UNESCO World Heritage Site since 1982, Leptis Magna is one of the most important archaeological sites internationally known, especially famous as the largest and best preserved Roman city in the world.

Encouraged in all its history by its geographical location in the past for the ease of access from the sea and the possibility of docking thanks to the river Lebda running through it. and, over the centuries, thanks to the sand that has submerged and protected, and then give it back to us almost intact. Leptis that preserves Punic and Roman ruins, is an exceptional testimony of Roman history, particularly the high point and the architectural brilliance that goes back to time of Septimius Severus who was born in Leptis in 146 BC, who promoted the city growth and monumentalisation.

Walking through the ruins of the monuments is like enter onto a path backwards in time, where it's possible observe and understand the typical composition and organization of urban of a Roman colony.



Fig. 2: Leptis Magna, an integrated system of fruition and communication.

Despite this, the archaeological site of Leptis is largely untapped: currently the only existing service for visitors consists of a small museum pertaining to the archaeological site. The lack of pathways between the different monuments, the insufficient services for tourists, the total absence of a communication system, leading to reflect on the importance of integrated redevelopment interventions in archaeological sites such as this one.
We thought therefore to propose a reuse project of the whole site, that starting from the survey and from the virtual reconstruction of spaces and monuments, arrives to encode an integrated system of fruition and multimedia communication. A project that, in this case, does not result only in tangible objects but also in a complex grid of "immaterial architecture".
Nowadays, the design of an archaeological park can and must go through the new possibilities offered by the web and new technologies of communication and information instant sharing, to a new and more current understanding of entertainment and increased participation during the guided tour.
In addition to "physical" design of paths and main systems of green, lighting, services and exhibitions we planned the design of a system of intangible paths that guide the user within the equipped areas during his visit. Through a multimedia system that uses GPS technology and web-apps, the visit becomes interactive and the whole archaeological site becomes a virtual museum in the open air in which every real monument corresponds to its virtual counterpart, complete with historical information, curiosity and virtual reconstructions.
In this process the graphic project plays a role of primary importance: in the exact identification of the individual thematic areas, in the park internal communication , through the development of signage and corporate communications and also acquires a fundamental role in the next, immediate, identification of places and monuments through the creation of *ad hoc* icons, shared and used then interactively on the web-app.
The appearance of virtuality is increasingly one of the most immediate and effective forms of promotion and attraction for the facilities - museums and archaeological sites - inserted in a logic of cultural tourism ever more demanding and competitive. The ultimate goal aims at the creation of an archaeological park whose design results the least invasive as possible, in accordance with the evidence of the past, which demonstrates how there can be an exchange common ground between archeology, architecture, information technology and environment.

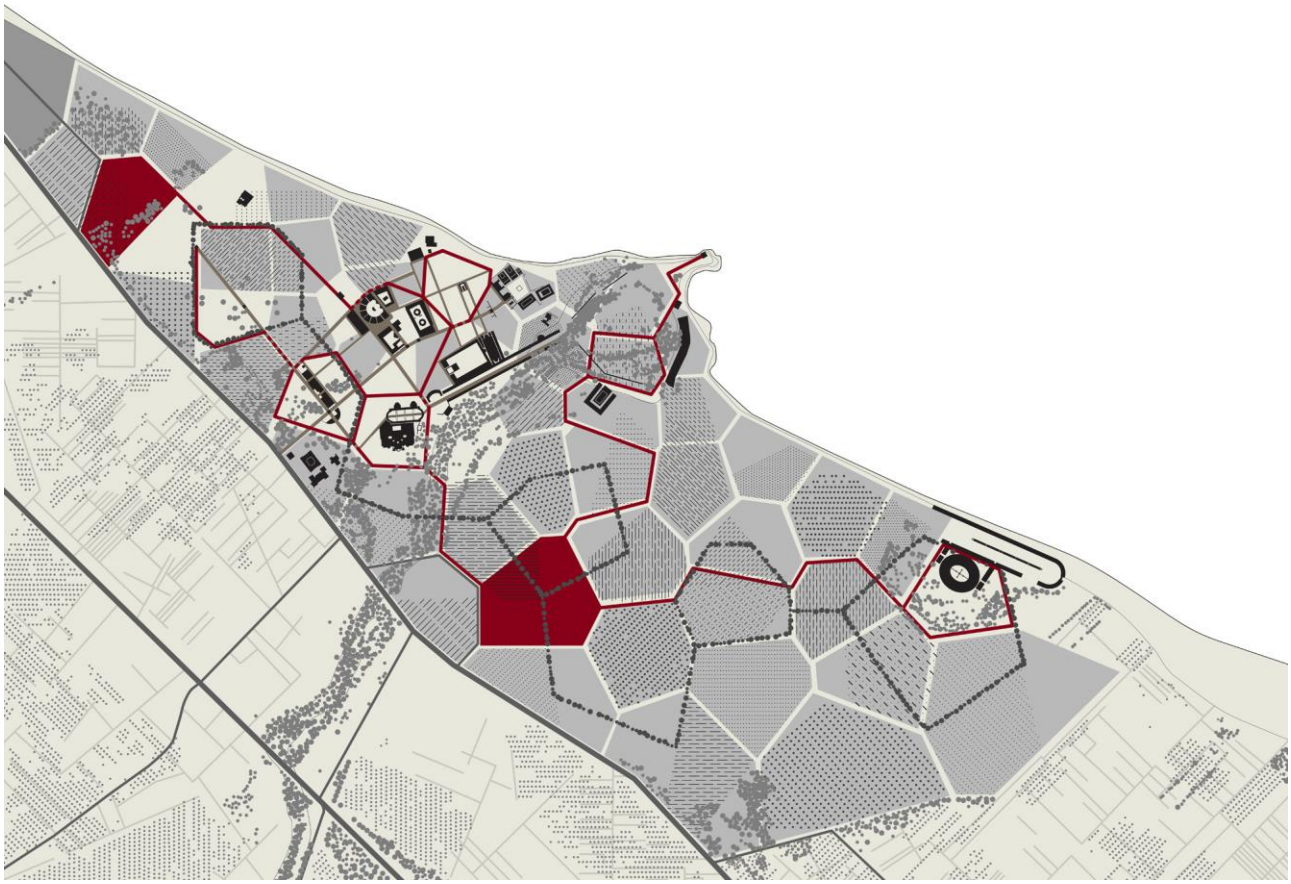

Fig. 3: The archeological park: tangible objects and immaterial architecture.

2. From real model to virtual reconstruction

(Andrea Manti)

The project phases of the virtual museum inside the Leptis Magna archaeological site, contemplate that the various types of data are collected and processed using different methodological approaches, to eventually then be integrated into a single interactive environment.

In recent years is emerging within the international community of archaeologists a strong interest in Virtual Archeology. The term "Virtual Archaeology" was founded in 1990 when Paul Reilly (pioneer in Virtual Archeology) first proposed it in reference to the use of three-dimensional models of monuments and objects.

This discipline is capable of giving access in a visual and interactive way to data that are otherwise would be difficult to control. Through the construction of 3D models and simulations it is possible to create a cognitive process of the past and make it accessible to users through an interactive display system.

We can therefore affirm that virtual archeology is a process of acquisition and simulation, as well as a tool to rebuild something that is no longer visible.

Modeling and three-dimensional reconstruction of the whole territory of the ancient city of Leptis Magna with its major archaeological monuments and the online publication of processed data were two of the main aims of this project. To achieve these objectives has been planned a phase of *in situ* data acquisition and another one of processing in laboratory starting from historical, architectural and archaeological sources.

Finally the 3D models have been optimized and rendered in order to be included in a web platform accessible through an App installed on mobile devices such as smartphones and tablets.

Concerning the realization of virtual models we have followed two different approaches:

1. metric data acquisition of the site and the archaeological monuments through techniques of integrated architectural survey, aimed at their graphic restitution and representation;

2. create, using the software Autocad, a three-dimensional model of the city, in its landscape, and of the most important buildings with its appearance in the ancient times.

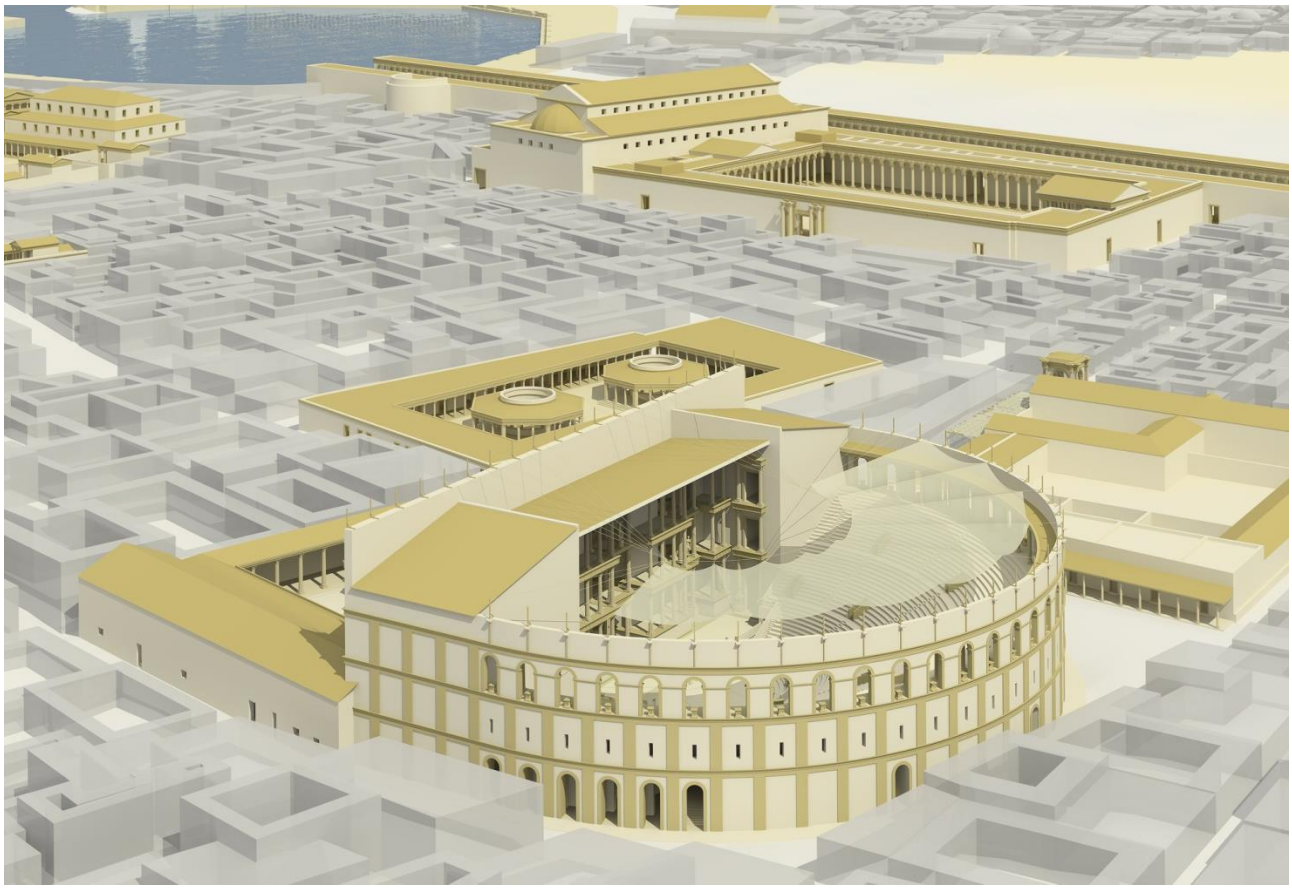

Fig. 4: Sample of virtual reconstruction: model of the Theatre and Market area.



Fig. 5: Bird's-eye view of the three-dimensional model.

2.1 Architectural survey of the archeological site Leptis Magna

One of the first problems encountered during the development of the project was the choice of a correct acquiring technique of the monuments metric data in regard of the size of the site. The communication and promotion of cultural heritage require an extensive documentation in terms of location, shape, color, geometry and also historical and artistic characteristics. The disciplines of the architectural survey have honed in time the techniques of data acquisition in step with technological development. The greatest expectations in the sector of Cultural Heritage are aimed at 3D laser scanning techniques; this system is able to operate quickly and give the opportunity to access to the data in real time. The ancient Leptis still presents a wide variety of very complex cases and situations because of its urban plan.

Currently inside the archaeological site there are ruins of important monuments. Some of them have the original structures almost intact.

This has been possible thanks to the fact that they remained protected for centuries under a heavy blanket of sand that in some places reached 10 meters in height.

The used methods are photogrammetry and architectural surveying through Laser Scanner 3D.

These two methodologies have provided all the elements necessary for modeling the analyzed object and their integration has provided the best results in terms of reliability and completeness.

The architectural survey through the terrestrial laser scanner CAM2 Focus3D generated in a few minutes dense clouds formed by millions of 3D points. The point clouds obtained were combined and filtered through the software SCENE and provided detailed and accurate images of detected objects.

In some cases we used more traditional techniques of survey to complete the acquisition of the data.

2.2 Three-dimensional modeling

Once finished the *in situ* survey operations we got on to the next stage of data processing and three-dimensional modeling in laboratory.

Starting from the metrics data originated from the acquisitions we have reconstructed the entire urban system in order to contextualize in the best way the ancient monuments and to create virtual tours in the archaeological park. We proceeded to virtually reconstruct the ancient urban plan modeling quickly the entire built-up area with a good level of definition of full and empty spaces.

There has been a complete control over the entire scene structuring in a hierarchical manner the various elements thus obtaining a large amount of structures all different from each other.

Because the ultimate aim is the online use of the 3d models we decided to represent with simple and schematic forms the buildings of the town, while for the monuments have been used different levels of detail. The virtual reconstructions are very useful in the understanding of ancient architectures. This is even more true when the aesthetic perception of the structure is ensured both in architectural entirety as in the decorative system. For this reason it has been adopted a manual technique of three dimensions modeling to reconstruct the ancient phase of monuments such as the theater, the thermal

baths and the arches, and to make them usable in real time. All reconstructions have been verified by archaeologists in order to ensure philological and scientific accuracy.
The 3d models were constructed with the software Autocad starting from the data obtained from the survey operations. To use 3D models within a virtual reality application we had to work on different levels of detail.
To create the more complex objects, such as capitals, we used surfaces made up of several polygons in more detailed versions and a smaller version for minor variations.
For the texturing of the 3d models has been assigned to the surfaces a neutral color material with the intention of giving a plastic effect to the object, therefore virtual, with the full intention of putting more emphasis on the spatial structure of the model.

2.3 Communicating the site through the Web App

The project didn't end realizing and rendering virtual models, but all the research material and virtual reconstruction was collected in a web-app available on the Internet at http://leptismagna.altervista.org.
The web-app created can be used like an interactive and multimedia guide as a navigator in the archaeological park.
Through a dedicated Wi-Fi network visitors can always know where they are, to be guided in their itinerary and get detailed information about what they are seeing. The park planned is designed as a virtual museum at the open air. Various paths connect different thematic areas and each area is like a museum room that exposes something. The most important rooms are those containing the monuments where will be placed a QR code. The QR Code (Quick Response Code) is a kind of bar code that is associated with the visible contents on mobile devices, the latest generation of smartphones and tablets.
Generally these codes connect the device to media content contained in a web page.
In this project through a QR code reader installed on the mobile device, once launched the application, simply frame with the camera the code and immediately will activate the visualization of the virtual reconstruction of the monument we are visiting, with a panoramic view of 360°.
The code must be placed on a pedestal that, once scanned, will allow to have the exact correspondence between the real and the virtual perspective.
We wanted to transform real space in virtual space where the individual monuments are displayed in their original form. Many museums have a website where the monuments are displayed in virtual space. In Leptis Magna the site becomes a virtual space.
In this way the monument is not taken out of context from its original site and the visitor also has the chance to see the actual state where there is a monument (real) and its reconstruction (virtual).

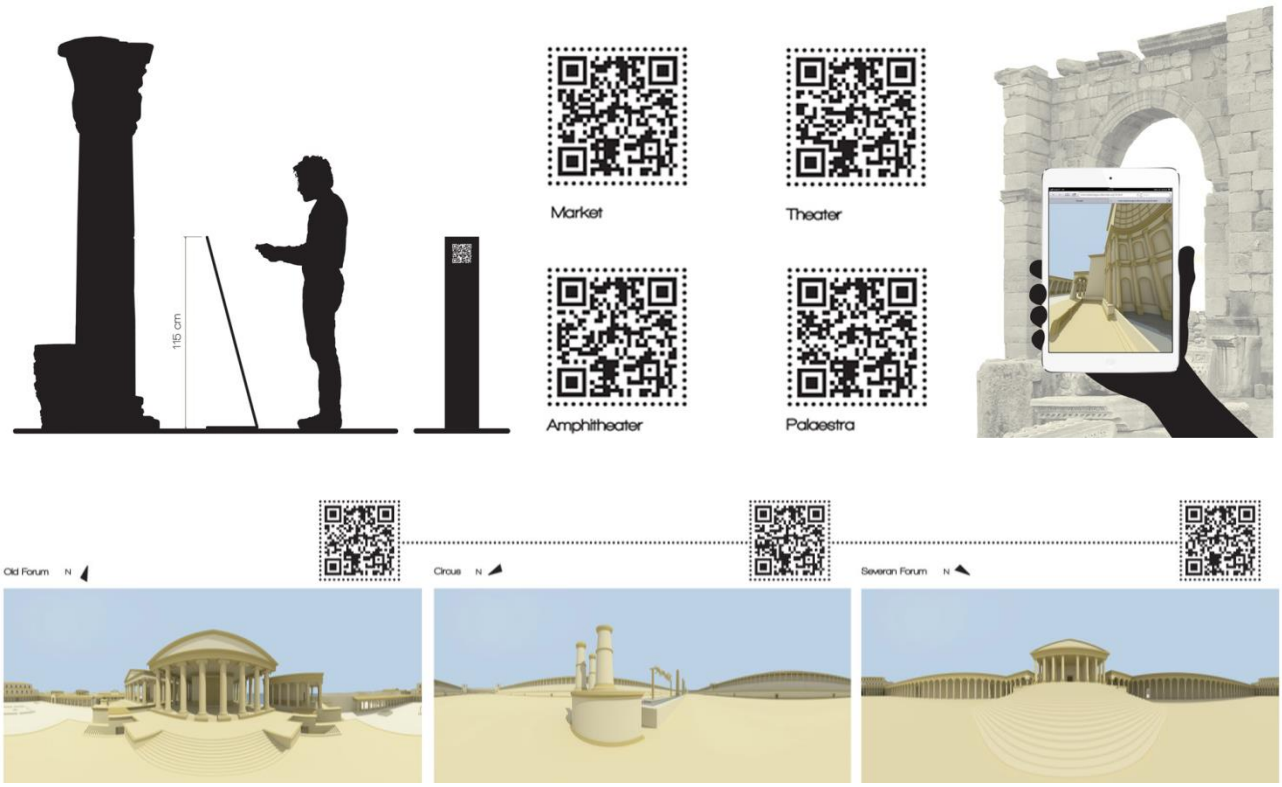

Fig. 6: QR code solution.

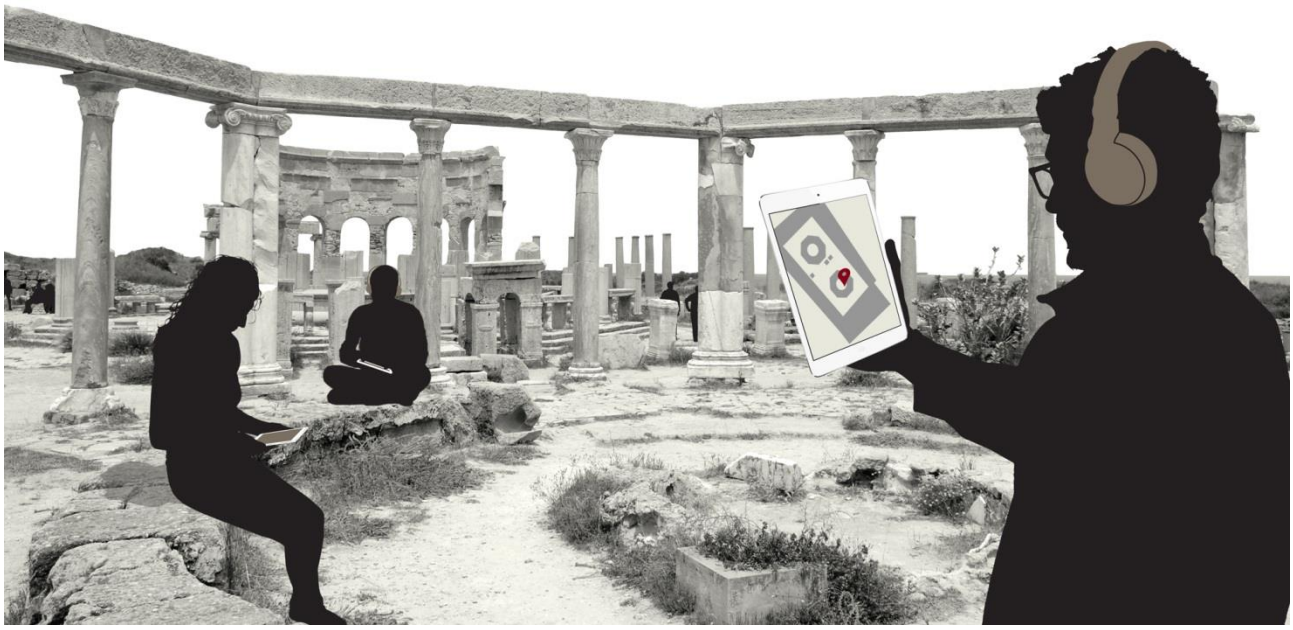

Fig. 7: Virtual tourist guide solution.

3. Multimedia archeological landscaping in Mediterranean area. Survey, modeling and communication.

(Domenico Tosto)

The main element of the research project carried out in recent years by the team coordinated by Prof. ssa Fatta, is its interdisciplinary character, whose ideal conception is the planning and the fulfillment of a master.

The specific aim of the master consists in comparing precise academic specialities, such as Archeology, Architecture, Engineering, Town Planning, Design and all the different academic field within Cultural Heritage, in order to succeed in developing expert researchers able to work in a competent manner and high standards in “Virtual Heritage” field.

The vast archeological heritage particularly in regard to the archeological sites and areas in the Mediterranean, will be the implementation and the interaction of all the different knowledges and disciplines involved in the development of a common language and a better coordination among the professions.

The organization of the master will provide a new course of study, both combined and coordinated, in order to give students the basis classical knowledge together with all specific competences on understanding and employing the modern technologies to value Cultural Heritage at its best.

The new profile of researchers will be able to understand, analyze and deal with cultural heritage and above all they will have every planning and program skill to create multimedia archeological parks.

The course involves students to get in-depth analysis of specific topics in areas of historical, archeological, and basic representation of architecture and archeology.

Procedures and specific protocols about different methods of survey will be investigated: manual, instrumental, topographic and photogrammetric.

The course also provides the use of specific softwares which are designed to perform various tasks, starting from the documentary research of the study area , the integrated management, the subsequent processing of all the collected data and the preparation of representative models designed for thematic or dynamic representations.

Computers and technology provide knowledge and essential aids to the “Virtual Heritage” field and are getting more and more important nowadays.

Today the most relevant aspect of interventions in cultural heritage involves the creation of a database, a data repository that can be used both as a historical memory, the DNA of a past whose traces have been survived up to the present days or they can be processed for the realization of digital models which become the basis for the creation of museums and archaeological parks built among artifacts, landscape, and communication.

They are specific tools to study the deep relationship that links tourism, local development and cultural heritage legislation.

1. L'unità di Ricerca coordinata dalla Prof. Francesca Fatta opera all'interno del dipartimento Architettura e Territorio dell'Università Mediterranea di Reggio Calabria ed è composta da Manuela Bassetta, Andrea Manti, Chiara Scali e Domenico Tosto. Gli esiti delle ricerche fino ad oggi condotte sono in parte pubblicati all'interno delle ricerche PRIN 2003-2009 "Spazi e culture del Mediterraneo".

** Le elaborazioni grafiche presenti in questo articolo fanno parte della tesi di laurea "Leptis Magna: Virtual Museum in an Archaeological Park" di Carolei G. e Costa D. Relatore Prof.ssa Fatta Francesca.*

*** Il contributo a firma di Andrea Manti è cofinanziato con il sostegno della Commissione Europea, Fondo Sociale Europeo e della Regione Calabria. L'autore è il solo responsabile di questo articolo e la Commissione Europea e la Regione Calabria declinano ogni responsabilità sull'uso che potrà essere fatto delle informazioni in esso contenute.*

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Smart communities and local company museums: two new concepts for the Mediterranean Museum System of Design and Applied Arts

Claudio GAMBARDELLA,[1] Jochen SIEGEMUND[2]
(1) Architecture and Industrial Design Department "Luigi Vanvitelli", Seconda Università degli Studi di Napoli, Aversa, Italy
claudio.gambardella@unina2.it
(2) CIAD - Institute for Architectural Design, Fakultät für Architektur, Fachhochschule Köln, Köln, Germany
jochen.siegemund@c-i-a-d.de

Abstract
The idea of creating a “Mediterranean Museum System of Design and Applied Arts”, as an extension of the “Officiamuseum” originally planned for the Campania region and will be based in Pompeii, intercepts many important issues affecting the arts and sciences: the development of artidesign capable of giving a voice to the material cultures of the euro-Mediterranean area and successfully establish itself within the global market shaken by the recession; the possible interaction between museums of specialized craft, applied arts and design to enter into cultural energies in the necessary process of revitalization and modernization of existing artisan production activities; the management of a complex system that seeks to involve various countries, culturally, politically and economically distant from each other, inspired by the concept of Smart Cities and Communities.
The local company museum project should be representative of a “productive landscape” such as the Museo Casa Enzo Ferrari resulted in a public competition by the Municipality of Modena that wanted to celebrate the many brands in the field of cars and motorcycles established themselves in the area.
The aim is to treat these two issues in order to explore and characterize the idea of the System, in this initial phase generated by contributions from the Cologne University of Applied Sciences, Okan University in Istanbul and the Second University of Naples.

Keywords: System – Mediterranean – Company Museums – Corporate Architecture – Artidesign

1. Introduction (Claudio Gambardella)
The project of the Mediterranean Museum System of Design and Applied Arts, following the 2012 edition of this Forum with our friends from Turkey and Germany, is becoming increasingly popular body. The “System” consist of numerous artistic and scientific themes, which include: the development of artidesign – as a third genre between design and craftsmanship – capable of giving a voice to the material cultures of the Euro-Mediterranean basin and, at the same time, establishing itself successfully in the global market shaken by the crisis and crossed by a thousand considerations of growth, post-growth and decline; the possible interaction between specialised craft, applied arts and design museums to insert cultural energies into the necessary process of revitalization and modernization of existing artisan production activities; the draft Company Museums of the territory that, unlike the corporate museums tout court, must be representative of a “productive landscape”, and finally, the management of a complex system that aspires to involve more countries, culturally, politically and economically distant from each other, inspired by the concept of Smart Cities and Smart Communities.

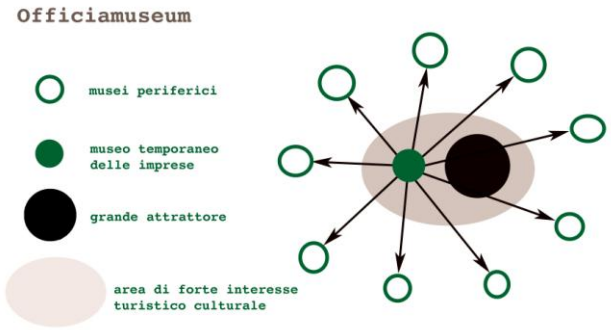

Fig. 1: strategic scheme of Regional Museum System of Design and Applied Arts – Officiamuseum (graphic design by Mariacarla Panariello).

2. The idea of system

The idea of system, widespread in the scientific world, has a chance of being implemented even in architecture. It is worth highlighting some basic points that have provided suggestions for subsequent considerations contained in this paper. The famous book *Uncommon Wisdom* by Fritjof Capra [1] tells of important meetings with important members of the worlds of physics, biology, psychology, economics, politics and culture of the 1900s, that the author, a former "flower child", had when travelling to every corner of the globe. However, it is in another book, *The Turning Point* [2], that Capra develops the scientific content discussed in those meetings, such as the studies of the American physicist Geoffrey Chew (1924). In contrast with the "quantum field theory", Chew launches in 1961 the manifesto of the "S-matrix theory". The central core of this theory is the "bootstrap" concept that indicates a system of "self-consistent" relations between elementary particles. In this perspective, a particle is no longer an entity ontologically determined in absolute terms but is defined only in terms of its relations with the entire corpus of all the others. Despite the new theory having been surpassed by further developments and experimental confirmation of quantum field theory, its influence on the construction of the contemporary world was notable. According to the bootstrap theory, Capra argues that "nature" is not understood as a composition of elementary entities with certain basic properties, but rather as a dynamic fabric of interconnected events in which no part is more important than another. The reduction of nature to elementary components comes from Greek philosophy, which is dominated by the dualism of spirit/matter, while the conception of the universe as a dynamic fabric of relations is typical of Eastern thought and has always fascinated Capra, leading him to write his most famous book, *The Tao of Physics* [3]. The theory of Chew is a philosophy of the "canvas", "network"[4], a philosophy based, therefore, on a structure of relationships. In fact, the *bootstrap* theory is very close to a general systems theory. It insists on relationships rather than isolated entities and, as the vision of systems theory, it perceive these relationships as inherently dynamic.

All that the worlds of science, culture and art produce, can and should flow into the world of design, periodically triggering the crisis of its doctrinaire systems, allowing fresh air to enter into the closed rooms of the disciplinary apparatus. If it were possible to apply the concept of network and system to architecture, it would be possible to get nearer to the essence of historic centers, for which the phrase "urban fabric" has been coined. It is worth considering cities like Siena or Palombara Sabina, 10th century historic centre, as well as the very different Corricella, an ancient fishing village on the island of Procida, "architecture without architects" that developed over time. It is easy to see that the chorus of these centres is not the result of a mortification of formal pluralism and that the differences do not affect the substantial unity of the buildings. These three paradigmatic examples could also include some of the considerations made by Gregory Bateson [5], dealt with in the books by Capra and summarized in the imperative "to shift the focus from objects to relationships". Perhaps the Middle Ages, is therefore the most modern era of our time? Perhaps the way of designing and building in the past, even with the construction of towers, cathedrals and ducal palaces, anticipated a "systemic" vision that is more advanced than what, in the globalized universe, we are able to produce today? It is not a question of construction methods, functions, architectural language, but of ability to see the land as a living network within which to create a dialogue with a new architectural intervention or a simple re-use of an existing building, such as in Procida.



Fig. 2: Procida island. The village of fishermen, Marina Corricella, is an example "work in progress" of "architecture without architects".

An example of how to apply systems thinking to contemporary architectural design and what the transition from objects “architectonic” relationships could mean is the Nelson-Atkins Museum of Art by Steven Holl in Kansas City [6], the United States, completed in 2007. The project consists of five interconnected structures as opposed to a single large existing building. The five buildings give rise to new spaces and new points of view. Steven Holl fused architecture, art and landscape into a unified experience. The project was part of a larger project that led to the annexation of more than 15 thousand square meters of new exhibition space to expand the old structure, expanding the “Sculpture Park” as well as a new exhibition of the permanent collections. “The annexation – said Steven Holl – does not translate into an object: we envisioned a new model that fuses architecture and landscape. In contrast to the stone building, the lightness of the new architecture in glass lens meets the surrounding landscape that takes form in the sculpture garden”. It was as if Steven Holl wanted to renounce an architecture of individualism in favour of the idea of fabric between new buildings, old buildings, art and landscape, focusing on the design tension of the interconnections rather than on individual buildings, simple translucent glass blocks.
This is obviously just an example of how architecture can buy sobriety, without losing in creativity. Designing architectures as systems, rather than an alternative absolute to traditional design, stands as one of the possible ways to give new meaning, new features and new resources to the many empty and uninhabited buildings located in the rural Italian countryside that is crossed by highways, as well as to historic buildings located in small towns that are unmanageable due to their size, and entire ghost towns, with no inhabitants. A design that repairs the wounds inflicted on the territory, which heals wounds. Italy, unfortunately, bears all the hallmarks of this devastation. Nowadays, the discipline of Architecture of the Interior cannot only deal with the internal spaces of buildings and cities, but also the creation of new relationships “between architectural objects” existing within a system to be founded on its strategic and economic variations.

3. Smart Cities, Smart Communities, Smart Countries

By 2020, the EU will have invested about €11 billion on the European project that promotes e Smart Cities; medium-sized urban realities – with a population between 100,000 and 500,000, a catchment area of less than 1,5 million people, but with at least one university - that a study carried out in 2007



Fig. 3: Steven Holl, the Nelson-Atkins Museum of Art, Kansas City (Missouri - U.S.A.), 2007. http://rsteins.wordpress.ncsu.edu.

by the Polytechnic of Vienna, University of Ljubljana and Polytechnic of Delft estimated about 600 (hosting nearly 40% of the entire urban European population). Now, the projects that are being developed, funded and, in some cases, created relate to interventions to improve the lives of citizens in the six areas identified by this study: Smart Economy, Smart Mobility, Smart Environment, Smart People, Smart Living and Smart Governance. Europe is, therefore, encouraging the "intelligent" community that go towards solutions "integrated and sustainable offering clean and safe affordable energy to citizens, reducing consumption and creating new markets in Europe and elsewhere"; a consideration, in line with the requests contained in the Communication "Europe 2020", that indicates by that date the five EU targets which will guide the process and will be translated into national targets. They relate to employment, research and innovation, climate change and energy, education and the fight against poverty. They are, in essence, interventions on the existing city, primarily aimed at the production of intangible goods, such as the provision of new services to citizens, or the implementation of a network of connections between people.
With the smart cities, there is to a new myth. It is in the intelligent city that contemporary man puts all his trust and entrusts the resolution of his fears. Salvation with the help of technology, he wants to put things right, remedy a serious situation culpably caused by his behaviour, convert a hostile territory into a livable habitat became, rejecting the idea of a tragic fate, inexorable where the air, land, water are scarce or polluted. Man wants to defend his right to create new realities. Starting from the "smart" city and the new relationships that can sprout in them, rebuilding at different scales pieces of society (smart communities) so as to interconnect clusters of smart communities, also located in distant geographical areas, but held together – as in the case of the Mediterranean Museum System Design and Applied Arts – by the common thread of a creative and productive culture welded to tradition and local excellence.

4. Designing systems: The Motorway of Art

An example of a system is the "Motorway of Art. A museum 100 kilometres along".
This a project produced by the Department of Design Culture at the Second University of Naples [9] on behalf of the Board for the Architectural Heritage of Salerno. It could be called a territorial marketing project for the A3**,** an Italian motorway, well-known all over Europe for the problems it has had since its beginning in the 1960s. Its layout, extremely tortuous in the Calabrian part, was designed by the Ministers and MPs of the time, which entailed very high costs due to the presence of several structurally complex viaducts. For several years, this important infrastructure of Southern Italy has been undergoing major works to be brought up to European standards, with motorists – and the tourists who want to reach seaside resorts in the summer – being stuck in endless queues. These

works are about to be completed. However, some still believe that this motorway will remain an inter-regional infrastructure to link the regions and towns it runs through, rather than provide a fast connection between the North and South of Italy.
The crucial point along this motorway, the place where to start to put in place a major project, is Padula, with its Charter House (one of the most important in Europe) – with its perfect conditions, its recently-acquired ability to attract international art and culture experts and quality tourism. For several years, the Soprintendenza has been promoting Contemporary Art (Exhibitions and Days) and Landscape Architecture (Hortus Artis) events curated by the art critic Achille Bonito Oliva. In these events, artists and architects have tried to give a new meaning to the monks' homes and gardens, turning the Padula Charterhouse into a Contemporary Art Centre. However, Padula, which is very far from the main city – Salerno, is not important enough to survive over time and become a real tourist attractor, due to it not having a living soul. At the same time, the areas through which the motorway runs cannot benefit from this prestigious presence. The idea, therefore, is to re-think this infrastructure as *a motorway of art: a 100km long museum*, a prestigious tourist itinerary to rediscover historical places and cultures, art, landscape, food and wine and handicraft, exploiting the benefits produced by these Contemporary Art events in the tourist-cultural sector. The project may also support any future contemporary art events at the Charter House, which will gradually lose its isolated nature of "cathedral in the desert".





Fig. 4, 5: Padula charter house. The big cloister and a contemporary art installation into a monk's house.

The project has involved 12 exits along the A3, and has also filed the small villages which can be reached from those exits for a total of 26 municipalities. The Petina exit has been selected because of the former Sant'Onofrio Convent, a standard-type container which is particularly suitable to house temporary exhibitions, with a bookshop and a design café. The product, which at the moment is only a ruin, is located in the area of Petina, two kilometres from the exit, but away from the town, which is further up. The ex-convent has become the subject of an exhibition design project to serve as a sort of "demo" version, or prototype, to re-propose other historical containers along the motorway within 5 kilometres of any of the 12 exits considered.
In addition, imagining the motorway of art as a company, whose legal nature will be determined in due time, a *Corporate Identity* project has been set up including signs, posters, banners, stationery and museum merchandising products which will reinforce the idea of a single system and increase its visibility. A Communication project along the motorway and the Municipalities that are part of the "System" (not only those located nearest to the exits) with the setting up of information totems in museums (one has already been designed), public buildings, refreshment stands and restaurants, info points, stores and productive companies characterising the various places, etc.
To give significance to the project, I am continuing to explore the specific issues relating to the various motorway exits. In particular, until now, there have been two theses in Interior Architecture which have dealt with a very interesting aspect: the recovery of a number of farms, located at the exit of Battipaglia, understood as a subsystem of the so-called "Highway of Art". They are very unique farms, from the point of view of architecture and construction, which are almost all in ruins. Their decline, of course, began with the decline of the agricultural economy, in part also caused by the creation of the motorway itself. How can these farms be recovered? What direction should be taken? How can this project to recover the farms be linked to a more general "Highway of Art" project? The Battipaglia exit is of great tourist value, especially for anyone coming from Central and Northern Italy and going to the seaside resorts of the Calabrian coast or further south, to Sicily. It may therefore be a viable alternative to the nearby motorway service station in Pontecagnano, offering more services, including

the “non-global” restaurant, as well as a place to stop to rest as well as stop over-night. It is for this reason that we have thought of a real “community of farms” with multiple functions that can represent one of the major nodes of the “Highway of Art”. Tourists, for example, can visit the “museum of the motorway”, tasting wines and local products, listening to the “audiobooks”, borrow the books, as you do with cars or bikes rented in many European cities, returning them to other centres of the “Highway of Art”.

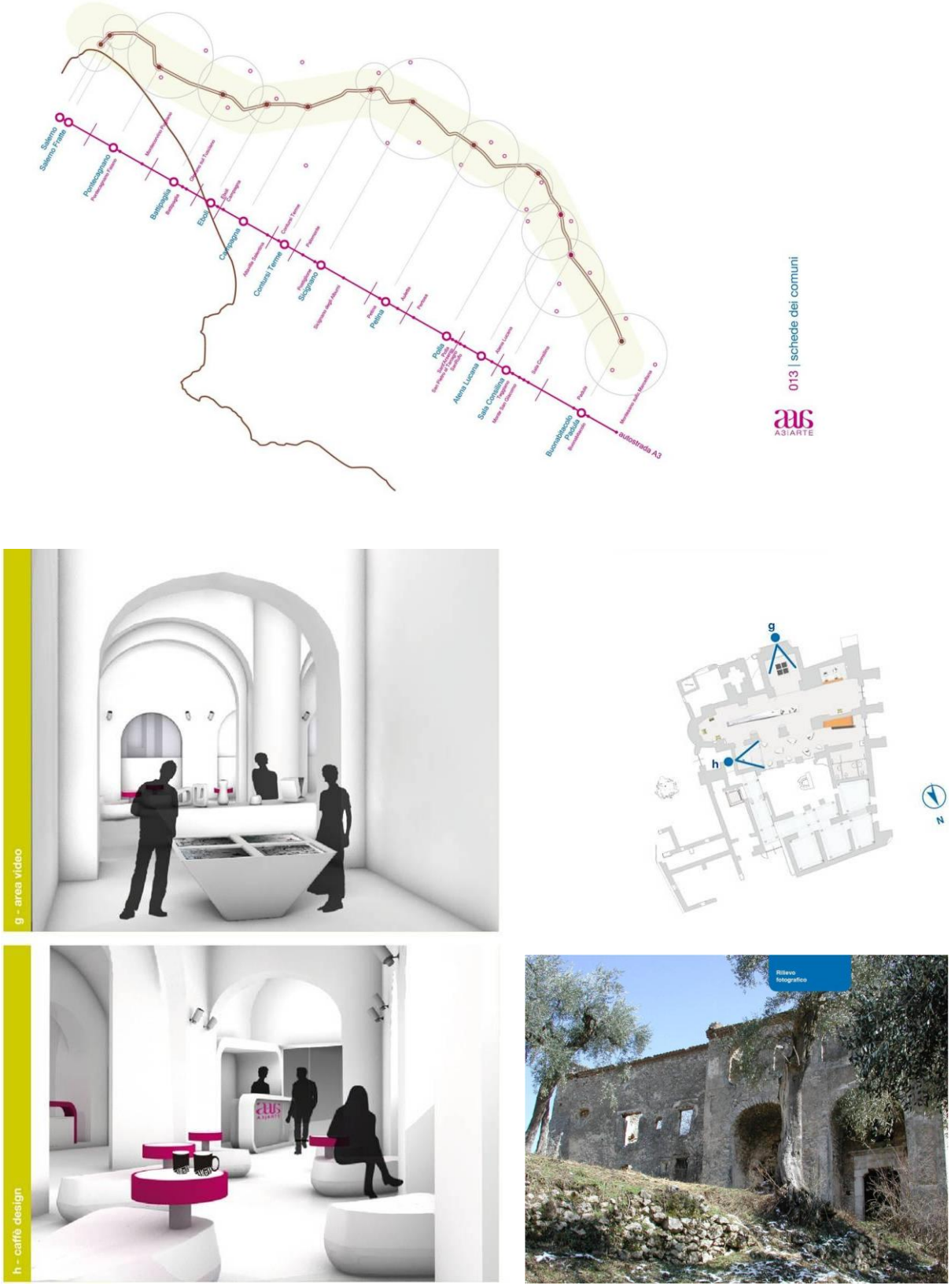

Fig. 6, 7, 8: .The “Motorway of Art”. General map and project of renovation of Sant'Onofrio Convent (Petina motorway exit). Rendering of the exhibition space and cafè design.

At the same time, the Battipaglia exit is strategic because it leads to the prestigious archaeological site of Paestum and, further on, the seaside resorts of the Cilento, almost all awarded the “blue flag”". For this reason, the subsystem of the farms, thanks to its geographical location and its architectural features, may attract Italian and foreign investors working in the food industry (think, for example, the activities promoted by Carlo Petrini Slow Food), or publishing, such as Feltrinelli. At the same time, it becomes of strategic interest for those who want to promote the productive activities of the dairy and agricultural sectors, with there being businesses many along the road that leads to Battipaglia, Paestum and the Cilento. All the resorts located at the A3 Motorway exits, from Salerno to Padula, have their own specific characteristic building, and through the reuse of this historic patrimony, currently disused, create parts of a great museum spread over one hundred kilometres. A museum that, like its contemporaries, is constituted not only by exhibition rooms, but also spaces for the so-called additional services.
It is clear then that the presence of a motorway, even when it is a poor infrastructure such as the A3, may be an indispensable factor for the creation of the system – in this case, the museum – which by its very survival. In fact, the entire structure of a motorway and state provincial, municipal roads, becomes the circulatory system. In other thesis, it is not a motorway, the backbone of the system, but a railway line that is underutilized or completely abandoned. In particular, the thesis by Gaetano Auricchio, “Live Platform”, the stretch of the railway line between the towns of Nocera Inferiore and Mercato San Severino, due to the freight and passenger traffic has declined over the years reduced to a few hours within a week, brings out an area that can easily be destined to a rural park in the service of the people who gravitate around the stations involved in the project. In the thesis (in preparation) by Fabio Carbone, more specifically related to the issues of *business museology* [8], “Irpino Wine System Museum” will have in the future the company museum of Feudi di San Gregorio as its main driver. In this case, the railway line Avellino-Rocchetta Sant'Antonio, now abandoned, is the necessary factor that can encourage the emergence of the system with 28 stations, linking a selected number of wineries in Irpinia, according to a sustainable model. With a section in Avellino of the Department of Agriculture of the University of Naples “Federico II”, where there is a degree course in Enology and Viticulture, the business system of some of the best producers of wine from Campania can be treated as a Smart Community, crossing university education, tourism, gastronomy and production activities. A renewed railway line, in fact, in addition to returning an important service to the inhabitants of the area, can be an effective non-polluting infrastructure within the system.

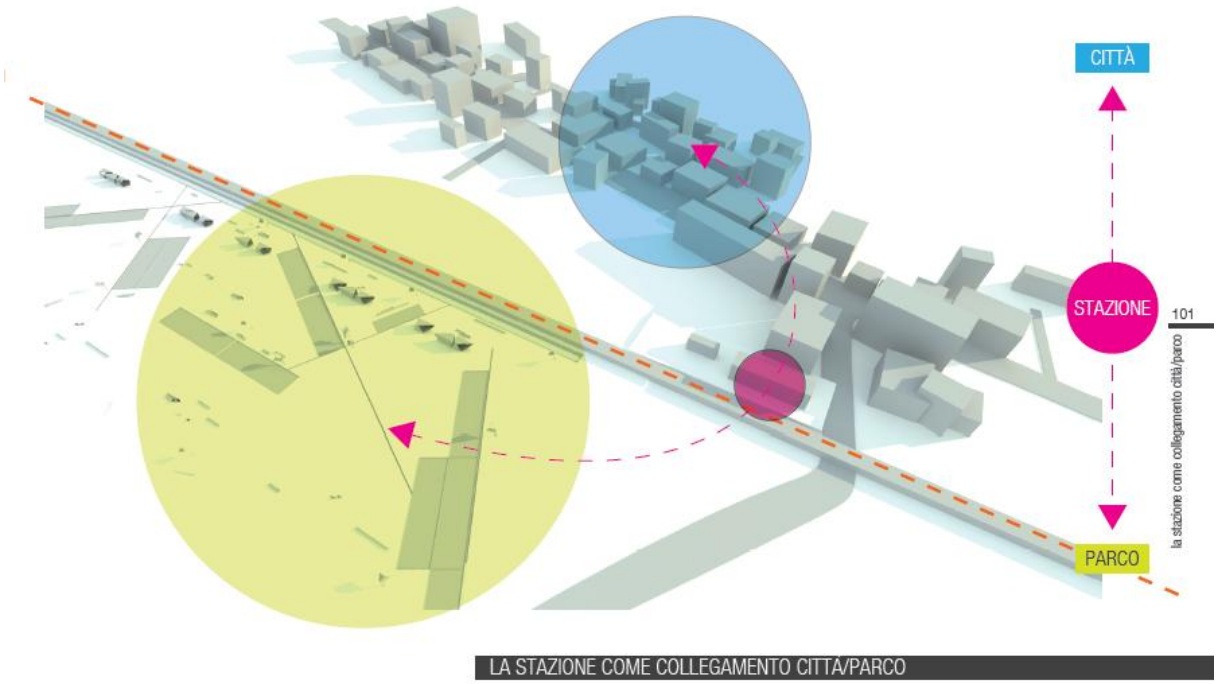

Fig. 9: "Live Platform", the railroad station becomes new nerve centre of relationship between city and park. Project of degree thesis in interior design of Gaetano Auricchio; Claudio Gambardella supervisor - Bachelor of Science in Industrial Design, Faculty of Architecture /S.U.N., 2011.

5. Designing systems: the University Smart Community

The project [10] deals with the creation of a Smart Community in the province of Caserta, between the art cities that are the venues of the various Departments of the Second University of Naples and the

four municipalities of the Domitian Coast. Firstly, the project aims to exploit an underlying tourism that already exists and affects the university population of students and professors, both Italian and foreign, operating in the five locations of the Departments of the Second University of Naples, within an area that is strongly characterized by historic-architectural, artistic, archaeological and landscape features, with Caserta being the "great attractor". In addition, the Smart Community extends to all the areas of the Domitian coast, within the province of Caserta, which, due to the presence of a large number of hotels, could be future "decentralized SUN guest accommodation", with it being a good standard and economically convenient, and not only providing beds and meals but also services related to the organization of events, scientific conferences, seminars and workshops typical of university activities.
The project also includes the promotion of a relationship between the university and the African community that lives along the Domitian coast with the creation of a "museum of African Culture", physical and virtual, and a meeting point in one of Municipalities of the Domitian coast and distributed in the form of museum fragments for scientific thematic areas in the different venues of the SUN. This could possibly help in the fight against organized crime and illegal employment, through the support and affirmation of a renewed cultural identity of the African Community.
Finally, the University Smart Community uses the environmentally friendly and sustainable services of car and bike sharing with electric vehicles that can easily meet, with reduced costs, the chronic lack of transport links between the different locations involved in the project.

6. Conclusions

As we have seen for Officiamuseum, it will be necessary to envisage the creation of a visible center of the "system" of Officiamuseumed. What should it be like? What requirements should it have? Although we are in the scientific context of Company Museums or Corporate Architecture (which is mentioned later by Jochen Siegemund), the architecture of this "museum" should not express a company's brand (like corporate museums) but the "brand" of an entire productive landscape and, therefore, of more companies within a territory with construction methods, materials, techniques related between them and the same "tension" design belonging to artidesign[11].
A paradigmatic example is the Museo Casa Enzo Ferrari. "It is a museum that celebrates the role of Modena in the evolution of Italian high-performance cars: the home not only of the Ferrari, but also of the Maserati factory. Modena is one of those special places where the tradition of Italian craftsmanship has met engineering, giving rise to a series of cars charismatic that, with irrepressible beauty, united a unique power performance"[12]. With these words, Deyan Sudjic talks about what he calls "[...] a monument to the vision of the project by Jan Kaplický" in the book entirely devoted to the museum[13]. Not a corporate museum but of companies, those between Parma and Bologna, producing cars and motorcycles, sports and racing cars (Lamborghini, Ducati, Maserati, Ferrari, Bugatti and De Tomaso) for a lifetime and that represent Italian excellence in these two areas.
The last work of Kaplický, who with David Nixon in the late 1970s founded Future Systems, was inaugurated in 2012, three years after the laying of the first stone, and his death [14]. For the purpose of the speech, we should highlight some important aspects that are inseparably related to architecture and the symbolic value/strategy of this museum: the goals, the client, the place in which it arose, shape and colour as well as the use interior spaces. The purpose was stated above. The museum was not to be dedicated to a single car, the Ferrari (which incidentally has its corporate museum in Maranello), but had to express a corporate culture that is the flagship of a territory. It is for this reason that the work was commissioned by the Enzo Ferrari Birthplace Foundation, a mix of public and private organizations which is part of the City, the Province and the Chamber of Commerce of Modena, the ACI and Ferrari SpA and chose the instrument of the international competition to decide who to entrust the project to. The site is of high cultural value and symbolic. The museum, in fact, is built next to the nineteenth-century birthplace of Enzo Ferrari, in an area rich in dealerships and factories of car parts, not far from the centre of Modena, from the Piazza Grande, the Cathedral and the Ghirlandaia Tower, all UNESCO World Heritage Sites. The work, then, could not but be strongly characterized. The form – the description of which is conveniently summarized by Sudjic: a "high-tech bulb encircled by grass" that like "a protective hand" cradles the birthplace of Enzo Ferrari - enclosing the dual need for mythical roots to an exemplary company story, with a strong and innovative affirmation, respectful but without submissions. Even the colour is the result of a reasoning that is attentive to the meanings. Not "Ferrari Red" that would end up favouring one company, but rather the "Modena Yellow" more connected to the place in which they all could be recognised. Finally, the structure of the museum: a permanent exhibition of the life of Enzo Ferrari, organized in the restored product and a space for temporary exhibitions in the new building can accommodate up to seventeen cars that Kaplický imagined placed on rotating rectangular platforms mushrooms with thin stems.
What the Mediterranean Museum System Design and Applied Arts would be like is hard to imagine, at least in the details *Officiamuseumed* is taking shape as a scientific project through a Summer School aimed at German, Turkish and Italian students of the three partner universities [15], aimed above all at

understanding the similarities and differences between the different territories and creating a first international station with which to operate in the future. A project that aims to be practical, with it being be realized in the coming years. In fact, the difficulties are immense. Consider a future extension of the “system” to other countries in the Euromeiteranea (over 35 EU countries, North Africa and Asia-Mediterranean), with it being very difficult, perhaps impossible to create. Moreover, Officiamuseum in Campania, as a set of companies and museums, has been blocked for about ten years, even if a small temporary museum in Pompeii is being realised as the centre of the system. The opening of an initial location in Turkey might even give new impetus to the project in Campania. Perhaps, this is a utopia, a dream that takes on the contours of a feasible international grouping of universities, museums and local small businesses for excellence to build a huge creative community, open to dialogue, focusing on local diversity, one the one hand, and on the matrix artigianal-design, on the other. The Summer School will be able to develop a possible and flexible model, carrying out a small scale experiment, on only two territories, in Italy and Turkey with only three initial partners. The scientific collaboration between universities has already been tested successfully. It will also try to create a dialogue between companies and their museums as well as convince the various operators that this is a great, cultural, economic and productive opportunity. As with the other systems, it will have to take into account the connections that, being all virtual but physical, will ensure maximum speed and ease and be, of course, sustainable, smart.

7. Corporate Architecture - Corporate Museum (Jochen Siegemund)

Tradition is the trend of brand management. Awareness of the value of a carefully prepared and presented appealing history has won in recent years increasingly important. Not only the big industries, the so-called global players have come up with their corporate museum created a permanent place your brand heritage and brand culture, and small to medium sized companies recognize in an increasing the possibilities of spatial presentation space for communication and interaction with their own traditions and core brand offers. Companies invest in spatial communication, such as industrial museums, exhibitions and corporate brand worlds.

The motivation and the reason for this entrepreneurial activity is obvious, on the one hand exists in the company an ever more extensive pool of corporate history, was suitable to present themselves, on the other hand offers a museum exhibition and brand world the chance of positioning the brand in our gobal , fast acting world. It is not limited to, the provision for displaying individual exhibits, it's about the permanent placement of intergenerational processes that have shaped our industry today and everyday culture. In view of the high turnover of company shares and brand names, corporate "Built identity" are museums, so symbols of continuity.

Corporate museums are not only as museums, they are a new building typology, a hybrid between the museum and brand world. Here, the corporate museum is a little different from the "classical museum" in public ownership. One thing they have in common, both preserve the society from the loss of their history and provide space for identity and history. This is not a new development, the latest at the beginning of the industrialization of large corporations have begun to collect art and cultural heritage and to present in foundations and museums. For industrial museums is not just a matter of preserving the history and issue, but rather active and forward-looking work essentially with the own collection, so to speak, to position itself as tradition-conscious businesses and to explore trends.

The term corporate museum refers to the association of the industrial museums to the field of corporate identity. The corporate museum takes in the corporate architecture of an enterprise, often a central, mostly experimental - strategic - function. While public museums reflect the educational mission, are additional aspects, such as research, brand management and brand image building communication is the priority here. Corporate museums are located at the interface between scientific and economic claims. Next to the branding of a company's corporate museum offer promising new potentials and synergies in a creative business management, between the poles, historians, cultural managers, engineers, up to business managers and marketing experts.

Companies are challenged to act smart and sustainable. Corporate museums offer these forward-looking company the necessary and meaningful place for future transdisciplinary learning and experimental laboratory situation of a forward-looking company. Corporate museums are an integral part of corporate culture. A trend that can be observed recently, are smart museum networks of corporate museums. Industry museums form are thematic, smart and strategic alliances and thus expand its international positioning in the competition gobalen Museums and brands.



Fig. 10, 11: Future Systems, Museo Casa Enzo Ferrari, Modena (Italy), 2012. External view of old and new building: View of the Gallery interior. Photos courtesy of Museo Casa Enzo Ferrari.

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[4] The word network refers us to cyberspace, the Internet and therefore to the greatest technological revolution in our way of living and thinking.

[5] British anthropologist, psychologist and sociologist (1904 – 1980).

[6] Steven Holl won an international design competition in 1999.

[7] In one of the numerous articles published for the opening in 2007, the following was written: “The expansion of the Nelson-Atkins Museum of Art fuses architecture with landscape to create an experiential architecture that unfolds for visitors as it is perceived through each individual’s movement through space and time. (…) The threaded movement between light-gathering lenses of the new addition weaves the new building with the landscape in a fluid dynamism based on a sensitive relationship to its context.” Source: GA Document 96 [Japan], May 2007. http://www.stevenholl.com.

[8] Over the years, many others have been developed with the guidance of Claudio Gambardella as tutor. It is worth recalling the very first thesis for Arflex International and the “Museum of Molteni & Enterprise Campus design”, in Giussano (Lombardy), that on Thonet in Frankenberg, Germany, the “Museum of Luce Foscarini”, in Venice, the Museum of Pasta Gragnano, the “Corporate Museum of Military Cords Production in Castellammare di Stabia", “Corporate Museum System Arflex, in Lombardy”, “Company Museum of Serralunga” in Biella, and “Corporate Museum of the San Carlo Theatre Naples. The System of Cultured Music in Campania”.

[9] The university project was edited by Claudio Gambardella (scientific responsible) with collaboration of Daniele Jannicelli and Domenico Rescigno.

[10] The project has recently participated at the invitation of the Ministry of Education on the occasion of the announcement of the Ministry of Education Smart Cities and Communities and Social Innovation. The project was edited by Claudio Gambardella (scientific responsible) and Alessandro Ciambrone with collaboration of Maria Rosaria Puca, Vincenzo Pollini, Matteo Schiavone.

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[14] The work was completed on the project by Andrea Morgante who at the time was already part of the project team that won the competition.

[15] The Faculty of Architecture of Fachhochschule Köln, the Faculty of Engineering and Architecture of Okan Üniversitesi of Istanbul and the Department of Architecture and Industrial Design of the Second University of Naples.

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Measurement, Representation and Rural Architecture Exploitation: Knowledge through Historical Maps from Mills to Hydropower Stations

Fabio Converti
Department of Architecture and Design, Second University of Naples, Aversa (CE) City, Italy
fabio.converti@unina2.it

Abstract
Belonging to a place (geographical and cultural area) is decisive, mainly for certain territories, in order to fix forms and technologies of the built heritage, both as specification of stylistic peculiarities and as method of approach to the project's process.
"*Striving to give new life*" and preserving coincide with an acquisition and knowledge process that represents the revival of roots from the historical tradition.
Sources, as investigative tool, allow us to enhance and innovate forms and construction technologies, but above all to gain a theoretical model that is the basis of architectural works of our lived backgrounds.
The objective of the quality of the landscape shows itself as relationship and feedback for any project on punctual and spatial scale, secondary targeting on it territorial modification interventions, in the direction of economic and social ambitions, through a shared planning for a multidisciplinary integrated enhancement.
In peri-urban and suburban area, topics of knowledge, recovery and enjoyment of the rural architectural heritage, also seen regarding their production of multifunctional values, play a fundamental weight. The agricultural environment, as result of continuous relationship of interdependence with the man, must not be perceived as an environment that produces only commodities, but especially "landscape", full of peculiarities, in which it is possible to read traces of the historical memory of settled communities and landscape identities.

Keywords: Representation, Heritage, Rural, Landscape

1. Introduction
Cadastral mapping, where thematic of possession is represented, is an essential tool for management of territory. Extended to entire national territory, it is made of 80% at 1:2000 scale mainly in Cassini Soldner mapping system and refers to several centres of emanation. The Land Agency has now maps in vector format in the native system effectively throughout the whole country and "original plant" maps in raster format are being in acquisition representing, even not up to date, " the most precise" basic metric criterion we have.
Landscape's representation - "traditional" or digital one - must inevitably take its origin from the problem of reduction of natural variety to an objective and transferable picture, because of its codification: this is a need providing scientific rigor to the possible graphical, analytical and descriptive model of landscape shape, which, according to theoretical approach of complexity and "multi-dimensionality" of knowledge of world, can never be reduced to mere measurement and extension, neither it is ever entirely attributable to "exact" rationality of map or vector path, nor to fascination of view or satellite photographs.
In 1965 George, for example, showed an important method perspective about criteria for reading rural territory, detecting in characteristics of soil use, in land ownership structure and in average size of

cultivated fields, some data collectors of prevalent agrarian type in a certain area, considered as the result of historical plot among socio-economic factors and local physical ones.

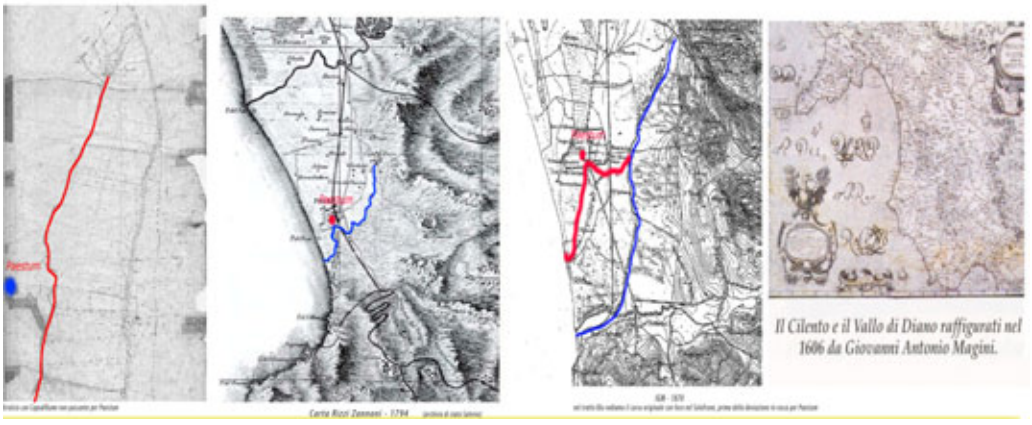
2. Research field

Socio-economic and structural modifications, occurring in agricultural sector in the last decade as consequence of EU policies with the reform of the Common Agricultural Policy (CAP) and the launching of Agenda 2000, imposed a reposition of Italian agriculture in the way that it seems better to give up the traditional concept of *agricultural* world by extending its meaning to that of *rural* one. This is the main effect produced by changes of company structure and organization, become more and more market oriented and integrated into socio-economic context.
Landscape reflects the "sense" of territory outlined in itself: it offers in a photographic and synchronic way its ability to reveal a form of identity regulation of its own order.



Fig. 1 Geodesic plant of Molini Capo di Fiume with respective sources and its surroundings in Capaccio (Salerno) in 1857, Designer and Surveyor Michele Caccavelli (State Archives of Salerno).

It exhibits signs of diachronic becoming told by the evolution of inner phenomena and more or less by the integration including elements arising from outside, inevitably exchanging models and phenomena with. *Landscape's shape is direct consequence of forces acting on it: forces, in appearance independent, are in fact strictly dependent on each other. Therefore, it is not only important to analyze each component, but also, and especially, all possible elements of connection among various forces* (Benedetto Croce).



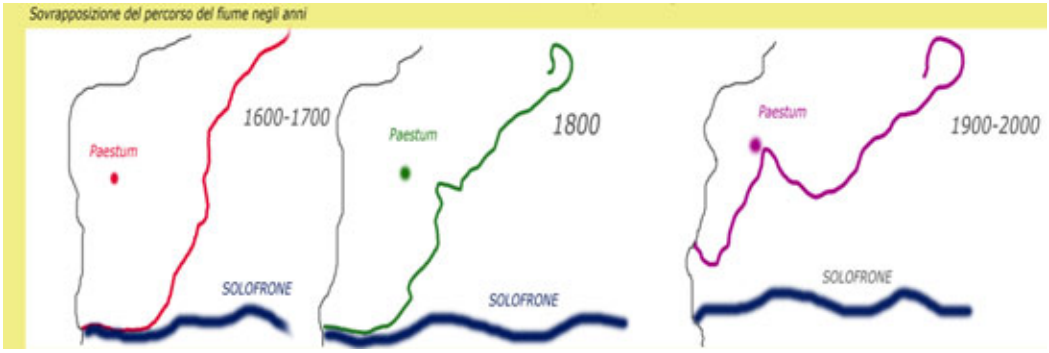


Fig. 2 River course through historical cartographies

The human living is in fact always a co-inhabiting, which is to say a social construction of sense (Bronfenbrenner 1979).
Rural traditional building, centuries-old sign of agriculture of place, is going to disappear, responding to a phenomenon more related to time than to space. Starting from Trulli in Puglia to Lombard farmhouses, from German Bauernhäuser to English barns, nothing seems to escape from silent and constant phenomenon of dismission.



Fig. 3 From mills to hydropower stations in Piana del Sele

The law of 1922 wanted by Benedetto Croce conjugated the notion of historical truth of landscape, in the broadest sense of environment including its natural and geographical specificities and its historical and literary proofs, with social and national sentiment.

3. Objectives

Century-old farm buildings do not seem suitable, or adaptable, to perform any nowaday function: owners are uninterested because of high costs for restoration, following the trend to build new productive structures, more functional and suitable to need production and Community directives and, finally, also because of numerous constraints.
Prescriptive contradictions contribute to discourage even more owners.
In other words, learning to understand landscape is a necessary step to "*comprehend the territory*" (Corna Pellegrini, 1997) and to decode it also in many cultural identity values; perhaps the most important purpose of this practice of research is the application, being the aim to raise awareness to local communities of the importance and often the specificity of values expressed by places and areas, and thus also to "*orient projects of government of landscape-territorial modifications/changes, because they will be anchored in line with concepts of protection, upgrading and enhancement* "(Castelnovi, 1998).

To catch elements fully, snatch their meaning and contextualize them, it was necessary to build a coherent and comprehensive interpretive trail, able to make identity of places recognizable, assigning membership, and revealing subtle links and fragile balances.
Therefore, the study of the Piana del Sele landscape not only brings out critical phenomena arising from consumption of free soil, but also focuses attention on the need to make the best to increase in value both historical and cultural potentialities of built environment and environmental ones with all concrete and possible connections.



Figure 4 Complex Le trabe of Capo di Fiume

The strong agricultural character of regional territory refers to the centrality of multifunctional role of agriculture and its actors - farms - which, from classical conception of goods "producers", become protagonists of preservation processes, through actions of management and of care. These actions, in particular geographical foothills areas, are irreplaceable contributions to functions of supervision and protection of territory.
Socio-economic mutation occurred over time have profoundly affected relationships, creating small particle properties and changes in cultural or territory abandonment.
The unbroken expanse of lands of ancient feud first was replaced by the plot of enclosed plots of land, and then, in some areas, by the further fragmentation of funds in smaller properties, till their definitive abandonment.
Therefore, the protection of rural areas should be considered a target since the beginning of planning and design stages, through knowledge of their current socio-economic, environmental, landscape tissue and of an "agricultural project" to which to guide them.

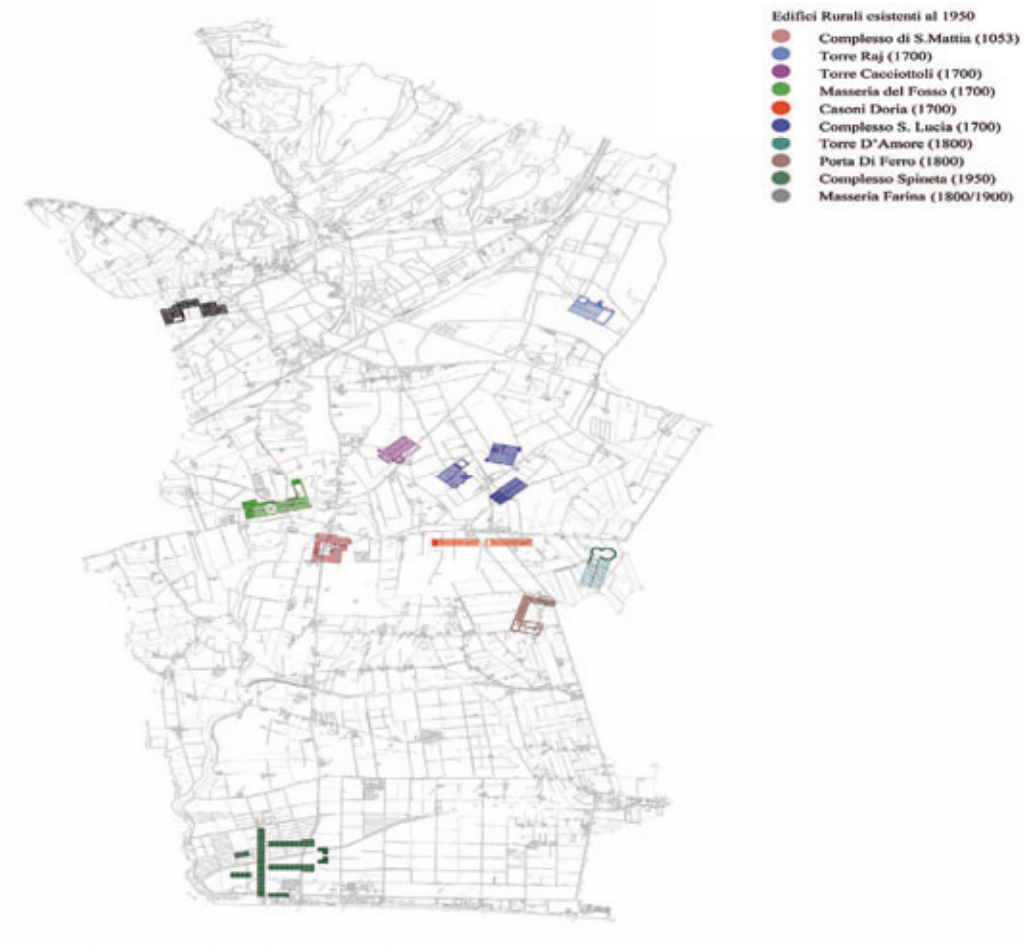


Fig. 5 Farms Network Plan of Piana del Sele

Not underestimating historical and documentary value of these assets, it would be necessary to give answers to problems still leading to the abandonment of rural buildings.



Fig. 6 Rural productive architecture (Bufalara) Capaccio

Each rural construction expresses manufacturer ability in relation to used materials, locally available. Rural housing contains a clear connection to identity of places where it was built and also with function and social level of the owner. In this field these motivations are essentially enhanced by predominance of one of these components: the function. In fact, on this simple but specific factor, the history, the evolution and the reason to be of rural building are based on.



Fig 7 Raj Tower (Battipaglia)

The continuous research of typological elements, the need to shelter for living and also protect animals and products of the earth, inspired and then refined over time the symbiosis form-technique building.



Fig. 8 Sketch of Raj Tower (Battipaglia)

In Italy each rural building is totally interdependent with landscape where it is inserted in. The historic settlement of rural matrix is a key component that helps to characterize traditional rural landscapes. It can t ake v arious f orms, t ypes and f unctions i n l andscape, bei ng r elated t o di fferent cul tures, techniques of building and local economies.

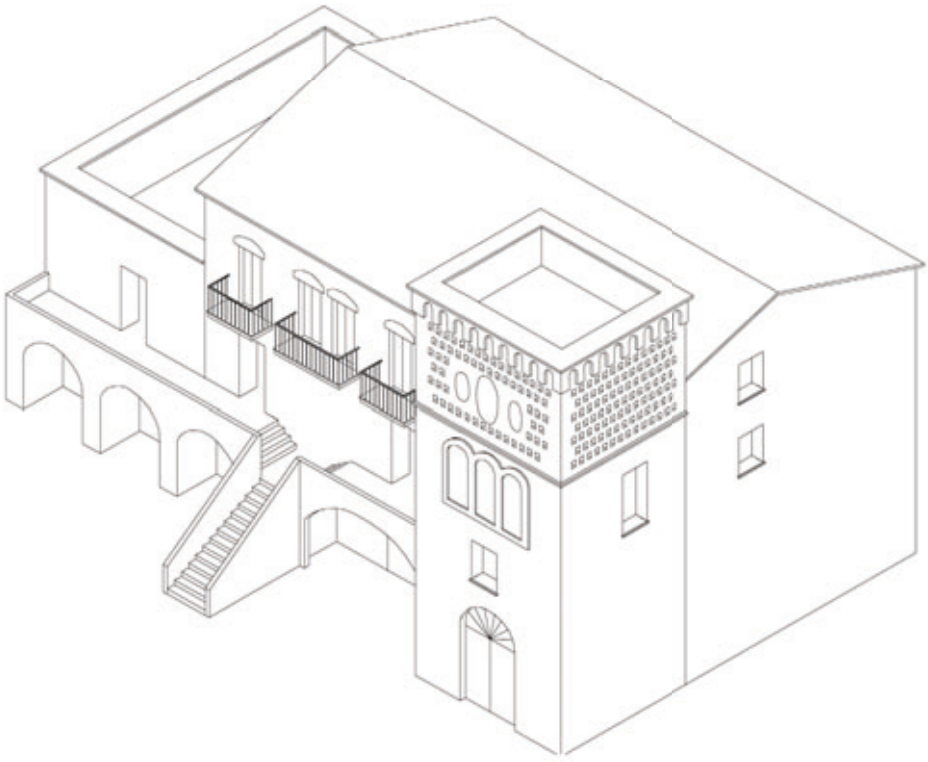


Fig. 9 Axonometric view of Raj Tower (Battipaglia)

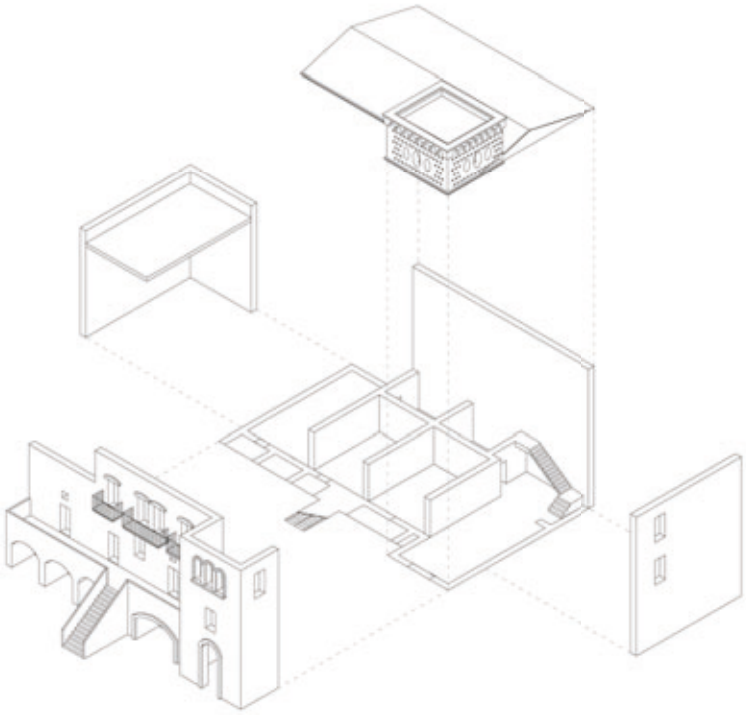


Fig. 10 Exploded axonometric view of Raj Tower (Battipaglia)

"*Even at legislative level rural environment develops concepts of multifunctionality which are also entering into vocabulary and agenda of Italian politics*" (Di Iacovo, 2003): the recent guidance law for the modernization of agricultural sector (Legislative Decree 18 May 2001, no. 228, Orientation and modernization of the agricultural sector, in accordance with Article 7 of the Law of 5 March 2001, n. 57. (published in Ordinary Supplement no. 149/L to the Italian Official Gazette no. 137 of 15 June 2001) is obviously moulded on a set of multifunctional type, and it is in this context that Article 13

(points1 and 2) defines rural districts and high quality food districts, leaving to Regions the task of their identification

4. Finality

The attention is focused on wide-spread growing awareness about the concept of development of rural areas considered in a more and more broad and different meaning, to exploit precisely those areas nowadays seem to be able to give new chances for future development.



Fig. 11 Front of Raj Tower (Battipaglia)

And this new point of view identifies *competitive advantages* of rural areas. This means that analysis of strengths and constraints of rural areas radically changed and is still going to change: the gaze looking at rural countryside of many European territories is not condescending, or rather questioning. Before considered sign of backwardness, rural heritage is now thought as a new possibility, to be analyzed using the criterion of innovation, no more the pure and simple preservation one.
This architectural heritage, provided with scattered nuclei, is a significant proof of the harmonious relationship between human activity and environment characterizing landscape bringing agricultural economies.

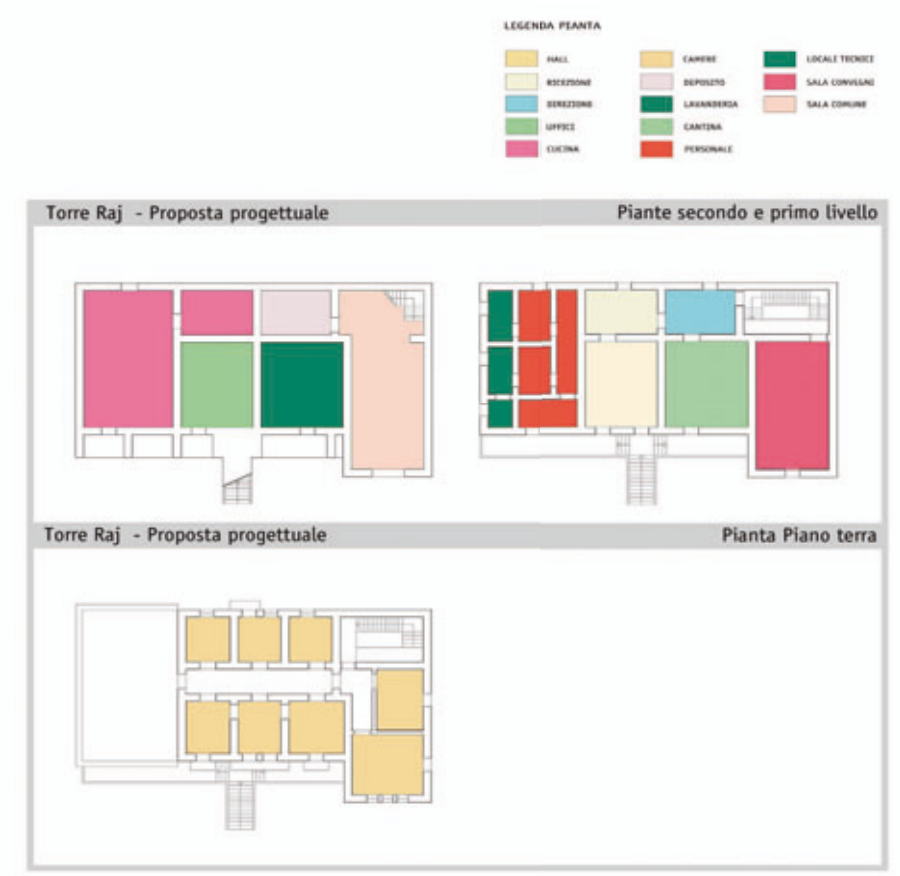


Fig. 12 Plans of Raj Tower (Battipaglia)



Fig. 13 Farina Farm (Battipaglia)

Analyzing traditional rural aspects of the Piana del Sele area, it is only right and proper to mention the water system: a landscape marked by "gore" (so called canals to irrigate fields and to bring water to mills driven by hydraulic power) by mills and by oil presses, also representing the terminal ring of farmer or landed dealer attention to issues related to hydro-geological instability and to floods caused by irregular fluvial regimes and by difficulties of water endorheic basins. A dedication to territorial maintenance often need to be remedied.



Fig. 14 Sketch of Farina Farm (Battipaglia)

5. Methodology

It is possible to improve a good by acting directly on it or by operating indirectly on surrounding environment: an action for the better intervening on territory can not ignore the inclusion in process of enhancing those places where the construction of agricultural landscape starts which is to say rural areas.

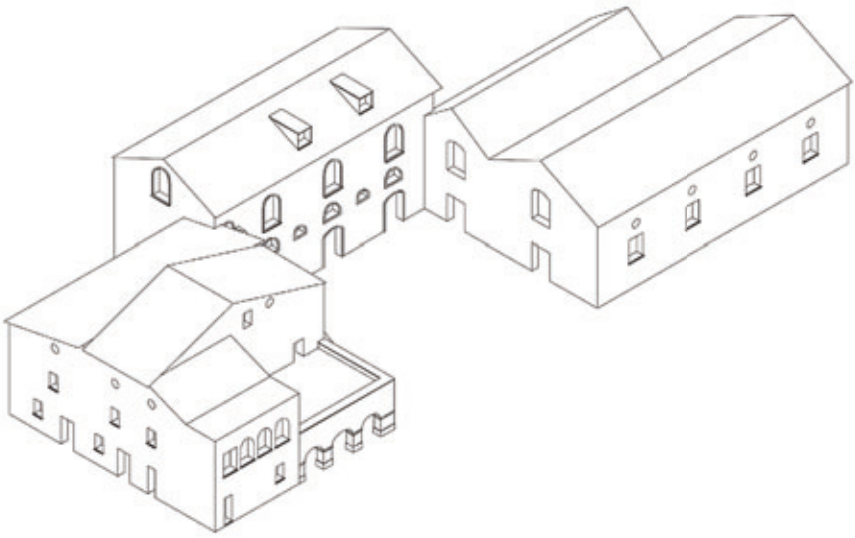


Fig. 15 Axonometric view of Farina Farm (Battipaglia)

Rural settlements, located in districts of Battipaglia and Capaccio, show themselves as a schedule of buildings of different periods, added to the basic core, depending on evolution of activities and on changing trends of cultivation.

Buildings themselves, in their typological structure, highlight this ongoing transformation made of new additions, adaptations, expansions.

Briefly we could define them as settlements constantly evolving, because they are intrinsically related to the execution of agricultural work.

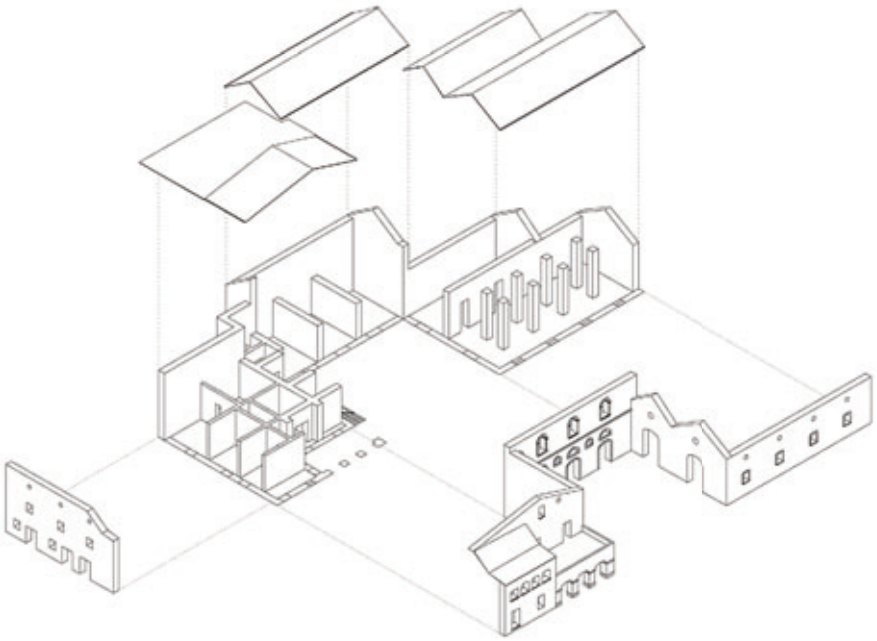


Fig.16 Exploded axonometric view of Farina Farm (Battipaglia)

Many contemporary buildings were not designed to be integrated architecturally with other ones and with landscape. Unlike ancient times (until early 1900s), recent farms do not help to give a positive image of agriculture in modern society.
After inspections analyzed buildings may be classified as follows:
1. Types of historical rural architectural heritage
Buildings of cultural, environmental, historical-monumental value and bound buildings or complexes included in dictates of Legislative Decree 22/01/04 n. 41 "Code for Cultural Heritage and Landscape" under Article 10 of the L.06/07/02 n. 137 and historical and architectural environmental elements present in aggregates themselves.
2. Types related to culture and local identity
Agricultural complexes and buildings retaining traditional features and types particularly identifying the site, and rural settlements of ancient formation having significant importance as evidence of culture and local identity.
3. Types of significant value for conservation and enhancement of agricultural landscapes
Handmade and rural buildings of environmental interest representing a typical factor and essential part of agricultural land.
4. Types of rural building of modern production or recent insertion
Buildings characterized by presence of structures of modern construction not of particular interest.



Fig. 17 Overview of Farina Farm (Battipaglia)

6. Conclusions

The conservation project is preceded by a preliminary feasibility assessment aimed to verify normative restrictions, compatibility of intended use in relation to structural characteristics, to spatial, technological, dimensional aspects, to cost/benefit evaluation.

The conservation project consists of a preliminary fact-finding phase divided into different levels: historical-critical analysis, geometric survey, materials and structures survey (furnished with stratigraphic analysis), degradation and collapse survey, diagnostic tests (for chemical, physical and petrographic characterization of materials).

On the basis of achieved results in survey it can be developed the proposal of restoration, enhancement and conservation of materials (also including reclamation actions for dampness) and the project of preservation of structures, aimed to stop causes of degradation and disruption through the use of specific techniques for repair.

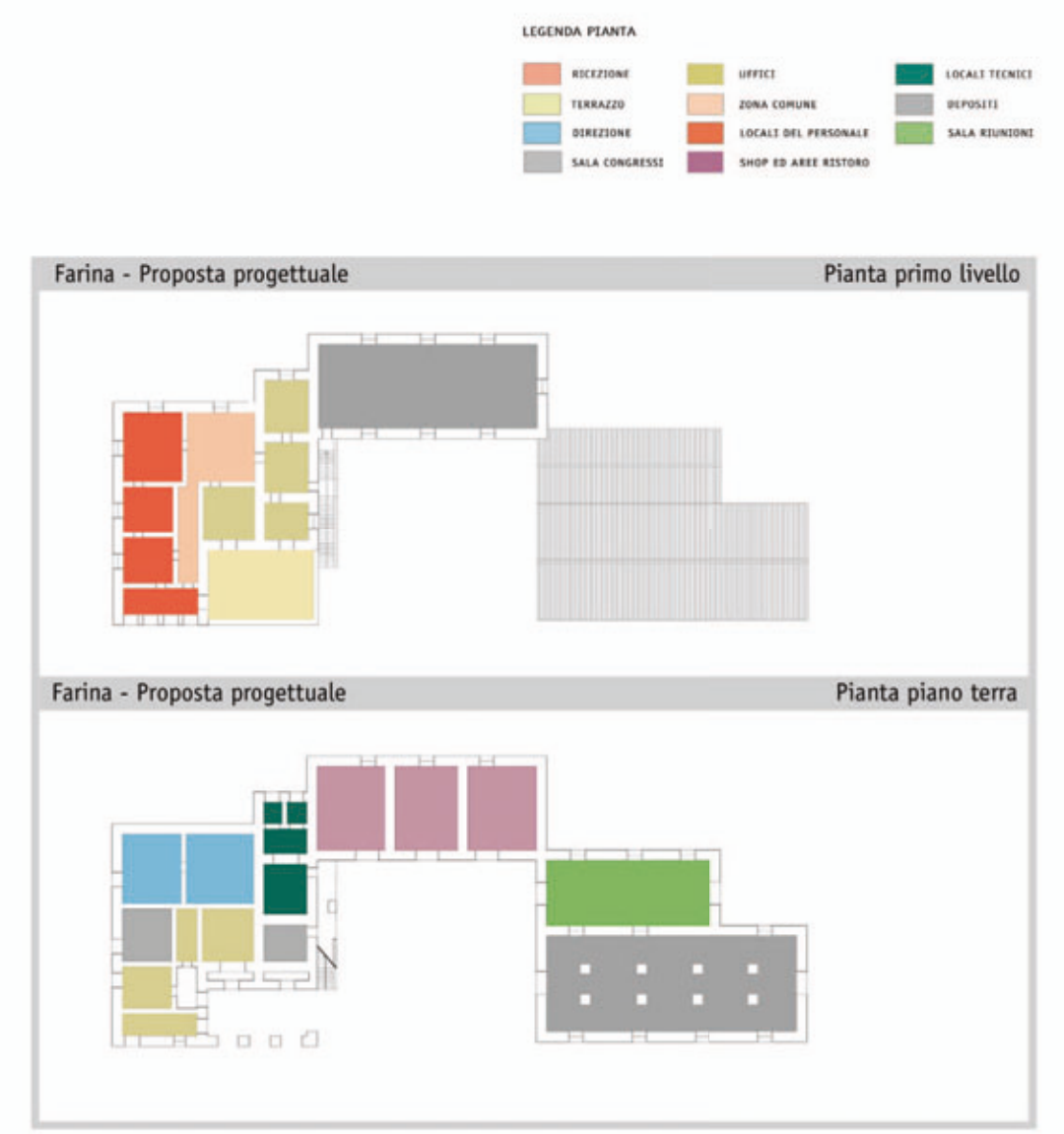


Fig. 18 Plants of Farina Farm (Battipaglia)

Ensuring preservation of material consistency of building, then architectural design will be consciously able to face issues related to built handmade use, as necessary condition for its preservation in time: from t he adapt ation of s ystems, t o di stributive, f unctional and s patial as pects and t he pos sible inclusion of new architectural elements that will stratify on material structure of building. This theme of relationship between old and new concerns not only a single building, but also, more generally, the construction of new buildings in a historical context.

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Sprawl Repair. Site-specific tools for Neapolitan sprawl town

Fabrizia IPPOLITO
Dipartimento di Architettura e Design, Seconda Università di Napoli, Aversa (CE), Italia
fabrizia.ippolito@unina2.it

Abstract
A collection of researches on Neapolitan territory (Ippolito, 2013) is the starting point for a reflection on the topic of repairing the residual landscapes of urban sprawl, focusing on the relationship between their generic and identity features. In a time when urban sprawl faces everywhere abandonment and waste, in a place where these phenomena are in part side-effect of unexpected economical and social mutations, or disobeyed future expectations, in part natural effect of the recent history of the place and its strongly connoted landscape, regenerating Neapolitan sprawl town requires a re-valuation of its peculiarity within the present debate on urban regeneration and site-specific tools of action.
Field of inquiry is the valley between Naples and Caserta, inland and sea, where a landscape of both natural-archaeological excellences and environmental-social alarms is the ground of a sprawl building process and of great infrastructural works which, from the 80s, have been answering on one side to the inhabiting and expansion's demand of Naples metropolitan area, on the other side to the construction's demand of an often self-fed cement cycle, swinging between emergency urbanism and everyday urbanism. Here the great works coming from extraordinary emergencies and from national and international growth funds, together with the products of a progressive, mainly residential, urbanization, face a tendency to abandonment which testifies the original vices and the failed promises of Neapolitan urban sprawl. Among the wastes, features, dynamics and peculiarity of the Neapolitan landscape re-emerge.

Key words: urban sprawl, Naples, residual landscape, repair/recycle, generic/identity

Sprawl Repair. Site-specific tools for Neapolitan sprawl town
Looking at Neapolitan sprawl town as a significant sample of inquiry for an urban debate which is nowadays engaged in reinterpreting, some years after their apparition, urban sprawl phenomena, in light of the abandonment and shrinking events which it is more and more involved in, and which suggest a reparation oriented design attitude, maybe useful for many reason. Because it is a territory where sprawl urbanization has developed in a very extended form, depositing piles of constructions and infrastructures over a manipulated soil; because here abandonment and shrinking phenomena arise with great evidence and frequency; because here the conflict between generic and specific, which concerns every town, but particularly sprawl town, representing an unavoidable issue for its regeneration, comes to evidence in a peculiar way. Most of all, because here sprawl town, showing an anomaly in its construction and a vocation to discard, particularly demands reparation. A look at the events of the construction of this territory and a sampling of its landscapes, taken from the infrastructure that make this town work, can be the occasion for highlighting these peculiarity and for searching for opportunity of intervention.
Chosen as a field of inquiry, the valley between Naples and Caserta, inland and sea, where the Neapolitan sprawl town appears at its extreme, is emblematic of the matters related to urban waste and is characterized by an accumulation of infrastructures – highway, freeways, high speed railway, hub, port, airport – at various degree of completion – completed, interrupted, under construction, designed, programmed – mingled with a spread of constructions – houses, boxes, residential buildings – at various stages as well - often interrupted

or abandoned -. Hereabout a land and a coast of both natural-archaeological excellences and environmental-social alarms are the ground of a sprawl building process and great infrastructural works which, from the 80s, have been answering on one side to the inhabiting and expansion's demand of Naples metropolitan area, on the other side to the construction's demand of an often self-fed cement cycle, frequently oriented by occasions rather than necessities. Hereabout emergency urbanism and everyday urbanism intersected each other within a massive change of the territory, consuming it by constructions and manipulations and by both evident and clandestine dynamics. Hereabout the great works coming from extraordinary after-earthquake interventions, being extended for decades through an infrastructural turn, and from national and international growth funds, mainly addressed to infrastructures, together with progressive, mainly residential, building interventions face a tendency to abandonment which testifies the original vices and the failed promises of Neapolitan urban sprawl, spreading wastes in the form of roads and houses over wasted soils. Among the wastes, into the folds of abandonments and interruptions, new discarded materials, populations and uses find place, while new great works keep on attracting investments and expectations and, in-between the two, features, dynamics and peculiarity of the Neapolitan landscape re-emerge (Belli 1986; Capobianco 1991; Corsi, Franco 1991; Montesano, Trione 2007; Braucci, 2009).
The hypothesis is that this territory is devoted to discards, and that discards can be an interpreting key for its conditions and materials. Side effects of the project, put at the center of the territory's construction, discards produce an implicit landscape design; repressed unconscious elements of urban life, put at the center of the territory's investigation, they reveal dark sides of the city (Lynch 1990/a; Dematteis 1995; Scanlan 2004; Vidler 2006).
A lateral point of view tries and reconstruct the implicit project in Neapolitan sprawl town and the links between the visible city and the hidden one, retracing the clues of latent transformations, uncertain definitions, secret relations, which, here more than elsewhere, make by quantity the quality of the landscapes. This investigative look, which has been practiced in the last years by urban studies, and is all the more necessary in such an elusive place, while following clues of transformation, intercepts the issues and scales of city and landscape, is affected by the variations of both disciplinary debate and territorial reality, and reveals, behind the generic of urban sprawl, the anomalous nature of this extended town (Zardini 1996; Ingersoll 1993; Boeri Lanzani Marini 1996; Biraghi Ferlenga 2012). Throughout a collection of researches, recomposed in a portrait by samples of the territory, this look identifies landscape exemplars: the ordinary landscape of the places coming in succession along an highway, variations on a few types of spaces and buildings, which, along the Street of the Americans, in order to consent ambiguousness of uses, introduces ambiguousness in building types, spreading all around rough outlines of constructions available for any destinations; the individualist landscape of the city of houses produced by a street junction, which at the coastal junction of Varcaturo advances by individual tactics of appropriation, growth, adjustment, dissolving public space and landscape beneath the only element of the house; the compact landscape of the settlements of speculation, made of accumulation of residences and facilities, which, in Villaggio Coppola Pinetamare, shows advanced signs of decay while, with a new touristic port, adds another great work to a long story of sanctions and redemptions; the fenced-in landscape of military theme parks, product and origin of infrastructures, which from the NATO bases spreads along American imitation highways genetic mutations of the territory; the discarded landscape of the middle lands, locations of extraordinary works, which along the Asse Mediano state highway participates in the extension of the after-earthquake reconstruction through the endless construction of the street, and puts its redundancies and its mistakes to use as refuge and catalyst of discards; the linear landscape of the coastal city, shaped by a coastal road, which, along the Domiziana state highway, includes archeological and natural remains, cumulates old and new episodes of abandonment and absorbs traces of transits and temporary presences. In each of these cases the infrastructure is generator of landscape, in the sense of ordinary landscape, and absorbs conflicts and compromises between great interventions and everyday adjustments; in each case it is narrator of collective stories involving individual ones.
An account which moves between these two level of narration, wide-ranging visions and particular ones, raises design issues which find place in the intermediate space between the infrastructures and their landscapes, the generic structure of sprawl town and its specific situations. Within this account, infrastructures are the structure of the evanishing sprawl town and the potential framework for its progressive restoration; their remains are a warning to a new reflection on the development criterions and the visions which produce buildings and landscapes devoted to discards; their adjustments, reuses, manipulations, their compromising with site-specific inhabiting practices and land uses are indications for a project which finds in the reuse of the discards and in the cross-reference among different tools and scales of intervention strategies for repairing sprawl. While the urban debate looks at sprawl town with intents of restoration, while the policy of public works still bets on great work, and on the contrary landscape and environmental issues

advance, while the architectural and landscape design works on recycle, reuse and repair (Corner 1999; Mostafavi, Najile 2003; Berger 2007; Ciorra, Marini 2011), hereabout, where the discard seems to be a vocation, repairing sprawl town acquires a particular value. If, within the cacotopia of a cataclysm running over our urban world, among the residual forms of the city, the sprawl is the easiest one to be regenerated, thanks to its low density and to its extended connections, in such a territory, where the cataclysm seems to be already happened, and a rich frame of infrastructure remains among the scattered discards, maybe in-between this frame and fragments we can find the tools for repairing sprawl town.

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HERITAGE ARCHITECTURE LANDESIGN
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Design the monument in the twentieth century. Innovation and tradition

Saverio CARILLO,[1]
(1)Department of Architecture and Industrial Design "Luigi Vanvitelli" Seconda Università di Napoli
E-mail: saverio.carillo@unina2.it

Abstract
The use of reinforced concrete in the works of architecture in the twentieth century, has had to deal with the events that have come and gone during this period, and especially following the two world wars in Europe, it has become an interpreter the most extensive reconstruction of the history of the old continent has ever known. The emblematic story of the reconstruction of the units of the Cathedral of Reims, as a result of the bombing in 1914, then scored, officially the use of this material is considered useful only for the types of settlement of industrial works or civil use, even for places of worship, regarded for the history of mankind, monuments par excellence. In addition, at the initiative of Auguste Perret, were designed and built churches in which the material of modernity was truly exposed to view, and so, accepted, even in traditional environments suspicious, prone to encouraging the use of stylistic features of previous centuries. The Second World War has fully liberalized the use of concrete thus changing, even in sacred spaces, a number of aesthetic balance and developing a new conception of the forms and images of architecture that, in turn, have also been contributed by the changes introduced in the liturgy of the Second Vatican Council held in Rome between 1962 and 1968. In Italy traditional postwar similar experience was also a revolution in the conception of the idea of Monument.

Keywords: architecture sacred; concrete, modern types of churches.

Italian architectural culture of the twentieth century, sacred space dedicated to the project, has been greatly influenced by the events that have occurred during this period. The two world wars have introduced new ways of relating between people and, therefore, have also transformed the conceptions of the common life. The religious experience of man of the twentieth century showed novel ways to represent their spiritual attitude marked by characters of simplicity and essentiality. The same architectural culture of the Modern Movement has supported the transformation process of the creation of new spaces in which to live a social policy. The absence of decoration and the preference of the geometries has enabled modern man to transform radically the places where traditionally celebrate the relationship with the divine. The new technologies and mechanization of the construction site have favored the transformation process by helping to educate society to expectations of sacred spaces more sober and less flashy. In this way it is also brought back to its



Fig. 1-2: Roma Santa Sabina Church; Paris, Church of Le Raincy.

original meaning, the word "monument" that wants to mean mainly 'remember', 'memory'. In the historical culture of the architectural context of the Italian monumental quality of a building accomplished in the richness of the decoration, which also represented the true value of the building itself. For the same reason very complex is the reflection about the restoration on built.
This, by its nature, must refer to the 'values' of which the building is 'remember' and, in this way, the architecture transformed into 'monument'.



Fig. 3: Roma Santa Sabina Church



Fig. 4: Paris, Church of Le Raincy.

The introduction of electricity and the new machines in construction site brought great economic benefits and substantial reduction of costs in the execution of works.
The most obvious case is the Basilica Santa Sabina on the Aventine Hill, which Antonio Muñoz, during the first world war, back to its former glory.
The exemplary value of this experience, especially for the influence that the end result has had on the sacred projects of the twentieth century, lies in its expressive synthesis and ideological expression of cultural season after the war. During this period changes the very idea of setting up a monument, a time associated with the use of precious materials and a precise architectural design.



La déposition de croix (fresque) ANTOINE BOURDELLE

LA NOUVELLE ÉGLISE DU RAINCY

Le sanctuaire récemment édifié au Raincy par les frères Perret est une chose neuve qui n'a pas cherché à l'être. Il restera, dans l'histoire de l'architecture en général, et particu-

ne furent pas seulement des calculateurs de résistance, ont su accentuer cette apparence dégagée des soutiens en les amincissant insensiblement de façon continue,

Fig. 5: Paris, Church of Le Raincy (by Art et decoration 1924)



DE LA VIE ARTISTIQUE 269

Une église en ciment armé

Au début de septembre 1914, les autos que le gouverneur de Paris dépêchait vers la bataille de l'Ourcq se réunirent au Raincy. En commémoration, on va édifier dans ce bourg une église qui, avant d'être placée sous le vocable de N.-D. de Consolation, était familièrement appelée Saint-Taxi, surnom qui subsistera peut-être.

L'architecte et le constructeur de l'église future : A.-G. Perret.

C'est assez dire qu'elle ne sera pas en pierre et qu'elle s'écarte des styles classés.

L'ayant prié de nous définir le monument :

— Son aspect général, nous répond-il, est déterminé par la forme de l'ossature et par la façon dont se disposent les éléments du remplissage de cette ossature.

« L'ossature est en béton de ciment armé [armé, — c'est-à-dire dans la masse duquel est pris un système de tiges parallèles d'acier doux frettées d'une spire de fil d'acier], et elle



Notre-Dame de Consolation ; A.-G. Perret, architecte.

Fig. 6-7: Paris, Church of Le Raincy; Church of Le Raincy (by Le Bulletin de la vie artistique 1924)

The church of Le Raincy has a plan with three naves divided by tall pillars that define the volume of five bays. Each module has a regular square plan which corresponds, in the aisle, a form divided by half. The sequence of spaces is repeated for the longitudinal bodies lower by half the width. Vaulted barrel lie on the individual areas between the pillars, while the aisles link up the pillars with a profile perpendicular to the axis of the central body. The entire perimeter of the sacred space is closed by a continuum of forms openwork design forming a barrier to that is repeated constantly.

The similarities with the upper part of the church of Santa Sabina are numerous because of the presence of windows hurdle released in arcades during the restoration of the arch. Muñoz. The entire space of the nave of the Roman church, the old church in this way provides an unprecedented condition of light that will be recognized as the novelty brought in by the substantial restoration work. The same restoration of the Roman architect, also documents that the columns of the church are all the same and, for this reason, must be treated as realized only the design of the church of the sixth century. Through the restoration, therefore, Muñoz documents that the church of Santa Sabina is the first project of basilica built exclusively for Christian worship. The Roman columns divide the whole environment of the classroom into three longitudinal bodies with different height between the higher and the lower side central space. The entire rectangle of plant of the nave, closed circular apse, becomes, as a result of the restoration, a strongly illuminated place giving, in this way, also highlight ancient paving clear and to the succession of the columns. The aisles are hiding in the shadows, in some parts, the successive chapels deeper. The apse is a very high end



Fig. 8: Roma Santa Sabina Church

very significant for the closure of the classroom acting as a crowning visual perspective to the whole environment.

For this reason the Roman Church will be treated in textbooks of art history as the prototype of the place of Christian worship. The similarity between the Romanesque basilica and the Paris church, the latter will make the reference model for the many classrooms of worship to be built in Europe at least until the celebration of the Second Vatican Council.

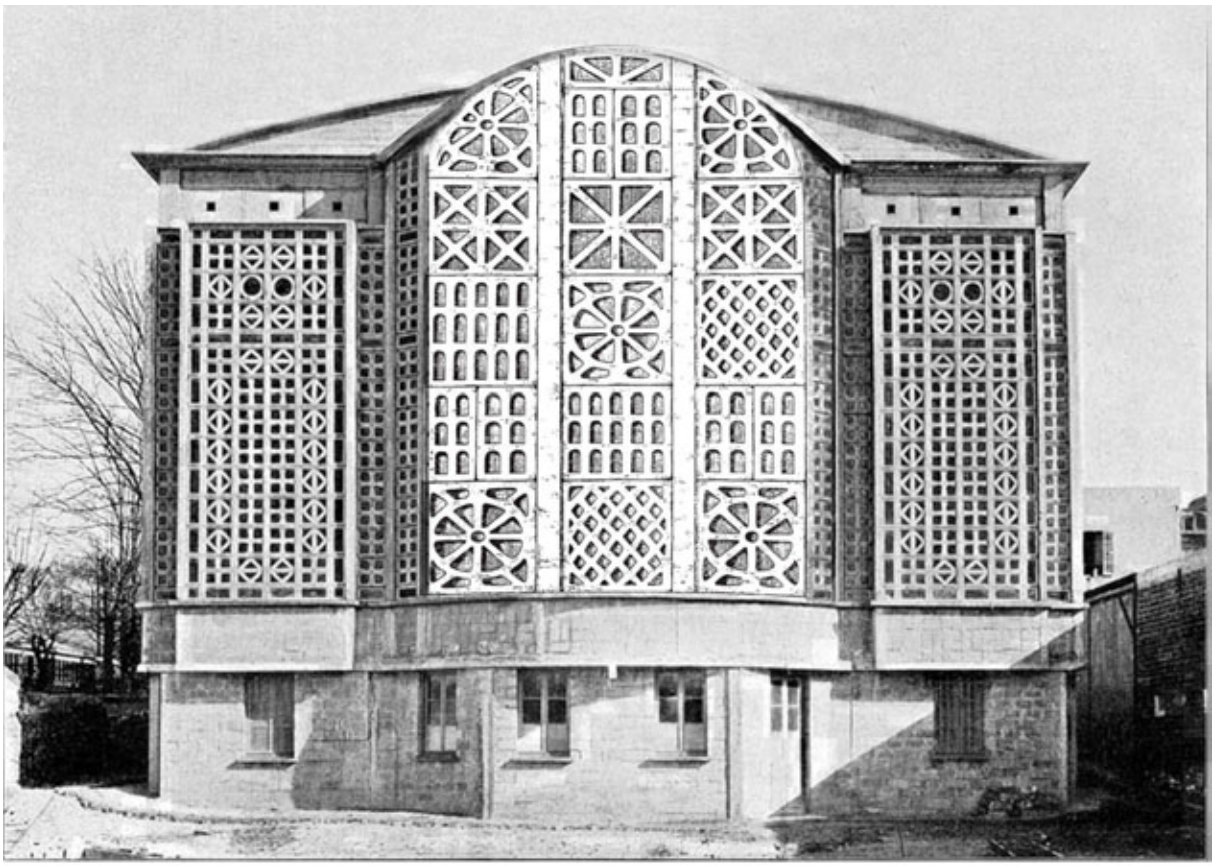

Fig. 9: Church of Le Raincy-Santa Sabina's hurdle (photomontage by G. Spera).



Fig. 10-13: Santa Sabina e Le Raincy- hurdle.

Even in 1935, one of the leading experts on sacred art of the twentieth century, the future cardinal Celso Costantini, argued: "«L'architettura ecclesiastica avrà sempre bisogno di colonne, di basi, di capitelli, di quel minimo di trabeazioni, che rappresentano esigenze inderogabili del razionalismo costruttivo e decorativo: sì, -come si è già detto- per le chiese, vi è un razionalismo anche decorativo, perché esse non sono delle sale d'aspetto di una stazione» (Costantini, 1935, 75)

It was still far from achieving thus the possibility of using new materials and technologies in sacred architecture. Only in 1947 papal encyclical recognized the potential use of new technologies in the liturgical: «Non si devono disprezzare e ripudiare genericamente e per partito preso le forme ed immagini recenti, più adatte ai nuovi materiali con i quali esse vengono oggi confezionate: ma evitando con saggio equilibrio l'eccessivo realismo da una parte e l'esagerato simbolismo dall'altra, e tenendo conto delle esigenze della comunità cristiana, piuttosto che del giudizio e del gusto personale degli artisti, è assolutamente necessario dar libero campo anche all'arte moderna, se serve con la dovuta riverenza e il dovuto onore, ai sacri edifici ed ai riti sacri; in modo che anch'essa possa unire la sua voce al mirabile cantico di gloria che geni hanno cantato nei secoli passati alla fede cattolica» (Pio XII, 1947).

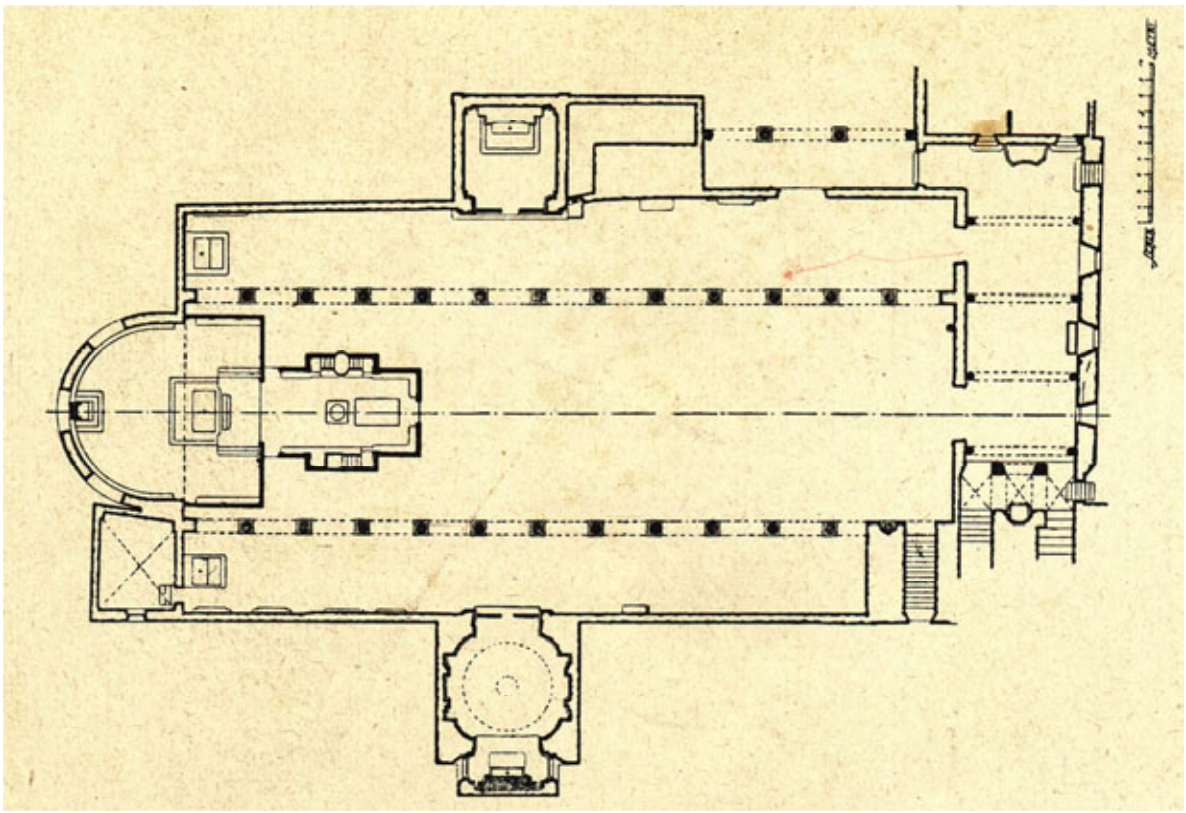

Fig. 14: Santa Sabina, plan.

The restoration of Santa Sabina is in this context a prototype of high symbolic value for the historical circumstances (sixteenth centenary of Milan's Edict) and arrangements.

The invention of this architecture will be so convincing that there is no art history textbook that does not bear the heading "Early Christian basilica", the plant of the church built by Munoz. Remained as the only objection to the Roman model Perret and the use of exposed concrete: it was the main reason for the distrust of the modern language for the space of worship.

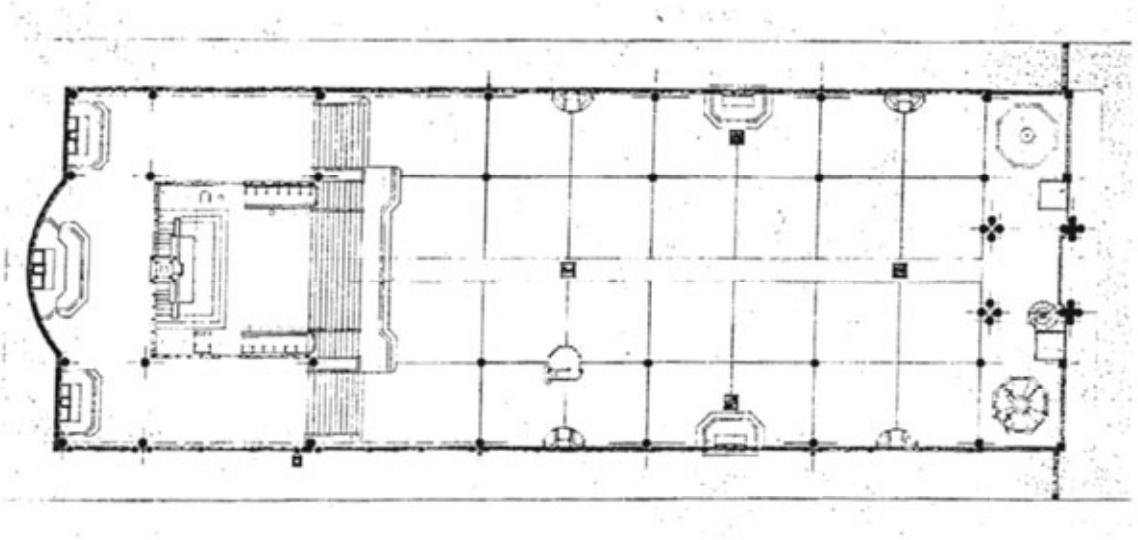

Fig. 15: Le Raincy, plan.

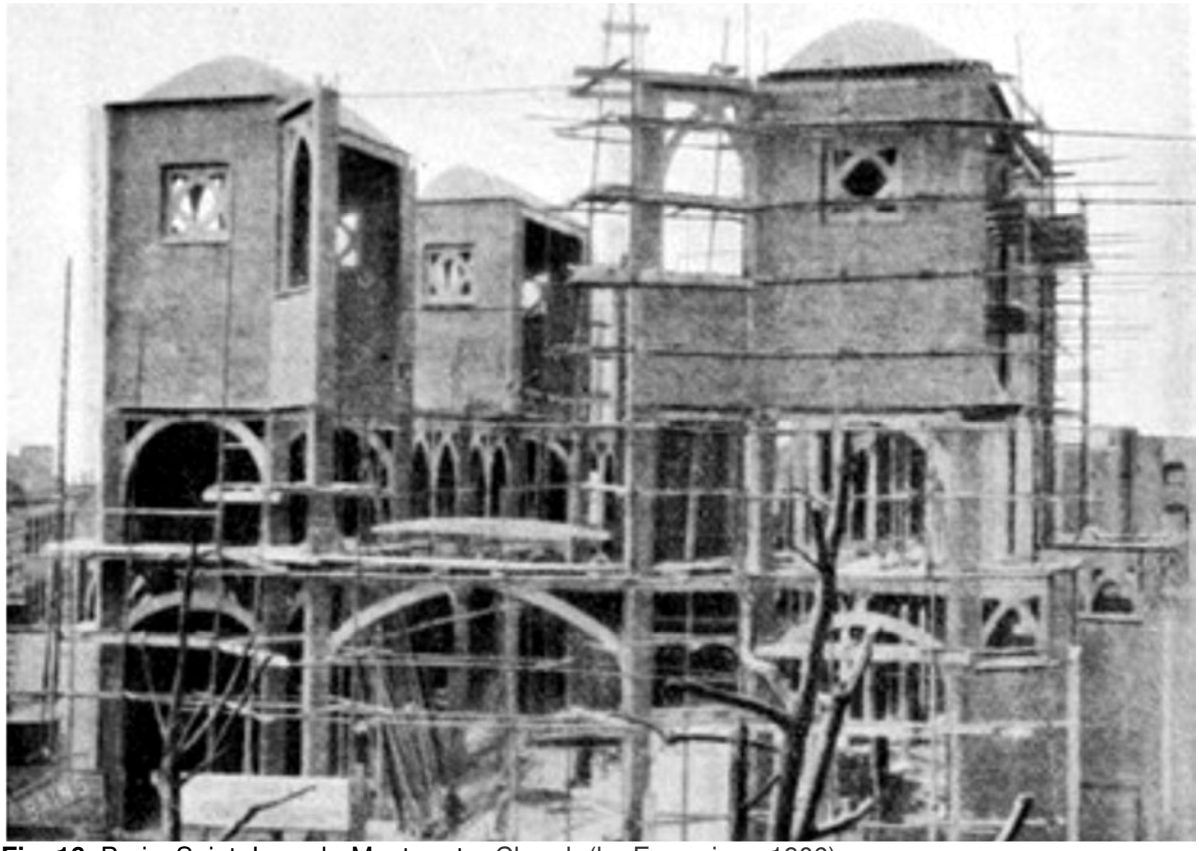

Fig. 16: Paris, Saint-Jean-de-Montmartre Church (by Emporium, 1906)



Fig. 17: Paris, Saint-Jean-de-Montmartre Church



Fig. 18: Paris, Notre Dame du Travail, Church

Remembered Costantini: «l'architettura novecentista cerca soprattutto la funzionalità, la praticità, la comodità. Ciò corrisponde mirabilmente all'indole di certe costruzioni, come magazzeni, rimesse, uffici burocratici ecc. Ma ciò non basta per le chiese. Non basta neppure per una caserma. Semplicità sì, ma non sciatteria; praticità sì, ma non volgarità» (Costantini, 1935, 60).
As documented in the experience of historic buildings, the distrust of the clergy for the concrete limited to single exposure view of a matter, which, too, had allowed the recovery and expansion of important religious buildings.



Fig. 19: Beuron, St. Maurus Chapel.

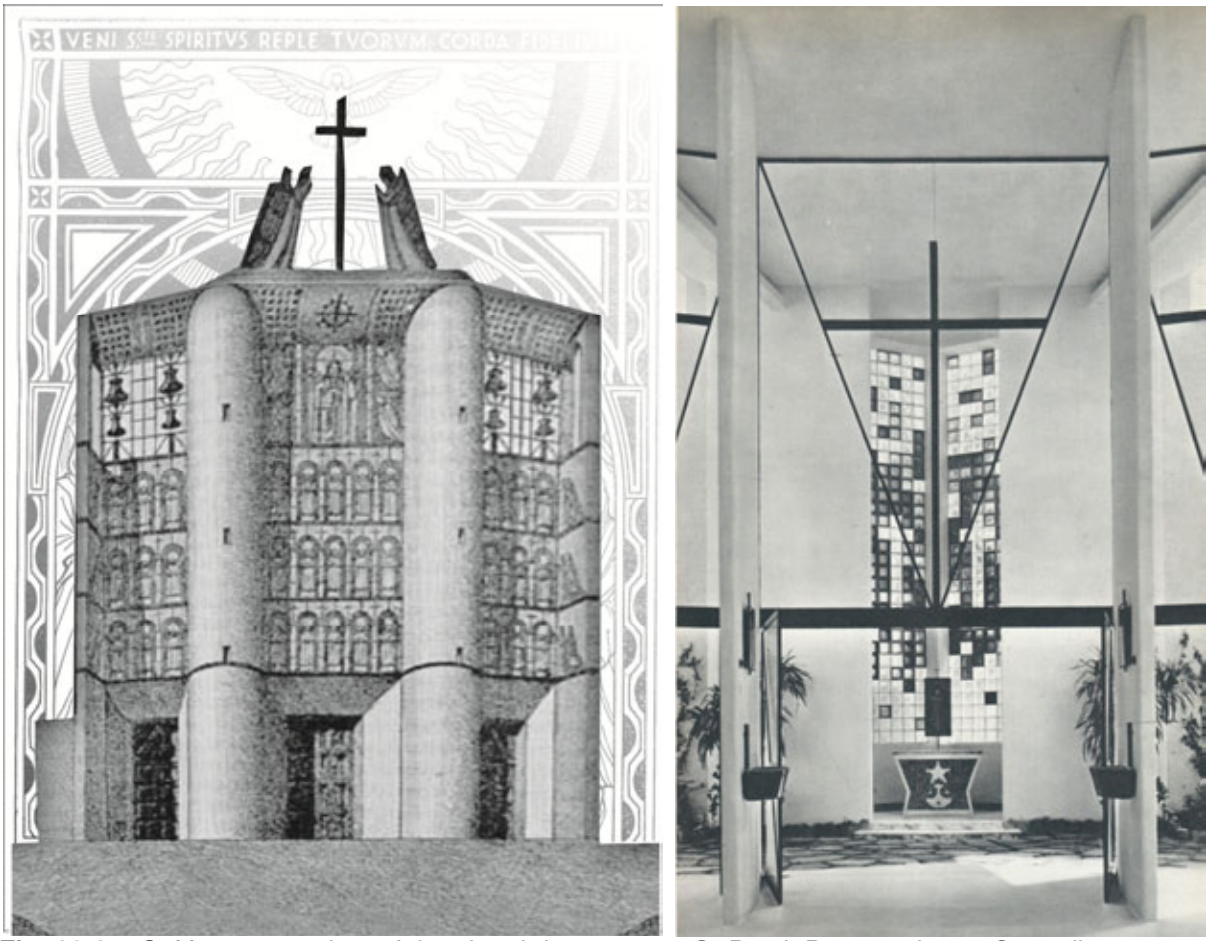

Fig. 20-21: G. Vaccaro, project of the church in concrete; G. Ponti, Bonmoschetto, Carmelite convent church (by Domus 1958)

The rebuilding of the bell tower of San Marco in Venice (1912), the arrangement of the trusses of the cathedral of Reims, the expansion of the shrine of Pompeii document the wide use of new technologies with the general mechanization of the yard. From the cultural point of view to creating true "scenarios intellectuals": in the study of Perret in Rue Franklin was not unusual discuss literature as Valery's *Eupalino* and Claudel's *L'Annonce faite à Marie*. The same French architect remembered that "«cemento è pietra che fabbrichiamo noi stessi, ed è molto più bella e nobile della pietra naturale. Le va fatto l'onore di risvegliarla. La si può lavorare col martello, la si può bocciardare, tagliare, gradinare con tutti quegli arnesi che servono per rifinire la pietra naturale. Il cemento appena disarmato vibra tutto delle striature che gli vengono impresse dalle assi della cassaforma» (Gargiani, 1993, 82).
The sincerity of expression of Perret's works connects constructive outcome of the material used, about which the author also claims the aesthetic value that results for the architecture. The modernity of language is fully captured by one of the intellectuals are more favorable contemporary sacred art.

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The BeuroneseSchool and the Schwarz's essays in the architecture sacred of the XX century

Maria Carolina CAMPONE,[1]
(1)Department of Architecture and Industrial Design "Luigi Vanvitelli" Seconda Università di Napoli
E-mail: mariacarolina.campone@unina2.it

Abstract
"To restore the church inspiring at sacred theme": with this sentence Rudolph Schwarz, theorist of the architecture sacred contemporary, abridge, in his *VomBau der Kirche*of 1938, Desiderius Lenz's the responsability (1832-1928), promoter of art School in Beuron, in the religious range.
Friar's consideration suggest content of faith in paradigms and shapes drawing at the iconographic repertory of the Near East and the classic Greek and rise to a summit, like is famous, with the publication of the *Kanon*. The title convey the author's attempt to latch on to the Phytagorean-platonic philosophy.
Lenz and his school abide by the works of greater commitment to the rules-harmonic proportional theorized in the work, were once again the idea of *nomos*and *rythmos* as a means of understanding the laws that govern the universe, and with it the arts and especially architecture, as in MaurusKapelle, Montecassino's crypt and Beuron'sArchabbey.
In a century marked by the discovery of the golden section in architecture and its pratical applications, the treaty of Lenz is distinguished by direct reference to the Greek sources.
In connection with the work performed by Lenz, Steiner, Verkade and others in Montecassino, the centenary year, you must re-read the personality of monaco-architect and the value of his writings, in the light of the weight in the sacred place well before reforms introduced by the Second Council Vatican.

Keywords: architecture sacred contemporary; golden section; sacred geometry; metric relation; non-iconic art.

The minor role which ecclesiastical architecture in general occupies in the historiography of nineteenth century art is to be deplored.
Peter Lenz, whose monastic name was Desiderius, is not among those who have found a recognized place in the history of the nineteenth century German and European architecture and fine art.
There are two reasons for this: apart from some early works, he confined himself to the area of sacred art; and he lived a life separated from the artistic community, as a monk in the Benedictine monastery of Beuron. He was noticed beyond the circle of ecclesiastical art only in the few years round about 1905. At that time his *Aestetic of Beuron* was published in a translation by the French *Nabi* painter Paul Sérusier, with an introduction by Maurice Denis and, through the intermediacy of Jan Verkade, the art of Beuron was shown in the Vienna Secession.
Contemporary architecture is based on that on Beuron and its geometric shapes. Rudolf Schwarz, father of contemporary sacred architecture, dedicated only to Lenz a chapter of his *VomBau der Kirche.* He attributes to the Benedictine the prototype of the "sacred way", a project template in which the sequence of the rooms of the building corresponds to the sequence of the episodes in the history of the salveza.
Not surprisingly, the architect in his essay only mentions Lenz and Mies van der Rohe, because in those years many artists have already left Germany and the Bauhaus has already been dissolved. Lenz in the *Kanon* leads sacred art to the standard classic geometric based on the golden section, theorized by Plato.



Fig. 1: Beuron, St. Maurus Chapel (by Kreitmaier , 1923).

The direct dependence of the German friar from Athenian philosopher is shown by the drawings which illustrate the treaty. They shall apply the reasoning Platonic which all plane figures can be split into triangles and each of them into two triangles rectangles, one isosceles, the other scalene, from which derive the four primordial elements, water, air, earth, fire[2]. Of these triangles «κάλλιστονέν» (*Tim*. 54a) is the equilateral form which the five Platonic polyhedra such.

By means of geometry and arithmetic, Plato was able to introduce into philosophical speculation the concepts of “infinity” and “proportion” of which all subsequent European culture was to be his debtor. Taking the concepts of the *Timaeus*, the most conceptually dense *Meno* has the problem dell'*antanairesis*, the doubling of a square built on the diagonal of a given square, determinant a rectangle whose height is three times the base[6].

It is the figure that symbolizes the infinite: through the solution of a geometry problem, Plato comes to express the irrational, announcing «la grandecongiunzionedell'*esprit de géométrie* con l' *esprit fin puramente*speculativodellagrandemetafisica» (Toth, p.9).

If it is well known the long fortune of this Platonic reflection, through Vitruvius, in all artistic production to the present day, the Lenz's *Kanon* is, in the long fortune that Plato has enjoyed an episode of considerable thickness. The friar's Benedictine attempt is to go back directly to the Plato's theories, by skipping links in a long chain that the Athenian, through the centuries, had come up to him. In geometric figures he recovers the fundamental patterns of artistic representation in its aims specifically epistemological.

At the beginning of the essay states that the geometric proportion are an indispensable means of representation of the uman figure in his dignity and that only in number allows us to understand the enigma of creation.

The first lines is a clear direct dependence on the *Timaeus*, since, as Plato, Lenz also inserts his discussion in a discourse cosmological.



Fig. 2: Montecassino, Crypt's decoration (by *Emporium*, 1911).

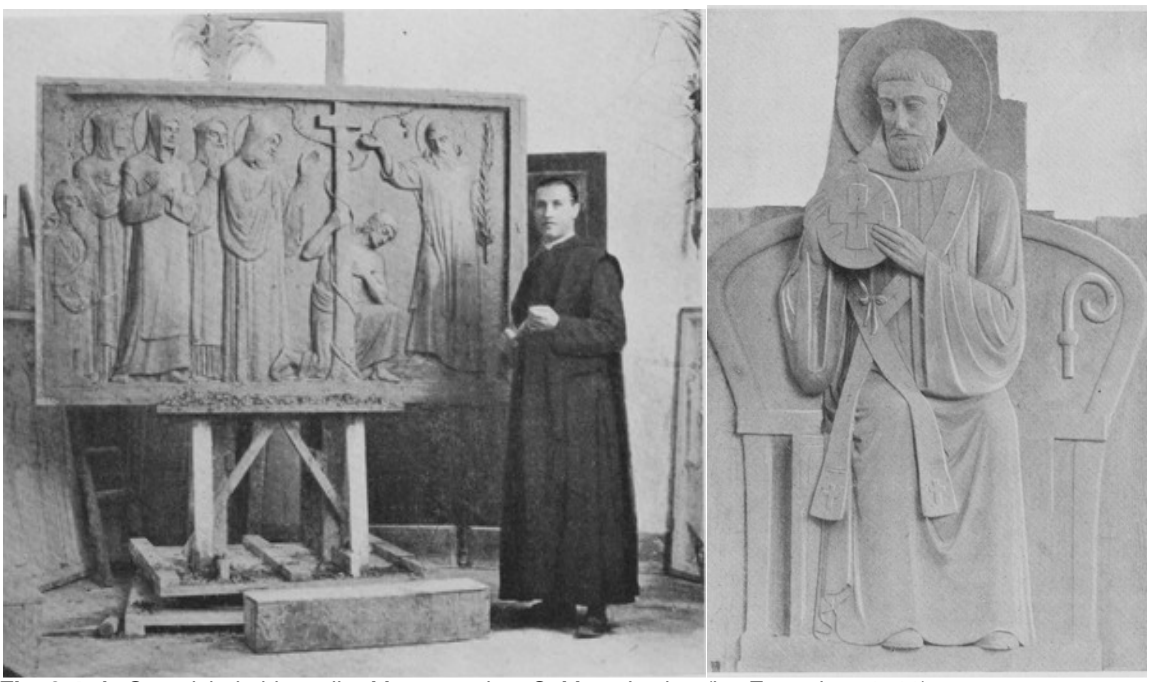

Fig. 3-4: A. Gresnicht in his atelier;Montecassino, S. Marco's altar (by *Emporium*, 1911).

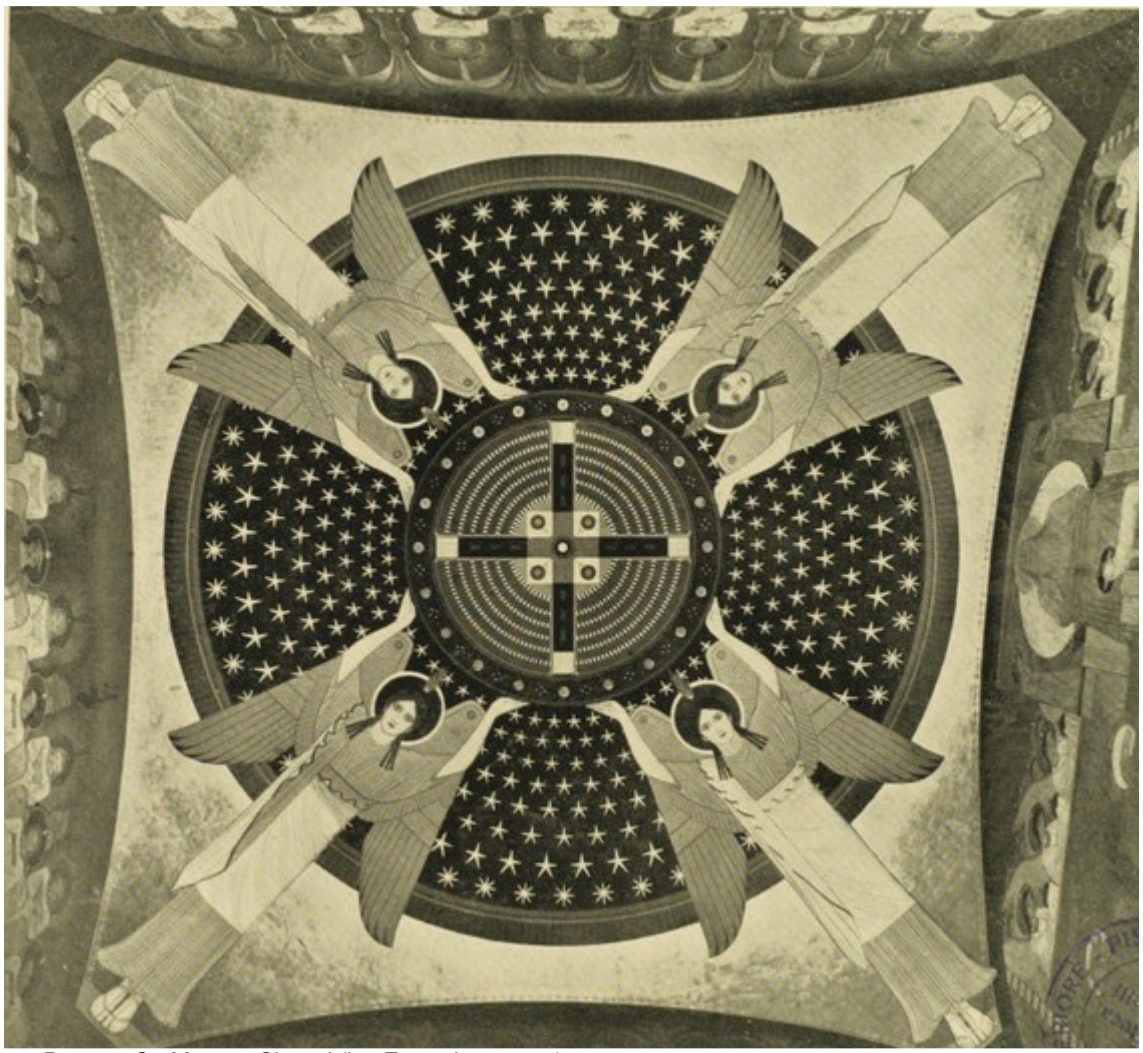

Fig. 5: Beuron, St. Maurus Chapel (by *Emporium*, 1911).

In doing so, he connects the Jewish-Cristian tradition to the classical, even resorting to the drawings which were to accompany the text. Made by WillibrordVerkade, Lenz's disciple and collaborator, they illustrate the steps that allow you to get a simple geometric shape (the circle) to the human body.
Lenz is, in the words of Schwarz, tried to restore the church building inspired by the sacred theme, combining classical roots to the Christian content. This is the end of the *Kanon* of which only recently has been published the first partial Italian version.
The series of sketches is the most modern and faithful of teorema explained by Socrates concludes his demonstration of innate ideas in the *Meno*.
Lenz's theories are a unique opportunity in St Maurus: come to Beuron in 1868, here he managed to get a commission from the Princess Katharina von Hohenzollern-Sigmaringen to erect a votive chapel not far from the monastery. By 1870, he had built the Chapel of St Maur, which is unique because of its unusual architecture and still more because of its painting, and deserves a prominent place in the sacred art of the nineteenth century. Jacob Wüger and his student Fridolin Steiner, as well as Lenz's sculptor friend Johannes Schwendfür, likewise contributed to the chapel. Lenz investigated the metric relations of Egyptians sculptures and Greek temples and was constantly searching for the ideal metric figure corresponding to the universally valid measure, according to that rule for the representation of human beings which he called “the canon”. For he was ever more convinced that there must have been, analogous to the dogmas of the Church, a correspondingly dogmatic art.
Behind platonic philosophie, ancient sculptor Polyclitus, great Renaissance masters and other aesthetic doctrines stood the conviction that the ideal beauty of the human body rested

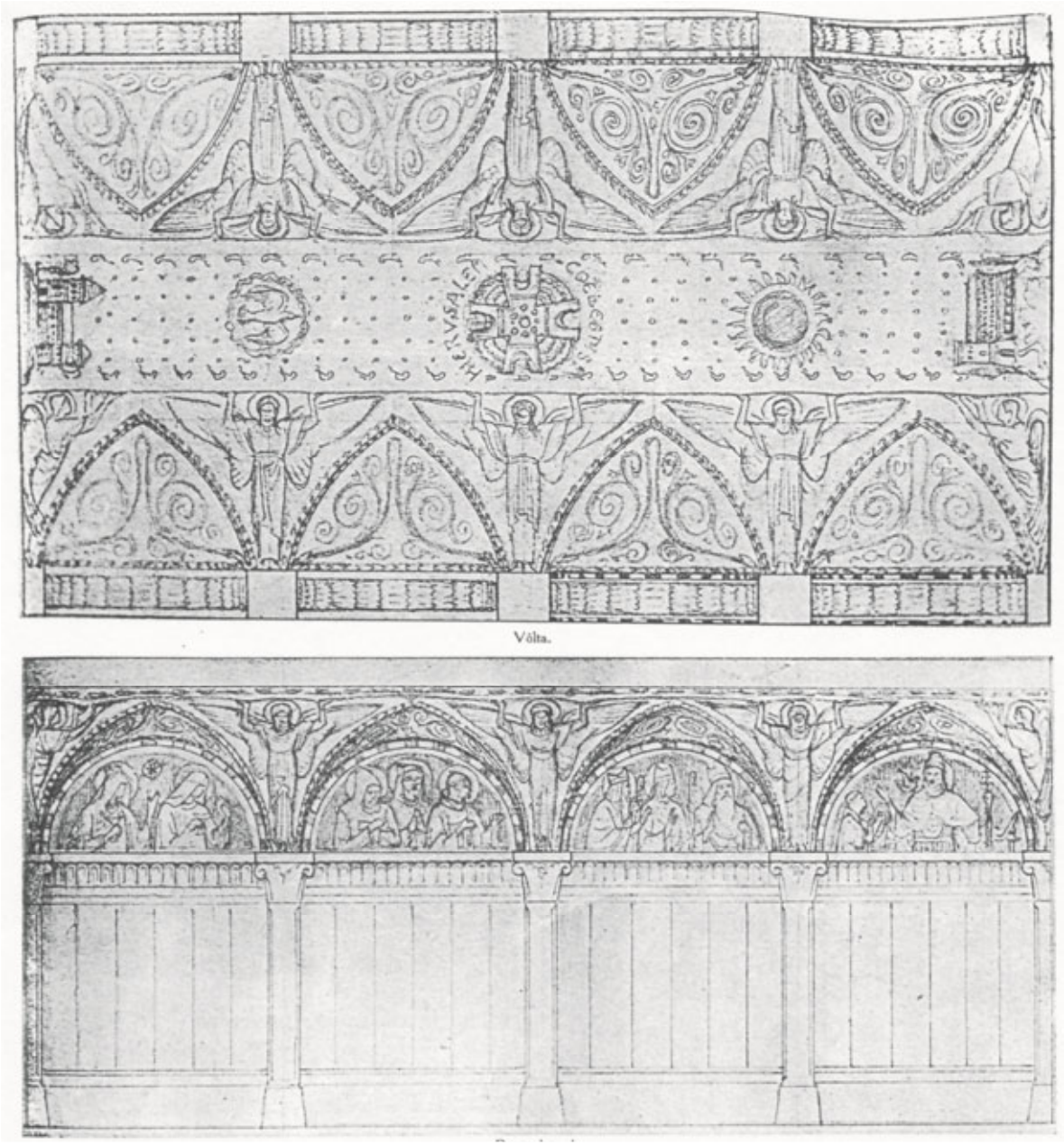

Fig. 6: Norcia, St. Benedict's Church, Crypt's decoration (by Carillo, *Spes*, 2007).

upon a geometric figuration or that it resulted from exact metric relationships of the parts to the whole. On the one hand, Lenz committed his ideas to two separate media: drawings - generally of male and female bodies frontally- and texts. On the other hand, neither of these media was suitable, except to a very limited degree, for carrying through his theories logically.

His drawings, however schematic they may be, also always show an artistic impulse: one almost gets the impression that Lenz wished to use the geometry as a justification after the event to reinforce a thrust towards symmetry and abstraction in his own creative will -while doing this, admittedly, only to the extent that geometric figures also held for him a symbolic significance.

It is only with difficulty that this side of his thinking can be gathered from his theoretical writings. Mathematical ideas are mixed in them with theological-mystical and artistic ideas, so that his thought takes on esoteric features. Throughout his life, Lenz time and again took up the project of formulating in words his studies of the canon and publishing them.

After short version, The Canon, appeared in 1921 in the BenediktinischeMonatsschrift, in the following year, an extensive manuscript went astray in the post.

From all of these published utterances we can gather certain fundamental ideas of the Lenzian canon:
- the source of his conviction is the Biblical saying: hence, the creation, as well as in platonic *Timaeus*, has a sacred geometry as its basis; geometry and revelation were equated; Lenz himself speaks of a theological geometry;
- Lenz matches the basic geometrical figures, in particular the regular solids, to the triune being of God in the following way;
- Since God created man in His own image, it follows that underlying the original human image also there must be a measure, a -for Lenz- sacred geometry. Whit original Sin, this norm, however, was obscured; only in Jesus Christ is it once more revealed;
- This original human image exists in two figures, equal in value: male and female;

- Lenz believes that the normative image of the man can be traced back to root functions. In his regard, his deductions, which differ in particular details and are presented only with extreme brevity, remain in large part incomprehensible to the reader. He reaches the woman's normative image via a further root, which hecalls the feminine, the diagonal of the double square «which as Golden Section can alone establish the contrast which is that of the second sex to the image of the man» (*Canon*, p. 64));

- the aesthetic principles derived from God's revelation are to be a basis for all future religious art: they should draw men towards the true, lead them towards the eternal, especially in places of worship and at the liturgical feasts.
If one asks, then, to what extent Lenz's geometry influenced his own artistic work, the evidence turns out to be meagre.

The value of the aesthetic geometry of Desiderius Lenz lies not in its utility for artistic practice, but in the fundamental position which Lenz adopted, namely that of a radical departure the principle of the imitation of nature. For Lenz, the knowledge of the canonical figure made the nude model, superfluous.

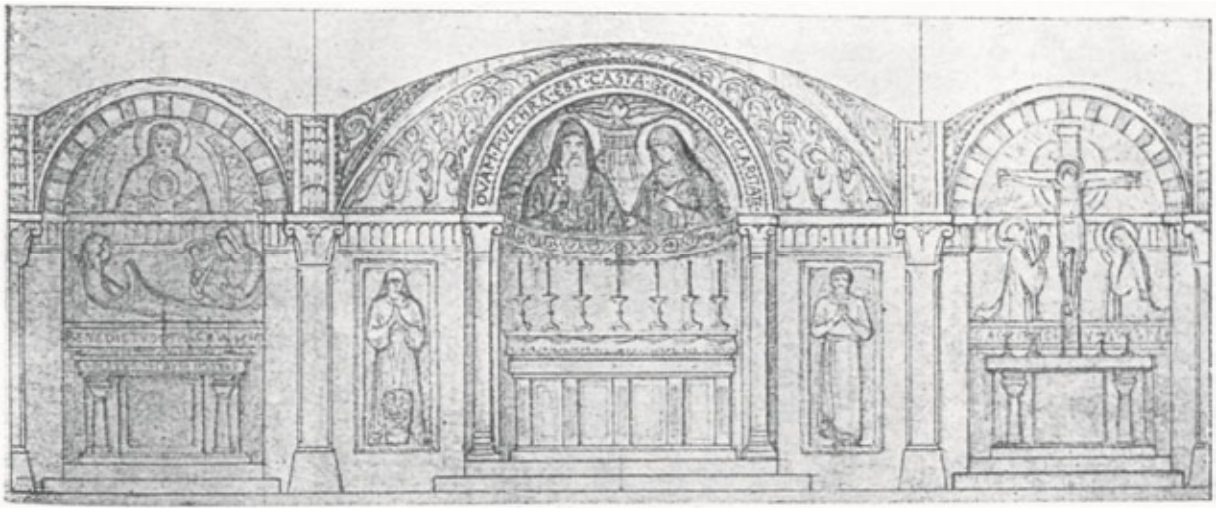

Fig. 7: Norcia, St. Benedict's Church, Crypt's decoration (by Carillo*, Spes*, 2007).



Fig. 8-9: D. Lenz, Good Shepherd (by Kreitmaier, 1923).

Religious art has been led astray (in one place he goes so far as to use the word entartet, degenerate) by the imitation of nature, with its perfect reproduction of optical stimuli; only the rediscovery of the canon -through him- will lead it back to its original and true path.
Implicit here, though it is not expressed presumptuously, is a claim to leadership in the direction sacred art should take. In fact, no other artist followed Lenz on his course; even his own work follows his theories only to a qualified extent. He had all the more importance, however, for some of the artists of the early modern movement, who were on their own way to overcoming the obsession with history and realism, and who found in Lenz a like-minded forerunner. In terms of art and architecture history Lenz in fact anticipated significant moves towards the abstraction of the composed image.
The long quote of Lenz's theories in Schwarz is symptomatic of the complex position of the second: the intent of his deeds is in fact the technique to solve through spirituality.
In the Germany of the thirties, in hich every energy was spent on the Great Berlin of Hitler and Speer, the technical problem was fundamental also from a theoretical point of view. The nation that had experienced the most rapid process of industrialization of the West, but has suffered defeat in a war essentially technological, the debate on the relationship between

technology and spirituality was on. In this debate, the position was that of shared Jünger,which seeks to connect the concept of “authenticity” with the technology or Dessauer, for whom the task of the technology is “serving the people”.
Schwarz invokes Lenz's ideas to indicate the urgency of bringing the technique to spirituality as evidenced already in the *Letters from Como's Lake*, published in “Schildgenossen” between 1923 and 1925.
No coincidence that the letters are addressed to a friend identified by Romano Guardini, philosopher and theologian who just Beuron had developed the arguments set out in *Vom Geist der Liturgie* (1919).
Lenz's speculation, his concern to bring together in one unit liturgical space artistically decorated, filtered through Schwarz's interpretation, anticipate many solutions proposed by the Secon Vatican Council, playing in a trend semantically relevant contemporary sacred architecture, present in recent case. The design of a «liturgical church» -in the words with which Schwarz interprets Lenz's thought- will have no small influence on the choice of the Council (eg, survey and visibility of the main altar) unanimously shared.

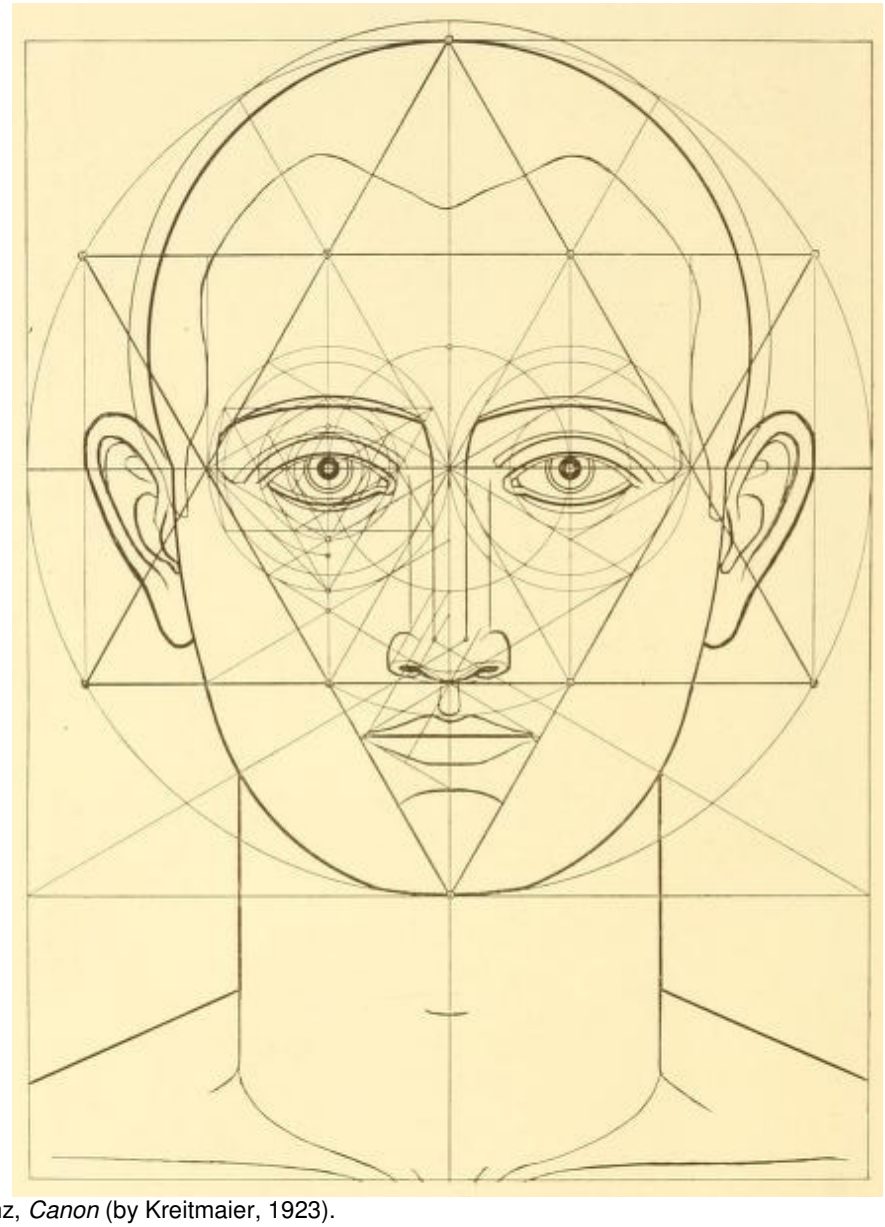

Fig. 10: D. Lenz, *Canon* (by Kreitmaier, 1923).



Fig. 11: Montecassino, Torretta, A. Engel, Tabernacle (by Kreitmaier, 1923).

A striking example of this is *Christ The Light Cathedral* in Oakland, California, designed by Craig W. Hartman (2008), in which the architect solves the so-called “via sacra” the problems associated with liturgical requirements of a single nave, which is set according to the forms in this golden ratio. Derives directly from Beuron'ssymbology, mediated by Schwarz's reflection of spirit and technique, the project of a church that recovers in the plant the oldest Christian symbols with use of cutting-edge engineering solutions.
Oakland's project exemplifies the fundamental notion that emerged out of the Second Vatican Council, the “People of God”: Hartman's draft, as well as that of Lund and Slaatto in St. Hallvard in Oslo (1966) or *Our Lady of the Angels Cathedral* of Rafael Moneo (1998-2002), they propose, to varying degrees, this sense that we gather as one -a single people meant to worship together,gathered around the Eucharistic table to be fed and nourished and to celebrate culture and art and music.Recovering the oldest Christian symbols or formulas geometric Pythagorean ancestry, they reproduce the model of «processional church».
At the same time, some of these projects -such as the Holy Face of Mario Botta or Oakland's Cathedral- using historical quotes (the Shroud face, the Christ of Chartres) on the one hand emphasize the value of the symbol that was already in Lenz, from a other things, raise questions substantial contemporary art. The mention of the historic effigy makes it instantly recognizable, avoiding the problems still warned against non-iconic art.

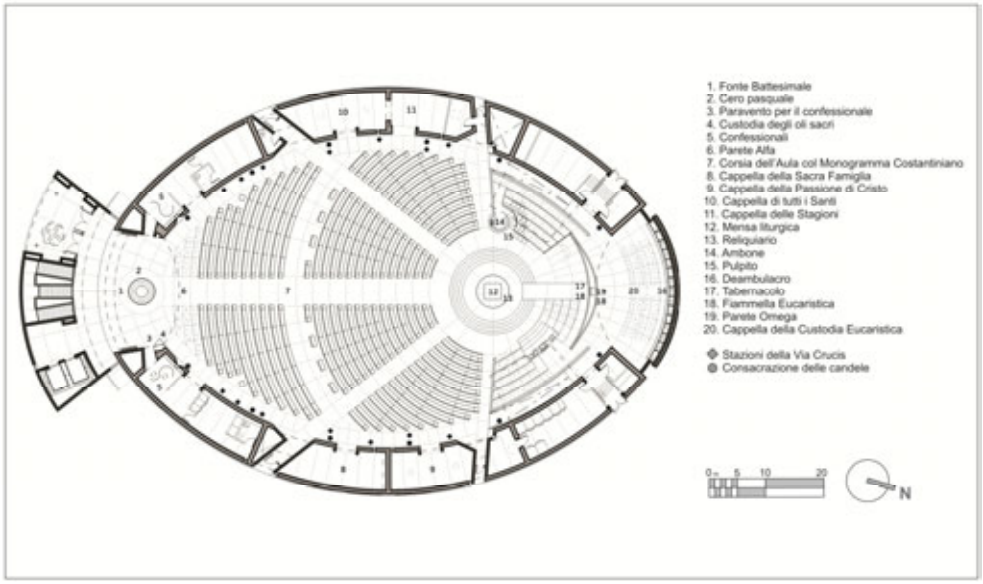

Fig. 12: Oakland, Cathedral, plant (published courtesy of the architect Craig Hartman).



Fig. 13-14: Stuttgart, St. Mary's Church, Via Crucis, and decoration (by Kreitmaier, 1923).

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The contribution of diagnostics in architectural survey; case study of combined thermography application.

Gerardo Maria CENNAMO
Engineering Faculty, International Telematic University UNINETTUNO, Rome, Italy
E-mail g.cennamo@uninettunouniversity.net

Abstract
If up to fairly recent time, the relational system between perception, processing and representation during representation processes was perfected by concluding through natural “intuitus” (physical environment) and human intelligence (perception and processing capacity), the assumption of a dominant role, in terms of methodology and practice, of a third "virtual intelligence", deriving from contemporary developments in technologies such as electronics, information technology and telematics, has transformed the previous method of approach to the environment, natural or built, and to the project.
Applied to the study and investigation of architectural heritage, the contemporary evolution of these technologies of knowledge and simulation, evolve the discipline of representation in the direction of the broader interdisciplinary interdisciplinary perspective, establishing a relational system of methods and information that precede and complement the process of knowledge.
The use of computer systems in the context of visual representation, while being purely a technical/operational aspect that does not conceptually introduce new modus or forms of representation, assumes an even epochal significance by creating a clear separation between pre-and post information.
Useful technologies for the material/formal control intervene in the field of diagnostics and in the behavior of materials by developing measurement, protection and monitoring systems of the performance characteristics.

Keywords: developments, technologies, survey, architectural heritage, diagnostics

1. Evolution of detection techniques
There is no doubt that such technologies supporting representative disciplines have strongly evolved the traditional method of investigation, detection and design, up unto determining an opportunity, if not a necessity, of broad insight in this regard by professionals and researchers.
As noted by Della Vecchia and Mura in the work "Technologies and techniques of graphic representation", in the history of visual representation there has never been such a radical transformation as that in the field of technical representation.
Currently with the development of technology, the acquisition of data is ensured in a more precise, quick and versatile manner. In fact even the same geometrical component of the detection does no longer appear as a simple dimensional measurement. Laser and photogrammetry are part of this innovation, and their integration is able to produce such a large volume of geometrical and material information that alone, already allow an in-depth knowledge of formal, constructional and technological values of the work.
The investigation and representation of degradation or damage can be carried out with tools that can simulate what happens inside the structure; these new opportunities are above all very useful in stratified and complex areas such as restoration work on historic heritage.
To know a building structure, in fact, signifies knowing its history, the natural and urban environment in which it is inserted, the distributional characters, the specific construction techniques, tools and materials used for its construction.

The knowledge of the events, also constructive, regarding the building allows the reconstruction of its evolution and the exact identification of architectural, formal and functional aspects.

2. Diagnostic analysis on architectural heritage

In the context diagnostics occupies a crucial role, or rather the set criteria, procedures and techniques for the identification, investigation and representation of the constituent elements, material and technological aspects and their evolution, which is essential for obtaining a deeper detection of architectural heritage.
The diagnostic action also analyses the changes in the structure and constituent materials of the object, produced by the most various causes, providing information on the composition of the materials used, on the technique of execution, on previous changes or maintenance interventions and on possible changes in the intended use.
The result of the diagnostic knowledge is also indispensable for implementing preventive measures.
The diagnosis for the conservation of artefacts is therefore based on the graphic documentation, which, starting from the autopsic examination includes a scale drawing and mapping of the deterioration. Along with the architectural detection and the mensorial activities, analysis and knowledge of the conservation status of broader area of archaeological and architectural heritage compared to the single artefact determines a regional level mapping that can delineate situations of greater or lesser uncertainty for the exposure to different risk factors.
Today the diagnostic phase tends to confirm its traditional skills, emphasizing the aspects of technical investigation due to the availability of efficient tools and recognized methods; in addition to the shape and architecture, it also investigates the structure with scientific rigor, objectivity and reliability, which is what is expected from a good diagnosis.
The possible progress in this sector today, however, often depends on the development of ever more advanced technologies, such as the use of innovative sensors based on optical fibres and on the miniaturisation of components in their energy autonomy.
The frontier of monitoring, therefore, moves towards the integration of skills and the development of integrated techniques of monitoring; the most frequently used non-destructive type diagnostic investigations are:
The sclerometry analysis, pachometric analysis, magnetometric analysis, sonic analysis, ultrasonic analysis, endoscopic analysis, analysis by X-ray and tomography and thermal and thermography analysis, the latter based on the visualization of thermal differences on the surface of architectural artefacts.

3. Thermography in the architectural survey

Among the non-destructive analysis techniques, thermography certainly represents an important tool of knowledge of architectural heritage and has found in recent years, after some initial setbacks, a wide application in the field of Cultural Heritage.
Thermography is definable as a true measurement procedure that is non-invasive and does not require direct action on the object and is applicable to the diagnosis of dysfunctions and constructive problems of the buildings. In most applications the absolute temperature of the buildings is not as important as the mutual difference that they have. Thermography can be active or passive; active if it detects the energy emitted from the wall, providing the distribution of surface temperature, active if it thermally stimulates the masonry. The thermography camera employed allows to investigate temperatures between - 40°C and 500°C, with a thermal sensitivity of 65mK and an error of ± 2% on the reading or ± 2°C, operating on the wavelength band of the infrared radiation comprised between 8 and 14 μm , which is an interval of the broadest infrared spectrum of the infrared spectrum.
It can be therefore easily understood, which cognitive contribution this technique is able to give in a completely non-invasive manner, providing valuable information relating to the transformations undergone by the architectural system, thanks to shown discontinuity of thermal-physical characteristics of the materials constituting the first deep layer of the wall. The difference in "response" to the thermal stimulation of frequently used materials, such as wood, bricks, stone and mortar between blocks, can therefore be easily visualised by the impression that they project onto the layer of plaster that covers the view. The information obtained and translated into depictions allows us to detect critical situations such as the presence of hidden or detached structural elements, cracks, metal adhesions and everything necessary to determine the historical evolution of the building.
Through the thermography representation of an architectural structure as a whole, and even through the thermogram when the infrared image represents entities that are not otherwise viewable, you effectively obtain the complex of more hidden information regarding the detected object. In this manner it is possible to highlight the quality, the constructive adequacy, highlight architectural structures hidden in the masonry and then buffered, hidden structural defects, rising damp, stagnant water, points of water infiltration, thermal bridges or detect interventions carried out previously.

4. Case study: the bell tower of Sagittarius and the grange of Ventrile

The case study presented in this paper is based on a thesis developed in the degree course in Civil Environmental Engineering, and regards The Grange of Ventrile, a Cistercian complex located in the province of Potenza in the region of the municipality of Chiaromonte.

The complex consists of the remains of the Cistercian monastery of Sagittarius and the defensive grange, a fortified structure with a round tower to the south and a square tower to the north; they are two historical realities, among the most important, especially the Abbey of St. Mary of Sagittarius, that emerges among the ancient monastic one of the county of Chiaromonte and the whole Basilicata.

The case study concerns the detection and combined analysis through the thermography technique carried out on the bell tower of Sagittarius and part of the perimeter walls and the recovery of an area of a structure, the Grange of Ventrile, directed to a bigger recovery action and renovation of the site and nature trail along the valley of the Frido stream.

In the case under examination active thermography was used, where the masonry is thermally stimulated.

On the survey site the radiation was measured with the thermography camera, which had to have the ambient temperature, the emissivity of the material of the object being examined and the distance of the object, set adequately in the instrument as it is influenced by the external environment and also to avoid temperature assessment errors and take into account the parameter of the angle recording, also called angle of incidence, which increases the reflectance of the surface on increasing the angle and decreases the emissivity.

Two thermography recordings were carried out of the constructive wall element with different recording angles, the first with a high angle and the second frontally (angle of incidence close to zero), in order to highlight the different physical characteristics of the material that justify the distribution of temperatures, such as density, the state of inhibition, the surface porosity, alterations and the presence of organic residues.

Infrared analysis were carried out with the Flir, ThermaCam™ P65 model, therefore showing the acquired infrared images and, where needed, the corresponding visible images to better identify the examined area.



Fig. 1: The landscape



Fig. 2: Image of the site



Fig. 3: Ruins of the Grancia



Fig. 4: The village of Sagittario

The structure has been completely abandoned, built of stones and bricks; there are three openings on the west wall, while the openings to the north of the body of the building are narrow slits.
A cognitive thermography investigation was carried out, allowing the present structures such as the masonry work of different periods interfaced by different layers of bricks, contributing to reconstructing the history of the building; it was possible to recognize the bearing wall made from bricks with a regular structure with inclusions of stones and recycled material.
From the point of view of architectural assessment the recognition of the existing architectural structure, of the type of masonry present, its homogeneity and varieties, the regularity of the wall paths, and the size of the masonry unit were important. All this information input is important to correctly perform the structural study whether it is a numerical or analysis of the finished element. In the structural assessment it is important to know the alterations suffered by the building and thermography is a useful tool for investigation in this regard.
Defects of mechanical relevance were detected, such as cracks and crevices, with greater ease and completeness compared to structural and photographic detection. The appearance of the detection of cracks was enhanced in this historic building thanks to image rectification, in this case of thermograms, having a correct spatial restitution of crack distribution on each wall or macro-element. The structural value of this type of detection lies in being able to locally and globally evaluate the instabilities, deduce the causes and interpret the behaviour of the building: to that end, being an abandoned there are considerable cracks.

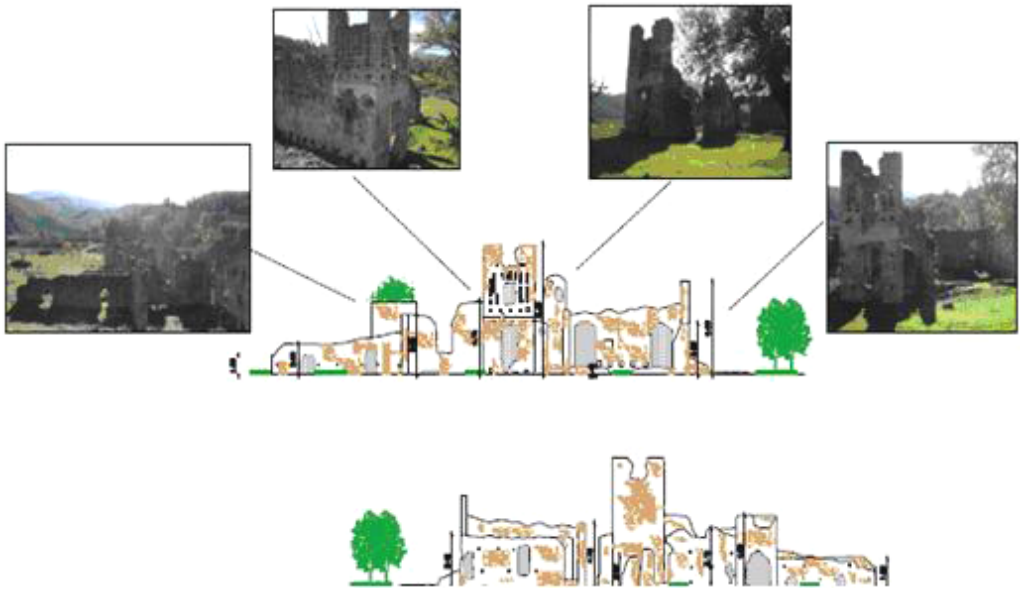

Fig. 5: Details of the Grancia

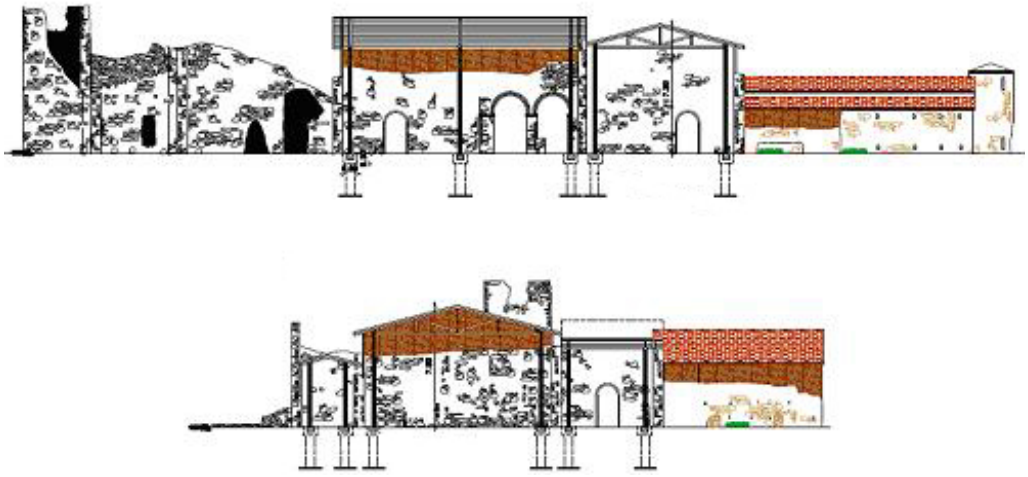

Fig. 6: Sectiones, village of Sagittario

Digital filter were also used to eliminate the influence of objects with temperatures higher or lower than a certain level in order to concentrate the temperature scale only on the masonry and overlooking the constructive element that do not regard the investigation. Advantages can be obtained if the filters are used accurately. You should decide from the moment of the shot what the object of the investigation is and restrict the temperature range used to investigate, in a manner to identify the details of the subject and decide where to shoot a photogram. When a thermogram is shot the element can be “burned” (or over-exposed) which does not apply, gaining on the ease of identifying the thermogram during the re-elaboration phase. In this phase a temperature scale is identified that mostly shows the details of interest of each thermogram, executing the mosaic and applying the filter, a detailed image is obtained in which only the masonry is visible.
With this procedure it is possible to identify even small details such as plug insertion used to support elements that are no longer present, but deducible by the regular distribution of their positioning.
In illustration 7 it can be noticed that the walls are subdivided in two main horizontal thermal layers. The dividing line is at approximately 1.5 metres from the floor and, considering the thermal gradient step which can be observed in passing from one area to another, it can be deduced that it is due to a different wall surface finish. In the high part a warmer area is present which could hide till preserved decorations.

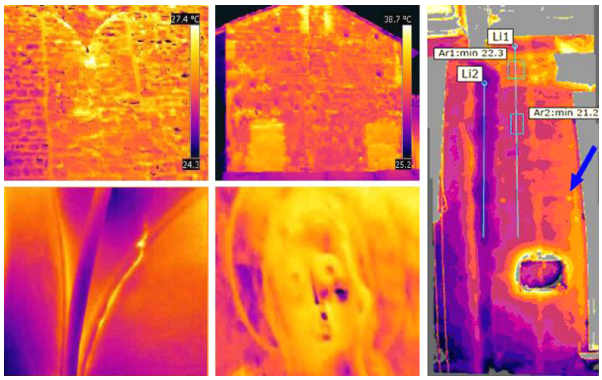

Fig. 7: Thermographic survey on the Grangia

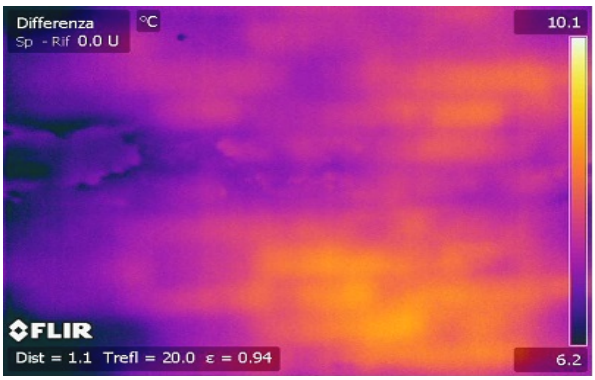

Fig. 8: Texture of the brickwork



Fig. 9: Survey points on the Grangia and on the north tower



Fig. 10: Survey points on the photographic image

From the analysis carried out, the following composition of materials was detected: the wall of the complex of Ventrile and the Abbey of Sagittarius were built with stone blocks of limestone, a material that tends to degrade rapidly, dissolving when attacked by acidic substances in the atmosphere. The masonry was built with stones of the river, partly mixed with flakes of clay and has in most cases, an absence of mortar in the joints. The roughness with the presence of cavities and the emerging on the surface of the concrete stone constitutes the element characterizing the stone surface. In general, the high porosity of the materials used in the two historical complexes, involves a strong sensitivity to the phenomena of frozenness which cause the disintegration of the wall surface. Furthermore, the micro fractures produced by roughing involve an accentuation of the disintegration of the materials, especially as in these cases, if they are in contact with water and exposed to winds, where the material undergoes thermal stress and investment from dust. The analysis of the instabilities and metric degradation, due to the investigation through thermography, led to the evidence of:

- Cracking in the wall and lack of continuity of it;
- Partial loss of bricks;
- Chromatic alteration for oxidation of ferrous substances present in the masonry;
- Efflorescence for crystallisation of salts detectable on blocks of stone due to the capillary rise of water from the soil;
- Progressive flaking of the stones associated to cracks;
- Cracks of mechanical breakage type;
- Patches, with flakes of clay;
- Marks at the edges as a result of the brick arches washing away arches arranged in joints, with an advanced state of internal fracture cracking;
- Internal corrosion phenomena for frozenness;
- Surface break-up and not brick.

Thermography is therefore an essential tool in order to plan with precision and accuracy the works of renewal interventions. Through the thermal image you can check the "health status" of the structure to be renewed. Being a non-destructive control, the thermal image cannot alter the state of the complex to be analysed. The thermography vision of an architectural structure as a whole, allows the quick and effective visualization of any structural defects. In this manner it is possible to highlight the quality and adequate or inadequate execution of work in construction works. Thermography applied to building allows you to highlight architectural structures hidden in the masonry and then tamponed, or go back to maintenance carried out prior to the thermography detection. It is therefore possible to reproduce the detailed account of the work itself, avoiding waste of time and invasive actions to identify areas of possible intervention.

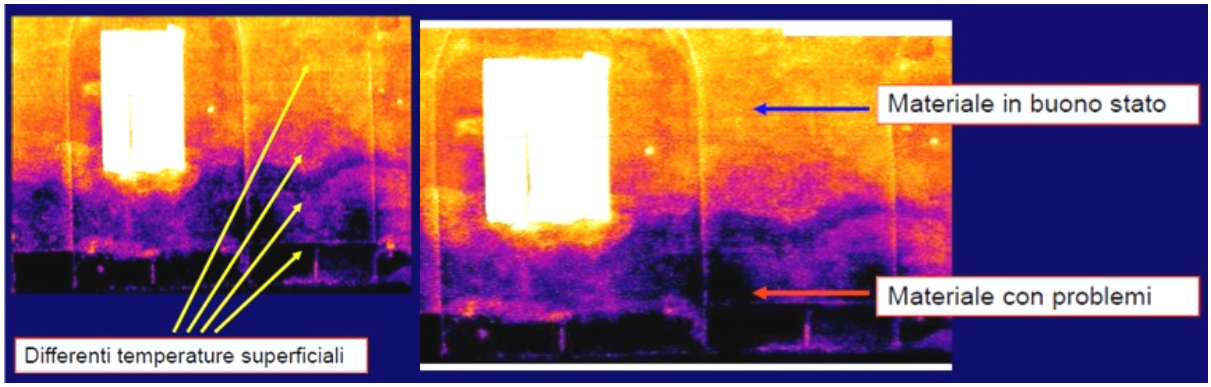

Fig. 11: Thermographic mapping

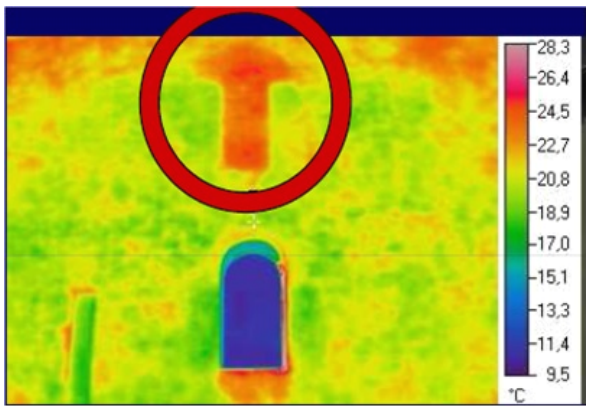

Fig. 12: Visualization of hidden elements

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The Ablution Room of the Hafsid dynasty in Tunis: architectural and artistic aspects

Lamia HADDA
Department of Architectural and Industrial Design "Luigi Vanvitelli", Second University of Naples, Aversa, Italy.
lamia.hadda@unina2.it

Abstract

Starting Ottoman era to the present day, the Hafsid monuments of the Medina of Tunis have undergone major transformations both from a structural and from stylistic-formal point of view. In many cases, the refurbishing have completely deleted the elevation of the original buildings, leaving only the fundamental trace of typological system. In other rare cases, however, it has preserved the original architectural structure, as the case of ablution room *Mid'at es-Soltāne*, built between 1448 and 1450.
The monument is located in the heart of the old town, down the road that leads to the *sūq al-'Attarin* (market Perfumers). This is an area adjacent to the mosque *al-Zaytūna* for the faithful who use the site for the ritual washing of the Muslim prayer. The room has a unique architectural style that draws much from the artistic traditions of Eastern from Syria and Egypt in particular.
The research is based on the study of the surviving parts of the planimetric and formal components by means of a systematic reading of the architecture of the second half of the fifteenth century in Tunisia and the Near East.

Keywords: Ablution Room, Hafsid architecture, *Mid'at es-Soltāne*, Medina of Tunis.

At the end of the Almohad dynasty (1147-1269), North Africa was ruled by three dynasties that were in constant conflict: the Marinid dynasty (1196-1465), that lived in Morocco; the western part of Algeria was under the control of the *Abd al*-Wadids (1235-1500); while the Hafsids (1235-1575) governed the eastern part of Algeria, modern day Tunisia and the west of Lybia. Under the constant threat of incursions by the surrounding Berbers, these dynasties fought for the hegemony of North Africa [1].
The founder of the Hafsid dynasty was Abū Zakariyā Yahya ibn Abī Hafs, known as Abū Zakariyā I (1228-1249). Whilst in Marrakesh, the capital of the Almohad kingdom, he declared his autonomy over the Ifriqiya territory. The hafsid princes governed Tunisia for almost three hundred years with its capital based in Tunis [2].
It was only towards the middle of the 14th century that the Hafsids were threatened from the west by the Marinids from Morocco, occupying the capital twice in 1349 and 1356. After the fall of Granada (1492), the Spanish – using naval power - threatened the coast of Maghreb up to Tunis. In the same period, the Barbary pirates, led by Redbeard, who had already occupied Algiers (1516), conquered Tunis in 1534, thus ending the reign of the Hafsid sultan Muhammad ibn al-Hasan (1573-1574). The rising power of the Spanish and the consequent fear of the Barbary pirates, led to the invitation for Turkish intervention which brought about the Ottoman conquest of Tunis under Sinan Pasha in 1574 [3]. From that time to the present period, the Hafsid monuments of the city have undergone significant transformations both from a structural and a formal-stylistic viewpoint. In many cases the change has completely modified the original buildings leaving only traces of the original foundations. Instead, in rare cases, the architectural structure has remained intact.

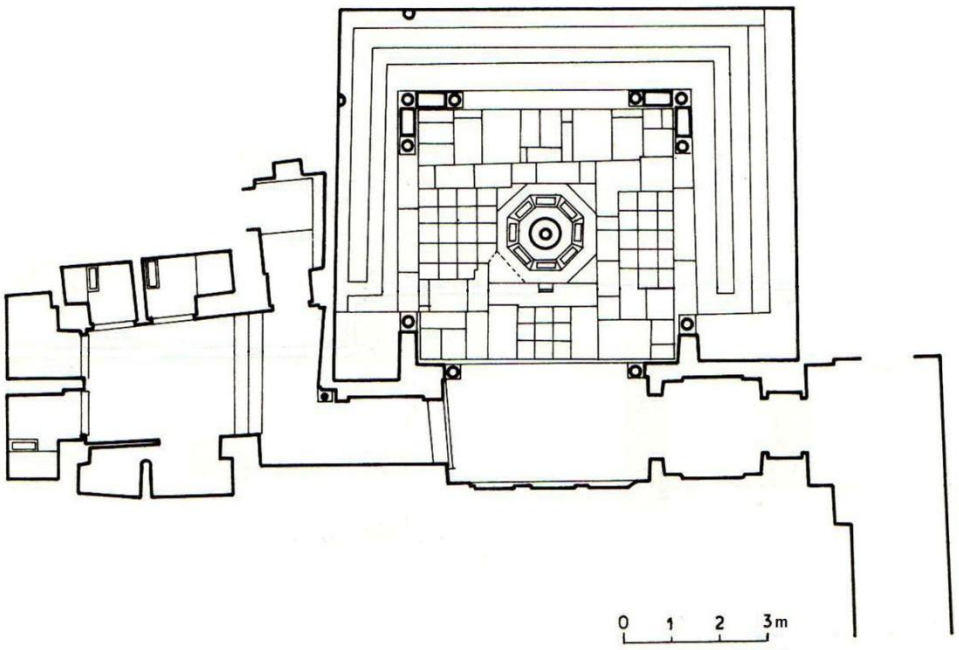


Fig. 1: Tunis, ablution room, floor plan.

In effect, Hafsid Tunisia went through a period of great economic and cultural prosperity under princes Abū Fāris 'Abd al-'Aziz (1394-1434) and Abū 'Amr 'Uthmān (1436-1488); many monuments were, in fact, built during this period. Among the most famous are: the Al Qasba with its mosque, the restoration of the *al-Zaytūna* mosque, with the annexion of the library, and the building of a prestigious ablution area called *Mid'at es-Soltāne* between 1448 and 1450 [4].

This monument is found in the heart of the historical centre, at the end of the road which leads to *sūq al-'Attarin* (market of the perfume makers). It is an area annexed to the great *al-Zaytūna* mosque, used by worshipers to wash according to the traditional rituals of the Muslim faith.

Written sources say that the monument was commissioned by the Hafsid sultan Abū 'Amr 'Uthmān (1436-1488). The building of the monument was presided over by the architect Ahmad al-Qusantini with work starting in 1448 and ending two years later [5]. The building has undergone some reconstruction especially of the wooden covering as can be seen from an inscription on a beam which dates back to the 18th century [6]. The rest of the building is in pure Hafsid style: the portal, the arches, the capitals, and the fountain.

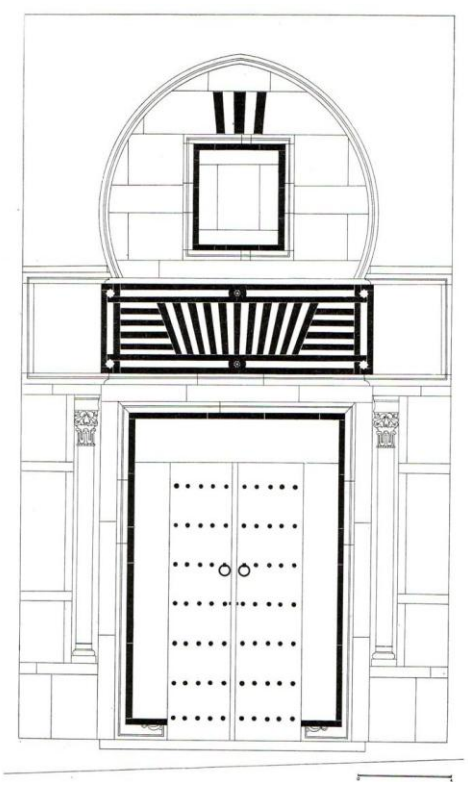
The entrance still preserves an elegantly decorated portal in two-tone marble with columns adorned with Hispano-Moorish capitals. The architrave is enhanced by a large slab made of ashlar blocks of black and white marble arranged with horizontal courses at the sides and radiating from the centre. Towards the middle of the 13th century the French architect Villard de Honnecourt paid particular attention to this technical process for stone. In his notes, kept in the National Library in Paris (Ms. fr. 19093, tav. XL, fol. 20), the famous architect describes the technique used to cut blocks for an arch in such a way as to obtain blocks which are suitable to be placed radially [7].

The entrance door leads to two halls, separated by horseshoe shaped arches with two-tone ashlar blocks and surmounted by a rectangular panel decorated with strips of black marble which form three quadrants of black and white marble with a star enclosed in a square in the middle.

The inlaid panels used to decorate the walls are representative of two-tone geometrical decorations. They can be summarized according to various fundamental geometrical shapes: flat arches or medallions composed of thin strips with ashlar blocks in different shapes; stars, intertwined, cylindrical, polygonal. They have all been created through the use of inlaid black marble strips on white marble.

The ornate with stellar motifs uses the basic principles of geometry, repetition, subdivision and multiplication to create a multitude of designs. The source of inspiration is the polygonal composition which normally originates from a central circle divided by polygons from which the various polygonal weaves (called stellar) develop. They are formed by surfaces of perfect proportions. The star forms part of the originating motifs of the geometric decoration to such an extent as to be counted as the most symbolic of Islamic art [8].

This type of inlaid decoration is found in Hafsid architecture on both walls and floors as we can see, for example, in the internal courtyard of the mausoleum of Sidi Qāsim al-Zalījī (second half of the 15th century) [9].



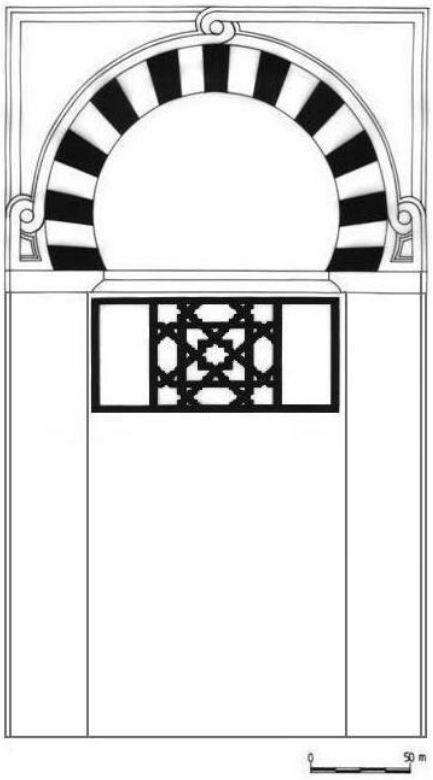


Fig. 2: Tunis, ablution room, frontal view of the entrance.

Fig. 3: Tunis, ablution room, main hall, frontal view of a blind niche.

The fulcrum of *Mid'at es-Soltāne* is composed of a peristyle square room surrounded by four large horseshoe shaped arches with two-tone ashlar blocks which lie on Hispano-Moorish capitals. The arched lintels of the arches are covered with slabs of black and white marble and are decorated with geometrical motifs. In the middle of the room there is an octagonal fountain, whose facades have panels of marble that are almost a metre high and which are decorated with imaginative geometrical motifs.

At the base of the piers, on both sides, a snake like decoration carved in relief can be seen. It is often presented in the shape of one or two spirals whose surface is covered with scales and is very similar to the palmettes on the Hispano-Moorish capitals in Tunis of the same period. This motif is also present in other monuments of the Hafsid era: on the piers of the doors of the mausoleums of Sidi Ben Arus, Sidi al-Kala'i and Sidi Qāsim al-Zalījī and on the door of the library of Abū 'Amr 'Uthmān in the *al-Zaytūna mosque* in Tunis [10]. Therefore, it can be said that the snakelike ornamental motif subsequently developed, elaborately, and is used extensively in Ottoman buildings and religious monuments [11].

The beauty, and the particular style, of the room drew the attention of many scholars of the time. Among these the famous poem by ad-Damāmini can be recalled. It defined *mid'at* as a beautiful building built in a perfect architectural style which is so elegant and finely executed to the point that it can be considered a model in its genre [12]. The shapes, and the architectural and decorative techniques used in the Ablution room recall the Ayyubid and Mameluke buildings in Syria and Egypt built in the 14th and 15th centuries, where similar motifs are found in black and white inlaid marble which were used to exhault the chromatic elements inside the monuments [13]. Among the most famous examples in Cairo are the masonry face of the funeral hall of Madrasah of Barkuk (14th century) and of the Ahmed al-Bardini mosque (15th century), the floor of the funeral mosque of the sultan *al-Malik* al-Ashraf Barsabay (1421-1438) and of the *Maqsura* of the Abū Bekr Mazal mosque (15th century) [14].

It is worth noting that these decorative motifs were probably brought to Tunisia through Egypt in the 15th century. This technique was widely used in the monuments during the following centuries, such as the *zāwiya* of Sidi Qāsim al-Zalījī (end of the 15th century), and even more so in the Ottoman era in the Medina of Tunis. Among the numerous examples of this last period, Dar Abū Zayane (15th – 16th century), The Palace of Dey 'Othman (16th-17th century), the Mausoleums of Sidi Yusef and Hammuda Pasha (17th century), *Dar* al-Mrabet (17th century) and *Dar* al-Bey (18th century) [15], should be mentioned.

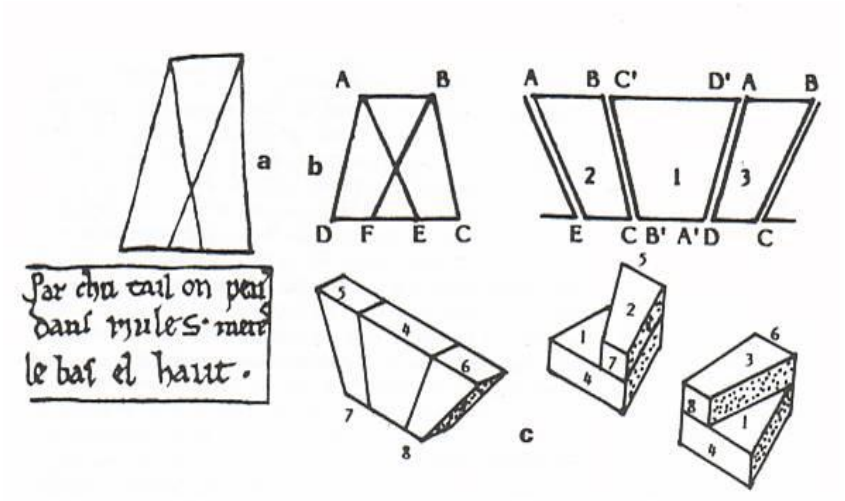


Fig. 4: The working phases of the radial segments according to the architect Villard de Honnecourt.



Fig. 5: Tunis, ablution room, facade of the south side of the peristyle.

It is worth reiterating the Andalusian influence. This influence took root in *Ifriqiya* during the first influx of emigrants who took refuge in Ifriqiya starting from the 8th century. This is also confirmed by the famous historian of that time, Ibn Khaldūn: "The arts develop admirably albeit with less momentum than in Spain. In addition, the influence of Egypt is particularly fruitful. The two countries are not distant and Tunisian travellers visit Egypt every year. Sometimes they live there for some period of time making artistic objects and sharing technical knowledge. For this reason Tunis has become as educated as Cairo, and Spain itself, thanks to the Andalusian refugees of the 7th and 8th centuries [16]." Moreover, the good relations between the Hasid sultans and the Mamluk rulers of Egypt contributed to the spreading of this artistic style during the 15th century. All of this was possible thanks to the continuous exchange of artisans between the two countries as can be seen from inscriptions written, by Egyptian craftsmen, during particular public works [17].

In conclusion, it can be stated that the Hafsid era was characterised by a simple but highly creative architectural output thanks to which diverse Mediterranean decorative features were brought together. On the one hand, the Hafsid repertoire remained linked to the artistic and architectural elements which developed in *Ifriqiya* such as the ancient Punic, Roman and Byzantine ones as well as the Islamic Aghlabid, Fatimid and Zirid ones; on the other hand, it was influenced by diverse trends coming from Andalusia, Morocco and even Mamluk Egypt.



Fig. 6: Tunis, ablution room, main hall, inlaid panel.

Fig. 7: Tunis, ablution room, medallion on the arched lintels of the peristyle.

Fig. 8: Tunis, ablution room, snake design carved on the upright arch of the peristyle.

Fig. 9: Tunis, ablution room, Hispano-Moorish capitals.

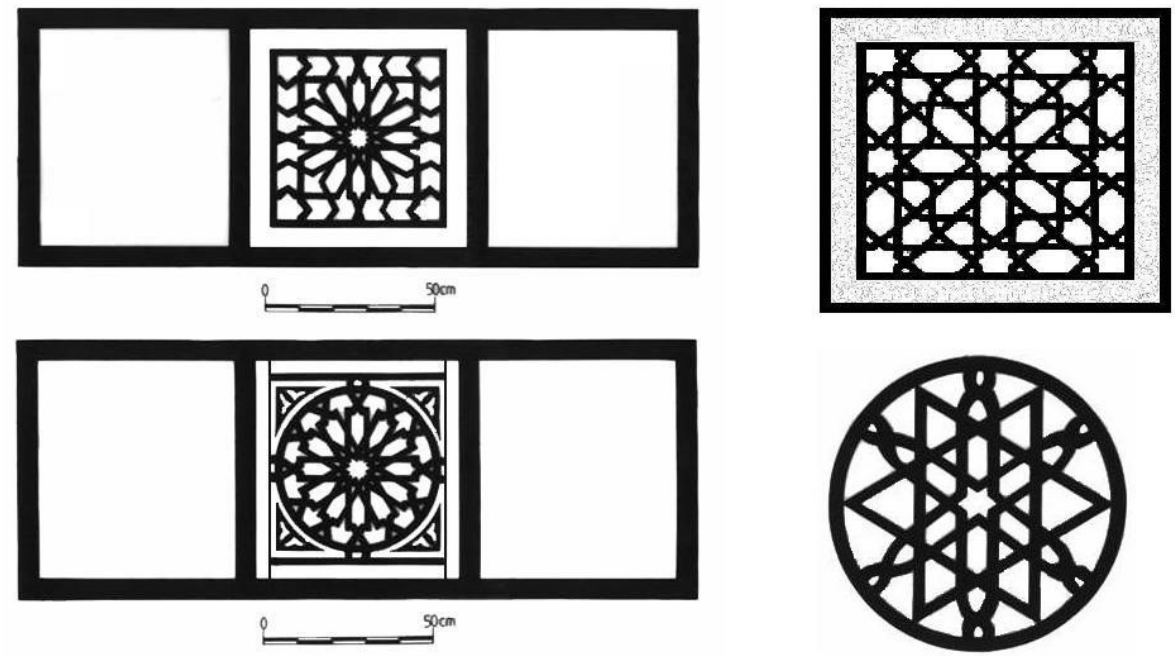
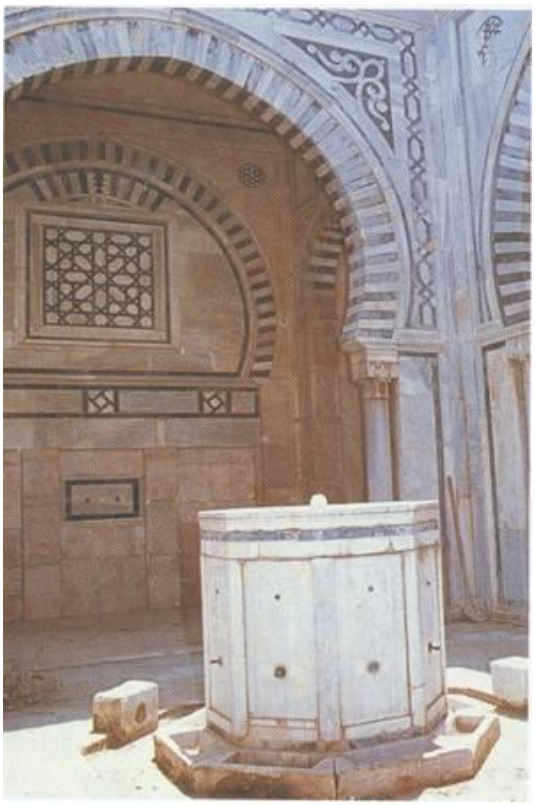


Fig. 10: Tunis, ablution room, main hall, two-tone panels inlaid with stellar motifs.

Fig. 11: Tunis, ablution room, facade of the principle corridor, marble panel with a geometric pattern.

Fig. 12: Tunis, ablution room, drawing of a medallion.



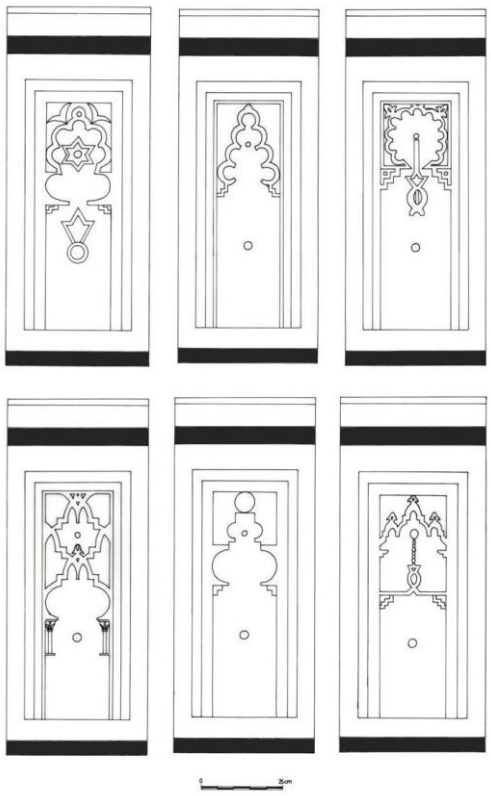


Fig. 13: Tunis, ablution room, octagonal fountain.

Fig. 14: Tunis, ablution room, white marble panel facade of the fountain.

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20th Century's cheap and lower-class dwellings in Caserta

Riccardo SERRAGLIO
SUN, Facoltà di Architettura - Aversa, Italia
E-mail riccardo.serraglio@unina2.it

Patrizia MOSCHESE
SUN, Facoltà di Architettura - Aversa, Italia
E-mail patriziamoschese@yahoo.it

Pasquale VAIANO
SUN, Facoltà di Architettura - Aversa, Italia
E-mail linovaiano@alice.it

Abstract
In the last pages of *Architetture per i lavoratori tra Napoli e Caserta. Progetti e realizzazioni dal XVIII al XX secolo,* published last June, where I analyzed working houses, I wished for the chance to study the popular districts made in Caserta during the 18th century as it was evident they represented interesting urban architectural solutions. After a year studying archive and bibliographic data I realized the validity of such an hypothesis mainly during the years between the I and II World War when the Municipality approved the building of cheap dwellings in key areas to improve the future development of the City. In this period, in the area of the market built in 1890 and in piazza Venezia, the Southern part of the City, they made new residential buildings for lower classes. Through such a publication I am presenting the research by Patrizia Moschese PhD, architect Pasquale Vaiano and I, whose development will be published in a future detailed work.

Keywords: Cheap dwellings, lower-class dwellings.

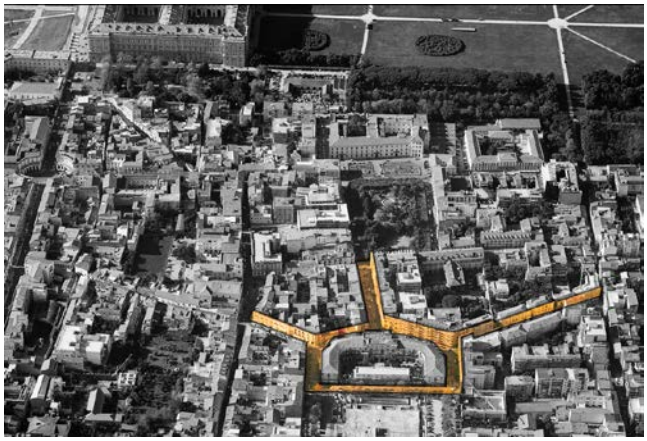




Fig. 1: Caserta, aerial view of Via Battistessa and Piazzetta Commestibili.
Fig. 2: Caserta, aerial view of Piazza Venezia.

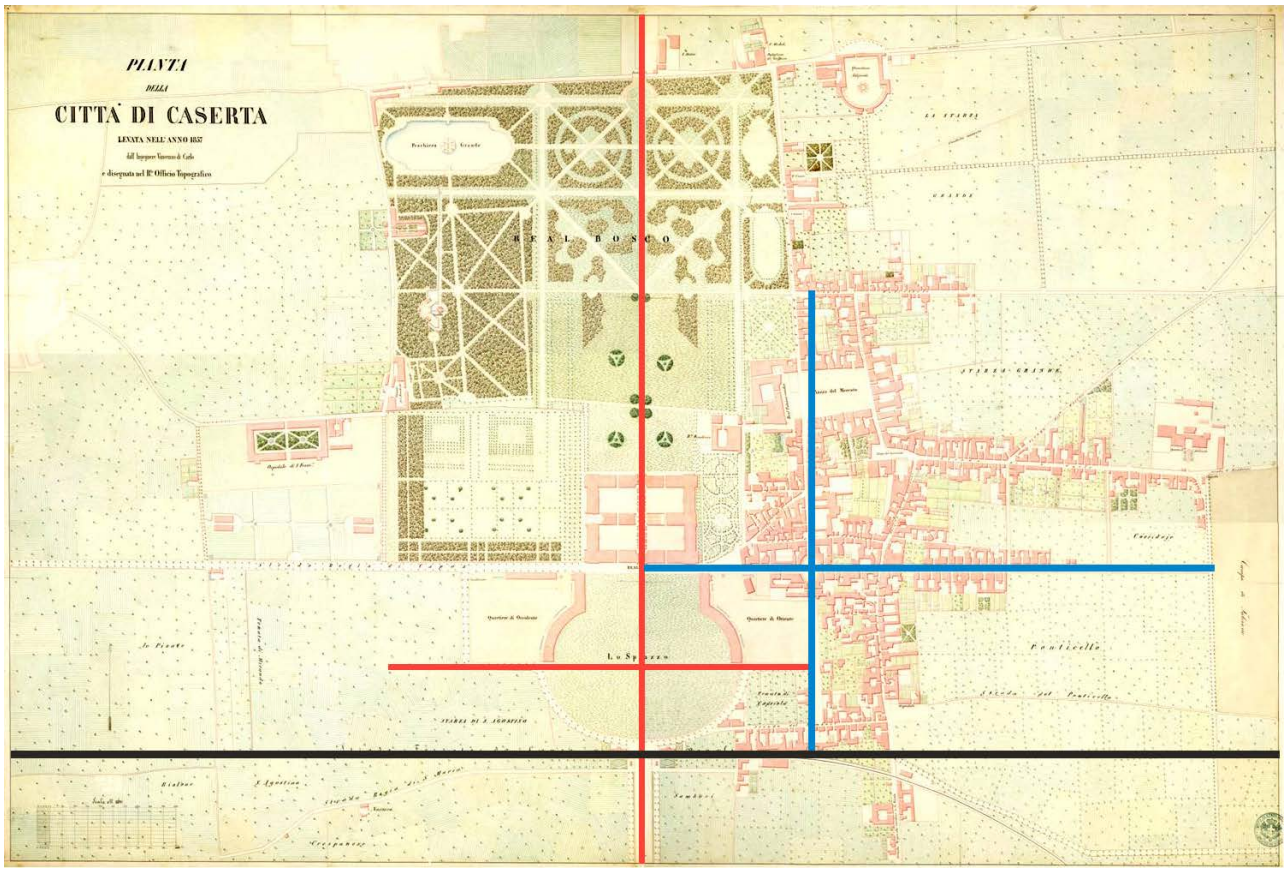


Fig. 3: Historical map (1857) with the axes of urban development in the eighteenth (red) and nineteenth (blue) century.

In 1920s, during a difficult building crisis, the ruling class of Caserta considered necessary the building of new low-cost dwellings. The coming back of world war survivors, the presence of a city military unit and employees, the idea of the Municipality «[…] to create the urban built-up in the city centre» calling to the city village people coming from the outskirt, shortly caused people increase and, consequently, «[…] an urgent need of small and medium sized houses and dwellings». This happened in a social context where building and agricultural activities were the main human income source, while the opening of new building sites would mean to revitalize local economy on one side, creating new jobs, and to provide the city with cheap dwellings they needed, on the other.
Moreover, from an optimistic point of view, they thought *Caserta* was capable of offering the best conditions to support the economic upturn: «it is necessary to underline that no city in Italy has such capabilities all together. The best and most perfect tufastone is nearby in the city-centre; the *pozzolana* is risen from the groundwork digging, the lime from the neighboring *Casagiove*, working men were little paid if compared to other cities, and we can easily get astonishing and dedicated masons».
The programmes of the Municipality were carried out in 1921 through «[…] the brilliant decision to create an Institution of " Case Popolari" (Housing Project) in order to build cheap and safe houses profiting governmental funds». At the beginning they used £. one million loan the Municipality got by "Cassa di Risparmio del Banco di Napoli", thanks to their lands and buildings – some in Centurano area once to the former *padri Riformati di Santa Lucia* monastery, *padri Liguorini* garden in *Giannone* street, some buildings in Sant'Elena square, *Caprioli* building palace in Ferrovia square – the Institution of Case Popolari started the building of residential buildings in the north side of the city centre, in the area of the *Mercato dei Commestibili* built in 1890 according to the project of eng. Mr Arrigo Veccia who conceived it in a crossing of roads built to link the new building texture to the former one.
In 1922, they started to build four buildings in Bologna street and the elevated railroad of Mercato dei Commestibili, planned by eng. Mr Luigi Fabricat. However, as the Istituto was not cautious in managing economic resources in 1925 here were many interruptions and controversies, consequently Giovanni Tescione, the first podestà of Caserta from 1927 to 1931, wanted to manage the Istituto Case Popolari to restore the budget to balance in order to ultimate the buildings mentioned above.: «[…] not easy commitment, but I considered it a duty for my engagement, despite the amount of economic interest of the Municipality».
Despite the managing difficulties of the Istituto Case Popolari, the podesta Tescione, decided to give to the

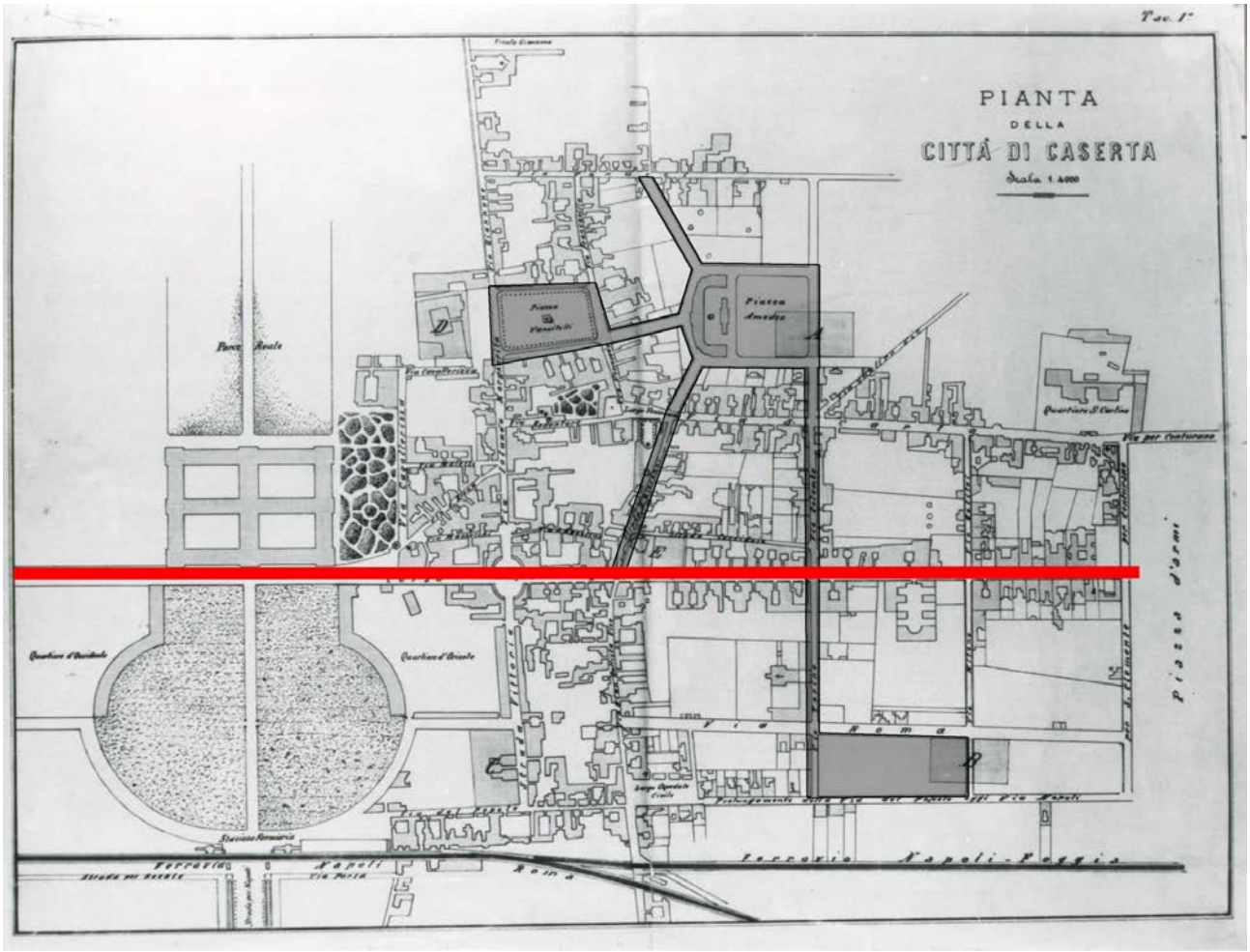


Fig. 4: Historical map (1902) with the central axis of the Corso Umberto I (red) and the new squares (gray).

Municipality Managing office the building of two residential buildings containing twelve flats, in the area of Venezia square, in the southern area of corso Umberto I, made up between 1927 and 1930 under the direction of eng. Mr Vincenzo Memma. In the same area and the same period five cheap dwelling- buildings were built: four small buildings belonging to *Cooperativa Ferrovieri*, built in Roma street in 1925-26 planned by Memma, and *Cooperativa Mutilati* and *Invalidi di guerra* building, built after 1929.
According to the press dating back to that time we know that they conceived cheap detached houses, not only the buildings mentioned above. In 1920 Memma's town plan called for small houses endowed with gardens, they were conceived for Soldiers in Giannone street, in an area they got by limiting the gathers of the Royal Palace of 30 metres, so reducing the wood which separated the public road by the Italian gardens planned by Vanvitelli, but luckily such a project has never been realised. On the contrary, in 1922 a report in Fabricat underlined the building of a " city garden" in Centurano, on a land probably belonging to a former monastery of padri Riformati di Santa Lucia, that the Municipality gave to Istituto delle Case Popolari in Bologna street and princess Maria del Belgio street and Amedeo square, and in Venezia square, so giving to so giving to the city about new 130 dwellings.
The first prerequisite of the new dwellings were cleanliness, comfortability and cheapness, as reported in *Fabricat* as regards the buildings in Bologna street: «[…] they correspond to their targets and blend modern cleanliness needs and conforts to cheap patterns in the available areas. Moreover they satisfy the City needs». They were the same needs they asked for the working class houses made in Naples soon after the State Union, making evidenti it was very important to take care of cheap and technical aspects instead of an architectural quality research. As a matter of the fact, the houses in Caserta were endowed with kitchens, bathrooms, limiting areas to separate the interiors, they were detailed as regards air and sun-light, private green areas and accessories (Shed, garages,…) everything was the expression of planning criteria aiming at optimizing and simplifying the well-known targets of residential low-cost buildings made up in many Italian cities in 20th century and codified by technical papers.
The most difficult planning aspect was to adapt to the irregular shape of the building lands, as in the case of "A" building in Bologna street, or in the case ofpreviously existing buildings, as elevated structures in Com-

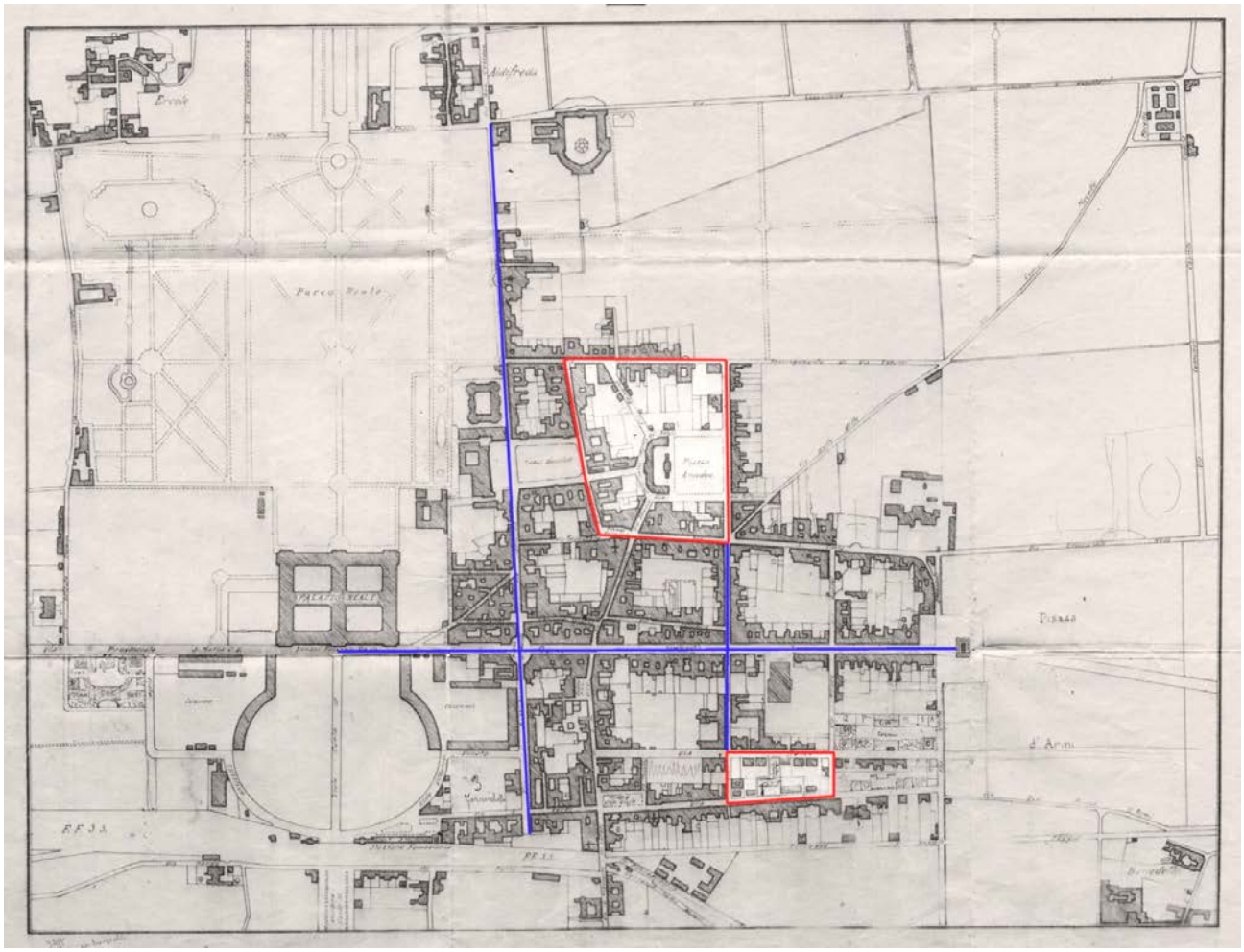
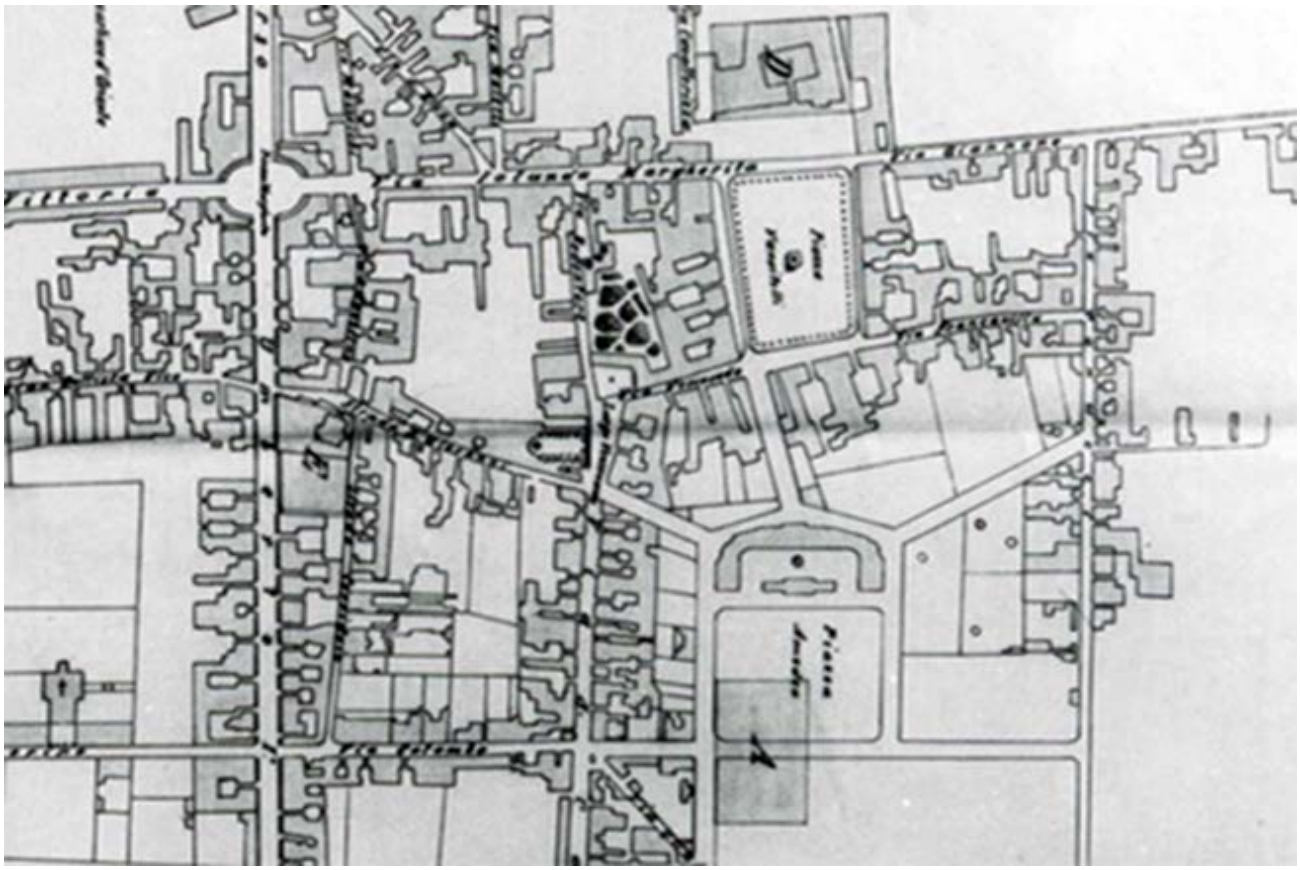


Fig. 5: Historical map (1935) with axes of urban development in the twentieth century (blue) and areas of Piazza Amedeo and Piazza Venezia (red).

mestibili place. However, even if they looked for cheapness and functionality they paid attention to building aesthetics through eclectic 19th century refinements and living to facades refinement and elegance instead of an ex cessive d ecoration, which was m ade b y t he s ame ar tists: «w e hav e t ried t o gi ve t o t he houses a simple, modest and not rich aspect but likely and decent, so to underline details and to make the tenant l ove his-own h ouse i n order t o improve a moral as pect too linking personal cleanness to a spiritual one».

The bui lding of the new lower-class dwellings was m ade necessary not only by the desire to build cheap houses or the chance to use governmental benefits but by a desire of up-to-dating the city. The managing class desire to empower and rationalize the urban system was clearly expressed in the town plan by eng. Mr Vincenzo Memma in 1920, only partly realized. In 1920s the city was made functional realizing new public buildings – Post of fice bui lding i n R edentore s quare, C hamber of C ommerce i n R oma s treet, t he s chool building today titled “Edmondo De Amicis” in Giannone street, the local headquarter of the Fascist Party in Amedeo s quare etc. – and enr iched b y s ome v aluable private dwellings (villa V itrone in N apoli s treet, Tescione palace in Umberto I street etc.). Unluckily the continuity of urban renewing was sharply interrupted by Mussolini go vernment r estrictions t hat in 1927 es tablished t he abolition of T erra di Lavoro area. Since then the work in progress buildings were carried out despite many economic and administrative difficulties, while the developing plan of the city was re-started after the Second World War by defining new urban tools.



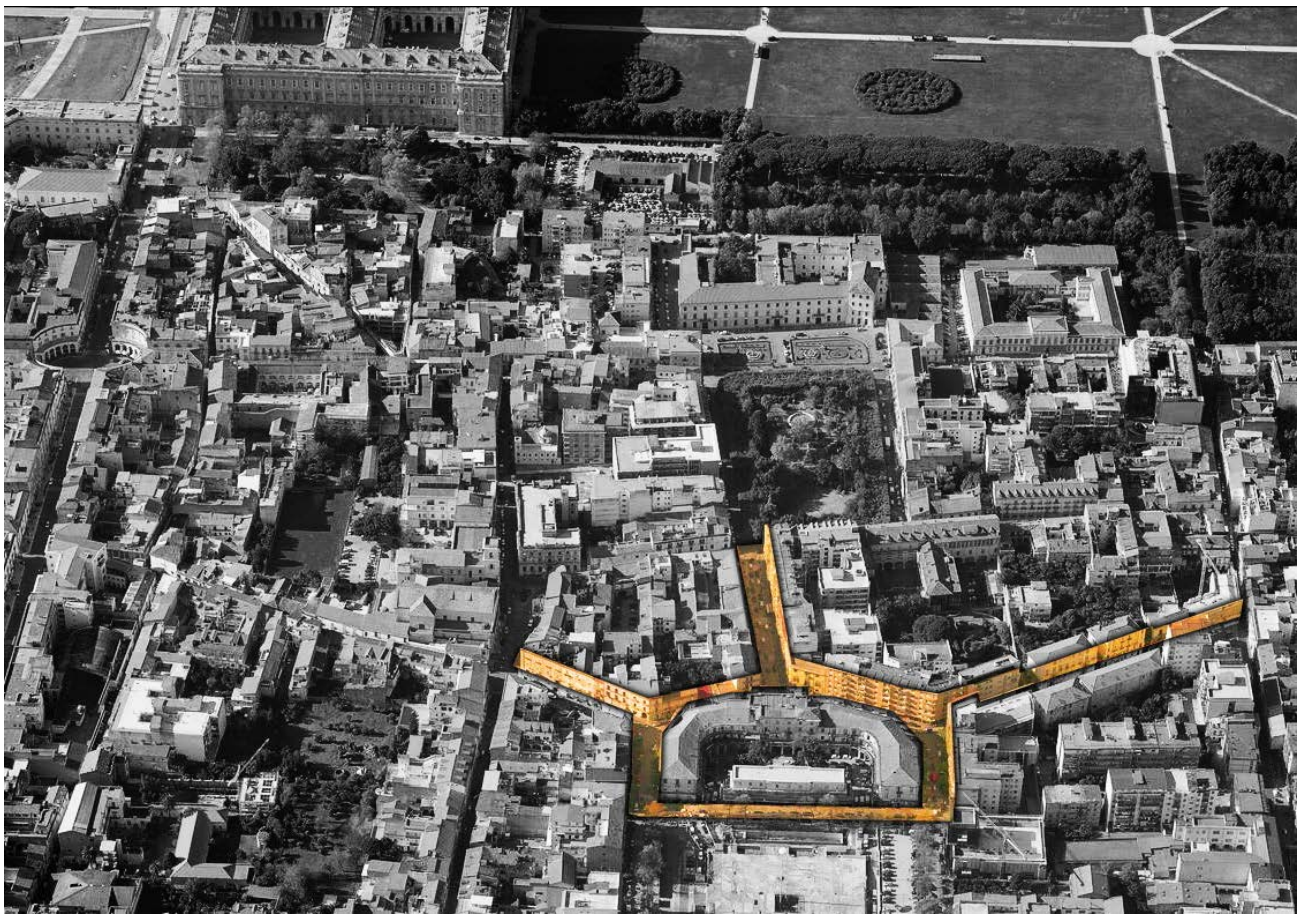


Fig. 6: Historical map (1902) with the area of Piazzetta Commestibili.
Fig. 7: Caserta, aerial view with the trident of streets converging in Piazzetta Commestibili.

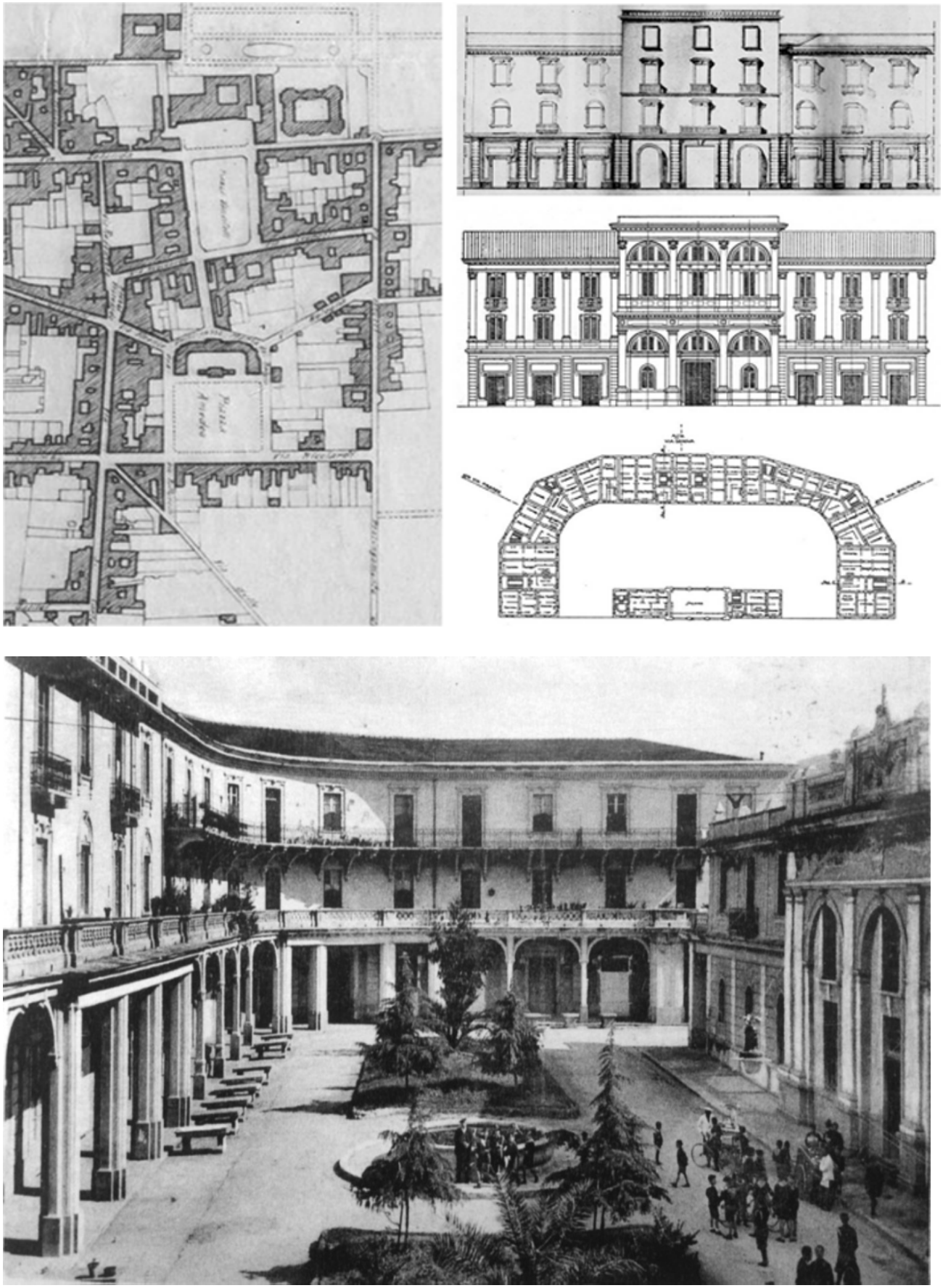
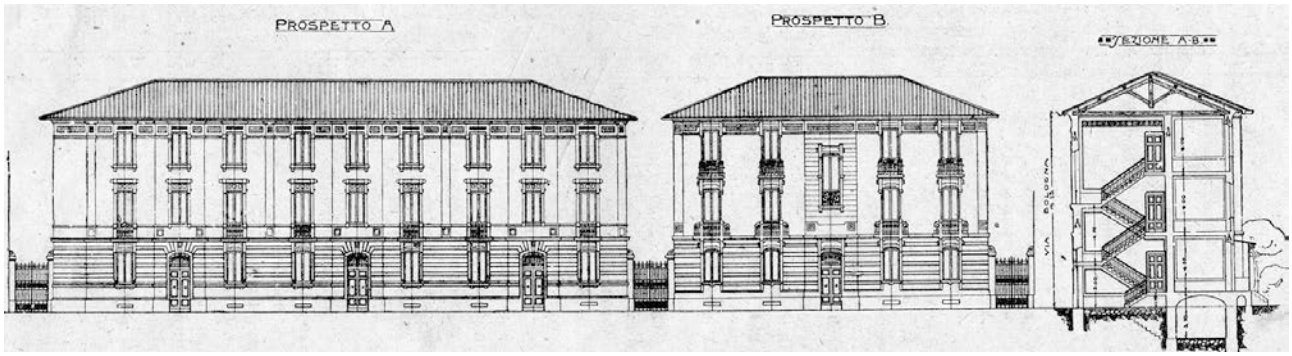


Fig. 8: Historical drawings and vintage photography of the social housing in Piazzetta Commestibili .



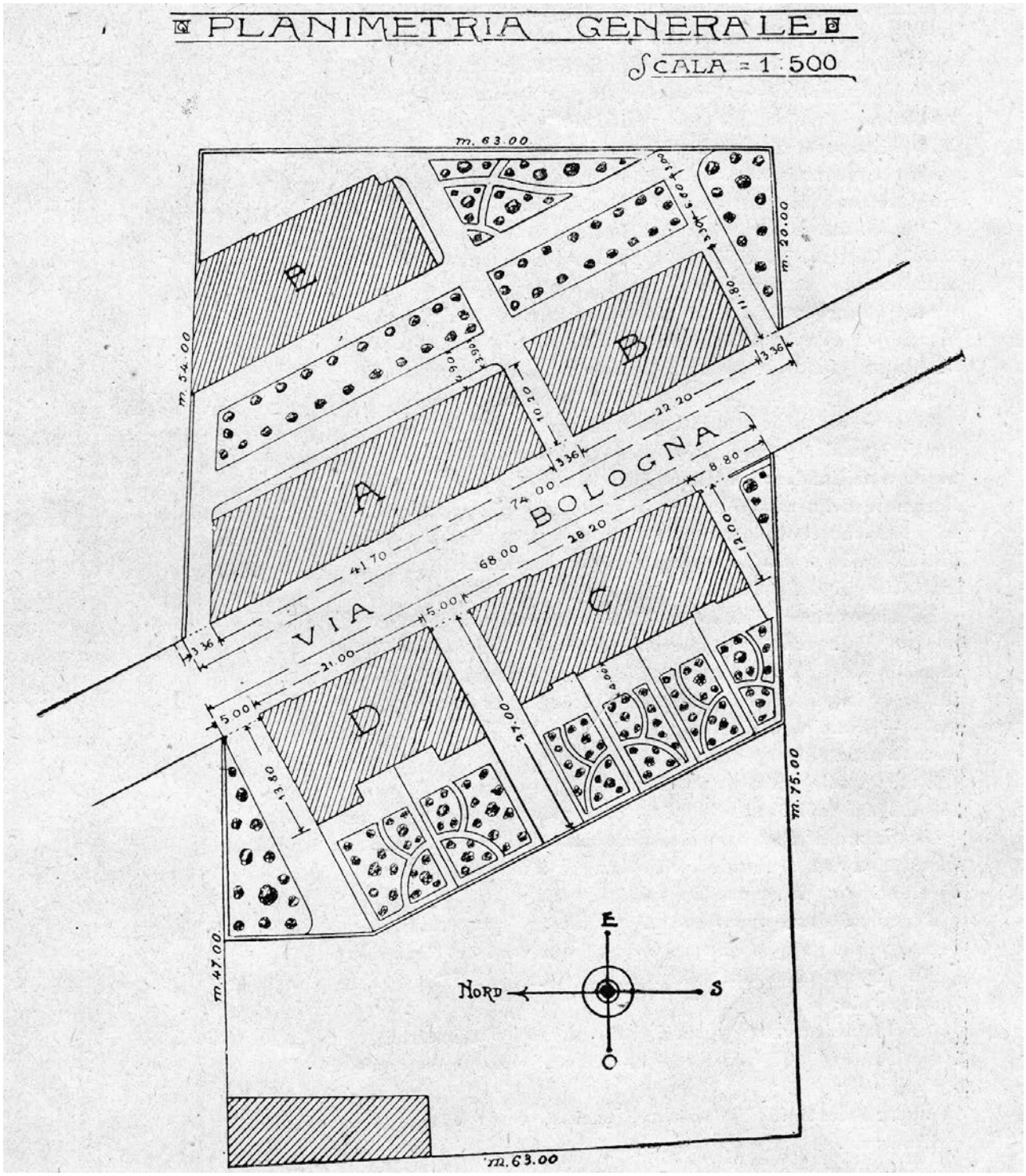


Fig. 9: Historical drawings of the social housing in Via Battistessa.

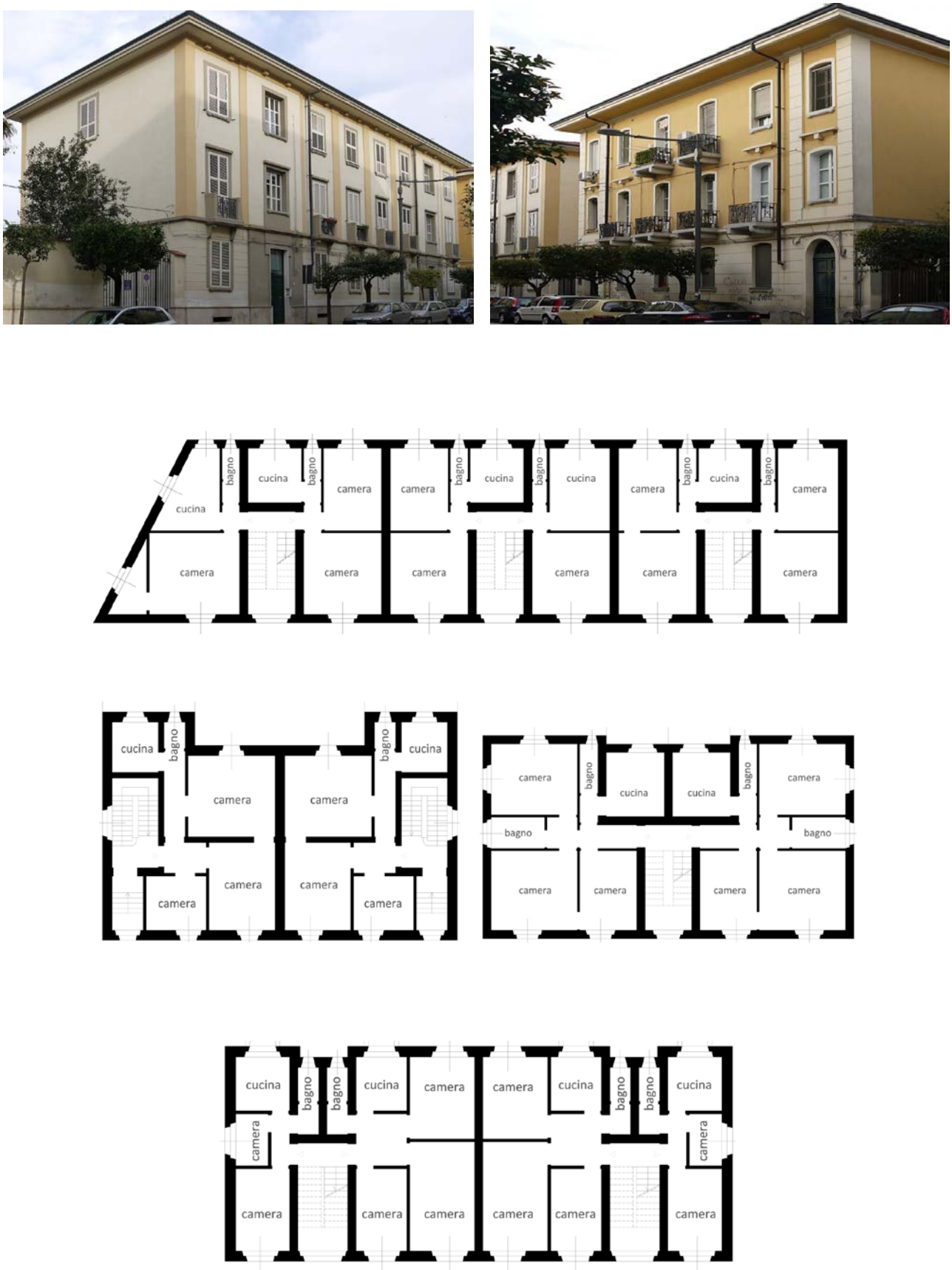


Fig. 9: Plants and current pictures of the “Istituto Case Popolari” buildings in Via Roma.





Fig. 10: Plant and current picture of the “Cooperativa Ferrovieri” building in Via Roma.



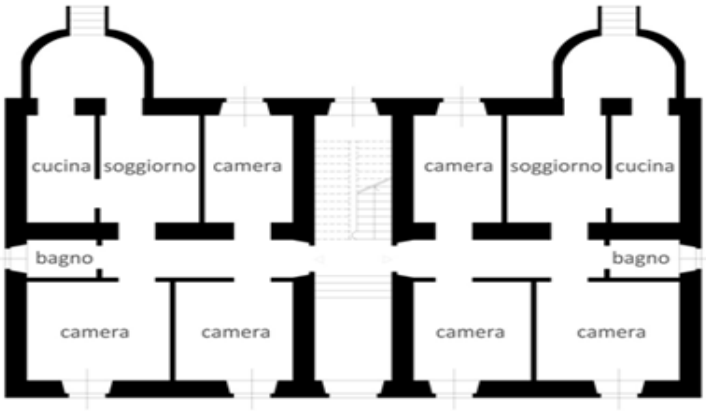


Fig. 11: Plan and current picture of the “Case Popolari del Comune” in Via Napoli.

Borgo Appius - Borgo Domitius

Gianluca CIOFFI
Dipartimento di architettura e disegno industriale "L. Vanvitelli"
gianlucacioffi@hotmail.it

Abstract
Borgo Appius rural settlement in Grazzanise, and Borgo Domitius in Castel Volturno, both in the province of Caserta, were built since 1940 as part of a broader plan to colonize the country.
They are "sponsored" by the ONC (National Opera Fighters), the organization of war veterans, who takes various actions similar especially in central and southern. As well as residential settlements and productive for new inhabitants, had become a reference point for the neighboring agricultural landscape.
The project is written by Moses Tufaroli and Emanuele Filiberto Paolini, but the construction work, which should have been concluded in a short time, they were interrupted by the outbreak of the Second World War.
In fact, the Borgo Domitian are completed only the church and the home of the beam, while everything else remains unfinished. Borgo Appius, however, comes at a higher resolution, settlement, intended to house 500 residents, is designed as a small, self-contained rural community, consisting of houses, public buildings and a church. All buildings, following the guidelines of autarkic building practices of the time, they are designed using a simple architectural language inspired by the Mediterranean villages, using local materials and reducing the use of high-cost techniques. The urban layout is linear and balanced, concentrating all public buildings in the central square and the location of residential areas in direct connection with agricultural land. After the construction stopped in 1941 the settlement was damaged during the war and has undergone further changes in the following decades, leading up to its current state of disrepair.

Rural villages in southern Italy

1. ONC Lower Volturno in Campania
The action of the ONC in Campania is concentrated mainly in the area of the Volturno and the Sele. At the beginning of 1939, the Work of a colonization program of about 18,000 hectares, including sub-basins arranged in a more urgent need for environmental remediation and social development. The area in question, formed mostly by wetlands, had for centuries been used for the natural grazing cattle buffalo, which, however, ha not been entirely lost, even if today happens in organized companies.
The first attempts to remedy the low use of these marsh areas date back to the early nineteenth century. While from 1917 to 1927, the consortia began plumbing and drainage work that subsequently led to the construction of a road network, which is essential to any attempt to change the land. “However, unlike other areas of remediation such as, for example, large parts of the lowlands of Puglia, a suitable plan in this area of colonization could not be conceived, if not coordinated for a swift completion of reclamation public works» [1].
The ONC intervention allowed for the works to be carried out faster, delayed due to the low efficiency of consortia, and also allowed “to introduce in the intensive cropping systems - active and succeeded in what until then had been considered inevitable, and the permanent home, on the same spot of the cultivation of a stable agricultural community in comfortable farmhouses built on their farms” [2]. Through this experiment, there is the start of a real renewal culture, what would be impossible through the previous project to centralize human settlements in the city. The idea of setting up a widespread number of settlers in the area with their farms is made possible thanks to the construction of numerous roads, first through the consortia and then the ONC. “It is obvious that such a complex farm organization had to be sustained and built for the purpose of lasting permanence of families on farms, by the establishment of business centres where they also collected the civilian community services: schools, churches, barracks for the police, municipal

delegations, post offices, doctors' surgeries. This work was begun with the building of two boroughs: Appius, in the right Volturno, completely built and still efficient, and that of Domitius, which was under construction in Ponte a Mare and was interrupted by the war"[3].

1.1 Borgo Appius

Borgo Domitius and Borgo Appius were designed by Moses Tufaroli and Emanuele Filiberto Paolini. The two designers shared with Concezio Petrucci throughout the long history of the fo unding of the city, but in t his case they were working alone j ust li ke Petru cci and Segezia. From Se gezia on wards, t he a ssociation is divided and i s not reu nited even if the Borgo Appio pr oject is ap proved by th e ONC, with note 325 79 o f October 28, 1939, to the Ministry of A griculture an d Fore stry in conj unction with its pla n for the T ableland prepared by Petrucci. The works for the construction of centres (Appius and Domitius) were coordinated with the work of land divisio n and beg an o n Jan uary 30 , 1940 with the com pany "Ing Antonio Caserta" fro m Naples.

The lan d division work of the Lowe r Volturno started on 1 Ap ril 1939 with a first pha se involving the construction of about 15.6 0 km of farm roads (with a width that varies from fi ve to three m etres), 185 new farm houses (with about 13.50 hectares each), and the renovation of 28 existing hou ses [4]. In Decemb er 1939, work began on the second batch, comprising 50 km of farm ro ads and 607 ne wly b uilt hou ses, f or estates ranging from 7 to 12 He ctres, as well as th e renovation of 42 existing homes to b e use d as fa rm houses, housing for employees, warehouses and various services. In the e arly months of 1940, work began on the construction of Borgo Domitiu s and Appius and the realisation of wareh ouses and silos. In the same year, work b egan on th e water an d el ectricity su pply. A ll these works were, according to forecast, to b e completed by 1941, but the difficulties caused by t he war, leadi ng to numero us slowdowns, with about 8 0 houses, 3.50 km of farm road s and two existing ho uses to be re stored still missi ng in 194 3. Borgo Appius was d esigned to give a ccommodation to 5 00 people a nd provide a ssistance to th e settlers scattered throughout th e territory. It fitted betwee n two ortho gonal conne cting roa ds, on e alrea dy pre sent Ca ncello Arnone - Brezza and a new one to be laid. The Plain was characterized, on the inside, by the intersection of the axes parallel to the first: these we re gene rated by the intersection of the four qua drants placed whe re there we re various buildi ngs and se rvices. The Hamlet resembled a fortified village, with seve ral stylitic solutions for individual buildings, inspired by the local rural tradition. The difficul ties arising from the war d id not allow for the completion of the villa ge, which in the post-war period was al so partly demolished. In th e first draft, the projec t for Borgo A ppio is called a proj ect for a "Civil Centre f or Torre degli Sc hiavi". The location is th e one chosen by the ONC, at the inte rsection of the existing road Brezza – Cancello and the road reclamation planned from the Volturno to the Regia Agnena Nuova [5].

The road system was set over two orthogonal directions that intersected at an angle of 27 °. This ap proach was chosen to encourage the best sunshine in buildings throughout the yea r: in fact, al ong the north-south axis, whi ch i s the m ost beneficial, th e buildi ngs were p redominantly re sidential. The complex ha d the following characteristics:

500 rooms, average size of room 25 square metres, Covered area about 6,250 square metres, the floor area ratio and the surface devoted to orchards and gardens 1:7 Total surface area of the blocks about 50.000mq. Calculating the surfa ce o f the lots correspon ding t o 60% of th e total area of the town, including in the remaining 40% of the squ ares, streets, gardens, buffer zones, the total area o f the town of is app roximately 8.4 Hectares, leaving an area of expansion equal to that of a farm of 2 Hectares. The plan was developed on one side of the crossroads between the two roads, in such a way to avoid traffic through the centre, with it merely passing by. In the streets and the square, there are the most representative buildings. At right angles to the backbone, they intersect other roads leading to the residential project. The main access road Brezza – Cancello had an initial 10-m se ction th at tapers at t he exit from the sq uare, b ecoming of 8 m, 6 of which roadway and 2 docks, whi le buildings are set back from the line o f 4 m road. T he road was not very wide , imagining a low volume of domestic traffic, but within the parametres of hygiene and lighting needed, thanks to the limited height of buildings that do not exceed 8 metres in height and two floors above ground.

The central square was 36 x 30m with one sid e slightly flared to increase the effect of persp ective, while at the side of the church there was a small wooded area. The roads and square were built on an embankment, as the campaign plan submitted to the street level of about one metre, and all the accessories of the project, (playing field s, vegeta ble ga rdens, a fair, squa re Agrarian co mpany etc..), we re expe cted to satin for economic re asons. At the squ are, spatially enclo sed by buildings, acce ssed via an a rchway, as well a s in traditional fortified farms of the south and Lazio, defining an inner core compact. The square was dominated by the volume of the church, a circular plan, which echoes stylistically typical buildings bells, but was defined by all buildi ngs representative that ca n envisage i nside: Ca sa del Fa scio, the comp any's ma nagement agrarian, pantry and po rch with home s. The buildings, constructed according to the dictate s of autarchy a ll had simple lines and features of Mediterranean architecture, the bases of the buildings and the pillars of the arcades were square blocks of lim estone, plaster treated with a t rowel, the crowning glory of the church in lava dome clad in grey and characteristic majolica glazed tiles, and while the covers were tiles channels. The walls were painted in tufa plaster, the floors in brick-mixed concrete, the vaulted tufa porch covered the roof

with big fir wood and plywood coverings, the flo ors were almost marble-chip. The buildings were all size d and calibrated to the spac e upon which there were well-placed in the context of rurality. The barracks of the RRCC was modest in size, designed to hold a few soldiers and a noncommissioned officer, consisting of an office, bedroom, dining room, security room and board for the commander of t he station. The offices of the agrarian ONC were located in a space between the inner square and a street of land division flared near the entrance to t he streets, so as to all ow the smooth flow of cars. T he square was b ordered to the we st, from the back of t he buil ding used for h ousing an d office spac e, while on the opposite side of the road on t he short sides, there was a canopy to shelter cars, a covered area of 250 square metres, and a stable for six horses with adjoining house. There were 7 company offices in total, three on the raised ground floor and four on the first floor. O n eithe r side of thi s buildin g and con nected t o it, there a re eight h omes for m anagers, divided by number of rooms, from two to four more services. On the opposite side of the building, there were two hou ses for ONC official s without any family, consisting of four room s each plu s lunch room and conventions, kitch en a nd bathroom. Th e com pany d irector's ho use wa s rather isolate d, co nsisting of five rooms plus accessories. In the square, there was also the building used as a pantry, on the first floor of the barber shop and the post office, while the upper floors, there were are the home of the host of the pantry, the rented ro oms and a stu dio for th e nu rse. Edu cational fun ctions are contained in a si ngle multipu rpose building n ear the squa re that hou ses the kind ergarten, elementary, and the home of the GIL; functions are communicating with each other and had a communal gym, while maintaining separate entrances. The school consists of three classrooms, more services, from kindergarten classroom largest single office, the home of the GIL had an office and the gym 7 x 14m, while in the back there was space for outdoor games; on the first floor, there was the caretaker's accommodation as well as for the teacher. The streets and plazas are raised, formed by limestone ballast of stones, gravel and crushed stone surfacing, in the square platforms shall have cord of stone and concrete floor detritus. The impending war and the inevitable repercussions on the market made materials significantly and continuously costly. The Ministry of Agriculture and Forestry, became aware of this situation, with note no. 4482 of 18 May 1940 and returned the projects Incoronata and Segezia so that the unit p rices were up dated to changing ma rket co nditions, the same was applied B orgo Appio [6]. T he principal work of Bo rgo Appius was completed in October 1941 by Company Caserta already running price revisions as per law. The total cost of the work vari ed, therefore, as a result of the increases due to the war and rose from £ .1.966.090,95 as contained in the draft of 30 Septembe r 1939 to £. 3675800 29 May 1944. In 1942 air strikes in Borgo Appius began, casuing the first damage which would be gradually increased until the maximum of de struction in conjunction with the Nazi retreat f rom Campania in Septe mber 1943. Th is was then foll owed furthe r destruction d ue to military exer cises, a rtillery fire, th e us e of stru ctures such as storage, fire and other damage. Some houses were completely destroyed, others suffered damage to roofs and walls, many fixtures were severely damaged and many were completely removed. Even the farm roads suffered a lot of damag e due to wear of the wa gons and other me ans of war, as well a s the explosions of bombs and artillery sh ells. Even the tre nches suffered extensive d amage primarily to ongoin g flooding th at hold two-thi rds of the company u nderwater O ctober 19 43 to June 19 44, b ut even the n t he da mage will persist as the dewatering pump will st art working onl y partially. In the month of October 1943, there was a collision between opposing factions: the fighting artillery left deep traces in the works of reclamation and of course on Bo rgo Appius, b ut also in the spirit of t he peopl e who li ved in these places. At the outbre ak of World War II, Borgo Appius was the centre and the reference point of the sparse population in the territory as well as the stable residing in the village, houses with understated simplicity, the "Management Company the right Volturno" ONC an d the familie s of officers and employees. At the end of t he conflict begin th e repair work: on 4 September 1945, the plan for th e repair of damage caused by the war was drafted, which also covered the repairs of some farm houses.

1.2 Borgo Domitius

"The village was situated in the locality Domitius Ve na about 65 0 metres fro m the coastal road (Domitian Way), and laterally to th e Villa Literno-Ponte a Mare" [7]. The building, as in the village of Appius began in September 1 940, pen ding ministeri al concessio n on the basi s of t he proje ct dated 31 -12-1939. The work was suspended in May 1942 for the pressure of war and until April of 1953 did not even receive any form of concession. The Op era tried in vain to recogni ze th e consideration for the works partly completed by the Ministry of A griculture for low Volturno and Capitanata, the und erlying problem, however, was the lack of funds related to the allo cation of La w 30.11.1939, n.2017 reported to the fun ds for the war then reused for new war initi atives. In December 1949, the G eneral Directorate of Reclamation and the Colonization of the Ministry of Agriculture predisposed a plan financing the works already carried out and those to be (according to indication of the Opera), but as stated in the l etter n.1373 of 10 August 1950 (dealing specifically with the township of Segezi a on the plai ns, a nd by exten sion referred to all simil ar situ ations) the Mini stry of Agriculture extinguished the hopes of competing the work, a s the Treasury was unable to proceed with the funding provided and also added that the a ssets built up to an h our to b ecome the prope rty of the Opera. Thus, the Op era had sp ecific building s constructed that became i ts prop erty and ren ewed, however, the request for input regarding the construction of churches and infrastructure (roads, sewers, aqueducts), letter

5084 of 19.2. 1951, subsequently letter 32758 of 11 .24.1951. Having noted the continuing inability, Opera waived any claims for the repayment formally declaring null and void the request made under the law 11/30/1939, n.2017. Upon clarifying the issue of ownership remains from that of completion, which had become urgent for the many families settled in the area by Opera in Vena. In planning the completion of public works, Opera estimated about 60 million lira distributed as follows:
1 - completion of the building the Church and Rectory
2 - "" Elementary School and Kindergarten
3 - "" Carabinieri Barracks
4 - "" Post Office - Surgery
5 - "" of your teachers
The infrastructure and services (roads and streets, sewers, water supply, electrical works and fencing and gardening), were restricted to parts referred to above designed in accordance with the plan dated 12/31/1939. Project data 31/12/1939.
The project was set to an orthogonal system, rotated 28 degrees to the west. The rotation was suggested by the best solar radiation so as to facilitate, for housing, exposure to the east-south. The plan covered a portion of land at the side of the road Villa Literno -Mare so as not to have passing traffic into the centre. Close to the above-mentioned road, there was the Piazza (size 41 x 28 m) overlooked by the Church, Canonica, Post Office and the Doctor's Office, more than the building of the company and the restaurant-inn added to the original project. The square was accessed from the main road through the road Villa Literno - Mare 12 m in width, the road past the square was reduced by up to 8 m wide, there were also branches to reach the interior points to the establishment of equal width to 5 m, with 3.50 m of roadway. The streets were designed with the roadbed thickness of 20 cm, gravel of crushed limestone with a thickness of 15 cm, displacement and tarred. The sidewalks were in detritus of concrete and travertine.
The total area developed in relation to subsequent development was also calculated on the basis of an estimated population of 500 inhabitants:
Population 500
500 Rooms
Average surface area of each compartment 25 sqm
"" Blanket 25x500 m / 2 m = 6250
"" Public buildings 1300 sqm
Total about 7500 square metres.
The relationship between coverage and green (vegetable and flower gardens) was: 1:6-7.
Area 50,000 sq m private gardens and allotments
"" Total 7500 square metres of isolates +50,000 = 57,500 sq.m.
Surface lots 75% of the total built-up
Streets, squares, gardens etc. ... 25% of the total built-up area.
57.500x100/75 = 76680 corresponding to 7.6 Hectares.
The buildings fronting the square were on two floors arranged along the road, while the buildings arranged along the streets were terraced houses with gardens at the front and rear. On the road to the junction with the main road, there were isolated houses with a garden as well as a vegetable garden.
The architectural features werere borrowed from the characteristics of the local buildings of the countryside and the Mediterranean tradition. The outside parts of the buildings were designed with flower beds and ornamental plants, expanded metal fences on the tufa walls with iron gates and brick pillars. Two hundred pines were on the sides of the access road and around the square.
The plan of the church was classical with a single nave with an adjoining pastor's home and the sacristy which, if any, could be used as a catechism hall: the bell tower completed the composition giving upward thrust to the whole complex. The basement of the church and the rectory were in limestone blocks, square-face view, the plasters were treated with a trowel. The crowns of the church and bell tower were covered with tiles from Vietri. The roof was vaulted brick with glazed tiles from Vietri.
The police station was designed for a few officers and a non-commissioned officer with the family. It consisted of a bedroom, dining room, two bedrooms, security and accommodation for the commander of the station.
The post office and clinic were located in the south east corner of the square, representing the buildings 5 and 6 of the Plan. The post office and the manager's house had three rooms on the ground floor, upstairs in four rooms, there were the surgery, the dispensary, the local doctor's lodges.
The school, kindergarten and gym were conceived together in one block accessible by two main roads, interrelated, but with separate entrances. The school had three classrooms with services, management and caretaker's house, while on the first floor, the re was the teacher's accommodation. In the space behind, there was an area of 3250 square metres in which there was the playing field, a paved bottom covered by a layer of pozzolana of 26x24 m.
The teacher's accommodation could be accessed from the main road connecting residents and the teachers of the school. It was a modest dwelling on the ground floor and first floor.

The walls were in tufa blocks, the mixed floors in brick and reinforced concrete, the covering were Roman roofing tiles and a wooden square spruce framework of Trieste use. The window frames were made of cedar wood while the interior spruce and plywood. The floors were in terrazzo tiles, the internal plasters of a civil three-layer, the outer two layers were frattazzati. The interior steps were covered in white Carrara marble, the outer travertine marble. Encircling the buildings, there were concrete pietrini, travertine sidewalks.

As already described, the construction works were interrupted in May 1942, up to that date mainly the foundations and part of the walls in elevation had been built, totalling approximately 9.77 million lira in 1953, the year of the presentation of new completion project, which was estimated at 6,057,400 taking into account the decay due to the time that is with a reduction of 38%. In conclusion, in 1953, a project to complete the wok for a total of 68,451,000 lira was presented and signed by Dr. Ing Giacomo Di Muro, and never realized.

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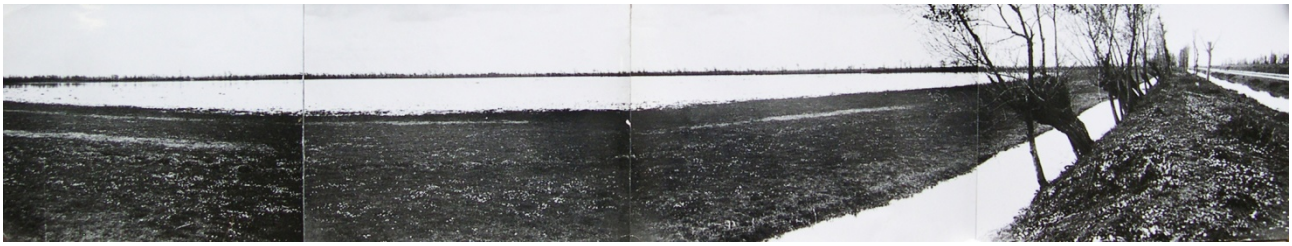

Fig. 1: reclamation of the Volturno, 2nd lot of land division along the Agnene

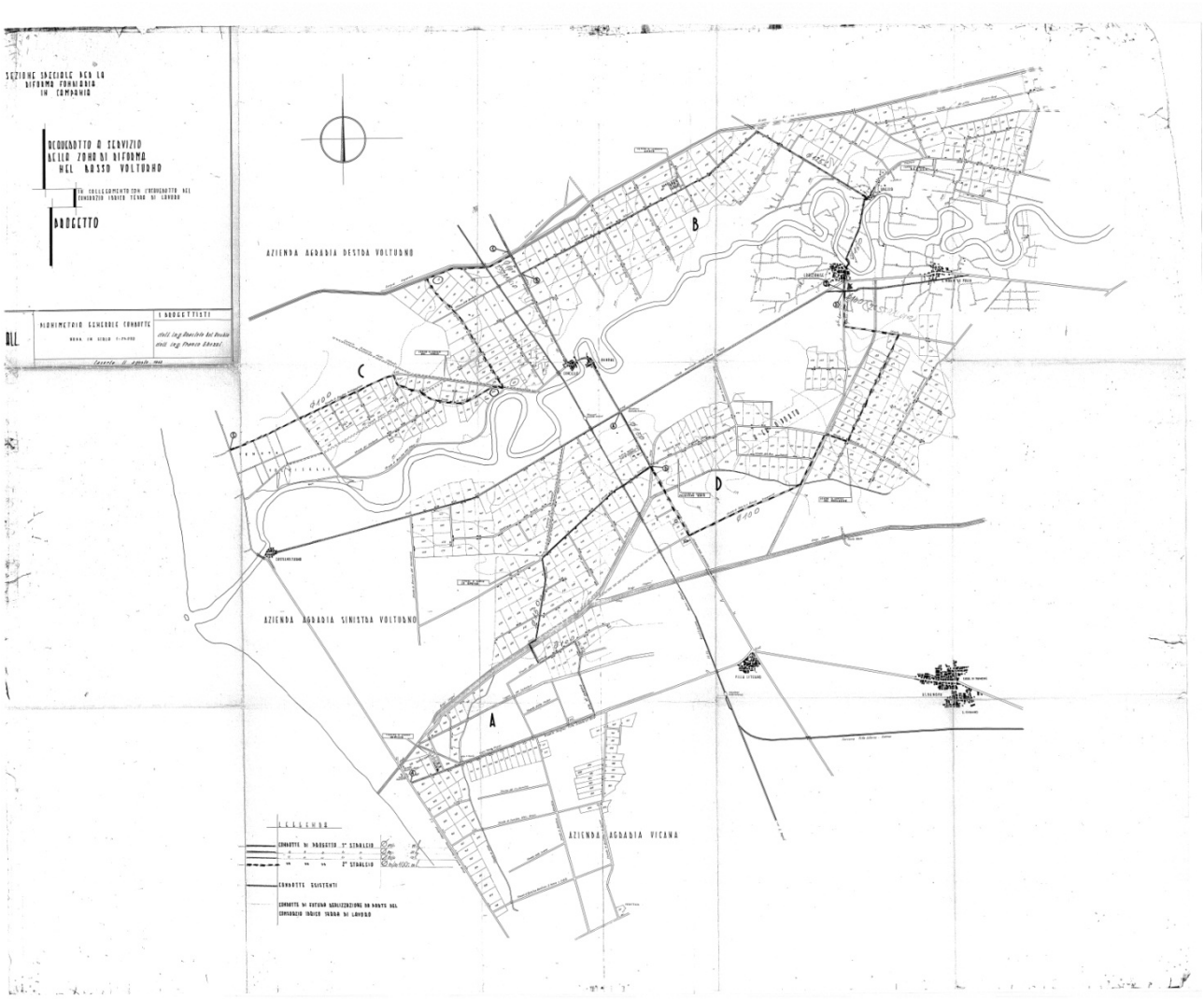

Fig. 2: Volturno, aqueduct serving the area for the Reform of Lower Volturno 1963

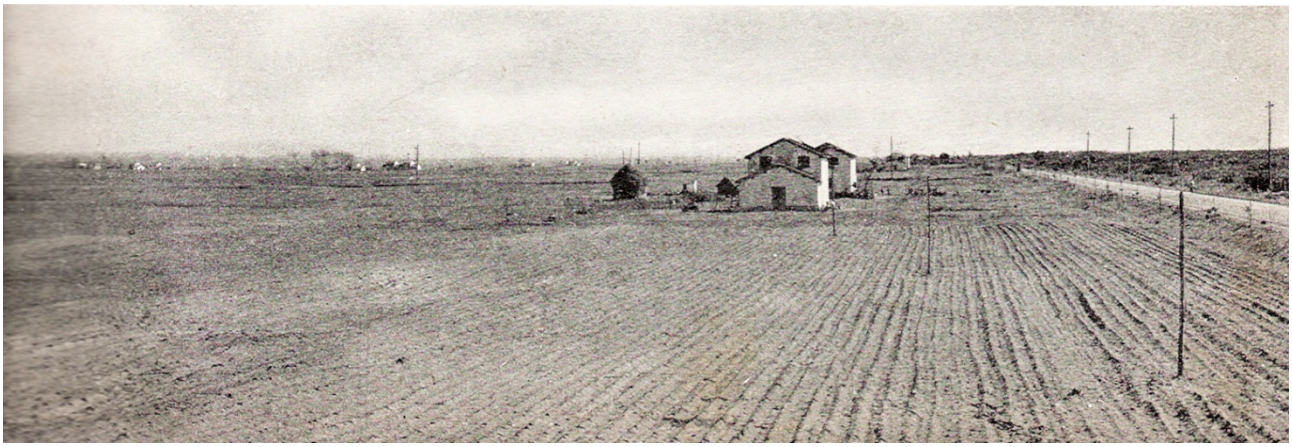

Fig. 3: road Domitiana



Fig. 4: Borgo Appius, plan

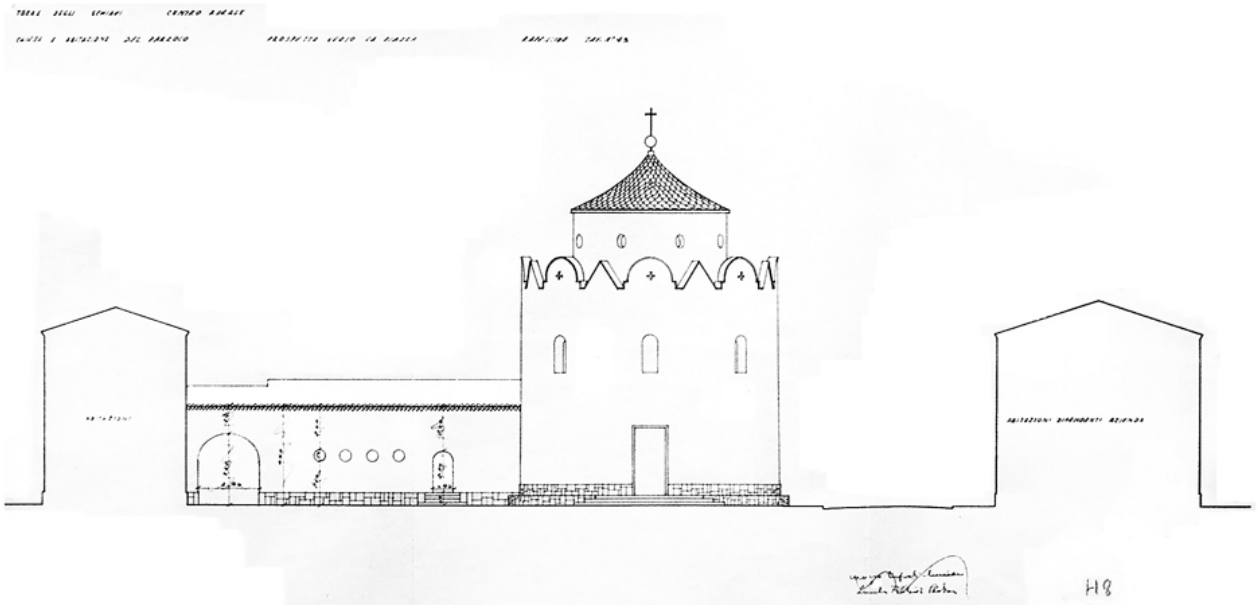

Fig. 5: Borgo Appius, section

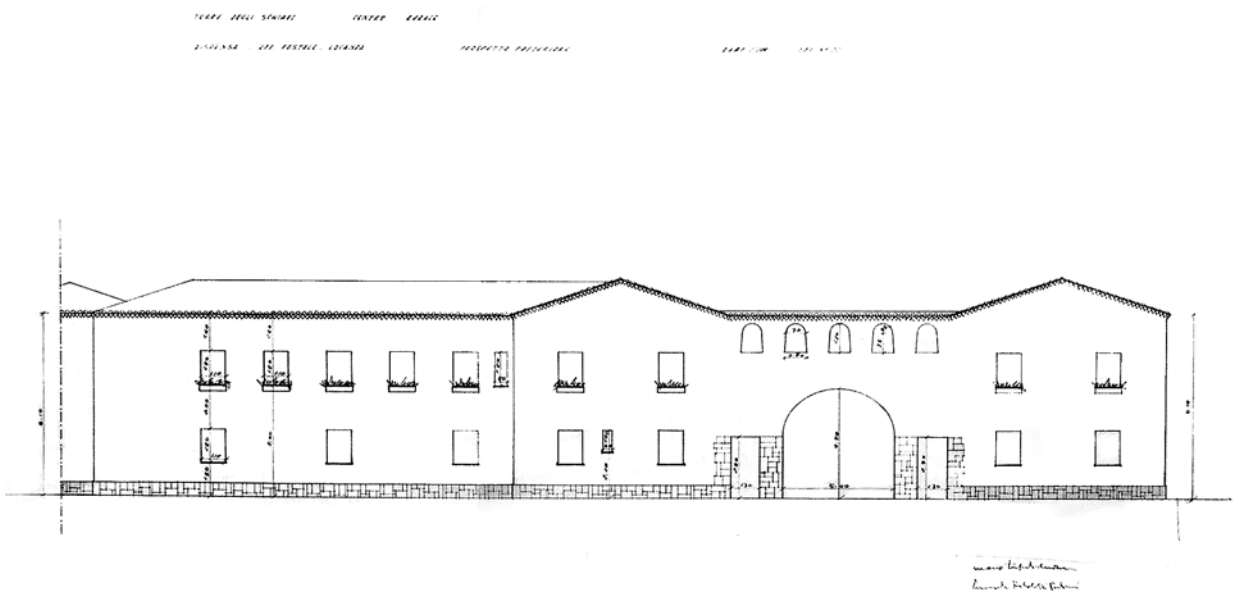

Fig. 6: Borgo Appius, prospectus



Fig. 7: Borgo Appius, construction of the church



Fig. 8: Borgo Domitius, plan

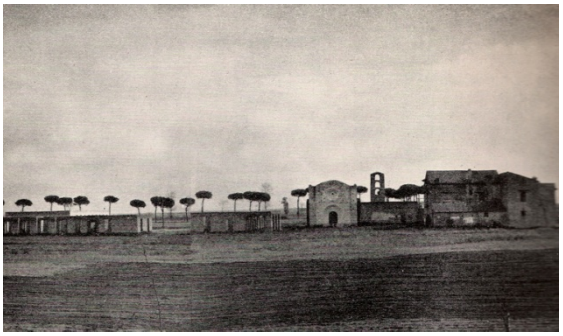

Fig. 9: Borgo Domitius, vintage photos

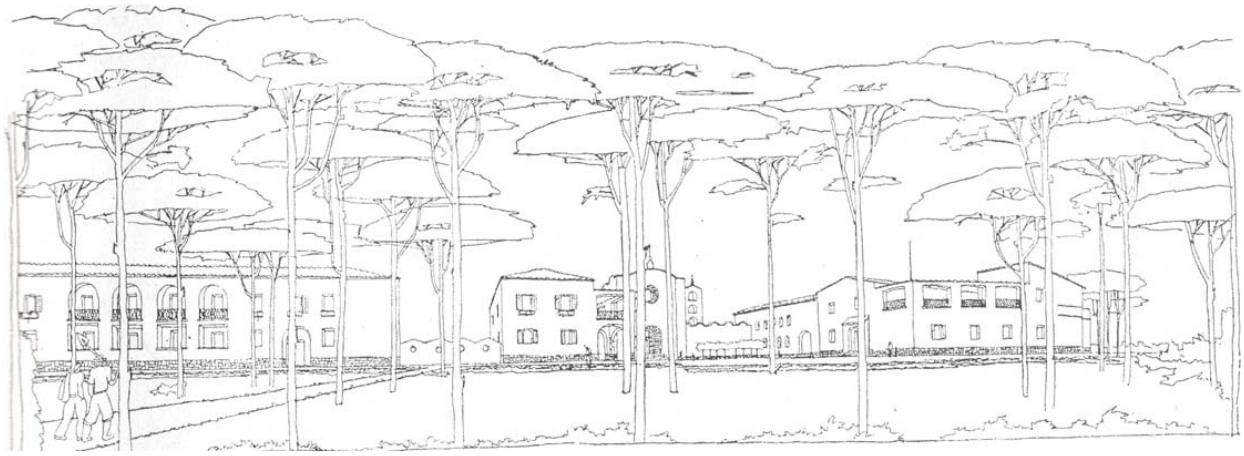

Fig. 10: Borgo Domitius, perspective

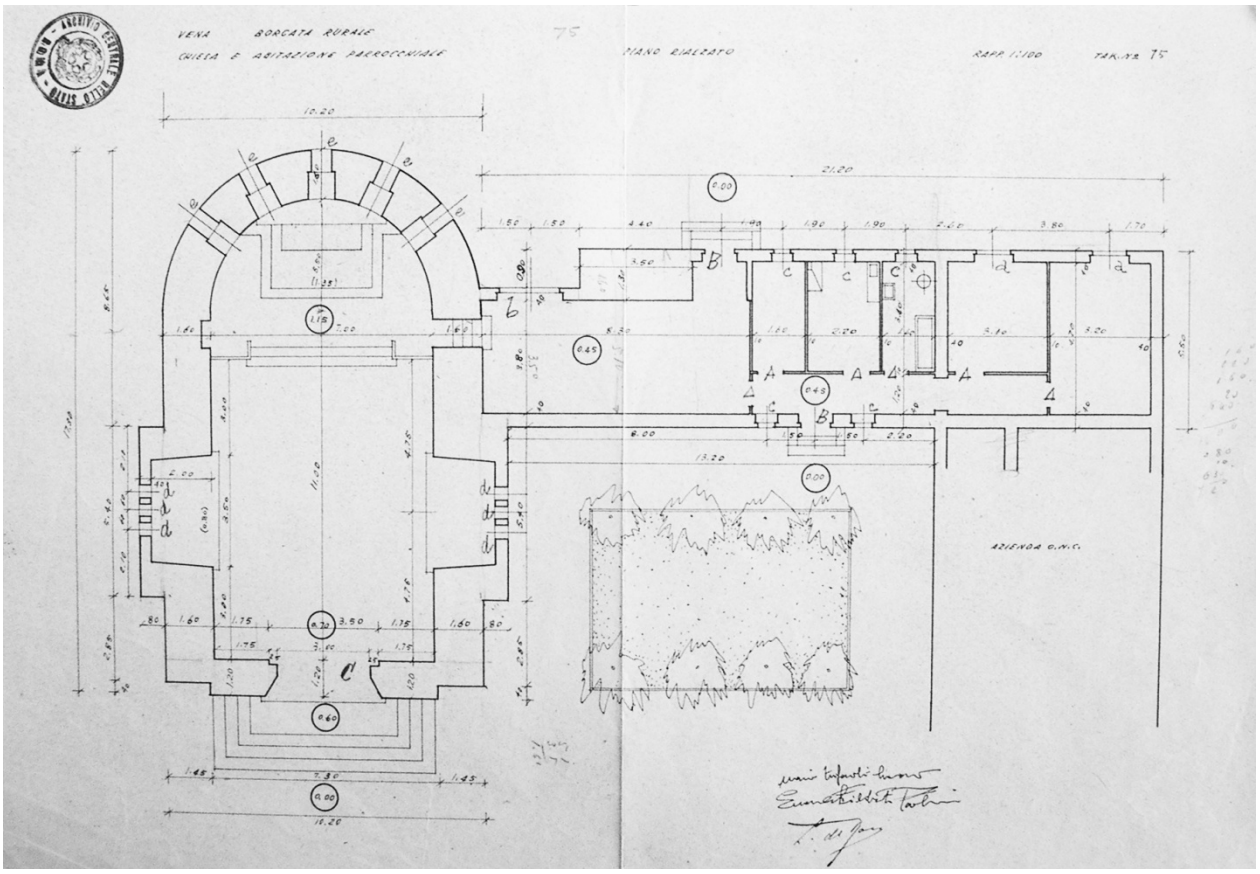

Fig. 11: Borgo Domitius, plan of the church

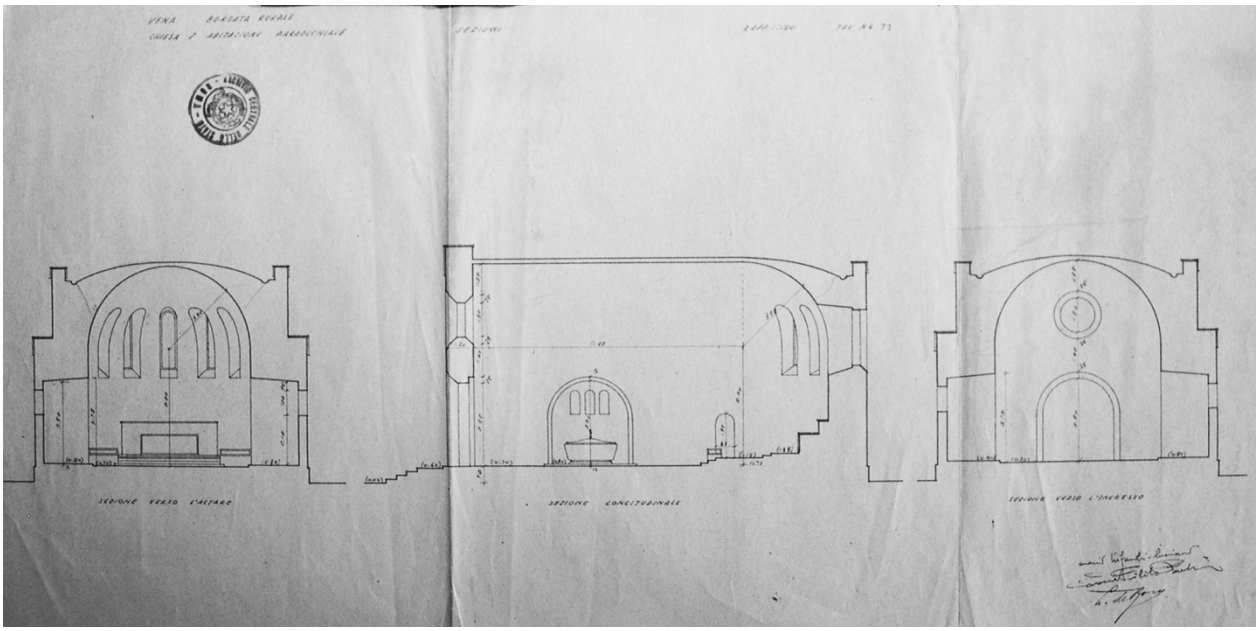

Fig. 12: Borgo Domitius, section of the church

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New urban models in the vesuvian Sarno plain

CARLO ALESSANDRO MANZO (coordinator)
Marino BORRELLI, Emanuele CARRERI, Carlo COPPOLA, Francesco COSTANZO, Efisio PITZALIS, Massimiliano RENDINA
Gianluca CIOFFI, M.Antonia GIANNINO, Gaspare OLIVA, Andrea SANTACROCE, Pasquale ZEPPETELLA
Department of Architecture and Industrial Design "Luigi Vanvitelli", Second University of Naples, Italy
Rejana LUCCI, Enrico CARAFA
Department of Architecture, University of Naples Federico II, Italy

Abstract
This PRIN research has been focused on the principles for the development of the Sarno plain structure, the urbanized countryside in the vesuvian area beyond Pompei. In order to take up an efficient strategy avoiding sprawl and soil cementing in the periurban areas, we propose to compact new buildings in a discontinuous system of small multifunction clusters, following the criterion "low rise – high density".
The concept is a green extended city, built up by urban parts with residential and productive structures and by public utilities separated by rural areas and parks. The discontinuity of urban parts alternating with agricultural plots allows that green and unbuilded areas avoid the building saturation of span among the detached cities.
The natural infrastructure of Sarno river should become an important element to order the next plans for the plain, increasing the multifold relationships among rural tradition and modern settlements. The urban projects follow different directions: the first one longitudinal direction will regenerate the river-bed, as the main "locus" plot of collective utilities (detached resorts, sporting utilities, vegetable-gardens with green houses etc.). These structures are integrated in parks and rural areas and connected by a continuous ribbon-road running along the river, recovering the landscape. The second ones are crossing projects adopted where the river cut the territory in the east-west direction: the solutions design new visual and functional connections between the Sarno utilities, the previous settlements and new residential clusters.

The Sarno plain, an area renowned for its specialist crops and manufacturing industry, has a twofold nature which helps explain the uneven concentrations of buildings. On the one hand, the area has been affected by strong pressures from the urban area of Naples which have led to high densities of building on the coast. On the other hand, the agrarian character of the fertile Sarno-Nocera valley accounts for the low density of building and scattered settlements moving upriver further inland.
As well as the coastal area around Castellamare di Stabia, the zones with high building density are related to the sprawl of urban centres, between Pompei and Scafati on the northern side towards Vesuvius and between Angri and Nocera in the foothills to the south. To the east two systems of urban settlement are situated in a position set back from the river (Striano, San Marzano, San Valentino, Poggiomarino) separated by agricultural areas dotted with small-scale building and crossed by a dense network of canals.
Overall the Sarno plain appears as a set of urban complexes connected by thin strips of building along the roads, alternating with rows of greenhouses, small factories and warehouses. Although it is imperfect and of low architectural quality, this settlement system contains large tracts of rural

countryside which could be saved and reintegrated within a hypothetical extensive city. If the theory of the “city by parts” is transferred to a local scale, the Sarno plain can be viewed as the basis of a multi-polar settlement that extends into the countryside; existing urban settlements resemble multifunctional districts, cultivated areas correspond to parks and gardens, and the system of public buildings coincides with large structures (archaeological sites, the shrine of the Blessed Virgin, the Bourbon explosives factory, the new hypermarkets and infrastructure).
The river has long played an important part in defining the constituent features of the countryside and the localisation of settlements (beginning with the lakeside settlement of Longola found near Poggiomarino). The river Sarno now seems to be an extraneous feature and of little relevance to the layout of the land, the architecture and the countryside. Indeed, since the river distributes industrial waste, it can even be considered one of the multipliers of the ecological disaster that has devastated the area. With a few exceptions, there have been no significant examples of urban construction on the river or its canals, either as a waterfront or as a redesign of the banks of the urban area.
Due to its importance within the landscape, the Sarno can be considered a privileged vantage point from which to assess the settlement problems of the area. This is why this study has regarded the Sarno as an incubator of new relations and links between river sites and cities. Considering the environmental reclamation programmes (such as restoring the river’s traditional navigability) and activities related to horticulture and floriculture, the upgrading initiatives on the river Sarno could play a leading role in the reorganisation of the area and the development of urban, rural and manufacturing settlements. It would be possible to reintroduce the technical and formal logic that used to underpin the rural landscape and architecture.

Based on this analysis, our research unit has focused on several criteria on which the transformation and growth proposals are based.
-1 The decision to adopt a strategy designed to counter dispersal led to the use of a discontinuous system of accumulative forms of intervention, with mixed functions, based on the criterion of “low rise – high density”. The basic idea is to construct a ‘green city’ made up of “well-defined parts” of residences and productive structures, and of recognisable primary and infrastructural features, separated by cultivated green areas and parks. The “parts” consist of residential units integrated with greenhouses and workshops, or small industrial complexes, situated within the rural landscape, designed to emphasise the importance of integration between urban and rural features.
-2 The decision to experiment with solutions that follow the criteria of discontinuity and alternation between the residential-manufacturing parts and the agricultural zones and parks, helps to ensure the presence of inbuilt and/or cultivated areas, as “buffer” zones that prevent urban sprawl and the merging of urban centres.
-3 The Sarno river-canal network, a natural-artificial piece of infrastructure in the plain, is considered the backbone of the future local framework which needs to be redeveloped and reinforced both from the functional and landscape perspective. It is given the role of a regulating feature of the transformations of the urbanised countryside, restoring landscape continuity and linking functions between sites associated with rural traditions and new settlements.
-4The proposed forms of intervention are arranged according to two directrices. Those along the longitudinal directrix are situated along the river Sarno which is redeveloped and reinforced with a series of facilities and collective places. The upgrading of the river-bed, the lateral canals and the buffer zones provides new margins and courses/layouts which provide useful reference points for the transformations of built-up areas and urban centres nearest to the river. Naturally, the upgrading system offers conditions of use that are compatible with its agricultural nature which should be reinforced as a resource. The new services on the river (with a low volumetric impact) are designed to be incubators of public and collective activities of public green areas rather than as accelerators of new building. The objective is to reconstruct relations and hierarchies between existing urban areas and give prominence to existing agricultural areas by preserving and enhancing them. The projects designed by Rejana Lucci offer a new way to cross the plain “at a leisurely pace” keeping parallel to the course of the river. A series of recognisable zones, collective places for existing urban settlements, have been identified along the Sarno where a series of activities linked to pre-existing features (archaeology, nature, agriculture and tourism) can be organised which need to be reinforced.
These centres, which will be systematically linked to previously existing infrastructure, will house the following: 1) tourism-hotel-spa facilities on the Castellammare coast; 2) info-points and fully equipped parks near Scafati (situated centrally between the river and the intersections between traditional local tracks and routes); 3) SouthEataly catering with locally sourced food at San Marzano; 4) teaching farms with fully equipped nature trails on the river, spaces for workshops, studios and residences linked to archaeology, specialist training centres and teaching farms at S. Valentino

In the parts where the river and other infrastructure such as motorways and railways have led to a rigid demarcation of the area in an east-west direction, work is required to re-establish relations

between the two sides. This will create new ways of crossing the two sides to ensure better functional and visual relations. The directrices that are transversal to the water course therefore provide new links between the river, existing urban centres, new residential and productive units and services, reinforcing the routes that run at right angles to the infrastructural corridors.
Small compact clusters of residential and productive units, together with new facilities, will be situated in the transversal zones. To provide practical support for this settlement pattern, town planning guidelines have been followed: both areas of “legalised” illegal accommodation which the PUC (town planning regulations) of Scafati describe as zones of redevelopment, and zones with potential for new facilities and services or the redevelopment of commercial areas. In general, the main criterion was to move the new building to the southern side of the Sarno to avoid increases in volume of the “red belt” at the foot of Vesuvius where there is a serious risk of a volcanic eruption.
The strategy of “transversal” initiatives also guides the design of several innovative pieces of infrastructure, such as the plan for a horizontal cableway between Pompei Sud and Pompei-Centro (Emanuele Carreri and Pasquale Zeppetella) which would pass over the Sarno river-canal system to link southern areas with the archaeological exvavations and the Shrine, the two main tourist resources of the Vesuvius area.

Productive residences and “compact” horizontal units designed to create a “green” city.
As mentioned above, an effective anti-dispersal strategy is based on the concentration and densification of residential initiatives. This will involve the creation of compact horizontal units with functions integrated with agricultural activities which can become the main features of a controlled redesign of the landscape. In architectural terms, they are well-defined parts, small fenced-off sectors or clusters, according to the relationships of continuity, discontinuity or alternation that are sought with natural features and the characteristics of the different contexts.
The potential for residential expansion in these areas is extremely restricted for town planning and safety reasons. The new residential units with mixed functions, provided with services and facilities, are intended to discourage fragmentary residential accommodation, and can therefore “reabsorb” phenomena associated with dispersed building initiatives.
On the one hand, the integrated low rise - high density clusters are inspired by the idea of a small community equipped with infrastructure and collective services, while on the other hand, they safeguard the autonomy of the individual units, responding to the expectations of the single family or parental house. Designed as coordinated local plans, these initiatives are intended to encourage aggregation and cooperation, promoting rationalisation for the production, distribution and sale of horticultural and floricultural produce. In conclusion, these innovative solutions are believed to be valid alternatives to isolated small blocks of flats, terraced housing or a condominium with a linear layout.
Inhabitable houses with fences, houses on open plots of land linked to areas with a danger of overflow. –Each residential unit consists of a cluster of housing types that are suitable for the rural-urban nature of these areas. From the architectural perspective, this involves a reinterpretation of the suburban detached house or the courtyard house, closely linked to the design of free and cultivated areas. In functional terms, the design proposes an extended use of the productive house, with a close link between domestic spaces and work spaces (greenhouse and workshop) and with small “district” facilities.
Planning and compositional regulations have been experimented within a sample plot measuring 35 x 70 m. (a typical size for the local area and comparable to the dimensions of many insulae – blocks - in ancient Pompeii). The design can be extended to up to five or six residential units, a greenhouse or workshop or district facilities.
In order to allow a gradual reduction of land occupation, the study of the “extensive city” investigated equalisation mechanisms for local regeneration. An interesting field of application was identified in the areas to the south of the river Sarno, between Pompei and S.Marzano, where industrial plants buildings of low architectural quality and a substantial floricultural economy, based on greenhouse cultivation, exist side by side. Using equalisation models, it is possible to construct sections that will lead to the increase in cooperative coordination between floricultural entrepreneurs. On the one hand, the proposals (M. Borrelli) may involve the construction of residential units in dismantled industrial and commercial structures – “factory houses”, while on the other hand, they may include the creation of vegetable gardens or “productive gardens” (typical of local traditions of horticulture and nursery gardening) – in greenhouses or outdoors within the new residential systems. For the area to the south of the river Sarno, irrigated for many years by the polluted waters of the river, an experimental phytodepuration system is planned using medium-sized plants.

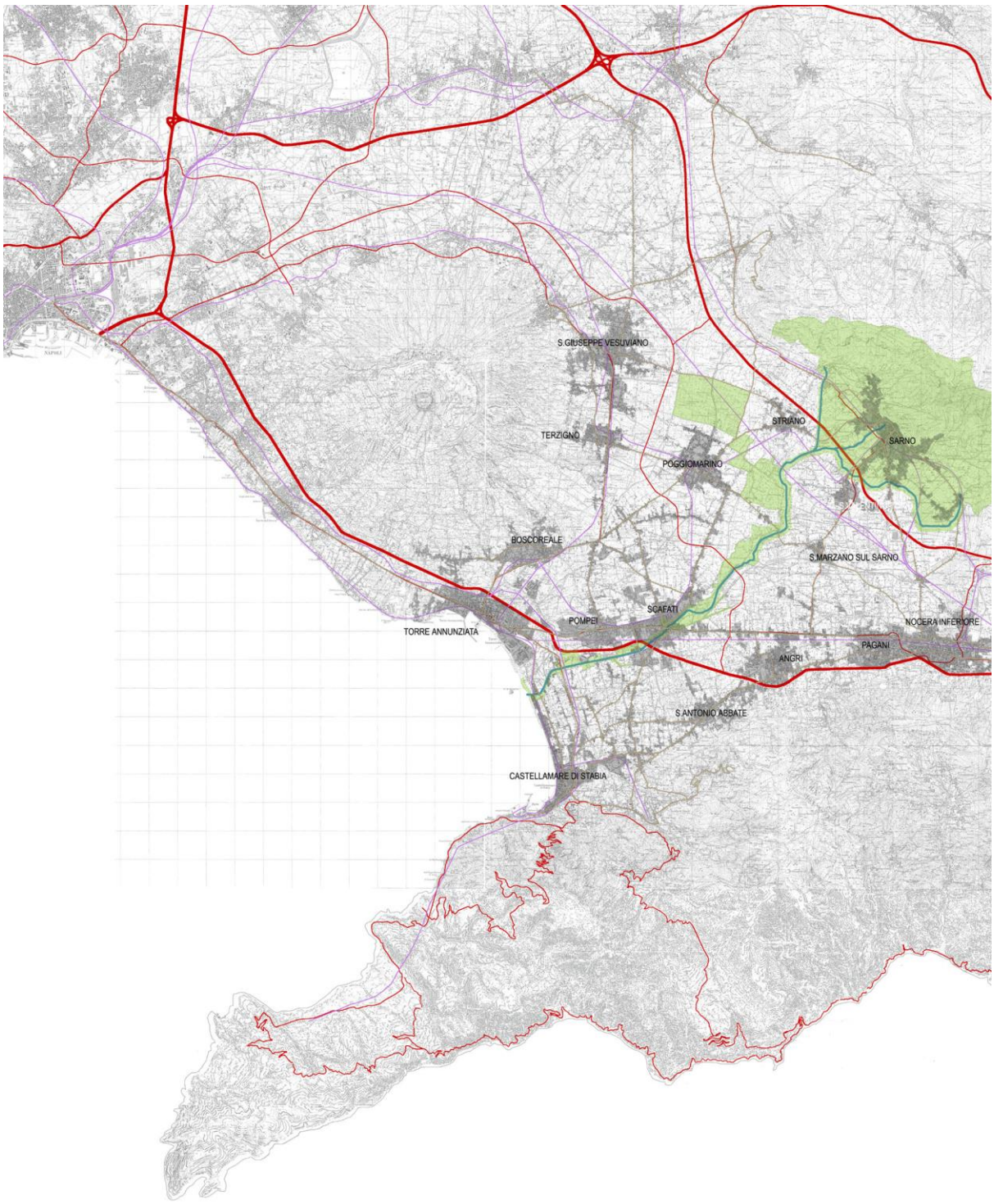

Fig. 1: Sarno plain settlements



Fig. 2: Transversal plot for green housing parts (with A. Santacroce e M. Giannino)

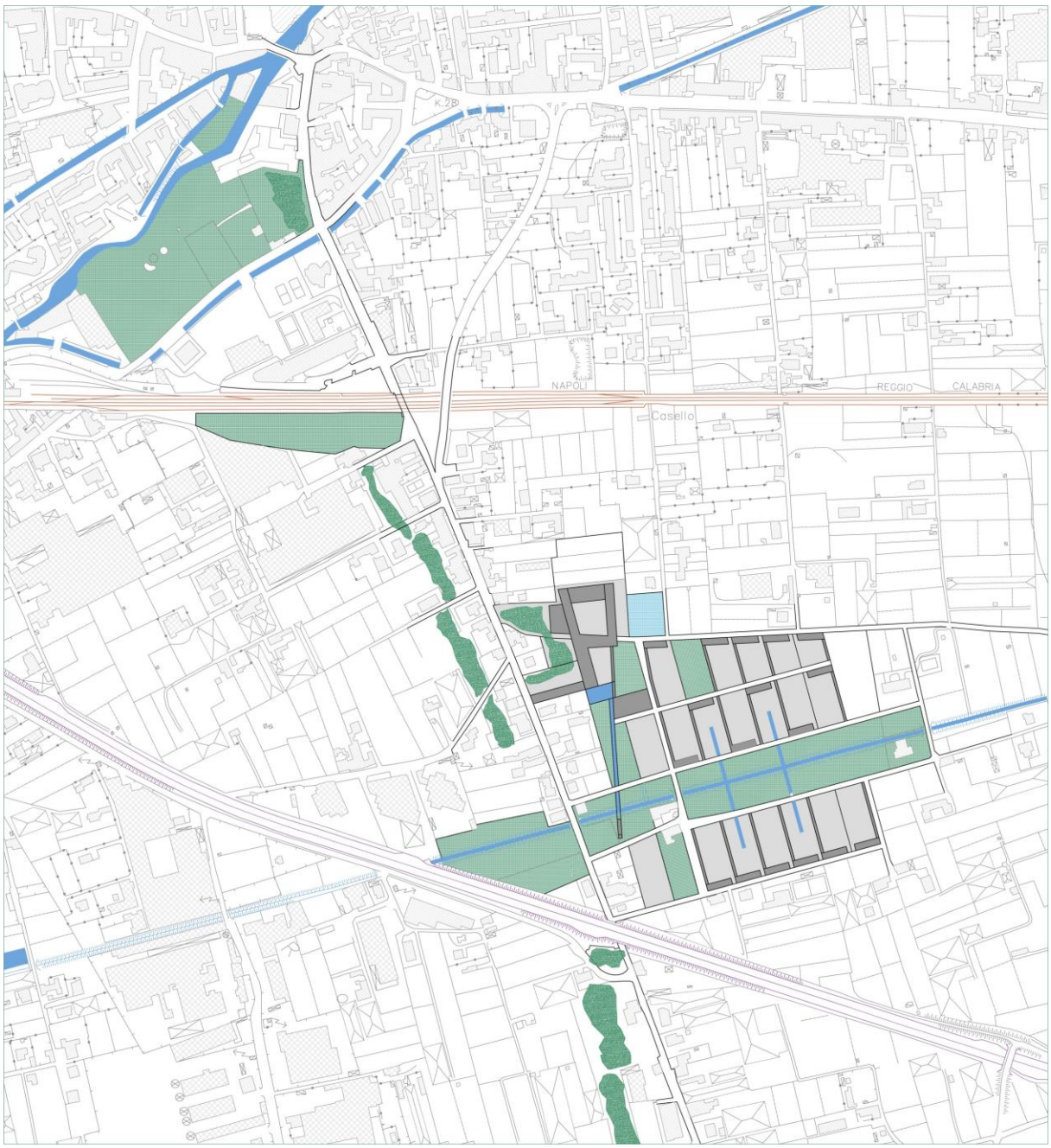

Fig. 3: Scafati productive housing plan (with A. Santacroce)

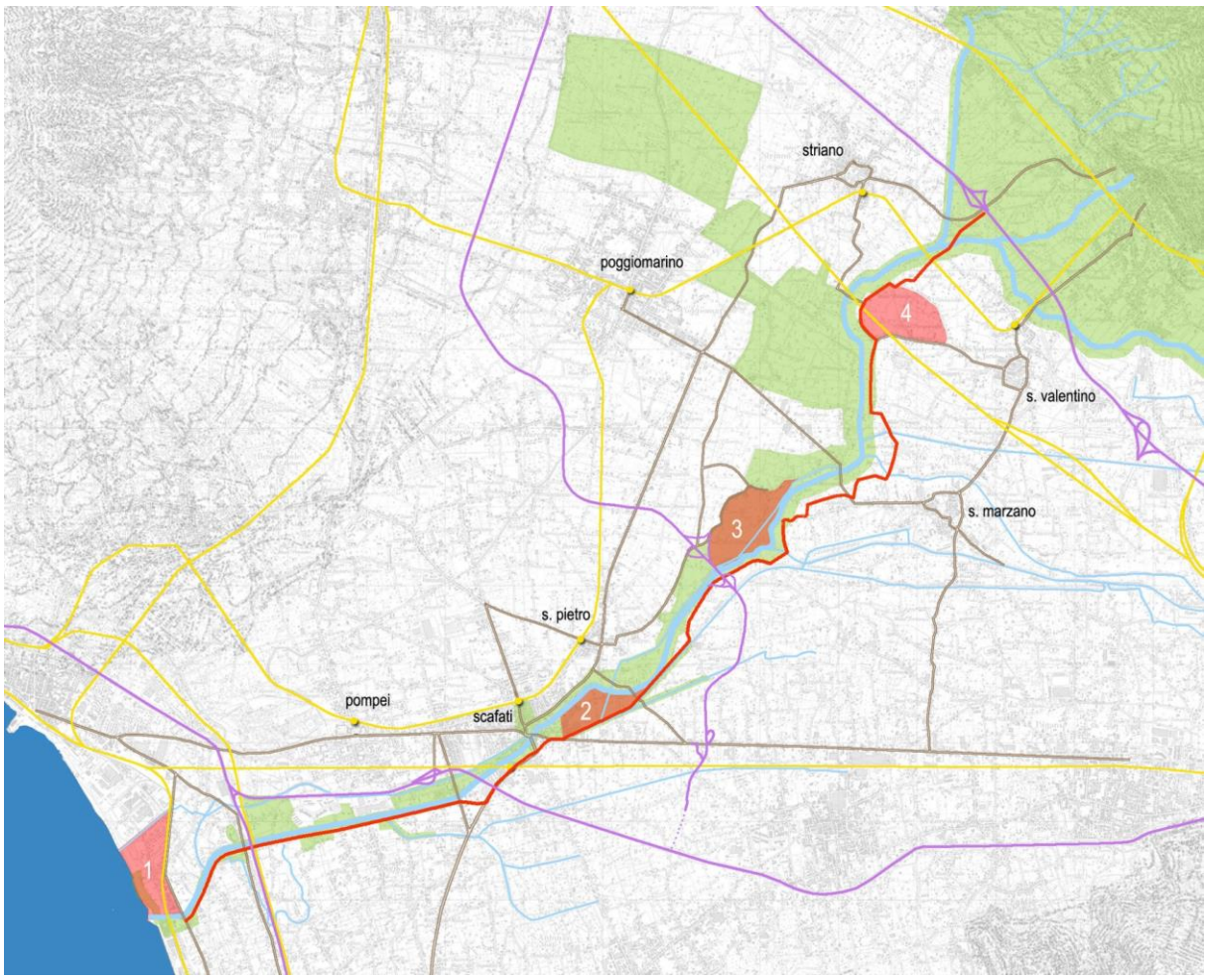

Fig. 4: Public spaces along the river (R.Lucci-E.Carafa)



Fig. 5: Urban park with facilities in Scafati (R.Lucci-E.Carafa)



Fig. 6: Agricultural and touristic park near San Marzano (R.Lucci-E.Carafa)

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Urban Regeneration. Methods and Strategies

Maria Antonia GIANNINO, Agrippino GRANIERO, Gaspare OLIVA, Ferdinando ORABONA
Dipartimento di Architettura e Disegno industriale, Dottorato di Ricerca in "Rappresentazione, Tutela e Sicurezza dell'ambiente e delle strutture e governo del territorio", Luigi Vanvitelli, Seconda Università degli Studi di Napoli, Abazia di San Lorenzo ad Septimum, Aversa (CE)
architetto.giannino@gmail.com, architettograniero@gmail.com, gaspareoliva@tiscali.it, orabonaferdinando@libero.it

The theme of *urban regeneration* has played a strategic role during the last two decades in European and national urban building policies. Current addresses, also defined in *Leipzig Charter on Sustainable European Cities* in 2007, indentify the necessity to invest in requalification of degraded residential assets and not in new developments, individuating in urban regeneration the main tool for development of contemporary city.
Public neighborhoods have developed, historically, a wide set of common problems. They are not only due to wrong planning but also to the concept of "housing for masses".
The original ambition of modern settlment, developed from German *Siedlung*, was to be an autonomous part, on the point of view of morphology, in urban expansion. Joined by new developments, a lot of neighborhoods became benchmarks for suburban areas and now we can define themas "new urban centralities". So their role in urban dynamics has changed and they can be individuate dasprecious reserves of public spaces and potential incubators for regeneration of larger areas.
Analyzing some Italian and European case studies, the most innovative relate to the densification of open spaces, inserting new services in a general redesign of green areas; concentration of built surfaces, in order to reduce land consumption and introduction of different residential types in order to improve *mischbebauung.*

Keywords: Regeneration, Neighborhoods, Develope

1. Fact-finding and design-related aspects for the Urban Regeneration (MAG)

The biggest problem with which our society must confront is the deep crisis of the concept of the distinction between city and country and the problem of redevelopment of public housing neighborhoods. The expansion of the built environment and urban fabric in farm and rural areas has led to a patchwork of hybrid spaces organized according to an alternation of full and empty spaces, cities and countryside, without any apparent connection. The complexity of the areas is formed by the overlapping of different layers sedimented in time according to a mysterious logic of cancellations and permanences that a cursory glance can not classify that as chaotic and incoherent. The gradual domination of the environmental characteristics of the area from the settlements built and networks, which began with the industrial city to another of the eighteenth century, in recent years has reached a high degree of irreversibility.
The address of the research project is measured by the substantial processing activities built that is taking place for several years in Europe, involving many parts of buildings, both old and new. Especially in the context of the progressive tradition has developed a sensitivity to the positive role that public spaces natural parks, gardens, green cities, agricultural areas, gardens metropolitan have in rebalancing the extreme artificiality of urban life by answering logical health benefits and recreation but also as places of practices and mobility alternatives and natural reserve. Similarly the processes of regeneration of the *housing* concern both the adaptation of existing buildings, both new functions and the redesign of open spaces and common areas. All work on the built becoming increasingly

expanded and diversified: additions, overlays, *infilling*, inserts, new coatings, *surefit*, remodeling of land.
In particular, the traditional affection of Italian culture to the conservation and protection has produced analysis on public housing and interesting contributions to recovery. The original idea of the modern district, which born from *Siedlung* German, is a morphologically independent part in the expansion of the city.



Fig. 1: Hufeisensiedlung, Berlino



Fig. 2: Bijmermeer, Amsterdam

Achieved by the new expansions, many neighborhoods have become points of reference for decisive and peripheral areas that were once considered today as "new urban centers." The quality of the relationship between full and empty, evident within parties often saturated and congested, resulted in a gradual change of their role in the dynamics of urban identifying them as reserves of precious public spaces to redevelop larger areas.
It is necessary to change some of our assumptions, to make a shift of our look on the territories of the urban landscape to identify new ways in making and dealing.

1.2 Urban design in a "site-specific"
The analysis of the materials from which the city inevitably lead to recognize the uniqueness of each urban situation contingent and the specificity of each territory. The historical sequence of topography, river networks, infrastructure networks and agricultural land fragmentation, the morphology of the built and vegetation, has been a progressive sedimentation of materials that are stratified according to temporal logics very slow, unknown to the acceleration of the phenomena of the contemporary . Renew the look of the city means, then, refuse the apology to the city "generic" and get rid of that *habitus* of surface observations that the contemporary city is not understandable if you do not like chaos, homogenization, randomness. Urban problems that confront us today are, of course, essential to this situation. It is the responsibility of the project to recognize the specificity and adapt its operating modes to the complexity of contemporary space refusing to formulate formal models. This discussion suggests the possibility of reorganization as an alternative to exogenous control of traditional planning that is constructed from the conformations, needs and specificities of places. The design, techniques of representation and all the tools that allow the analysis of the sites have a key role to re-think the contemporary city, which otherwise escapes any meter of understanding. The project is common ground in many disciplines but it is precisely the disciplines of architecture to give it a result of spatial as well as linguistic.
So the disciplinary specificity of urban design is to be found in the relevance to run in the space of the city, in the "care of form." In particular we want to use here the term "urban design" in the sense of "*projet urbain*" French as a tool that is able to articulate the different scales and in different times both the spatial aspects, figurative and formal and the social intervention planning by means of a "morphological axis" and a "axis of the process", the first reported to the organization of the space, the second to the processing capacity along the time. In this sense, it is then possible to speak, especially in the French tradition of a "culture of urban design" in which some aspects are clear: attention to the context and history of the places the consideration of the temporal component in the process of building the city, the belief in the proposal of a *mixitè* uses with particular attention to social complexity, typological and landscaping. It is interesting to note that in order to address an area suspended between town and country the best ideas come from their own disciplinary fields on the boundary between architecture and landscape, as if the morphological complexity should be reflected in a complex thought and analog.

1.3 The city in the landscape

Now seems inevitable reversal of perspective that is turning his attention to empty rather than full, open spaces and landscape rather than those built, to the relations between the parties rather than to objects.

The Ville Radieus is perhaps the most accurate / fitting of this conception of urban design in the landscape. The project of Le Corbusier in 1933 for a million and a half people has the aim to solve the housing problem of mass. The residence of the "Ville verte" occupies buildings in line with eleven floors, bent into a series of right angles, the *redents*. The buildings are constructed on *pilotis* to keep out of the distance at ground level that is configured as a large public park open to the landscape in which departments are located at the residence.

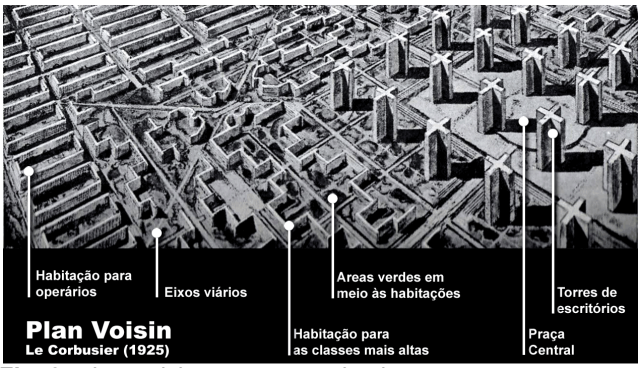

Fig. 3: Plan Voisin,1925, Le Corbusier

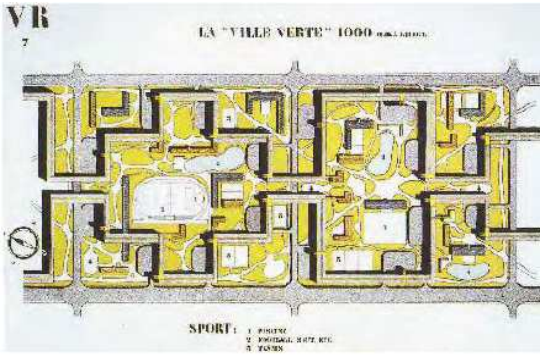

Fig. 4: La Ville Verte, 1935, Le Corbusier

The various research methodologies may have a number of basic assumptions and common lines:

1-The design as a tool capable of articulating the different scales and in different times both the spatial and the social aspects of the intervention on the landscape.

2- The territorial scale in relation to the concept of landscape and its implications in the field of design in its various forms (architectural, urban, ecological, artistic).

3- The discourse on the form and, in particular, on the morphology of the territory.

4- The emptiness, the open space as the beginning of the project reflection operand fact a reversal on the usual relationship between design and object.

2. The city expands (AG)

Starting from the last century we are observing, in Italy and in the world, a degenerative process caused by the sprawl of the city, the major cause of loss of identity and social space of places. The explosion of the city, due to factors of an economic, social, political, technological discontinuity creating fragmented urban form of the built and functional segregation. The enlargement of the urban fabric has led to a progressive increase of the cemented surfaces, driven by a strong desire to build, sometimes with no correspondences to the real demographic and market needs, and by the multiplication of places that the French anthropologist Marc Augé called " non-places ". In big peripheral areas, near major thoroughfares are born giant malls, multiplex cinemas, nightclubs, train, industrial areas and functional centers which, being inserted by force, often results in irreparable fractures with the surrounding area, going to upset dynamics and balances between the natural and artificial components of the landscape. Residential neighborhoods, public or private in the suburbs, often occur as areas without commingling functional and social, dormitories or even simply ghettos. While the expansion has occurred without intervention lines and then through a process of random and spontaneous addition that responded exclusively to individual needs, the other is the result of precise planning strategies to certain goals. In both cases, the spread of cities has caused and continues to cause a relentless consumption of land with big consequences, devastating for the environment, in order to reduction of the agricultural areas, in a worsening of the quality of the landscape, impoverishment of biodiversity, hydrological and physical problems due to deforestation and soil waterproofing. All the data concerning the expansion of urban agglomerations are worrying. ISPRA, Institute for the Protection and Environmental Research, conducted a study on the use of land in Italy from 1956 to 2010, which shows that in recent years it has come to lose more than 8 square meters of soil per second. The settlement pattern characterized by urban dispersion is an inefficient system, in particular for what concerns the power consumption, the connections, the possibility of social interaction. The widespread location of residences, equipment, services, forces people to travel

greater distances, resulting in an increased need for means of public or private transport, an increase in energy consumption, more pollution, more and longer travel times.



Fig. 1: Public housing in Afragola, near Naples.

2.1 Intervention Strategies

The concept of "ecosystem" of the city sees itself as the environment in which man lives and interacts with the various components of a complex and open system in which many factors contribute to the establishment and characterization of every single part of it through interactions in dynamic equilibrium. This dynamism is expressed in the urban structure through urban planning and construction work which often irreversibly affect the quality of life and use of space. Urbanized areas, in this relentless advance, have become more extensive, covering the surrounding territories, making the invisible boundary between a city and another, between the city and the countryside, unrecognizable identities and vocations of the individual sites. In this continuously evolves and expands comes the need to rethink the ways of making city, through the adoption of new strategic development aimed at curbing urban sprawl, conserve, regenerate and innovate the existing, reversing the processes of decay and neglect, working on urban spaces, structures and infrastructures already implemented, improving the quality of living and more generally of the city, creating new connections, more effective services and social and functional mix. In order to govern and limit the land use you for first must know the existing city. Through detailed analysis, elaborating a multidimensional representation of the urban fabric is possible to identify the potential and manage resources such as games of a profit and loss account to be used for the sustainable development of natural and built. On the one hand, through the knowledge and optimizing the use of available resources, we can protect and enhance local identity, the historical sites and monuments of existing cities, on the other we can build new projects in the areas of more recent formation, define lines of action innovative and sustainable that limit or even cancel the land consumption. Precise strategies for urban equalization, associated with the use of certain building types and the introduction of special purpose, make it possible to rationalize and optimize the use of space within the city area. These opportunities management and control systems could certainly be the responsibility of local authorities, called directly manage some important actions of transformation of the city as well as in the Federal Republic of Germany, where the Länder contribute to the achievement of the reduction of land consumption fixed by so-called "law Merkel" in force since 1998.



Fig. 2: Housing expansion in Giugliano, Napoli, Cmapnia

A further line of action is the ability to act on the urban fabric already built. The overbuilding, driven by speculative logic first, but the city did not create clusters of buildings with no identity. The expansions, even those that are planned, often occur through building works of poor quality. Should intervene on the existing, giving it value and meaning, creating connections and new solutions. It would therefore be appropriate, before occupying new territories, check out what you can do using all the opportunities available within the city. By conducting a survey of the use of existing building elements, identifying underutilized facilities and those not used, you might plan the recovery and regeneration of individual buildings or building complexes on brownfield sites, paths of disused railway lines or roads never completed. These offer great opportunities for development of recycling architectural and urban interventions, through which it would be possible to restore and enhance large parts of the city. The cognitive processes, systems, information management, enable us to design new urban structures and develop new solutions and territorial quality. And it is the quality of the fundamental prerogative of the city of the future, the distinguishing feature of the architecture to make it feasible to realize the sustainable development of the environment. Quality as the result of democratic participation in decision making and therefore the expression of specific needs and collective, as an effective balance between economy, efficiency and operation, as a result of a wise warping of relations between the artifact and its surroundings, as a response to the need to lower consumption of soil, as an expression of the awareness that the territory, seen as a common good, should be preserved so that it can be enjoyed by future generations.

3. Urban regeneration in Europe, the example of Robin Hood Garden in London (GO)

This contribution is about public initiative developments realized in Europe from second post-war period to Eighties. The recent proposal for urban regeneration of Robin Hood Gardens (RHG) complex in London, advanced by Sarah Wigglesworth Architects (SWA), can be taken as a best practice in the field of urban regeneration policies for degraded situations in planned developments.

3.1 Principles for urban regeneration in planned developments

French grand ensambles, German siedlungen and many works by IACP (Autonomous Institute for Public Housing) in Italy (INA casa e 167 plans) are characterized by big extension and their value is more evident in urban structure than in individual buildings. Hypotheses of discontinuity and big dimension of the buildings, taken as urban principles, involve the concentration of built surfaces in few volumes and the presence of big open spaces that stand as green stocks in deregulated and extensive development of contemporary European city. Concentration, as typical character of modern development, can be pursued, considered actual problems connected with land consumption, as sustainable and desirable hypothesis for new urban policies.

We have to overcome the prejudice about big dimension of modern developments, because this feature is not a cause of the decay of this areas. Big dimension must be considered not only as a condition for a sustainable urban project, but also as the representation of a collective idea about housing, that for the second part of Twentieth Century had inspired social housing experiences in the whole Europe.

Intervention in modern neighborhoods should be respectful of developments' specific features and should propose adjustments and improvements adding new contents to existing elements we consider as values, first of all the presence of big open spaces.
Possible interventions, we can take from a wide range of contemporary examples and realizations, can be organized in three big categories:
-Provision of equipments or improvement of existing equipments
-Change in distribution and typological features
-Technological adjustments
Collective buildings are often missing in modern development or their realization is incomplete. First category is about interventions that introduce collective uses and improve conditions of existing services. This kind of buildings, as interaction elements with open spaces, produce new ways of using open spaces, improving safety and social dynamics. About intervention techniques, we can work in different ways. Ground modeling allows to integrate new architectures with open spaces. The conversion of ground floors, if they host accommodations, and their occupation, if they are empty, allow to insert new uses without new volumes.
If we talk about buildings realized between 1920 and 1950, distribution features are often connected with existenz-minimum culture, that, in response to a large demand of houses, used to propose houses with very small rooms. These small and spartan spaces are nowadays insufficient for actual housing needs. Urban regeneration of Kiefhoek development in Rotterdam (designed in Twenties by Oud) demonstrate that is possible to adapt modern houses respecting the base-idea and character of original buildings. This project provided the union of original terrace houses two by two to obtain bigger accommodations.
Many modern developments were characterized by a single house type and so the social composition of these urban areas were not various. Contemporary regeneration interventions should realize conditions for coexistence, in a common urban context, of different kind of inhabitants. In this way, social dynamics and phenomena connected with control and appropriation of collective places could develop. Coexistence of different house types (simplex and duplexes houses in multifamily buildings, single-family houses, terrace houses and patio houses, …), that modern architects called mischbebauung, represents the condition for the presence of different typologies of inhabitants.
We can talk about some urban project realized in Italy between 1940 and 1960, built on the hypothesis of typological mix. Between them the most interesting are Tuscolano development in Rome by Adalberto Libera and Via Dessiè development in Milan by Piero Bottoni, Gio Ponti, Luigi Figini and Gino Pollini. In the first example we can find the minute fabric formed by patio houses and a three storey multi-family building; in the second example there are big slab blocks with decks organized following a centrifugal logic, creating a half open central space, and there are some aggregations of one level single-family houses. These experiences represent successful attempts of spatial integration between different types through the definition of high quality external spaces.
Technological adjustment interventions represent the precondition for regeneration of modern developments.

3.2 Robin Hood Garden (RHG) project by Alison and Peter Smithson

For this development, commissioned by Greater London City Council in 1966 on a two hectare site in Tower Hamlets in the East End of London, Alison and Peter Smithson, as designers, proposed a scheme recuperating distributive solutions developed in competition project for residential buildings in Golden Lane in 1952. Site was surrounded on three sides by streets and the main goal, on the urban point view, was the definition of a huge and protected green space. Accommodations, organized in two slab blocks with mixtilinear shapes and different lengths, face on this central open space that architects called "soft landscape". The two small hills situated in central area are artificial and they were realized recovering the rubble from excavation of the site. Smithsons realized an operation similar to Piero Bottoni's solution for QT8 development in Milan, where the big artificial hill were built using rubble from bombed buildings of that area.
On the typological point of view, the two buildings are characterized by presence of galleries as distribution systems and they consist of repetition of just one duplex house-type. Designers decided to place galleries (decks), intended as *streets-in-the-air* with a social vocation, on the sides facing perimeter streets while dining rooms and bedrooms overlook peaceful landscape of internal park through tall windows and small loggias. On the ground floor there are small houses for elderly and in correspondence of buildings' southern sides there are special accommodations with turned views.



Fig. 1: The park of RHC in a photo of 1978



Fig. 2: External view of RHC

The interest of the project, on the architectural point of view, is the definition of an interesting distributional device. Studying the transversal section of the building we can observe that duplex houses have dining and living rooms at deck level while bedrooms are situated on the upper or the lower level. This solution was proposed by Smithsons in Golden Lane project some years before. This competition project was more radical than RHG, infact decks used to have the same width of the building and they used to host small stairs to reach accommodations below and above. Scheme's complexity was enriched also by a big number of different house-types and by the presence of a series of half-open courtyards between buildings.
The will to transform connective spaces, decks, in places of social interaction is for sure the most interesting aspect of RHG and Golden Lane buildings.
A small excerpt taken from the text titled "Urban Re-Identification" presented by Alison and Peter Smithson during CIAM IX in Aix-En-Provence in 1953 with drawings about Golden Lane, allows us to deeply understand what designers thought about social attitudes of the project:
"…we proposed three levels of streets-in-the-air; each level we called a deck. Each deck was to be occupied by a sufficient number of people – 90 families – in such a way that it would constitute a social entity. The streets-in-the-air would thus become places with their own identity [...] The total penetration of deck dissolves the dead-wall effect of the conventional slab block, and produces ever-changing vignettes of life and sky; the individual dwelling clearly being the measure and reason of the whole. People are its predestined ornament".

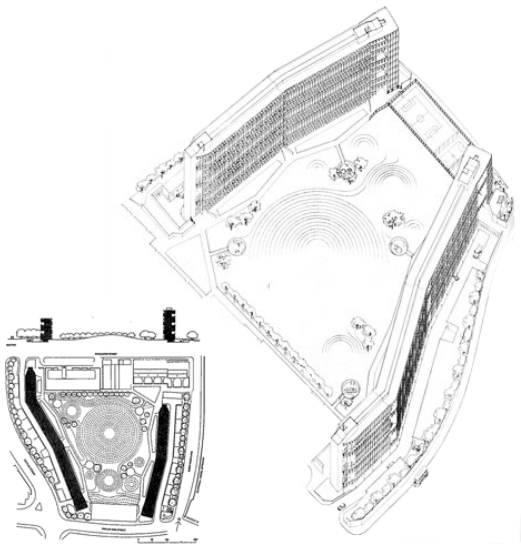

Fig. 3: - Plan and axonometric view of Robin Hood Garden

3.3 Urban regeneration for Robin Hood Garden (RHC)

The demolition of this residential development seems almost certain. It is supported by predisposition of design proposals that are about the realization of 1700 accommodations in substitution of 214 existing duplexes. They have generated a big discussion about second post-war period architecture in UK.
Many urban transformations, changing completely urban fabric of Tower Hamlets, have produced new high density areas (Canary Wharf, Docklands,…) and RHG looks like out of scale. For public and private actors is better to demolish existing buildings to realize new development quintupling inhabitants, than do complicated and expensive regeneration interventions.

In these context Sarah Wigglesworth Architects (SWA) has proposed a regeneration project for RHC and it provides different levels of intervention oriented towards improvement of technological performances of the building and increasing of number of inhabitants:
-Re-configuration of existing accommodations
-Introduction of new accommodations
-Improvement of energy performance
Existing duplexes should be changed into simplex houses with different sizes rather than insert new stairs and reducing at minimum new windows to limit alteration of Smithson's buildings character.
The proposal individuates in coverings and perimeter areas the most suitable sites for new accommodations. In this way there are no problems for nucleus of original design, the big central park, that represents a strongly characterized common place. Perimeter blocks host garages and they should be converted into houses obtaining brand-new 33 duplexes. Existing stairs reach cover level and so it could be possible to realize duplex houses with wooden structure at last level of the building, obtaining other 38 houses. Overall RHG would have 71 brand-new houses.
On the technological performance point of view, SWA says that substitution of actual windows with new ones characterized by high thermal performance and inserting of suitable panels for external walls could induce a halving of current costs for air conditioning and heating.

4. The construction of Public Works. Criteria and tools for finding resources (FO)

The dramatic financial crisis of recent years has been a decline in the construction of public works.
To avoid suspend the implementation of Public Works, it is necessary for the public administration of complex systems of access to financial resources, with the participation of public-private partnership, such as sponsorship, leasing of public property, contract of availability, project finansing, all alternative forms to finance public works.
Two important elements are: the fundamental role of banks and the ability to unlock the financial resources to ensure that the Public Administration debtor is no longer with the business.
The introduction of sponsorship contracts, as provided by art. 43 of Law 449/1997 and then implemented by the "Code Contracts" under Legislative Decree n. 163/2006, art. 26 and 27 introduces a system of private funding for the construction of works of public interest that is difficult to apply because the private entity intends to finance a work must necessarily have an economic return and image.
Examples of use of this tool are represented by financing the restoration of the Flavian Amphitheatre, Rome (Colosseum) operated by the group Tod's Spa and the renovation of the Police Station in Square San Lorenzo in Lucina in Rome. These interventions have a strategic character and give private parties a significant economic return and image.



Fig. 1: Colosseo, Square San Lorenzo in Lucina, Rome


Fig. 2: Colosseo, Rome



Fig. 3: Front of the Police Station in Square San Lorenzo in Lucina, Rome

The sponsorship contract provide two forms of sponsorship: the pure sponsorship and technique sponsorship. The first is aimed at financing by the sponsor, while the second is a form of partnership extended to the design and realization of the work to care and expense of the sponsor. In this case, the Public administration has the obligation to ensure the exact and proper completion of the work.
The introduction of the leasing of public property, with the art. 160 bis of Legislative Decree 163/2006, poses in the availability of public administration a 'financial instrument' innovative, in most cases, does not affect the "Stability Pact" and enables the construction of public works by the same Administration that engaging the private funds made available by leasing institutions. For the correct use of the instrument of leasing of public property in the public sphere, it would be appropriate to hope for a greater share information and knowledge of the content and potential of the instrument itself, that also aims to highlight the ways in which the public administration should act. The choice in favor of the leasing of public property must be appropriately weighted according to the feasibility and practicability of the operation through the use of forms of borrowing for capital expenditures. From an economic point remains essential for the Public Administration the need to draw up accurate feasibility studies, from which would emerge the comparison between several alternative solutions, designed to capture the most suitable methods of construction of the infrastructure and to allow the choice founded and motivated of the solution that will produce the best result in terms of benefits, social and economic costs. The potential benefits to the adoption of the leasing of public property are subject to a careful division of risks between the Administration, the leasing companies and the manufacturer, which is achieved through a careful and clear definition of the contract, as to exert both in the notice that in the contract and related contracts for the entire duration of the relationship. As said before, although there was an increase in the use of leasing of public property, this instrument is not yet seen as a solution to public-private partnership for the construction of public works.
The introduction of the contract of availability required by art. 160 ter of Legislative Decree 163/2006, it was an incentive contained in the DL 1/2012, "development decree", converted into Law 27/2012. Through this contract are entrusted, construction and the provision of a work of private property intended for the exercise for a public service, in the face of a price. The Administration gives the caregiver a user fee, as consideration for the construction and provision of the work. However, not having the legislature intended a definite pattern, the correct classification of each transaction for accounting purposes can only result from careful consideration on a case-by-case basis, of an individual case. In particular, the exclusion of the budgeting of the expenditure as an investment, is based on the actual allocation of the risks of construction and availability of the ends of the private contractor, not affecting the Stability Pact.
Other form of public-private partnership is given by the project financing governed by art. 152 of Legislative Decree 163/2006 that you can define as a tool for the realization of Public Works without financial burden of the public administration by transferring risk and financial coverage to the promoter.
For example, always with the spirit of promoting the project financing is guaranteed to the promoter, if it were to be the successful bidder, the possibility of pre-emption, or the instrument of project financing can be added later, and only after that the Administration has approved, in the three-year program of Public Works under art.128 of Legislative Decree 163/2006, and not least the possibility of tax relief sanctioned by the CIPE recently. This circumstance, however, will be the subject of the next government for final approval. This circumstance, however, will be the subject of the next government for final approval. For the use of project financing have been issued guidelines for the process of financing for construction UNI / TS 11453 which are not binding, but may be useful to develop and encourage the use of such an instrument.
All possible forms of alternative finance highlighted above still need to be used depending on the type of work to be carried out that are basically divided into three categories: works cold, warm and hot.

For cold works are the works that during the course of use do not generate substantial economic returns, so you will need to have, as part of the public, of economic hedges for the payment of the rental payments.
To warm works, however, are those works which, during the course of use, generate economic returns not quite enough to pay back the initial investment and need a partial level of contribution from the budget of the Public. (exemple : thermo-hydraulic or electric systems for energy saving, public lighting with flow control).
For hot works, finally, are the works whose management generates its own financial resources in excess or at least sufficient to pay off, with the revenues, fees and costs of routine maintenance and repairs, as well as the "Redemption Price" during a certain period of time.

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[7] http://www.agriregionieuropa.univpm.it

[8] http://www.consumosuolo.org

HERITAGE ARCHITECTURE LANDESIGN
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The rural homestead of Casignano: taken from documents regarding the monument

Rossella BICCO
Departments of Architecture and Industrial design "Luigi Vanvitelli", Aversa, Italy
rossellabicco@live.it

Abstract
The analysis conducted traces a journey in "Terra di Lavoro". Casignano in Aversa was already mapped in the XV century as an independent rural hamlet. In 1793 it was attributed as having 29 fires, however by the end of the 18th century the name had disappeared from the maps, having been absorbed within the folds of Carinaro. What remains today is an vast "garden" abandoned along with the ruins of the antique farmhouse of Lieto and the annexed shrine dedicated to the Holy Virgin. Examination of the soil has highlighted that to this day the bottom ground has an elevated capacity and aptitude for different uses in particular the cultivation of tree crops, vegetables, and flowers. In reference to the latter, a restoration project has been developed for evocative contiguity, inspired by the closed garden that is the backdrop for the Annunciazioni del Beato Angelico. A particular and original prompt is the reinterpretation of the enclosure and of the plants in the garden. The former made up of the rose hedges, and the latter modeled for the production of wild roses, one of the few with pentagonal symmetry, an intense and expressive symbol of the medieval theme of pure love and the giving of oneself, that is ingrained in the catholic-Christian nature, as it is in Hellenic mythology, traditional Rosicrucian order themes and in alchemy.

Keywords: Landesign, hortus conclusus, Casignano, agricultural park.

1. Taken from documents regarding the monument
The purpose of this analysis is to individuate a possible area of interaction between the fields of urbanization and landscaping.
Focusing particularly on the panorama of the periphery territory which runs a greater risk because of its lack of identity and its absence of a specific role in the territorial structure, however, at the same time it could be rediscovered as an environmental and social resource within the city area, we must keep in mind that the quality indicator that determines the level of attractiveness of an area is the natural environment.
The settlement system in the Aversa area was formed along the ancient roads of via Appia, Campania and Atellana during the transformation of the plains owing to the abatement of land recuperated from the flooding of the River Clanio. The historical structure of the area was clearly characterized by an obvious hierarchy of centers which gravitated around Aversa.
The structure of the historical center of Carinaro is made up of a dense network of courtyard house that mark its characteristic personality.
The courtyard house which descended directly from the style of Pompeian homes typical of the Aversa area, has among them some examples of noteworthy craftsmanship and environmental value.

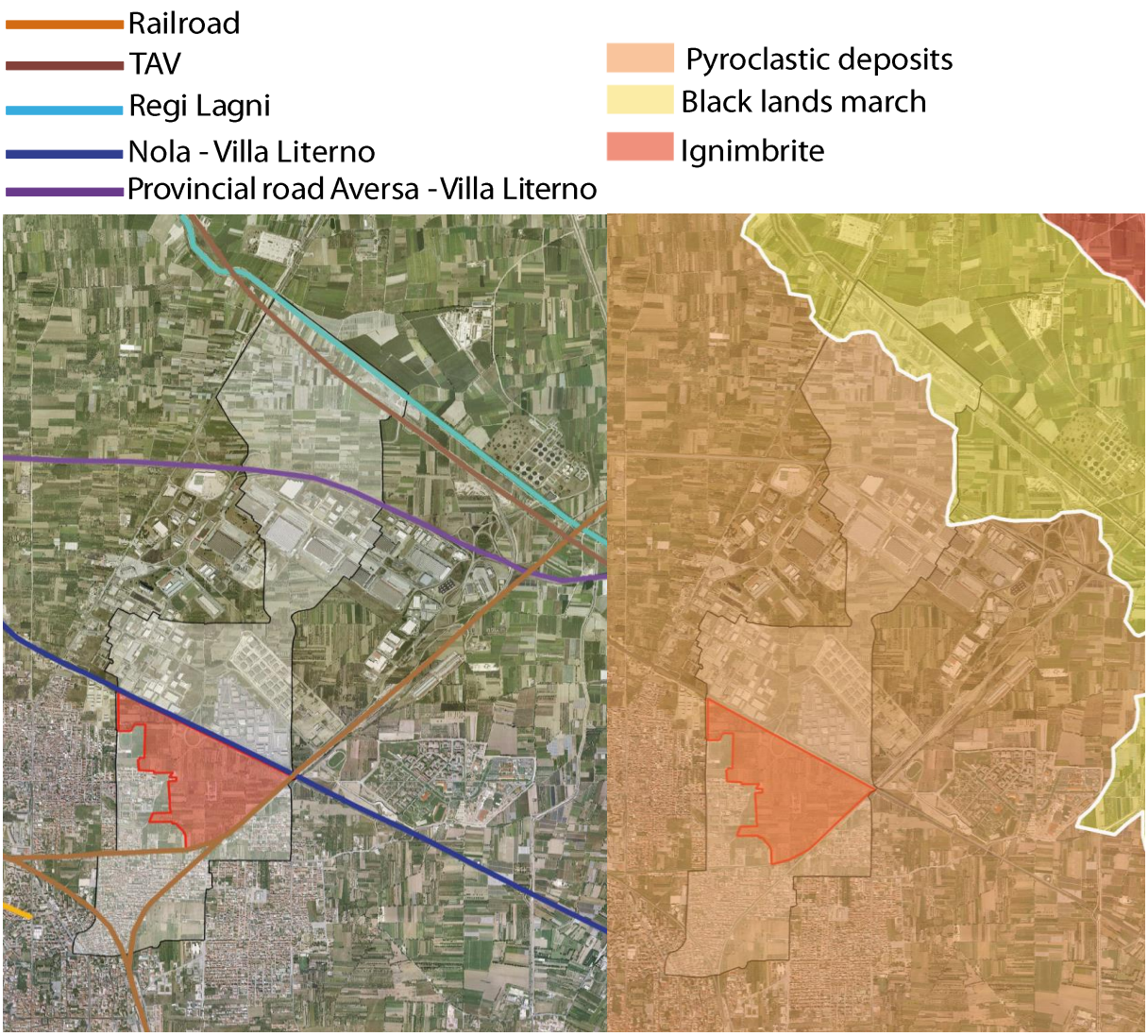

Fig. 1: Infrastructure network and geology

Among the many examples of single family patriarchal homes there are also many courtyard homes with condominium structures or small agricultural villages with annexed chapels, mills etc. as in the case of Casignano and other sites in the area of Aversa. Construction in the post war period occurred around the historical nucleus within the barriers formed by the railway system.
Historically the territory of the town of Carinaro is divided into two original pre Norman constituencies: Casale di Casignano dating 1104 and Carinaro 1158. The two constituencies were united in the 18 th century, designating the inhabitants of Casignano to the parish of Carinaro. The unit developed as a farming village with dwellings and other annexes that gravitated around the small church named for San Martino until it was suppressed for lack of inhabitants in 1847 by the Papal brief; L. Giustiniani in the Dictionary Geografico Ragionato del Regno di Napoli of the year 1757 states: «There was an antique parish named for San Martino placed by the Bishop, as seen during a visit made by P.Ursini on 28 October 1597. As time went on and the diminishing number of souls in the desert of Casignano it was suppressed with a Papal Brief dated I February of 1847 “executed” the 30 June that same year; and the care of those same souls given over to the nearby parish of Caringaro by a decree of Bishop De Luca in February 1848, “ the annuities to it associated go to the seminary convent, to the seminary were also given organ, parameters, wardrobes and to the above mentioned parish pyx, and I don’t know what else.; to the other parish of S. Spirito in Aversa goes the baptismal fountain […]». [1]
Since that time , the site, which was completely abandoned has gone to ruins, which was further aggravated by the seismic activity in 1980, afterwards a fire provoked further damages such as the collapse of the roofing.
The Casale of Casignano, has been over the centuries fief to many noble families, such as the Brancaccio, Capece, Crispano, Del Tufo, Di Sangro, De Lieto; [2] a symbol of importance and wealth that land holdings represented which to this day is surrounded by vast agricultural areas characterized



Fig. 2: Office Topographic military, Map of the Kingdom of Naples, I series, sheet 18, 1839. Particular of "*agro aversano".*
Fig. 3: Military Geographical Institute, Italian paper, sheet 184, 1905. Particular of "*agro aversano".*
Fig. 4: Military Geographical Institute, Italian paper, sheet 184, 1957. Particular of "*agro aversano".*

by their tradition of quality cultivation and by high levels of environmental integrity, characteristics which we intend to safeguard with the formation of an agricultural park. In reference to the most traditional and profound cultivation and production processes of the area as highlighted by L. Giustiniani in the dictionary Geografico Ragionato del Regno di Napoli "the territory is inseminated by its inhabitants […] with grain, hemp; they produce light asprigni vines, and gathering suggestions made by observing the very area of which we speak, I have based the form of the project on the outline of a wine leaf using its principal arteries as pre existing communication axis.

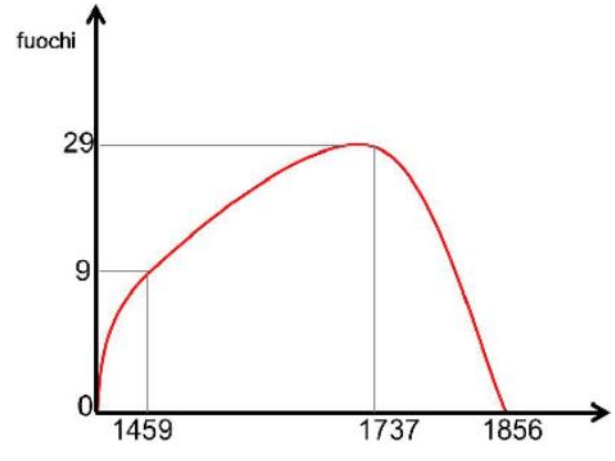

Fig. 5: Historical evolution

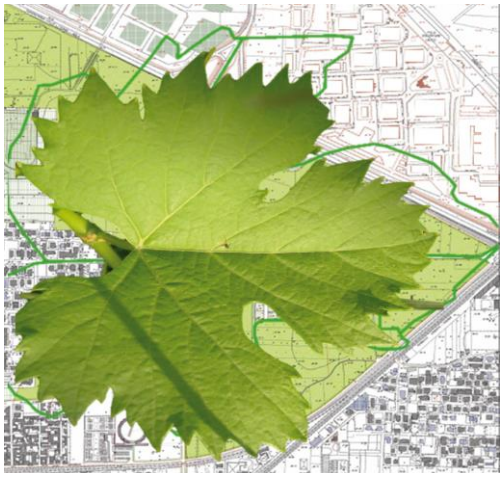

Fig. 6: Natural trace

As an incentive and to facilitate movement we have designed three thematic entrance ways, the north entrance called "Ubi Facit" comes from the adjoining production area ASI that aims to reunite the idea of finished product and raw material, towards the west is the entrance called "Mens sana in corpora sana" where we will create areas equipped with sports equipment and the possibility to be close to nature, nature walks, bike paths, horse riding, the east entrance instead is named "Mediatio" which dedicates a part of the open space to activities like meditation and contemplation of the divine due to the shrine which was situated in this area, the only remains of the small church dedicated to San Martino present in that space. As a finale project for this type of intervention the positioning of a Hortus Conclusus, that in mystic medieval symbolism becomes a metaphor of the bride and the virgin Mary and of the church; in a Christian translation, the proposal of a "bosco sacro" sacred glen.
Referring to the Virgin whose image is the subject of an afresco which is still visible in the shrine, we have based the form for the Hortus Conclusus. The wild rose, the most symbolic image for the Mother of Christ, because this type of rose does not need to be pollinated (thanks to this characteristic it has been chosen as an example that symbolizes virginity and the splendid face of the Madonna, absolute perfection and conception, without defect). [3] A through choice was made in the selection of the trees and flowers that design in their own way a chromatic journey, careful consideration was given to their individual reproductive cycles determining an optimal result throughout the year.
Characteristic elements of this Landesign project are the paving in irregular stones, the stone benches; the lawn, Junipenus horizzontalis Glauca; wild rose hedges arranged along the way called "Way of the Rosary"; the Peonia Sinensis also called "Thorn less Rose" and the violets that bud in the spring which symbolize the humility and modesty of the Holy Virgin Mary; the red rose hedges that

symbolize the maternity of the Madonna and white that represents her virginity; Carnations (Dianthus Allwoodii) that with their shape and color remind us of the nails in the cross and in reference to the iris which is a symbol of Mary's broken heart; Galanthus Nivalis (snowdrop) the first flowers to bloom after a harsh winter.



Fig. 5: Shrine of the Virgin

[1] GIUSTINIANI, Lorenzo. *Dictionary Geografico Ragionato del Regno di Napoli.* 1757

[2] GALLO, Alfonso. *Aversa normanna*, Aversa. 1988

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Saint Lawrence outside the walls. Notes one the nineteenth-century restoration by Virginio Vespignani

Cesare CUNDARI[1], Gian Carlo CUNDARI[2], Maria Rosaria CUNDARI[3]
(1) Dept. of History, Drawing, Restoration of Architecture, Sapienza University of Rome, Italy, Rome - cesare.cundari@uniroma1.it
(2) Dept. of Civil Engineering, University of Rome Tor Vergata, Italy, Rome - giancarlocundari@libero.it
(3) Dept. of Civil Engineering, University of Salerno, Italy, Salerno

Abstract
After the original Church of St. Lawrence was restored in the first half of the thirteenth century, two events were particularly important in the history of the Basilica of St. Lawrence outside the walls: the restoration by Virginio Vespignani in the second half of the nineteenth century, between 1857 and 1865, and a later restoration after it was bombed in 1943. Both events affected the configuration of the building as we see it today, but the first restoration is certainly the one which – as we have already mentioned – not only changed the appearance of the basilica, but also the area around it. In fact, during that restoration the first basilica, commissioned by Pope Pelagius between 579 and 590, was almost entirely brought to light. The Lanciani Holding, housed in the Institute of Archaeology and History of Art, has an extensive selection of drawings about the restoration. Based on these drawings it is possible to reconstruct almost the pre-restoration state of the building as well as Vespignani's project. In this paper we will analyse the most important drawings in the Holding in order to reconstruct the pre-restoration state of the building and the main guidelines of the project.

Keywords: survey, design of the architecture; architectural design of the project

Premise [1]
After the original Church of St. Lawrence was restored in the first half of the thirteenth century, two events were particularly important in the history of the Basilica of St. Lawrence outside the walls: the restoration by Virginio Vespignani in the second half of the nineteenth century, between 1857 and 1865, and a later restoration after it was bombed in 1943. Both events affected its current configuration, but the first restoration is certainly the one which – as we have already mentioned – not only changed the appearance of the basilica, but also modified the area around it. In fact, during that restoration brought to light almost the entire first basilica commissioned by Pope Pelagius between 579 and 590.
The Lanciani Holding, housed in the Institute of Archaeology and History of Art, has an extensive selection of drawings regarding the restoration. Based on these drawings it is possible to reconstruct not only the almost entire state of the building before Vespignani's restoration, but the project itself. Indeed, Vespignani's project was monumental; the portfolio in the Lanciani holding has drawings of a multi-coloured façade with the coat of arms of Pope Pius IX and an inscription with the words: *Engraving and chromolithograph of the Basilica of St. Lawrence outside the Walls after the general restoration commissioned by the magnificent and Supreme Pope Pius IX under the supervision and with the drawings by the architect Count Commendatore Virginio Vespignani*.[1] These drawings, which provide very useful iconographic and graphic information about Vespignani's project, prompted us to elaborate the considerations set out in this article, considerations which are in line with the conclusions of previous scholars. While in this article we will focus only on some of the main aspects

of the restoration, a more extensive and comprehensive review will be provided in another article; it is important to point out that an accurate reconstruction of the building of the basilica complex has already been carried out by Krautheimer.[2]
The reader may also find useful the book written by the Capuchin friar Giuseppe Da Bra and published in 1952; the book summarises the main steps in the construction of the complex.[3]
The basilica complex of St. Lawrence was restored during the construction of the Verano cemetery. Early work on the cemetery (begun in 1837) had damaged the catacombs of St. Cyriaca (the Basilica was part of this complex); this prompted the Holy Archaeology Commission to raise the problem of the restoration of the basilica. Due to its importance, Pope Pius IX was asked to personally make a decision on this matter and he entrusted the project to the architect Virginio Vespignani. Vespignani's project included its restoration, consolidation, and detachment from the Verano Hill. One of Vespignani's most industrious and diligent collaborators was the archaeologist Giambattista De Rossi, an authoritative member of the above-mentioned Commission.[4]

1.1 The state of the surroundings and building before restoration [2]

The state of the building and immediate surroundings is clearly illustrated in some of the tables in the Lanciani Holding; the first (fig. 1) is a drawing of the project with all the elements of the subsequent redevelopment of the area around the basilica. The table shows the layout of the site and indicates the areas which had to be excavated to the north and east of the complex in order to detach it from the Verano Hill. The former redevelopment is visible in the area in front of the basilica, with the perimeter of the Verano Hill threatening the left side of the square.

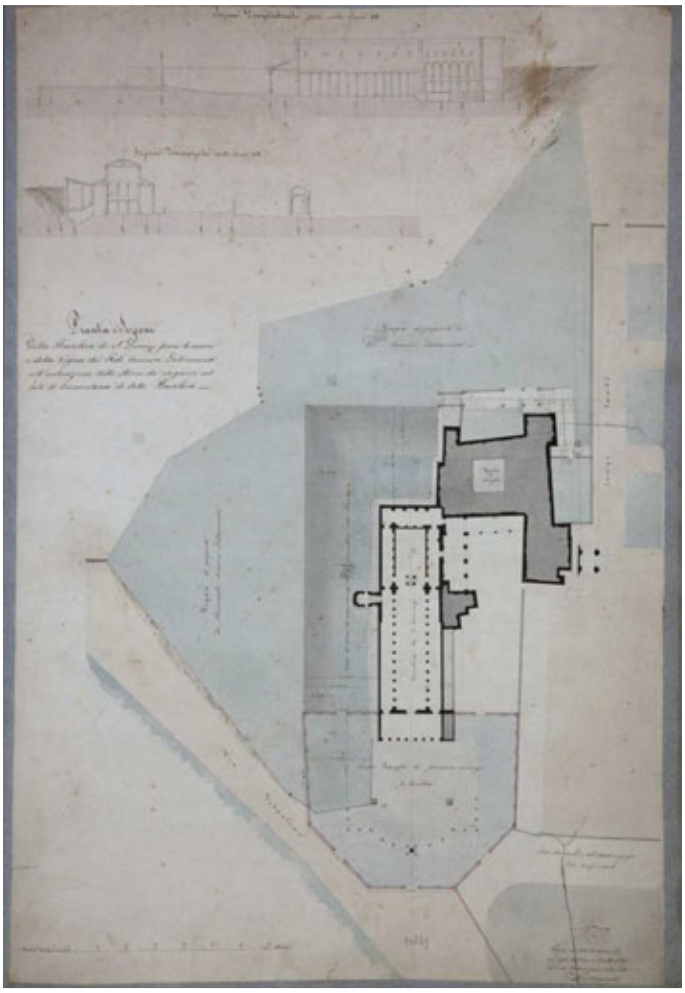

Fig. 1: The plan of the complex included the layout of the basilica and adjacent convent; it also shows the path leading to the side entrance of the façade, continuing on to the buildings next to the belfry alongside the south wall of the basilica, and protected to the south by a wall; the plan also shows that following on from these buildings the basilica had a side portico (later turned into a sacristy) and another portico in front of the convent; there is also a double entrance from the portico to the side nave of the basilica, the first is located in the middle of the southern nave of the east church, while the second leads to the former narthex area near the portico in front of the convent (dis. V. Vespignani – Lanciani Holding).

This situation is also portrayed in several old views (fig. 2).

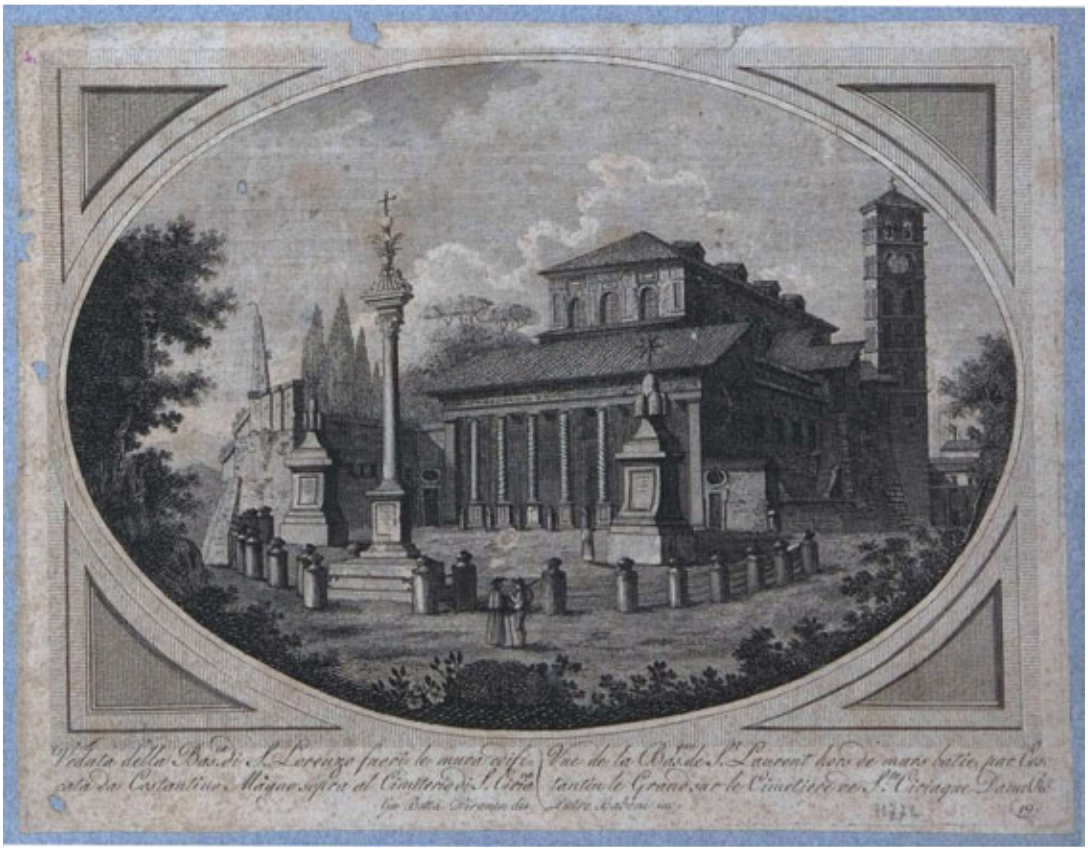

Fig. 2: St. Lawrence outside the Walls. View by G. B. Piranesi.

The table also includes two sections showing the site before Vespignani's restoration project: a longitudinal section (in axis to the basilica) and a transversal section (near the Chapel of St. Cyriaca).
The longitudinal section shows that since the basilica was below the level of the nearby road (via Tiburtina), the area in front of it was very steep so that it could be accessed from this important road. The transversal section also shows the outline of the Verano Hill with a slope to the north of the church; this slope was perhaps created to try and stop water from filtering into the church. The slope can also be made out thanks to the different colours used in the plan showing the planimetric image of the Verano Hill. The transversal section also shows that there was another building above the Chapel of St. Cyriaca; this building was eliminated during the restoration by Vespignani.
It is also possible to deduce from the longitudinal section that only the crypt of the saint was accessible from the lower level of the east basilica built by Pope Pelagius, because all the other parts had been completely filled. In fact, the floor of two ancient side naves of the east chapel and its old narthex were located behind and to the sides of the apsidal area; instead seven steps led to the crypt which was accessed through the west church.
This situation is described in more detail in another drawing in the same holding which has four survey drawings of just the basilica: apart from a longitudinal section there is also a façade and two transversal sections. In all three sections the floor of the area around the apse – the two side naves and the old narthex – is on a slightly different level compared to the floor of the other naves; this was due to the fact that the area underneath had been filled in many centuries earlier. However, more importantly, in all three sections in this drawing (fig. 3) the base of the giant columns we see today on three side of the apse were all free standing. It is even possible to see a parapet in the transversal sections which reduces the width of the ambulatories and allows the latter to be seen. We should point out that several decades before Vespignani's project (in 1921, 1822) the lower level of the columns had already been ascertained.[5]
Both sections clearly illustrate the original pseudo-domed shape of the top of the canopy later modified by Vespignani; this is also documented in numerous contemporary engravings (fig. 4). The engraving also shows the coffered ceiling of both the centre nave of the west church and the presbytery before Vespignani's project.

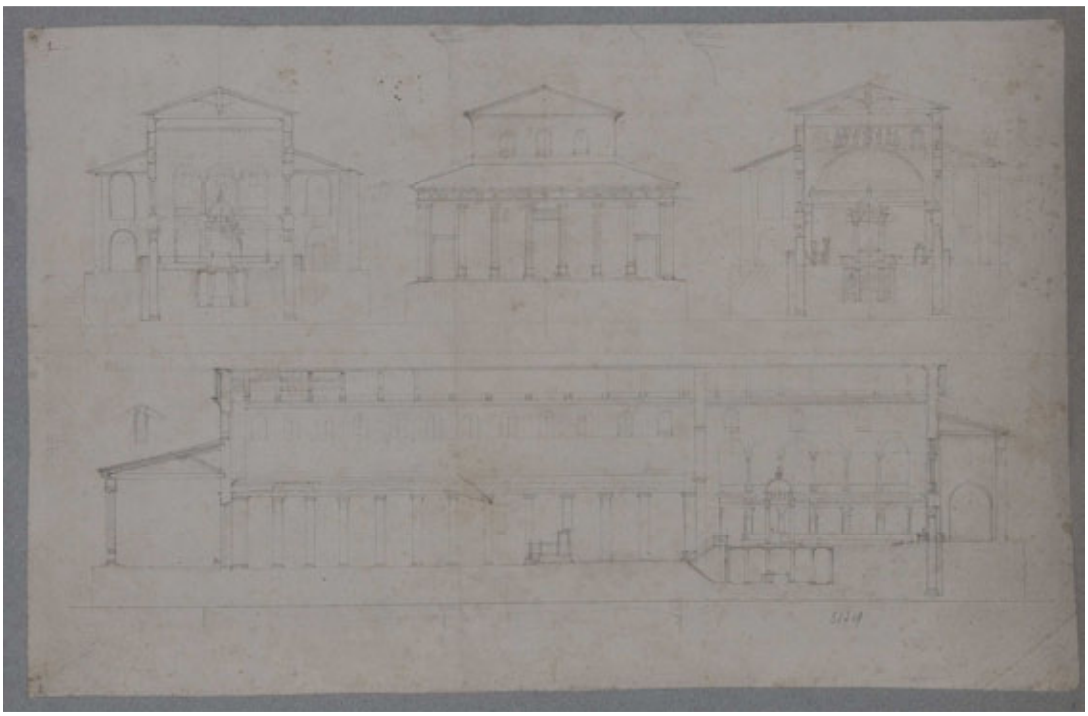

Fig. 3: The transversal section – of the apse area – showing how the columns were already completely visible when Vespignani surveyed the area (dis. V. Vespignani – Lanciani Holding).



Fig. 4: The engraving by Rossini shows the interior before restoration by Vespignani; note the small dome over the ciborium and, in the background, the arches of the blocked transept.

The transversal section of the apse also shows the blocked arches of the women's gallery visible in the longitudinal section and in several engravings (cfr. Fig. 4). The extensive iconographic material on this issue is housed in the Institute of Archaeology and History of Art; the documents illustrate the basilica before and after Vespignani's restoration project.
The careful and systematic study of the drawings in the Lanciani Holding reveals how Vespignani tackled and solved the major restoration issues regarding the complex of St. Lawrence.
First and foremost, the afore-mentioned general plan shows that a decision had been taken to isolate the monument from the Verano Hill; the drawing indicates the distances envisaged for the new containment walls.

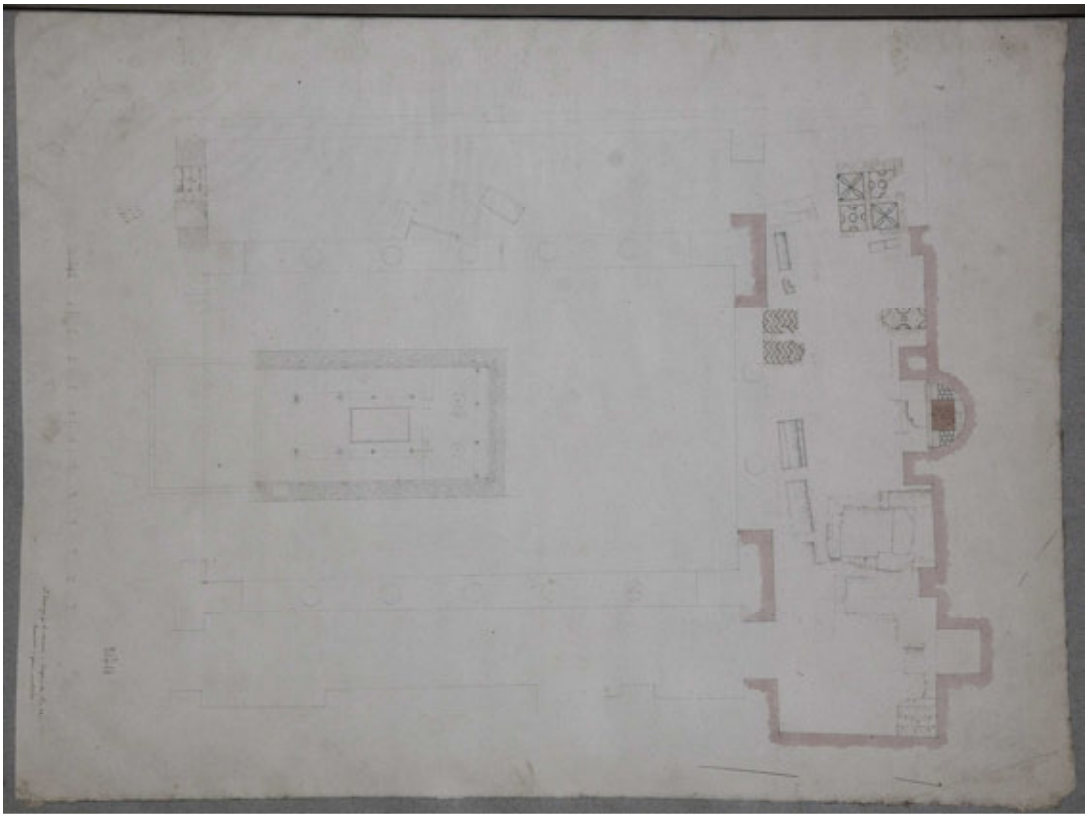

Fig. 5: . Plan of the lower level of the Basilica with the area of the old narthex which had been freed from debris (red perimeter) and the crypt of the Saint (dis. V. Vespignani – Lanciani Holding).

Apart from this decision to isolate the monument from the hill, Vespignani focused primarily on freeing the old buried basilica from all debris. A drawing (fig. 5) of the lower level of the east church shows that it has been freed; the drawing also shows: the crypt of the Saint surrounded on three sides by a wall without any openings (cfr. Fig. 6), the old narthex to the east (and the results of the excavations of the floor), and several remains of the paving discovered in the side naves. The perimeter of the old narthex is particularly interesting; apart from its irregular shape, there's a circular niche in the centre of the east wall and a rectangular niche towards the south end; both niches are embedded in the Verano Hill. Steps appear to be represented towards the south end; it's possible that they used to either lead outside or to the next portico of the Convent nearby (?).
We should point out that the basilica was surrounded by catacombs; in fact, from the basilica it was possible to access the five levels of the catacomb of St. Cyriaca underneath the Verano Hill.[6]
Furthermore, bibliographical material reports that when the Verano Hill was excavated to isolate the basilica, part of the catacomb corridors on several levels had to be demolished in order to cut into the hillside.[7]
During the restoration, Vespignani worked closely with the archaeologist G. B. De Rossi and together they discovered (and re-interpreted) many elements of the original basilica. However it wasn't until almost a hundred years later that the elements needed to reconstruct the development of the original building, in particular the apsidal area, were brought to light during the excavations carried out as part of the restoration project implemented after the basilica was bombed in 1943. The results of the excavations are illustrated and critically commented by Krautheimer in his afore-mentioned book.

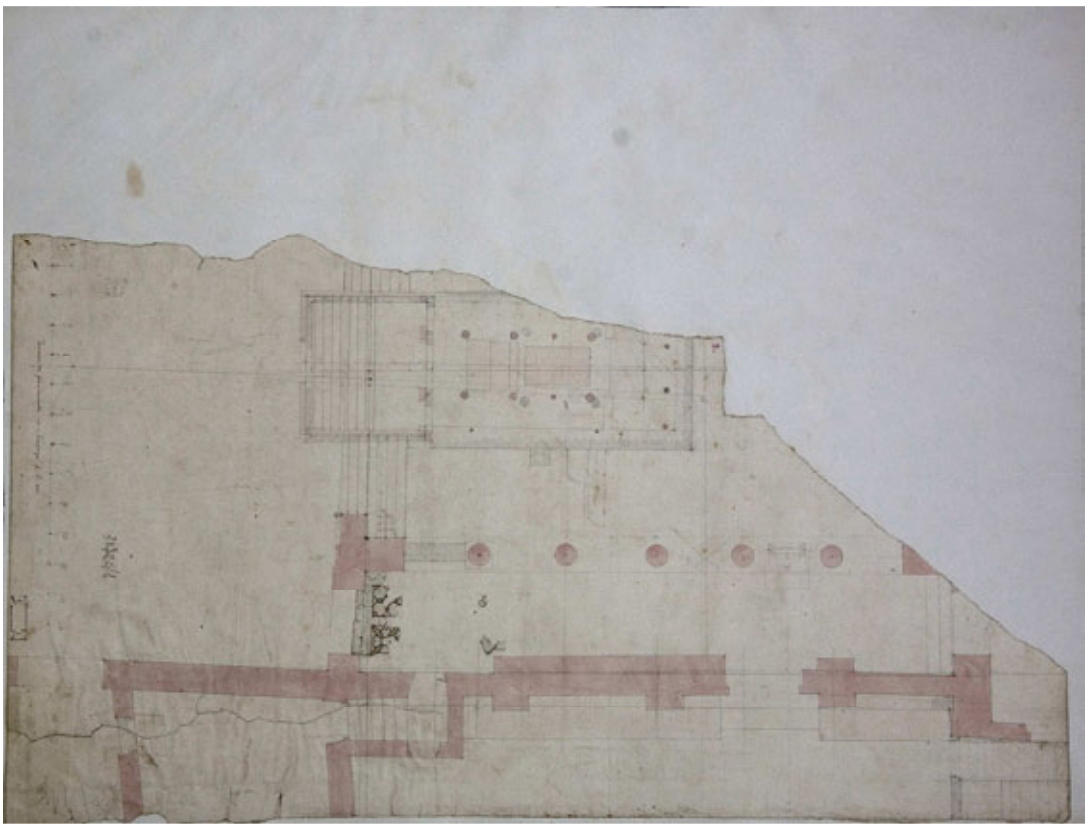

Fig. 6: Although incomplete, the drawing shows the plan of the lower level of the basilica freed from all debris and earthwork (dis. V. Vespignani – Lanciani Holding).

When the old church had been completely cleared of debris and could be accessed, the areas which had previously been decorated but had remained hidden were finally brought to light.

1.2 The restoration project[2]

After the basilica had been freed from all debris and many of its elements had been brought to light, Vespignani worked on his restoration project. Apart from detaching the basilica from the hillside, the project for the basilica also included a new layout (which is in essence the one we see today) and the merger of the two buildings into a single organism.
The main goals of Vespignani's project were: a) removal of debris from the lower level of the east church and joining it to the naves of the east church; b) redevelopment of the old narthex of the early Christian church; c) restoration of the envelope of the crypt of the Saint and redevelopment of the surrounding area under the presbytery; d) transformation of the southern portico into a sacristy; e) connection with the convent. The architect also built a staircase near the belfry to access the women's gallery where new floors had been laid.
In this article we will focus on the first two parts of the restoration project and will discuss the others in another longer paper. We will also propose several considerations about the redevelopment of the floors which was a particularly important part of the overall reorganisation of the monument.

1.3 The construction of the new presbytery[3]

Regarding point a), the architect created two sets of steps between the lower level of the east church and the two side naves of the west church (fig. 7). Freeing the area from debris also required the construction of structures to support the large upper presbytery.
Another drawing, also in the Lanciani Holding (fig. 8), shows the overall structural solution used to support the large presbytery which, apart from the new perimetral structure of the crypt (more on this further on), also had fewer slender columns and marble pilasters holding up a grid of beams (now visible in the intrados of the ceiling). The first columns (only four) are positioned in the centre area, the others (mixtilinear: column + pilaster) are located against the columns of the giant order along the perimeter of the presbytery area (five on each of the long sides, west and east, two behind the Bishop's throne towards the old narthex, and two in the corners at the intersection of the walls). In short, a very ingenious solution completely independent from the other pre-existent structures in the church.[8]

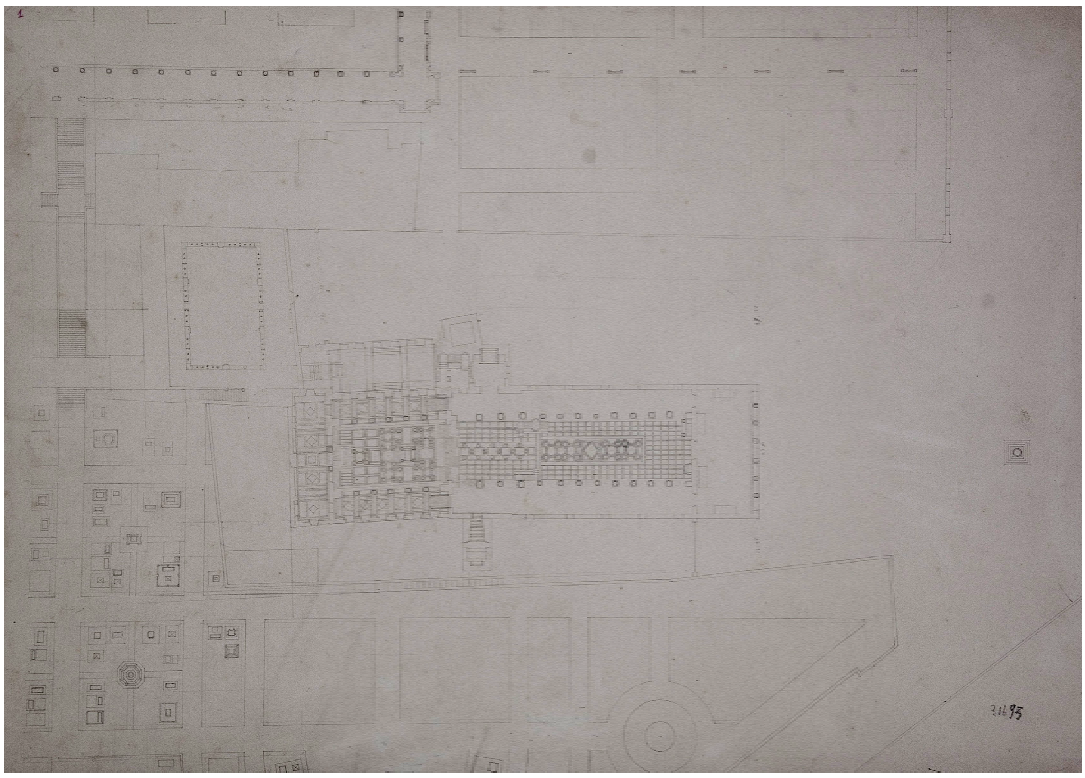

Fig. 7: The drawing shows the overall plan of the Basilica with the new redevelopment of the lower level (dis. V. Vespignani – Lanciani Holding).

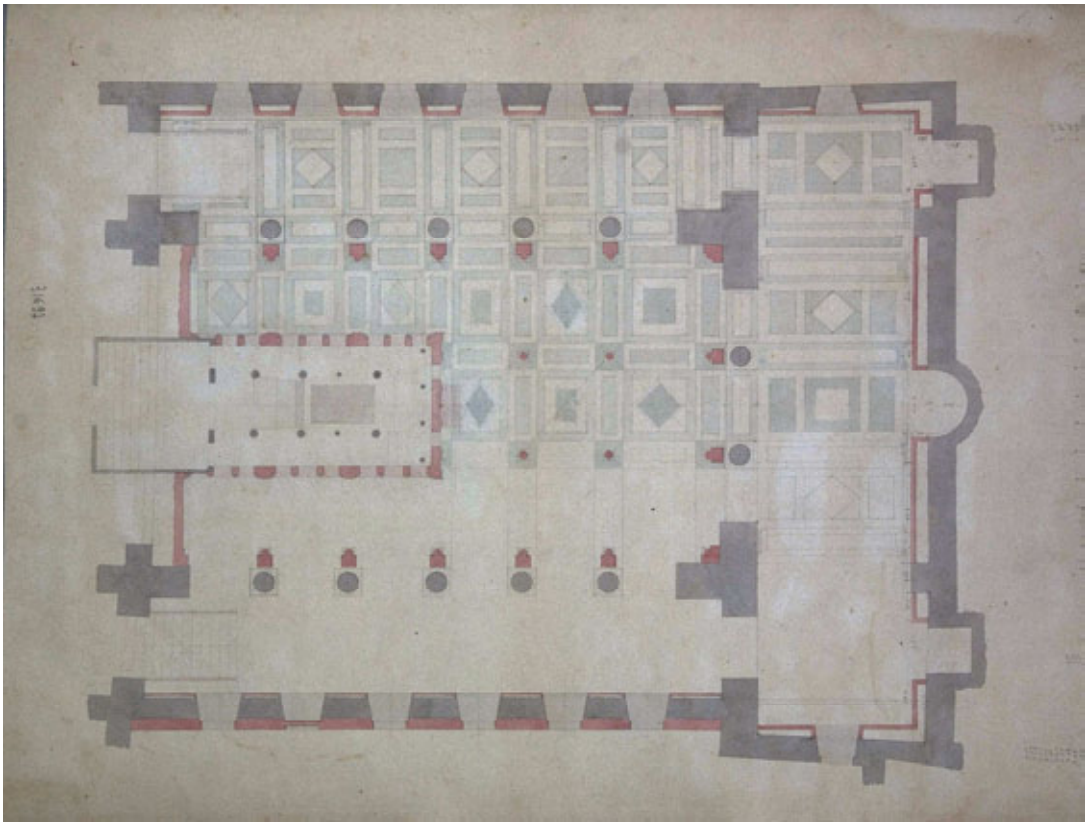

Fig. 8: The drawing shows the restoration project of the lower level of the Basilica. In red the load-bearing structural elements of the new floor of the apse and the new elements closing off the crypt of the Saint. The drawing also shows the increase in width of some of the walls envisaged by Vespignani, and the new counter walls (most probably to protect from moisture). Finally, the drawing shows the design of the new floor envisaged by Vespignani which corresponds to the one which exists below the apse. For information about the Chapel of Pius, see figs. 10, 11 (dis. Vespignani – Lanciani Holding).

Vespignani also modified the top of the canopy over the main altar clearly inspired by several famous models in old Roman churches, and even by the canopy over Cardinal Fieschi's funerary monument located against the counter-façade of the church; this project is also illustrated in several drawings in the Lanciani Holding (fig. 9), as well as in several contemporary views.



Fig. 9: The engraving shows the new canopy top designed by Vespignani.

1.4 Transformation of the old narthex and the lower level[3]

With regard to the narthex of the old east church, the drawing of fig. DSC 0026A probably reflects Vespignani's initial intention to maintain an opening in the centre of the wall towards the hillside (in turn connected by several ramps to the cemetery area above); in fact the design includes two symmetrical flights of steps to access the lower floor level. The drawing also reveals that he had envisaged a staircase to the ambulatory of the cloister (access was through the grated opening which still exists at the southern end of the east exterior wall of the chapel of Pius IX). We have cited this drawing because it shows Vespignani's intention (unimplemented) to build a ramp between the area on the northern side of the basilica (freed by the work to isolate the basilica) and the Verano cemetery above.

Redevelopment of the lower level inevitably required work on the presbytery area and the women's gallery. Several drawings in the Lanciani Holding refer to the splendid mosaic of the presbytery pavement (fig. 10); we believe that these works were necessary because freeing the lower level from all debris had somehow required the demolition and reconstruction of the floor of the presbytery area.[9]

Although Vespignani's project already had very important solutions to recover and make the areas of the old narthex functional again, a competition for the construction of the new chapel within the old narthex was launched just after the death of the Pope who had devoted so much attention to Roman basilicas. The competition was won by the architect Raffaele Cattaneo: his solution was very respectful of the previous spatial arrangement of the area and yet was also very innovative with regard to the coating (mostly figurative mosaics) of the walls and floor. Several of the plans by the architect are also housed in the Lanciani Holding.

1.5 The floors[3]

The floors were naturally part of Vespignani's overall project for the basilica; the work almost certainly involved not only partial recovery and restoration (for example, the areas under the altars of the side naves), but also maintenance because the figurative works are similar to others in traditional Roman buildings. Most of the work was to be done on the lower floor (the crypt of the Saint) where the entire area, discovered after earthwork, had to be paved. Figure 8 illustrates Vespignani's solution.

This floor was only built in the area under the apse; instead a much more elaborate and chromatically brighter floor, with an alternate pattern of geometric figures, was built in the chapel of Pius IX during the work designed by Cattaneo (figs. 11, 12).

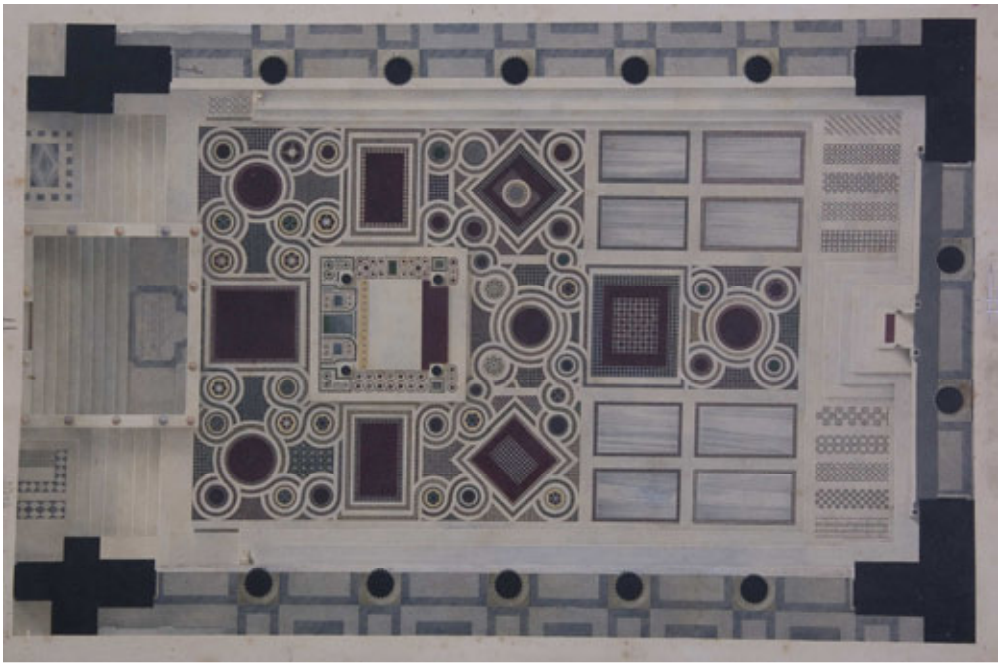

Fig. 10: The drawing shows the floor of the apse area rebuilt by Vespignani (dis. V. Vespignani – Lanciani Holding).



Fig. 11-12: The floor of the Chapel of Pius IX. A) partial image, B) graphic restitution showing how the geometric pattern was developed.

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[2] KRAUTHEIMER, Richard; WOLFANG, Frank; SPENCER, Corbett. *Corpus basilicarum christianarum Romae - Le basiliche paleocristiane di Roma*. vol. II, Vatican City, 1962

[3] DA BRA, P. Giuseppe. *San Lorenzo Fuori le mura*. Rome, 1952

[4] CUNDARI, Cesare, BAGORDO, Giovanni Maria, LA MANTIA, Mariella, LANFRANCHI, Fabio. *San Lorenzo fuori le mura*. ed. Aracne, Rome,2012

[5] Papers or presentations in the proceedings of a conference are cited as part of a monograph. SURNAME(S), Name. Paper title. In AA.VV. *Proceedings of.* City: Publisher, 2010, p. 100-108.

Notes

1. Cfr. Munoz (La Basilica di S. Lorenzo fuori le mura, Rome, Fratelli Palombi, 1944, p. 101, 102). The intervention designed by Vespignani was never published; some of the tables are very rare, others were displayed at the Exhibition of the city of Rome at the Expo in Turin in 1884. The following words were published in the catalogue: *"These tables are part of a design which, supervised by Commendatore De Rossi and the cooperation of the late lamented Count Virginio Vespignani, should have been published about the grandiose restoration work of the basilica of St. Lawrence commissioned by Pius IX, but which instead remained unpublished. We took advantage of this exhibition to present several tables elaborated for the restoration; these tables represent the monuments and frescoes of the old basilica"*. Even Munoz remarked on the fact that this important material had been lost.

2. Richard Krautheimer retraced the history of the basilica complex of St. Lawrence outside the Walls also thanks to the archaeological excavations which had been carried out in the previous two hundred years and, above all, the surveys conducted during restoration after the basilica was bombed in 1943. His studies were published in the important and remarkable book (edited with Wolfang Frankl and Spencer Corbett) CORPUS BASILICARUM CHRISTIANARUM ROMAE - LE BASILICHE PALEOCRISTIANE DI ROMA, vol. II, 1962, Vatican City; the book has an extensive selection of important photographs and drawings.

3. P. Giuseppe Da Bra, SAN LORENZO FUORI LE MURA, Rome, 1952. The book was reprinted in 2005 and curated by the Order of the Capuchin Friars Minor (to celebrate the 150th anniversary of their arrival in the Basilica of St. Lawrence outside the Walls). We should point out, however, that the studies by Friar Da Bra were carried out before the excavations which, years afterwards, led to the discovery and identification of the Constantinian basilica, as reported by Krautheimer in the afore-mentioned book.

4. Cfr. Munoz A., op. cit., Rome, 1944, p. 93.

5. Cfr. Krautheimer, op. cit., p. 16.

6. Cfr. Krautheimer, op. cit., p. 23

7. Cfr. Krautheimer, op. cit, p. 24

8. With regard to the visit by Pope Pius IX on 20 October 1864, Munoz (op. cit., p. 100) writes: *"Having entered (the Pope) in the sacred temple he saw, with manifest satisfaction, that work had been completed on all parts of the Basilica of Hadrian and Sixtus III, and then, after praying for some time in front of the tombs of the Saints and Martyrs Lawrence and Steven, he descended the new stairs, on the left, decorated with a balustrade made of various kinds of coloured marbles, and saw the Constantinian Basilica, where with great artistic expertise the floor, Confessional, papal throne, and marble seats and seatbacks rested on a robust support after being dug out of the earth which Pelagius II had commissioned to be deposited....."*. We were not able to verify using other documentary or bibliographical sources whether after freeing the area from the debris which had been deposited Vespignani found the pre-existing structures under the presbytery area. Nor were we able to find any further information, except for the information extrapolated from the afore-mentioned drawings.

9. Confirmation of this theory comes from Munoz (*op. cit.,* p. 94): *".... the tomb of the martyrs was unearthed and protected with golden grates, and fourteen pilasters made of Carrara marble were installed to support the aynali vaults on which the presbytery floor rests; the* strange small dome *of the ciborium was removed, and a cusped crown on slender columns installed."*



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Kusadasi, the Ancient 'Scalanova'.

Prof. Dr. Ahmet Vefik ALP TMMOB, AIA, RIBA, IAA
Architect, Urbanist, Regional President of International Academy of Architects, Istanbul, Turkey
ahmetvefikalp@alparchitects.com.tr

Abstract
Past few years, Turkey's western and south-western coastal zones have experienced a significantly rewarding tourism-oriented growth throughout. Certain centers, however, specifically Kusadasi, have recently been subject to a reverse trend and decline in touristic demand.
A splendid town of very comfortable climate amidst world-renown antiquities, religious centers and natural beauties, Kusadasi, the ancient 'Scalanova', has been increasingly condemned to haphazard urban planning and cheap architectural design activity, primarily as a result of inappropriate and biased actions of authorities. A significant majority of the developers and architects active in the region have also remained insensitive to the loss of historical and natural heritage in trade of a characterless built-environment, and, occasionally, misused the weaknesses of local and central decision-makers and planners in favour of individual interest and profits.
Consequent to a sensible decrease in the tourism market primarily caused by the overbuilt, messageless environment and dull architecture, the people of Kusadasi have, at last, realized the mistakes committed. Yet, attitudes have remained similar while, now, remedial measures are being worked on.

Keywords: Urban planning, urban heritage, natural heritage, tourism

1. Degrading the Cultural Heritage and Touristic Attraction Via Poor Planning, Design and Implementation

Kusadasi was born as a new port village as a result of receding waters of Ephesus and Miletus in the Menderes Valley. The name 'Scalanova', meaning new port, was attributed by the Genoese and Venetians who have been governing the trade in the region. 'Scalanova' has then been a colony of traders, comprising consulates and warehouses, the Muslim Turks living primarily on the hinterland in a settlement called 'Ardiz' on the skirts of 'Pilavtepe'.



Fig. 1: Scalanova (New Port) in old times.

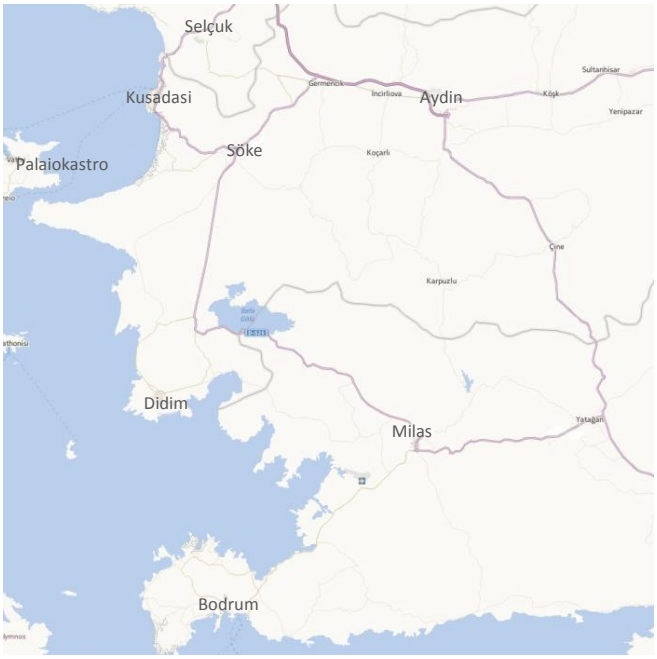

Fig. 2: Aegean coast of Turkey.

The present city structure of Kusadasi originated from the early XVIIth century. The Prime Minister Okuz Mehmet Pasha, 'Sadrazam' of the Ottoman Empire during the reign of Sultan Ahmet I and Sultan Osman II, built the city walls together with a caravanserai, public baths and a mosque in 1618. The two-level caravanserai, 19x22 m large, surrounds a courtyard entered from north. The structure originally conceived for sea trade was restored in 1966 towards touristic use.
Kusadasi's nuclei were two neighbourhoods: The 'Camiikebir' was built on the flat zone with narrow, grid-iron street fabric. The distance between two parallel streets allowed two back-two-back lots with houses on the street side and courtyards on the rear. The 'Dag' neighbourhood on the hillside was structured in terms of houses and courts terraced in accordance with the topography, depicting an Ottoman architectural accent primarily expressed in the form of deep projecting roofs, horizontal eaves and classical roof tiles. Today, most of the genuine fabric is gone forever. Few remaining fragments of the city wall stand unattended, yet witness the origins of the settlement. Many new neighbourhoods have been born, bringing the population to 30.000, and an unprecedented touristic potential came to surface in 1960's.

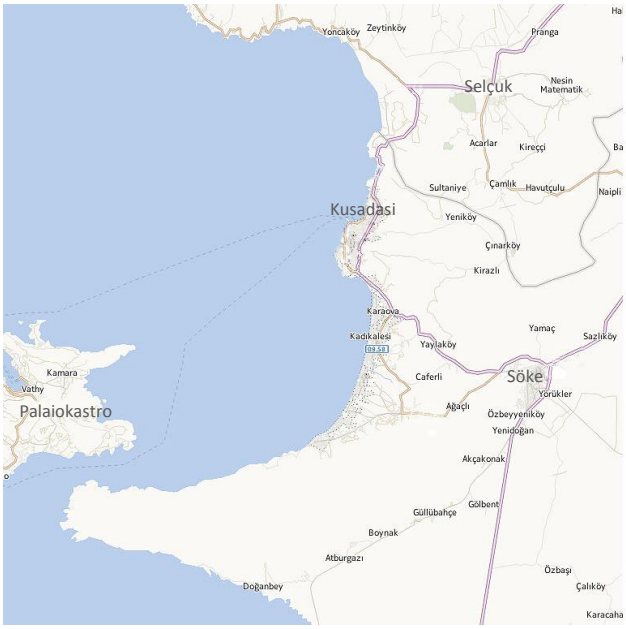

Fig. 3: Kusadasi and environs.

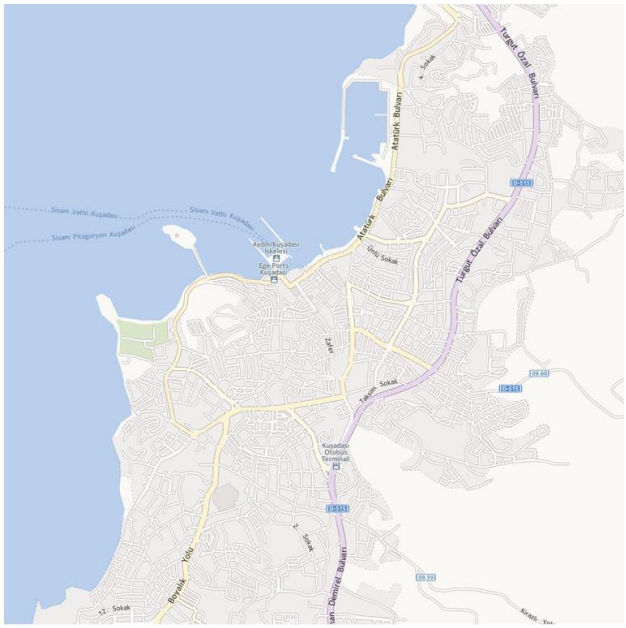

Fig. 4: Kusadasi city plan.

2. The Historical Development

The origins of Kusadasi are not fully known. It is strongly believed that at the point called today 'Yilanci Burnu' a satellite of Ephesus called 'Neopolis' was founded by Ionians.

Famous traders and sailors, the Ionians reigned from the beginning of the IXth century BC in the zone between the Menderes and Gediz Rivers called Ionia of the antique era. Very rapidly, they enjoyed political superiority and established 12 cities named Ionian Colonies. In the VIIth century BC the Lydians, two centuries later the Persians, then in BC 334 the Great Alexander, and subsequently a synthesis of Greek and Local Anatolian Cultures have shaped the surroundings of Kusadasi giving birth to the antique cities of Ephesus, Miletus, Priene, Didyma, amongst others. In the IInd century AC, Romans gained dominance in the area which then became a religious focus. Kusadasi, a pirate port for many years, became Scalanova in the XVth century.

The Turkish Seljuk State won sovereignty over the area in 1186 under Kilic Aslan II, rendering Kusadasi an opening of caravan routes to the Aegean Sea. The Ottomans embodied Kusadasi in 1413 with Mehmet I, or Okuz Mehmet Pasha. Since then, Kusadasi remained under Turkish rule.

The island 'Guvercinada' (Pigeon Island) has been functioning as a cost-guard station during Byzantine and Ottoman rule. The fort, built in 1834, enjoys a tower for observation now called 'Pirate Fort' due to its defensive role against such attacks. The fort is today linked to the shore by a promenade jetty.

3. Antique Sites Around Kusadasi

Panionion is reported to be located south of Kusadasi, between the villages of Davutlar and Guzelcamli. It was the capital of the 12 Ionian Cities Confederation. All rituals, ceremonies and similar gatherings used to be performed here. Phygela has been built by Agamemnon at a point 3 km north of Kusadasi. It is believed he had the settlement built for his ill soldiers during the Trojan War. Ephesus, one of the most important antique settlements in the world, was founded by Androcles, yet the area has been already inhabited by Lelegians and Carrians earlier.

Ephesus was colonized by the Ionians by the end of Xth century BC. During its climax, Ephesus had a population of 300.000 and was a center of culture, art and wealth. The Temple of Artemis, a sector of Ephesus complex, has once been numbered among the seven wonders of the ancient world. The Basilica of St. John is a Byzantine citadel built by the Emperor Justinian in the VIth century AD. It is adjacent to Isa Bey Mosque, a typical Seljuk structure. Priene on the south was the most vibrant port of the Ionian Federation. Its grid–iron geometric city fabric is the work of Hippodamus of Milletus in the IVth century BC. Milletus, once a port again; and Didyma with its Temple of Apollo further south; Aphrodisias, Heraklia are other antiquities of international popularity around Kusadasi.

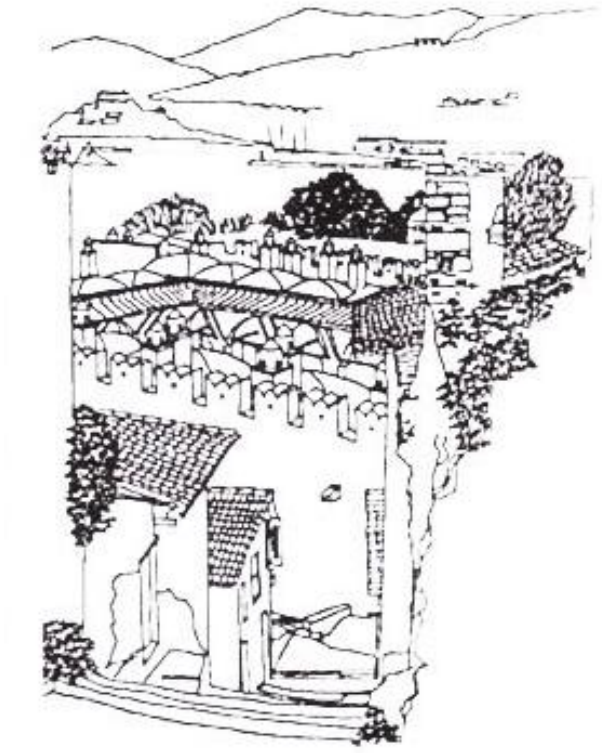

Fig. 5: Okuz Mehmet Pasha caravanserai with marina in the rear.

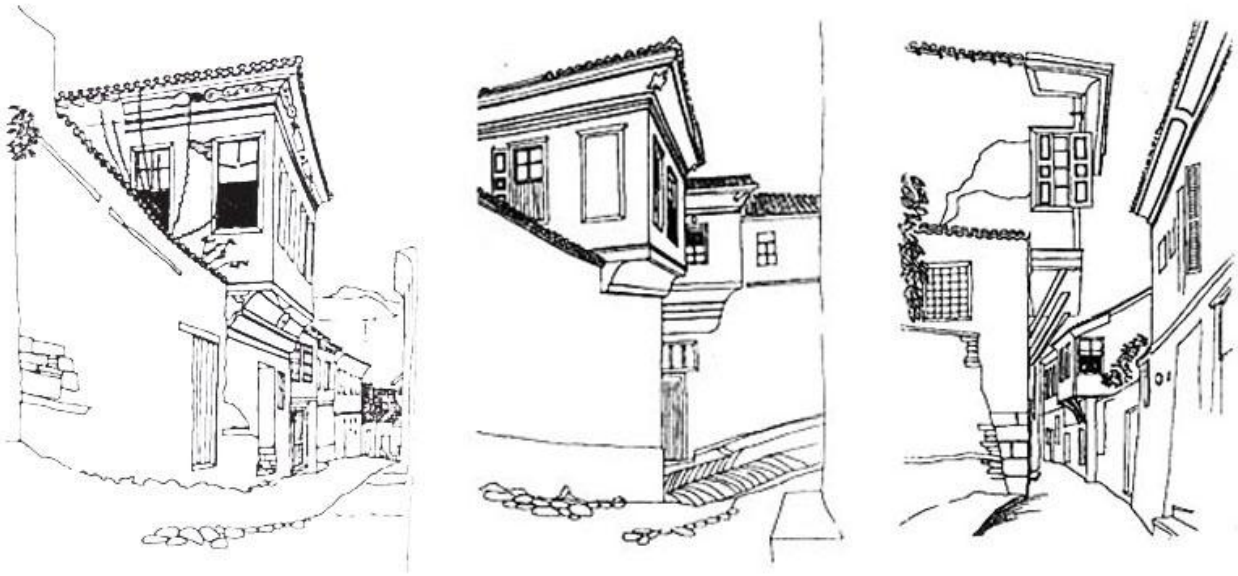

Fig. 6: Vernacular houses of Kusadasi.

4. Kusadasi's Touristic Powers

The antique sites in the vicinity of Kusadasi, all half or one-day round trip distances, make the town a major tourist center. In addition to those, The Church of Holy Virgin in Ephesus is a pilgrimage point for Christianity.

Furthermore, a 625-yacht international marina, a port for touristic vessels with custom facilities, an international airport 60 km away, a national park of extreme natural beauty, exceptional beaches, a wonderful climate render Kusadasi a focus of touristic activity. The presence of a major city, Izmir at 1 hour car distance further enhances the touristic potential of Kusadasi.

5. The Unhealthy Developments

Numerous facts, already mentioned, make Kusadasi a point of prime touristic potential. Indeed, the town has experienced an unprecedented growth in tourism industry since 1960's. The Ministry of Tourism has declared Kusadasi a pilot area, and a master project GAC "South and West Anatolian Environmental Project", receiving funds from international sources, has chosen Kusadasi the target point for action.

In spite of all these positive aspects, now Kusadasi is now industry and recreational popularity. Although the downwards trends may partially be attributed to global forces such as the Gulf War and some other negative developments in and around Turkey, Kusadasi's gradual loss in touristic interest is believed to be result of the following actions.

5.1 Overbuilding

The sudden touristic breakthrough in Kusadasi has resulted in an immense and dense building activity mostly in the form of hotels, motels, resorts villages, pension houses, summer houses and the like without any attention to the insufficient infrastructure.

5.2 Poor Architectural Quality

Almost invariably, the architectural quality of the new building stock is poor, ugly and repulsive.

The following points may be cited as significant architectural setbacks:

a. Poor design quality in general, devoid of aesthetic and visual character and insensitivity to environment.
b. Poor material and workmanship even in highly luxury establishments.
c. Unfinished, roofless buildings with rebars left exposed on the roof terrace for possible future floor addition.
d. Visually disturbing solar energy packs installed on the roofs.
e. Additions such as pergolas, venetians blinds, aluminium framing in balconies executed haphazardly after the completion of the construction.
f. Absence of any reference to the traditional and vernacular building tradition.

g. Absence of sensibility to the historic and natural context.
h. Drawbacks resulting from poor urban planning.
i. Invariable urge to maximize the built up area, even beyond the permissible limits.
j. Construction which is not in line with building permits documents.
k. Poor site supervision and maintenance.

5.3 Poor Urban Planning

The city plans of Kusadasi have been initially undertaken by Iller Bankasi, a governmental agency responsible for producing city and town plans across Turkey. Subsequently, the local authorities, entrusted with planning powers through legal action, have commissioned a private city planning office which has been changed in every political takeover. Upon the sight of the catastrophic building trend in Kusadasi, the Central Government has warned the Municipality in many occasions.

Almost invariably, the plans prepared for the town, both by the Iller Bankasi and by private firms commissioned by the Mayor, resulted in poor and inappropriate plans, and the architectural character of the town has gradually worsened. Among numerous points, the following ones may be cited as the weaknesses of the plans and planning process for Kusadasi:

a. Lack of an underlying philosophy.
b. Absence of references to the historical and natural entities and landmarks.
c. Absence of a strategy which would enhance and reinforce the old town's fabric and elements such as the caravanserai, the mosque, the city walls, the gates and the like.
d. Insensibility towards the topographical morphology, with impossible streets, improper slopes and indifference towards the plant cover.
e. Insensibility to the property lines and ownership structures, rendering either impossible or ugly architectural execution of the city plan.
f. Higher land coverage ratios.
g. Improper circulation network design and traffic studies.
h. Weaknesses in face of pressures from investors.
i. Absence of academically qualified critics and approval bodies, plans produced by the planning office circulating between councils and approval bodies without structured and coordinated criticism and expert critics.
j. Method of compensation of the planning office which is occasionally asked to establish direct financial contacts with investors, developers and the people in general.
k. Biased influences and pressures from local and central authorities.

In addition to all these chaotic, biased, improper processes resulting in a characterless, messageless building environment in Kusadasi, the garbage collection and storage problem, the pollution of the sea, the shortage of water, and other drawbacks resulting of the lack of proper substructure and incapability of the Mayoral office which is short of funds, have negatively affected the tourist attraction power of Kusadasi from inside and outside.

6. What Can Be Done for Kusadasi?

The statistical data demonstrate the downwards trend in the tourism activity in Kusadasi in spite of the very significant incentives for tourist attraction in and around the town.

The officials express that the touristic activity would have been 300 % higher if the town has not been subject to the destructive and degrading effect of the cheap architecture and urban planning. Tourists would favour Kusadasi more if the cultural heritage and the natural wealth have not been vandalised in favour of concrete monsters, however there is still much which could be done for Kusadasi:

a. The present private planning office for Kusadasi commissioned by the Mayor seems in principle appropriate and mature to the preparation of plans. Yet a body formed primarily by academicians and experts with at least one foreign member should govern the policy making, the criticism and approval processes of the city plans.
b. The preparation of the city plan should be totally closed to political pressures and other influences directed to work for the profit of individuals rather than the welfare of Kusadasi in general.
c. The city office responsible for approval of building permits shall be supplemented by expert architects.
d. The Mayor shall use academic advisors in all matters related to building and construction.
e. Aesthetic standards shall be developed and required for all building to be built within Kusadasi.
f. Close coordination and cooperation with the Council for the Preservation of Cultural and Natural Entities shall be initiated.
g. Close cooperation with surrounding municipalities, primarily Davutlar and Selcuk shall be initiated.
h. Planning works shall be conducted in close cooperation with related Ministry and Directorates.
i. A comprehensive landscape project shall be developed to mask the present architectural terror.

j. National and international symposia on the planning of Kusadasi shall be organised and competitions be launched.
k. The skyline and the sea cornice shall be given priority in planning and design.
l. The public awareness on architectural issues shall be enhanced and matured.
m. More efforts shall be devoted to obtain sources from governmental and international establishments and agencies.
n. Developers, investors, landlords which do not properly follow the guidelines shall be severely punished.
o. Architects active in the area shall be educated through seminars.

7. Conclusion

The intention of this paper is not to establish definitive remedies to the problems of Kusadasi or to criticize certain offices or agencies. The points listed above consist only of a sampling of measures to be considered in the process of restoring Kusadasi's genuine character. The goal of this contribution is to diffuse S.O.S. messages in all directions to stimulate concerned bodies and officials to act at once. If proper action is further delayed, the trend to catastrophe will then be irreversible and Kusadasi whose nature and culture have been favoured so much will be lost forever.

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NEW CONTEMPORARY ART MUSEUM BUENOS AIRES

Anna MANDIA,[1]
Dipartimento di Cultura del Progetto, Facoltà di Architettura, Seconda Università di Napoli Luigi Vanvitelli,Napoli, Italia
anna.mandia@fastwebnet.it

Abstract
The project has been developed, with a group of architects: Anna Mandia, Giuseppe Mandia, Alexandros Karim Alevas, Barbara Blondi, in order to participate in the International concept and design competition for the new contemporary art museum in Buenos Aires. The proposal is to create architecture which refers directly to contemporary art. An amorphous objects of unnatural size, presented to the public on a geometrically simple base. Its morphology reminds of a diverse quantity of forms in nature: from bubbles to clouds to various marine mammals or more abstract shapes. But as a matter of fact this project is not designed to be referable to something really existing. It tries to be a work of art itself rather than only a container for it – an object capable of surprising and moving, intriguing and inviting anyone who looks at it. Like contemporary art which refuses to be interpreted in a rational way but still achieves to evoke an emotion in the observers mind. Located in the Puerto Madero District - which currently represents the largest urban renewal project in the city of Buenos Aires - the museum is situated on the intersection of two important pedestrian axes: the north-south promenade (Juana Manuela Gorriti) and the east-west axis connecting the city with the new urban barrio with the impressing Puente de la Mujer by the Spanish Architect Santiago Calatrava.

Keywords: design competition, contemporary art museum,

1. The project
The initial idea of this proposal is to create architecture which refers directly to contemporary art; An amorphous objects of unnatural size, presented to the public on a
geometrically simple base. Its morphology reminds of a diverse quantity of forms in nature: from bubbles to clouds to various marine mammals or more abstract shapes. But as a matter of fact this project is not designed to be referable to something really existing.
It tries to be a work of art itself rather than only a container for it – an object capable of surprising and moving, intriguing and inviting anyone who looks at it. Like contemporary art which refuses to be interpreted in a rational way but still achieves to evoke an emotion in the observers mind.

Located in the Puerto Madero District - which currently represents the largest urban renewal project in the city of Buenos Aires - the museum is situated on the intersection of two important pedestrian axes: the north-south promenade (Juana Manuela Gorriti) and the east-west axis connecting the city with the new urban barrio with the impressing Puente de la Mujer by the Spanish Architect Santiago Calatrava.On this exact point of intersection our proposal opens itself inviting the public offering an urban square, which – being connected to the multi-purpose space on the ground level – becomes a point of urban art, performance, installation, exhibition, open air theatre, concert, etc... Continuing along the promenade the ground level remains open to the pedestrian public providing one entrance, a café and the souvenir shop while it hosts the technical and administrative areas in the west part of the building easily reached by car through Av. Alicia Moreau de Justo.

2. Description of the museum - interior -

Entering the ground level the visitor finds oneself inside a wide and luminous foyer defined by a sculptural ramp and the functional core hosting elevators, emergency stairs and rest-rooms. These vertical elements are also of structural importance being the main pillars of the building, sustaining its three levels together with minor pilasters. Walking up the ramp and entering private space inside the "object", four open-space galleries of
different height are to be found on these three floors. Through a rational channel system their ceilings make it easy to hang different types of module-panels and lights
in order to change room situations and routes according to the ongoing exhibition.
On the last level the museum hosts an auditorium with space for up to 250 persons and its foyer with a small bar.

2.1 The structure

The structure of the "blob" itself is self-supporting and lies on the ground level base. Its surface material is ethylene tetrafluoroethylene, a fluorine based plastic, designed to have high corrosion resistance and strength over a wide temperature range combined with excellent chemical and electrical resistance properties. It is a lightweight material (1% the weight of glass), and its self-cleaning and 100% recyclable characteristics make it an ideal material for the eco-aware society of the 21st century. Pneumatic panels of ETFE furthermore provide optimal acoustic and thermal isolation thanks to the layer of air lying between two membranes. According to specific requirements, opaque or transparent facade-cushions can be used to provide perfect diffuse lighting conditions for an exhibition interior.

"Architecture is a art when one consciously or unconsciously creates aesthetic emotion in the atmosphere and when this environment produces well being."

Luis Barragan

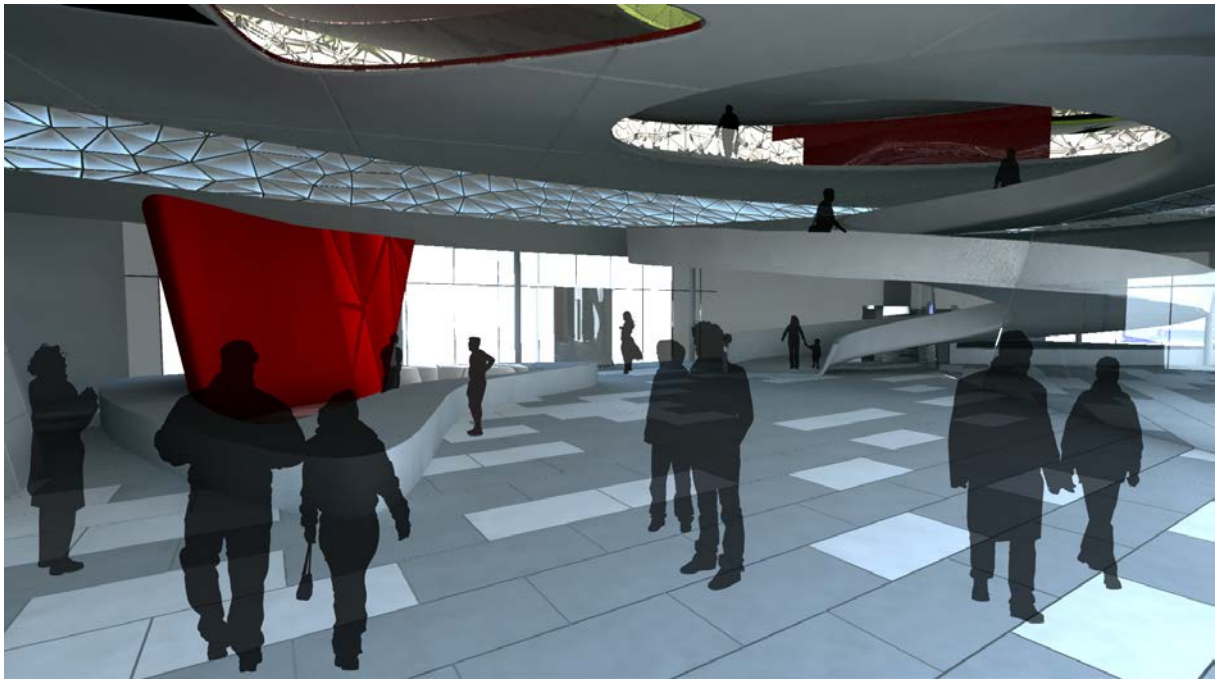

Fig.1 Museum entrance



Fig.2 The urban square

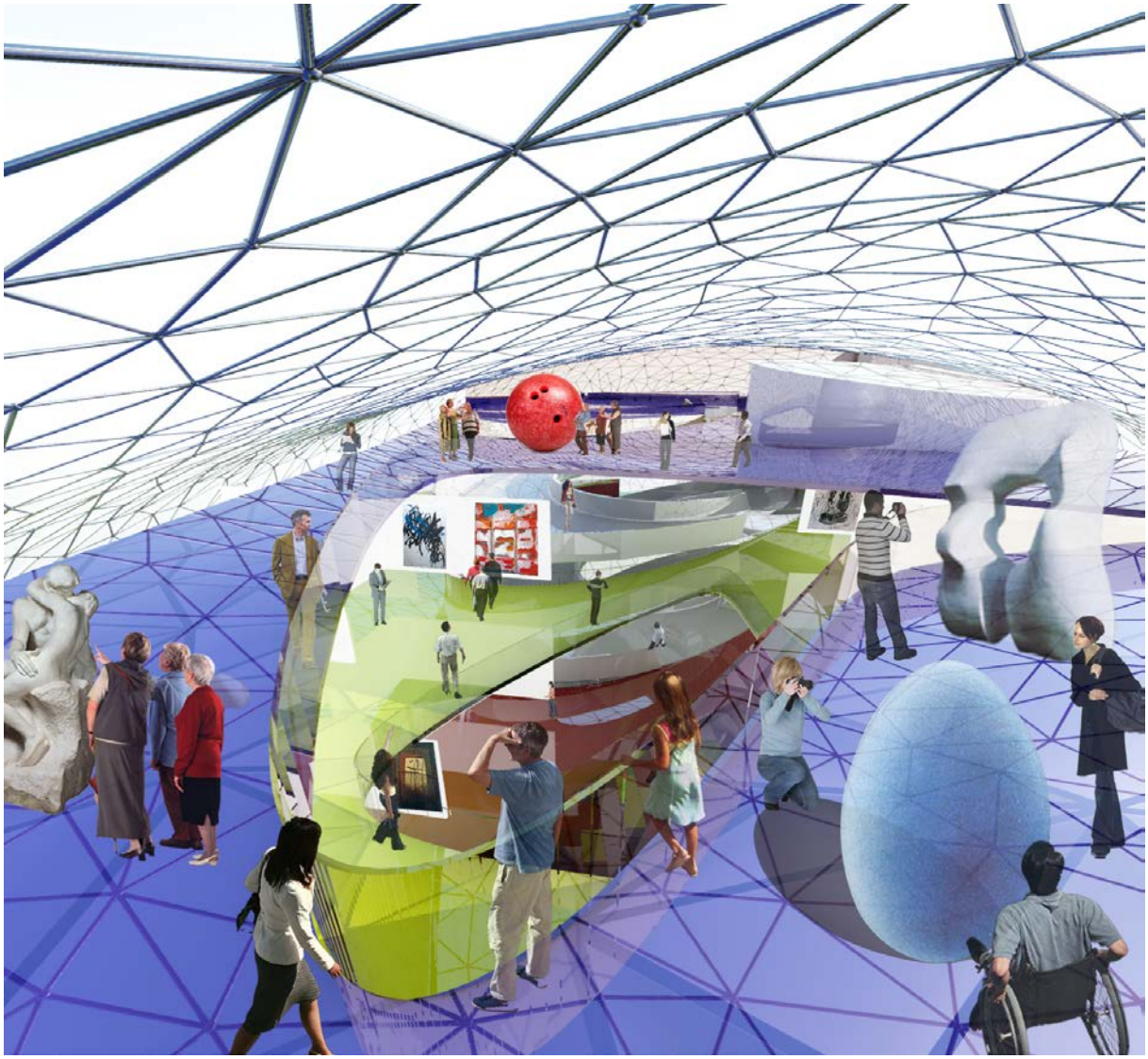

Fig. 3: Last level of the museum



Fig. 4: The project

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(ID 012)
Confronting Contemporary Sustainability Norms with the Durability of Historical Buildings

Carmela CUCUZZELLA
Design and Computation Arts, Faculty of Fine Arts, Concordia University, Montreal, Canada
Scientific director of LEAP@Concordia research lab (http://leap.concordia.ca)
carmela.cucuzzella@concordia.ca

Abstract
Environmental norms and certifications are increasingly used today to measure the level of environmental sustainability of buildings, often reducing the definition of sustainability to these norms or certifications. Our previous research has demonstrated, through an analysis of contemporary architectural competitions, some of the paradoxes resulting in design projects from the use of environmental norms and certifications, particularly in the Canadian context. This paper seeks to highlight a new series of contradictions related to the use of environmental norms or certifications for addressing the sustainability of buildings, through the analysis of a selection of historical buildings from the early 20th century. Research has already shown that some historical buildings are closer to addressing the challenges we face in the unsustainability crisis today, than some of today's projects built using rigid prescriptive processes, such as the LEED green building rating system. The highly publicized energy efficiency results of the building in New York city, the 7 World Trade Center, showed that even a LEED Gold certified building can be less energy efficient than the historical Empire State Building in New York city, albeit after upgrades to the insulation and mechanical systems of the building.

Keywords: sustainability, environmental certifications, judgment, contradictions, architectural competitions

1. Introduction
When it comes to addressing the sustainability of architectural projects, the questions of energy efficiency and the performance of buildings are considered prevalent concerns by most stakeholders. The objective of this paper is to question the idea that says, contemporary buildings would be more sustainable than traditional buildings. Amongst the traditional buildings, what happens when we consider those that are worth preserving as heritage buildings? Can we say that historical buildings are more or less sustainable than contemporary buildings? In other words, how would historical buildings fair today within the discourse of sustainability?

In this paper, rather than presenting the results of a variety of case studies, we use a few illustrative examples in order that we may deconstruct contemporary environmental management tools to present a new theoretical framework based on their ontological, epistemological and operational definitions. A first example can help illustrate some of these contradictions that our present condition addresses, specifically related to the strict use of environmental certifications in competitions today. Then we will present a second example outside the competition process showing that some historical buildings are closer to addressing the challenges we face in the unsustainability crisis when compared to some contemporary projects built using rigid prescriptive tools.

To study this complex phenomenon, the architectural competition format is a perfect empirical situation to analyze some of the paradoxes of contemporary approaches to sustainability. Indeed, the debate on quality during the competition jury process highlights the variety of value systems represented by the members of the jury, which are themselves representative of a variety of stakeholders. The increasing importance of arguments related to environmental certifications in competitions is showing indications of a shift of the ideal of quality in competitions and by extension in most situations where architectural quality goes through a judgment process.

2. Competitions as Empirical Situations

A first example can help highlight how sustainability as a new value system can be somehow counter-productive regarding the way in which we judge quality and sustainability altogether. This competition was rigidly driven by the measurable requirements of low carbon performance: the Concours EDF Architecture Bas Carbone 2011. This was the 4th edition of this competition, organized by EDF (Electricite de France) on the premise that "the low carbon performance requirement stimulates architectural innovation on all the planes and drives design towards a global quality that privileges comfort and harmony with the habitat." [2, p.15]. In spite of the fact that the jury consisted of mostly architects, the jury's comments regarding the winning project were very divided since there was much concern about the lack of overall architectural quality, while all competitors very rigidly addressed the question of carbon emissions. It is clear that technical solutions won this competition. In fact, the state architect/urbanist, a member of the minister of ecology of sustainable development and a member of the jury, voiced profound concern about the project saying that, "I have some fears with regards to the image, as part of a larger whole, and with the omissions it may encourage. I think that we must one day give ourselves the means to analyse the existent correlation between the technical solutions and the urban form and to measure these on the architecture." [2, p.29] (Figure 1).

This competition is indicative that a serious problem is emerging in architectural competitions when the winning project of an architectural competition is lacking architectural qualities. The rigid environmental requirements can be considered as the invisible 'member of the jury', driving the entire deliberation process by focusing heavily on the questions of carbon emission, while essentially ignoring the overall qualitative architectural debate. Our research on competitions conducted with scholars at the *Laboratoire d'étude de l'architecture potentielle* (www.leap.umontreal.ca) in recent years have shown that environmental experts and certifications are not only problematic for the jury process, but they also seem to impact the design phase, shifting the designer's focus to technological solutions.



Figure 1: Winning project of the « EDF Architecture Bas Carbone » 2011, les Docks de Saint-Ouen, Saint-Ouen (Seine-Saint-Denis). X-TU Architectes, avec Berim et le Sommer (source: d'a hors série, 2011).

What is interesting with this example is that it is a competition for young architects dedicated to sustainability. Rather than finding innovative ways to address the very complex questions, it seems that the low carbon achievements became the competition prize.

There seems to be an increasing occurrence, where the least controversial project wins rather than the best overall project whenever it comes to questions of energy performance. It follows that a building could be at once, an exceptionally performing building and considered high quality on this question, and yet on other qualitative architectural aspects, such as symbolism, identity, space, fluidity, etc., it is judged extremely poor.

Let us highlight here that the competition process is a format that allows comparisons among a variety of proposals each addressing the same given problematic. In the domain of architecture, it is mostly through comparison and debate that we can create new knowledge. This is noteworthy because usually the preservation of historical buildings is precisely supported by a strong qualitative appraisal of their value. What happens then when we consider the complex issue of the qualitative assessment of historical buildings in the growing demand for sustainability?

3. Can Historical Buildings Compete with Contemporary Buildings?

A recent survey in New York showed some astounding paradoxes regarding our current impetus towards the use of environmental certifications for many new commercial or public buildings. The city of New York ran a citywide survey of more than 2500 commercial high-rise buildings in Manhattan in in 2012. The buildings surveyed were the largest in New York and account for just 2% of the approximately one million buildings in the city, yet they also account for about 45% of the energy used by the whole set of New York buildings. The buildings were compared with regards to their energy efficiency. The Environmental Protection Agency's *Energy Star* rating was used to score the energy efficiency of these commercial buildings considering that a minimum energy score of 75 is needed to pass the Energy Star rating.

The Chrysler building, constructed between 1928-1930, and designed by architect William Van Alen is an example of an Art Deco style masterpiece. In 1976, this building was declared a national historic landmark. It is 77 stories high. At the time it was built, in 1930, it was considered the tallest building in the world, at 319 metres. But it only retained this claim until the Empire State Building was completed the year after, in 1931, designed by architect William F. Lamb from the architectural firm Shreve, Lamb and Harmon. The Empire State Building was 381 metres (102 stories) and kept this claim until 1972. Both these buildings were part of this energy efficiency survey. Some of the results of this survey were unexpected.

The Chrysler building (Figure 2, left) received a score of 85, a very respectable score, as it was 10 points beyond an acceptable minimum. The Empire State building (Figure 2, middle) received a score of 80, also quite respectable. Both buildings were built during a time where the questions of sustainability were far off into the very distant horizon and the debate on architectural quality was not substantiated through questions of energy efficiency. When we compare the results of these two buildings with that of the 7 World Trade Center building, built in 2006, 52 stories, LEED Gold certified, and the first LEED certified commercial building in New York, the results are somewhat surprising. The 7 World Trade Center building (Figure 2, right) received a score of 74, below the optimal threshold.

The less than optimal performance of the 7 World Trade Center Building is not surprising since LEED New Construction, which is the certification received for this building, evaluates buildings before the occupancy phase without a follow-up after tenants move in. Yet this building is highly appreciated because of its LEED Gold label. Older buildings have their own intrinsic values of appreciation, which have nothing to do with the LEED label. The Chrysler building is one of the most identifiable icons of New York City's skyline. And they fair rather well when faced with today's energy survey, to some extent because older buildings have superior thermal envelopes as a result of their thick walls, less glass, and less ventilation.



Figure 2: (left) Chrysler Building, New York, built 1930, 77 stories, energy score 85; (middle) Empire State Building, New York, built 1931, 102 stories, energy score 80; (right) 7 World Trade Center, New York, built 2006, 52 stories, energy score 74.

Consequently, the Empire state and Chrysler buildings were both recently retrofitted with upgrades to their energy and water systems and from these renovations, both received LEED Gold certifications for existing buildings, in 2011 and 2012 respectively. The Chrysler building had however already won the Energy Star credibility in 2008, three years before these retrofits.

The unexpected results of this survey as well as the results of many architectural competitions that must meet very rigid certification requirements even before any other requirements, highlights the very crucial question of what is the value added by these certifications today. Can we say that our present unsustainability condition represents a 'crisis within a crisis'? In order to address such a complex issue, it appears necessary to revise both our epistemological and operational frameworks.

4. Sustainability: A Crisis Within a Crisis

We have seen how environmental norms can be counter-productive in competitions. We have also seen that some historical buildings can compete with contemporary buildings if we reduce our understanding of sustainability to that of the certification or rating tools. In addition, our previous researches on evaluation practices and qualitative judgment suggest that the sudden introduction of environmental certifications in the architectural competition can be at the expense of a more qualitative assessment of the design project [1].

Let us highlight here that research on tools, certifications and methods for assessing concerns related to sustainability, particularly the environmental pillar, has been conducted since the early 70's. This reflective, at times critical, activity is growing exponentially, as these instruments are continually being improved and as new ones are constantly being introduced to address newly uncovered concerns or impacts. Whether this increasing precision in todays' tools for assessing environmental or social impacts is actually getting us closer to a more sustainable development is unclear and is the subject of another research. But what is evident is that there is a huge disciplinary gap between the enormous body of research on evaluation tools for environmental, economic or social sustainability, many of which are oriented towards performance efficiency and optimization, and the shallow body of research

on how these are used in design projects, particularly on architectural and urban design, and how they impact the outcomes of these designs. There is little regard to how these tools are ultimately adopted by professionals, including architects, urban designers, or even public planners – in a context of design for sustainability.

In this light, we cannot avoid a deep reflection and criticism of these tools, not only at the epistemological or operational levels, but also at the ontological level. So doing our current research program endeavours a deconstruction of environmental management tools from this perspective.

4.1 Ontological Definition: Plethora of Tools, Lack of Integration

The environmental management tools and methods that are increasingly being used in design projects are as diverse around the globe as they have been in time. The tools have been in constant fluctuation, as they are constantly being modified to better handle the on-going limitations. And as we can see through the variety of environmental building certifications systems around the world, there is an attempt to accommodate these concerns with regards to the varying cultures and climates (Figure 3).

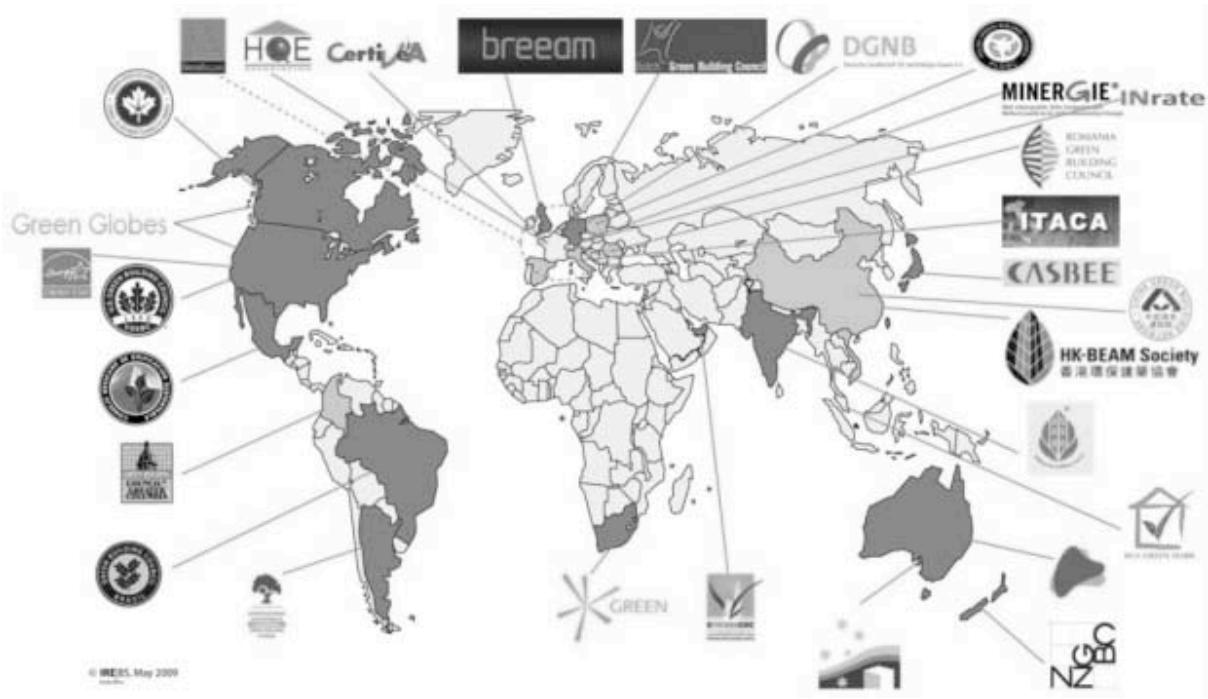

Figure 3: Environmental building certifications around the world (source: http://www.usgbc.org/International)

The paradox at the international level is that there is a demand to find development solutions that integrate concerns related to the four pillars of a sustainable development (culture, social, economic, and environment), yet the tools that are being developed do the exact opposite. The current environmental management tools reduce the concerns in any one pillar to a series of fragments of concerns. These reductionist tools are being heavily advocated for development projects around the world, whether they are urban, architectural or landscape projects. They have become increasingly prevalent for many reasons, two of which are that: (1) They simplify a very complex problem into a manageable set of criteria; and (2) we are embedded in a risk society obsessed with the quantification and prediction of risks. The question that comes up at this time is: what kind of unintended consequences will emerge from actions based on such reductionist tools for addressing the very complex problems of architectural projects in the contemporary context of sustainability?

4.2 Operational Concerns: Contradictions from their Use

Even if the intentions of any green building certification system are to seek to reduce environmental impact of the building, unintended consequences often arise from their use. If we take the example of the LEED (Leadership in Energy and Environmental Design) certification, which is consequently the basis of many other certifications, it is based on a point system. It is very standardized, usually for a national context. In fact, there is actually very little adjustment from country to country, even if the climate, the geography, the cultures and the societal habits are very different. Here, we can see that such a universal system has trouble addressing the specificities of projects. This standardization, in many cases, will encourage the game of 'finding the most points', rather than the searching for the most appropriate and efficient technologies for the given site, or more generally, exploring innovative or creative approaches towards environmental, social and cultural responsibility. So the project is set against the point system rather than using the criteria of the certification as a set of universally accepted general guidelines that may or may not be appropriate for any specific project. Often, creative and unique approaches, which may offer transformational sustainable improvements, are just not considered in the LEED point system because they cannot be *proven* to be an improvement, as they are not 'tried and tested' technical solutions.

In addition, we are seeing an increasing number of buildings being certified, where the notion of green certification is contradictory to the purpose of the building itself. For example, the spaceport project won by Foster and Partners in New Mexico, USA, located in the middle of a desert. The enormous amount of toxins emitted from the use of this spaceport allows us to question: what is LEED certifying? This project is designed to be LEED Platinum, the strictest of the LEED certifications. Will the performance improvements obtained from a LEED Platinum certification outweigh the emissions resulting from the building's operations? Unlikely.

In fact there have been several studies regarding the performance outcome of LEED certified buildings. A first research has shown that there is no correlation between the level of LEED certification and energy performance of post-occupancy buildings [9]. A second research has shown that LEED-certified buildings do not collectively use less energy than their non-LEED counterparts [10].

4.3 Epistemological Reflections: Risk Society, Technology, and Expertise

What we are increasingly observing, particularly through the growing imposition of the use of environmental certifications for public buildings, is an evaluation of quality emerging from risk society. Proving that a building is environmentally sustainable through the acquisition of some green building certification has become a goal in itself. How are these certifications shifting the ideal of quality in today's buildings? A more rhetorical question would be: are buildings allowed to be beautiful today? This question actually introduces a contemporary paradox where risk society and its plethora of environmental analysis or prescriptive tools are redefining quality in general. This has become an epistemological problem since quantifiable empirical data is increasingly needed to design and judge a quality building.

"Risk may be defined as a systematic way of dealing with hazards and insecurities induced and introduced by modernization itself" [3, p.21]. By modernization we mean the way humans increasingly seek technological mastery over nature. Risk society is "a society increasingly preoccupied with the future (and also with safety), which generates the notion of risk" [4, p.3]. It describes the way that modern society responds to risk. Risk society emerged with the growing concerns of environmental risk - as these had come to be the predominant product of industrial society – and development of probabilistic risk assessment. The prevention of these 'manufactured' risks through measurable, predictable means became inadequate in a society where risks were being introduced faster than they could be understood, let alone quantified. So even if this modern understanding of risk was supposed to help humans control their future or to normalize it, attempts to control the future through these measurable methods have led to the realization that humans need different approaches for relating with uncertainty.

With the increasing need to quantify environmental risk, there is a parallel imposition of environmental experts embedded within architectural projects. Should the question of expertise be reconsidered and evaluated within the general theory of qualitative judgment?

We have observed in various European and North American competitions today, that when environmental experts are "part of the jury", the deliberation may result in a series of discursive deadlocks directly related to the gap between the specific and varying lexicons of the many members of the jury. Qualitative debate is needed to collectively construct and agree on the best overall project. When a deadlock is reached, then this implies that we cannot arrive at a best project since the debate is circumvented by the quantitative rigidity of the experts. It is difficult then to circumvent the general theory of judgment in dealing with this discursive gap. According to Dewey reflective thinking is judgment suspended during further inquiry, where a state of doubt is maintained until some conclusion can be finally reached [5]. In order to reach a judgment, a series of inquiries where elements such as evidential facts, principles, and tacit knowledge, may all be necessary. Evidential facts are a result of the evaluation of empirical data – an objective perspective. Principles provide the worldview – a normative perspective. Tacit knowledge is the knowledge acquired through experience and is considered subjective, where experience is the natural stimuli for reflective inquiry. These three can be related to what Habermas terms the cognitive-instrumental (objective), the moral-practical (normative), and the aesthetic-expressive (subjective); all three dimensions of modern culture that have become increasingly detached as they have become increasingly expert driven [6]. From this point of view, the declared experts can be easily observed to provide quick conclusions in their evaluations, since they assume to have enough evidence – however on their very fragmented vision of the project. Architects in the jury, on the other hand, are observed to be in a continual state of suspended conclusion and reflective thinking, grounding the information from declared experts within their overall project experience.

As far back as 1954 (original French publication), according to Ellul, the paradox with technology is that it drives intention and so individuals have become the slaves of the technologic society, where "*the multiplicity of means is reduced to one: the most efficient"* [8, p.21]. And yet,

"(...) the individual participates only to the degree that he is subordinate to the search for efficiency, to the degree that he resists all the currents today considered secondary, such as aesthetics, ethics, fantasy. Insofar as the individual represents this abstract tendency, he is permitted to participate in the technical creation, which is increasingly independent of him and increasingly linked to its own mathematical law." [8, p.74]

For this author, the search for efficiency has overwhelmed the individual's ability to consider other ways of thinking, such as aesthetics, ethics, etc. impoverishing humanity's ability for creativity and reflection. The rigid use of environmental certifications for architectural projects has become a main protagonist of this impoverishment.

5. Conclusion

As the recent New York survey showed, older commercial high-rise buildings tend to be more energy efficient because of their larger mass and are therefore naturally insulated through this very characteristic. It may be that whether the architecture is a result of a competition or a call for tender, it seems that the expertise on heritage preservation and the understanding of the historical value of buildings would be more *sustainable* than the 'mechanical' imposition of norms and certifications of performance which can be at times put into question. There is still much work to do on the method for evaluation. This question of evaluation becomes crucial when trying to judge overall architectural quality. Although in North America competitions are rarely addressing historical preservation issues, most European contexts witness a real clash between the problematic of qualitative judgment, heritage preservation and sustainability.

Finally, the dichotomy between performance measurements and the complexity of projects is a disciplinary problematic. This becomes quite evident when we confront today's performance measurements with historical buildings. This increasing need to *quantify quality* represents a point of fragility since architectural projects are judged nowadays by measuring quality, rather than through debate. But can we speak of heritage conservation outside a collective construction?

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THE INFLUENCE OF NEW TECHNOLOGIES ON SUSTAINABLE PARKS: DUISBURG NORTH PARK AND CENTRAL PARK VALENCIA.

Mª Carmen VESES JIMENEZ[1]; Dr. Ignacio BOSCH REIG[2]

(1) Department of Architectural Design, ETSAV, UPV, Valencia, Spain.
maveji@upv.es
(2) ibosch@pra.upv.es

Abstract

The case studies considered are Duisburg North Park, 1999, and the winner of the Valencian Central Park project competition, 2011. Duisburg was one of the first sustainable parks created and the Valencian case study is a recent sustainable park.

In Duisburg North Park sustainable actions are delivered by passive measures: maintenance of pre-existing constructions as ruins, implying a low cost intervention and historical preservation, analysis of the water cycle, closing some contaminated areas to public and allowing spontaneous growth of vegetation, among others.

In Central Park Valencia, sustainability is manifested through technological advances in the field combined with passive design: catalogued protection of the industrial heritage, the bowl design of park structures for collecting rainwater, the choice of plant species of low water consumption, among others. Highlighted active measures include: the use of low-carbon technologies, and drip irrigation with recycled water, sustainable urban drainage systems, LED lighting with daylight sensors and implementation of geothermal collectors.

After comparative analysis of both cases, the presentation raises the debate about the need to combine passive and active mechanisms in the design of sustainable parks, establishing relationships and differences between the two.

Keywords: sustainable, passive, active, park, Duisburg, Valencia.

1. Features of sustainable park

Firstly it is necessary to define what we mean when describing a sustainable park. According to the definition of CRANZ and BOLAND [1], the sustainable park is the latest model in the evolution of park design, which appearing in 1990, characterized by the following features:

•Self-sufficiency with regards to natural resources and maintenance.
•Resolve larger urban problems, such as fragmentation and conurbation.
•Create a new standard for aesthetics standards, innovating landscape management both in parks and urban spaces.

SUSTAINABLE PARK 1990 - PRESENT	
Social Goal	Health, ecology.
Activities	Walking, excursions, cycling, recreation, enjoyment of nature, culture.
Size	Diverse, generally in form of corridors
Relation to the city	Linked to a larger urban system.
Order	Shape and area are adapted to solve an urban problem.
Elements	Native plants, ecological restoration, green infrastructure, resource self-sufficiency.
Promoters	Environmentalists, local communities, landscape architects, volunteer groups.
Beneficiaries	Residents, wildfire, city spaces.

Fig. 1: Features of sustainable park. Chart adapted from CRANZ and BOLAND[2]

Further demonstrate that, Duisburg North Park (DNP) and Central Park Valencia (PCV) satisfy the requirements indicated in the chart. Both are partially self-sufficient with regards to material resources and maintenance, do not have a heavy energy consumption, do not waste resources (such as water) and have established mechanisms for the treatment of residues.

Both parks solve large urban problems, DNP forms a green belt within a conurbation zone of fragmented infrastructure. PCV will eventually successfully link six different areas physically separated by train lines. The park and boulevard will also improve social permeability and will give the city a central focus.

1.1 Passive and active measures in the design of sustainable parks.

In the definition of a sustainble park one differentiates between passive and active measures.

Passive mesuares are based on the rational use of different shapes and materials related to design. An example of these could be: the choice of plants with low water consumption, investigation into lowering maintenance costs, consideration and treatment of the water cycle, low cost interventions involving existing material, among others.

Active systems are related to the use of new technologies, such as renewable energy (solar, wind and photovoltaic energy), also systems which need an initial input of energy to function (domotics, daylight sensors...)

2. Features of Duisburg North Park

The decline of industrial activity in the Ruhr left large areas contaminated by the coal, iron and steel industry, with a strange landscape, environmental damage and contaminated soils.

The Emscher Park International Exhibition Building (IBA) was created to repair the area (environmentally, economically and culturally) on the former site of the steelmaker Thyssen, including the park inside a large urban green system, as part of a green corridor of about 300 km^2.

One of the main projects of the IBA Emscher Park is Duisburg North Park. The area has a dimension of 230 hectares, located between several urban centres and is crossed by huge traffic arteries.

The project, designed by Peter Latz, produced a metamorphosis of the industrial buildings, considering them as a ruin to be conquered by vegetation. The main interventions are in the area where constructions accumulate, the remaining land, 200 hectares, are areas where leaves grow spontaneously vegetation, there are some areas, like where was the lake of coal tar covered today, which are closed to the public due to the high pollution.

Multiple sports and leisure activities have been developed in the park, such as the exploitation of the scars and cracks in the walls of the ore deposits for use as a climbing wall, a dive centre in the gas works and the ability to go cycling in the entire area.

The park is divided in four different sections [3]:

-AREA A- The industrial buildings are concentrated forming the cultural center of the park. Activities held in this area include summer film screenings, theatre, operas and concerts at the Old Hall, large-scale events in the Power Plant and various cultural activities in the Storeroom.
-AREA B- The northwest area composed of the bunkers, the old Emscher, and the wind power plant. Diverse sport and leisure activities: the huge detritus walls are used for climbing, there is a diving center in the old gasometer, cycling throughout the whole area…
-AREA C- Educational farm; maintains a record of the agricultural past of the place.
-AREA D- Areas with high contamination are closed to the public. One of the most polluted areas, where the coke plant was situated is now converted to a tertiary center.

The park has achieved social and economic regeneration of an area marked by the economic crisis after the closing of industry whilst preserving the industrial heritage of the area.

3. Duisburg North Park: Sustainable measures and considerations applied

All the main sustainable measures in DNP are passive, thus alluding to the design, but each assume a different character: environmental, social and economic. Sustainable measures considered in the project can be summarized in the themes developed below.

3.1 Conservation of industrial heritage. Historical memory.

Despite the apparent low heritage value of the remains, they have been maintained in the park, reconfigured as their symbol of identity; helped the zonification of the park and form the basis for many recreational and sporting activities.

In addition to the conservation of the industrial ruins, their recycling has two objectives:

- Low operational cost: In comparison to dismantling, conservation is a low-cost intervention, as the former was estimated at 50 million euros, while the current project cost about 15 million euros, not including new building, demolition and decontamination.
- Generation of a tourist attraction: The park is integrated within the Emscher industrial route, and designed so as to generate a green, industrial themed corridor.

3.2 Analysis and study of the water cycle

The ”Old Emscher” was a channel which used to transport the waste material from the steelmaking process to the river Emscher. The intervention has achieved that the channel now carries clean water gathered from the roofs of buildings and other horizontal surfaces to the ponds and gardens. Sewage waste is transported away via sealed underground tubes 3.5 metres in diameter. This facility was one of the biggest investments of the park[4].

A wind-powered water wheel installed in a factory tower has been used to improve the oxygenation of the water.

3.3 Consideration of waste

Soil at the site was contaminated with arsenic, cyanide[5] and polyaromatic hydrocarbons among others. The following measures were carried out according to the German federal soil protection *Bundes-Bodenschutzgesetz* (BBodSchG) law of 1998 which refers to former industrial facilities, *Altstandorten* [6].

- Decontamination measures: cleaning the contaminated site

500 tonnes of arsenic mud was removed from settling tanks, which were drained and the slime moved to other old mines.

The old sinter plant was demolished almost entirely due to serious pollution. Contaminated materials were stored in sealed containers in sinter deposits and covered with roof gardens. The stones which were not contaminated were grounded and used to form new land surfaces and aggregates for concrete.

-Safety measures include a long term reduction of the spread of the polluting agent.

The dams that crossed the park carried high pH slag and therefore were able to bind heavy metals. The external surfaces are covered by dolomitic limestone chips, also with a high pH [7].

-Protection and limitation measures: When it is not possible to apply the aforementioned measures for technical and economic reasons, the area is closed and access restricted.

The soils of the coking plant, which was demolished, are contaminated with polyaromatic hydrocarbons. In the project it was decided that the place was to remain a part of the park and to accept a slow release of gas during several generations to allow a reduction in contamination, limiting the use of the area to bicycle riding and walking only. Currently these lands are not part of the park a tertiary centre has been built on them.

It was decided during the project to close some highly contaminated areas, such as the coal and tar lake, and take no action on them. At present the coal and tar lake has been covered.

The model therefore seeks to isolate the toxic substances from the natural cycle through: cleaning highly polluted areas, moving the waste to another place or to maintain it in place if is completely isolated. Finally, to counteract heavily polluted land whose removal or isolation is uneconomical and technically unfeasible the area may be closed to the public.

3.4 Recycling of materials

The industrial structures themselves were recycled because, as discussed, they serve as a basis for sporting activities, such as the use of a former gas tank as a dive center, mining deposits as climbing walls ... also some of the local materials were reused. In the central square, *piazza metallica*, the floor is made from sheet metal from the melting tanks. Demolition debris has also been used as a substrate for new plantations, recycled concrete or pavements. Some overpasses and stairs have been made with existing steel, for example with the steel from dismantled maintenance corridors.

3.5 Low maintenance cost

The park has a total of 230 hectares, and 200 of them are composed of land where vegetation is allowed to grow spontaneously without special care. Areas that were closed due to pollution do not require maintenance. Also the system collecting rainwater from roofs managed to reduce maintenance costs.

In 1999, the maintenance cost for the entire park was 1,789,521€ (3.5 DM). In comparison, in the same year the budget for labour and maintenance of Regent Park in London, half the surface area of DNP, was 3.125.980 € (£2.2 million) [8].

Despite the low cost of maintenance the park maintains a high diversity of plant species through the action of gardeners trained to maintain the variety of vegetation found there.

Also exist in the park other measures about diminution of energy consume, as the wind-power plant, the photovoltaic system and the solar panels[9].

3.6 Social and economic issues

Because of the industrial crisis many miners and steelmakers lost their jobs. The unemployment rate in the Ruhr, which was 0.6% in 1970, reached 12.2% in 2000. One objective of the IBA was to regenerate socially the zone and to generate employment.

Although the tourism industry only generated a fraction of the employment in the region, in 1999 DNP employed between 250 and 300 people, therefore, the environmental revitalization of the area attracted investment. The technology sector accounted for the bulk of job creation. Specialization in the technology sector directed towards the environment and waste treatment, and therefore against the environmental consequences of the old industries. According to HOSPERS[10] in 2004 this environmental technology cluster created more than 100,000 jobs, a number that keeps growing.

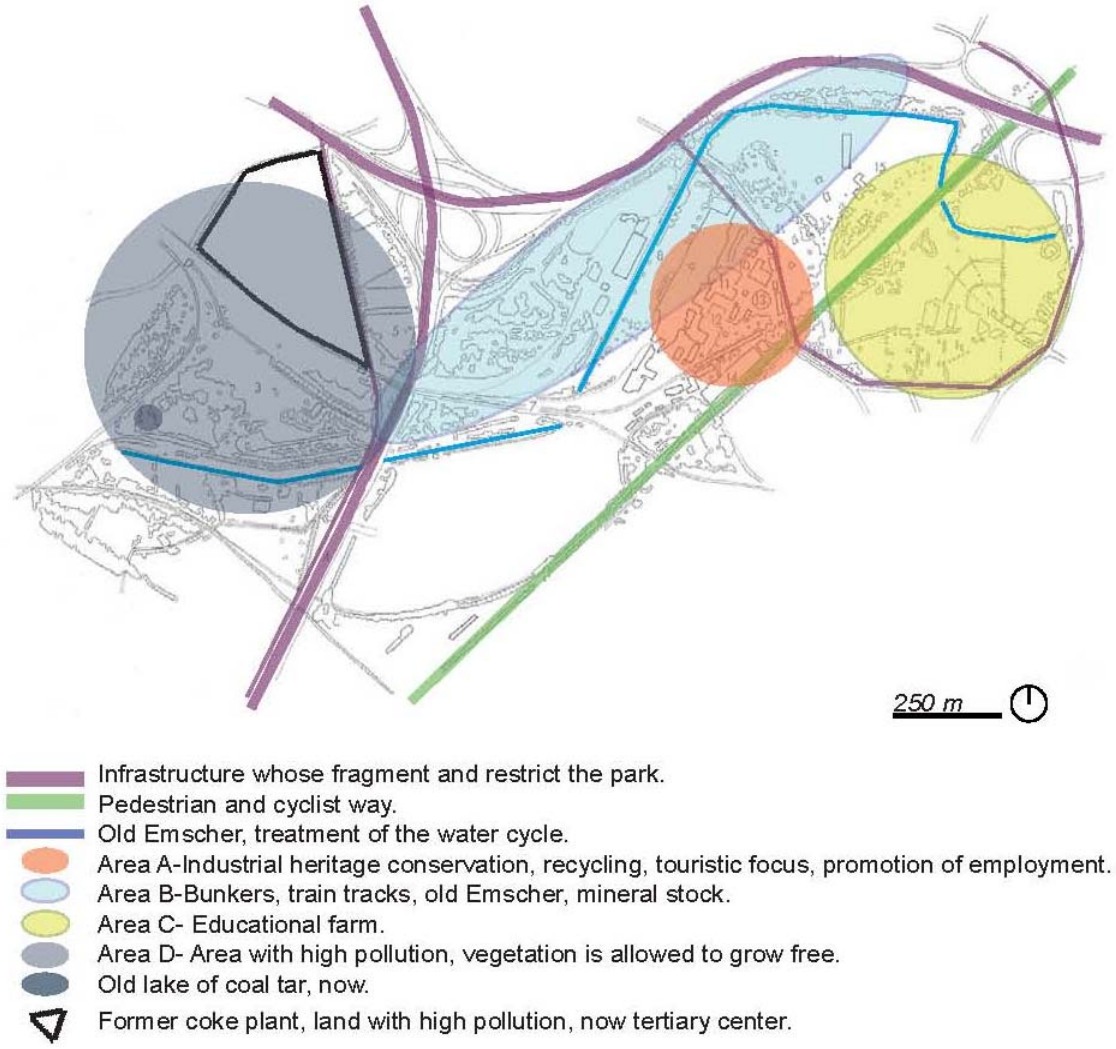

Fig.2: Duisburg North Park project, plan based on TATE [11]

4. Features of Central Park Valencia

The grounds of the central station, located in the centre of Valencia will provide 80 hectares of land to the city once the train tracks are buried underground. The train tracks divide the city of Valencia in two parts, creating a physical barrier between six neighborhoods.

The Central Park and a new boulevard, both designed by Gustafson Porter team, have been designed to occupy the empty urban space, aiming to promote permeability between different neighborhoods. The park's mission is to connect the disjointed parts of the city, it is also the opportunity to provide the city with a large park, as it is devoid of green spaces.

The proposed uses of the park are varied and are related to culture and leisure, such as a library, a restaurant, or a space for children, among others.

5. Central Park Valencia: Consideration of the sustainable measures applied

The measures under consideration are passive and active. The park has used BREEAM certification as a design tool, which assesses the sustainability level of the proposal, it is a voluntary certificate with international recognition. The following fields have been developed to achieve future certification: climate and energy issues (studying the topography of the park to allow maximum storage rain water), community, workplace design (residential streets as safe spaces for recommendations urban insurance), ecology and biodiversity (mostly native trees and shrubs), transportation (bicycle network planning), resources (low impact material) and economy and buildings (although these actions have

been determined by preliminary planning and are more difficult to justify.)[12] They can be summarized as detailed in the following points.

5.1 Conservation of industrial heritage. Historical memory.

Regarding to industrial heritage, the park's design seeks to preserve the historical memory of the zone via the existing industrial structure. The warehouse workshops of Renfe, most likely designed by Demetrio Ribes, will be preserved and restored in their original location, but the covered springs which are on the route of the new undercover rail tunnel, will be moved to the perimeter of the park allowing their preservation. The covered springs were also catalogued by the General Urban Development Plan of Valencia in the areas of Sant Marcel.li y Camí Reial, although they suggested their transfer to a different location.

5.2 Analysis and study of the water cycle

On the surface of the park will be arranged sustainable drainage systems (SUDS) that collect rainwater. In addition, one of the main strategies is divide the area in different bowls. The park is divided into six bowls sloping inwards. The rain water in SUDS will be collected in the soakage pits (polypropylene compounds modules) located in these low points. Subsequently a pump lifts the water and gray water will be recycled. Specifically in the park is collected 35.6% of the consumption needs of the park (irrigation and fountains) and the boulevard 62% of the same amount.

The central lake ecosystem is proposed as cleaning (grey water) and also proposed drip irrigation and low water consumption plants.

5.3 Consideration of waste

In this case there is no highly contaminated soil due to industrial activity. Other measures have been taken in consideration of future park waste.

- Organic waste: It is proposed to have a composter to process and reuse materials from pruning and cleaning.
- Light pollution: Uplighting will be minimized, thereby reducing light pollution and energy consumption.

5.4 Recycling of materials

Stone blocks currently existing on site will be recycled for new flooring and the steel rails will be used in the construction of retaining walls and pergolas.

5.5 Low maintenance cost

- It is proposed to enforce a closing time and therefore the allow the possibility of regulating the daily energy consumption.
- The proposal includes efficient external lighting systems controlled by daylight sensors, LED lighting and photovoltaic technology will also be used and applied to the luminaires.
-Regarding energy capture, restored buildings will be provided with solar collection panels. Also a high efficiency photovoltaic installation in the four warehouse workshop will be developed, which will provide 60% of the energy consumed by the park [13].
-It intends to implement in buildings of the park sensors geothermal and biomass, for heating, air conditioning and hot water production.

5.6 Social and economic issues

The development of the Central Park project will be a social improvement for the environment, on one hand there will be the union of the six districts and on the other is the regeneration of a degraded and abandoned area. The design of the park is conditioned by the user.

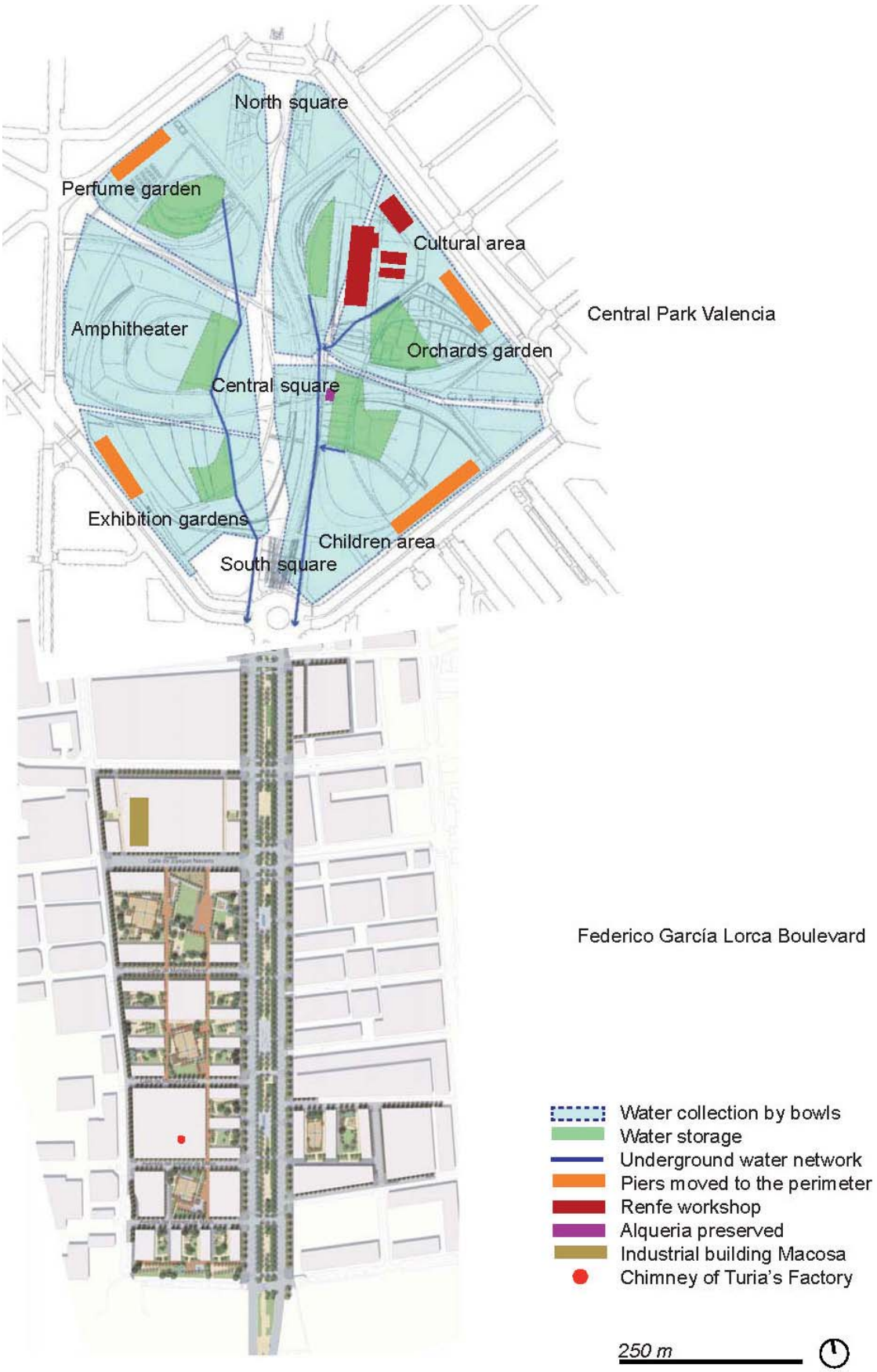

Fig. 3: Park Central Valencia project. Based on GUSTAFSON [14][15].

6. Comparison and conclusions

Both parks are made by renound landscape architects, being the temporal distance between them of 12 years. In DNP sustainable measures taken, which made it, accordingly to numerous authors, one of the first sustainable parks, are passive, as they allude to the low cost of maintenance and execution, preserving the historical memory of the place, such as study of the cycle water, among others. This is regardless of whether nowadays it has installed new mechanisms to control energy consumption, since these were not considered to qualify as a sustainable park.

PCV has been certified by BREEAM as sustainable, by integrating new technologies and therefore active measures. A whole study of energy strategies that can be applied in the park has been carried out. Implementation of solar thermal, photovoltaic, biomass and geothermal energy technologies has been proposed. With the implementation of the photovoltaic technology the park will generate sixty percent of the energy which it consume [16].

The highlighted sustainable interventions include the geothermal wells, LED lighting, solar and photovoltaic panels, and the composting facility. These are accompanied by other measures relating to the design (passive) such as sustainable urban drainage systems, reduction of paved areas and the choice of plant species with low water consumption.

	Duisburg North Park		**Valencia Central Park**	
	Active	Passive	Active	Passive
Social		Conservation of industrial heritage. Maintenance of the ruins.		Conservation of the industrial constructions by moving them to the perimeter.
		Partially solve the conurbation problem.		Improve the link between neighborhoods, and social mobility.
Enviormental	Natural oxygenation of water by the wind plant.	Water evacuation separate system.	Gray water pumping	Sustainable urban drainage systems.The park is designed in bowls which facilited the storage and recycling of water. The use of a lake as a water cleaning system. Selection of plants with low water consumption
		Treatment of contaminated soil with respect to technical and economic considerations.	Composter for future organic waste.	Cleanup of contaminated sites if it is necessary.
	Low maintenance cost: Solar and photovoltaic panels.	Low maintenance cost -In most of the park vegetation grows spontaneously. -Reusing rainwater	Low maintenance cost -LED technology and solar panels. -Using photovoltaic lighting. -Solar panels in buildings. -Photovoltaic panels on the roof of warehouse four. -Geotherm wells in buildings. - Use biomass in restored buildings	
		Recycling steel plates as new pavement. Use products of demolition for concrete.		Recycling of railways for retaining walls. Recycling stones of the place for new pavements.
		Development of industrial tourism. Recovering environmentally the area for new investments.		Promotion of tourism. Investments in marginal neighborhoods.

Fig. 4: Table of sustainable measures applied in projects. Created by the authors.

In Figure 4 we can compare the different measures applied to achieve sustainability in both parks. In the case of DNP the measures are passive and are included in the design, in the case of PCV the interventions are varied.

In the case of DNP, the IBA, a territorial institution, lead the intervention for the conservation of the heritage and industrial ruins. In PCV, industrial buildings with heritage value, have been preserved more traditionally, creating a testimony to the railroad history of the area. The town planning and protection of the industrial heritage was determined by the Special Plan for Internal Reform. It also decided to move the former industrial warehouses away from the trajectory of the the new rail tunnel, allowing their preservation.

Sustainable urban park projects should be a perfect integration between the design of passive and active measures for energy saving, so that the latter do not become liabilities. The active measures need to be integrated into the design and serve to strengthen the passive measures. An example of these are the environmental measures considered in PCV. Specifically the rainwater storage and recycling systemis designed simultaneously to the park itself allowing its installation to coincide with the construction of the bowls used to define park zones.

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Linear limbic spaces between land and sea: Landscape designing in river Evros' delta.

Eleni OUREILIDOU
Faculty of Engineering, School of Architecture, Aristotle University of Thessaloniki, Thessaloniki, Greece
eloureil@gmail.com

Abstract
Delta of river Evros, located in the frontier between Greece and Turkey at the crossroad of east and west culture, consists of a physical form in the borderline between land and sea. Landscape designing in a river's delta environment requires the analysis of physical, geological, geographical and building reserve parameters. Taking these factors into consideration, a strong conceptual background is formed, which examines the significance of the borderline as a matter of structure both in the existing environment and in the proposing one. In order to create a limbic space from the scratch and to implement it in the landscape of Evro's delta, my research focuses on the formation of a linear structure. As a result, every particular physical procedure, which can generate a linear form, is thoroughly examined. The requested linear structure is found in the pre-existing microstructures of metals, which is transferred in the 3d space under the certain conditions of lineation and cleavage. As far as the design process has been developing, the final curves create a route with several forks interacting with the characteristics of the given environment and resulting in the creation of dry ecosystems inside the flooding areas of the river's delta. In the end the possibility of creating new ecosystems with different characteristics inside existing ones through the creation of limbic spaces is of great importance and could create a future approach in landscape design.

Keywords: landscape designing, landscape analysis, microstructures, borderline, limbic space

1. Introduction
Delta of river Evros, as a physical phenomenon, triggers of human curiosity since ancient times. According to Plutarch, delta was known as "Rhombus", an expression to describe the constant penetration of the water in the land and the formation of the river's branches. Nowadays, Evros is considered to be the longest river flowing in the Balkans. It stems from Bulgaria and just before empting into the Aegean Sea, it bifurcates forming a biotope of great value, defined by two territories. During the winter time period the land of the northern part of the delta stays dry, creating proper conditions for cultivation, while the land of the southern part is flooded, preserving the growth of rare plant communities and animal species.
Geographically, river Evros' delta is a tabular ground occupying the intermediate space that separates Greece from Turkey, Europe from Asia and the West from the East. As the river flows, it creates the natural linear border between the two countries. Although both of them are claiming its ownership, the only temporary residents of the site are the illegal immigrants and the birds. Furthermore, during the past years, the construction of dams, dikes and artificial canals undermined its existence, resulting in the gradual degradation of its ecosystem.
Being a vast territory, almost completely abandoned, river Evros' delta provokes feelings of insecurity and disorientation. The reasons are the innumerable natural and artificial water canals and the fact that the environment of the delta is constantly changing, since the traces of previous conditions are vanished due to the eternal water movement. Another fact is that the birds overpower the presence of the humans, enhancing the natural sublime but also undermining the possible aesthetic dynamics of the landscape.

People have to look to nature and if they learn to look, it will become landscape [1]. Thus, the initial purpose of the intervention is to recall the human presence on the site and to enrich their overall experience of this rare natural formation. The necessary frames should be proposed in order to manage the spatial quantities of the territory and subsequently to transform it into landscape. Possible way of framing is the construction of paths and arrivals that guide the visitors' movement, highlighting interesting places and providing a way to look at the nature.
At first, are defined the structural characteristics of the context according to the physical and geological parameters of the landscape. From the structural point of view, river Evros' delta landscape consists of a patchwork of surfaces along with the fishermen's huts spread locally and unorganized over the entire area. Thus, surfaces and points undermine the existence of the linear form. The already existing network of the dikes is inadequate and therefore, it requires the implementation of a new route, which can interact with some of them, by reshaping them, or diverting them.
This new route extends mainly along the flooding area of the river Evros' delta, intersecting vertically with its branches. Its position derives from the topography of the site and especially from the visible and invisible borders of the landscape. The visible borders concern the areas of the alternative plant communities, and the invisible borders underline the areas of different water salinity, including also particular areas of birds' activities as they are denoted in Fig.1.
After detecting where the new route extends, the strong conceptual background generates also the possible designing methods. The design process focuses on the creation of a linear form that derives from the borders of the landscape and occupies the limbic space between heterogeneous surfaces such as the ground and the water. The intervention conceptually intends to create a megaform. In the past, megaforms were distinguished thanks to their capacity to act as a catalytic agent in the context. They were able to create new states of equilibrium, but still were perceived as consistent objects, providing a sense of continuity [2]. The proposed linear form interacts constantly with the context of river Evros' delta and positively transforms it at a larger scale, acquiring a conceptual correlation with the former megaforms.
Since the design process triggers of linear forms, the requested procedures that are able to generate them, are found in the geological forms of the landscape and especially in the transitional spaces of the local microstructures. The geologic turn reveals the vitality of the earth itself and proves that matter is not passive; it awakens the ability to discern the force of things [3]. The examination of the typical geological microstructures proves that the emerging linear structures bifurcate and reunite. The initial designing purpose is to revise the geometry of these lines according to the established compositional rules and then to apply them in the context by preserving their proportions and their flowing characteristics [4].
Nowadays, there is an increasing interest on the way we are living on the planet earth, and the way we interact with the geological phenomena. It can be claimed that we are like walking rocks, as part of our aliveness is composed of geologic materials such as calcium, iron and phosphorous [5]. The ground is no longer perceived as a thin, folded surface to build upon but something deeper and meaningful. Additionally, the geological form devises new regimes of perception of the nonhuman [6]. Therefore, by analysing the existing landscape to its geological attributes and by transforming the results of the analysis to the design procedure, it is possible to enable the visitors of the river Evros' delta landscape to see and sense the slow and vast geologic dynamics as visible flows, delivering at the same time the knowledge of the emergence of the geological space. In the end, the purpose of designing the limbic space between the land and the sea is the perception of the natural landscape along with the experience of the geological landscape.

1.1 Exploring the physical and geological context

Landscape designing in such a fragile ecosystem, requires the comprehension of both visible characteristics and invisible procedures, which contribute to its topographic formation. All the physical and geological parameters are taken into consideration so that the specific territorial relationships of the site can be explored and for the definition of the conceptual background of the project.
As a functional apparatus, a river's delta enables the gradual expansion of land over sea, through the creation of alluvial depositions. Earth material is extracted from high speed river's flow areas and is later on reposed in the estuary of the river. This procedure of subtraction and reposition indicates the gradual preponderance of land over sea. Before the river debouches into the sea, it widens and creates a branching system, which extends like the Greek letter Delta (Δ). Structurally, there are four main delta types: the radial type of delta, the birds' treads type of delta, the lobed type and the sagittal type as they appear in Fig.2. Evros'delta belongs to the lobed type, because the sediments caused by the flowing water of its branches create irregular protrusions around lobes [7].

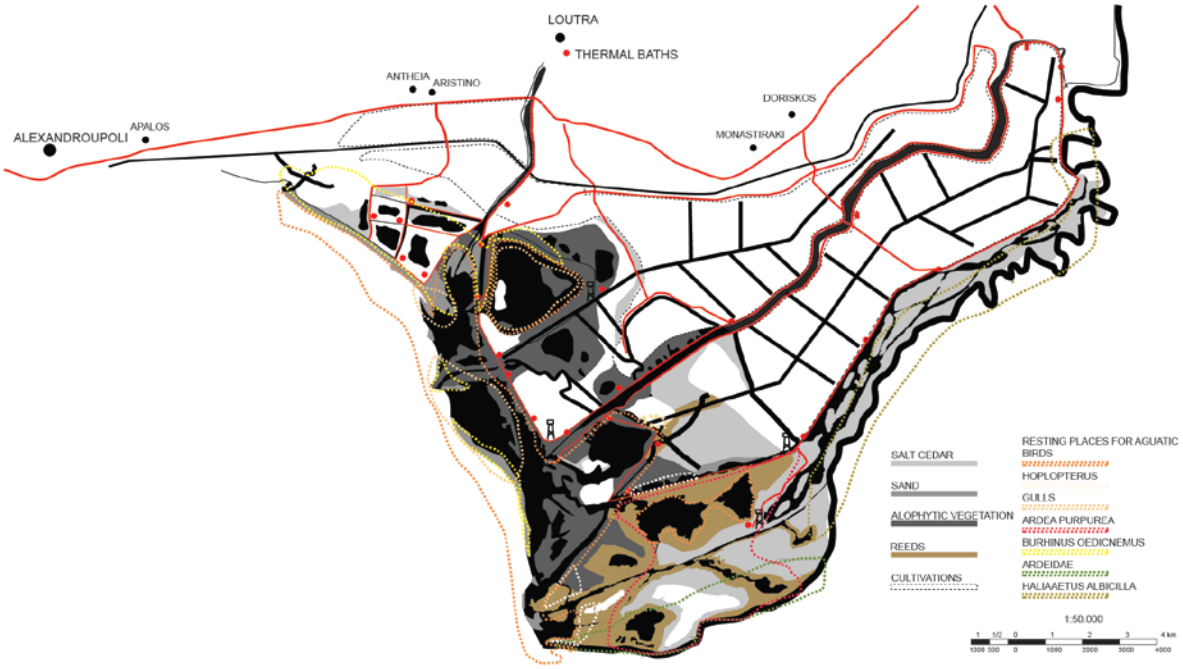

Fig. 1: The borders of the plant and birds communities.

The network of the river's branches and the water canals monitors the mixing process of the sweet water of the river with the salty water of the sea. Along with the movement of the underground water, salty sea water penetrates the land and causes a constant change of the substantial equilibrium, which is crucial for the vitality of the ecosystem. On the one hand, the discharging areas of the underground water form layers of organic material, which is essential for the growth of the rare vegetation, and on the other hand, superficial waters classified according to their salinity, creates salty and sweet water lakes. The most important lakes of delta's ecosystem are: Lake Drana, Lake Nymfon and Lake Paloukia, and sustain the accumulation of genetic material and nutritional substances.

This constant change of the salinity of the water is also responsible for the growth of the plant communities. The most important components of the ecosystem's plant diversity are: the halophytic vegetation, which grows because of the high water's salinity, the aquatic vegetation, the riparian forests and the cultivated fields. Apart from the movement of the water, another crucial physical parameter that configures the landscape is the depositional power of the wind, which results in the creation of sand dunes and contributes as well to the growth of different types of vegetation [8]. All these plant communities appear in zones and in combination with the water lakes define the landscape as an extensive horizontal field of interconnected surfaces.

The internal sustainable relationship between the growth of plant communities and the movement of the water establishes a perfectly regulated mechanism that supports the ecosystem, and determines the existence of avifauna. Rare species of birds can find a shelter during their long migratory trip, establishing their own boundaries in the landscape. There are areas where they rest, move and reproduce, determined by the consistency of the ground and the vital ingredients of the vegetation.

Additionally, as far as the geological background is concerned, linear formations, tectonic fabrics and transitional forms are the visual results of the hidden geological procedures that take place both in micro and macro scale. The starting point of this research derives from the alluvial depositions of the river Evros, which under certain conditions of pressure and temperature can create sedimentary rocks, appearing in the landscape at most of spatial and temporal scales. By definition, deposition proceeds when sediments, soil and rocks are added to a landform by building up layers. In some occasions, flows imprinted on the microstructure's surface of the sediments, create interesting linear shapes and reveal natural procedures and physical forces that formed the sedimentary rock through the ages. Thus, the microstructures of the landscape can be perceived as an icon of the infinite geological processes.

In macro-scale, two layers of different sediments and rocks can never be in abutting engagement with one another. There is always an additional layer, which exists between them and is always positioned in vertical direction, known as the phyllitic layer [9]. These vertical layers along with the cracks that are identified on the rock mass are the most obvious linear forms of the underground geologic formations.

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Fig. 2: The structural types of delta. From left to right: the radial type, the birds treads type, the lobed type and the sagittal type.

In micro-scale, there is a variety of structures produced by procedures, believed to be chaotic. Two of these procedures are responsible for the unexplored spatial geometries: foliation or cleavage and lineation. The foliation causes the division of the microstructure's surface into layers, while the lineation defines the elements of the microstructure that display a standard linear orientation. Both contribute to the emergence of the tectonic fabric [10].
Furthermore, geological parameters form the folds of the ground, which structure the matrix of the river's water flow. River's route is defined by three main stages: the stage of youth, the stage of maturity and the stage of anility. These stages are classified according to the section of the riverbed. During the age of youth, riverbed section is shaped like "V", which means that the ground is pretty sharp resulting in the creation of waterfalls. Subsequently, the riverbed is shaped like "U", and the river follows a curved route, which locally forms meanders. Although during the first stage, the river erodes, during the next stage the river deposits. In the end, when the river starts to bifurcate, the banks become plain, leaning towards the sea. The water volume is very low implying that the deposition of the extracted material reaches the highest point as the final stage of anility [11].

1.2 Introducing the concept of the "borderline"

The borderline identifies the context as the limbic space between controversial physical phenomena. Delta's environment appears to be the hinge between the physical transactions, supporting the bipolar territorial relationships. While Evros provides the ground with sweet water, forming the surfaces of the corresponding vegetation and the water lakes, its delta accommodates the slow penetration of the sea streams inside the territory. The water surfaces become mixed and configure areas of different water salinity and areas of controversial plant communities. The tide constantly changes the pre-established orders and enables the coevolution of the dipoles: land and sea, areas of sweet and salty water and the relative plant communities.
According to the geological phenomena, the borderline concerns the phyllitic layer, which is positioned between the rock masses made of different materials: the lava or the sedimentation. The phyllitic layer exists also between the layers of the masses created in different time periods. In the micro scale, the concept of the borderline appears also in the tectonic fabric, which consists of two main structures: the cleavage domains and the cleavage lamellae or the microlithons. The relation between the cleavage domains can be parallel, anastomosing or conjugate as it is denoted in Fig.3. Since the microlithon is located inside the cleavage domains, the borderline appears as the transitional space that separates the one from the other and it can be either gradational or discrete [12], as it is shown in Fig.4. The tectonic flow takes part along the transitional space between the cleavage domains and the microlithons, or else in the limbic space between them.



Fig. 3: The relation between the cleavage domains. From left to right: the parallel, the anastomosing and the conjugate.

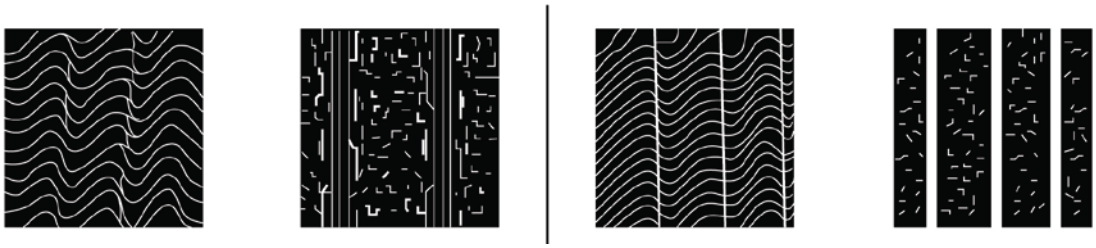

Fig. 4: The transition between the cleavage domains and the microlithons. From left to right: the gradational and the discreet.

2. Transforming the design process from the physical and geological principals

Primary design purpose is to explore the possible physical and geological parameters, so that they can be transformed as the main conceptual tools for the design process. Actually, during the design process, there are two distinct stages: the stage of research based mainly on observation and the stage of proposal based mainly on composition. The concept of the borderline is introduced in order to define the structures that emerge from the osmotic procedures of the physical and geological phenomena.

In order to compose a linear structure, the design process focusses on the main procedures that are able to generate it. The first procedure derives from the physical background of the river and the way the folds of the riverbed are formed. The second focuses on the geological background and especially on the characteristics of the rocks' microstructures. There is a wide range of patterns to be explored, which display lines and surfaces and are able to provide the design process with the essential structural instructions.

The examination of a variety of such microstructures including the local rocks leads to the detection of a particular rock called "rhyolite". The root of the word comes from the Greek verb "reo", which means flow. Through the observation of the rhyolite's microstructure, it is noticed, that the tectonic fabric is an imprint of the flows that were created when the original material formed the rock.

At first sight, the flows of the rhyolite seem to be irregular. After observing the sequence of its patterns formed through the ages, under specific environmental conditions, it is observed that the initial linear forms gradually acquire additional curvature points and start to bifurcate and relink. As they extend on the microstructure's surface, the linear forms occupy lenticular transforming spaces framing the cleavage domains as it is shown in Fig. 5. The microlithons appear inside these lenticular shapes. The linear structures extending along the transitional field between the microlithons and the cleavage domains are chosen to be used in the design process. Thus, in order to reproduce them, the design process triggers of the geological procedures that are able to generate them: the foliation and the cleavage.

2.1 Designing the limbic space

The design process establishes possible ways for the application of the foliation and lineation on the plain board surface, in order to form the limbic space between the surfaces of the cleavage domains and the microlithons. At first, the surface is divided into tandem stripes according to the division of the rock's microstructure into layers, imitating the way foliation is performed on the rock. The stripes are not completely detached from the surface, because otherwise it would result in the creation of singular useless stripes. Then, a curved linear system is imprinted on the cleaved surface, in an attempt to operate the procedure of lineation on it. Different creased surfaces are produced with imprints of alternative linear systems on them. After the particular linear system is established on the surface, the model is put under pressure and as a result it creates folds, which could resemble to the shape of the riverbed's ground.

Afterwards, the wrinkled surface is additionally modified embedding some physical orders. As it is already mentioned, certain folds of the riverbed direct the water flow and determine its stages. Numerous folds that mark the beginning of the route on the surface create a rough background, just like the stage of youth. Subsequently the folds of the surface become gentler and the linear system forms meanders. The end of the route is marked by a completely osmotic field resembling to the final stage of the river, when the folds of the surface become almost plain. Based on these physical principals, the initial random folds are adjusted according to this physical conceptual background.

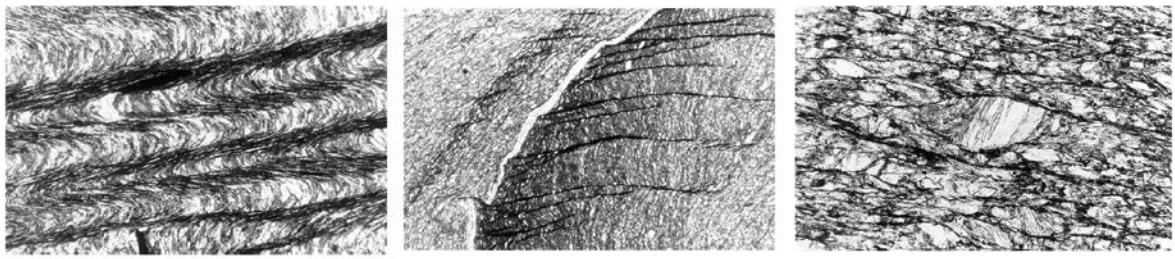

Fig. 5: Typical microstructures. From left to right: the gradational transition between cleavage domains and microlithons, the discreet transition and the lenticular shape appearing inside the cleavage domains.

Apart from the regulation of the pleated surface, some additional orders are applied to determine the geometry of the linear structure that is inscribed on it. The analysis of the applied curving system includes the definition of the distance between the curvature points, the regarding angles and the proportions.
The process that leads to the regulation of the curves is described here. Firstly, a single line is selected to be slightly deformed through a constant change of its curvature angle, just like the sequence of the rhyolite's microstructure. The results of these deformations are drawn one after the other and create a regulated two-dimensional linear system. A single line is again pointed out of it and is placed in mirror position in order to create the lenticular shape according to the cleavage domains appearing in the microstructure. This along with the slightly deformed lines consists of the core of the infinite system of the curves (Fig. 6). The additional rules concerning the distances and the angles stem from that core and are repeated along the rest of the system and regulate it. Thereafter, the spatial articulations of the deformed multiple curves along with the lenticular shapes are inscribed on the divided surface and create a model of artificial contour lines (Fig. 7).
In the end the divided surface with the vertical contours, is put under pressure. The stripes move because of the pressure and the linear imprints create folds on the surface. The angles and the proportions of the distances that define the points of curvature are repeated except for the existence of a particular angle that provokes a point of instability in the linear structure. All the lines have a standard orientation and along with the folds generate the route, which forms an osmotic field like a regulated artificial riverbed (Fig. 8).

3. Forming the requested syntactical background of a curved line synthesis

In order to explore the syntactical background of the curved line synthesis, the distances, the angles and the proportions of the conceptual linear structure should be applied on a route that derives from the context. The linear structure is reshaped as it adopts the contextual characteristics. The application causes the relocation of its curvature points, while its angles and its proportions stay the same.

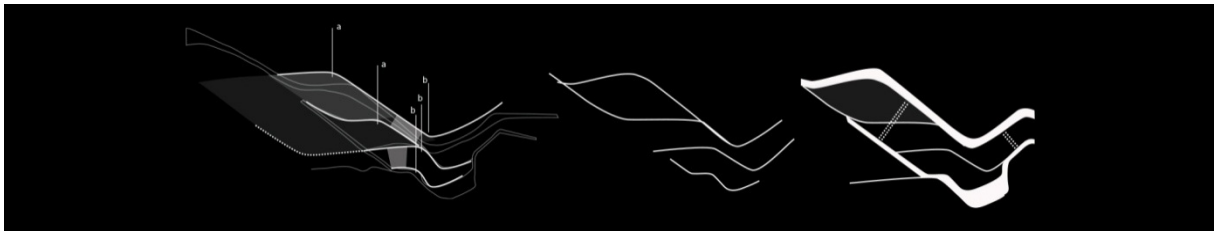

Fig. 6: The core of the infinite linear system. From left to right: the form of the lenticular shape, the distorted curves of the system and the final outcome of the codification.

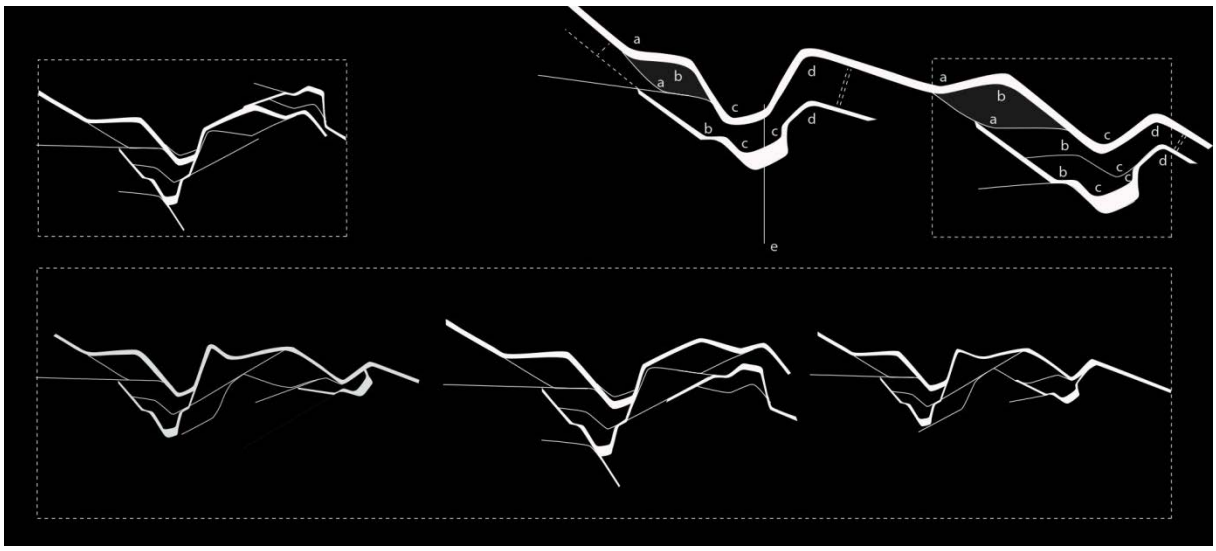

Fig. 7: The linear system according to the rules of the core and the alternative regulated linear systems.

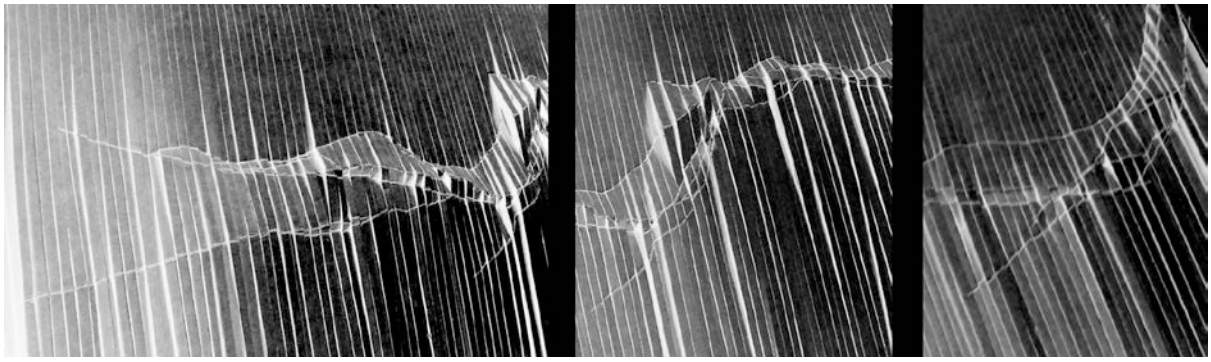

Fig. 8: The model of the pleated surface. From left to right: the folds that define the beginning of the route, the bifurcating and relinking curves and the multiple folds that define the end of the route

As it passes through the interesting areas, the deriving route is deflected locally and in particular occasions enters in to the water. In this point it starts to extend in a different way, acquiring multiple curves according to the geometry of the artificial contour lines that were established before. The single line is replaced by the pattern of the curves, which form the transitional osmotic field between the route and the water surface. Its spatial formation associates two contradictory elements and derives as an expansion of the coastline that marks lenticular grounds within the larger water surfaces.
Initially, the structure of the limbic space consists of two agglomerated parts: the torn surface and the folds generated by the lines, resembling to the rock mass. Both of them enable the variable curvature of the surface. On one hand, the divided surface illustrates the procedure of foliation where the parallel stripes represent the traces of the divided layers of the rocks' micro-surface. On the other hand the linear imprints that generate the folds indicate the procedure of lineation and provide with the horizontal continuity. In order to be incorporated in Evros' delta landscape, these elements interact with the spatial characteristics of the context. The surface where the geological procedures were performed is replaced by the water surface of the context. Furthermore, the discontinuities caused by the movable, almost detached, stripes are now inscribed in the landscape through the intermediate voids that have been created as it is denoted in the second model of Fig. 9. These parallel vertical surfaces consist in the backbone of the new and flexible structure and are reformed in order to support structurally the bifurcating dikes. As a result, they display the undoing procedure of the interaction between the conceptual pleated surface and the existing surface of the context.
The structural backbone provides a system of parallel buttresses endowing it with a sense of repetition and rhythm. In addition, some of them are subtracted, while others are added in another place along the linear intervention, in order to create spatial dilutions and densifications. These buttresses scan the entire curved line composition and like blades slice the bifurcating paths into several parts just as foliation subdivides the surface of the sediment's microstructure. The backbone is made of steel and arises in Evros' delta landscape as a piece of land art.

The composition is enriched by additional linear elements made of steel according to the procedure of lineation as it is shown in the first model of Fig. 9. These elements extend along the site like choreography, following the direction of the established dikes. They appear and disappear due to the linear pattern of the initial structure and they unveil traces of its preexistence. Most of these linear components are canopies, railings, ramps and bridges that are necessary for the composition's interaction with the water. Ramps made of steel intervene between the branches of the paths and the water. In Lake Drana where the curved line composition starts to expand, tide and ebb occur every six hours. As a result, the parts of the construction that are made of steel are gradually corroded, imprinting the movement of the water on their surface.
The limbic space reveals structural continuities and discontinuities and appears in this landscape as the transitional space between the land and the sea. Its materiality refers to the route that is formed as a dike made of soil and the rest of the structural elements that are made of steel. The use of casting and malleable materials tends to feed the confusion between artificial and natural. In the end, the artificial landform interacts with the existing one through its materiality.
From functional point of view, the entire route extends to a distance of 25km, connecting the Lake Drana, which is mainly constituted of salty water, with the Lake Nymphon, which is on the contrary constituted of sweet water. When the route passes through the Lake Drana, it is formed according to the rules of the initial patterns. It is deflected and enters the water, acquiring the characteristics of the curved line synthesis. The metallic backbone appears in the landscape, fastening the system of the bifurcating dikes horizontally and disconnecting them vertically by separating them into several parallel parts. The flowing characteristics of the new dikes are enhanced by the extra metallic elements. The leading dike is designed for the cars and the bicycles and as it locally bifurcates, it enables the movement of the pedestrians. In a central point is also located a parking lot. The branches that are designed for the pedestrians are developed like extended steps following the vertical direction of the metallic backbone. There are four arrivals attached to them. Two of them are covered and are designed appropriately for bird observation. Therefore, they are placed on the highest level of the dikes. The rest are formed amphitheatrically, placed on the lowest level of the dikes and completely exposed to the water.

4. Conclusions

The use of the geological procedures in the design process results in the creation of a mutant landscape. The new hybrid landscape transforms locally the existing ecology of the landscape, exceeding the boundaries between natural and anthropogenic environment, between nature and culture. It refers no more to a simple plan of a garden; instead it creates a landform reconstructing the site itself.
The geometrical discipline of the entire architectural composition avoids approaching the complexity and the smoothness of the natural form. The blades made of steel underline the remnants of the folded initial surface and provide the razed plane of delta's landscape with a sense of sharpness. Thus, the existence of these parallel articulations that support the curved line system endows it with a sense of accuracy, revealing at the same time the possible ways of its morphogenesis.
Additionally, the act of revealing the visible and the invisible borders of the context through the implementation of the transformed geological space deliver to humans a versatile experience of the entire landscape. The final outcome of the design process resembles to the act of scenography. The metal surfaces are gradually distorted because of the water chemical reaction with some of the metal substances.



Fig. 9: The syntactical elements of the curved line synthesis. From left to right: the spatial transformation of the lineation and the foliation.

As a result, natural forces, like the movement of the water, are exposed to human perception through the materiality of the construction. Furthermore, the lenticular dry precincts accommodate exotic vegetation and inform the visitors about the growing procedure of the vegetation.
In the end, the project constructs a new topography through the constant interaction with the context of the Evros' delta. The lenticular voids appear as holes in the water and create new forms of inhabitation, smaller landscapes that can be expansive according to the length and curvature of their artificial shore-lines. Eventually, exploring the matter of the borderline and composing the limbic spaces between land and sea in vast territories like deltaic environments establishes new boundaries for the existing surfaces and new ecologies.

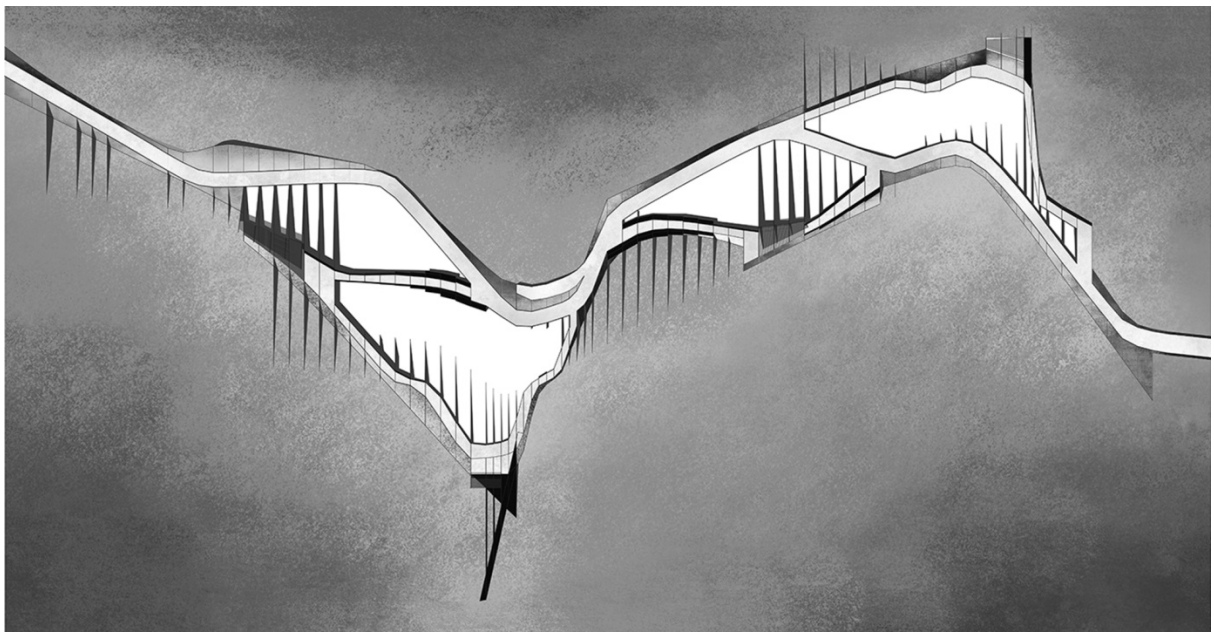

Fig. 10: Top view of the linear structure that displays the way the route expands as it enters the lake Drana.



Fig. 11: Renders displaying the dry lenticular precincts and the relation between the natural and the artificial.

This paper is based on the diploma project with the title: A hole in the water, supervisor: Vana Tentokali, September 2012 , Faculty of Engineering, School of Architecture, Aristotle University of Thessaloniki, Thessaloniki, Greece.

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Affirmation and Integration of Architectural Heritage in Urban Landscape: Contribution of Landscape Architecture*

Jelena RAKOCIJA, Marko DIMANIĆ
Department of Landscape Architecture, School of Architecture, University of Thessaloniki, Thessaloniki, Greece.
jelena.rakocija@gmail.com
marko.dimanic@gmail.com

Abstract
Architectural heritage is inseparable part of the city as whole and represents source for manifestation of identity as well as the place for representing the identity. In that context, space is considerable element of these relations and produces physical and psychical frame for perception of heritage. Thus, investigating spaces of heritage, is search for the aspects of contemporary state of site, presentation and visibility of monuments.
This paper represents a theoretical framework for design of spaces of heritage within living urban ensembles in terms of landscape principals and landscape architecture approaches (socio economic, ecological and perceptual) for overall treatment of landscape and sustainable management.
Through examination and critical investigation of landscape design practice for spaces of heritage in Europe, it is presented contemporary state in landscape design of these sites as well the level of integration in urban landscape.
Thinking about spaces of heritage as public open spaces from discourse of landscape and within the frame of landscape architecture where landscape is seen as a space for living and social interaction, together with the trend for the enjoyment of space could contribute to understanding of these sites and creating their future what is presented as a concept for affirmation, integration and creative preservation of architectural heritage in urban landscapes and urban structure of historic matrix of the city.

Keywords: architectural heritage, urban landscape, historic landscape, identity, landscape architecture.

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1. Introduction
The question of affirmation and integration of architectural heritage in urban landscape, opens up the question of landscape designing and respectively planning of landscapes and open spaces surrounding architectural heritage.
In the last two or three decades great attention has been given to the conservation and rehabilitation of such historical urban and rural sites, as expressed in recommendations given by UNESCO and resolutions of ICOMOS. From this engagements the concept of historical urban landscape is also created, that implies combination of natural characteristics and built spaces.
In Article 14 of The Venice Charter 1964: "*The sites of monuments must be the object of special care in order to safeguard their integrity and ensure that they are cleared and presented in a seemly manner*". The Charter further writes that "the conservation of a monument implies preserving a setting which is not out of scale" (Article 6). It is worth to mention and UNESCO's *Recommendation concerning the safeguarding and contemporary role of historic areas* (1976), that puts emphasis on

the entire historical frame and the need to consider all valid elements *"including human interventions, no matter how modest they are"* , that are significant in relation to the whole.
International conventions and charters about architectural heritage have common basic postulate that the future of architectural heritage greatly depends on its integration in context of social life.
Therefore, Investigating spaces of heritage is, above all, search for the mechanisms of collecting, preserving, researching and presenting testimonies of past within continuously changing urban landscape, in structure of space. In that context, landscape is considerable element of these relations and produces a frame for perception of heritage.
Today in many cases, archaeological sites and monuments within their natural environment and landscape's setting are still far away from being integrated into their present day setting. Therefore, the landscape design of a heritage site is still one of the most controversial and unsolved aesthetic and functional design tasks.
In that context, Landscape architecture is here introduced as science and art dedicated to study and design of landscape.
Two questions are set in this study: What are landscapes in the study of landscape architecture and how are landscape approaches relevant for protection, enhancement and integration of architectural heritage.

2. Theoretical background: landscape and study of landscape architecture

For need of this study it is necessary to limit and explain the terms of landscape used in the study of landscape architecture, that can provide adequate frame for forming the specific landscape architecture approach for improvement of heritage sites.
Landscape is a very complicated and ambitious word which has been used in different connotations for the purposes depending on the profession which it deals with, including geography, cultural anthropology, archaeology.
First connotation that should be repeated is the one given by Michel Laure that the land becomes landscape when it is described or seen in terms of its physiographic and environmental characteristics [8]. As defined in European Landscape Convention, Florence 2000.: *Landscape represents an area, seen by human eye, which characteristics are result of activity and interrelation of natural and/or human factors*.In its broad definition landscape is the place where humans and nature interact.
Within landscape architecture, a number of scholars (Hayden, 1981, 1997; Jojola,1990; Rainey, 1997; Stilgoe, 1982, 1998; Swentzell, 1990a; Zube 1994) view landscape not as a single uniform construct but as a multiplicity of coexisting texts that either provide unity for a community or serve as an arena of cultural tension and social conflict (Groth, 1997) [16].
For Jackson a landscape is “a collection of spaces made by a group of people who modify the natural environment to survive, to create order, and to produce … society” (Jackson, 1995,p. 43; see also Jackson, 1984, 1994). In viewing varied landscape elements as products of human values and aspirations, Jackson maintains that a landscape “is never simply a natural space, a feature of the natural environment” (1984, p. 156.) [3].
The landscape is both medium for and outcome of action and previous histories of action. Landscapes are experienced in practice, in life activities [12]
The two major directions dominating landscape terminology are firstly the specific one, considering landscape as a three dimensional environment, where man lives, works and spends his time; and secondly an abstract one , where landscape is nothing other than what human senses can record. That means the landscape is perceived as visual sensual and perceptual space according to the later definition , and as an ecological space according to the former [1].
Contemporary trends following the spatial image of the landscape are observed as follows: landscape, as an experience space, a space of social interaction. It is an approach recognizing its social dimension. Landscape as a live recording that is an expression of social relationship and history, it is an effort to comprehend it, to read it [1].
Therefore, we cannot derive that landscapes without users and activities that fulfill the essence of its existence. It gets the attribute of quality ambient only through contribution to everyday life of users, and therefore contributes and involves into cultural value.
Conclusion is that landscape cannot be seen inseparable from human activity in space over time.
Recent trend toward the “creative landscape”, as seen as an attempt to restore the lost meaning of creation and creativity in landscape architecture and looks landscapes as works of art [1]. For John Davey, ecological and community values derive directly from an understanding of human-nature relationship and, indeed, that the formulation and understanding of this relationships is expressed in and through art [3].
According to recent theoretical framework, landscape architecture is determined as science and art dedicated to study and design of landscape.
Study of landscape architecture is the evaluation or exploring the potential suitability of the landscape for social use, in the context of the conditions that created and form landscape [2].

Landscape analysis is based on a socio-ecological and perceptual approach in order to specify the potential, suitability, capacity and the capabilities for development (Ananiadou 1984).
During the landscape study of specific ecological, social, historical and cultural information about the landscape are collected, revealing specific particularities and character of given landscape, its genius loci, what represent backdrop for guiding principles necessary for decision making in design proposal.

3. Conceptual framework: *urban landscape – historic landscape*

Urban landscape is seen as a result and synthesis of unity of human activities in space, and processes of community life in motion and constant change - with one word the expression of total culture of one environment and timeline, is alive, changeable living environment, in constantly changeable time of always new meanings and brand new values [10]. On the other hand architectural objects are the basis of physical structure of the city, they are according to their shape and character the most static part of urban structure. Controversy is found in confrontation of past values contained in terms identity, tradition, authenticity, uniqueness combined with architectural heritage on one hand, and on the other, urban landscape presenting contemporary values and changing identity.
In historical centers open spaces are above all those at locations of archeological excavations. Areas that are typical public spaces, have timeless landscape in collective subconscious. Cities that possess rich architectural heritage express explicit historicity.
Historic landscape is therefore seen as a special case of landscape.
In our conscience, that designing of structures and free spaces gives places certain specific character that we remember. Monuments and landscapes are therefore embedded in the social and individual times of memory. Their pasts as much as their spaces are crucially constitutive of their presents. Neither space nor time can be understood apart from social practices which serve to bind them together [12].
Exactly such places have those qualities that are assumed as tradition and terms: authentic, indigenous, autonomic, unique, unrepeatable and such. When talking about those places, it is considered their specific, recognizable character, their spirit of place or genius loci. The fact that historical cities and settlements today lose their identity more and more, due to the negative influence of globalization processes, influences the disappearance of specific meanings of the place, their spirit [9]. This process is seen in isolation of historic setting which is detached from its surrounding environment.
A landscape has ontological import because it is lived in and through, mediated, worked on and altered, replete with cultural meaning and symbolism – and not just something looked at or thought about, an object merely for contemplation, depiction, representation and anesthetization [12].
Kevin Lynch stated that the images of environment are result of two processes within which the surrounding points to differences and relations, within which the observers choose, organize and connect with meaning that what they see. According to him, image is made through physical qualities that refer to identity and structure [7]. And other researchers made similar differences between "identity", the real appearance of the place, and "image", the combination of that identity with perception of place by individual, with their own feelings and impressions of it [7].
Mental maps and images of the place and surroundings, especially common images, represent backbone for research of perception of environment and landscape design [7].
in order to define potentials for future design, knowledge about specific particularities and features that influence the character and identity of historic landscapes with prevailing historic value, explicit historicity and sense of continuity, seem necessary.

4. The role of landscape architecture approach for integration and affirmation of heritage sites in urban landscape

" Attitude towards the past becomes creative if the architect is able to understand its inner meaning"
S. Gideon, in: Space, Time and Architecture

Given that historic landscapes are site specific because they contain notable historic information of past activities and tradition attached with values as authenticity, and they contain a certain meaning for social use and the inhabitants, it seems of crucial important , before approaching design to be done landscape architecture study according to mentioned approaches fully with specific emphasis on the symbolic resources that reveal historicity and genius loci.
Landscape architecture approaches toward analytical studying of different aspect and meaning of landscape, and it its essence as product of human values and aspirations, establishes framework for integration, affirmation and preservation of architectural heritage. This framework is seen in direct relations that occurs between monuments as heritage historical values and urban landscape that is a space for social activity and daily life, with its natural and cultural qualities.
Integration and affirmation of architectural heritage in urban landscape is determined by reading of the particularities of the landscape's setting of architectural heritage, historic landscape and its surrounding urban environment, urban landscape.

In order to accomplish successful design, two specific analysis should be applied on two previously mentioned specific cases of landscapes (historic and urban) that are adjacent and simultaneously intertwine.
First, the analysis of the architectural heritage and its historical setting: historic landscape; socio-economic, historic context of the monument and its spatial-physical characteristics, ecological, environmental characteristics, and perceptual approach, combining visual-aesthetic qualities with the image of the place, its genius loci and its semiotic content which posses and express explicit historicity and sense of continuity, as elaborated previously.
Second, to analyze live boundary urban environment-contemporary urban landscape according to landscape analysis based on the socio-economic, ecological and perceptual principles leads in defining landscape identity and character, what will give information for possibilities of altering social activities and functions in sense of sustainable development.
These approaches are presented as part of the analysis that is involved in reading of the particular landscape identity, what is a first step in design making decision.
Until now contemporary design approaches range from the absolute respect of the historic site / memorial with a kind of allegiance to the new configuration historicity of the first, accompanied by a marked tendency mimicry, especially in morphology and material selection, to the search for a more free and creative approach design, without excluding original, innovative forms, structures, materials and plantings for the new surgery, often alien to the character and the character of the landscape. Displayed intermediate course views, which converge to the dominant current methods of rehabilitation and enhancement of archaeological sites, which try to balance work as the previous two and suggest mild (Astrinidis 1997: 16), and "invisible" (Lava 1998) interventions so as not to compete with the site [5].
This is possible to achieve with design practice based on landscape architecture approaches for treating of the historic places integrated to the urban landscape and public spaces, where historical places are combined with public usage and enriched with the visual and cultural quality of open urban spaces respecting ecological conditions.
Investigating spaces of heritage, is search for the aspects of contemporary state of site, presentation and visibility of monuments.
According to data collected and presented before, we can conclude that the goal of the landscape design and planning on archaeological site in order to provide integration of architectural heritage in urban landscape, are argued in terms of:
1. perception, visibility and aesthetic qualities (design materials used, also planting as design tool) and presentation of site for the public.
2. social and economic dimensions of sites involved through new functions and usages in terms of tourism, education, information, leisure.
3. conservation of natural resources. (for spaces with special natural beauties)
Design practice of places of heritage should be oriented to create the link between the historical value of the monument and social, cultural and natural value of the landscape. Possibility of integration the sense of past within the visual character of the place, respecting the past values in its public life and natural conditions avoiding on the same time mimicry of the past landscapes, greatly depends on the creativity of the author.
Therefore, there is no doubt that such landscape architecture projects are seen as works of art, which may project the enjoyment of space, not as an expression of nostalgia for the past, but as cultural projects for a contemporary society [1].
Within the theoretical approach presented before, in order to enable integration of architectural heritage in social context for purpose of their preservation, conversion of heritage sites into public parks, squares and green spaces, based on appropriate design that includes landscape analysis which respect the conditions of protection of historic monument, historic values and genius loci of historic landscape will ensure creative preservation, resulting in improving conditions and quality of life of residents and users within urban ensembles.

5. Landscape design practice. Current state

Given that the particular design issue is site-specific and time-dependent it is considered necessary that the new design proposal is adjusted to the individuality of the urban space in total [5]. In this chapter are presented examples of designed heritage sites to demonstrate current state of the sites where integration is examined through level of altering surrounding urban space whit emphasis on land uses, without giving notice to specific particularities of design proposal.
Selection of heritage sites is based on next criteria:
1. sites within living urban ensembles, where a contemporary population is active.
2. presentation of heritage sites in its current state
3. sites where architectural concept of the heritage is possible to be perceived.

5.1 The remains of Roman bath in Frankfurt's 'Domhügel' (Cathedral hill)/ German

Archeological finding is situated between the Cathedral, Schirn, Art Gallery and the Technical City Hall. It was set up in 1972/73, during construction of the underground car park and the Technical City Hall, as an open-air archaeological installation [18]. The site of Roman bath remains in Frankfurt lies within active urban landscape. This example represent a case study of integrating heritage to the physical setting of the urban fabric as using it as a component of the open public space The remains are displayed in a park-like space, between buildings of the modern urban fabric [16].
In this case public access is altered through involving new social use in model of park for the heritage site, making possible perception and visibility for the site with altering plantings what will improve conditions and quality of life within contemporary urban landscape.



Fig. 1: The remains of Roman bath in Frankfurt's 'Domhügel' (Cathedral hill)/ German, [18]

5.2 Archeological findings on Michaelerplatz | Vienna | Austria

In the historical centre of Vienna, World Heritage City since 2001, the archaeological findings from roman and medieval periods excavated in 1990-1991, are now integrated to the historical square, Michaelerplatz, of the historic city. The contemporary design concept with modern materials enables the historical structures to display in the historic urban landscape and enhance the quality of the square (Wehdorn 2004: 67) [16].
Considering the high level of social use and visitation intensity within dominate structured space which appears at the Michel square, the quality of the square has been increased with historical monument as its main component. Square like solution is involved to alter new public use.



Fig. 2: Archeological findings on Michaelerplatz | Vienna | Austria,

6. The example of Thessaloniki, Greece

Greek cities have unique distinctiveness. In historical centers open spaces are above all those at locations of archeological excavations. Areas that are typical public spaces, have timeless landscape in collective subconscious [11].Cities with reach cultural heritage, continuous history and strong cultural identity show explicit need for successful integration of historic monument within their urban landscape, and should be presented as specific case of study. City of Thessaloniki is therefore a case in point to be presented.

Few cities can claim continuous history lasting over two millennia: fewer yet can claim that their primary places of daily business – their streets, their market spaces occupy the same locations as they did two thousand years ago. Thessaloniki is one of them [13].

Archeologist date the foundation of the Thessaloniki from 315 BC. The city plan of Roman Thessaloniki was based on the network of roads parallel with and at right angles to the shoreline with Cardo and Decumanus, as most important of these roads. From the second half of the second century AD, the closed urban complex of the Roman Forum is constructed at the intersection and to the northwest of the intersection of Cardo and Decumanus, the later -Via Regia- representing the extension of Via Egnatia eastward into the city. In about AD 300 the city becomes a "walled city", a form which Thessaloniki remained up to the end of the 19th century[4]. The emperor Galerius (293-311) selects the city as his sit and extends the fortification. Around the fourth century AD Thessaloniki's functions are dominate by two centres (Fig 1, left):

- the economic and cultural center (forum, odeion, baths)
- Galerius', administrative and religious center.[4].

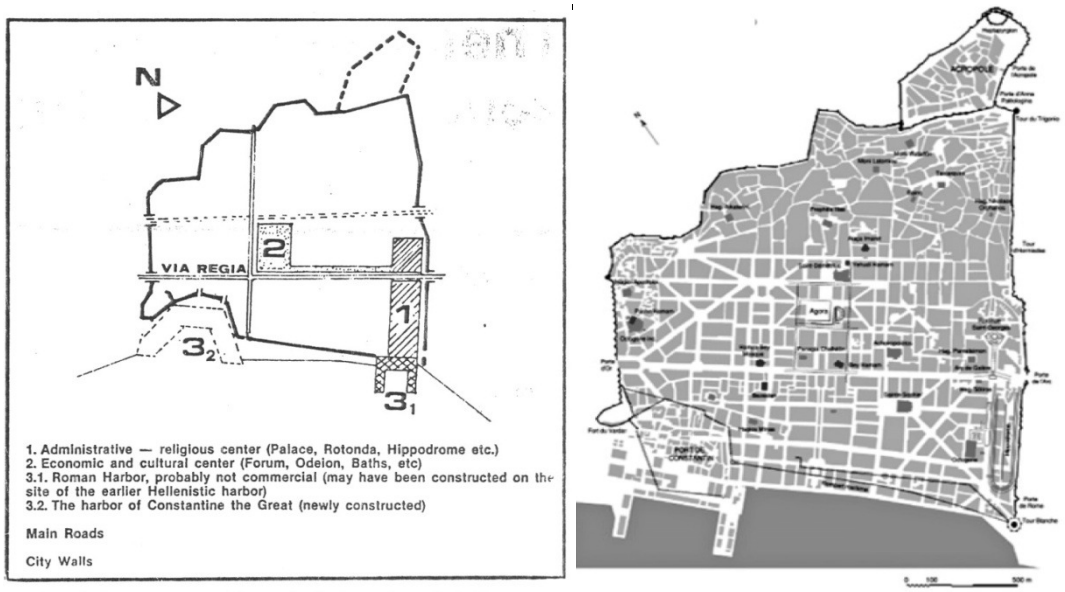

Fig. 3: Left: Schematic plan of Thessaloniki from the period of Galerius to the 4th century AD, [4].
Right: Contemporary look of Historic center of Thessaloniki with marked main historical monuments, [14].

Its urban fabric was given its initial form by its Hellenistic origins during the late 4th century BC. Enlarged and developed during the Roman era, its city plan was continuously modified ever since, yet in its core it retains certain key elements which have eluded change in the course of history. [13]. (Fig 1, right).The first substantive attempt to enhance the physiognomy of the city was manifested in the Thessaloniki Master Plan, approved in 1985. Its aims included highlighting the city's historical profile and enhancing the historic centre [14].In 1997 Thessaloniki was designated as the Cultural Capital of Europe. Within this context numerous urban and architectural projects were advanced: pedestrian areas of east, west and central archeological paths renovations, and archaeological excavations and restorations [14].

For purpose of this study therefore, it will be presented current state at archeological site of Ancient Agora.The Ancient Agora (Roman Forum) is surrounded from Filippou, Agnostou Stratiotou, Olympou and Makedonikis Amynis streets. Historic place of Ancient Agora has its own calm atmosphere surround with everyday life of the residents of surrounding buildings with small café shops. People today find this place appropriate for day visiting small café shops and magazines because of the grandiose open view on the ancient agora which in today appearance with aromatic plants and only one tree in the middle represents one theater scene where past time is seem to be captured.



Fig. 4: Thessaloniki, the Ancient Agora, view from north east side, (photo: M.Dimanic)

Archeological findings today are presented as open air museum, within museum successfully integrated in space of the archeological finding not disturbing the image of the place. Open space of agora are redesigned and adapted for cultural manifestation which occur occasionally.
Therefore a potential for use of historic place of Ancient agora as green space and free open space for social gatherings and open air activities has been recognized and would contribute in higher level of integration within urban landscape.



Fig. 5: Thessaloniki, the Ancient Agora, view from south east side. (photo: M.Dimanic)

7. Conclusion

The need of integration of architectural heritage in its urban landscape and context of social life has been recognized by International Conventions and Charters.
Art and science of landscape architecture, dedicated to design and study of landscapes in terms of evaluation and exploration of potentials and suitability of the landscape for social use, is introduced in this paper as conceptual approach for affirmation and integration of architectural heritage.
Two questions have been set: What are landscapes in the study of landscape architecture and how are landscape approaches relevant for protection, enhancement and integration of architectural heritage.
Landscape, in its essential meaning is a place for interaction between human and nature, respecting its qualities and inherited values, reading its specific genius loci, what is especially drawn to the attention at historic sites where monuments as past testimonies with strong symbolic support contribute to the character which has to be taken into account in order to preserve the monument and integrate it in urban context.
Thinking about spaces of heritage as public open spaces from discourse of landscape and within the frame of landscape architecture where landscape is seen as a space for living and social interaction, ecological space together with the trend for the enjoyment of space could contribute to understanding of these sites and creating their future what is presented as a concept for affirmation, integration, presentation and creative preservation of architectural heritage in urban landscapes and urban structure of historic matrix of the city.
It is therefore carried out the conclusion that successful design of spaces of heritage in urban landscapes, should include two group of analysis:
First, carried out for heritage site and its historic landscape, in order to read and record all landscape particularities and qualities, the image of the place, its genius loci and its semiotic content which posses and express explicit historicity and sense of continuity.

Second, carried out for urban landscape, which will lead in defining landscape identity and character, what will give information for possibilities of altering social activities and functions in sense of sustainable development.
Given examples show that each instance of altering of a system of open spaces from surrounding urban landscape, with altering land uses and functions (as long as the protection of the monument is fully secured) will contribute its integration in urban landscape with involving users in active preservation.
Proper analysis based on: socio-ecological, perceptual and ecological approach (Ananiadou 1984), can provide design guidelines, determine the activities that may be altered, respecting authenticity of historic sites, its genius loci and involving the user to get in touch with historic monument through understanding of its inner meaning, resulting in affirmation and integration of architectural heritage in urban landscape.

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Making Belief:
Tastemaking, the Public Imagination, and the Spaces of Everyday Life

Tim WATERMAN

Department of Landscape Architecture and Garden Design, Writtle School of Design, Writtle College, Chelmsford, Essex, United Kingdom
tim.waterman@writtle.ac.uk

Abstract

Popular taste-makers have long exerted a profound influence on the practice of everyday life and on the built environment, and many landscapes we now see as particularly vernacular or local are actually the result of recent or contemporary media influence. Tastemaking events, home shows, for example, have had a powerful impact which lingered on in the public memory much longer than the products featured in them might have survived in people's homes. The influence of such personalities and events is usually concerned primarily in a strictly domestic sphere, proscribed by the limits of the kitchen, home, and garden.

Cumulatively and collectively considered, however, the manipulation of popular tastes that may have been intended to sell products or improve domestic life has just as effectively determined the built form of neighbourhoods and cities. Further, urban form is shaped by the actions, tactics, and associations of everyday life as modified by shifts in taste and public belief. Collectively held ideals - in part beliefs constructed by tastemaking - facilitated by technological innovations can, in a contemporary environment, redefine how designers and communities work together to create built form. This paper will evaluate the place of make-believe and future landscape imaginaries in the creation and adaptation of suburbia.

Keywords: Taste, tastemaking, landscape, urban design, everyday life

"Here, in the new town, boredom is pregnant with desires, frustrated frenzies, unrealized possibilities. A magnificent life is waiting just around the corner, and far, far away." -Henri Lefebvre

The land of make-believe

Once upon a time has become frozen in timeless time, a world of immediacy and simultaneity that is seemingly ecstatic but is merely frenetically banal. Reduced to a image, cypher, the land of make-believe has folded itself into a glossy, multi-sided brochure advertising the idea of 'away'. Make-believe, properly, belongs in the here and now, for it is the *away* that acts on the *here* reflexively, remembering, prophesying, and creating.

To practice 'make-believe' is to *fabricate* an imaginary situation and to populate it with stories, actions, activities. These stories, no matter how incredible, are believed in the course of the imagining, and vestiges of new beliefs may still cling after the reverie has ceased. Make-believe begins in childhood, a process of imagining the world, of inhabiting scenarios, a way of beginning to comprehend the machinations and associations of the adult world. This can often be seen in the activity of making dens or forts, and then of inventing elaborate rules of admittance to and

occupation and practice within. Childhood games often rehearse adult situations, preparing the child for adulthood, but these processes are also critical, with children using make-believe to figure solutions for problems they see in the adult world. Play can be solitary or it can involve multiple children; make-believe can be a collaborative as well as an individual act.

As the child ages, the act of make-believe accommodates different possibilities and fantasies, complicated by sexuality, adolescent alienation, and high emotion. Make-believe can be benign, malign, or more often somewhere in between as the situation warrants, and this range continues on into adulthood. A daydream might spirit one away to a land of rainbows and unicorns, or allow one to envision strangling one's boss.* There is both an element of escape and of experimentation with roles and environments that allows possibilities for actual improvements to follow. By the time adulthood has been attained, within western culture it is commonly assumed that we have left the land of make-believe behind, which is reinforced in our educational methods that fail to reward imaginative thinking. Many believe that adult creativity is compromised by this process.

Teaching design, I often see my role as to enable students to regain the powers of creative imagination that are lost in the welter of rote learning and examination preparation that is secondary education. In particular design for landscape requires the envisioning of scenarios, using drawings and models to aid the imagination to test whether a design will work. Designers in the architectures do not have the luxury of making full-scale prototypes, and thus the modes of representation they employ for creation and communication are primarily aids to the imagination. Designers are also engaged in the act of manufacturing belief. First, their own belief that a design will work, and then second that of the clients, who must be convinced that a design will work to accommodate their needs, and further the belief that the design is beautiful and appropriate in a variety of other ways. Further, the designer is often seeking to 'educate' a client, to introduce them to new ideas that may even run counter to their expectations, installing a belief in new possibilities. In this way the designer works as a tastemaker. The designer takes his ability for child-like play and combines it with the ability to make and construct. The designer for the built environment is both *Homo ludens* and *Homo faber*.

Here we have introduced the tastemaker. Note that the term, like make-believe, combines the notion of construction or fabrication with a concept that is decidedly less substantial than bricks and mortar, but that is not without its own power. And if make-believe is an act of prefiguration, then so is what might otherwise be called 'make-taste'; in each desirable scenarios are envisioned that allow us to advance a progressive notion of living. Tastes are influenced and manipulated for a variety of reasons. The imagining of future modes of inhabitation or everyday practice is of paramount importance to those who would seek to influence people to act in a certain way. Perhaps the most obvious role of the tastemaker today is as salesperson. It is certainly an oversimplification to say that tastemaking is the act of creating a market for a new product or service, but this is the realm in which the average person encounters tastemakers regularly.

This is a one-sided view, however, of the process of tastemaking, which, when combined with design is actually a dialogic process, within which new practices, products, or services are necessitated by or invented for the technological improvement of evolving environments. Thus creativity is framed within and grows from existing (traditional) conditions, but those conditions are augmented or transformed by the original creative act. The process of tastemaking and design, further, recodifies and reclassifies everyday practice, refashioning and reframing rituals and beliefs. Imaginative processes allow the introduction of new metaphors and metonyms. These distinctly reframe experience, and can be used to suggest new possibilities that cannot yet be framed in words; as Paul Ricoeur notes,

> ...poetic discourse brings to language aspects, qualities, and values of reality that lack access to language that is directly descriptive and that can be spoken only by means of the complex interplay between the metaphorical utterance and the rule-governed transgression of the usual meanings of our words. I risked speaking not just of a metaphorical sense but

* Don't worry, Ruth.

> also of a metaphorical reference in talking about this power of the metaphorical utterance to redescribe a reality inaccessible to direct description. I even suggested that 'seeing-as,' which sums up the power of metaphor, could be the revealer of 'being-as' on the deepest ontological level. (1984, p. xi)

The process of reaching into the past and tradition while simultaneously casting into the future recalls what Colin Rowe and Fred Koetter in their seminal *Collage City* might call 'theatres of dreams', in which the the city is envisioned as a collage of enacted spaces. Rowe and Koetter distinguish between, but stress the interdependence of 'theatres of memory' and 'theatres of prophecy'; in which prophecy signifies hope and memory enables communication. (1978, p. 49) Ultimately, the city is a theatre of civilization, where scripts and rituals of memory and prophecy are acted out continually.

Edward Said cautions that these processes of envisioning can be manipulated positively or negatively, and that the spectre of nationalism and bigotry can be raised within them; "Memory and its representations touch very significantly upon questions of identity, of nationalism, of power and authority." (2002, p. 242) This in turn is true of projections into the future. The imagination of the world-yet-to-come is every bit as fraught. Have we been overly occupied with memory? Constructing place is a balancing act of creating both pasts and futures. It is the act of creating the story of the place where one lives happily ever after. Said talks about constructed, imaginary, often literary worlds as “imaginative geography”, which he describes as “the invention and construction of a geographical place called the Orient, for instance, with scant attention paid to the actuality of the geography or its inhabitants,” (2002, p. 243) but then he goes on to explain there is great power in the imaginaries of narrative history to “mobilize people around a common goal.” (2002, p. 249) These imaginaries involve the creation of political and social metaphors that can shift real processes of place-making, dwelling, and community.

Is make-believe a place or an image?

Tastemaking events and publications with a focus on marketing tend to treat landscape scenographically, presenting a consumable image; a 'happily ever after' that is as fixed and frozen a nowhen as the 'once upon a time' with which I opened this essay. There are, however, other approaches to tastemaking that have had considerable impact upon the built environment, and understanding the underlying motives helps to chart some of the motivations for tastemaking, how these approaches are presented and consumed, and what the ultimate effect is upon the landscape, particularly the suburban landscape.

This imageability of land begins with the picturesque and is implicated not just in capitalistic landscape and property practices, but also in the mechanisms of nationalism. The idea of the land began to be fixed and delimited in the Renaissance, at which time the land as polity is "reified as the material scenic groundwork upon which the edifice of the state as an absolutist national unity is built, and the parliament is marginalized, if not abolished. Land becomes one with the physical property of the state, and with those who serve its political estate and hold a share in that land as a national territorial unity, its boundaries (rather than its parliament) defining its state." (Olwig, p. 27)

Here we see that the idea of place and of politics has shifted from one which is negotiated (in *parli-*ament) to one that is distributed across parcels of land; framed in discrete spaces, the aggregate of which compose the polity, and hence the state. It is important to nationalism that the obsessive, unresponsive imprinting of landscape as image is employed repeatedly in order to structure beliefs that are impervious to being influenced by context. Here we see tastemaking as a function of state and of control, its dark side.

Kenneth Olwig goes on to explain that, in the time that John Clare was writing so evocatively about the death of the commons, that

> the land was not merely transformed into private property, to be exploited for agricultural

> 'improvement,'; it was also transformed into vast pastoral pleasure parks, ideologically shaped to resemble an idealized commons, while, at the same time obliterating 'real' (in law) working commons. In this way the representation of ideas of the ideal nature of the land in landscape art and gardening, in the Renaissance Italian tradition, creates an ideological landscape which is doubly alienating to those, like Clare, whose lives are attached to the working pastoral landscape. The social reality defined by shared rights in land is here transformed into private realty and its accompanying scenic landscape backdrop. 'Land' and 'place' became equated with 'propriety' - meaning in seventeenth-century English both property and knowing one's place. Whereas the term estate had once referred to one's place in the polity, landed property itself now became known as an estate, the seat of one's status in the countryside and nation; one's place in the country was thus effectively defined in terms of the possession of a country place. (2005, pp. 28-9)

Here nationalism is compounded by privatization; or is one a condition of the other?

These associations are difficult to unpick, and modern times have shown us that 'blood and soil' in the working landscape can equally be employed as a driver for nationalism. The idea of land and belonging is still tainted by this phenomenon, casting suspicion, for example, upon the slow food movement and new urbanism as containing both the memory and the prophecy of right wing extremism (I will return to slow food below). Perhaps the point to highlight is that where tastemaking and the manipulation or influencing of the popular imagination is concerned, there is a continuum between totalizing approaches and *bricolage*. There is no clear boundary, and this spectrum may not reliably be used to parse what is 'good' propaganda or 'bad'.

To further complicate understanding the phenomena, propagandizing tastemaking engines have evolved through the late twentieth and early twenty-first centuries from expressing ideals of private property in the service of nationalism into instruments of neoliberalism that transcend the waning power of the state. Take, for example, the British magazine and bastion of the conservative middle class *Country Life*, which is, according to the splash page of its website, "the essential weekly read for those who are passionate about the British countryside, fine art, gardening and property." The magazine not only champions private property and a picturesque notion of the countryside, as it has for many decades, but it now champions the 'heroics' of land trading as pure profit-making enterprise. A recent article, for example, seeks to make celebrities out of real estate agents. The piece, entitled "Property's Dream Team", elects a pantheon of "pillars in status" amongst estate agents, modelled as a rugby team with all the language of professional warfare ("Blind-side flanker: Tim Garbett (Knight Frank): ‘A big fellow who'd be jolly polite once he'd flattened you, and won't let opponents blindside him'"). (Easdale, 2012) Only neoliberalism could promote the contemporary FIRE sector (Finance, Insurance, Real Estate), devoid as it is of moral motivations, as a clash of the titans appropriate for the myths of our present and future.

Contrast this with the tastemaking apparatuses of the last century, particularly in France, where Curnonsky helped to popularize regional cuisines and encourage tourism (Mennell, p. 243) and interest in traditional culture; Britain, where Elizabeth David helped to rebuild culinary, domestic, and community practices after the war, and likewise MFK Fisher and Julia Child in America. These authors wrote with genuine warmth and love about place, culture, and food. They certainly hoped to enrich themselves financially with their endeavours - no one may be faulted for wishing to earn a living - but were first and foremost dedicated to sharing their *joie de vivre* with their readers in order to enrich their lives. What is important about the influence of these culinary tastemakers is that they consistently associated the pleasures of the table and the kitchen with ways of life - foodways - that extended far beyond the walls of the home, and these modes of thinking and associated had a wider influence on urban form (the amazing arrival of the sidewalk cafe in London is one such example). Witness some of these place relationships and their romanticization at play in this evocative text by Elizabeth David:

> Provence is now a great market garden centre, and from Cavaillon and Pertuis come melons, asparagus, artichokes, lettuces, courgettes, aubergines, peaches and cherries to enrich our own English markets. The little town of Le Thor supplies France with great

> quantities of table grapes; Carpentras is the centre of a lively trade in the local black truffles. The natural caves round about the astonishing red and ochre village of Roussillon are used for a large-scale cultivation of mushrooms; Apt provides peach jam and bitter cherry jam and most of the crystallized apricots we ourselves buy at Christmas time. It is also one of the few places hereabouts where you can still find the old traditional earthenware *gratin* dishes, saucepans and cooking pots of Provence. (2006, p. 7)

English readers were both encouraged to rediscover their own regional food heritage, which had been so seriously compromised by the effect of rationing in the war and long after, and to look to surviving traditions in mainland Europe for inspiration and motivation. Literature allows for a much more effective transmission of ideas of movement and interaction in space than does an image, and begins to set up the associations necessary for tastemaking to create real spaces through aspirations spurred by text.

Interestingly, it is impossible to uncouple these noble efforts from twentieth-century developments that were much less savoury, such as the tremendous impact of the car and the concomitant effect of sprawl (facilitated by Curnonsky and Michelin in France as people drove around like mad in their search for authenticity) and the increasing atomization of public and community life as greater wealth allowed people to retreat to their private kitchens and living rooms. This proliferation of separations provided opportunities for tastemakers, as marketers, to fill these isolated, ringfenced homes with millions of duplicate items that might once have been, like farm tools and land, shared amongst many. Representations of the landed country life became fused with suburban imagery throughout the twentieth century, and thus the process of alienation from the commons was completed.

The suburbs

As I've mentioned above, rather than thinking of tastemaking as a determinant of urban form, it should rather be thought of as dialogic. As innovation occurs, new images and myths accommodate them, or they are worked into the fabric of existing patterns. Imagining suburbia as a fixed concept both denies it an evolutionary past and militates against reclaiming or adapting it for the future. As *tabula rasa*, neoliberal processes of total erasure and regrowth can be recruited, and these inhuman processes prevent the creation or furtherance of communities and the success of families, which require environments that grow and change incrementally over time, not in the 'timeless time' of contemporary development.

Thus I don't intend to abandon suburbia as unreal. Peter Rowe, in *Making a Middle Landscape* states: "It is only by recognizing the middle landscape as a real locus of growth and innovation in our society, rather than trying to make it in the manner of somewhere else, that progress will be made." (1991, p.291) and Rosalyn Deutsche both echoes and deepens this by warning, "Idealizing traditional cities as real ignores the politics of their constitution and transformation. Dismissing new kinds of spaces as unreal abandons them as spaces of political action." (2001, p. 78)

And in fact, the opposite might be coming to be true, particularly in global cities, as their centres are increasingly hollowed out by processes of real estate acquisition which leave giant luxury apartments standing empty in the ownership of the international wealthy (Mayfair and Belgravia, Lower Manhattan, Ipanema, downtown Hong Kong) while the streets outside are filled with tourists and businesspeople rather than communities or families. It is certainly the suburbs in these cities where most 'real life' is lived. Families, indeed, are foundational to civil society and are the cornerstones of communities. Janet Flammang explains,

> "Most communitarians see the family as foundational to civil society. For example, Jean Bethke Elshtain defines civil society as 'the many forms of community and association that dot the landscape of democratic culture, from families to churches to neighborhood groups to trade unions to self-help movements to voluntary assistance to the needy.' Alan Wolfe

> contends that the contemporary Left and Right rely on the state and the market to 'organize their codes of moral obligation, but what they really need is civil society - families, communities, friendship networks, solidaristic workplace ties, voluntarism, spontaneous groups and movements - not to reject, but to complete the project of modernity.'"(2009, p. 7)

The industrial age, though not the root, but a symptom of modernity, shifted everything. It redefined domestic roles in the west as well as creating new types of urban and rural landscapes through a great variety of spatial uses and typologies ranging from tourism, theme parks, open air museums, fast food outlets, and the strip, to name a few. With the decline of the nation-state, we need to look for solutions to the construction of space and culture even further, perhaps, in the past (a very old theatre of memory). In the middle ages, the concept of 'society' was utterly different. "The fundamental conceptions about 'social groups' were centripetal and hierarchical, rather than boundary-oriented and horizontal." (Anderson, p. 15) When the concepts of private property was introduced the social order and the construction of both urban and rural life shifted. "But in the older imagining, where states were defined by centres, borders were porous and indistinct, and sovereignties faded imperceptibly into one another." (Anderson, p.19)

A new and very contemporary imagining of the landscape of the future could very well be based upon the logic of the Occupy movement. The communitarian ideals, based in direct and local action, could well be compared to medieval constructions of space and society, but without the uncomfortable oversight of overweening structures of church and state.

Occupy the land of make-believe!

In an interview last year, David Graeber, the anthropologist who is one of the principal voices behind the Occupy movement, stresses that prefigurative processes of make-believe are at the core of the movements lack of concrete demands, and that the protestors “act as though they are already living in a free society,” refusing to “accept the legitimacy of existing political institutions and legal order.” This imaginary leap challenges the dominant metaphors and narratives and opens a space for creativity in public life and public space. We need to occupy the space of our future landscape imaginaries to prevent them being hijacked by forces that are counter to the city for families and communities. Occupying the imaginary can give ownership of the theatre of dreams back to the citizen, reclaiming it from the paralyzing forces of neoliberal media and development.

Suburbia is commonly seen as a la-la land of desperate housewives and kooks, but it is another sort of fantasy land entirely. It is the convergence of myriad tastemaking engines acting upon space. This fantasy land is the real space of many people's lives and it deserves tastemaking that is not just mercantile but moral. It needs a dialogic process of tastemaking that engages with both environmental and social ecologies to create future imaginaries that are both beautiful and sustainable.

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PLANNING FORM THE AWARENESS OF A PLACE.

Miguel A. MEDINA
CEO; Medina Architects, Mexico City, Mexico
miguel@medinaarquitectos.com

Abstract
This paper deals with the presentation of a Municipal Sustainable Land Management Program in central region of Mexico.
For the development of the Program we were invited by the local government. We won the contest because the proposed work presented, however it was the most expensive of the competition.
The local government of Cuernavaca (that is the name of the place) raised the need to do this program because there was great insistence of some groups of investors to develop the West Township. To which our program said no because the most important ecological infrastructure with which has precisely this territory is located in the West.
For the preparation of the program we build the corresponding topographic map scale 1:2000 for which a specific flight was conducted to obtain an aerial photograph that once restored as a basis for the construction of the map. Should clarify that in Mexico there are official maps produced at scales 1:50000 and 1:100000
Then, we develop all maps of physical-environmental analysis and strategies for land use planning. But beyond that, we offered people a new perspective on where they live and invite the government and the people to transform the place where they live in an urban ecological region of environmental services shared with neighboring municipality. In a water supplier for the entire region viewing to the future and a city of outsourced services that benefit the poorest municipalities in their environment.



Fig 1: View of the Valley of Cuernavaca

Keywords: Planning, awareness, sustainable development, methodology, knowledge

1. METHODOLOGY.

The municipality we have studied is located in the center of the country at 85.0 km. from the city of Mexico. It has an area of 15120 hectares and a population of 340000.

Our way of working in this type of study requires us to primarily know the place and meet the people. We carry out the required charts of geographical information, issues of our interest were: Geology, Geomorphology, Topography, Pedology, Climatology, Hidrology, Land use, Open space, Conflict and Ecological evaluation (Fig 2 and 3).

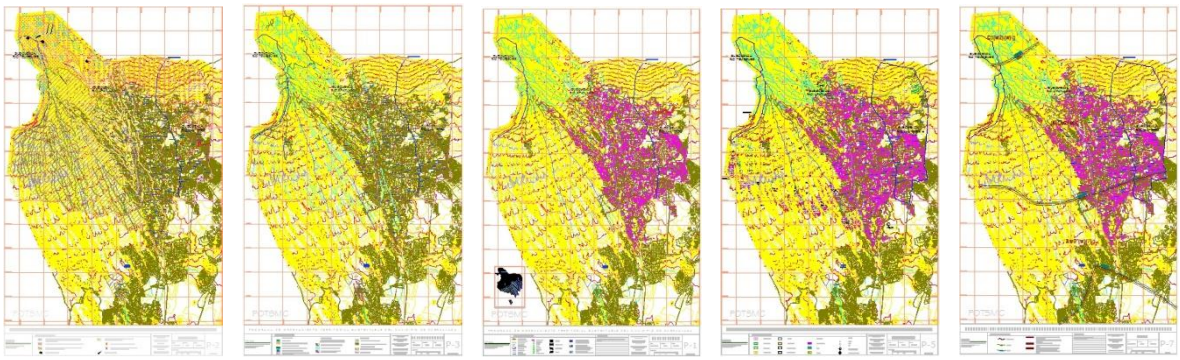


Fig. 2: Geology Geomorphology Topography Pedology Climatology

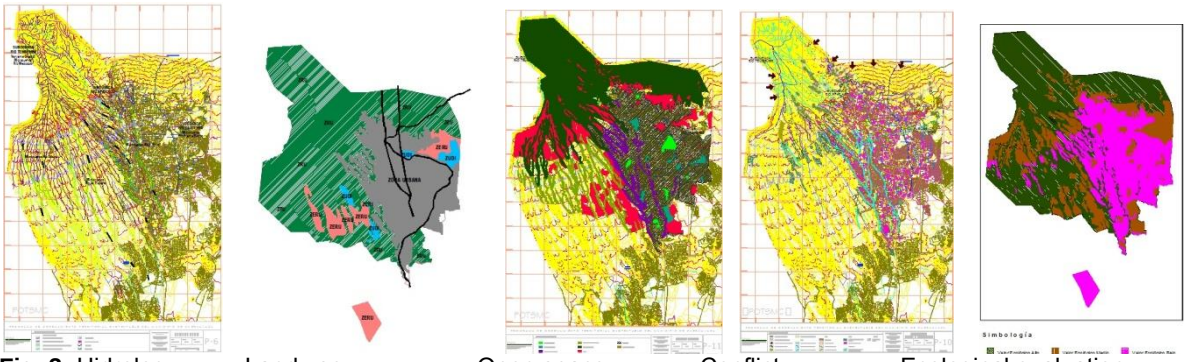


Fig. 3: Hidrology Land use Open space Conflict Ecological evaluation

Parallel to the study of the physical and environmental characteristics we did a study of environmental psychology based questionnaires and systematic assessment to meet the expectations of the population in relation to what might be the sustainable development of the municipality, and the perception that the population had of their environment.

Unfortunately we found that people did not have sufficient knowledge of planning, environmental problems or sustainable development and concerned only generalized data on air pollution but most showed a particular interest in Apatlaco river pollution associating to urban growth. This finding fundamentally guided our research.

As a result of our analysis we decided to do a combination of the four qualities that characterize the territory uniquely: its physiography, topography, hydrology and climatology (the city of Cuernavaca is known as the city of eternal spring) to better understand their nature and discover its Genius Locci.

The study of the physiography of the territory led us to understand that this is composed of four main regions we call Mountain, Upper slope, Lower slope and Plain.

In the Mountain and Slopes there is deposited as natural wealth of the municipality: its pine forests, oak forests and riparian forests growing on deep canyons that descend throughout the western portion of the territory.

In the Plain there sits the city that has a history as a human settlement since the fourteenth century and are large tracts of land used for agriculture but are getting pressure from urban growth and becoming peripheral semi-rural settlements or sub-urban poor development.

Moreover, the analysis of the hydrology of the site led us to consider that the restoration and conservation of water resources planning is the key issue for future development. Not only by the amount of biomass, natural resources and environmental services that contribute runoff to the streams and place, but also because the Municipality is seated on one of the largest aquifers in the Midwest.

(Fig 4 to 15).



Fig 4: Aerial photography of Municipality of Cuernavaca

The municipal territory is located in the Rio Grande Amacuzac Basin and is crossed by the watersheds of three rivers: Tambembe, Apatlaco and Yautepec. This unique quality of the Municipality is due to its geographic location: the territory is part of the foothills of one of the highest mountains in the center of the country and its altitude gradient goes from 3000 to 800 meters above sea level.



Fig 5: View of highway descending from the high mountains to the valley of Cuernavaca.

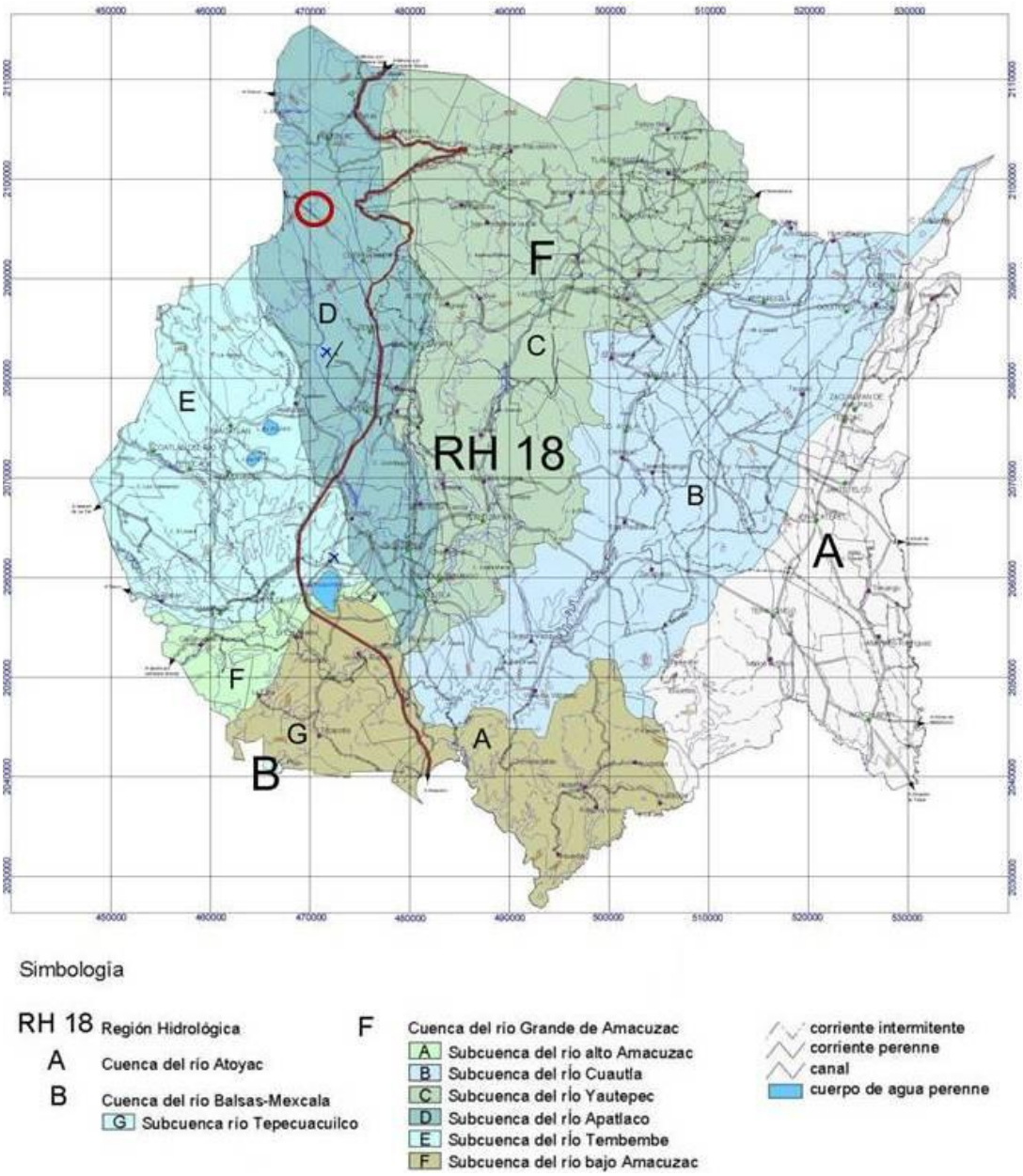


Fig 6: Cuernavaca Valley location in the context of the watersheds of Morelos State

Our analysis of the place made us realize that the site has a privileged location in relation to neighboring municipalities: Northbound Huitzilac Township is nestled in the mountains and its economic activity is very limited due to topographic conditions and legal protection of forests.
Southbound Municipalities of Temixco, Jiutepec, Emiliano Zapata and Xochitepec hold basically agricultural activity in their economy but significantly influences the location of popular Tívolis and Spas dependent on water coming from the mountains across the valley of Cuernavaca.
Also, the city of Cuernavaca is the capital of the state of Morelos and therefore has a diverse economy and a great political importance.Moreover, the city occupies only 30% of the municipal territory. It has important water resources, climate (mild climate is ideal for the development of human life and in the extreme south of the municipality is located one of the largest place basking in the country with a Solar Research Center), along with its plant and animal biodiversity.



Fig 7: Plant and Animal biodiversity of Cuernavaca Municipality

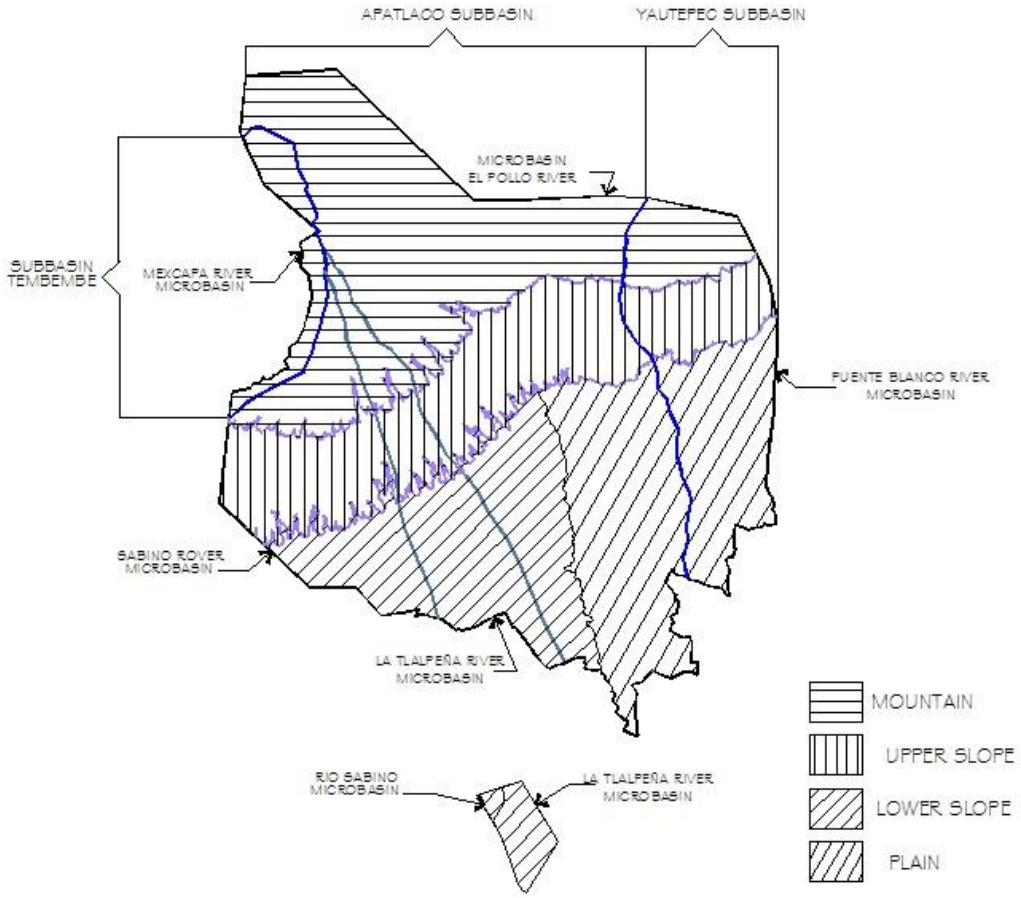


Fig 8: Physiography and Sub-basins of the territory of Cuernavaca Municipality

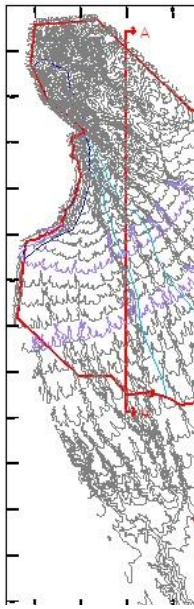
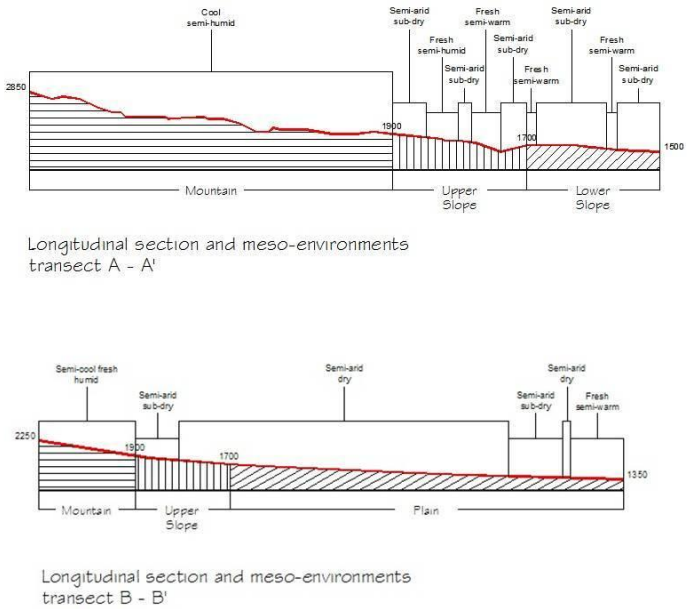
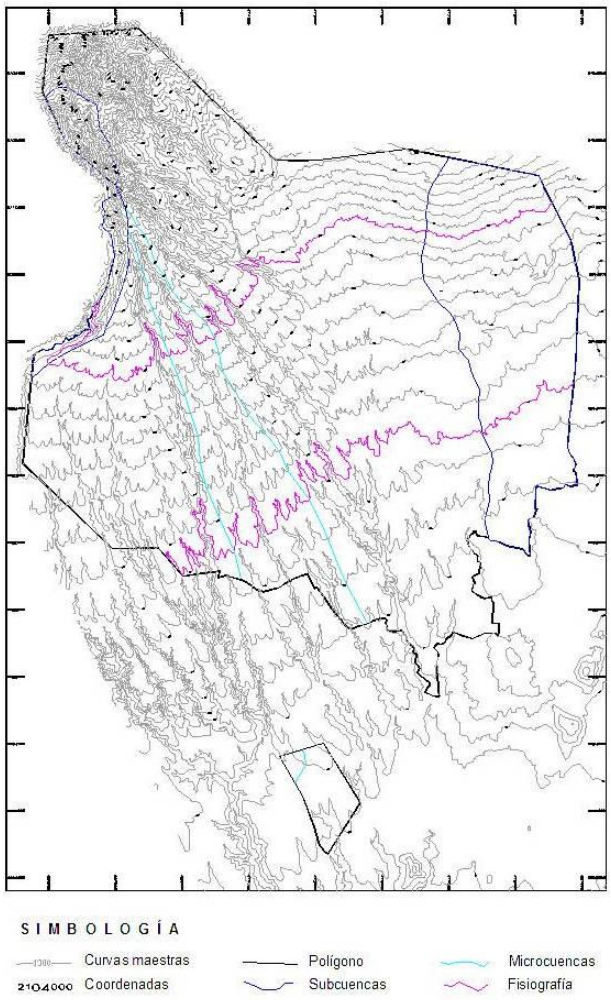


Fig 9: Polygonal and sections



Physiography and meso-environments



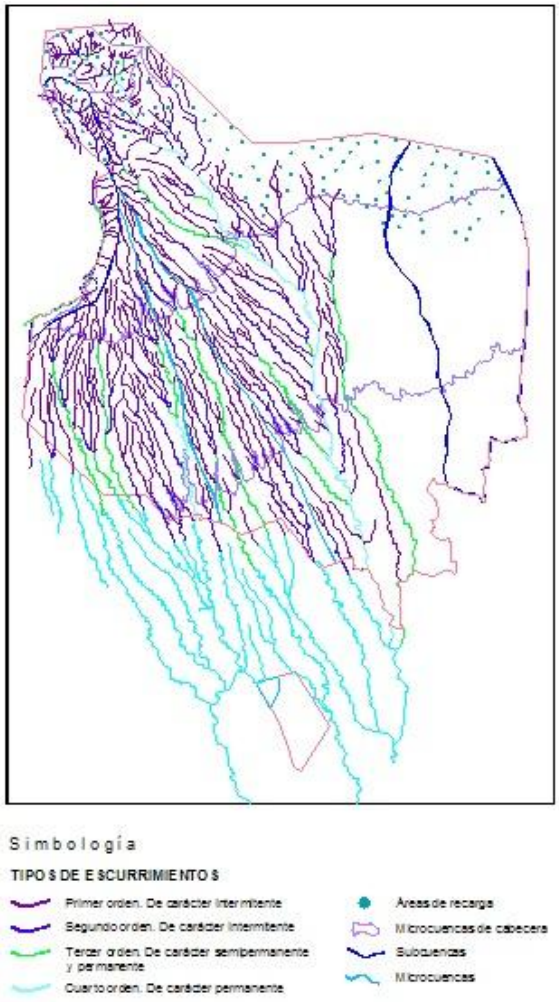


Fig 10: Topography of the Municipality Chart of water runoff



Fig 11: Vegetation of the Mountain region



Fig 12: Vegetation of the Upper and Lower slopes and agricultural areas at the Plain

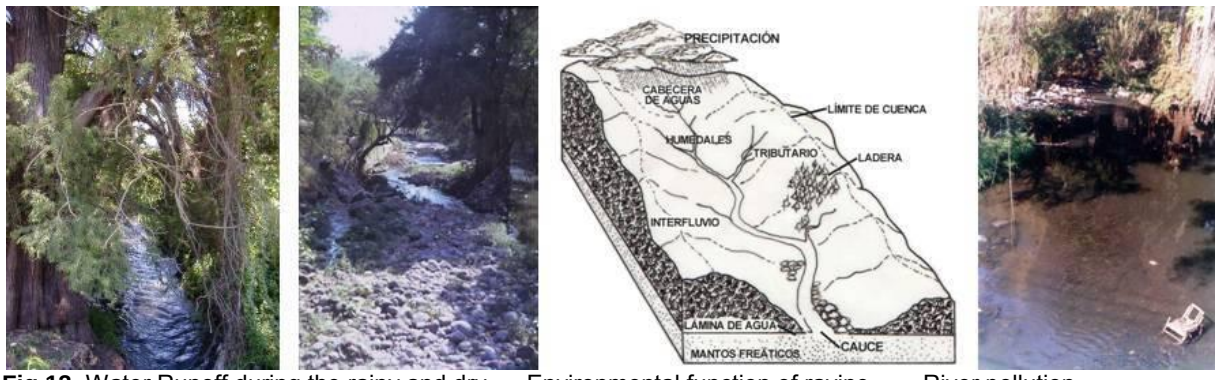


Fig 13: Water Runoff during the rainy and dry Environmental function of ravine River pollution



Fig 14: Peripheral urban settlements



Fig 15: Views of Cuernavaca City

2. CONCEPTUAL PLANNING FROM DE AWARNESS OF SITE AND PEOPLE.

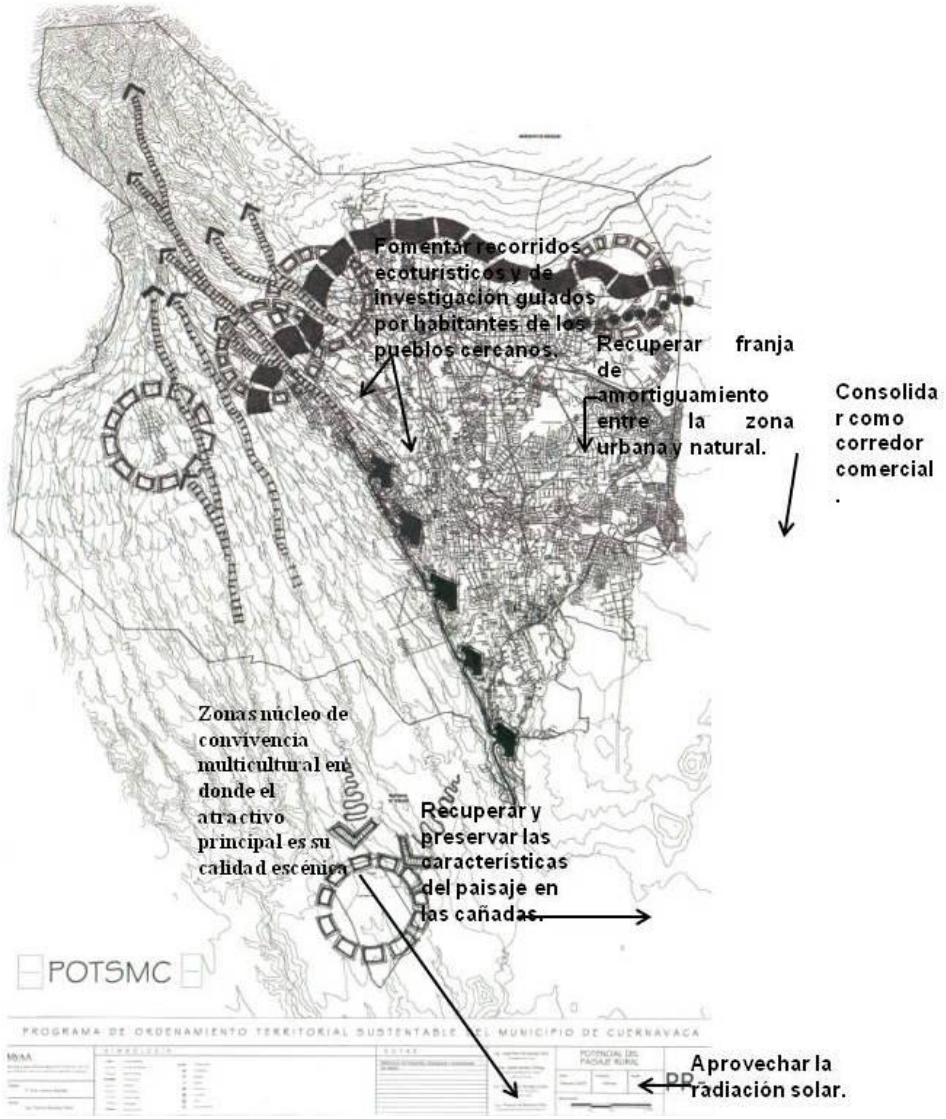
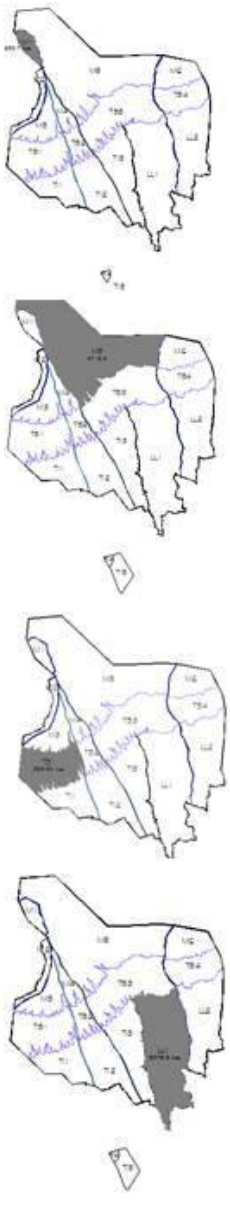


Fig 16: Conceptual Plan for sustainable development of Cuernavaca Municipality.

In Medina Architects we think that what we call sustainable development is not a goal or the result of a project, but the promotion of socio-environmental, economic-environmental and political-environmental processes that in time determine the establish and sustainability of different bio-geographic regions.
Therefore, to promote sustainable development of the municipality produced a document which set out the following aspects:
We define a physical division of the territory based on the four physiographic areas: Mountain, Upper slope, Lower slope and Plain. And the three hydrological basins mentioned above. Within this division proposed a zoning legally called Local Environmental Management Units (ULGA'S).
Determined in each ULGA conflicts concerning: natural hazards by seismicity, volcanism, weathering and erosion, and anthropogenic threats. Conflicts over political and administrative division, with the structure of land use, housing, commerce, industry, the classification of the territory, with the road structure, urban transport. Conflicts over mountain system, with the water system, defragmentation of forests, deforestation, urban growth and the expansion of the agricultural area, with fire, introduction of exotic species and the opening of roads.
We made a strategic plan whose main objective was to design a possible future project, able to face the risks of local environmental decline in its full extent, and to combine integrated actions aimed at preserving the natural heritage, modernize tourism, economy, and improve the quality of life of the population of the municipality (Fig 17).



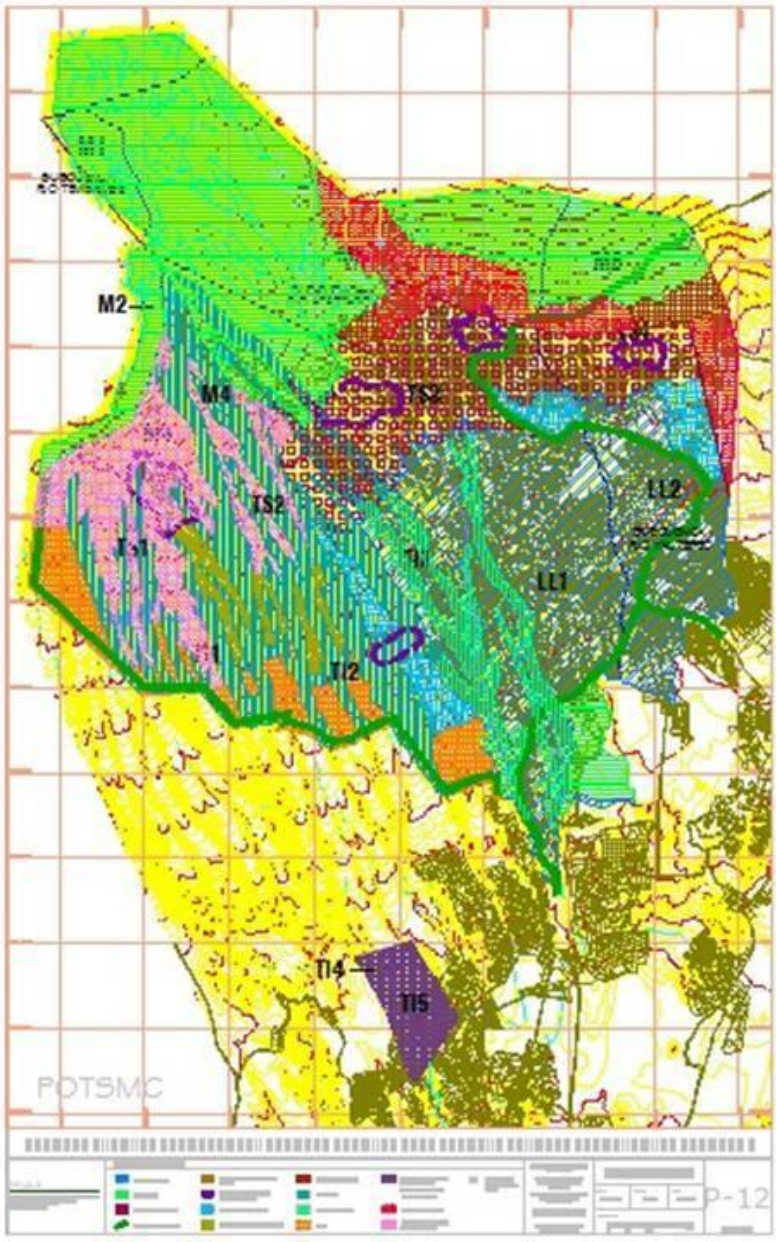


Fig 17: ULGA's examples Strategic Plan for the Cuernavaca Municipality Sustainable Development

In our strategic plan include guidelines for what we call a preventive planning to avoid late solutions to environmental problems. We established conditions to access a local Agenda 21 based on strategic potential advantage of the Municipality in terms of ecological infrastructure, regional central city, multimodal

communications, multimodal tourism, targeted on management and conservation of natural resources, social and economic dimensions and strengthening the role social groups.
To achieve these objectives we established 10 lines of action including 40 strategic projects:

Line1. Contain human pressure, limit growth and promote rehabilitation of the Territory.
1. New municipal urban development plan
2. New urban development in areas of immediate growth
3. Norms of urban eco-responsibility

Line 2 Encourage integration, coexistence and quality of life of the resident population.
Living in Cuernavaca, new urban and rural
4. Social integration, training and employment in Cuernavaca
5. Volunteers Cuernavaca
6. Coexistence, cultural integration and quality of life in Cuernavaca
7. Cuernavaca, sustainable city
8. Cuernavaca, Clean Water Town

Line3. Preserving the natural heritage and promoting the creation of a regional tourist ecotax environmental fate.
9. Preserving the natural water in Cuernavaca
10. Protect soil and forest systems in Cuernavaca
11. Recovering mesoclimatic quality of Cuernavaca
12. Restore the main environmental impacts and landscape in Cuernavaca

Line 4. Rescue the historical, cultural and natural heritage of Municipality.
13. Knowing and caring heritage of Cuernavaca
14. Historic downtown of Cuernavaca
15. The Parks and Gardens of Cuernavaca
16. Chichinautzin Range biological corridor
17. The Canyons of Cuernavaca
18. Constitution of a public natural history in Cuernavaca

Line 5. Promote the rehabilitation of population towns and middle-income residential and popular.
19. Rehabilitate and strengthen cores Cuernavaca
20. Development of a plan to expand urban eco-
21. Pilot programs "Environmental Rehabilitation Areas"

Line 6. Improve Cuernavaca as a tourist destination: replace sustainable quality growth, seeking the lifting of spending per visitor and tend to balance the season.
22. Cuernavaca, multimodal tourist destination
23. Cuernavaca, American Spring
24. Modernize the existing tourist park
25. Development of new ecotourism products
26. Promoting the ecological quality in Cuernavaca

Line 7. Improve public transport and encourage pedestrian and bicycle travel within population towns.
27. Improve existing public transport in Cuernavaca
28. Promotion multimodal forms of transportation
29. Plan for ecological conversion of mobility in Cuernavaca

Line 8. Introduction of sustainable management in key environmental sectors: water, energy and waste
30. Water Year Plan
31. Local program management to stabilize energy demand, reduce consumption
32. Promotion of renewable energy production
33. Year plan of waste in Cuernavaca

Line 9. Investing in human resources and knowledge, stimulate and diversify the economic system
34. Creating a sustainable development agency in Cuernavaca
35. Investment in human resources in Cuernavaca
36. Development of new business projects in Cuernavaca
37. Stimulation of "rural" in Cuernavaca

Line 10. Innovating into the Municipal Government and expanding the capacity of concerted public-private investment.
38. Modernization of Municipal organization in Cuernavaca
39. Expanding the investment capacity of the Municipality of Cuernavaca
40. Knowing and caring environmental heritage of Cuernavaca


Fig 18: *Bombax ellipticum* the representative tree of Cuernavaca

Our plan is fully explained about the meaning behind the lines of action we propose and how strategic projects should be agreed and implemented with the population as the basis of the acquisition of sustainable practices in the municipality.
I think the most significant contribution of our plan to the municipality is to offer its inhabitants a new vision of the territory in which we consider the Municipality of Cuernavaca as the heart of an eco-region and the precursor of the establishment of a virtuous circle of Municipal interaction in which the villages located in the upper conserve ecosystem services which benefit the peoples of the lower basin by remuneration which covers not only a green tax but also the exchange of goods and services.
We propose, among other things, that the City of Cuernavaca stop urban growth expansion offering investors in real estate facilities for reinvestment in decaying or abandoned areas of the city re-densifying built space and upgrading the services and infrastructure.
We also propose that the City of Cuernavaca specializes in tertiary activities so it can offer a menu of advanced technology in communications, financial operations and management to its neighboring municipalities
Similarly, we propose to create a multimodal and inter-municipal transportation network that serves to facilitate the flow of people and goods in the region.
Finally, we propose that the City preserved itself as a water reservoir that in future times could offer the use of this resource to other parts of the country, considering that 60% of the country is semi-arid areas that definitely will have great needs to solve.

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A Discussion On The Micro-Scale Urban Preservation Projects In Turkey

Dr. Şeyda Güngör Açıkgöz, Dr. Burcu CEYLAN

Kayseri Nuh Naci Yazgan University Faculty of Fine Arts and Design, Department of Architecture.
Akdeniz Universtiy Faculty of Letters, Department of Art History.
seydagun@yahoo.com
bceylan@yahoo.com

Abstract

Even though Turkey puts considerable effort in complying with the international regulations concerning the preservation historic sites, due to various local realities, desired outcome has not been achieved. As a result, the loss of historic fabric in urban sites is a common issue of Turkish towns. Recently a new practice, which is restoring a small portion of the site -generally the most preserved street- has become a trend in urban preservation. Advised and financially supported by the central government, “street renovation” promises a rather feasible solution to the problems of urban preservation practices in Turkey. Moreover, it presents an intermediate stage between the urban preservation and restoration of individual buildings. On the other hand, this practice contradicts the idea of total preservation of historic sites by reducing the cities to fragments.
The presentation aims to discuss these types of micro-scale urban preservation projects, in relation with the social and economic realities of Turkey. The legal background, fiscal possibilities, application processes will also be mentioned. The outcome of such projects will be evaluated in reference to case studies.

1. The Idea of Urban Preservation and International Charters

The idea of safeguarding the urban areas entered the universal notion of preservation as early as 1931. Article 3 of Athens Charter, “AESTHETIC ENHANCEMENT OF ANCIENT MONUMENTS”, states that the surroundings of a monument should be given special consideration. However, the urban environment, referred as “surroundings” here, was taken as a background of the monuments to be preserved. In Venice Charter, while the monuments still take the centre stage, their preservation also incorporates the preservation of its traditional setting (Article 6,14). On the other hand, article 1 regards urban or rural settlements monuments, as they evidence of a particular civilization, a significant development or an historic event. With these articles, the historic areas became another subject of conservation. It is mainly the Amsterdam Charter that accentuates the importance of urban preservation as a subject of its own right. Article B states that architectural heritage includes not only individual buildings of exceptional quality and their surroundings, but also all areas of towns or villages of historic or cultural interest. A year later Nairobi Charter, makes a meticulous definition of historic

sites as “any groups of buildings, structures and open spaces including archaeological and paleontological sites, constituting human settlements in an urban or rural environment, the cohesion and value of which, from the archaeological, architectural, prehistoric, historic, aesthetic or socio-cultural point of view are recognized.” Urban preservation had a comprehensive definition with the Washington Charter, which “concerns historic urban areas, large and small, including cities, towns and historic centres or quarters, together with their natural and man-made environments”. Historic sites given importance since they embody the values of traditional urban cultures, and they have a role as historical documents. Washington Charter aims to complement the International Charter for the Conservation and Restoration of Monuments and Sites (Venice Charter) in that it defines the principles, objectives, and methods necessary for the conservation of historic towns and urban areas.

2. Urban Preservation in Turkey

In Turkey, the legal frame of the urban conservation developed simultaneously with the European practices. After the enactment of “the Law for Safeguarding the Natural and Cultural Assets” in 1973, historic urban areas of almost every city have been listed as ‘historic sites’[1].
Unfortunately, as it is well known, the legislation alone is never enough in preserving the historic environments. Even though the legal frame work was formed; it is difficult to state that Turkey has put up respectable preservation practices. In fact very few cases of integrated urban preservation can be mentioned with confidence like Amasya and Safranbolu (Fig. 1, Fig. 2)
Though it presents a major topic of discussion which has several social and economic factors, here we would like to sum the conditions of urban preservation in Turkey.

- Actions of preservation and its continuity require a social awareness. In Europe the consciousness for preserving the historic monuments and settlements evolved by the actions of civil initiatives during 19th and 20th centuries. Turkey, which didnot go through a similar historical phase, imported the idea of preservation by the weak efforts of scholars but majorly by the international agreements. Therefore the preservation has not been supported by the internal dynamics of the society. In fact, almost all of the practices of preservation in Turkey, whether it is about a single building or for a historic site, have been achieved by the governmental bodies and through state finance. The fact that historic sites in Turkey are in a poor state of preservation is due to the lack of civic consciousness rather than legal irregularities.
- Preservation of historic sites always includes the problems arisen from the private ownership. The persuasion, encouragement and support of owners, together with the before mentioned social problem, becomes even a bigger issue in the preservation of historic sites.
- Preservation in urban scale requires considerable economic resources. Turkey, as a developing country, has difficulties in providing the necessary funds.
- Legislation leaves the safeguarding of historic sites to the local preservation councils. Unfortunately, the effective formulation and structuring of these councils took some time. Even today, the formation of the councils, the regions which each council is responsible of still being altered, causing a lack of consistency and continuity in urban preservation practices.
- Since the concept of preservation had been limited only to the monumental buildings, the vernacular architecture, which forms the greater parts of the historic sites, was neglected. Except palaces and large mansions, very few examples of domestic architecture were listed until the 1980’s.
- Within the protected area of historic sites, buildings which are not individually listed have been ignored. However, these buildings have indispensable role in the formation of the urban pattern with their dimensions, ratios and relations with the neighbouring buildings and urban spaces; even though their stylistic characteristics are not qualified for being listed. Since they are not protected by the law, they are either in dilapidated condition or replaced by modern constructions. In either case, they create visual gaps in the historic pattern.

Therefore, the situation of the historic sites in Turkey entering the second decade of the millennium is as follows: Several cities had already lost large parts of their historic areas when the law was promulgated in 1973. The loss continued even after that date, such that in some cities historic sites were needed to be redefined with reduced areas. In some of the cities only small fragments of historic pattern survived. In several cities, the listed buildings are still in dilapidated condition, due to the lack of the will and resources for proper restoration. The historic areas are torn by recent constructions, most of which lacks decent architectural quality and almost all of which alien to the character of the area. In addition to the buildings, other

urban amenities like pavements, garden walls, street furniture or greenery which defines the urban character, are also not preserved and changed with modern counterparts.
In these circumstances a seminal project was initiated in 1977 in İstanbul The project area was the vicinity of Sultan Ahmet Square, the most important touristic centre of the old city, which also encompasses monuments like Blue Mosque and St. Sophia and Topkapı Palace. Here the area was planned to be transformed in to an 'open museum' which would house exhibitions, cultural activities and tourist accommodation. [2] The initial project had particularly refrained from reserving the area only for touristic activities by including culture and accommodation. The first phase of the project involved a detailed survey of buildings, archaeological ruins, traffic and other usages, and function analysis. The design offered a contemporary architectural approach, but complied with the existing historic pattern with appropriate dimensions material and facade characteristics.
Despite all its good intentions, the project was not realized as expected. Soğukçeşme Street, runs between the walls of Topkapı Palace and St Sophia, was "renovated". The method was highly criticized for being against the universally accepted rules of architectural restoration: the buildings on the street were rebuilt, as similitude of 18th century houses by modern materials and techniques The historic integrity of the area was compromised. What achieved is a stage set for touristic purposes where the original was lost among the fake. The ideal of authenticity was completely sacrificed.(Fig. 3)

3. 'Street Renovation' as Minor Scale Urban preservation Project

By a queer twist of fate, Soğukçeşme project become an inspiration for urban renovation projects. It was initiated by the Ministry of Tourism and realised by an association promoting the development of tourism in Turkey. Even though it was only a fragment of the original project, it created the expected tourism income as intended. Therefore it opened a new path in urban preservation practices. It demonstrated that when an integrated urban renovation project is not possible, minor scale projects, limited to a portion large enough to create the desired atmosphere would be more than enough for tourist attraction.
The last two decades, "street renovation" projects are being prepared in growing numbers. According to the Ministry of Culture 12 projects from different cities are presented to the local preservation councils for the year 2010. (Fig.4,5,6)
The related specification issued by the Ministry of Culture defines 'street renovation' as a project for preservation, rehabilitation and revitalisation of a street by restoring the street facing facades of buildings, listed or unlisted, courtyard/garden walls, outbuildings/annexes together with other architectural elements like gateways, fountains. It also requires the restoration of original street pavement and other street furniture.
The guidelines for 'street renovation' projects are specified as follows:

- The motive should be preserving the natural, cultural, architectural, historical aesthetical, visual values and original identity of the city.
- The accordance with the environment should be aimed. The project should be sustainable and consider ecological preservation. The project should provide optimum climatic conditions
- The project should be in accordance with the user profile, the needs of disadvantaged users, i.e. children, elderly or handicapped should also be considered.
- The project should protect the functional integrity of open spaces, while promoting the development of traditional architecture
- The project should provide an integrated pedestrian and vehicle traffic between the area and its surrounding
- The visual pollution of alien features like energy and communication lines, billboards and like should be prevented.
- All infrastructures like water, sewage, garbage, fire prevention should be updated
- The improvement of housing should be considered.

The specification clearly shows that the legal basis of the street renovation is derived from the Washington Charter, especially its principles section. In close examination, the similarity of the language is obvious, as in the definition of the urban preservation (Articles 9, 12, 13, 14).
The street renovation projects are bound by the Law for Safeguarding the Natural and Cultural Assets. They should also comply with the local urban development plans and urban preservation plans. The street in question should be in a listed historic site. The approval and

control of the project is left to the local preservation council. It must be noted that the specification does not have any regulation or references to financing of the project.

4. Discussion

Behind the wide acceptance of street renovation projects, lies the fact that, it offers several of the profits of an urban preservation project (a rise in the land value, touristic income, improvement of the physical quality etc.) yet it is relatively easier and quicker to achieve and apply. On the other hand, a smaller scale would be much more effective in creating the image of a perceivable environment [3].

However, street renovation projects come together with problems of restoration ideals, finance, and application. The legislation places projects under the guidance of development plans, which mostly have minor concerns for preservation. In the occasion of a conflict, preservation would automatically be rendered as secondary.

The street to be renovated is chosen by the numbers of the existing historic buildings. Even though this has a merit, when the quantity becomes the dominant parameter, another area, more valuable in terms of artistic or historic value but fewer buildings would be ignored.

The local preservation councils may have different interpretation of legal framework. Therefore there are differences in the extent and context of the project depending on the demands of the council. Some councils approach the project as facade renovation, -only the facades facing the street- while some regard it as a complete restoration project, with more detailed designs.

Another problem comes with the application. Since the specification does not force immediate application, some of the projects are prepared as small scale urban preservation projects. The application is left to private initiative to be completed with time. In this case, for every single building detailed restoration projects would be prepared based on the preservation decisions. In several cases, restoration project was not designed by the authors of street renovation projects since there is no specification for that. Different teams of applicators may cause inconsistency of the quality of restoration and damage the integrity of the project. Moreover, for the continuously decaying historic building sites, projects may require updating, causing the waste of time and effort.

The projects with provided finances are in fact not in the context of preservation. They should be considered as large scale restoration projects. In this case the phrase “facades facing the street” of the specification becomes irrelevant since there cannot be such a thing as “half restoration”. As a result there is a tremendous inconsistency between the projects presented to different councils.

Consistency of the street renovation projects to the universal ideas of preservation is another topic for discussion. As mentioned earlier, the conservation of historic towns and other historic urban areas are not necessarily an integral part of urban and regional planning. Even this fact alone raises serious problems.

One of the aims of urban preservation is to renovate the traditional character or the city within the possible boundaries. The ‘renovation’ should include the revitalisation of the urban life of the area as well as restoring the architectural character. Boundaries on the other hand should be carefully designated, depending not only on the structural remains but also on the other visual and physical factors like topography or landscape.[4] The preservation should cover the chosen area as whole and should ensuring a harmonious relationship between the historic urban areas and the town as a whole (Washington Charter Article 5). Here street renovation projects are totally contradicts the holistic, integrated idea of urban conservation. Street renovations due to its limited character, compartmentalises and isolates the area visually from the rest of the town as well as the rest of the historic area. In addition to that, it creates the illusion of total preservation and results in ignoring the other parts of the historic area, which might well have more values than the renovated street.

It is a fact that historic areas, when they are well presented, provide a considerable income as tourist attraction. This is the main motivating factor for the local governments in pursuing street renovation projects. With this goal in mind, the historic character of the area is limited to a face value, and converted into ‘Disneylands’. Another negative outcome would be the loss of original function of the area. In several projects, the buildings of the street, i.e. the houses of the local population, are designed to provide luxury lodgings for tourists, with the addition of non-original features like swimming pools. Inaccurate practices are not only confined to historic buildings themselves but also to the new constructions on the site, that are designed as copies of the traditional architecture. These practices would compromise the authenticity of the historic town

or urban area (Washington Charter Article 2).On the other hand, the change of function, from residential to touristic, most often results in the casting out of the local population. However, the conservation of historic towns and urban areas should concern their residents first of all (Washington Charter Article 3). The process may also fail in promoting “the harmony of both private and community life in these areas and to encourage the preservation of those cultural properties, however modest in scale, that constitute the memory of mankind”.

5. Conclusion

Some of the above mentioned problems are the result of wrong practices and approaches. However, in Turkey, the historic sites are decaying in such a velocity that it becomes a luxury to pursue comprehensive urban preservation projects that complies with all the universal principles of conservation. In these circumstances “rigidity should be avoided since individual cases may present specific problems” as the article 4 of Washington Charter states. Street renovation projects are constructive attempts in protecting the bond between past and present. Moreover, their inspiring effect on the promotion of preserving historic areas, by creating visual as well as economic values, cannot be denied

Two recent mainstream scholarly debates in Turkey on preserving the historic towns also supports the potentiality of street renovation projects. Both present a cynical approach to the subject: to achieve the ideal urban conservation is merely impossible. Kuban states that the orthodox methods of conservation are the reason behind the loss of historic sites in Turkey.[5] Tanyeli proposes a new concept which he calls “preservation of visual values” on urban scale. Here the conservation of buildings only as a facade or as a body would be enough to preserve the appearance of an area. Tanyeli carefully refrains using the term historic conservation, since what is achieved by the method would not be conservation. However, he claims that even though this creates an illusion of historic site, towns require that illusion.[6]

Within the light of these theories, new approaches to urban conservation, like street renovation should be taken seriously. However, in order to achieve healthier projects, the above mentioned problems should be solved. Here the Ministry of Culture should take the initiative to instruct the local governments and also the local preservation councils about the ideals of conservation.

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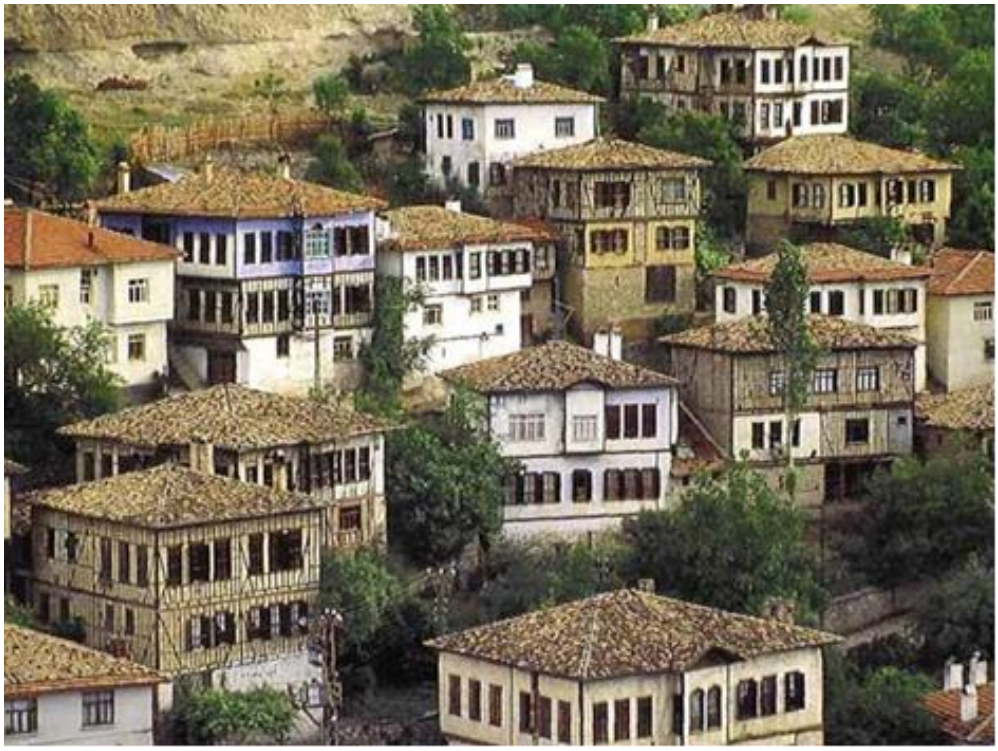

Figure 1 Safranbolu Historic Preservation Area

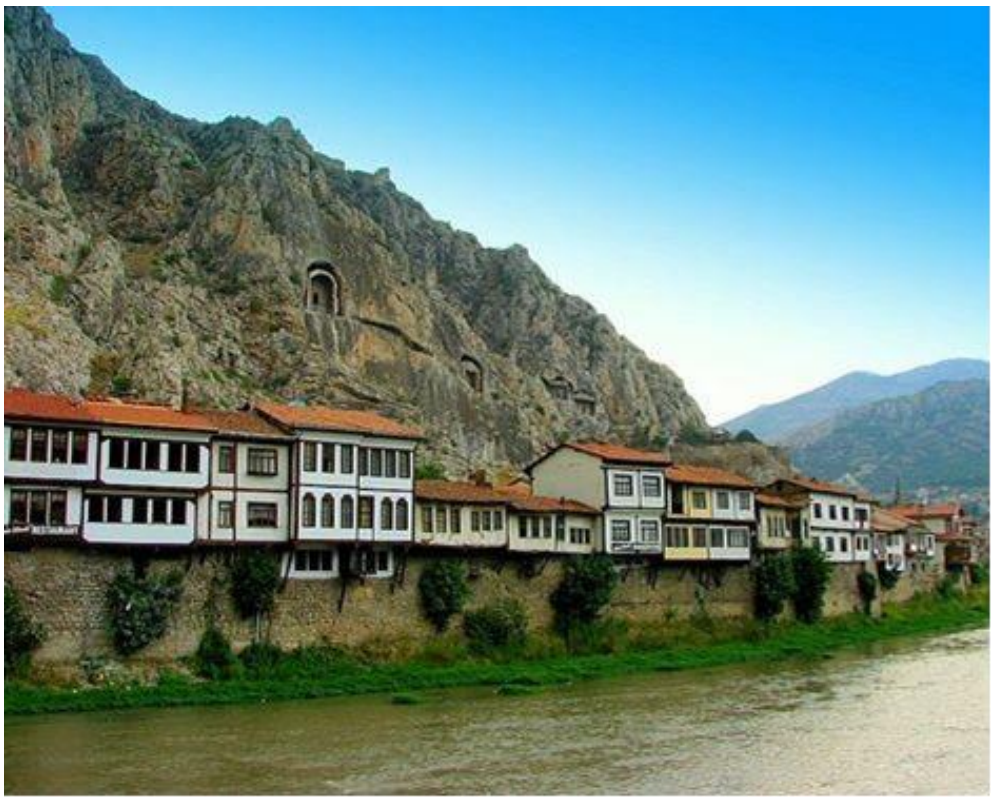

Figure 2 Amasya Historic Preservation Area


Figure 3 Soğukçeşme Street


Figure 4 Tarsus Street Renovation Project


Figure 5 Malatya Street Renovation Project



Figure 6 Giresun Dik Sokak Street Renovation project

HERITAGE ARCHITECTURE LANDESIGN
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A TRANSPARENT CHOICE

Antonella VIOLANO,[1] Fancesca VERDE[2]
(1) Department of Architecture and Industrial Design "L. Vanvitelli"- Second University of Naples
Aversa (CE), Italy
Email: antonella.violano@unina2.it
(2) Email: francesca.verde@unina2.it

Abstract
In line with the architecture of lightness, the transparent "skin" of the building is playing an increasing important role by ensuring the comfort of the building system. It is becoming a type of extremely sensitive component in order to design choices.
About control of material fluxes and especially of energy, incoming and outgoing the building system, the glazed surfaces constitute the weakest point of the envelope. A correct exposure, a suitable distribution and a proportionate sizing on the opaque surfaces significantly affect the comfort conditions of users, not only in terms of natural light, but also in terms of sensible heat, so as to become a real source of passive income in the winter season.
Solar heat gained in the summer is an unsolved (but not unsolvable) issue, especially in the climate zones belonging to the Mediterranean area; they are a negative entry in the energy balance, a discomfort factor, an amount of energy to be dissipated.
This study, developed in the second phase of the "Solar Eco-efficient Envelope Model" Project, financed by the Environmental Ministry in a wide range of research projects, is aimed at both energy efficiency measures and use of renewable energy sources in urban areas. This is in the middle between a market survey and a magnifying glass on the progress of the last technologies offered by glass components producers, so it is aimed at monitoring the range of opportunities launched on the marketplace and making it available to a technician/engineer in order to support his/her intervention choices.

Keywords: transparent skin, glass components, passive solar system, energy efficiency

1. Analysis Methodology[1]
"*We need to learn how technologies work, not trying to reproduce them, because they became obsolete just one year later* " (Mario Bellini).
The leading companies in designing and processing transparent components for the construction industry daily confront each other on the field of innovation. This is increasingly oriented to strengthen the variety of the market supply, trying to elaborate solutions in order to respond each time to specific needs, closely connected with both the use of the building and energy performances that are more and more restrictive according to the last standards.
The advance of the technological research in the construction industry, engaged in manufacturing transparent components for the envelope, is essentially based on the study of glass performance.
It is finalized to improve the relationship of the components with solar radiation at different wavelengths that they intend either to capture or to screen: the radiation component of light (falling into the visible range) and the thermal component (falling into the infrared range).
We analyzed different types of products, more or less widely available on the market. They respond to either different applications in the field of ex-novo projects or rehabilitation of the existing ones, or in the field of rehabilitation of historic buildings, ranging from insulation glass unit to the hyper-thin surface coating, to the avant-garde of the vacuum system and the chromogenic glasses.

2. The insulation glass unit[2]

Heat exchange through a single glass happens only by conduction: a single 4 mm clear glass reaches 5.8 W/m2K of transmittance, the same 8 mm glass reaches 5.7 W/m2K.
So it 's almost irrelevant to increase the thickness because the material shows low intrinsic thermal capacities. In order to obtain high quality performances, it is necessary to adopt the IGU (insulation glass unit) system, also to respect the limits of transmittance imposed by the standards.
The IGU uses the transmission of the thermal wave combining conduction in the glass and convection in the gap, filled with air or other low-density gases such as argon or krypton, which decrease the heat transmission of about 0.2-0.3 W/m2K.
It's possible to change the convective/radiation glass behaviour coating their surfaces inside or outside the gap, without considering more specific features.
There are two major types in the industrial production of the sector: low-emission glasses, allowing the light and thermal radiation to go through them and prevent them from exiting, and selective solar control glasses, able to select and reject the thermal component that arises from a direct solar radiation. The surface treatment called "coating" could be either of a pyrolytic type (a physical deposition of vapours of metal: for example silver or tin), or of a magnetron type (vacuum chemical vapours deposition).
This last technology, in comparison with the previous one, is more laborious and obviously more expensive, but it provides higher benefits in terms of durableness and workability of the surfaces. The deposited film directly influences the emissivity of the glass surface and, for the coating positioning it's possible to obtain different results in terms of selection of the transmitted or reflected wavelengths and returned chromatic aspect.
The designer has to select the component with the best performances according to specific needs. He/she can be helped by the evaluation of some important parameters:

- light transmitted through the glass (in percentage in comparison with the incident light);
- heat transmitted through the glass (in percentage in comparison with the incident radiation);
- Trasmittance value (in KWh/m2K);
- Solar Factor *g* (a percentage value that ranges between 0 and 1): it indicates the ratio between the thermal energy globally transmitted through the glass and the incident one.

It's important that the designer makes his/her own choice considering the heat component is not the only variable: conditions of light comfort and fruition of the confined space need a different quantity of natural light in relationship with both the intended use, and exposition and characteristics of the environmental surroundings (presence of obstructions close to the glass front and their shadows).
The recent standard developments about the calculation and certification of the energy performances of the building-plant system give great importance to the transparent envelope design.
A very important requirement is the glazing percentage, between the transparent surface of the building and its overall useful surface.

TABELLA 4.a	Chiusure trasparenti (U limite in W/m²K)		
Zona climatica	Dal 1 gennaio 2006	Dal 1 gennaio 2008	Dal 1 gennaio 2010
A	5.5	5.0	4.6
B	4.0	3.6	3.0
C	3.3	3.0	2.6
D	3.1	2.8	2.4
E	2.8	2.4	2.2
F	2.4	2.2	2.0

Fig. 1: DLgs 311/06 - All. C : Limit values of U Thermal conductivity of transparent closures including the frames (W/m2K)

TABELLA 4.b	Vetri (U limite in W/m²K)		
Zona climatica	Dal 1 gennaio 2006	Dal 1 luglio 2008	Dal 1 gennaio 2011
A	5.0	4.5	3.7
B	4.0	3.4	2.7
C	3.0	2.3	2.1
D	2.6	2.1	1.9
E	2.4	1.9	1.7
F	2.3	1.7	1.3

Fig. 2: D.Lgs 311/06 – All. C - Limit values of U Thermal conductivity of transparent closures - glass (W/m2K)

If it is below 0.18, it is possible directly to attribute the value EPI = EPI = limit to the building, where they occur simultaneously other requirements on the plants and on the envelope: useful thermal efficiency and transmittance. In other cases, it is very important valuating the effective performances of the transparent envelope (see DPR 59/09, article 4 paragraph 4: transmittance of transparent closings below the tabulated limits).
The D.Lgs no. 311/06 has introduced some interesting innovations: the designer has to use better external environmental conditions and distribution features of the spaces to encourage natural ventilation of the building and introduces, with the enclosure I, the obligation of sun protection systems to control solar gain in summer conditions.
The companies chosen for the comparison have been identified among the most widely diffused and publicized in Italy and abroad by architecture and design magazines, according to some criteria:

- Wide distribution on home market
- Large productive supply
- Clarity of information about technical performances
- Availability of contacts with local branches
- Possibility of performance verification using business software.

For the comparison some energy parameters are considered, within the technical files provided by the companies, as well as the type of glass (single, double or triple glass):

- Transmittance U-value (W/m^{2}K)
- overall thickness of the glazed component
- gap filling (Air, Argon, Krypton).

Among the light parameters Solar Factor *g*, external aspect, that is color response, and type of surface coating are considered. The selected products are able to offer a good thermal resistance, without substantially reducing their Solar Factor *g* and maintaining their transparent appearance almost unchanged. The maximization of the Solar Factor is desired in order to ensure passive solar gain in the wintertime, especially if it is complied with the law obligation of sunscreens selectively protecting windows in the summertime.

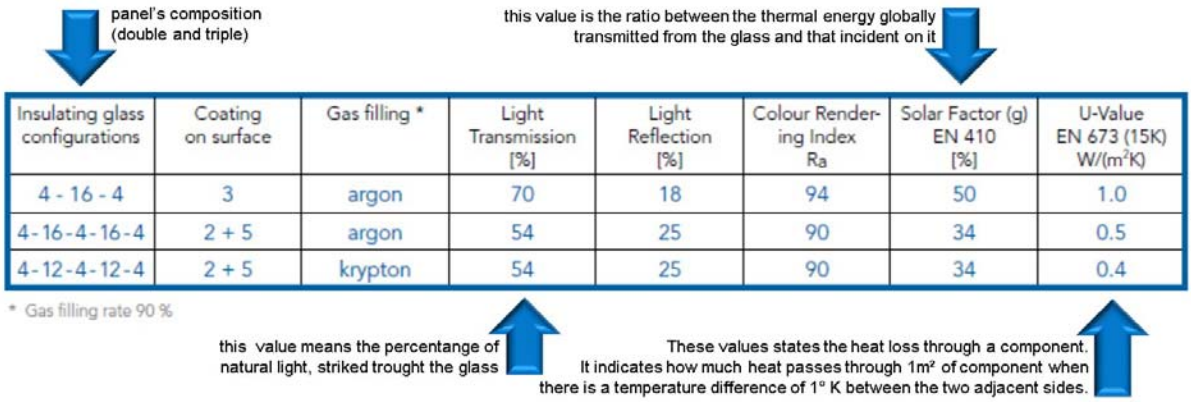

Fig. 3: An example of technical characteristics of glasses with solar control coatings

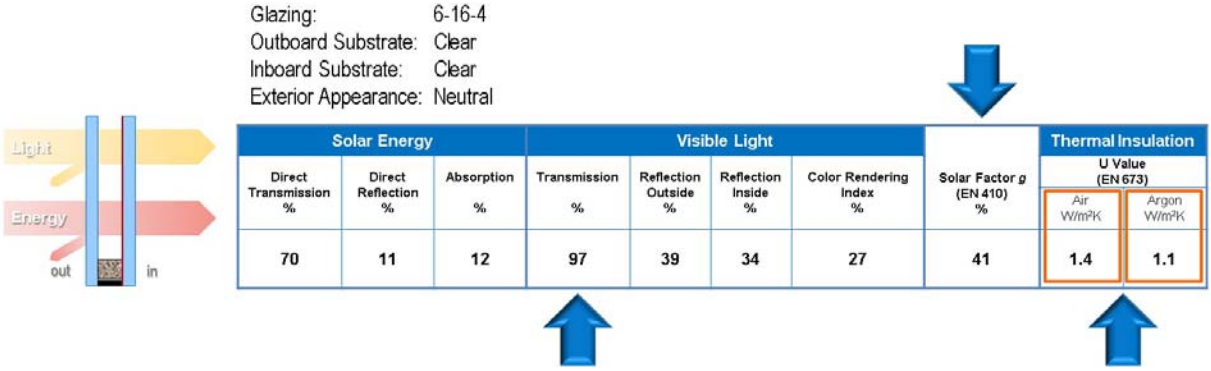

Fig. 4: An example of technical characteristics of glass with high selectivity, high transparency and very good thermal insulation: an ideal design solution for school building and hospital

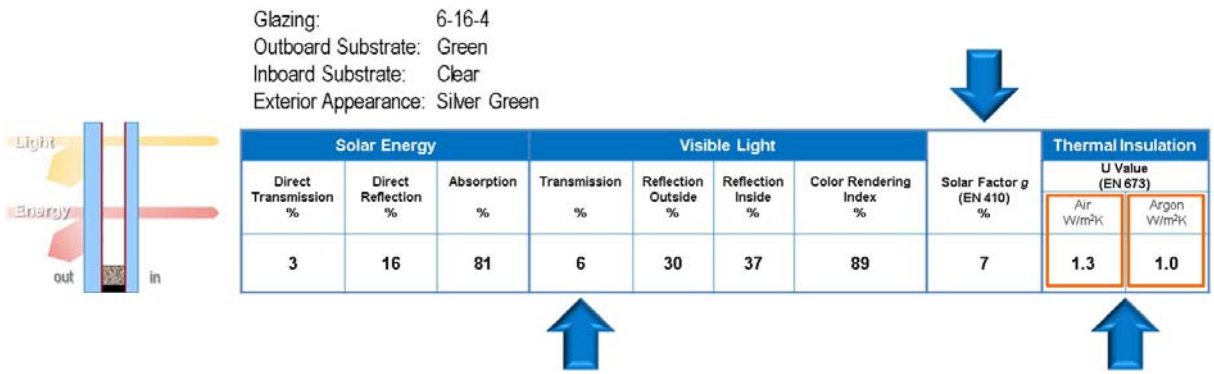

Fig. 5: An example of technical characteristics of glass with very low transparency and excellent thermal insulation

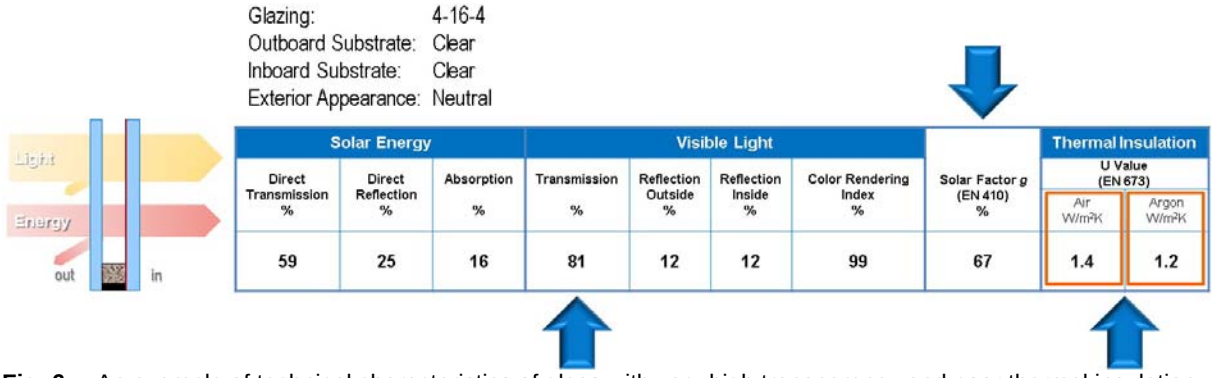

Fig. 6: An example of technical characteristics of glass with very high transparency and poor thermal insulation

The survey shows that of course big businesses offer a very wide supply for any type of use, not only for the number of finished products placed on the market, but also for the possibility of different glass combinations, while small businesses tend to be oriented to a specific segment of the market, obtaining very highly performing products that meet less very specific uses.
Finally the three parameters that characterize a solution of glazing visible light, Solar Factor *g* and transmittance are directly compared, identifying four levels of performance: insufficient, sufficient, good or Best Practices, attributing consequently, a score from one to three on the elaborated rating scale. (Fig7)

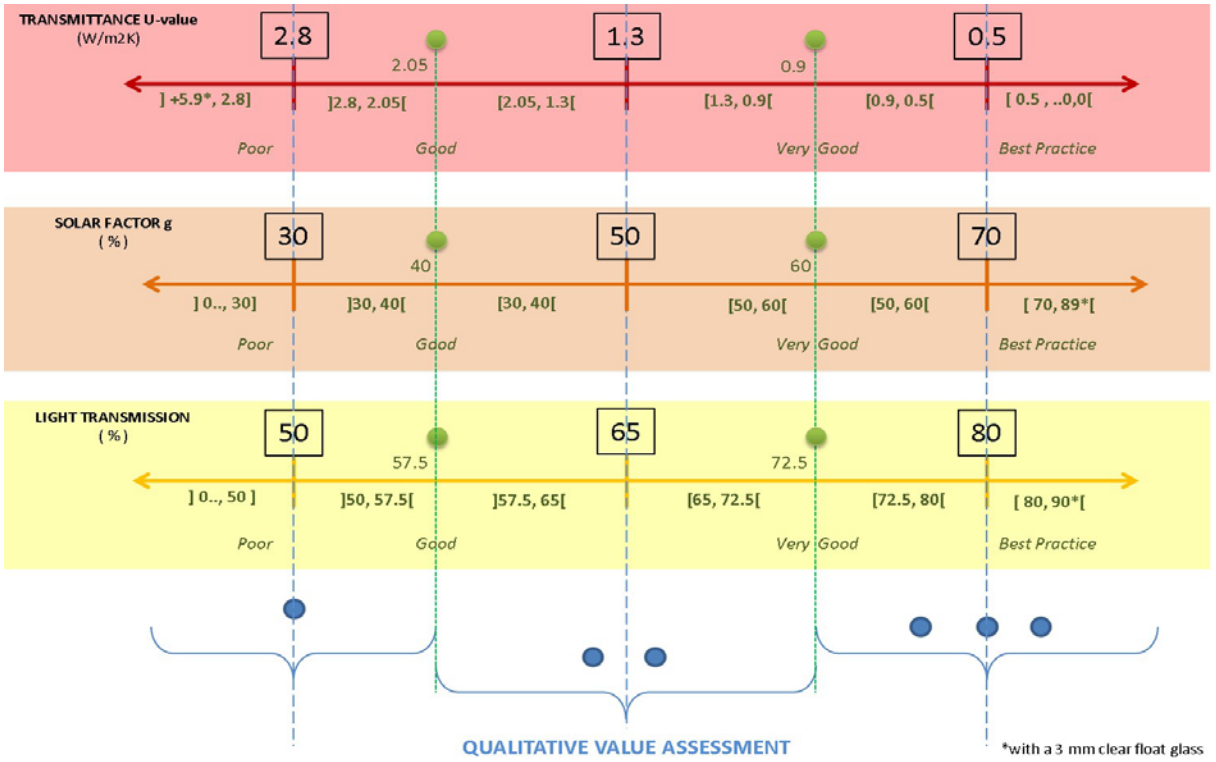

Fig. 7: Assessment of the significant parameters for glass.

The IGU totally responds to the need of the installation of a glazing system (glass-frame), suitable to meet the requirements of standard comfort and performance for each type of environment.
The rehabilitation of the buildings, especially for a tertiary use, characterized by large glass surfaces, usually without screens, involves the necessary adjustment of the glazing systems. Very often, however, the installation of a double glass system with an ex-novo selective or solar control film is prohibitively expensive, both for the finished product cost (considering the involved areas), and the subsequent replacement of the whole frame system. The application of a superficial adhesive film is a very practical technological solution; it is quicker in installation and has a minimal influence on the regular use of the building.

3. Coating for the energy building retrofit[3]

The polyester self-adhesive films are installed directly on the glass by highly transparent adhesives, UV rays inhibitors, in a "sandwich" structure, in the middle of which there is a layer of metallization, acting as a reflector of solar radiation; the surface finish is made up of one or more layers of scratch-resistant coating.
There are different types of films suitable to meet different requirements of comfort for confined spaces and areas immediately surrounding the building, but that guarantee a reflection of the sunlight equal at least to 70% of the incident one.
The installation can be done both outside and inside the glass, getting different results, especially for the discomfort glare and the raising of the surface temperatures, but that creates also different conditions of duration and maintenance.
There are different types of films on the market, suitable to meet security needs or specific for the protection from UV rays. We can distinguish two main categories of films based on the deposition of metals and the external chromatic response among those studied in order to save energy.
The first type of product is defined reflective, its processing is done by the vaporization of metals (usually aluminum) with a controlled density on the glass; the final effect is a high chromatic response, and a mirror effect. This solution is excellent for breaking down the thermal summer gains and the problems caused by insulation on the transparent walls.
The sputtered type instead presents a more complex process called sputtering and is done through the disintegration of the atoms of the metals by ion bombardments. The use of this type of process ensures a low mirror effect, making it suitable for applications in the historic centre, while maintaining excellent performances in terms of reduction of discomfort glare.
For both types there are different versions according to the need to shield the solar radiation more or less densely, the distinction is made through the combination of different surface layers, lightly colored (defined: "*fumè*") improving the conditions of glare, avoiding the reflections inside the rooms, but of course reducing transparency and visibility outwards.
The real drawback in these films installation, in the past, was the poor resistance to atmospheric agents, which compromised their functionality (reductions experienced by 90% of the performance), and their transparence becoming opaque layers applied to windows, causing greater energy expenditure for artificial lighting.
The current market trend is oriented towards hyper-thin films, a few microns thick, highly transparent and at the same time with a better solar control, that are able to guarantee their performances in extreme conditions for periods ranging from five to ten years.

4. The forefront of the glass vacuum system[4]

The research on transparent surfaces, especially in Italy (where they intervene heavily on the existing heritage), doesn't become the research of highly performing double and triple coating components of a reinforced thermal insulation (ITR), but it is oriented to identify high benefits in reduced thickness.
Heat flows through the glass surface by conduction and convection by means of air and gas inside the gap, which serve as the carrier fluid. Imposing vacuum condition means to block the passage of energy by convection and only allow the radiation transfer. The vacuum system allows reaching, in low thicknesses of glasses, insulation performance equal to 0.30 W/m2K: it is necessary a minimum thickness of "empty" to be complied with the standard requirements in comparison with the traditional glass unit with gas.
There are many studies about it and the uncertainties due to its limited uses. The hardest study is the research of clear technical specifications, available on the network, but surely the perspectives let the margins of reducing energy consumption understand, with transmittance values conformed with the *passivhaus*.
The glazing evacuated or vacuum is made up of two glass layers of 3 mm spaced of just 0.2 mm (for a 6.5 mm total component thickness), the surfaces composition depends on the producer but a low-emissivity glass and a clear float glass are used from inside towards outside.

The vacuum condition alters the pressure between the transparent panels, where metal- made spacers of 0.5 mm diameter placed every 20 mm along the whole area of the layer are inserted in order to prevent the implosion.
Most producers analyzed for the IGU system propose their own version of the vacuum system, but only some of them have their own patented product; it's still lower the number of products actually available on the market.
It is interesting to notice, however, the tendency of some Italian companies, which have focused heavily on the vacuum sector, launching their preview products in the most famous exhibitions of products for the construction industry, creating a market segment as an immediate response to the supply for the rehabilitation of the historical heritage.

5. The smart changing glasses[5]

If the research and testing company reserve an infinitely large range of chances and combinations of the glazed surfaces performances, as we have seen, the real avant-garde for the transparent skin of the building is the ability to change, adapting itself to different external conditions.
The chromogenic glasses react to the changing conditions of light, heat, charge or electric field, passing from a state of total transparency to a gradual and more or less quick opaqueness.
The variation acts on the light spectrum of the glass component that passes from the transmitter to the reflector or absorber of the light.
There are two types of chromogenic windows: those activated by external conditions such as temperature and light (photo-chromic and thermo-chromic), and those activated by electrical systems (electro-chromic and liquid crystal).
The photo-chromic glasses pass from a state of high transparency (about 80%, 90% of the visible range) to an opaque state (about 10%, 15% of the visible range) with changing of the solar radiation incident on them. The transition takes place in a natural and rather slow way, and these glasses have good chances for durability.
The thermo-chromic glasses are composed of polymers that change their transparency when the surface temperature varies by passing from a condition of good transparency (80 -90% of visible light) to an opacity condition (20% -30%), they set themselves independently, but they might also benefit from the activation of thin resistors within them.
The electro-chromic glasses are composed of five layers within the glasses; the layers serving as conductors and accumulators act on a layer of tungsten oxide or nickel that is activated when the electric field changes. The variation decreases of about a third the percentage of light transmission (from 50-70% to 10-20%). This type of glasses has a specular appearance both in the active phase and in the passive one; it is necessary to charge the electric field only to start the process.
The liquid crystal glasses are the only ones among the chromogenic glasses to be diffusely available on the market, even in large amounts; its working is due to the constant administration of electricity. The system is made up of molecules encapsulated in a polymer, randomly arranged, therefore the effect of the light radiation is the diffusion of a white-opaque glass, the application of the electric charge puts in order the molecules according to the electric field making the surface transparent (the oscillation is between 60-40% and 40-60%).
There are applications of all these types of glasses in different fields of industry, including aviation, but they are still testing their adaptability to applications in architecture, that have not been established yet, both for the uncertainty of their duration and for their prohibitive costs.

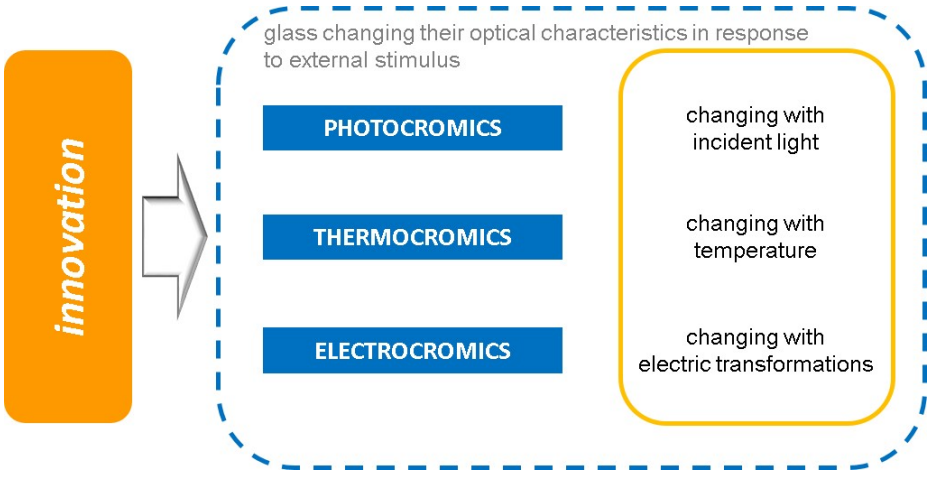

Fig. 8: The avant-garde for the transparent skin

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[1] This section is due to Antonella Violano
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[5] This section is due to Francesca Verde

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APPROACHES TO ENVIRONMENTAL IMPACT ASSESSMENT OF PHYSICAL POLLUTIONS OF TERRITORIES DURING DESIGN AND CONSTRUCTION OF INDUSTRIAL OBJECTS AND ITS REALIZATION IN SAMARA REGION OF RUSSIA

Andrey VASLYEV, Vitaly BUKHONOV, Vladislav VASILYEV
Institute of Chemistry and Engineering Ecology, Togliatti State University, Togliatti, Russian Federation
E-mails avassil62@mail.ru, NIL9@tltsu.ru

Abstract
Impact of physical pollutions (electromagnetic fields, noise, vibration, ionization etc.) may cause significant discomfort and health damage of inhabitants of urban territories and of workers of industrial enterprises as well as of ecological state of territory. Peculiarities of negative influence of different physical pollutions to the man's health and to environment are considered. During design and construction of industrial objects it is necessary to estimate and forecast expected levels of physical pollutions. Approaches to environmental impact assessment of physical pollutions of territories during design and construction of industrial objects are discussed. It is pointed out that during environmental impact assessment it is necessary to undertake a complex of steps: identification of the most intensive sources of physical pollutions, calculations and measurements of physical pollutions propagation to the nearest living territories and of it impact to the workers of industrial enterprises, estimation of results of calculations and measurements, mapping of physical pollutions, development and implementation of measures to reduce negative impact of physical pollutions. Experience of realization of suggested approaches to environmental impact assessment of physical pollutions of territories are discussed on the example of Samara Region of Russia.

Keywords: Physical pollution, assessment, design, construction

1. Introduction
Modern city may be considered as a sophisticate system with increased impact of negative factors to environment. Some of such factors are physical pollutions, especially noise, vibration, infrasound, electromagnetic fields, ionization etc. [2, 4].
Noise level is increasing together with the cities growth. Noise pollution adversely affects the lives of millions of people. Studies have shown that there are direct links between noise and health. More than 60% of population of large cities is living in exceeding noise conditions [1, 3]. Damaging influence of intensive noise to the human's health is not restricted only by impact to ears. It is known, that noise is affecting to the human's central and vegetative nervous systems, influencing to the human's psychological condition etc. Problems related to noise include stress related illnesses, high blood pressure, speech interference, hearing loss, sleep disruption, and lost productivity. Noise Induced Hearing Loss (NIHL) is the most common and often discussed health effect, but research has shown that exposure to constant or high levels of noise can cause countless adverse health affects. The most serious problems are caused by low frequency acoustic impact.
Recently vibration impact to the urban areas (environmental, industrial, domestic) is rapidly growing. It is difficult to find in modern town the place where vibration is completely absent. Vibration in urban areas may cause serious negative problems up to the buildings and construction breakdown and inhabitants decease. Vibration and structural noise may cause decrease the operational characteristic, durability, reliability of different kind of power plant and industrial equipment. Among of the negative sequences are destruction of parts and units of machines and equipment, pipelines, junctions of

aggregates etc. Industrial vibration leads to workers disease, fatigue breakdown of pipeline and apparatus junction, disturbance of sealing airproof, decreasing of machine operating characteristics, etc. It should be noted that the accidents connected with pipelines destruction by vibration are rapidly growing and may cause other negative sequences like fires.

It is possible to subdivide two main types of vibration: free and forced vibration. Free vibration occurs when a mechanical system is set off with an initial input and then allowed to vibrate freely. Examples of this type of vibration are pulling a child back on a swing and then letting go or hitting a tuning fork and letting it ring. The mechanical system will then vibrate at one or more of its "natural frequency" and damp down to zero. Forced vibration is when an alternating force or motion is applied to a mechanical system. Examples of this type of vibration include a shaking washing machine due to an imbalance, transportation vibration (caused by truck engine, springs, road, etc), or the vibration of a building during an earthquake. In forced vibration the frequency of the vibration is the frequency of the force or motion applied, with order of magnitude being dependent on the actual mechanical system.

Noise and vibration sources of environment may be divided on two main groups: separate sources and complex sources. Separate noise and vibration sources are: separate vehicles, electric transformers, holes of ventilation systems, plants of industrial or energetic enterprises etc. Complex noise and vibration sources are transport flows at highways and street roads, train flows at railway, industrial enterprises with complex noise sources, stadiums, sports grounds etc.

Electromagnetic radiation (non-ionizing) is the term generally applied to all forms of electromagnetic radiation whose primary mode of interaction with matter is other than by producing ionization. Therefore non-ionizing radiation (NIR) refers to electromagnetic radiation with wavelengths exceeding 100 nm, equivalent to quantum energies below 12 eV, i.e., encompassing the spectrum which includes all radiation sources whose frequencies are equal to or less than those of the near ultraviolet.

Scientific, medical, industrial and domestic uses of devices producing non-ionizing radiation are rapidly expanding in type and number, leading to a steady increase in the amount of NIR in man's environment and causing concern about potential health hazards to workers and to the general public from uncontrolled or excessive radiation exposure.

Ionizing radiation is either partical radiation or electromagnetic radiation in which an individual particle/photon carries enough energy to ionize an atom or molecule by completely removing an electron from its orbit. If the individual particles do not carry this amount of energy, it is essentially impossible for even a large flood of particles to cause ionization. Examples of ionizing particles are energetic alpha particles, beta particles, and neutrons.

The ability of electromagnetic waves (photons) to ionize an atom or molecule depends on its frequency. Electromagnetic radiation can cause ionization if the energy per photon, or frequency, is high enough, and thus the wavelengh is short enough.

The most dangerous illness caused by the impact of ionizing radiation is cancer: a class of diseases in which a group of cells display *uncontrolled growth* (division beyond the normal limits), *invasion* (intrusion on and destruction of adjacent tissues), and sometimes metastasis (spread to other locations in the body via lymph or blood). These three malignant properties of cancers differentiate them from benigh tumors, which are self-limited, and do not invade or metastasize. Most cancers form a tumor but some, like leukemia, do not. The branch of medicine concerned with the study, diagnosis, treatment, and prevention of cancer is oncology. Mutations are changes in the deoxyribonucleic acid sequence of a cell's genome.

Radon is a colorless, odorless gas that can be found in the soil and rocks beneath homes, in well water, and in building materials. Radon is in the soil because the soil contains naturally occurring uranium that eventually decays to radon gas. Radon can get into our homes from the soil through any cracks or holes in the foundation and from the water supply. The radon concentration allowed in water supplies is highly regulated; therefore, it is the radon in air coming in to your home from the ground that can pose a danger.

Radon is estimated to cause many thousands of deaths each year. That's because when you breathe air containing radon, you can get lung cancer. In fact, the Surgeon General has warned that radon is the second leading cause of lung cancer in the United States today. Only smoking causes more lung cancer deaths.

Thus, the impact of physical pollutions (electromagnetic fields, noise, vibration, ionization etc.) may cause significant discomfort and health damage of inhabitants of urban territories and of workers of industrial enterprises as well as of ecological state of territory.

During design and construction of industrial objects it is necessary to estimate and forecast expected levels of physical pollutions. This paper is devoted to discussion of approaches to environmental impact assessment of physical pollutions of territories during design and construction of industrial objects.

2. Environmental impact assessment as a tool of estimation of pollutions

Environmental Impact Assessment (EIA), is now regarded as one of the principal tools in the estimation of pollutions of environment, including physical pollutions. Overall, EIA should be seen as a practical, anticipatory, decision making tool that allows the likely effects of a project upon the environment to be determined, and indicates the need for appropriate mitigating measures to reduce adverse effects and maximise positive effects.
Typical policy requirements for EIA:
- compliance with regional/national/international planning objectives and priorities;
- the assessment of alternative options that provide the same benefits;
- compliance with the requirements of emerging regulatory authorities;
- the increasingly pronounced definition of environmental protection purposes;
- awareness of the public's growing concern for environmental issues and the associated political and economical implications.

EIA began to emerge as a separate and distinct planning tool, allowing the decision makers to weigh up the potential cost and benefits of particular schemes. The basic principle is that prevention is better than cure.
EIA it is required to be undertaken prior to the project receiving authorisation (from planning authorities) to proceed. The term "project" means the execution of construction works or other interventions in natural surroundings and landscape.
Some types of public and private projects (e.g. large thermal power stations or reactors; installations for the reprocessing of irradiated nuclear fuel; iron and steel works; oil refineries, integrated chemical installations; construction of motorways, railway lines, airports etc.) may cause a significant environmental effect and, therefore, prior to the development of these projects, the developers must submit information about the project and, where appropriate, consult all interested parties for their views on the proposal (including members of the public).
Some projects are exempt from EIA. For example, projects serving national defence purposes are not covered.
For the developers of a project it is necessary to undertake an EIA that will identify, describe and assess the direct and indirect effects of a project on the following factors:
- human beings, fauna and flora;
- soil, water, air, climate and the landscape;
- the interaction between these two groups of factors;
- material assets and cultural heritage.

Developers are also asked to provide any appropriate alternatives and justify the options that have been selected. Consultation must take place with all relevant authorities and members of the public who have an interest in the project proposal. These parties are to be given access to the information outlined above and must be given an opportunity to express an opinion before the proposal is taken beyond the planning stage. Likewise, authorities with relevant information are to make this available to the developers on request.
Protection of the natural resources is also part of the protection of human life. However, there are other socio-cultural aspects which require consideration during a planning process and which are part of a comprehensive environmental impact assessment.
Key steps of the EIA process may be determining as following.
1. Screening – determining whether an EIA is necessary for the particular project.
2. Scoping – determining.
3. Gathering information/data.
4. Predicting and assessing the impact.
5. Preparing the "Environmental Statement".
6. Consultations with some parties throughout the EIA.
7. Synthesising the findings and reaching a decision.
8. Monitoring the impacts of the project.

General EIA principles may be described as following:
1. Timing – the EIA should begin at the earliest possible stage in the planning process, integrating with engineers and economic phases of the project planning.
2. Multi-disciplinary – the EIA will require inputs from a number of experts. These should be identified and briefed at the earliest possible stage.
3. Organization – the EIA must be well managed as it will require the assimilation of inputs from various sources.
4. All findings should be based on documented evidence and supported where possible by hard data open to verification.

The EIA process will often not end with the submission of a report or environmental statement. It is necessary to provide continuous monitoring and reconsideration of issues as the project develops.

3. Environmental impact assessment of physical pollutions of territories during design and construction of industrial objects

Industrial enterprises operational activity leads to the negative impact both to environment and to the health of staff. EIA estimation of physical pollutions not only allows to make a conclusion about industrial object construction/reconstruction, but also may used for taking the required measures for physical pollutions reduction. During environmental impact assessment of physical pollutions it is necessary to undertake a complex of steps: identification of the most intensive sources of physical pollutions, calculations and measurements of physical pollutions propagation to the nearest living territories and of it impact to the workers of industrial enterprises, estimation of results of calculations and measurements, mapping of physical pollutions, development and implementation of measures to reduce negative impact of physical pollutions.

Let us consider some experiences of realization of suggested approaches to environmental impact assessment of physical pollutions of territories are discussed on the example of Samara Region of Russia.

3.1 EIA of noise at industrial site of construction of carbon dioxide production of "Khimteco" Company

The characteristic of noise and vibration are differs for the different branches of industry (e.g. machinery, civil engineering, energetic etc.). During operation of chemical plans it is possible to point out as specific industrial equipment (compressors, chemical aggregates, pumps etc.) as chemical processes (oxidation, ammonia production etc.) as the sources of high level noise and vibration. In order to forecast in time possible negative sequences from noise and vibration impact and to develop the measures for efficient noise and vibration reduction it is necessary to carry out the monitoring.

In order to illustrate the examples of noise ad vibration EIA at industrial cites of chemical production of Russia let us describe noise EIA at industrial cite of construction of carbon dioxide production of "Khimteco" Company.

Carbon dioxide production of "Khimteco" Company it was decided to construct in 2-store building in the Central district of Togliatti city. The nearest living areas are situated at the distance of 2,5 kilometers from the cite. Using SLM "Octave 101AM" more that 15 noise level measurements were provided. Example of presentation of measurements data is shown at the figure 1.

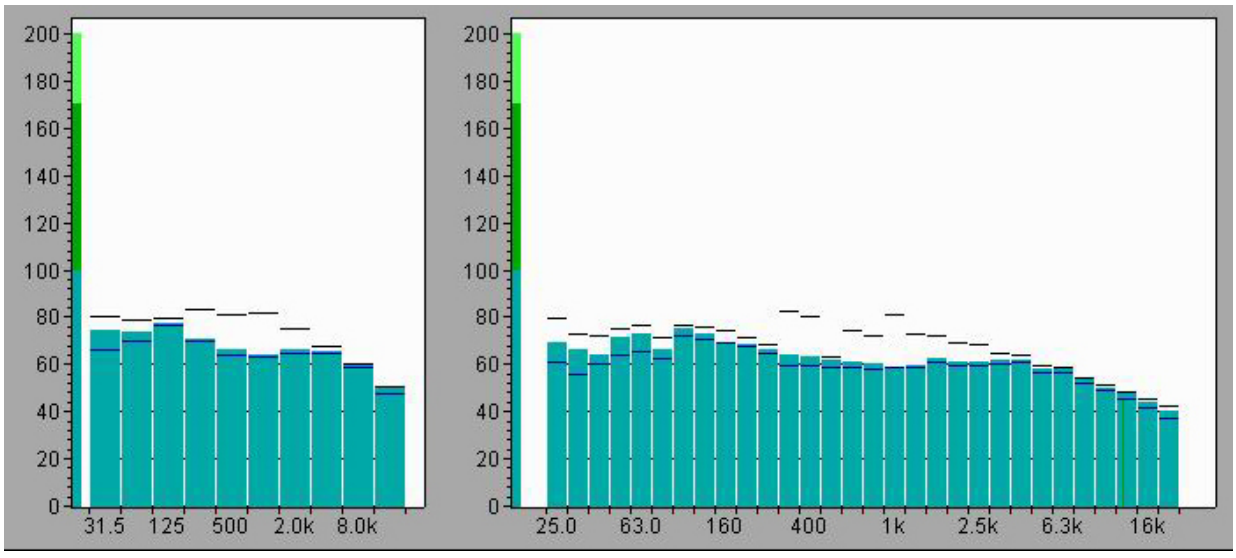

Fig. 1: Diagram of spectral characteristics of sound levels for point 1 of measurements (octave and 1/3 octave bands)

Also control measurements of noise levels at nearest living areas were provided. The results of measurements were estimated according to according to hygiene requirements, stated by valid Sanitary Norms (Sanitary Norms 2.2.4/2.1.8.562-96, Russian State Standards etc.) and Building Norms and Rules [6]. Analysis of measurements results is showing that the most significant equivalent level of sound power is 73 dBA. Calculations of sound levels of industrial cite to the nearest living houses of the Central district of Togliatti city have been provided. Methodic of calculations have been described in [9].

Sound pressure level (dB) of the point source on the distance r (m) in homogeneous medium without the absorption is equal to:

$$L(r) = L_p + 10\lg\Phi - 20\lg r - 10\lg\Omega, \quad (1)$$

where L_p - source sound power level (or sound level), dB (dBA);

Φ - factor of source directivity for the point of observation;

$\Omega = 4\pi$ - full space angle, in which the sound is radiated, $10\lg 4\pi = 11$.

Results of calculations are showing that normative requirements are not exceeded.

3.2 EIA of vibration at industrial cite of construction of energy-efficient production of cyclogeksanon of "Kuibyshevazot" Company

It was decided to construct energy-efficient production of cyclogeksanon of "Kuibyshevazot" Company situated in the Central district of Togliatti city. The nearest living areas are situated at the distance of 2 kilometers from the site. Using SLM "Octave 101AM" more that 20 noise level measurements were provided. The scheme of measurements is shown at the figure 2. Example of presentation of vibration measurements data for the point 9 (direction z) is shown at the figure 3.

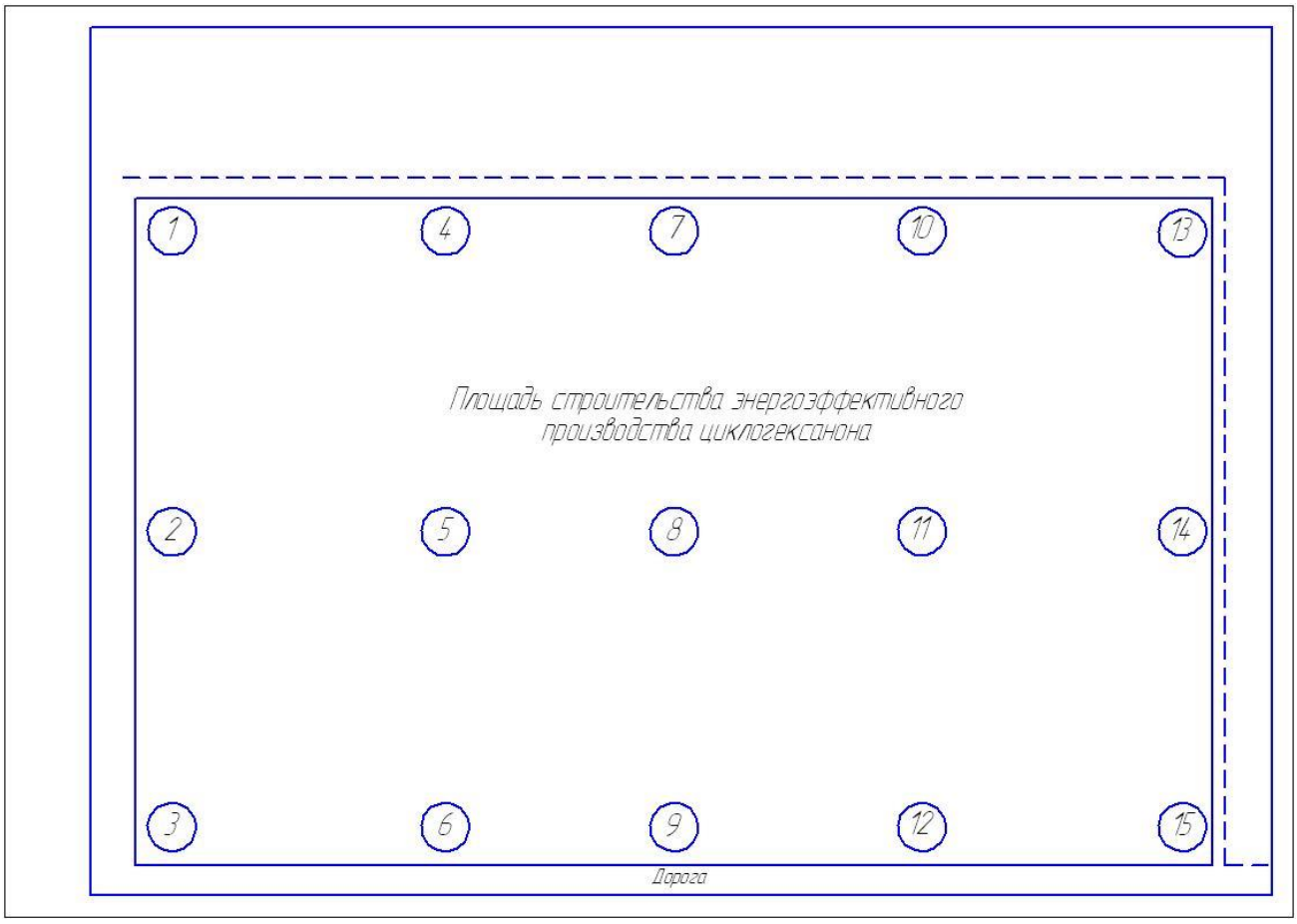

Fig. 2: The scheme of points of vibration measurements at industrial cite of construction of energy-efficient production of "Kuibyshevazot" Company

Analysis of results of measurement of vibration of energy-efficient production of cyclogeksanon of "Kuibyshevazot" Company shows that maximal value of vibration according to equivalent correcting level of vibration acceleration is in point 9 and equal to 92 dB. Analysis of potential sources of vibration generated in the industrial site of construction of energy-efficient production of cyclogeksanon of

"Kuibyshevazot" Company after beginning of exploitation have been carried out by using of technical documentation, studying of used industrial equipment and of kinds of technological processes. Results of analysis are showing that maximal values of vibration according to equivalent correcting level of vibration acceleration will not exceed 95 dB. It means that vibration levels are fitting to Russian sanitary norms rules.

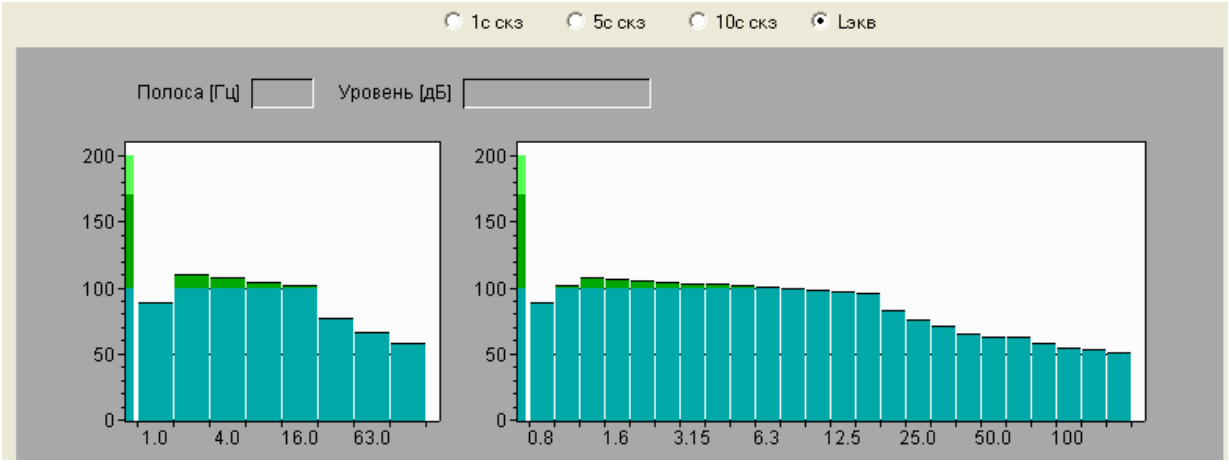

Fig. 3: Diagram of vibration measurement results for point 9 (direction z) at industrial cite of construction of energy-efficient production of "Kuibyshevazot" Company

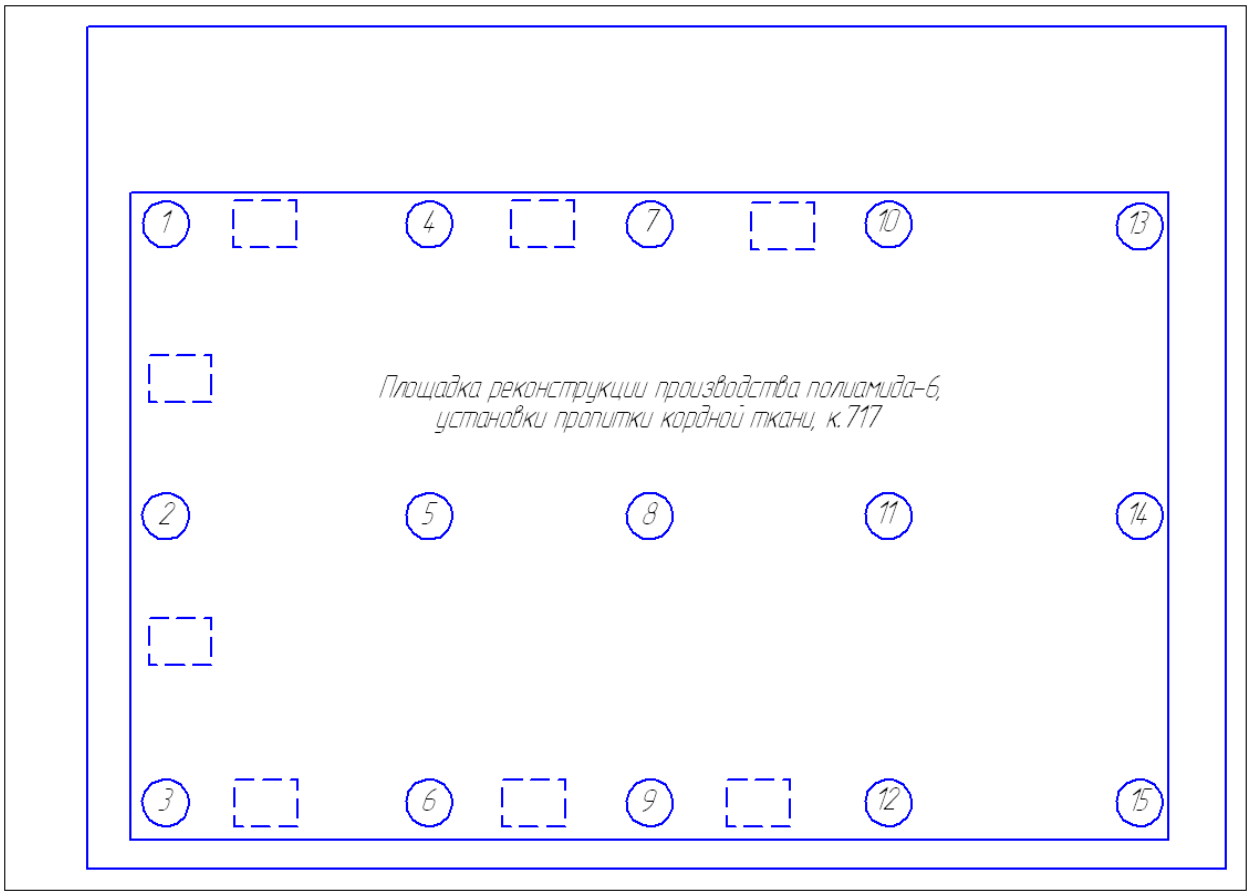

Fig. 4: The scheme of points of vibration measurements at industrial cite of construction of polyamid-6 production of "Kuibyshevazot" Company

3.3 EIA of electromagnetic fields and ionizing radiation at industrial cite of construction of polyamid-6 production of "Kuibyshevazot" Company

It was decided to construct energy-efficient production of polyamid-6 of "Kuibyshevazot" Company situated in the Central district of Togliatti city. The nearest living areas are situated at the distance of 2 kilometers from the site. Using SLM "Octave 101AM" more that 20 noise level measurements were provided. The scheme of measurements is shown at the figure 4.

For estimation of ionizing radiation dosimeter of gamma-radiation DKG-07 D "DROZD" was used. In total 45 measurements of power of ambient equivalent of doze of gamma-radiation and of ambient equivalent of doze of gamma-radiation have been carried out in 15 points. Requirements of radiation safety in Russia are determined by Norms of radiation safety in form of main doze limits, admissible levels of impact of ionized radiation and according to the other requirements for restriction of man's radiation exposure. Efficient doze for population for the all period of life must not exceed 70 mZv, for one year – 1 mZv. Natural ionizing radiation background must not exceed 0,2 mkZv per hour.

Analysis of measurements results of ionizing radiation levels at the site of construction of energy-efficient production of polyamid-6 of "Kuibyshevazot" Company have showed that exceeding of normative values is absent. Maximal level of power of ambient equivalent of doze of gamma-radiation was in points 5 and 14 and not exceeding of usual background values. Potential sources of ionizing radiation generation after starting of production exploitation are also absent.

For estimation of electromagnetic field of industrial frequency range meter of intensity of field of industrial frequency PZ-50 was used. For estimation of electromagnetic field of radio frequency range small-size microprocessor meter of intensity of field IPM-101 was used. In total over 100 measurements of electromagnetic fields of different frequency ranges have been provided. All measurements results are correspond to sanitary requirements.

Example of mapping of electric part of radio frequency range electromagnetic fields measurements at industrial cite of construction of polyamid-6 production of "Kuibyshevazot" Company is shown at the figure 5.

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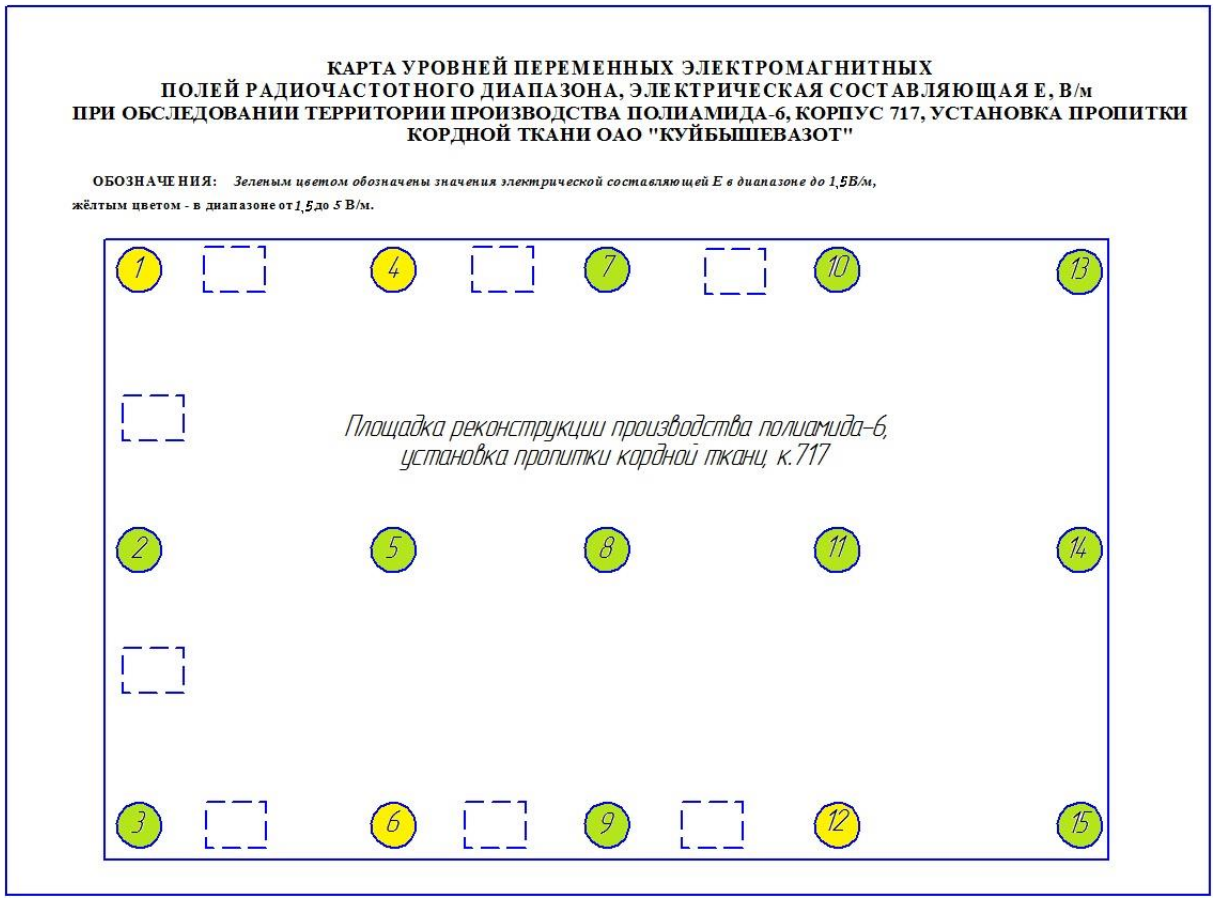

Fig. 5: Mapping of electric part of radio frequency range electromagnetic fields measurements at industrial cite of construction of polyamid-6 production of "Kuibyshevazot" Company

4. Conclusions

It was shown that physical pollutions influence during exploitation of industrial enterprises may cause significant negative impact to the health of population and to environment, therefore in is necessary to carry out environmental impact assessment (EIA).

Methods and results of EIA of physical pollutions at industrial sites of enterprises of Samara region of Russia have been described. Main physical pollutions sources of the industrial enterprises have been considered. Methods and values of some physical pollutions of industrial enterprises estimation are described in the hygiene requirements, stated by valid Sanitary Norms and Russian State Standards.

EIA estimation of physical pollutions not only allows to make a conclusion about industrial object construction/reconstruction, but also may used for taking the required measures for it efficient reduction.

Acknowledgement

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APPROACHES TO CLASSIFICATION AND TO REDUCTION OF NEGATIVE IMPACT OF LUBRICATING COOLING LIQUIDS

Andrey VASLYEV, Pavel MELNIKOV, Vlada ZABOLOTSKIKH
Institute of Chemistry and Engineering Ecology, Togliatti State University, Togliatti, Russian Federation
E-mails avassil62@mail.ru, ecology@tltsu.ru

Abstract
Lubricating cooling liquids are widely used as in industry as for domestic purposes. The problem of it negative influence to the human's health and to environment have become especially important for the last years due to the significant volumes of it and the high toxicity. Results of analysis of negative influence of lubricating cooling liquids to the human's health and to environment are described. Methods of classification of negative impact of lubricating cooling liquids are suggested including it biological, chemical and physical features. Approaches to lubricating cooling liquids negative impact reduction are suggested. The main directions of lubricating cooling liquids reduction are including:
- Using of ecologically safe materials instead of lubricating cooling liquids;
- Treatment without of using of lubricating cooling liquids;
- Treatment with minimal using of lubricating cooling liquids.
It is pointed out that only design and implementation of complex of methods may give efficient results and significant reduction of negative influence of lubricating cooling liquids and to reduce the damage to the environment and to the man's health.

Keywords: Lubricating cooling liquids, classification, reduction

1. Introduction
Lubricating cooling liquids are widely used not only in industry, but also for domestic purposes. The problem of it negative influence to the human's health both in industry and in domestic conditions have become urgent for the last years as due to the significant volumes of it as or the high toxicity.
Mainly lubricating cooling liquids are the mineral oils or the oils with wear-protective additives or it water emulsions consisting of water, mineral oils, emulsifiers, inhibitors of corrosion, bactericides or other dangerous components.
Due to it chemical nature lubricating cooling liquids may cause different negative impact to the humans leading to the damage of cardiovascular and respiratory systems, skin damage, toxicity poisoning and other negative sequences.
According to the results of many researches, all existing marks of lubricating cooling liquids are toxic and having the different degrees of toxicity (from hyper toxicity to middle toxicity). It contains components polluting the environment: oil products, ether extracting particles, fatty acids etc.
That is why it is important to make an analysis of lubricating cooling liquids negative influence to the human's health and to suggest the ways of it reduction.
This paper is devoted to development of approaches to classification and to reduction of negative impact of lubricating cooling liquids.

2. Analysis of negative influence of lubricating cooling liquids to the human's health and to environment
Lubricating cooling liquids (LCL) may cause negative influence to the man as in result of direct contact with skin of man or due to the contact through the special protective clothing and also in result of

penetration of gases, aerosols, condensate of LCL to the human organism through the respiratory system.
Analysis of special features of negative influence of lubricating cooling liquids to the human's health shows that it tends to the growth of professional illnesses of workers of different branches of industry. E.g. in Public Joint Stock Company "AVTOVAZ" it tends to increase the growth of such professional illnesses as bronchitis and eczemas.
Statistics of distribution of illnesses caused by lubricating cooling liquids impact in conditions of Public Joint Stock Company "AVTOVAZ" for men and women (years 2002-2012) is shown in figure 1.
Influence of used lubricating cooling liquids is especially dangerous both for man and for environment.
It is well known influence of lubricating cooling liquids to the man's health in industrial conditions. One of the main sequences of lubricating cooling liquids impact are professional illnesses. Analysis of scientific papers in this field is proving the that aerosols of lubricating cooling liquids may cause pneumonia, cause skin illnesses, damage heart muscles, liver and kidney [1, 5, 7, 9]. Moreover, it is determined that products of thermal destruction of harmless components of lubricating cooling liquids as well as possible chemical formations in zone of treatment are also may cause negative impact to the man's health.
Due to the chemical nature lubricating cooling liquids are causing negative impact to the workers in industrial conditions in result of direct contact with skin and as result of lubricating cooling liquids evaporation. Degree of negative impact is depending to the chemical composition of lubricating cooling liquids; conditions of treatment of metals; conditions of surrounding microclimate.
Influence of lubricating cooling liquids may cause significant negative impact to environment mainly due to the toxic impact. For example, atmosphere pollution by lubricating cooling liquids impact may occur not only in the process of it exploitation, but also due to evaporation and combustion of lubricating oils. Used lubricating cooling liquids may be considered as dangerous toxic wastes, utilization of which is very difficult [3].
It should be noted that even feebly toxic medium may cause significant negative influence on water reservoir biota. Waste waters of industrial enterprises are containing LCL causing toxic impact to water resources. For example, waste water of Public Joint Stock Company "AVTOVAZ" is causing low toxic impact to Kuibyshevsky water reservoir. Therefore it is very necessary to develop efficient methods and means of further minimization of negative impact of toxicity of LCL.

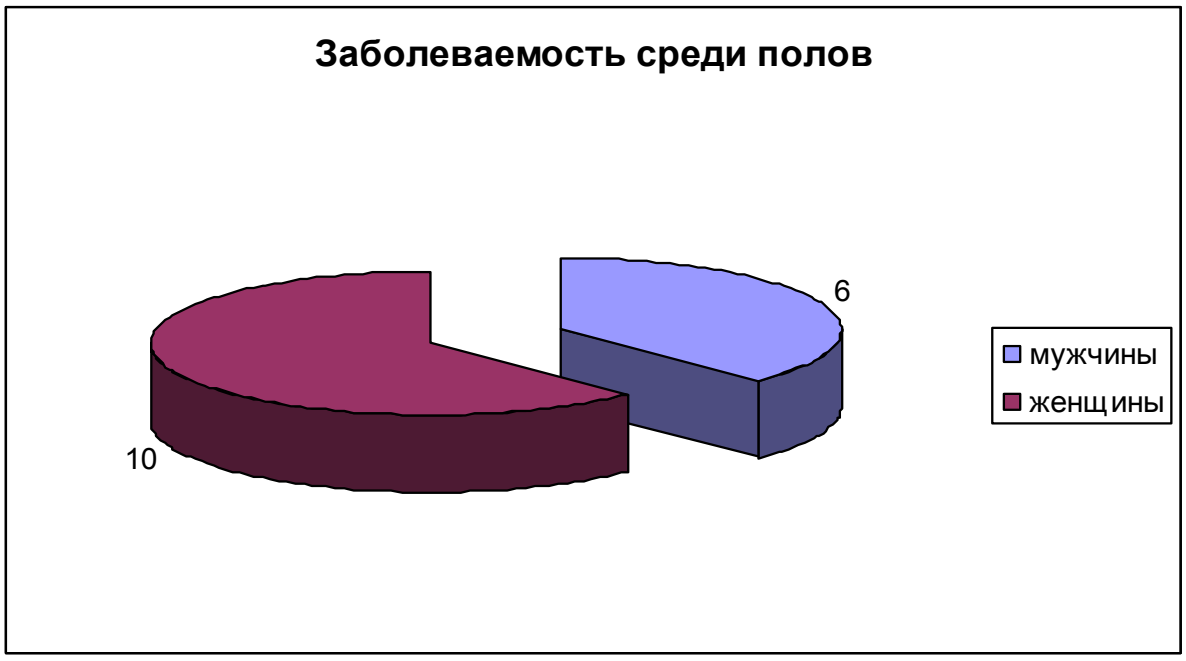

Fig. 1: Illnesses caused by lubricating cooling liquids impact in conditions of Public Joint Stock Company "AVTOVAZ" for men and women (years 2002-2012)

3. Classification of negative influence of lubricating cooling liquids to the human's health and to environment

Environmental control of toxicity is a complex procedure including estimation of sources of toxicity, determination of the most potentially dangerous zones of toxicity of urban territories, selection of

methods for estimation of toxicity, analysis of results of estimation of toxicity, conclusions about the degree of toxicity, and, finally, development and implementation of methods concerning reduction of negative impact of toxicants.
New method for estimation of toxicity has been suggested by the authors of this paper. Characteristic feature of the developed method in comparison with existing methods is complex consideration of the main toxicological values of toxicants (e.g. lubricating cooling liquids) on the basis of its point-rating ranging.
The following toxicological characteristics have been taken into consideration:
- irritating effect on eyes;
- skin-resorptive effect;
- sensitizing effect;
- toxic particles assignable under exploitation of lubricating cooling liquids (number of singled out toxicants and it class of danger);
- toxicity during inside-stomach injection.
In table 1 the scheme of distribution of points during estimation of degree of toxic effect of lubricating cooling liquids on the man and environment is presented.

TABLE I

DISTRIBUTION OF POINTS FOR ESTIMATION OF DEGREE OF EFFECT OF TOXICANTS ON THE MAN AND ENVIRONMENT

Name of indicator of estimation	**Parameter of estimation**	**Points**
Irritating effect on eyes	No effect	0 points
	Weak effect	1 point
	Irritating effect	2 points
Skin-resorptive effect	No effect	0 points
	Weak effect	1 point
	Irritating effect	2 points
Sensitizing effect	No effect	0 points
	Weak effect	1 point
	Irritating effect	2 points
Toxic substances assignable under exploitation of lubricating cooling liquids (for estimation the substance corresponding to the most high class of danger is selected)	I class of danger	4 points
	II class of danger	3 points
	III class of danger	2 points
	IV class of danger	1 point
Toxicity during inside-stomach injection (medium mortal dose (LD50) under injection into the stomach)	LD50 ≤ 5000 mg/kg	2 points
	LD50 > 5000 mg/kg	1 point
	Toxic impact is not determined	0 points

4. Classification of negative influence of lubricating cooling liquids to the human's health and to environment

The general ways of lubricating cooling liquids negative impact reduction are shown in fig. 2. It is suggested to subdivide the ways of lubricating cooling liquids reduction into three main directions:
- Using of ecologically safe materials instead of LCL;
- Treatment without of using of LCL;
- Treatment with minimal using of LCL.
Traditional approach to reduction of negative influence of by lubricating cooling liquids to environment is it utilization. But utilization of used LCL it is not safe and rather expensive.
As an alternative to the expensive and ecologically dangerous process of LCL utilization is investigation and implementation of methods of reduction of using of LCL or the full avoiding of LCL using during technological operations. According to the data of Swiss company «Micron SA Agno», the average cost of lubricating cooling liquids used for one lathe daily is equal to the sum of 50-250 of US dollars. It means that annually company «Micron SA Agno» spends the money for application of

one lathe approximately 12 750 - 63 730 of US dollars. For machines building enterprises the average cost of lubricating cooling liquids used for one lathe is equal to 8000 US dollars annually.
Avoiding of using of lubricating cooling liquids allows to increase also the quality of manufactures parts, for example in work [2] is shown that chemically-active elements of LCL are causing the reduction of endurance and corrosion protection of surfaces of details. It should be noted that the absence of lubricating cooling liquids in zone of treatment allows to use more widely an active control in process of treatment and to eliminate the effect of heat shock on the surface of the instrument.
Avoiding of using of lubricating cooling liquids in the process of treatment force to decide the following main problems:
- Withdrawal of heat from the zone of cutting;
- Reduction of coefficient of friction in the process of treatment;
- Moving off shaving from the zone of treatment.
Analysis of authors is showing that presently technologies of ecologically sound treatment without of lubricating cooling liquids only for 10% of all existing lathe equipment in Russian Federation and in West countries.
The more carefully the questions of treatment without of using of lubricating cooling liquids are investigated in West European countries, and also in USA and in Japan. In these countries different kinds of blade and abrasive processing without of lubricating cooling liquids are investigated: drilling, turning, grinding, glazing.
Review of Russian and foreign literature allows to point out the basis of investigations of dry treatment by using of methods of surface plastic warping and allows to determine the ways of decision of problems arising during the treatment without of lubricating cooling liquids. Such process of treatment is mostly convenient for the primary stage of investigations of processes occurring during the dry treatment because it has no such intensive heat emission and chip forming as cutting or grinding. Thus, the main task is reduction of coefficient of friction between the instrument and procurement.
Implementation of new technology allows to decide the following problems:
1. Reduction of expenses, because of the most of lubricating cooling liquids on the basis of oils are having comparatively small flash temperature.
2. Improvement of labor conditions, because of lubricating cooling liquids components may cause different illnesses.
3. To increase ecological safety of industrial production because of losses during the leakages and of carry-over, emission, flushing water and utilization of waste LCL are polluting soil, water and air.
4. To reduce the expenses for purchase, storage, transportation and utilization of lubricating cooling liquids.
5. To increase the quality of treatment due to expansion of possibilities of using of the means of active control.
It should be noted that monitoring of the state of environment is also efficient way of estimation and of forecasting of changes of the state and of pollution of biosphere or of it separate components under the impact of lubricating cooling liquids. Presently many scientists are carrying out researches for using of different biological indicators as test-objects. In a meantime, estimation of degree of toxicity of lubricating cooling liquids is having certain specific and needs in detailed examination.
Analysis of literature sources shows that during the estimation of toxicity of several objects of biological testing (including also lubricating cooling liquids) the mostly generally studied. It is reasonable to use as a test-objects of green algae Chlorella (*Chlorella vulgaris* Beijer), ПНД Ф 14.1:2:4.10-04, 16.1:2:3:3.7-04, and of crawfishes Daphnia magna Straus, ПНД Ф Т 14.1:2:4.12-06, 16.1:2:3:3.9-06.

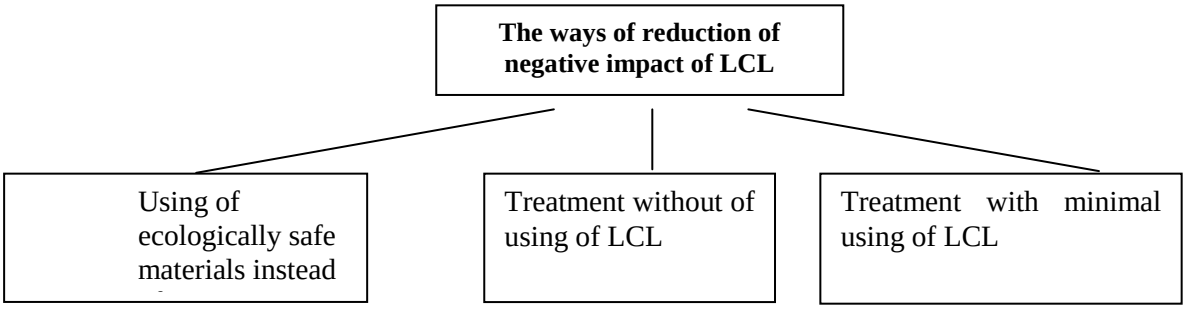

Fig. 2: The main ways of reduction of negative impact of lubricating cooling liquids (LCL)

Above mentioned methods are accredited in Russia. It allows to obtain rather high precision of results

during it using for researches.
Generally, only using of complex of methods may give efficient results of significant reduction of negative influence of lubricating cooling liquids.

5. Conclusions

Lubricating cooling liquids are used in industry in large volumes. Due to the high toxicity ad other negative characteristic lubricating cooling liquids may cause significant negative impact both to the man's health and to environment. Analysis of special features of negative influence of lubricating cooling liquids to the human's health shows that it tends to the growth of professional illnesses of workers of different branches of industry. Statistics of lubricating cooling liquids impact in conditions of Public Joint Stock Company "AVTOVAZ" is described and analyzed.
New method for estimation of toxicity has been suggested. Characteristic feature of the developed method in comparison with existing methods is complex consideration of the main toxicological values of toxicants (e.g. lubricating cooling liquids) on the basis of its point-rating ranging.
The scheme of distribution of points during estimation of degree of toxic effect of lubricating cooling liquids on the man and environment is presented.
The general ways of lubricating cooling liquids negative impact reduction are described. It is suggested to subdivide the ways of lubricating cooling liquids reduction into three main directions: using of ecologically safe materials instead of LCL; treatment without of using of LCL; treatment with minimal using of LCL. It is pointed out that as an alternative to the expensive and ecologically dangerous process of LCL utilization it is reasonable to investigate and implement the methods of reduction of using of LCL or the full avoiding of LCL using during technological operations.
Monitoring of the state of environment is also efficient way of estimation and of forecasting of changes of the state and of pollution of biosphere or of it separate components under the impact of lubricating cooling liquids. Different methods of LCL impact monitoring are discussed.
Generally, only using of complex of methods may give efficient results of significant reduction of negative influence of lubricating cooling liquids.

Acknowledgement

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The iso 50001: a tool of energetic management of architectural public heritage

Monica Cannaviello,[1]
(1) Department of Architecture and Industrial Design "L. Vanvitelli"- Second University of Naples
Aversa (CE), Italy
monica.cannaviello@virgilio.it

Abstract
The energy efficiency of the architectural public heritage is a strategic goal of Europe. This type of buildings should be, in fact, an example for the entire construction industry. In fact, the actions taken by the government about its heritage in order to improve the energy performance is twofold: on the one hand they bring direct benefits in terms of reduced fuel consumption, on the other hand they are demonstrative projects that act as incentives for the construction private sector.
To achieve the expected levels of energy efficiency, it is not sufficient to impose minimum requirements to be met. It 'important to act with the support of voluntary instruments. From this approach, the international standard ISO 50001 - Energy Management System, originates.
Particularly, the ISO 50001 was created with the objective of promoting the development and implementation of policies aimed at improving energy efficiency, and it's applicable to any organization wishes to communicate to the outside world the conformity of its energy policy.
The ISO 50001 is a very useful tool for the public administration that wants to improve its energy performance in a systematic way. The Energy Management System can be considered an effective tool for continuous improvement to manage the energy efficiency of public building, because the buildings are usually the most significant portion of the energy consumption of a public administration.

Keywords: energy efficiency, public heritage, Energy Management System

1. European targets for energy efficiency for public heritage
The energy efficiency of public heritage is a strategic objective at European level. The legislature has clearly spelled out in the Directive 2010/31/EC known as the Energy Performance of Building Directive (EPBD) recast, which replaces the 2002/91/EC, stating that for the buildings occupied by a public authority or at least open to the public, the obligation to be "nearly zero energy" will start with two years ahead of all the other buildings.
This is motivated by the exemplary nature of this type of building, which should take a leading role in the path towards the energy efficiency of the entire construction sector. In fact, the actions taken by government on its assets in order to improve the energy performance are twofold: on the one hand make direct benefits in terms of reduced fuel consumption from fossil fuels and consequently emissions, on the other hand should be aimed at illustrating that act as a stimulus for the private sector.
This intention of the EU to focus on public buildings is also confirmed in the Directive on energy efficiency 2012/27/UE [5] which entered into force December 5, 2012 and must be transposed by 5 June 2014. It amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.
Chapter II is for efficiency in energy use and, in particular art. 5 deepen the "Exemplary role of the public bodies' buildings".
For heated and/or cooled buildings owned and occupied by its central government, with functional areas greater than 500 square meters, the Directive introduces the requirement to renovated each year at least 3% of the total useful floor area, to meet at least the minimum energy performance

requirements that it has set in application of Article 4 of Directive 2010/31/EU. Since July 2015, the renewal will also cover public buildings that have functional areas greater than 250 square meters.
This requirement is very significant and is related to the fact that in Europe the setting of minimum standards, even if severe, only for new buildings and those undergoing substantial restructuring, it is not a sufficient measure to drastically reduce energy consumption. The new building represents a marginal part (just over 1%) compared to the entire building stock. The public heritage, in particular, is mainly composed of old buildings and highly energy-intensive. And the public bodies hardly decide "spontaneously" to renovate its buildings, to improve energy performance requirements.
In this sense, the article 5 of the Directive 2012/27/UE is certainly an interesting addition to improving the energy efficiency of public housing.
The energy efficiency measures should be primarily aimed:
• buildings with "the poorest energy performance "
• where is " cost-effective and technically feasible "
In order to make these assessments it is necessary that the central government has, for each building, an updated energy audit or energy performance certificate within which is located a scale of priorities for redevelopment energy as a function of ' cost-benefit analysis.
Always article 5 provides that, no later than 31 December 2013, Member States shall shall establish and make publicly available an inventory of heated and/or cooled central government buildings with a total useful floor area over 500 m2, which must include , for each building, as well as the covered area also its energy performance or relevant energy data.
Member States should also be encouraged among other public bodies, including at regional and local level, to
• adopt an energy efficiency plan, containing specific energy saving and efficiency objectives and actions,
• put in place an energy management system, including energy audits, as part of the implementation of their plan.

2. The tools: the role of ISO 50001

To achieve the levels of efficiency expected by the European Union to impose minimum requirements to be met, as well as resulted from Directive 2002/91/EC, now replaced by 2010/31/EU, is a necessary, but not sufficient. It is essential to act through voluntary instruments, the application of which is expressly determined by the organization that decides to use them and not from external impositions.
From this assumption flows the international standard ISO 50001 (International Standard for Energy Management) related to Management Systems for Energy.
The ISO 50001, which represents the development of the European standard UNI CEI EN 16001 "Energy Management Systems - Requirements and Guidelines for Use", is part of the voluntary instruments for environmental management, together with ISO 9001 therefore for the management of quality in the processes, and the ISO 14001 certification for the improvement of environmental performance. These types of rules, created initially in the industry, you are then spread to other types of private and especially public.
In particular, the ISO 50001 was created with the aim of promoting the development and implementation of policies aimed at improving energy efficiency, and is applicable to any organization wishes to communicate to the outside world the conformity of its energy policy.
The voluntary approach of the standard involves an active attitude in the definition of the objectives in the implementation of the measures needed to achieve them, and also offers the advantage of each organization to establish from time to time objectives, both in terms of quality and quantity and the relative timing of implementation, depending also on the financial resources available.
The ISO 50001 appears therefore as a very useful tool in the hands of a public administration that wants to improve their energy efficiency systematically. And because the buildings are generally the most significant slice of the energy consumption of an Entity, then, the Energy Management System can be considered an effective means for continuous improvement (in line with the provisions of the Deming cycle: Plan, do, check, act) the energy efficiency of public housing.
First the body which decides to implement an Energy Management System must define its own "energy policy."
It is important to highlight that the ISO 50001, like the other tools of a voluntary, does not define minimum criteria for energy performance, but give how to organize systems and processes aimed at continuous improvement of energy efficiency. The main objectives are to bring economic benefits to organizations resulting from lower energy consumption and benefits to the community, especially in terms of reducing greenhouse gas emissions.
One of the key points of the energy policy is the commitment made by the Organization to comply with applicable laws and regulations. This aspect may seem trivial, but often it is not.

Suffice it to say that the law 192 of 2005 requiring all public buildings to adopt energy performance certificate (ACE), which was to be displayed in a prominent place clearly visible to the public. Well, at a distance of about eight years, many public buildings are in fact accompanied by ACE?
The next step is what is called the Energy Planning. This schedule, which of course must be consistent with the energy policy previously defined, takes its cue from the identification and analysis of energy aspects considered significant. This means understanding what are the processes that use energy and is the basis to identify opportunities to improve energy performance and prioritize interventions to reduce consumption.

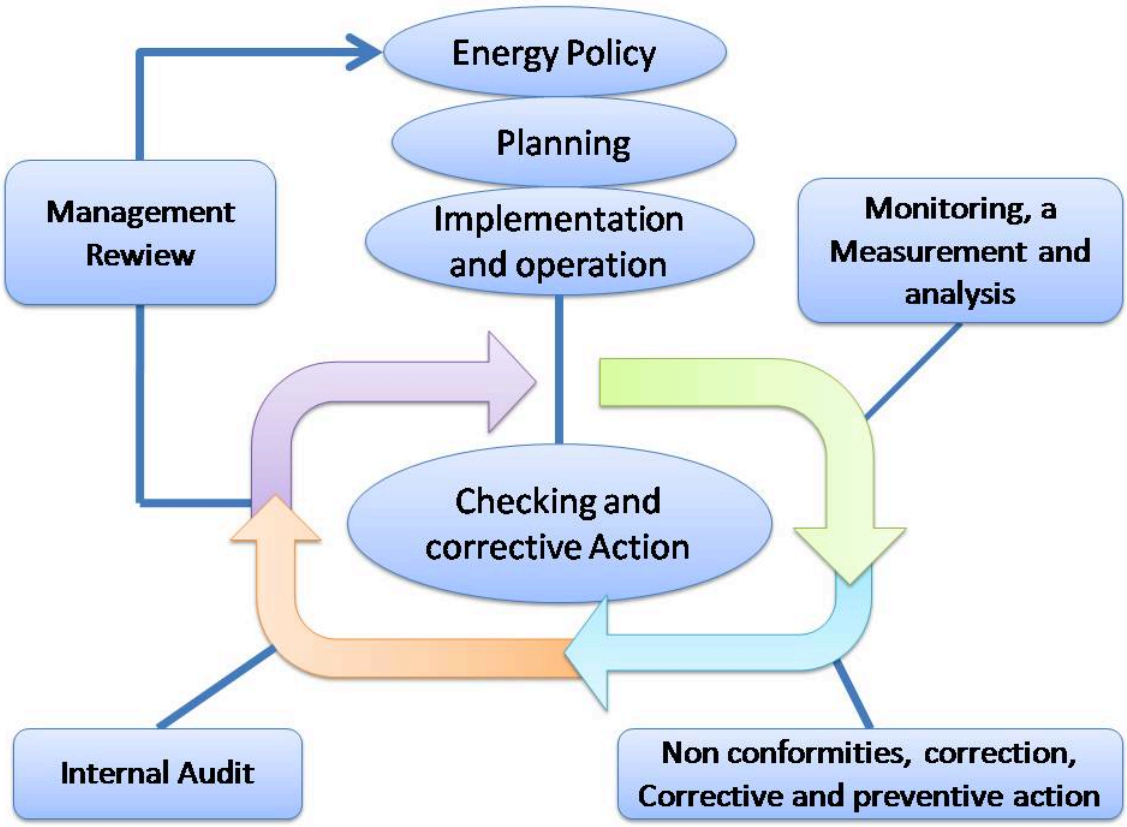

Fig. 1: Scheme of Energy Management Systems

It is considered significant when an energy aspect, in addition to affecting a high proportion of energy consumption can impact on one of the following aspects:
• a more efficient use of energy
• increase the use of renewable energy on site
• a greater exchange of energy with the rest of society
The building heritage is certainly one of the most significant energy aspects of a public body.
The process of energy planning must start from the analysis of energy use and energy consumption of the building, past and present. This allows you to identify areas of significant energy use and consumption within the building. Through the evaluation of fuel consumption and performance you can get help to put in place plans to improve energy efficiency and to define the scale of priorities.
The best tool in this regard is represented by Energy audit.
The D. Lgs. 115/08 defines 'energy audit' a systematic procedure to:
• Provide adequate knowledge of the energy consumption profile of a building or group of buildings, of an asset or industrial facility or public or private services;
• identify and quantify energy saving opportunities in terms of costs and benefits;
• report on the results.
It 'just arise from the audit will require energy and energy objectives, which shall be consistent with the energy policy, both targets, which must be consistent with the objectives.
The audit will arise also the action plan through which the organization intends to achieve its objectives and targets.

3. The professional in charge of the implementation of an Energy Management System

Once identified the Energy Management System as the most appropriate tool to improve the energy efficiency of public housing, it is also necessary to identify the most suitable professional to use this tool.
Start by saying that if a public administration in one year consumes more than 1,000 tons of oil equivalent (TOE), are obliged by law 10/91 the appointment of a consultant for the rational use of energy, called "Energy Manager".
The functions and the profile of this professional are defined inside a circular MICA N219 / F.
The E. M. must be a "professional with functions that support the decision-maker about the best use of energy in the structure of its competence, however, having no responsibility for the effective implementation of actions and interventions proposed, but only in relation to the technical and economic viability opportunities that have been identified "
The ISO 50001 specifies that the top management shall appoint a representative who shall have defined roles, responsibility and authority to ensure that the energy management system is established, implemented and maintained in accordance with the standard. This representative must possess appropriate skills and competencies. The Energy manager represented, until a few years ago, the only figure in a government that had the tasks of management and rationalization of energy use and that it was therefore unable to perform the tasks previously identified.
The liberalization of energy markets and the continuous updating of the energy and environmental measures and financial instruments, have necessitated a new professional, modern and interdisciplinary expert in energy management (EGE). This figure, which associates, technical skills in the field of energy, solid foundation in environmental matters, economic-financial, business management and communication, lends itself very well to the role of head of the Energy Management System under the ISO 50001.

4. Conclusions

As was made clear in the preceding paragraphs, Europe assigns public building energy efficiency a strategic role as early as 2002 with the first EBBD directive. The Directive 2012/27/UE strengthens the exemplary role of such buildings and invites public administrations to adopt Energy Management Systems. The consideration is that which arises from the application of a SGE of a public building can result in considerable benefits in terms of energy efficiency.
The centrality of the role of public buildings in energy efficiency targets has also been reaffirmed in the assembly of the States General of the Green Economy, which was held in Rimini in November 2012. The States-General, promoted by an organizing committee which includes the Italian Minister of the Environment and the main associations of undertakings "green", are intended to steer the Italian economy towards a more sustainable approach. The final acts of the assembly have shown that, by acting with energy efficiency measures on 11,000 offices, 30,000 school buildings and buildings of 70,000 social housing, you can achieve energy savings of 1 to 2020 Mtep, equivalent to 33% reduction in consumption in the buildings considered.
Among the objectives identified by the working group for "energy efficiency and savings" are highlighted those "facilitate energy efficiency in Public Administration" and "to promote energy management systems and training of energy managers and experts in management of energy ".
This confirms the idea that these objectives are strongly correlated, and that ISO 50001 represents a new and powerful tool in the hands of a public administration to improve continuously and systematically, the energy efficiency of their housing stock.

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DESIGN AND HANDCRAFT FOR NEW CREATIVE DIMENSIONS OF INDUSTRY

Marco BORRELLI
Department of Architecture and Industrial Design, Second University of Naples, Aversa, Italy
marco.borrelli@unina2.it

Abstract

The famous definition "***farewell to growth***" by **Serge Latouche** develops new considerations in the scientific debate concentrating on the economic and social issues as well as relating to the purpose of design in standardized production which is concerning the global economic crisis identifying the new millennium in a negative direction. Research focused on the furniture product's theme tries to recover the creative value, expressed more effectively through the productive dimension of the prototype, and encourages the development of **new methods** of production standing between **handicraft and industrial** production.

The actual economic crisis is weakening the great standardized industrial production and the growth of small and medium enterprises is considered as the "***innovative company***" which is getting its strength from the peculiarities of the local areas such as more material resources, human and identity, as well as a greater appreciation of the local handcraft traditions.

Therefore, supposing a process and technique's review proposed by the industrial production model, in order to recover the local identity for the processes and products regeneration, it will be better to use an alternative model of technological and industrial development through the promotion and rediscovery of sustainable handcrafted processes and eco-friendly products strictly linked to the cultural and territorial values.

Finally, the aim is the revaluation of a creative figure expressed through traditional handicraft methods (makers) capable of enhancing the size of the test through the prototype of a designed project idea.

Keywords: Handcraft Design, Slow Factory, Innovative Company, Soft Technology, Self-production

1. From the artisans' knowledge to the knowledge of the project designer: contamination of the creative process to improve production competitiveness.

The opportunity to participate in the convention entitled "Design, technology and craftsmanship: prospect and trends" promoted as the Report of the outcomes of the Furniture Fair of Milano 2013, held during the event Campania Design week, has prompted me to collect part of the scientific research work around the theme of the virtuous relationships that exist between design, productive technology and creative process, framed in the current time of economic social and ethical crisis. The scientific research, in the schools where it deepens the **culture** of the project design, to keep pace with the times, has to deal with a situation of uncertain productivity since the models of economic and industrial development are slowing down and primarily for the delivery of a new philosophy of

consumption focusing on a more fuel efficient lifestyle, that is more careful and therefore more sustainable.
Starting from the famous definition of "**peaceful decrease**"[1] of Serge Latouche numerous considerations and guidelines have been developed, in the social and economic field, that in my opinion, discusses the role of **design** in **standardized production**.

1.1 Social-economic scenery

The social-economic development of these recent years continues to be based on an economic weakness that has slowed the markets by reducing employment and production capacity of enterprises to such an extent so as to create a process of **recession** that is no longer manageable. The production slowdown that results can be considered a consequence of a series of "**excesses",** accumulated during the last decades of the last century, the result of a capitalist system inherited and imposed, and also considered as the results of the model that today is now promoted and adopted from the **knowledge** of economy and that result too formalized, too encompassing and too global. Leveraging on a form of economy linked to knowledge, replicability of the knowledge and the use of the product, in the field of the **design**, it has favourite an excessive of generative capacity that cannot find more grip and acceptance in the market, and the new life philosophy suggested by those currents of thought emerging that are based on the concept of **peaceful decrease.**

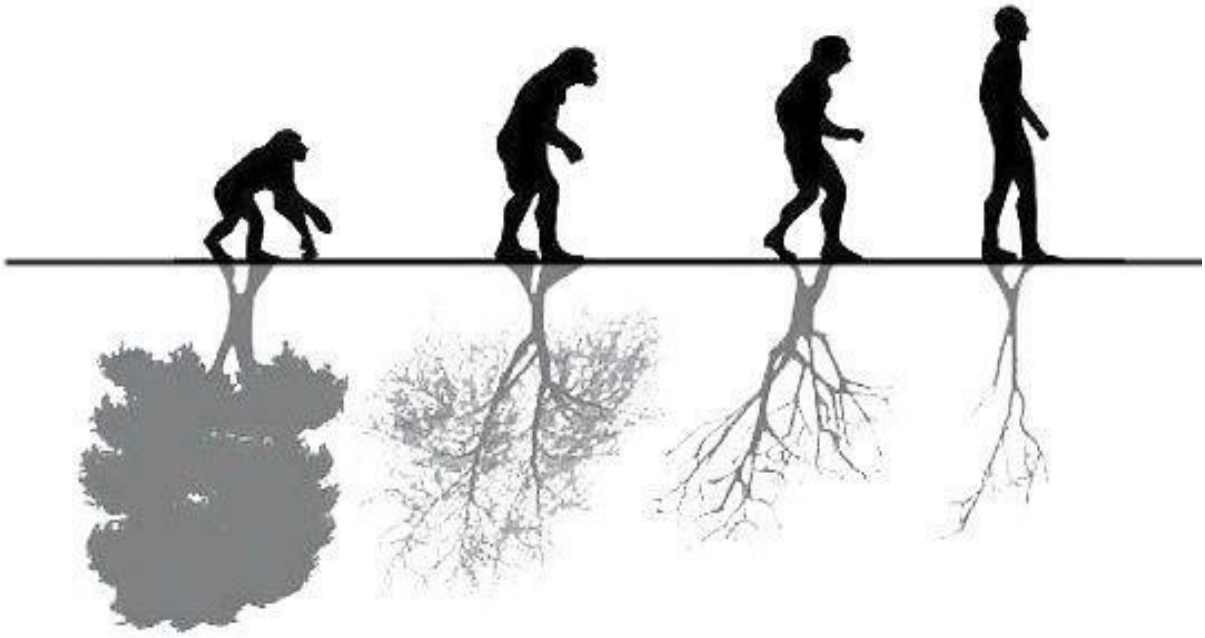

Fig.1 Presentation picture of the evolution of man that favours natural evolution

According to this "thinking", the world is full of objects and design, aware of this new trend devoted to the control of resources and the consequential reduction of waste, has to be prepared to **respond** to new lifestyles, and consequential new styles of **consuming**, no longer through the *invasion* of the market with **unnecessary** products, how has been done and continues to be done, but mainly proposing **solutions** that are designed to spread a culture richer in the content of a promoted and responsible production, paying attention to sustainability and recovery, that moves away from the devastating ideology of **disposable**[2].

1.2 The soft factory

What follows, analyzing the emerging theories of this *new vision*, is the possibility of adopting **alternative** types of economic-productive, even more closer and closer to the **slow model** (and an initial reference of this thought can be certainly be considered the *Slow movement*[3] in particular with *Slow Food*, long been a well established on the market, in the specific field of agro-industrial , born as an alternative to the illness of frenetic consumerism of the poorly health of the fast generation.) This

new state of *conscious of economic slowdown* is progressively leading to a new trend in which the size of the deal with the **slowness** is an **advantage** rather than a defect to contain and suppress, contrasting sharply with the standards imposed by the speed and progress induced by the Second Industrial Revolution and the processing in steps promoted by the taylorist assembly line. Even current economic models consider fundamental paradigms between them the value of slowness that coincides with the profound quality, with attention to the details, in contravention of the customary law in contrast to the scheme of the "cage imposed by the scientific management"[4] around which, for decades the success of the market has been established.
In such a ferment, slowness takes the lead new proposal and *new needs*, to which only a **manufacturing process** that follows new and different dynamics more sensitive, slower, more attentive to the creative dimension, typical of the culture of the current design, can be significantly characterized new habits of consumption.
The anticipated growth planned for the first quarter of the 2014[5]-showed desire for new needs, to **dare**, as a response of the economic downfall, through the increase of the activism in the seeking employment, even more to create it. This **trend** is due, in part, to the positive results derived from the enterprises that have adopted different strategic guidelines and, in a sense, in a new **trustworth**y man crafting that has revived to an interest to production and to do business through the rediscovery of the value of the **talent** of craftsmanship.

1.3The Innovation through "Future Craftsman"
The Desire to Dare, feature phase youth of the life of every human being, seems to be the right road **inventing** a job and an employment in fact, we might say, inventing the *project company*. If the business and production appear too static to the point of not hiring and promoting the contribution of young minds active and creative able to promote the new, but considering expected but strangely still a success productive current economic model, in fact it happens that always more of the young creative are rejected by this productive system, they strive to self-style "do it yourself" *Anglo-Saxon* manner, through new forms of Entrepreneurial Development known as the term **start-up**[6]. Perhaps, in coincidence with the view expressed by Stefano Micelli in the Future Craftsman[7], "... the work is not to be sought, intead it's created…"[8] many young people get activated in various parts of Italy (in this case there is no distinction between north and south, we are all united under the ideology of "roll up our sleeves"), driven by a new spirit loaded of life energy and, encouraged by the possibility of access to a series of differentiating announcements and funding, they are organized to share and spread orient the future Working towards new opportunities that reward **creativity**. A classical example of post visible in the web come to witness a race of ideas organized by Ninja Marketing Napoli[10] where are activated new forms of viral communication focused on the promotion **innovation and technology** among youth and between young people spreaded through a new model and a little 'provocative *guerrilla marketing*[11].
So its born a new way of thinking at work, a new idea of doing enterprise. This spirit adventurer characterized the passion of "doing" is also the road which should tend more towards the world of entrepreneurship and industrial too still and anchored in the habit of their partner, that manipulate to its liking, instead favouring a greater specialization and a greater **new figures** qualification of operators (designer), talented of very good ideas, good capacity management and great practical sense. The traditional relationship between industry and distribution (including Also the GDO) has lost value because through new tools for communication and dissemination of the web, it has introduced new logics, new tools and new approaches that open up completely new markets overturning the old rules.

1.4 The rebirth through new forms of contamination
The main objective consists in relying on **talent** and **creativity** that feeds of the effervescence of the youth, in order to improve the integration between phase ideational and realization phase, that result more able to make a more efficient production system because it improves the competitiveness of its products in the current market through the provision of Shared Values (Sharing the Retails that shared distribution tied to concepts economy hybrid[12]) and widely supported by new systems appreciation widespread In the culture of the Web and in the dynamics of distribution linked to the short chain[13].
The **rebirth of productive companies** and diversified industrial sectors from different scales can occur, however, only through a greater focus to offer these new dynamics of sharing of the project and

product **laboratories experiencing new production free, alternative and creative** (**Fab**rication **Lab**oratories) that the world and the market seems to be ready to welcome today more favourably, so perhaps new tools Intangible promotes the internationalization because global joins the size that a local (glo-cal[14]) by way of information and the sharing expressed through virtual communities that creates a new trading system that in the past struggled to institutionalize small Creative Workshop. Greater propensity for research and investment for the development and adoption of new technologies experimental places produced in places where some of the young people and creativity, in the places of the knowledge of diffusion , culture of the university is a new form of dialogue capable of build connecting bridge between reality industrial inclined only at the cost-benefit ratio and the creative world that have gotten back in a solitary dimension in a domestic artesian laboratory and in the threading of small reality chain of small business continuously enriched the knowledge in gated community in creative territories.
The current disconnect between production and creation must mend the breach that has been created in the last years of the twentieth century favouring a synthesis between the two worlds that for too long have opposed statically and that today the market wants to encourage a convergent contamination of knowledge and skills not disjoint more's techniques and processes product processing. Perhaps the recognition of the dominance of large retail of manufacturing industry has authorized the subversion of old relations of production and economic rules that for almost a century had powered a system that then has degenerated into a mechanism that has diminished the creative contribution of 'man and that advantages too automated production and everything suffocates. The economic and social crisis has place more clearly the limits of this system making it necessary to revise the Taylorist model, intercepting, through the help of new process technology also accessible to those who are not a part of this system, a new attitude simultaneous complicity, and an instinctive traits, of doing, thinking and producing.

1.5 Emerging figures and new protagonists

There are many signs of this new trend as there are numerous occasions where the **new protagonists** of doing business make progress: the *Crafters*, namely the category of highly skilled craftsmen who, starting from their own vocation, expand it, *contaminating it* with new digital technologies thus characterizing the emergence of a new category of creative talent, the *Makers*.
These digital cousins, while being capable of producing artefacts, even if only in some specific sectors, integrate operational expertise to current technologies and digital tools through the new 3D printers, with the result of combining the immaterial stage of the creative process to the immediate implementation of a prototype, also starting from a simple mock-up[15], until completion of the construction phase of the production process. It is therefore evident that the *makers*, compared to the *crafters*, represent the *advanced stage* of **doing craftsmanship**, with the doing not only taking advantage of *technique* but also on the basis of the *designer's own creative process*.



Fig.2 The thinking hands of a craftsman who designs and produces as if a self-producing designer

It is difficult to count the number of events, fairs and exhibitions of objects, furniture and garments that fall into the category of self-production, due to the trend of the design, now more than ever, using new forms of promotion and communication that have been altered by modifying the relationships in the supply chain of manufacturing and distribution.
The *originality* which launches the makers' product onto the market in a more competitive form is the digital control of the production process (**Digital Fab Lab**) carried out with self-production using **3D printers**[16]. This novelty should encourage the creation of many small personal factories with by "digital artisans" replacing mass production. Innovation is the ability to self-promote themselves using the new tools of the trade as well as new virtual sales platforms, thus reversing the rules of distribution of industrial mass product. Even **eBay** has been surpassed, with new types of networks such as **Etsy** or **Blooming**[17] becoming more and more popular as well as more effective and efficient in the sharing of values and content consistent with commercial products.
What has been lost in the field of design research and product design, even in schools of architecture, is the intrinsic value expressed in the drafting process of the project, where the material culture plays a central role along with the higher dimension of **creative doing**. For too long, the industry has orchestrated at will the culture of product design, deceiving the market through the promotion of miraculous outcomes and innovators, mixing the primary stakeholders and actors, without obtaining any high value results in terms of originality, authenticity and expression of individuality. At present, the reasons that have led to a different production culture through creative doing by exploiting the ability of the individual operator who produces the product is triggered by the market availability of new tools with numerical control and new technologies that allow for prototyping experimentation in the field of three-dimensional project moving from a virtual dimension (three-dimensional modeling and photo-rendering) to the actual size.
This particular **stage of the production phase** should not be neglected or stifled by the industry that is used to suppressing the creative dimension of industrial product design subject to its liking, thus attributing to an object that belongs to the disposable sphere very little character, memory, personality considered as the relationship between man, the territory and his roots. The limits of the industrial world are in the distribution of **strong** objects, durable and resistant, but **weak** as they are unable to preserve memories of being objects of memory and therefore leave only the value that is now considered negative that is the increase in waste. The cultural shift is indicated in the self-production as a stage of doing that is capable of restoring the right time and right values to the product that physically materializes in the making. Finally, arriving at the season of self-production, where the brightest innovators will be those who will combine new "products" to new "visions" without being affected by the conditioning of the manufacturing industry.

1.6 Self-production in the production process

Self-production, therefore, becomes one of the most current forms of innovation and **renewal** of both the production and socio-economic systems, resulting in a possible creative alternative to the situation of production stagnation and involution that is characterizing this period of crisis.
It is the **revolt of doing**, the revolt of *"thinking hands"*[18], the sincere and genuine collaboration between who has ideas and who creates without any intermediary. The craftsman who governs the processes of digital automation completes his personal profile and frees himself in the world of production and distribution.
It is in this **renewal**, in this socio-economic revival of *"Renaissance style"*[19], in which the innovation of the new society of the future is played, i.e. the reality that is increasingly being called by many the **2.0 society**. In addition to the talented creative dimension, a new concept of **design** plays an extraordinarily important role, intended as a system of government of the project that creates a more balanced form of synthesis between the idea and the product both as a product as well as an artefact, i.e., with the ability to activate extemporaneous processes, almost *maieutic* in close connection with the subject and the object-product without abandoning the expectations of man.
However, is it really true that the industry, by far, does not accept a possible compromise? In the culture of production, there is no will **to risk**, thus favouring some creative and experimental spontaneous initiatives, also probably because the culture that precedes us, and perhaps still be with us for a long time, is based on an ideology of profit, of mere commercial success of the single market product of taste and trend, without, however, listening to the real needs of the market, without

understanding the value of resources and without understanding the involutions which are bending the production system.
It is worth recalling that, in the culture of the project, a major role was played by the educational dimension and popularization of the project in order to educate the thinking, feeling, and the user's taste and allow for a better understanding of the conceptual effort that results in, in concrete form, in the product.
Self-production must be interpreted in the right way, without falling into easy mode, without luring the user into hasty decisions, due to this moment of the production phase without question, helps in the verification after the implementation phase of the project because, through the control of the material and the feasibility of the combination of material-production system, it brings additional value to the product as it allows for the expression of personality and feel of the self-producing designer, a feature now almost completely lost in what is the serial and automation of processes.

1.7 Conclusions

The ***new season*** should, therefore, be based on a new "awareness", centred on an evolution of the relationship between man and object, where *doing* provides new visions and perspectives. The craft dimension yesterday, as well as the self-production today, may be the verification phase of the project fostering improved cooperation with the industry as it must be considered as its next bet in enhancing the act of creation meant by "giving shape to things".



Fig.4 Concept Map realized in the Thesis in Fashion Design by Maria Antonia Salomè (student of Department of Architecture and Industrial design "*Luigi Vanvitelli*" SUN)

The figure of the self-producing designer has tremendous benefits when placed in the context of the industry, especially through forms of mutual support in creative workshops that test solutions and proposals enabling a principle of research and innovation, as an essential requirement of the product of "design of the technological artefact" that promotes an innovative technology (*calm*) as a "non-hyper presentational and not ostentatious"[20].
Creative man, which at the same time designing and producing, assumes a central position in the man-object process allowing for a renewal process through a different use of technology due to the **integration** of *knowledge* and *skills*, those *values* that the industrial production system has, for too long, set aside. These values result in a *new figure* who through his own experiences brings with him the *artisan skill* and *design knowledge*, mixing them with current production processes giving the hybrid figure of artidesigner or "third kind with its own characteristics and purpose" [21].
The artidesigner actives, through his knowledge and skills, personal relationships with the material, with the project-object, which becomes part of himself, of his being and his work and that, through his hands, turns into a part of the world, taking on its own identity. To paraphrase the message of the tale of Pinocchio by Collodi, the artisan can be symbolically identified in the person of Mastro Geppetto, persuaded by his manual dexterity, he decides to transform the material of wood into the figure of an

icon that in the inner imagination of a man that completes his path of life enriching it with emotions and values.
At the same time, however, the object does not have its own identity, except for that of the wood, in this case the wood, with the intervention of the creativity of the designer being necessary, who with his "magic" contribution of technical knowledge of materials, "gives new life" to the material allowing the just finished artefact to join a "community", as the guardian of "memories" as well as virtuous model loaded with emotions.
In our socio-economic-productive context, the designer craftsman (artidesigner) becomes the **interpreter** of the change, the only person able to develop *new visions* in which design is a *mediator* to integrate the knowledge as well as trace out new routes of innovation that can follow social change and become productive as well as a promoter capable of directing society towards more sustainable and balanced new heights.
This consideration, based on the right balance between new digital technologies and crafts, introduces us to the combined use of new technologies, combined with skilful craftsmanship, allowing for new **testing** of the product-project that can be realized through the integration of craft figures in the production processes, changing the traditional rule of the production-creative process of technological culture of the industrial project. In many cases, they currently have invaded the world of design, with the experimentation being only ideological and stops the recovery and reuse of parts or small pieces of discarded objects into neglected disuse. However, the real contribution that innovative technology of energy saving, and not only, could be implemented to promote the right balance between best craftsmanship and design.
During this time of stagnation and **slowness**, the time and manner, always "slow" of the craftsman allows entrepreneurship, especially in the part that is careful and **sensitive** to the problems and, above all, interested in resolving them in the best ways to acquire **new potential**s, represented by the rediscovery of knowledge that has always meant, in the material culture, the symbol of a production process as well as a series of processes and techniques of quality but also, and above all, values that are related to both the territory and cultural heritage of that particular local context. Promoting the potential of being able to make their own crafts products leads to recovering and preserving the historical memory of a place and its community, protecting what represents the **cultural heritage** of that place, enhancing the territory thus allowing for the creation of new opportunities enabling the gradual advancement of innovation.
Applying this thinking to business practices, implies placing on the market products that are able to transmit to user the flavour (the sensory experience?) and **emotion** that has lived in that place, creating a chain of memories that can hardly become part of the current process, that process is exhausting and closed in the disposable life cycle.
Despite the "good intentions" which refer to the recovery of cultural values, to territoriality and sustainability, this "doing" of the new creatives brings a limit that may not be less attentive to the showing due to the experimentation of self-producing, in its nature of fairly recent trend may not always be an in-depth study and a mere research on what may be the most appropriate materials and technologies to innovate the product and its production process. There is the risk, without realizing it, of creating a fleeting and falsely virtuous trend, unable to generate a real stage of advancement of the processes, with it being too careful to only certain dynamics of charm and emotion. The limits of self-produced objects is in the weakness to innovate due to the prevailing of the value of charm and emotion prevailing, thus excluding the contribution of technology and innovation. For example, many lamps built with scrapped pieces or elements neglect the contribution of the technical components in terms of sustainability, or the lack of an accurate verification in terms of technical performance of the individual elements as for the entire system.

Bibliographical References

1 **Serge Latouche** states: "The decrease is a virtuous circle that is divided into eight goals, in a process that we can call the eight "R". The first two of which are certainly "Reassess" and "reconceptualize" and this involves a reversal of the way of thinking and apprehending reality. You need to decolonize the imaginary values of society's growth, which are competition, the appropriation and commodification of the environment, speed, and find a way to live in harmony with nature, recovering the sense of limit. This leads obviously to changing the relations of

production: then “Restore” or adapt, as a function of changing values, the economic and productive structures, consumption patterns, social relationships, lifestyles. Changing the relations of distribution, then “Redistribute” fighting inequalities, ensuring that all the inhabitants of the planet have access to resources, access to natural resources, ensuring a satisfactory job and decent living conditions for all. You must then “relocalize” or consume local products, thereby supporting the local economy. Any decision of an economic nature should be taken locally, for local needs. “Reducing” the carbon footprint, waste, work schedules, drug addiction by fashion. “Reuse” overcoming obsession, functional to the consumer society, the continuous tension to the new, “Recycle”, recovering all the waste are not decomposable arising from our activities. From “The challenge of decline. Interview with Serge Latouche” on the website Mani nella Terra: http://www.maninellaterra.org/2012/11/la-sfida-della-decrescita-intervista-serge-latouche.html

2 The adjective disposable refers to an object designed to use a single or very limited in time, in that case it is even more appropriate to use the term disposable. The term implies a disposable meaning of affordability and utility in the short term, sometimes in a derogatory sense and/or metaphorical, as opposed to the higher economic value and long-term durability of the products shall not disposable. (From Wikipedia http://it.wikipedia.org/wiki/Usa_e_getta). It is worth mentioning the existence of a book by Latouche, *Usa e getta. Le follie dell'obsolescenza programmata, Ed. Bollati Boringhieri, 2013, in* which the philosopher demonstrates the phenomenon now an integral part of society’s growth and is referred to as “planned obsolescence” or scheduled also mentioned by Catherine Soft in the article *Usa e getta: l’arma letale del consumismo* published on the website Fatto Quotidiano:
http://www.ilfattoquotidiano.it/2013/03/07/usa-e-getta-larma-letale-del-consumismo/523309/

3 “The recession is the best time to escape from the vicious circle of speed that has taken over our lives" is one of the slogans promoted by the founders of the **Slow Movement** as reported in the article THE SLOW MOVEMENT'. DRiPs INTO THE SLOW REVOLUTION ALL AREAS OF LIFE in this blog NoviNow at http://www.novinow.net/2009/05/18/the-slow-movement/. The philosophy of the Slow Movement was founded in 1986 with the Slow Food movement through an act of protest by Carlo Petrini which manifested itself against the opening of a McDonald's restaurant in Rome (Piazza di Spagna). Since then, life has taken a new philosophy (which Carl Honore defines as “Slow Philosophy”) that has found its way in different cultural areas embracing the style and ways of living (Slow Living), a new way of traveling (Slow Travel) urban living (Slow City) and design (Slow Design). (Source: Wikipedia at http://en.wikipedia.org/wiki/Slow_Movement)

4 cfr. GOBBI Linda, Dal riconoscimento della maestria verso l’economia civile, in *L’impresa del talento*, a cura di GOBBI Linda, LANZONE Giovanni e MORACE Francesco, pag. 30, Nomos Edizioni, Busto Arsizio, 2012

5 cfr. Scenari economici n. 15 settembre 2012 e Scenari Economici n. 16 dicembre 2012 di Confindustria; Rapporto sulle tendenze produttive della Banca d'Italia 2012

6 The term **start-up** is intended to indicate the period of start-up and development of an enterprise. During this phase you start different practices, from the acquisition of technical resources to the definition of internal hierarchies and research personnel. At this stage, the company may choose to list on the market by placing securities to facilitate the raising of funds to start production processes (from Wikipedia, http://it.wikipedia.org/wiki/Startup_(economia)). In Italy, the starts-up are mentioned as an innovative company in the law n. 221/2012 Decree Law also called **Growth 2.0** with which the State has adopted legislation for the development and growth of the country. In particular, Section IX is devoted to new types of business such as a start-up innovative or "a corporation incorporated under Italian law, established in the form of a cooperative, or a European company, established for tax purposes in Italy that answers to certain questions and whose objects are exclusively or mainly to the development, production and marketing of innovative products and services with high technological value. " (from Startup. Registro imprese: http://startup.registroimprese.it/#)

7 cfr. MICELLI Stefano, *Il Futuro Artigiano. L’innovazione nelle mani degli italiani,* I grilli, Marsilio Editore, 20112011

8 cfr. CATANIA Gabriele, “Il futuro è l’artigianato: il lavoro non si cerca, si crea”, articolo/intervista a Stefano Micelli, Linkiesta, 26 gennaio 2012, pubblicata all’indirizzo http://www.linkiesta.it/artigiani-italia

9 “Italy will be the first European country to have a law on crowdfunding. Consob has in fact just published the consultation document on the new regulation, as provided by the "Decree growth bis" (Decree 179 of 18 October 2012), which aims to facilitate access to public savings by startups via online portals”: it is the equity crowdfunding. Unlike the “classic” version of crowdfunding, which provides funding for individual projects (concerts, records, films, documentaries), instead equity crowdfunding aims to support the emergence of new

companies, or the expansion of existing ones. The legislature took into account only the innovative startups. *Crowdfunding, arriva il regolamento Consob. Finanziamenti diretti per le startup innovative,* articolo di Rosaria Amato pubblicato in La Repubblica e all'indirizzo web http://www.repubblica.it/rubriche/startup-stories/2013/03/31/news/crowdfunding_consob-55715390/.
In addition to the funding provided innovative companies, each region has issued the calls for the creation of business incubators and financing of new enterprises which may take place through the form of venture capital (the contribution of venture capital by an investor to finance the start-up or growth of activity in sectors with high growth potential. Often the same name is given to funds specifically created while the subjects which carry out these operations are called *venture capitalists*).
http://www.fasi.biz/it/news/approfondimenti/5029-tutti-i-finanziamenti-per-avviare-una-start-up-venture-capital-banche-incubatori.html

10 On October 2012, 12 and 13 , *The battle of ideas* organized by **Ninja Marketing** in collaboration with the City of Naples and Microsoft with the participation of Marco Zamperini was held in Naples at the Castel dell 'Ovo. The event, a sort of rally divided over two days, it was proposed that the participants share knowledge and raise awareness and reward the best ideas of talents from all over Italy. The participants were also given the opportunity to present their ideas on a stage in a competition playfully confronting to the last pitch through a spectacularized format.

http://www.ninjamarketing.it/2012/09/27/ninja-marketing-presenta-la-battaglia-delle-idee-12-13-ottobre-napoli/
http://www.chefuturo.it/2012/10/report-la-battaglia-della-idee-la-posse-degli-startupper/

11 **Guerrilla Marketing** is a term coined by Jay Conrad Levinson U.S. advertising in 1984 in his book of the same name to indicate a form of advertising promotion unconventional, low-cost obtained through the creative use of tools and instruments that aggressive leverage the imaginary and the psychological mechanisms of end-users (from Wikipedia, http://it.wikipedia.org/wiki/Guerriglia_marketing).

12 cfr. MORACE Francesco, *Nuovi paradigmi e nuove visioni. Sharing retail, oggi e domani,* MARK UP 185, Gennaio/Febbraio 2010, http://www.mark-up.it/articoli/0,1254,41_ART_4034,00.html

13 **Short chain** as a distribution system of the local product at km 0 eliminating many traditional steps in the chain.

14 "... images and concepts derived from global culture, with some adaptation to local, following the logic of contamination glo-cal ..." in RULLANI Enzo, *Lo sviluppo del territorio: l'evoluzione dei distretti industriali e il nuovo ruolo delle reti di città*, Economia Italiana, n.2, 2009, pag 430

15 The **mock-up** is the activity of playing an object or scale model reduced or increased for educational use, demonstration, scenic or visual communication. (From http://it.wikipedia.org/wiki/Mockup)

16 **Digital culture** after its success in the field of music and video publishing, has initiated a process of transformation of physical objects, implementing a form of revolution through the use of 3D printers allow you to print objects as well as printing a sheet giving life to the factory staff. See Chris Anderson, MAKERS. THE RETURN OF THE PRODUCERS, published by Rizzoli, January 2013

17 eBay is a platform (marketplace) founded in 1995 (in Italy arrived in 2001) by Pierre Omidyar. The site offers its users the opportunity to sell and buy items both new and used, at any time, from anywhere on the Internet and in different ways, including sales at fixed and dynamic pricing, commonly referred to as "online auctions". There are several formats of sale (auction, buy it now, buy it now with the purchase order, direct contact). The sale consists principally in the supply of a good or service by professional sellers and not, buyers are bidding to win the goods (http://it.wikipedia.org/wiki/EBay); Etsy is a website dedicated to e-commerce (activated in 2005 by Robert Kalin Chris Maguire and Haim Schoppik, which was added later Jared Tarbell), within which members may sell crafts or vintage items. Founded in 2005, the site is described as a cross between Amazon.com and eBay (from http://it.wikipedia.org/wiki/Etsy); Blooming (activated in 2010) promises to make e-commerce "simple as blogging "and accessible to all. It offers comfortable and free online software that allows everyone, simply to open his own blog, manage comments, and insert various applications (surveys, calendars, tag clouds, etc.). Compared to e-Bay, Bloomming changes the way in online sales generating an embed code from "share" on various social platforms like a link or a YouTube video http://www.webnews.it/2010/05/24/blooming-la-promessa-di-un-e-commerce-facile-e-flessibile/?ref=post

18 cfr. LA PUCA Guido, in *La reazione di un antidesigner,* di Claudia De Simini, pubblicato sul quotidiano Roma il 28 luglio 2008, pag. 14

19 cfr. GOBBI Linda, LANZONE Giovanni e MORACE Francesco, *L'impresa del talento. I territori creativi delle aziende italiane*, Nomos Edizioni, Busto Arsizio, 2012

20 cfr. **Tecnological calm** in BASSI Alberto, *Il design dell'artefatto tecnologico*. XXI Secolo (2010), in Treccani.it http://www.treccani.it/enciclopedia/il-design-dell-artefatto-tecnologico_(XXI-Secolo)/

21 cfr. DE FUSCO Renato, L'artidesign (1991), in *Teorica di arredamento e design. Scritti brevi dagli anni '50 a oggi*, Liguori editore, Napoli, 2002 pag.205

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Visione sostenibile (Sustainable vision in the conservation of cultural heritage project)

Anna MAROTTA
Full Professor, Politecnico di Torino
Turin, Italy
anna.marotta@polito.it

Abstract
"Who less sees, thinks nothing" in four words Filippo Juvarra emphasizes the close link between visual culture and architecture theory and practices. In this perspective, what meaning can be attributed (by designers or users), to their "own" architecture and their "own" city? Considering the landscape as a heritage to be safeguarded (according to the Europe Council, the landscape is "perceived territory"), new plants for renewable energy "with environmentally sustainable technology" are sustainable also from the point of view of visual consistency, and therefore of the "sustainable vision"? We are all ecologists and believe in eco-sustainability, but we have to take into account also the "sustainable vision" issue, that is managed by formally coherent and congruent actions in the architecture and landscape between text and context in all scales?. The same inconsistencies can be detected for new integrations (or recovery projects) in the historical structure of the city, which is characterized by specific aspects concerning what we might legitimately define its "visual structure". Similar problems can be finally found when the same visual characters are not analyzed, studied, acknowledged and valued appropriately within restoration and-or conservation projects, both in architectural dimension as well as in the urban one. A careful analysis of these phenomena - disciplinary identified - will avoid that such inconsistencies may exacerbate the increasingly diffused "cultural loss". In support of this thesis will be mentioned, within a large series of case studies being analyzed, national and international examples, both positively and negatively.

Keywords: sustainability, architecture, landscape

1. Sustainability
Bio-architecture, "green architecture" or environmentally friendly, as well as renewable energy, can be considered variations of the same concept, from the common root "green" in order to contain resources and energy, according to the recalled – on an empirical basis – by Hastings S.R, Wines J., Woolley T. [11] [1] [2] [14] [15] [5].
An energy consumed (and all it contains) in the production of materials and components or in carrying out basic functions such as temperature control; or as the "intrinsic"; or in the distribution and transport of materials and components to the construction site ("gray" energy); or even in managing of machinery and systems building and its inhabitants ("operational" energy). Not be forgotten other requirements, such as the ease of recycling of materials and the amount of the same effectively used by building. Despite the considerable progress in the introduction of measures for energy saving, some processes have slowed and sometimes hindered this trend. The capital required to invest in new equipment and procedures with high energy efficiency is often not easily available; measures to reduce waste and pollution (which have a higher legislative value of regulations to encourage monitoring of energy use) sometimes imply (contradicting the theoretical premises) an increase in energy consumption. Such as in some areas with "refined" productions: glass, composite and curtain wall. [9] [24] [13] [8].

1.1 Visual parameters in sustainable project.
Considering the building in its entirety, as well as can be conceived, designed and managed to ensure maximum energy efficiency, including renewable sources, the term "passive" appears misleading. The house passive solar or bio-climatic, to cite one case, there isn't an inert set of materials and

components: in fact it must have, or at least imitate, the constituent parts of an organism, capable of constant adaptations. Saw that the building depends on the exploitation of positive climatic factors, must also be able to react to their mutations.
Basically, "regulate" adjust the casing means that about a quarter of the wall surface of the building must be opened and closed, a third party must be able to let in natural light without hindrance and a similar surface must allow the solar radiation to enter at certain times and screen in other time. In addition, the casing must be designed to do all this without interfering with the ability to look outside. The new importance given to the casing respect to its general structure provided additional stimuli to the architectural expression of the facade and the coverage, elements that were previously confused - respectively - by the indifference of the curtain wall and the necessity to fit under cover implants, triggering even innovative forces in the industrial strategies. The production (for example) of the glass with "sustainable" characteristics has reached results which allow not only the visibility, but also the thermal insulation, the solar control and the spontaneous regulation between different modes of dimming [20] [26] [23] [16]. Innovative topics related to sustainabiitye, are confirmed in the graft on the more traditional relationship between architectural project and its context: Steven Holl in defining an "anchor" the dynamic relationship that is established between the built and the site, considers foundation of the "concept": the resolution of the respective functional aspects, views and opening visuals, the circulation and access are "necessary physical to the metaphysics of architecture" [4]. In La Jolla, California (for example) at the Salk Institute of Louis Kahn (1959-1965), at a time of day the sun reverberating in the ocean, merges with the light reflected into the water of the moat that separates the central courtyard, while the functional and physical requirements blend with the visual character of the place.
So, in general, among the broader aspects of objectiv and individual comfort, along with data and objective standards, should be considered as perceptual, variables in the course of the seasons, the day, the users. Outside of specialist and disciplinary treatments, a possible definition of comfort could be a "no hassle"without forgetting the psychological well-being. But in the parameters to measure such comfort, is also included the visual one, according to the theoretical (for example) from Maslow? We can therefore talk - within the architectural / environmental sustainable system - even "sustainable vision", a visual input (perceptual and cognitive) acceptable and congruent of new environmentally friendly technologies and methodologies respect to the context? And this can be achieved with their methodological approaches, disciplinary and specialist? Or these discrepancies (as in the case of wind turbines, or "coat" linings) are a price "aesthetic" to be paid in the name of an "healthier" ecosystem?

2. Sustainable color

Inside of the problems outlined above, the chromatic themes arise with particular force and complexity: from the middle of the last century the tendency to color reborn through a number of objectives: to conflict with or accommodate the architecture (local or not); enhance or camouflage material construction, enhance or manipulate the volumes, or to emphasize the characteristic features of the building, such as the Centre Pompidou in Paris in which the building by Renzo Piano and Richard Rogers is inserted as a single volume in the variety of "Grey Parisian" adopting the typical colors of the tecnologic information systems.
In the design phase, the set of conditions relative to the levels of building system adequate to health and the conduct of activities of the users can be connected to the use of color to enhance the sustainability of buildings. In particular it will be the need for thermohygrometric comfort, combined with the recommendation of climatic resource utilization , one in which the color will better contribute to the improvement of performance through a careful choice of materials, but also the coloring of surfaces, systems and technical systems and its exposure to the sun. The reaction / reflection that follows must therefore take into account, in an area predominantly constructive and architectural, the role of the color of the buildings especially with regard to the choice of materials or decorations, keeping in mind the characteristics for a sustainable color of natural light and artificial which (with its different intensity and with that brought from the shadows) will cause effects on items particularly charismatic and determinants, such as to greatly exceed the level of the single formal and "objective" image. The choice of building materials is also another important factor where the color can even more help to improve the environmental sustainability, not only individually buildingd but also in the areas of reference (UNI 0050) [12] [22] [3] [18]. Has been widely demonstrated that in the phenomenology of color the physical definition "objective" is to be combined with aspects perceptive and subjective: when an object or a material is in our daily surroundings, its color just does not seem to change if it is to illuminate the sunlight or the light of a candle. For example, observing the snow at night we would be ready to affirm that this is white in color, even if the light radiation that comes to our eye is not at all. In this case it is our brain that deceives us by making a sharp correction on physiological data. But this trick enables us to live with greater security and mastery the environment around us [28].

2.1 Susteinable vision of new material

Among the new generation products, there is (among many others) colored glass, to continue the tradition of those mass-coloured: thanks to a chromatic "interlayer" in PVB. The interlayer, an integrated component of laminated glass, featuring a new generation of films for the manufacture of laminated glass for building, decorative, high technology and which opens the door to a new way of interpreting and using color in internal and external design. The range of products of interlayers is the versatile response to the growing needs of design whit glass and to the market changing . The system is made up of eleven primary colors from which you can generate more than a thousand tones transparent, translucent and opaque. The maximum size of production is directed generally to the size of the autoclave for the production of laminated glass: 2.00 x 7.00 meters or 2.60 x 4,60 meters. Interlayers provide the benefits commonly associated to laminated glass, widely used in construction: sunscreen, it can absorb up to 99% of harmful UV rays, resistance and therefore safety, as well as significant reduction in the transmission of noise in indoor environments. Staining of the color interlayers is based on shades of red, yellow, blue, black and white and can be stacked offering a full range of colors, from neutral and relaxing white and browns to lively and gaudy violet and orange. It will therefore be the color of the glass that you want to obtain to determine which interlayer chromatic must be privileged. The reproducibility of the color of the intervals is directly related to the gradient obtained from the mixers and the light transmission of each same interlayer. To get a specific shade, many configurations require asymmetrical compositions of interlayers. The perceived color may be different depending on the mode of observation, especially when the colors were examined by reflection [21] [7] [6].

3. Positive and negative examples

With figures like Richard Rogers, Norman Foster and Renzo Piano, in recent years the most advanced hi-tech movement has joined both the "green manifest" that his architectural vocabulary: on this trail, there are many positive examples made in the field of sustainable: the first selected here is the asylum "Els Colors" in Barcelona [Fig.1 and Fig.2], follow the Kilometro Rosso by Jean Nouvel [Fig.3 and Fig.4], the Centropadane Bridge in Brescia enlightened by Philips [Fig .5] and the Water Tower near the Farini Bridge at Porta Garibaldi Rail Station, Milan [Fig.6] in the new redesign.
Among the negative examples, carriers of problems and issues at stake, you can cite instead the wind farm in the Natural Park of Adelasia in Liguria [Fig.7] or the example of the thermal analysis of the housing stock held in San Lorenzo di Greve , Florence [Fig.8].

3.1 The “Els Colors” Kindergarten [Figg. 1 e 2]

Reassuring entertaining and educational spaces of nurseries and pre-schools are affected by the configuration of objects and places, but also by the colors with which children are having to interact daily. Generally environments asylum, both external and internal, their furnishings and finishes, provide a quality range of colors, materials and light large enough to activate sensory stimuli of various kinds. In particular, the colors affect the learning and development of children: the pink glaze is definitely more suitable for creating a magical atmosphere, instilling safety as a family environment and leading to the discovery of the surrounding environment; the shades of tenuos linght blue _, however, help the older children to internalize those experiences in early childhood, facilitating the assimilation of information and understanding of the same. The search for a combination of formal and perceptual quality and technological quality of the project seems to resolve himself in "Els Colors” kindergarten, designed by RCR Arquitectes in the outskirts of Barcelona [17] [27], in juxtaposition between the use of color as characterization spatial technique typical of school building and the creative use of color interlayers inside the laminated glass. The architecture of this nursery is characterized by the simplicity of the composition obtained from a planimetric structure of high linearity: two longitudinal buildings whit a marked horizontal development, house the classrooms, spaces for socializing and dining, connected to each other in transverse with a covered walkway, access in turn also to the inner courtyard; a higher volume is positioned above the main entrance and is used as a multifunctional space. The project has been developed thinking to the different perception of space that have children and the fact that their point of view originates lower than that of an adult. The extensive use of bright colors (with hot / cold contrasting), yellow-green, orange, red and blue, coatings and glass walls of the classrooms allows to enrich the perception of children and direct them to the knowledge of complex relationships, interpreting spatial and perceptual differences suggested and also induced by the transparency and opacity of materials. A shade of green unifies interior linoleum flooring and the external in synthetic carpet, proposing on the horizontal plane the same visual continuity that windows ensure vertically. From a technical point of view, appears to be fundamental the choice of safety glass, given the proximity of the children to the panels . The color interlayers leds to a varied coloring, providing an ideal level of safety for cases, due to the excellent adhesion to glass and high elasticity, which allows an effective absorption of the energy impact. From

the point of view of the sustainability of buildings, the use of solar control glass, or sunscreen, has allowed to obtain a considerable energy saving for the air conditioning improving the indoor comfort due to a greater control of the temperature and brightness [25].

3.2 The "Kilometro Rosso" [Figg. 3, 4 e 5]

"For me there are only three colors: black, theoric gray(which we call neutral) and white. Other colors are mere nuances ". [10] Black is the color of the secret and pain, which absorbs and returns every light, every reflection. It is often combined with gold, red and electric blue to create theatrical effects, which emphasize the taste of the performance of the architecture of Nouvel. Black, gloomy during the day, comes alive with color at night, through lights flickering that remind lighthouses, which become points of reference for the viewer that is situated to admire the built. The power of light today it has become almost an obsession for Jean Nouvel. According to him, those who love light, like also its opposite, that is, its shades and fade away into the darkness, through a path of shadows that transform the distances in illusions [19], while its production is similar to a complex optical machine, more important for effects it produces that for their physical substance. This philosophy can be found confirmed in the realization of the "Kilometro Rosso", the first Italian opera of the French architect: an installation in the lombard landscape , located between the municipalities of Bergamo and Stezzano. The project is intended to be, within the Science and Technology Park, a sustainable last generation building. The main objective is the creation of environmentally friendly architecture as a symbol of sustainable development, innovation and research, ie an active role in the development of the entire territorial system in the respect for the environment, for the best quality of life. Nouvel use the wall as a real wall system, which "hang" the new architectures that complete the equipment of the Park, a place that is home to companies, research centers, laboratories and activities of hi-tech production. As for color choices, "Daniel Thompson considers the synthesis of vermilion as the most important technological innovation in medieval painting: there is no scientific invention has had a vast and lasting impact on the practice of painting, since the invention of this color, as if the Middle Ages had not owned this bright red, could hardly develop its high standard of color, and there would be less need to find other bright colors that appear on the scene from the twelfth century onwards. Was certainly the medieval prince of red» [17].

The wall / barrier, who is also the very important role of filter between the A4 and the Park that extends to the back of the barrier, is coated in red extruded aluminum; _ is just one kilometer long and a height of ten meters. The imposing red backdrop born of the water, rises, takes thickness and is deflected. Almost as if something huge was leaking from the highway and struck him. Then, plastically, falls and continues to run, ending its stroke after a thousand meters. The attention of the passer is certainly affected, arousing a feeling of curiosity, but the deciphering of the product itself is not easy to grasp, unless it is to stop to observe, penetrating inside. The red color , recently "rediscovered" by the designer, symbolizes strength, dynamism borrowed from the coordinate image of the new Center for R & D Brembo (manufacturer of braking systems for Ferrari). The red acquires a symbolic value, due to the client company, as well as functional appeal to its target of attention, due to the specific characteristics of the color. The same meaning is conveyed from the wall: this in fact is always the first step that moves the architecture: is what defines a space, defends and locks him scoring an inside and an outside. The perception of the architectural complex also imposes as an icon for motorists who travel the highway that passes by; but at the same time, the "Kilometro Rosso" is a protective shell for activities that are located within the park that extends over its structure.

4. Conclusions

In the project and sustainable yard, to avoid the rigidity of formal technology solutions that are likely to be highly repetitive, monotonous and serial proves fundamental the research and formal experimentation, without excluding the utility of theories of color and the vision, applied to sustainable project. And the same is true for studies aimed at a "sustainable vision" in deepen and develop in symbolic values mentioned in one dimension genuinely multicultural and inclusive. Thus understood, visual culture is the consequent - more pragmatic - experience of phenomena and visual characters not only be antithetical technological and constructive approach, but it will be an indispensable completion.



Fig. 1: The interior elevation of asylum that overlooks on the courtyard, used as a recreation area for children. From a technical point of view appears to be _ fundamental the choice of safety glass, due to the proximity of the children to the panels . Colored PVB interlayers provide an ideal level of safety for cases, due to the excellent adhesion to glass and high elasticity, which allows for an effective energy-absorbing shock. (In AA.VV. *Asilo Els Colors*, The Plan, n. 15, luglio/agosto 2006, p. 63).



Fig. 2: Focus on the reflective properties of the glass used, typical of multilayer glass with PVB interlayer plastic. Through this reflection, the building is fully embedded into context, reflecting the conformation. The importance of color in the relationship between man and the environment becomes therefore essential for the construction of a psychological climate for the function that is in charge of the place itself. (In AA.VV. *Asilo Els Colors*, The Plan, n. 15, luglio/agosto 2006, p. 68).



Fig. 3: The Kilometro Rosso seen from the A4 highway. Despite the cars slide quickly down the stretch of road, _ perception of the building is guaranteed by its color. The Kilomero Rosso is the first Italian work of the French architect Jean Nouvel; the barrier, which acts as a filter between the highway and the park, is covered extruded aluminum and is just one kilometer long and has an height of 10 meters (da http://www.kilometrorosso.com).

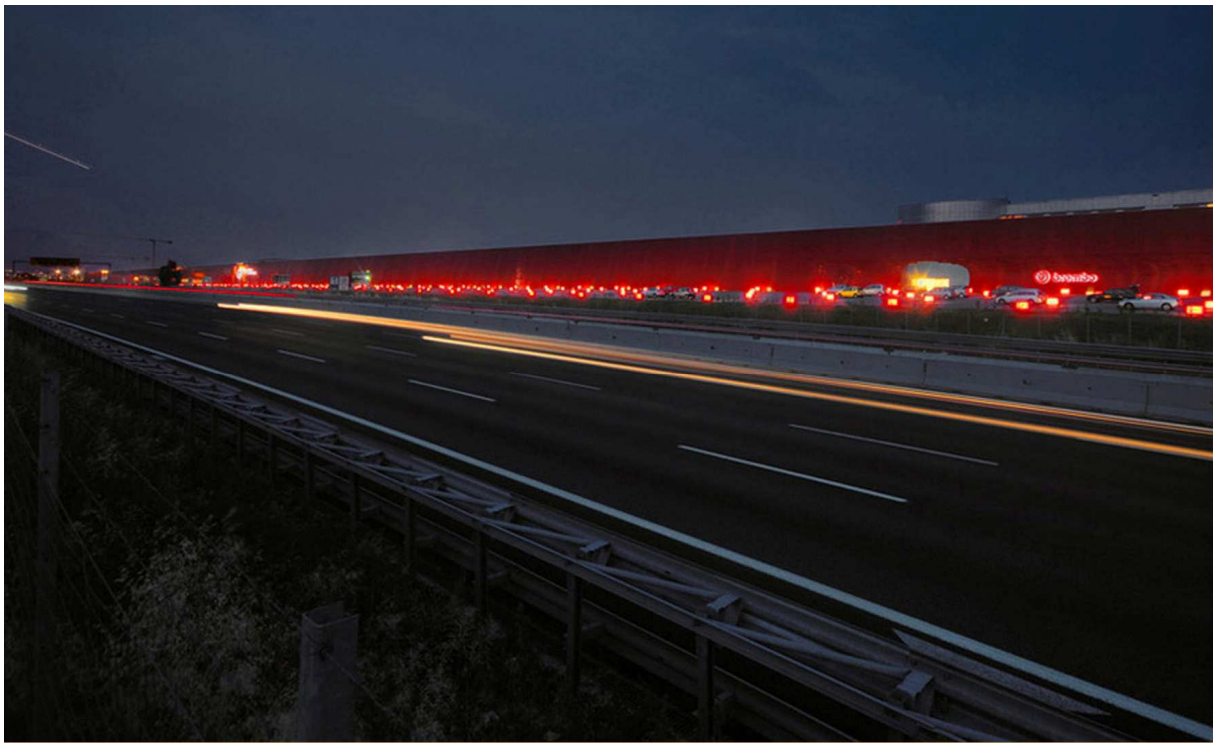

Fig. 4: Night view of Kilometro Rosso from the A4 highway, with the illumination of red. At perceptual level the wall is imposed as an icon for drivers who travel that stretch of highway. The imposing red backdrop seems to be born of water, rise, take thickness and inflect (da http://www.kilometrorosso.com).



Fig. 5: Centropadane Bridge near Brescia. The lighting design of the bridge is made entirely with LED products, because this technology enables highly dynamic nature and the ability to configure different scenes in an elastic way (da http://www.lighting.philips.it/projects/italian_projects/ponte_centropadane.wpd).



Fig. 6: Water tower near the Farini Bridge at Porta Garibaldi Rail Station, Milan in the new restyling. Restored for the FIFA Football World Cup "Italia'90", the coating is composed by ceramic tiles. (Image from www.panoramio.com).



Fig. 7: 2004, Natural reserve of Adelasia, Liguria. Photo by Filippo Serafini.

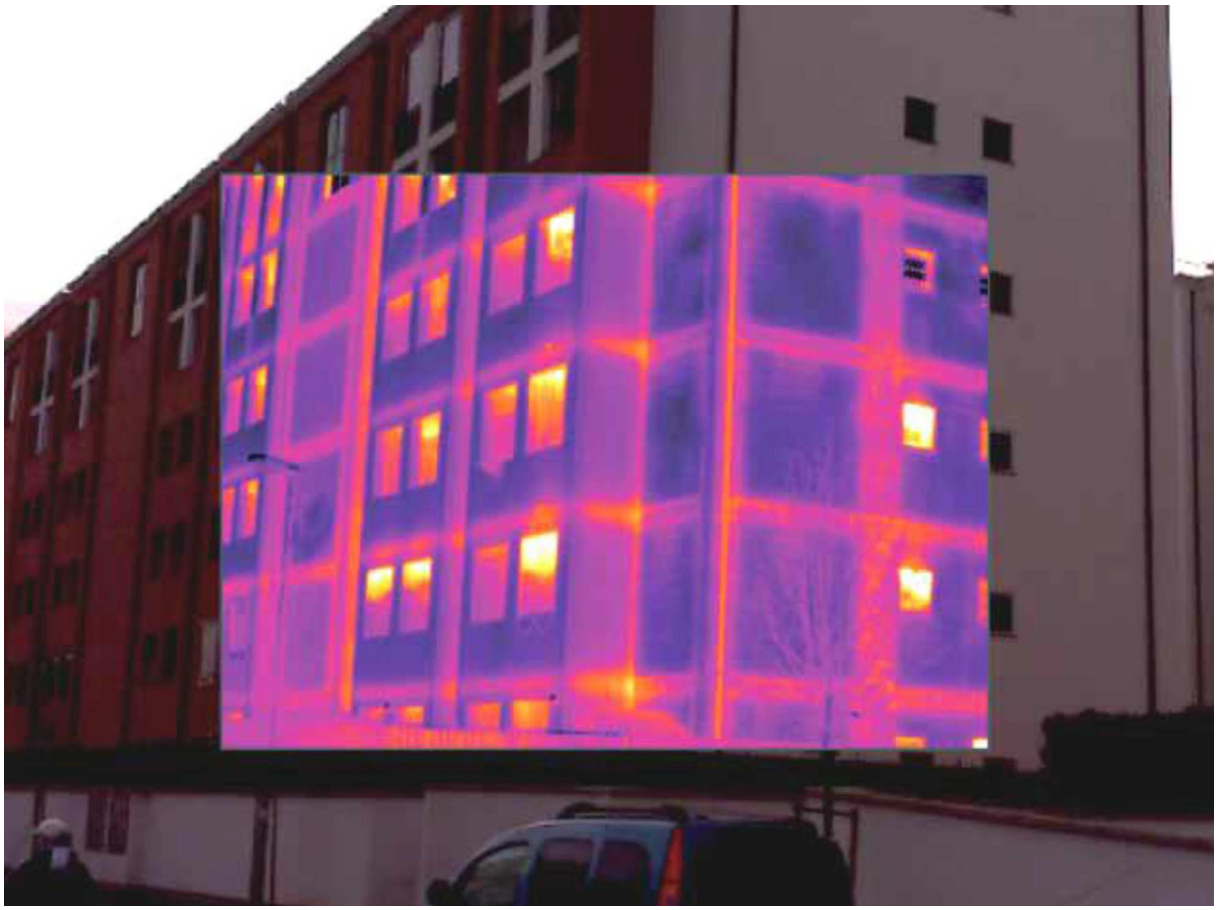

Fig. 8: Firenze, San Lorenzo a Greve, via Tiziano, year 2010. Thermographic analysis of the housing stock for the Italian Legambiente campaign on energy efficiency in buildings (da http://www.legambiente.it/sites/default/files/docs/tuttiinclasseaper_sito.pdf).

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THE QUARRY LANDSCAPE OF GUIDONIA MONTECELIO IN LAZIO. KNOWLEDGE, SURVEY AND PROJECT OF A BUILT ENVIRONMENT.

Laura FARRONI,[1] Annalisa METTA[2]
(1) Assistant Professor of Architectural Representation
laura.farroni@uniroma3.it
(2) Assistant Professor of Landscape Architecture
annalisa.metta@uniroma3.it
Università degli Studi di Roma Tre, Dipartimento di Architettura
Roma, Italia

Abstract
Guidonia Montecelio (Rome) is characterized by huge travertine extraction fields, which over the centuries conditioned its territory becoming.
We intend to verify the recurrence of a typological and constructive model - "*casale* (house) + quarry" - and how the spreading of this model over a vast area produced a reticular framework of infrastructures related to the basic stone production needs, where each *casale* + quarry unit is a sensitive ganglion.
Littered with partly active and partly abandoned industrial plots, quarries and buildings for stone extraction and processing, this built environment today is largely illegible.
To give value to the place identity and to manage its current weaknesses and contradictions should be the aims of an urgent redevelopment project, that should make clear the network of physical and intangible relationships between buildings and quarries, from landscape to architecture and viceversa, with a retrospective as well projective point of view.
The site has lots of environmental and cultural layers that need to be investigated through multi-disciplinary and infra-scales approaches and tools: integrated survey, historical and iconographic analysis, maps of physical items and perceptive values.
Preservation, regeneration and innovation in the field of heritage, architecture, landscape, are the main themes of this study, taking as sample the Bernini house, checking its potential for recovery and for new uses in a specific landscape context like that of the leaving off quarry.

Key words: landscape, quarry, survey, map, laser-scanner, inventory

Introduction [1]
The landscape of Guidonia Montecelio, in the province of Rome, is characterized by the presence of a large extraction field of limestone – the Roman travertine - which over the centuries has conditioned local transformation and identity. Littered with industrial plants, small buildings and quarries related to the extraction and processing of stone, partly active and partly abandoned, it presents environmental and cultural layers that need to be investigated through multi-disciplinary approaches and inter-scalar tools.
From a morphological point of view, it is a large area slightly inclined towards the south, surrounded by the crown of Cornicolani and Tiburtini hills. The hydrographic network plays on this frame and is composed of natural tributaries of Aniene river and surface artificial drains clearly identified by their serial order, signs of ancient water reclaiming, which remains in the memory by many names of places referring to the once swampy nature of the area.

The settlement system of towns and mobility conforms with these local morphological characters, so being natural physiology and human actions not separable at all: architectures and infrastructures form a coherent and readable system because they are based on the systemic elements of the natural geography.
The geological structure has allowed the development of mining activities that have so long and strongly marked the place, till to be the main element of its geographical, economic and cultural identity. The exploitation of travertine has been made possible since ancient times due to the presence of mobility infrastructure, roads and especially the river; in turn, quarrying has contributed to the definition of new infrastructure directly related to further development of travertine industries, including the production of lime.
The mutual interrelationships between natural and man-made geography have a circular character: for example, the artificial lakes produced in the quarries when the action of scooping machines ceases are signs that add to the natural water system, featuring profoundly the landscape as well the environment.
Quarrying has also promoted the development of buildings closely linked to mining, till to the definition of the quarry-house system which is the specific subject of this study. The house (*Casale*) was a key device for the management of the quarries territory: place of control, supervision, decision-making, organization of human resources and equipment, it was at the same time insignia of economic, technical and political power of the quarry owners and an equipment inherently connected to the proper functioning of the production process. So, its architecture has been characterized by the adherence to the functional program and also by an iconic desire.
Several *Casale* dot the plateau now largely eroded by the quarries. From their origins, they are an infrastructure network related to the basic needs of stone production and together form a framework where each unit quarry-casale is a sensitive ganglion and that needs to have again evidence and readability.

1. Landscape as a palimpsest. Description, interpretion, recognition, represention.

We mean by landscape a body of tangible and intangible characters, that at a given time and in a given context is perceived as a semantic unit by one or more communities feeling involved in. It's a sum of values of great relevance from a cultural, economic and social point of view. Landscape is therefore that quality of a place where legal and techniques practices and ethical and aesthetic reasons come together in a synthesis recognizable as manifestation of a shared culture.
Landscape, so defined, is generated through continuous overwriting, which accumulate and deposite on top of each other. So it's therefore describable as a palimpsest of progressive layers of signs. As Sebastien Marot writes: "The art of the landscape consists, starting from the observation of a given territory, in deducing the laws of formation, then taking them to design tools. The landscape project could not be defined as the art of the imagination, but of reminiscence" (Marot, 1996).
Both imagination as well reminiscence require to take a double identity, in a sort of game of disguise that makes us wear time by time the role of two different characters, one to the other essential: the geographer and the explorer.

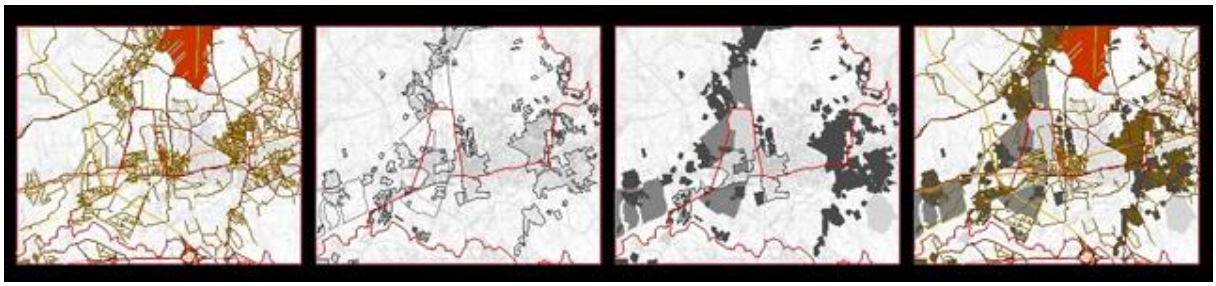

Fig. 1

1.1 The geographer's gaze: the cartographic deduction

To decipher the landscape as a palimpsest, it is helpful to take an analytical look, processing for progressive disassembly and allowing to distinguish and name the settled traces. It is an exercise in questioning and describing places according to categories of homogeneous elements, which belong to the interrelationships between artificial and natural patterns.
To investigate an area means, in fact, taking care of two equally important aspects: on the one hand, the natural invariant items (related to the physiology of the landscape); on the other, the signs produced by the actions of settled communities. It means, in other words, to deal with the natural geography and the artificial geography.
This exercise of disassembling re-cognition is map-based and structured through partial questions for items that match sets of morphological elements (forms of the territory), environmental elements (the

conditions for the development of biological forms) and settlement elements (the forms of living and producing in a place), which are the units that over time have been affected with historical, symbolic and aesthetic value. One-level maps correspond to each of the selected categories (including geomorphology, hydrography, vegetation, mobility infrastructure, building components). They, properly stacked, return the complexity of the landscape and give clearness to correspondences between signs and their reasons, referring to the deep structures of territory and society: in a certain society (in its cultural and economic aspects) there is a certain landscape that manifests itself through a certain type of signs. In the specific case of the quarries of Guidonia Montecelio, disassembling and re-aggregating of categories of natural and artificial geographical elements highlight their structuring value for the whole territory. The analytical-descriptive scanning is instrumental to master the main materials that form the structural matrix of the place and to acquire the interpretative criteria of their re-aggregating potential, giving evidence to the hierarchies of significant relationships among the playing elements. In other words, this step of cognitive disassembling already contains the codes for turning then to practice of re-composition that is at the root of the project.

1.2 The explorer's gaze: the revealing experience

To have awareness of large scale territorial phenomena can be difficult and elusive: it is difficult to see, measure, describe, understand and then decide. Deciphering signs of macro-geography is not enough to landscape understanding and designing, if it is not accompanied by a survey of the places through their direct experience and perception.

The semiotic reading of landscape therefore requires to complement the gaze of the geographer with the explorer's one. It requires to verify the correspondence between the macro-marks found on a map and the "true form" of sensitive landscapes physically crossed and exhausted. In other words, it means to associate mapping to detect by measuring and the revealing experiential perception, combining the gaze from outside and above with the gaze from inside, employing a bifocal lens.

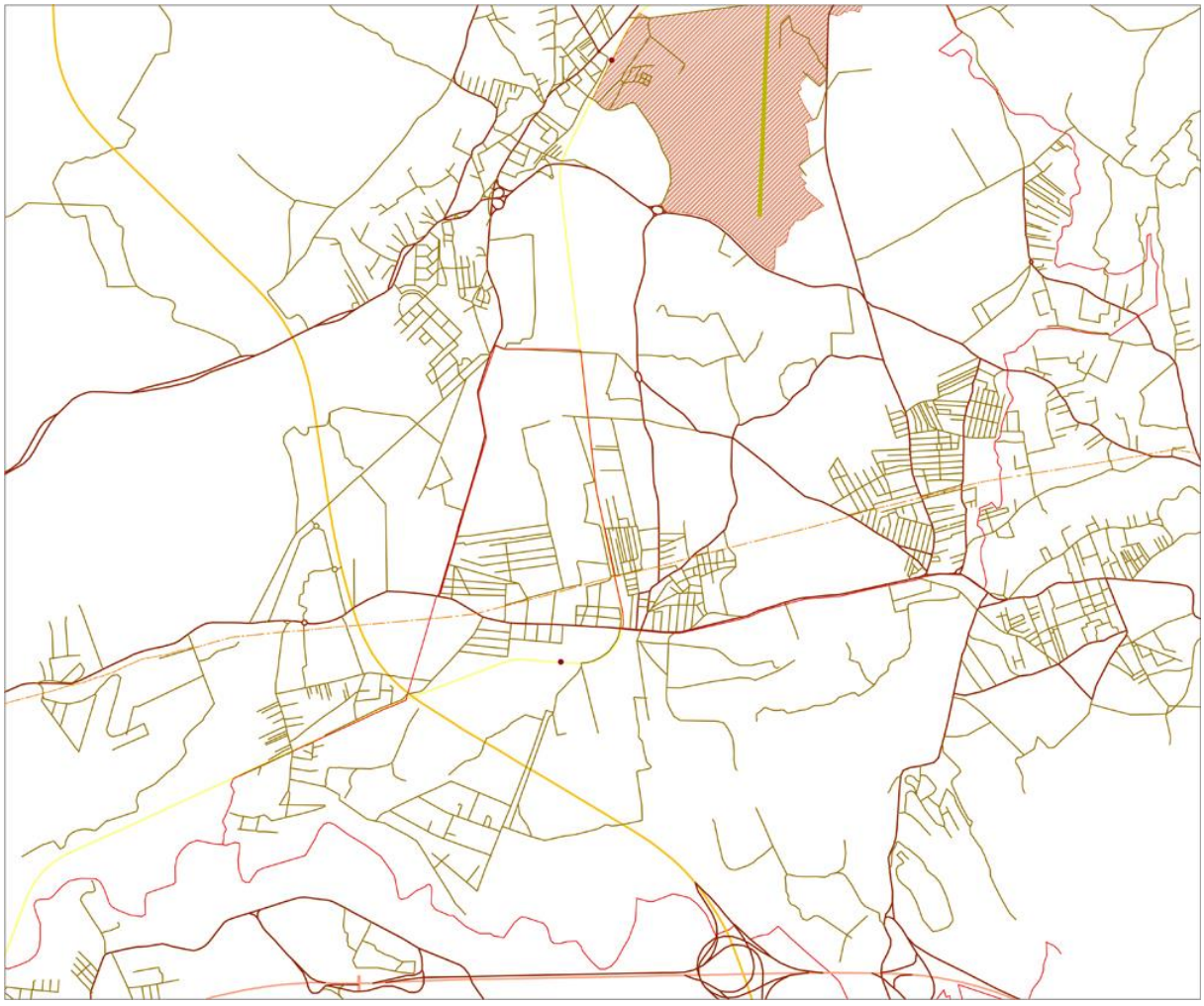

Fig. 2

This means to reclaim the need for a sensitive relationship with the landscape, in which the representation becomes the synthesis of synesthetic perception that inevitably takes place in the direct experience of places.
The direction of the gaze of the explorer cannot in any case be neutral, diluting much of the rigor of objectivity that still we find in the geographer's one. Regardless of the technique used - photography, drawing, collage, just as examples - the centrality of the perceptual aspects will always require a choice, a selection. The eyes of those who explore is by its very nature leading, directed by a prejudice that contains within it the seeds of intention, which is the very reason for exploration.
We can proceed browsing horizons, playing in the vertical dimension the same tool of overlaying layers of the palimpsest landscape: at Guidonia, on the distant horizon of wavy-edged Cornicolani hills, the straight lines and assertive sides of the quarry overlap, on which stand the profiles of machinery and cranes, till to the nearest horizon, the one of the fences, which, almost everywhere, stop the look on the first floor.
Exploring the mutual relationships between figures and backgrounds, with roles variously interchangeable, is an organization of meaning from general to the most salient detail, with the same inter-scale procedure that characterizes the cartographic reading. We can easily verify that the most obvious characters are found both in the general views of orientation, as in the observation of detail.
We can work through collections, samples, or - we prefer - through *inventories*, a very interesting word because it's the marriage, only apparently contradictory, between cataloging and inventing. The inventory can organize materials, as well as textures or patterns, finding even at the scale of the micro-landscape - that of the block of travertine marked by the grain and porosity of limestone on which the regular pattern of linear cutting lays out - the overlapping of natural and artificial categories, here continually and everywhere confused or repelled.



Fig. 3:

1.3 The meta- project transmission of the acquired knowledge

Information and interpretations collected as geographers and explorers are expressed through forms of representation that are on the one hand descriptive and analytical, as means to make visible and therefore understood the faces of the landscape; on the other hand, are intimately connected to design: the diagnosis of mode of genesis and evolution of a landscape is already an anticipation of transformative thinking about it. Landscapes are composed of heterogeneous elements that do not evolve all at once.

The exercise of reading (both for layered mapping, both for perceptual report), occurred over time, provides insight into the processing steps of each of these elements - or systems of elements - and into the eventual far-reaching transformative strategies that take into account the singular becoming of each face and the interactions among them.

The area of the quarries of Guidonia requires a project for the restructuring of territorial network simultaneously in multiple scales, from the geographical, to understand and decipher the frames that are largely invariant and structuring systems, to the minute intervention of architecture - including the building components as well those relating to open spaces - which functions as a kind of prototype. The relationship between the two scales is twofold: the territorial scale supplies the frames on which the minute interventions are anchored; then, these last have specific geographical memory of territorial systems - which are an important feature of – and, at the same time, help to measure the extent realizing what Michel Desvigne called "désir de réalité et d'architecture" (Masboungi, 2011).

It’s the equivalent to create a laboratory to test the relationships of meaning, space and environment sought and evoked at the large scale. We cannot have the claim to determine a unified framework for such a huge place and for so long time. Therefore, it is necessary to activate processes of changes, acting on sensitive areas which can then propagate their effects around, as in acupuncture. The quarries will not be deleted, their presence is welcomed as a significant sign of this landscape, but they’ll change character, role and nature: "tout reste en place, mais tout change de nature", citing again Desvigne (Masboungi, 2011). We can prepare this territory to its future vocations, not working on forms, but on processes: conversion, new functions, new meanings, new nature, all included in transformation projects that are part of a long time ambition.

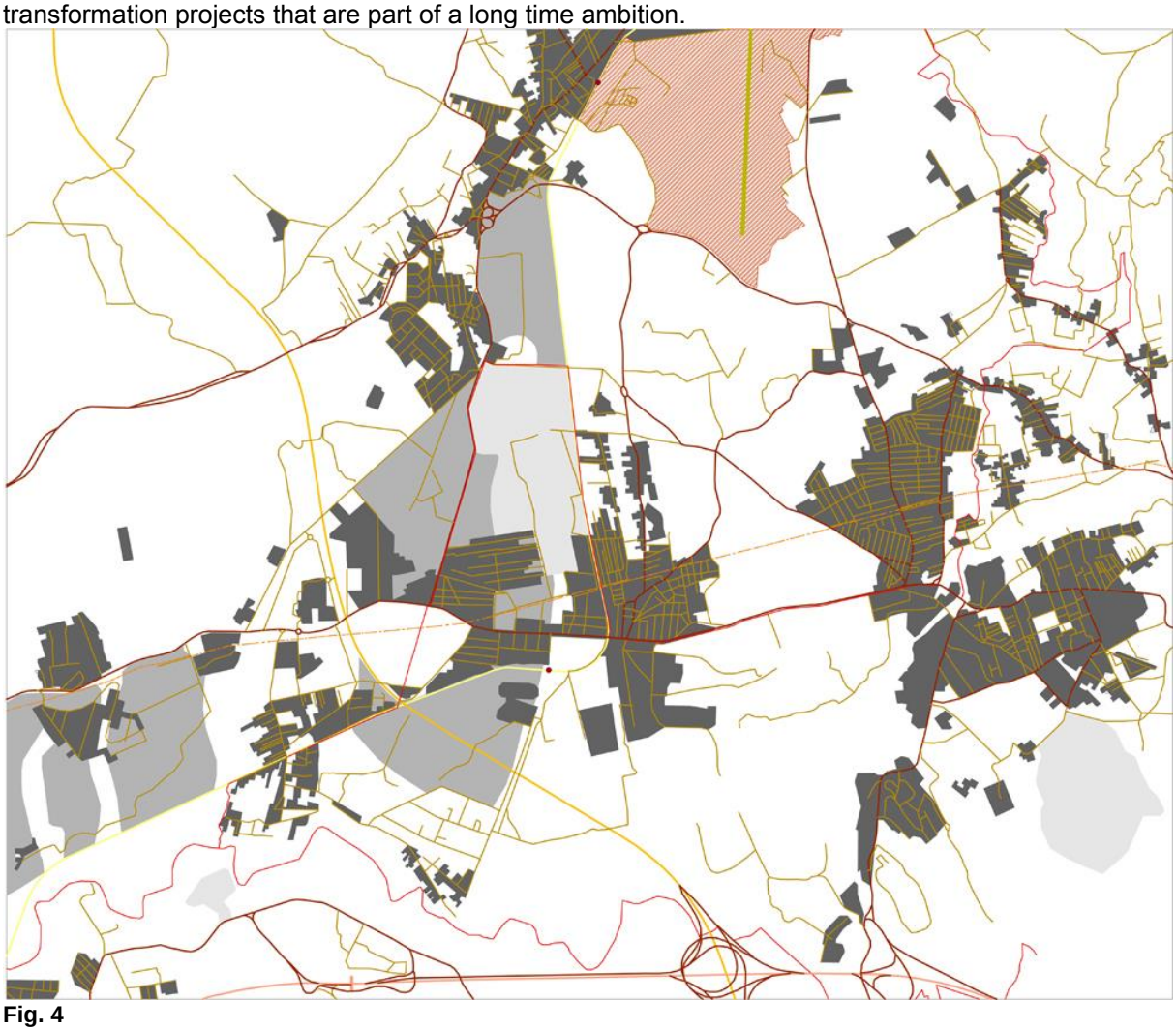

Fig. 4

2. The survey project in an inter-scale field: hypotheses and lines of development

The survey phase of the project, following the step of collecting historical material/documentary analysis and in situ reconnaissance - both in support of the survey itself - proceeds in the development of paths method and considerations that are presented in this paper. The methodological approach to the case sample wants to be an example of a method applicable to a wider territorial system, such as the North East of Rome, subjected to stone extraction and characterized by different entities (vegetation, archaeological, industrial, infrastructure, thermal systems) that contribute to the identity of the landscape between the Tiber and Aniene rivers.

2.1 Lines of investigation and instrumental management for the survey of the built environment

The case study presented in this conference offers the opportunity to act as a survey method of applied research in which speculation and experimentation discipline will contribute to the development of strategies to be implemented for recovering a specific built environment: that of travertine quarry - called Bernini in Guidonia Montecelio - and the connected *Casale* of historical relevance. The methodological and instrumental experimentation will operate on the sample, checking the concreteness and the real validity of the proposed objectives: knowledge of the system *Casale*/quarry and enhancement of environmental contexts with outstanding productivity and/or disposed of. In practice, the emphasis is placed on survey as a challenge, to renew its role as guarantor of interdisciplinarity through the neutral and polythematic reading of existing realm.
It persues the task of revealing visible and invisible data, of knowing necessary permanent and temporary man-made transformations in the environment, of catching relationships of discontinuity/continuity among different configurations of space, matter and time. This is a survey that offers scientific and critique interpretation of reality.

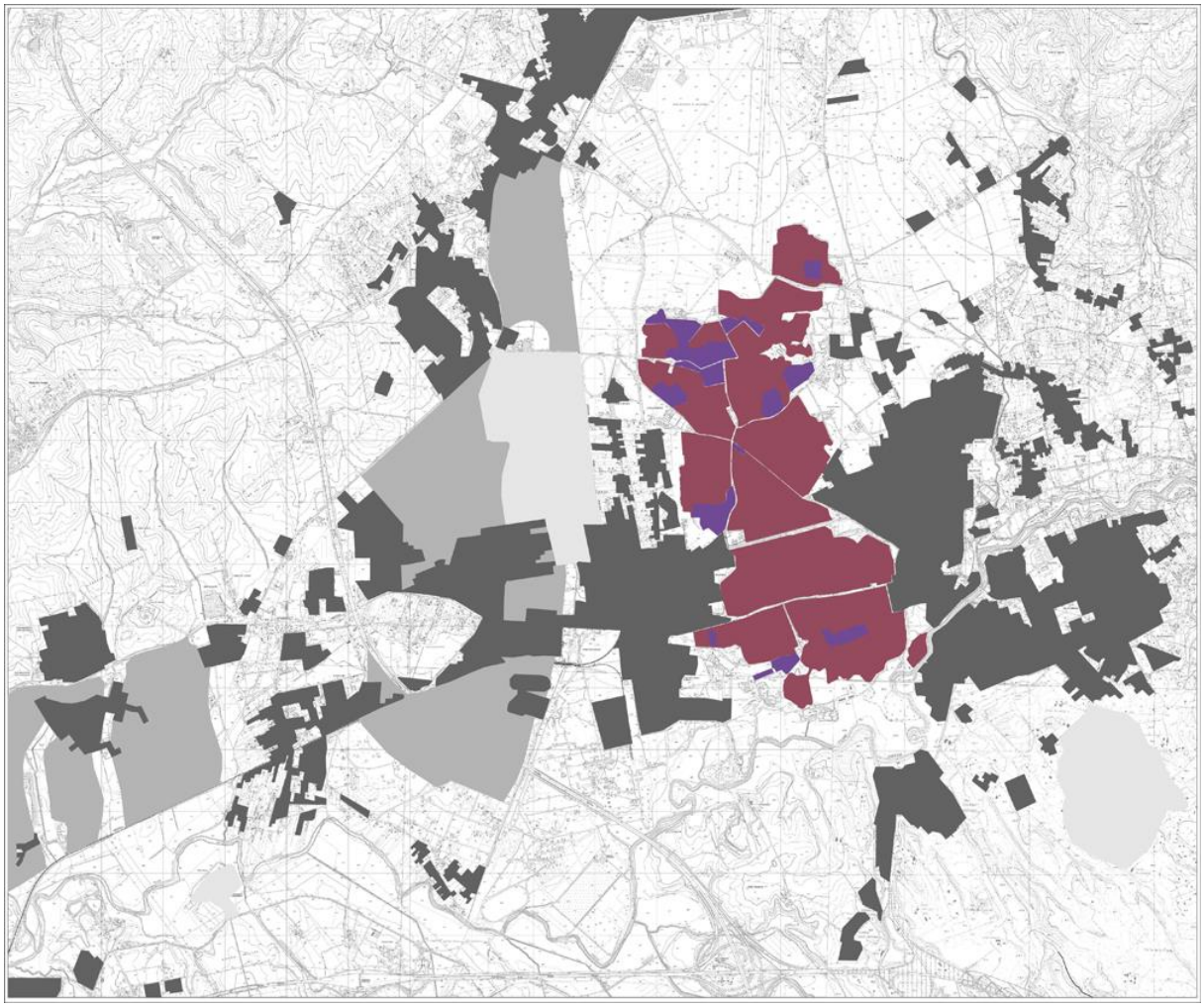

Fig. 5

The built environment under investigation is a highly complex system, where a variety of information converge together. The inter-scale survey, through its various stages and methods, transfer the inter-scale approch into scientific terms: it will be managed both instrumental, both in terms of processing and return of data. But we must now focus on a reflection.

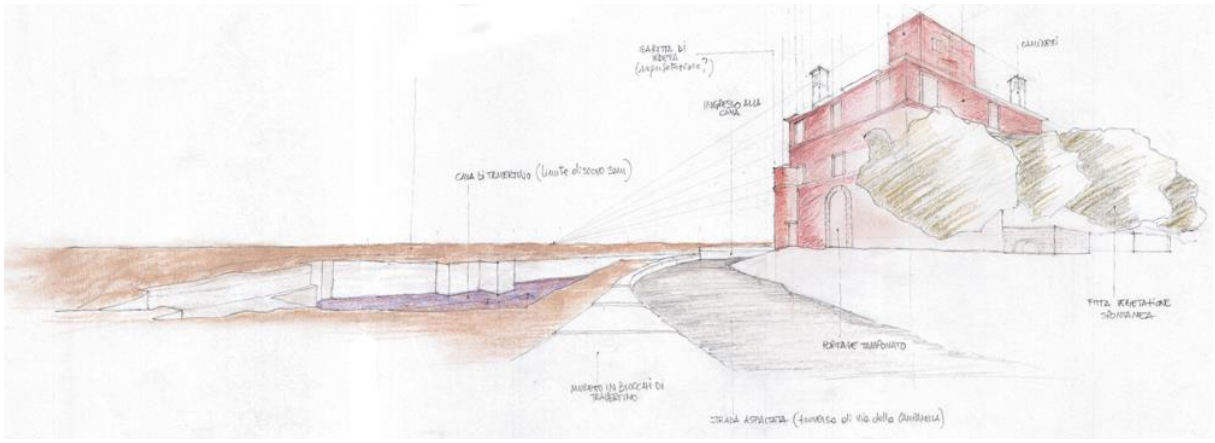

Fig. 6.

Experience shows that the integrated survey provides a more comprehensive knowledge and all methods contribute, from time to time, according to the arising situations, to acquire information about the object/landscape as a whole. Laser scanner is the proper instrument for the detection of geographical areas such as quarries, in this case under the sky[2]. The use of this tool opens up fields of inquiry and theoretical issues. In general, the laser scanning involves the acquisition of a large amount of information - geometrically contained in the point clouds - above the usual level of predictability shared by other detection methods. In this study, it is assumed that the management of the data is expected to become a stimulus to the knowledge of the different landscape invariants - present but not noticeable - in order to broaden the scope of the design choices.
The discovery process should grasp the links between the different materiality in the area, surpassing the hierarchy or traditional divisions between survey and architecture, making choices of acquisition and return on multiple scales simultaneously. This approach can be made possible by the use of laser scanner: since neutral instrument, it is able to cover large distances with a coverage of 360° on the horizontal and 270° on the vertical and to detect - defining the resolution - from the existing general retail, providing data on the material consistency and color[3]. Reading and selecting data in the points cloud will return - according with different scales and themes - many aspects that arise, from the metric to the material, cracks etc.. The guiding idea is to return a model in which the relationships between architectural forms and landscape shapes - related to the extraction cycle and stratified in time – could be revealed tracking technological and cultural signs.

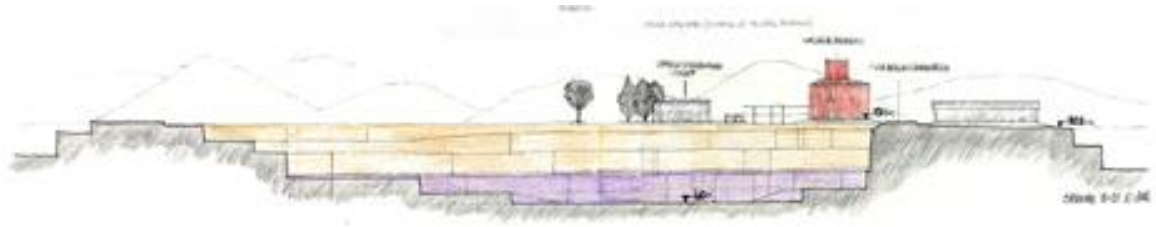

Fig. 7

2.2 Discretization and survey project The perceptual analysis performed on site shows that the Casale Bernini is located in the middle of three travertine quarries, with different activities conditions: one in full operation, a disposal one and a disposed of one. The quarry originally related to the Casale was placed in front of the building.
We will proceed to laser scans at multiple points of stations - even at very different levels - so to scan the item on time and the Casale/quarry unit in the first instance by ensuring knowledge of dimensional relationships, in linear, superficial and volume terms. From this information, however geo-referenced, we'll be able of course to extrapolate data to understand the directions of spatial development - both linear and volumetric – in comparison to the other Casale/quarry units in the area of Guidonia Montecelio, that in fact took part - with different functions – at the travertine production cycle.

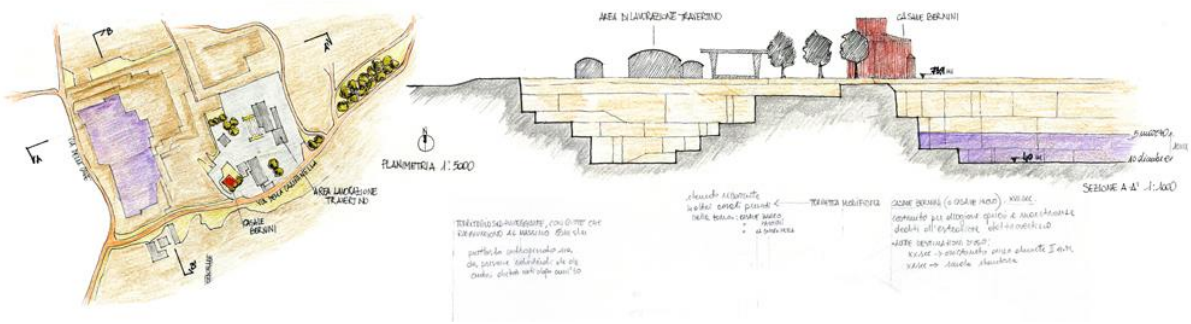

Fig. 8

The identification of topological relationships between elements of different scale is among the objectives of the geometric models definition. This is useful for the interpretation of the spatial configurations that have sprung up in the interweaving of natural and man-made phenomena (geological layers, vegetation, hydrography, mining methods, settlement). Also it is assumed to perform taken data at successive times in order to detect the permanent and temporal entities: it can thus provide models of the steps of the manufacturing process, whose output will present images of the concretization of variability. We can think, for example, about the temporary accumulation of granules, the different position of the cut and then assembled blocks or subsequent signs of tracking cut on the quarry fronts. These data, returned in a scientific way, will then be subject to interpretation in the project, revealing the identity of the place and its memory.
In the light of these considerations of method, it is natural that the acquisition with laser scanner should be guided by careful design, otherwise we may not be able to use the large amount of data. The discretization of the landscape in terms of previsions prepares the data knowledge for the elaboration of the final intervention: the enhancement project. This condition, with interdisciplinary reflections, makes creative the definion of point stations, in terms of quantity and position and then the reading/processing phase, finalized to obtain appropriate models for the fixed purpose. In essence, we are creating an inventory of what is considered appropriate to be detected: an inventory of ideas, arguments, true or plausible, relevant to the project. In the first draft, we'll deal with the following characteristics: dimensions, referring to the limits of quarried, the volumetric size of the void (intended as survey of the immaterial), the house and the industrial buildings; the presence/consistency of the footprints on the ground given by the historical and current processes; matter, relating to the geological aspects of this limestone and the material quality of the settlements; the variables phenomena such as the presence of groundwater, vegetation, referring to the natural and planted flora.
Last but not least, the survey will provide the state of rules and laws about mining landscape to interpret and reconsider a regulatory framework currently very complex, through the development of a graphical language coded and implemented.

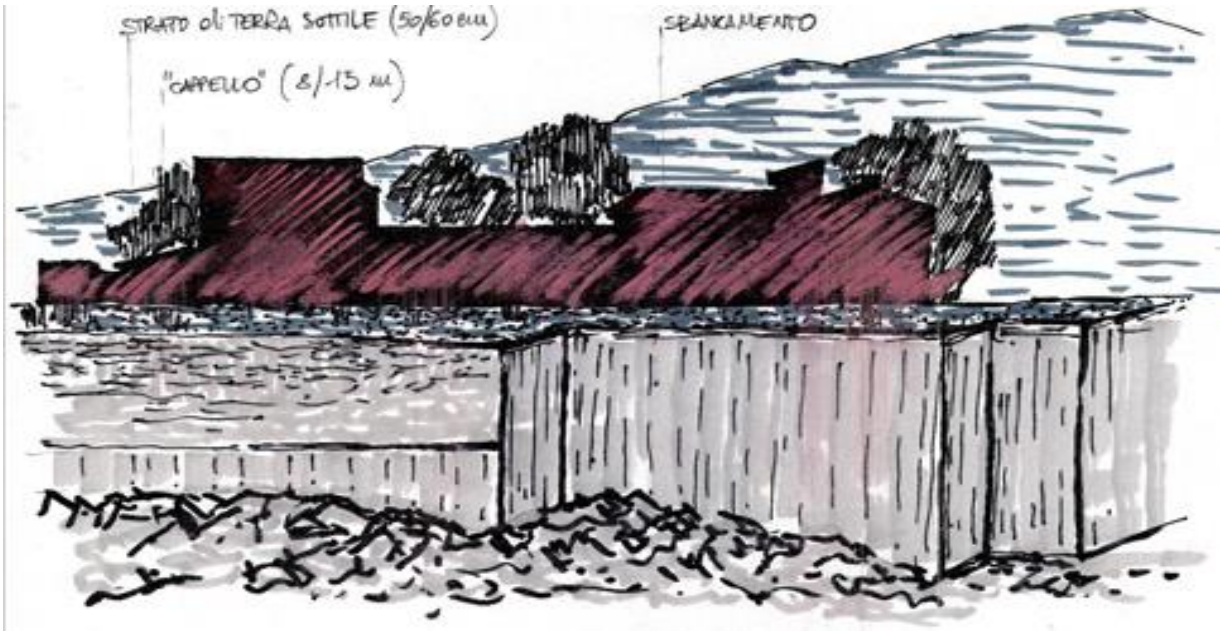

Fig. 9

Conclusion

What above exposed means to develop a model of the evolutionary dynamics of the territory and interactions with man-made actions. Consequently, we will have to identify data patterns that, interpolated and thematized, allow a simultaneous reading of all aspects of a built environment. The study of Casale Bernini and the appurtenance quarry is proposed as a model of knowledge applicable to qualify the network of quarries and buildings of that specific landscape, just because the investigation is polythematic and not fractionary: the topic is that of a historic Casale in relation to an under the sky quarry excaveted in a plan, with fronts of mixed spatial configuration in an extreme landscape. The presence of artificial constraints - such as the road network to support the plants, settlement buildings, placed in apparent randomness in the system of extractive industry - and natural ones - such as the water system and the orographic system - must be related and decoded to reveal the presence of invariants items. Reading a wide spectrum, accompanied by detailed information, the aim is to reveal the essence of the place: a mining landscape, characterized by secular activities, of which only a part disposal, and architectural artifacts of historical value, not yet subject to protective restrictions by laws. The theoretical orientation is also to include the methodological approach to survey in a procedural framework closely related to the project to improve the built environment [4]. The comparison with a different epistemology of the project will reveal the historic potential connected with restoration project of cultural heritage, within a system still largely industrial, for valuation strategies that can resolve open issues and create new development opportunities.



Fig. 10

Fig. 1, page 2: Sequence of maps surveying mobility infrastructure and urban settlement. From left to right: mobility infrastructure pattern (see Fig. 2, page 3); the border of urban imprint; the character of urban imprint related to its evolutionary processing (see Fig. 3, page 4); the overlapping of infrastructure and built areas (see Fig. 4, page 5).

Fig. 2, page 3: Mobility infrastructure settlement. In yellow, the E45 motorway; in red, the main roads; in ochre, the secondary local roads. The dashed red area is the Guidonia airport. We can note the close coherence between the roads layout and the morphological items of this territory. The prevalent direction of main roads is

parallel to the river and follows the connection between the extractive area and Rome, originally the principal travertine business basin. We can also note the thick pattern of local road very close to the mining area.
Fig. 3, page 4: The built area. In dark gray, the processing urban settlement; in medium dark gray, the steady settlement; in light shade of gray, the historical urban realm. The red dots mark the presence of the unite *casale*+quarry , with a greater concentration in the traditional mining area.
Fig. 4, page 5: The map shows the overlapping of the previous ones: mobility infrastructure plus urban settlement. We can observe the huge interruption of the urban imprint corresponding to the extension of the mining area and also the minute grain of urban texture – we can gather by roads pattern - in the areas very close to quarries.
Fig. 5, page 6: The urban settlement and the mining area. In dark pink, the excavation areas; in violet, the storing areas and those one used for travertine manufacturing. We can well observe the so huge dimension of mining areas, compared with urban imprints and other geographical signs.
Fig. 6, page 7: Perspective sketch indicative of the relationship Casale /querry. A first discretization of the environment relates to the identification of: superfetations, architectural elements for the recognition of settlement forms, spontaneous elements such as the presence of vegetation, access paths, topographical features. The view also shows the relationship between the development of the vacuum of the quarry and the vertical direction of the element punctual -house
Fig. 7, page 7: Eidotipo of longitudinal section of the querry. The profile shows the relationship among the Casale and the querry and the depth of excavation.
Fig. 8, page 8:: Eidotipi in plan and sections of the system house / quarry. It 'clear that the house stands as punctual element, positioned in apparent randomness within a territorial transformation. The performance of the sections are indicative of procedures for the extraction of limestone. Also indicates the presence of groundwater, element variable trend.
Fig. 9, page 8:: Sketch indicative of the relationship Casale /querry, in a near querry. The Casale/house is on the querry face.
Fig. 10, page 9: Photography and sketch of a quarry face with annotation graphics and written for the recognition of stratigraphic sections of travertine quarry. This gives a first reading of the different porosity of the material, a feature that will impact on the acquisition and return data with the laser scanner. Also highlighted are the vegetation system and the presence of machinery to carry out the extraction cycle. These are among the elements of temporality and variability of the environment.

NOTES

[1] This paper regards a didactic research in progress at the Department of Architecture of Roma Tre University, starting from the master thesis in architecture of Silvia Rinalduzzi, who's the author of the drawings collected in thse pages, under the direction of Laura Farroni, with Annalisa Metta e Francesca Romana Stabile.

[2] The use of laser scanner allows a high dimensional geometric control for framing in the environment and the environmental impact study. Specifically, the instrument offers a high flow rate of the shoot, the speed of acquisition, production of models DTM (Digital Terrein Model) and DEM (Digital Elevation Model), useful for the management of the quarry cultivation. Standardized operations are the calculation of the volumes (cut and fill also at different times to evaluate the areas of excavation) and surfaces, the extraction of the vectorized level curves of the area of quarry and the extraction of the sections of the quarry faces .

[3] To the digital returned model can be applied further information through the use of BIM.

[4] That sees the environment as a resource and not just tied to different constraints that may limit the development

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Le Vie dei Mercanti XI Forum Internazionale di Studi

Cultural landscapes in transition: Representation and relationship between shape and context

Serena ABELLO,[1] Chiara CANNAVICCI[2]
Department of Architecture and Design, Polytechnic of Turin, Italy
(1) serena.abello@polito.it; (2) chiara.cannavicci@polito.it

Abstract
The transition of the defense landscape understood as a variation, modification, of the image type, with different cultural backgrounds, communication objectives, completions of sense exists in parallel with the physical transitions, changes of use, changes in sense and meaning, as a real language. The fortifications draw the territory through a deep cultural stratification emerging interpretations of images with different and unique in shape and conservation condition have come down to us. Each historical period is characterized by methods and technologies available to designers: the representation is child of its time, from simple pencil sketches to “elevations” to the seventeenth-century prints perspective views to the current three-dimensional views. In order to better understand the nature of fortifications is essential to observe the changes of the project, from architecture “drawn on paper” to “drawn on the ground” from drawing to reality. The perfection of the geometric rule is applied on imperfect orography territory. Thus, the defense landscape lives and completes the transition “from war to peace”, with its use of structures for different purposes, including through the process of “visual transition”. They are fortresses, castles and fortifications born with functional and economic reasons that they cannot be reactivated today. However they can be modified and they can to transit to the topicality by acquiring new meanings and values.

Keywords: representation, fortification, shape, context, drawing

1. Introduction

This paper continues the issues presented during the IX International Forum of Studies "Le Vie dei Mercanti" of 2011 (Aversa-Capri) focusing mainly on the relationship between form and context [18]. At this meeting, there were reported the first results of a research conducted by Serena Abello under the guidance of Professor Anna Marotta, concerning the cultural landscape in its conception from the material to the immaterial. Here, we propose further results of the research project that is to be completed as part of the PhD thesis in Cultural Heritage. Some themes still have to be further studied and deepened, as the thesis could only outline the main guidelines.
The themes here presented are to be placed in a wider territorial system that allows to observe and describe the anthology of European defensive types (preserved in treated), able to provide a new and different "network of learning and knowledge", as shown in various examples, from theoretical texts in the territory application.
The transition of the defense landscape understood as a variation, modification, of the image type, with different cultural backgrounds, communication objectives, completions of sense exists in parallel with the physical transitions, changes of use, changes in sense and meaning, as a real language.
Thus, the defense landscape lives and completes the transition “from war to peace”, with its use of structures for different purposes, including through the process of “visual transition”: from a real perception to a virtual vision, for a different and fully awareness of the landscape, understood as a disseminated and understood Cultural Heritage. In the written contribution for the XVI International Interdisciplinary Conference "The cultural landscape mosaic in transition" of 2011 (Udine), Anna Marotta and Serena Abello propose, through an summarized outline of the method, an approach for the defense’ territory observation [19]. The study of the types of fortifications and the types of

representation were carried on through case studies taken as samples and gathered by categories with respect to typological and iconographic similarities.
The analyzed case studies are fortresses, castles and fortifications born for functional and economic reasons that cannot be reactivated today but that can turn and transit from the topicality by acquiring new meanings and values.

2. The context drawn: the defence territory

The fortifications draw the territory through a deep cultural stratification emerging interpretations of images with different and unique in form and conservation condition have come down to us [18] [19].
The perception of our cities is increasingly complex, and the observer becomes an insatiable researcher for new incentives and relationships. The definition of a specific territory, in particular the defense ones, requires the definition of landmarks thought as strong territorial signs with vast structures that characterize the urbanized areas. From their recognition it is possible to develop a restoration project, considering the existent as a mosaic of landscapes, that could be tangible or intangible. This constitute an integrated and consistent way to read the territory both in its complexity as in every single component.
The defense of the territory - with their "science and arts of war" constitutes, together with the food supplies, one of the human oldest activities. It can be considered one of the first human processes and therefore one of the first elements structuring of the landscape.
In particular we can notice how the symbolic value can be considered as an element able to support the cultural tourism – that is having an increasingly importance in the world economy – as well as social support if conceived as recognition of the population' identity.
The landscape, once became officially part of the Cultural Heritage, imply increasingly difficulties in decision-making because of the range of implicit meanings: the choice between the ideal image of the landscape – as proposed by Viollet-le-Duc – and the love for the ruin – as suggested by Ruskin – becomes complex. Von Humboldt, a member of the geographical and natural Mitteleuropean school, in 1846 defines landscape as "the entirety of an area features".
Among the key parameters for the analysis and observation of the territory, Anna Marotta [21] shows the relationship between two strong concepts like "geometry" and "architecture" that can be enhanced if they are correlated to each other, especially if the link between them is the word "construction". From the abstract form of the first of the first concept to the tangible physicality of the second one, the distance seems really short.
More in specific, Jacques Le Goff in his contribution (*Construction and destruction of the fortified city*) in the volume edited by Cesare De Seta [6], speaking about the city (in particular the city of foundation), shows that the urban phenomenon can be studied just starting from the concept of the "building": the city's history is articulated by alternating periods of construction, reparation, reconstruction with other periods of destruction and survival in the form of marks.
The research addresses the defense of the territory of the Alessandria area [Fig.1], as a vast anthology of fortifications types and military architecture. It has been inspired by the examples already studied by several authors – among them Anna Marotta, who has been crucial by her several contributions – trying to make a cultural connections within the Citadel of Alexandria [Fig.2] and others Citadel and City of foundation in a wider European context [7] [9] [12] [13] [14] [15]. This study determines a knowledge path and cognitive similarities and / or differences between the investigated types.

3. Representation and time

Each historical period is characterized by methods and technologies available to designers: the representation is daughter of its time, from simple pencil sketches to "stand up" to the seventeenth-century prints perspective views to the current three-dimensional views.
The representation has to be seen as an educated and critical knowledge operation that enables the communication and dissemination of a message. Of course, one of the first steps, to exploit the full potential of representation and visual communication at the same time, is the selection and definition of an adequate representation code. The collection of drawings in the Treatise of Wilhelm Dilich [1] make us understand, through the beginnings of the current representation codes, how the characteristics of fortified systems are described with embedded images, usually a floor plan and a front view. In the following pages there will be reported an example of fortification built on high ground [Fig.3] [Fig.4].
The representation of this specific structure can not be described exhaustively only by its planimetric view. Therefore it has to be associated with the design of the landscape in a three-dimensional view which is exactly halfway between the traditional statement of orthogonal projections and the axonometric and landscape definition.
In the eighteenth century the territory is mainly described in drawings of the "landscape" artists, how substantiate its entity through three-dimensional images, making the representation – this type of

representation – the best that allows the "visual possession" of the whole surrounding territory [Fig.5] [Fig.6]. These drawings were also performed works by survey operators – architects and engineers as well as artists-geographers – who, with few simple sketches, conveyed the thought and knowledge of the area to armies and leaders [20]. The landscapes also became the opportunity to represent the war describing the fortified structure at specific war event, as well as the attack and defense techniques at that time. Such representations, also if not metrically reliable, constitute a fundamental document for historical memory. The “views from above” representation, or axonometric and aerial perspectives have been constituted for a long time the element to convey the architecture and landscape knowledge. Moreover, in theory, the Treaties provide us the formal features of the fortifications, whereas the project drawings allow us analyze the cultural context (investigating similarities and/or differences with the theoretical types).
At the same time the observation of the existent – with its graphic outcomes – allows us to verify the conservation state (including in relation to the original functions, modified or not) with the changes of the mutual relations between the defense project and territory, welded in a "defense landscape" in transition. The integration of various representation codes has been accompanying the iconography over time until, for example, the nineteenth-century celebrating drawings of the fortress of Bard by Francesco Antonio Olivero, that follow the established discipline of geometric design [Fig.7].
The assume is confirmed both for the traditional representation and the digitally expressions – in the geometrical thought as well as in the practice – it constitutes the fundament of the architectural formation and production. This is true both for the architectural and urban dimension: especially for defense architectures and cities of foundation.

4. Architecture “drawn on paper” and “drawn on ground”: the shape

In order to better understand the nature of the fortifications is essential to observe the changes of the project, from architecture "drawn on paper" to "drawn on ground" from drawing to reality. The perfection of the geometric rule is applied on imperfect orography of territory [Fig.8].
In the implementation of the project from the intangible drawings to the materiality of realization often occurred that the perfection of the project had to fit the land conformation: the drawings were corrected during the execution phase and later depending on the peculiarities of the site.
In this case the representation can be seen as a tool for verification of the existent from the drawn project, in comparison with the archival documents, those belonging to the treatises (and iconography) and the physical reality. From research carried out on fortifications emerge that there are some case studies that allow the comparison of experiences very different each other. In this report, we want to give two examples of the relationship between architecture "drawn on paper" and "drawn on ground" and finally realized: the walls of Tortona and the Citadel of Alessandria.
Tortona is recognizable as a particular case in which architectural elements are "invisible" and no longer existing but where we can identify them through the knowledge of archival documents [Fig.9].
During her analysis phase on the Tortona Castel’s shape, Anna Marotta [15] had to face with sources that mention how the original design was changed several times to adapt to the existing territorial situation.
The drawings show that from the "perfect geometry" with six bastions of the fortifications, the fortress had to adapt to the existing structures of the territory. The first version of the project is characterized by perfect geometric rules, then it has been transformed to meet the built environment. In this case, the project designed by the mathematician Campione has respected the position of the Convent of San Francesco that stood just outside the borders. The drawing also offers two variants for a section of the wall in which it was decided that “*Il colorito di Giallo pare meglio parere che fare la linea Rossa / e solo si fà una faccia in più*”. The design is considered an important document to understand the study and research of the best walls conformation in the existing territory.
The case study of the Citadel in Alexandria represent an example of fortification which, starting from the contemporary treatises indications, fits the physical conformation of the context in this specific case also geological [9].
Amelio Fara [5] describes the Bertola fortified hexagon, referring to the particular hexagonal shape and its deformation with the consequent loss of radial symmetry. In the specific case describes the generated shape as inscribed in an ellipse. Fortified hexagons take shape in the sixteenth century and are developed mainly in the seventeenth century, for example in the transformation of the hexagonal citadel in the castle of Milan, as well as the citadels of Perpignan and Casale, the Goletta Nuova, the hexagons of Vauban and Coehoorn.
Before dealing with the project for the Citadel of Alexandria, Ignazio Bertola has meditated on the theory of the fortified hexagon. His "Inventory of fortification" shows that he studied in particular in the treaties of Daniel Speckle (1589), Claude Flamand (first edition in 1597), Vincenzo Scamozzi (1615), Peter Sardi (1618) Pierre Mallet (1666), Donato Rossetti (1678), Du Fay (1681), Menno van Coehoorn (1685), De Cambray (1689), Doroteo Alimari (1692), Naudin (1695), Johann Friedrich Pfeffinger Junior (1698). Gabriello Busca, were defined as 'specialist of mountain fortresses' because he was able to

design observing the different levels of altitude that may affect the safety of a place controllable from above. In 1601 he wrote that "*la figura di sei lati fa il belouardo perfetto con la punta, se non retto, di pochissima cosa minore*" [9].
The shape of this peculiar fortress is coming from the need to allow the soldiers' wait as near as possible to the river, in order to take advantage of the best natural obstacle that you could have: the Tanaro river. Other factors that influenced his elliptical form, no longer evident, were related to hydrological issues: a large area in the south-west side of the fortress was (at that time) invaded by a branch, now deceased, of the Tanaro, with stationary and muddy water.
Furthermore, the chosen shape had also the purpose to avoid laying the foundations on areas prone to flooding. Bertola was able to design a form characterized by great harmony and rationality.
We can also compare in the literature different definitions of the shape of this fortified structure: "hexagon elliptical" and "hexagon oval" at the same time. Of course this dichotomy of terms can be evaluated only after a verification of the actual shape through an appropriate survey because, the geometry of the two geometrical figures can be obtained by different processes.
Finally, we can notice that the citadel was designed, and its location has been defined, mainly "on paper" and subsequently has been assessed the impact that this project would have: the complete destruction of an entire neighborhood with a major impact on urban conformation and its neighborhood as well as on its future opportunities for growth and expansion.

5. Conclusions

The architecture verification from the representation "on paper" and from the survey "on ground" can be the fundamental basis of a new representation which, also through digital technology, enable the revision, the study and the possibility of recovery in order to bring of the defense system from the past to the future, making itself an active part on this process.
The redesign of the built environment becomes a verification tool able to highlights the intrinsic value of the choice of an appropriate representation code. The drawing is then proposed as an explanation of the form as well as a tool for its comprehension and verification.
The representation codes – especially the axonometric one – have been crucial in the past for the checking of the fortified buildings. When the construction of physical models (*maquettes*) was too expensive, axonometric projections were the solutions for the calculation and verification of the range, for example, of the cannons. The great dissemination power of digital animations could act as a suitable tool to explain the geometry of fortified building that, starting from an hexagonal scheme as defined by treatises, could describe the really made conformation, as in the Alexandria Citadel case study (inscribed in an ellipse with major axis parallel to Tanaro river).
Moreover, the notion of shape can be extended from architecture sphere to the urban context. The value of the geometric construction of the territory is confirmed with great vividness in the fortified city, which was for centuries the urban prevalent model in the West world. This model is today presented to historians as a material structure at the same time, urban, social, political and, from the representation viewpoint, as an conscious and recognizable image. In particular, from what concern the urban form, the planimetric conformation of the current Citadel of Alexandria allows the reading of formal modifications which led to the tradition "from war to peace" up to the present. The urban form was substantially blocked in its expansion until more recent times, when the preservation of the fort territory has been forgotten leading to an incontrollable spread of buildings. But this is another topic ...

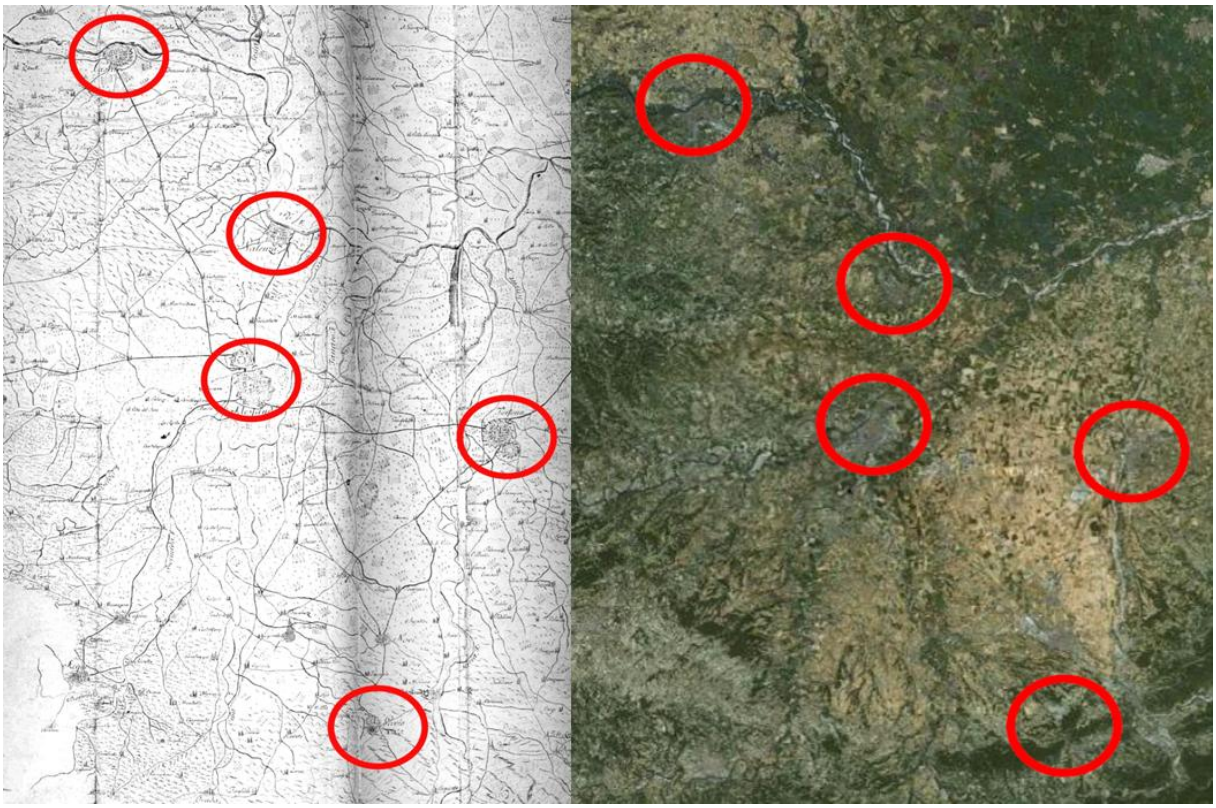

Fig. 1: Mapping of the case studies considered in the Alessandria area. Composition of images to describe the situation and emphasize the transition from past to present. From the left: Part of [XVII secolo]. Johannes Jansson, *TERRITORIO / DI / PAVIA, LODI, / NOVARRA, TORTONA, / ALESSANDRIA / ed altri vicini dello / Stato di Milano*, from Anna Marotta (a cura di), *La Cittadella di Alessandria. Una fortezza per il territorio dal Settecento all'Unità*, SO.G.ED. Edizioni, Alessandria 1991, p. 102-103. To the right: map from *GoogleMap* consulted on april 2010. From the top to the bottom: Casale, Valenza, Alessandria, Tortona and Gavi.



Fig. 2: Aerial view of the central area of the Alessandria city. Peripheral areas of expansion of the city extend to the North, South and West. You can see, underlined in red, the Citadel beyond the Tanaro river. (www.bing.com/maps/).

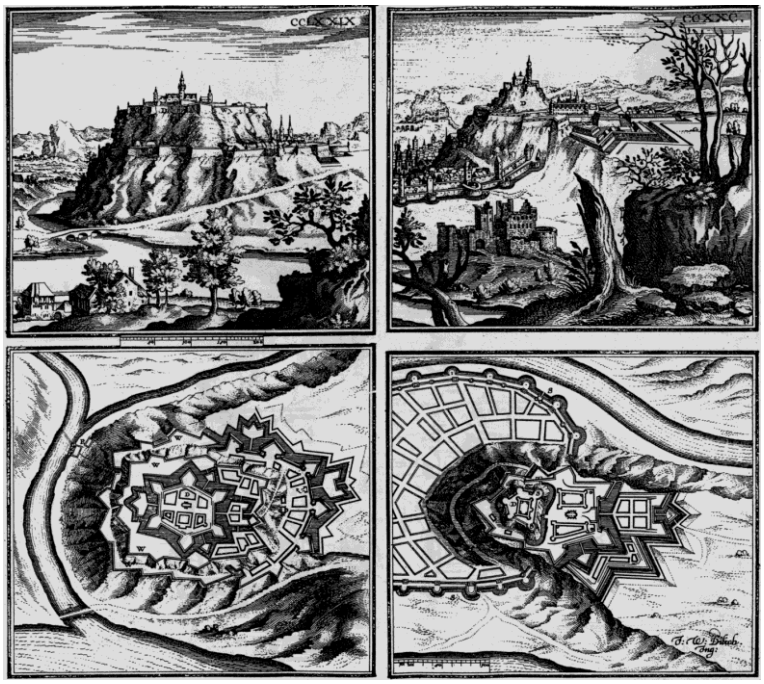

Fig. 3: Examples of fortifications on high ground. map and representations of the landscape. Images from Johann Wilhelm DILICH, *Peribologia oder Berichy Wilhelmi Dilichy von Vestungsgebewen vieler Orter, vermehrett wie auch mit*, Unterschneidheim, Munchen 1640.



Fig. 4: Another example of fortification on high ground. map and representation of the landscape. Images from Johann Wilhelm DILICH, *Peribologia oder Berichy Wilhelmi Dilichy von Vestungsgebewen vieler Orter, vermehrett wie auch mit*, Unterschneidheim, Munchen 1640.

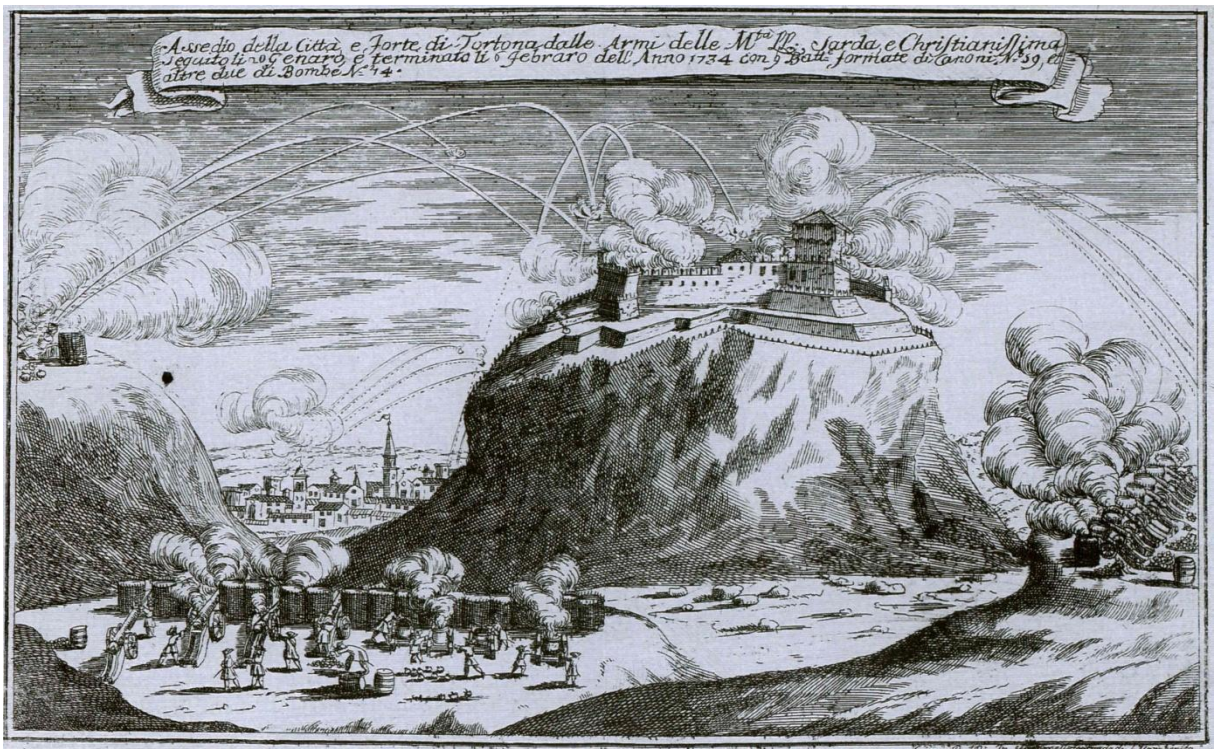

Fig. 5: 1734, 20 January – 6 February. *Assedio della città e, Forte di Tortona dalle Armi delle M.tà PP. Sarda e Christianissima […*]. Image from Anna Marotta (a cura di), *Tortona e il suo castello, dal dominio spagnolo al periodo postunitario*, SO.G.ED. Edizioni, Alessandria 1995, p.91.

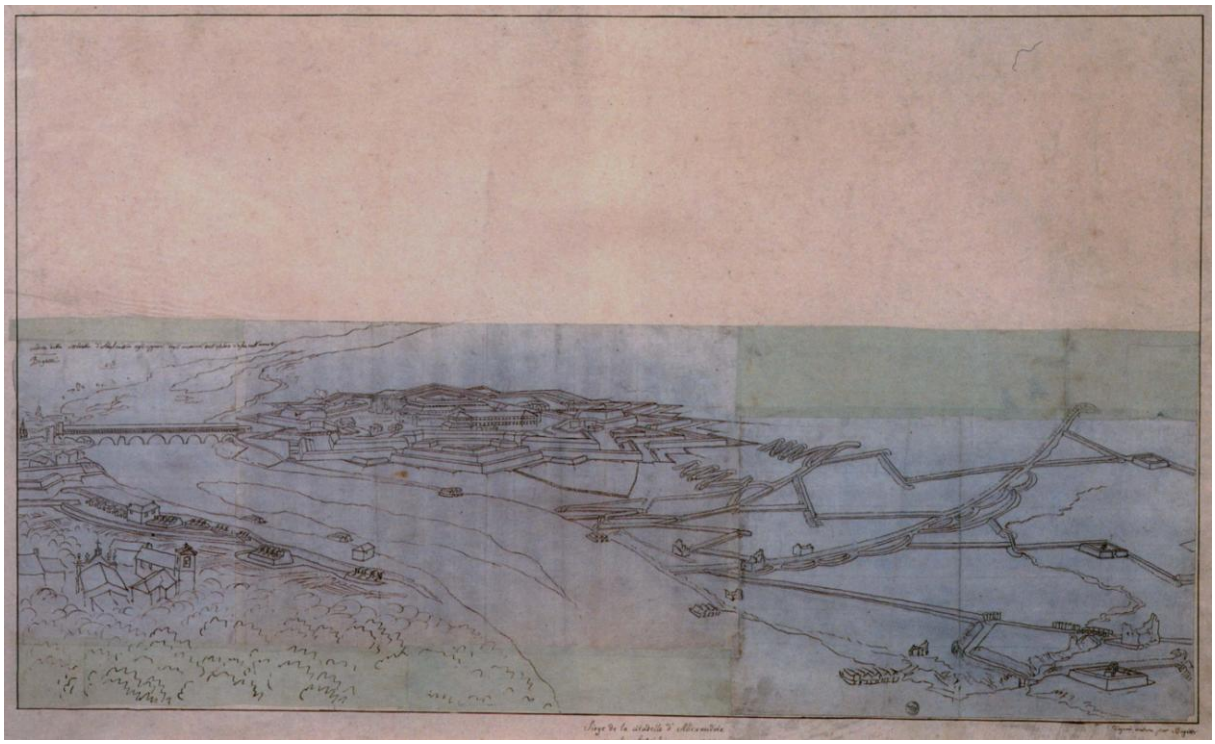

Fig. 6: [1796]. Giuseppe Pietro Bagetti, *Siège de la citadelle d'Allexandrie*. Image from Anna Marotta (a cura di), *La Cittadella di Alessandria. Una fortezza per il territorio dal Settecento all'Unità*, SO.G.ED. Edizioni, Alessandria 1991, p.52.

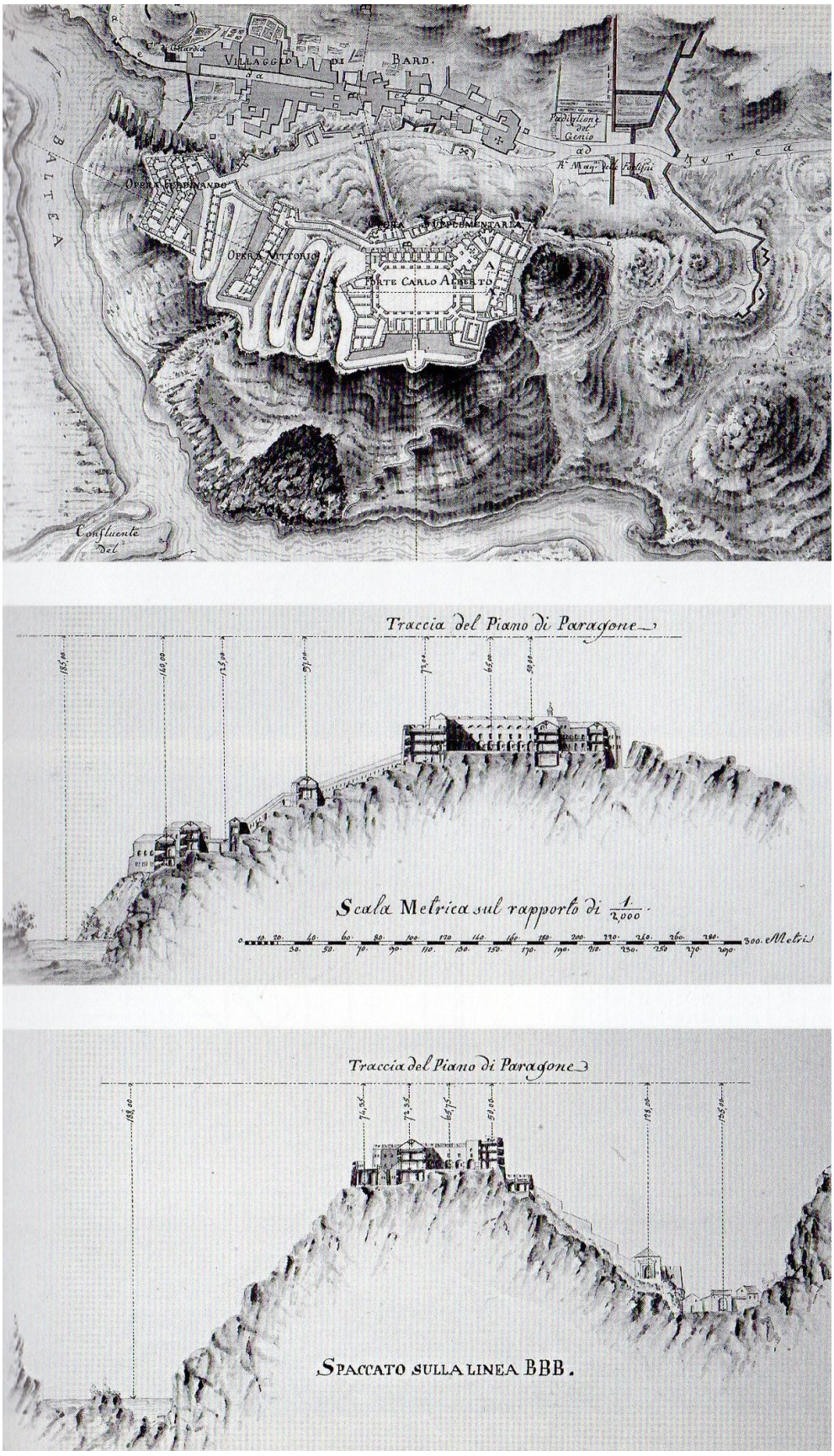

Fig. 7: 1838, Francesco Antonio Olivero, *Disegno celebrativo della fortezza di Bard*. Icnografia - Spaccato longitudinale – Spaccato trasversale. BRT. Image from AMELIO FARA, *Luigi Federico Menabrea (1809-1896). Scienza, ingegneria e architettura militare dal Regno di Sardegna al Regno d'Italia*, Leo S. Olschki Editore, Firenze 2011.

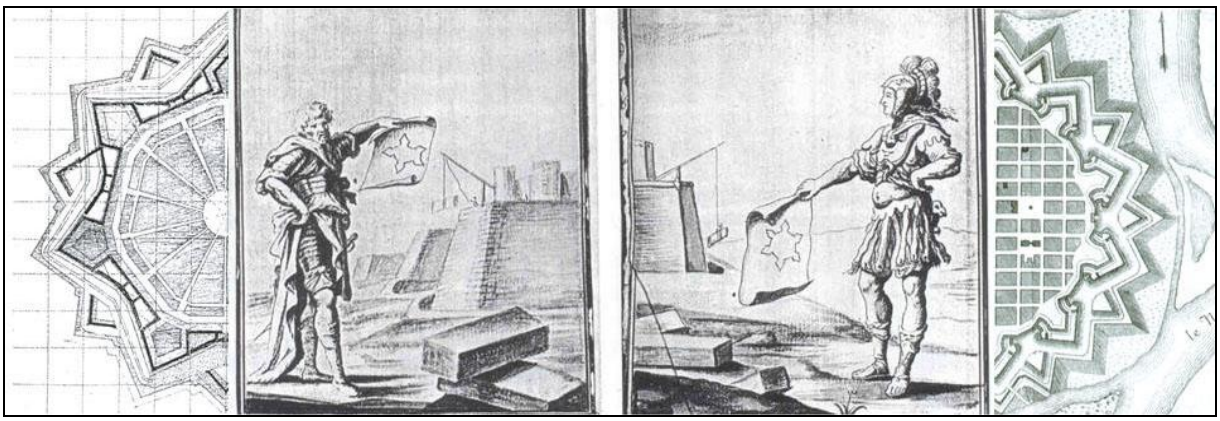

Fig. 8: Reworking of images from different sources to show how the fortifications – as well as all the buildings – are the result of several steps, starting from the design on paper regulated by the geometric perfection, to the realization by adapting to the real situation of the territory (image by Serena Abello, 2011).

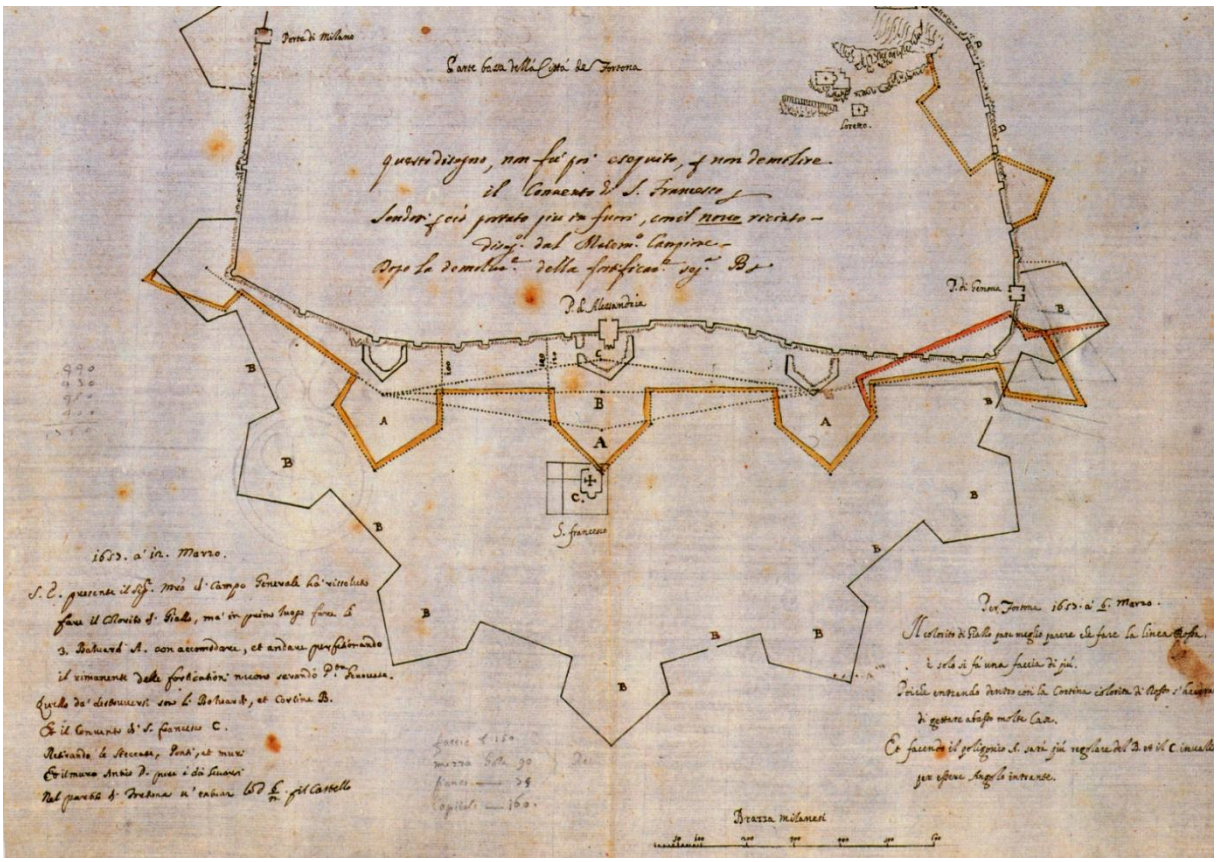

Fig. 9: [1657, 13 marzo]. A. Dissegno aprovato da S.E. [...] S. Francesco con fare li sei Baluardi come si vede dall'ordine dé 13 marzo (sul verso). Disegno su carta, inchiostro nero, rosso e giallo (283 x 383 mm). Il commento riporta quanto segue: "Questo disegno non fù eseguito, per non demolire / il Convento di S. Francesco, sendosi poi portato più in fuori, come il novo recinto / diseg.to dal matem.o Campione. Dopo la demolizione delle fortificazioni segnate B.". In basso a sinistra si legge quanto segue: " 1657, à 12 Marzo, / S.C. presente il Sig.r Ma.o di campo Generale hà rissoluto / fare il colorito Giallo, mà in primo luogo fare li / 3. Baluardi A. con accomodare, et andare perfezionando / il rimanenze delle fortificazioni nuovo servando P.ta Genovese. / Quello dà descriversi sono li Baluardi, et Cortine B. /Et il muro Antico pure è da servarsi / Nel partito di Tortona à entrare del 6/m per il Castello". In basso a destra è riportato quanto segue: "Per Tortona 1657. à 6 Marzo / Il colorito di Giallo pare meglio parere che fare la linea Rossa / e solo si fà una faccia in più. / Poichè entrando dentro con la cortina colorita di Rosso s'haverano / di gettare abaso molte case. / Et facendi il poligonio A. sarà più regolare del B. et il C. invalido / per essere Angolo intrante". BTM, Belgioioso, Fortificazioni, cartella n.265, p.47. This image shows the drawing that, from geometric perfection of fortification project, must adapt itself to the real situation of the territory. Images from COMOLI MANDRACCI, Vera, MAROTTA, Anna (a cura di), Tortona e il suo Castello. Dal Dominio Spagnolo al Periodo Postunitario, SO.G.ED. Edizioni, Alessandria 1995.

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HERITAGE ARCHITECTURE LANDESIGN
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Sustainable Landesign for Archaeology

Ottavia GAMBARDELLA
Department of Architecture Federico II, Naples, Italy
ottaviagambardella@gmail.com

Abstract

The abstract proposes an illustration of a Research carried out during the Workshop "Archaeology and Architecture: Campi Flegrei"1. The aim of the Workshop was to identify strategies of intervention to enhance the cultural and archaeological heritage of Campi Flegrei in Pozzuoli. My research is focused on the theme of landscape design and mobility at urban and territorial scale. The mobility infrastructure has a key role in the use of cultural heritage "establishing violent, though sometimes suggestive, relationships with the context" (B. Secchi, 2000). The mobility space is not only seen as a simple connection element but as real place for socializing and living outdoor. The design approach for the regeneration of the areas is characterized by the use of a complex and integrated system of sustainable mobility, which is a hybrid between the traditional public transport and alternative means of transportation. One of the aims is to change the approach of people to the mobility in the territory, promoting knowledge of the city and a perception of archaeological sites different from those given by the use of the car. The complex system of sustainable mobility and the redesign of the urban park proposed could represent strategic tools to improve the habitability of archaeological sites and the quality of life of citizens, in a new concept of city that is not only welcoming or supportive but that can reinterpret itself and interpret new forms of living, mobility and production.

Keywords: sustainability, mobility, Archaeology

1. The Analysis of the area

The Campi Flegrei is a large volcanic area situated in the north-west of the city of Naples. The area is characterized by a strong presence of volcanoes and archaeological finds that determine an enormous historical, environmental and territorial importance. During the Workshop "Archaeology and Architecture: Campi Flegrei" my research has been focused on the identification of strategies of intervention to enhance the cultural and archaeological heritage of Campi Flegrei in Pozzuoli through the regeneration of the areas and the creation of a complex systems of sustainable mobility. From the Plan it is possible to notice the landscape importance and the strong presence of archaeological sites in the area. The archaeological remains, due to their fragmentation and the absence of historical and urban contextualization, present a condition of incongruence with the territory. Both the remains visible for centuries, and the finds discovered or rediscovered recently are not or poorly integrated with the urban space. There is mostly a musealization to fulfill conservation purposes. There isn't a dialogue between the different times of the city, thus reducing the archeology passive object of a merely aesthetic contemplation. To avoid the embalming of archaeological remains - and its reduction to relic of memory - the architectural design should try to trigger new relationships between the finding of the past and the contemporary urban landscape.

[1] Workshop that took place in the University of Naples Federico II, Department of urban Design and Urban Planning, on June 2012, proposed by Professors F. Izzo, P. Miano, L. Pagano.

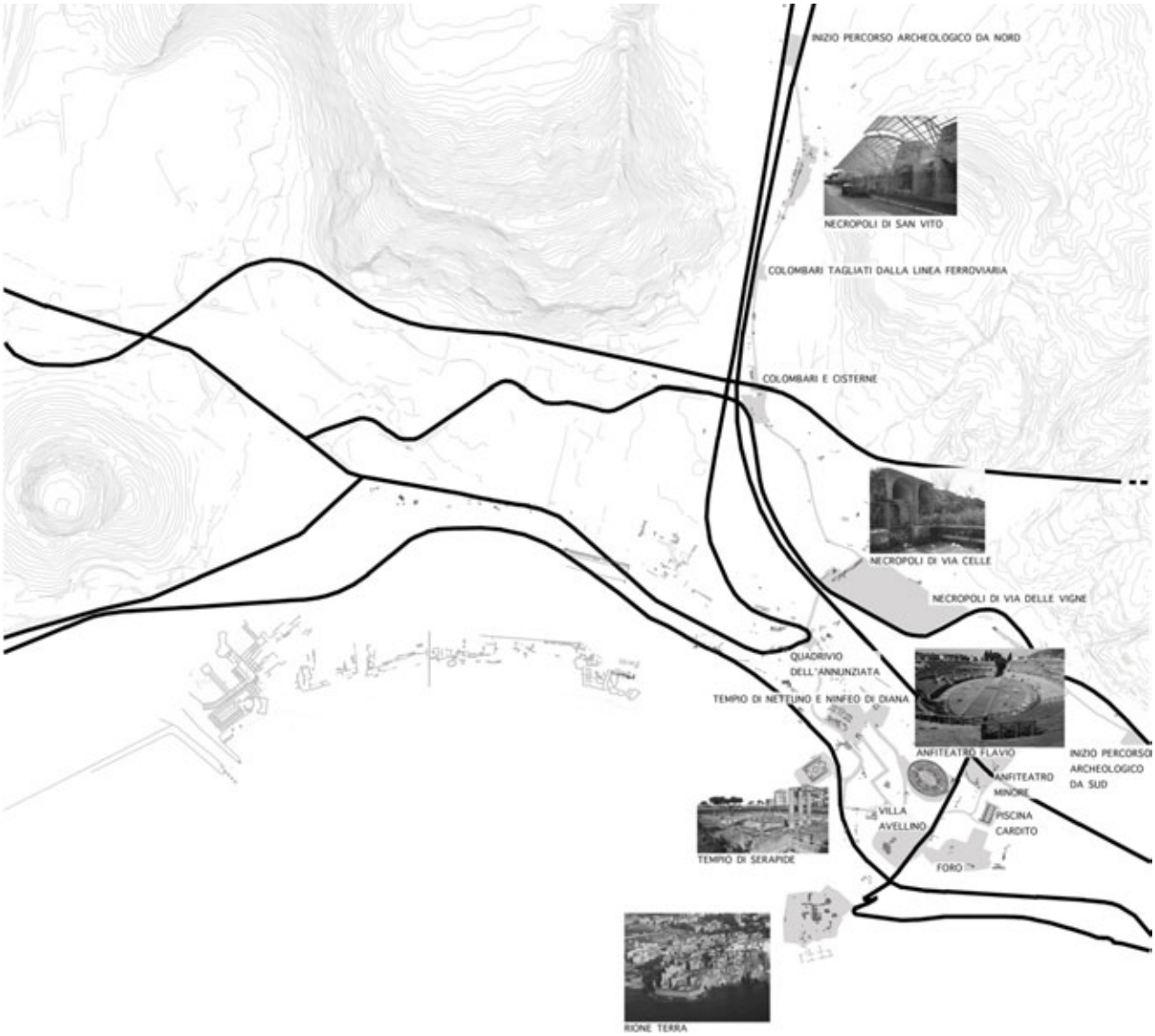

Fig. 1: Areas of interest.

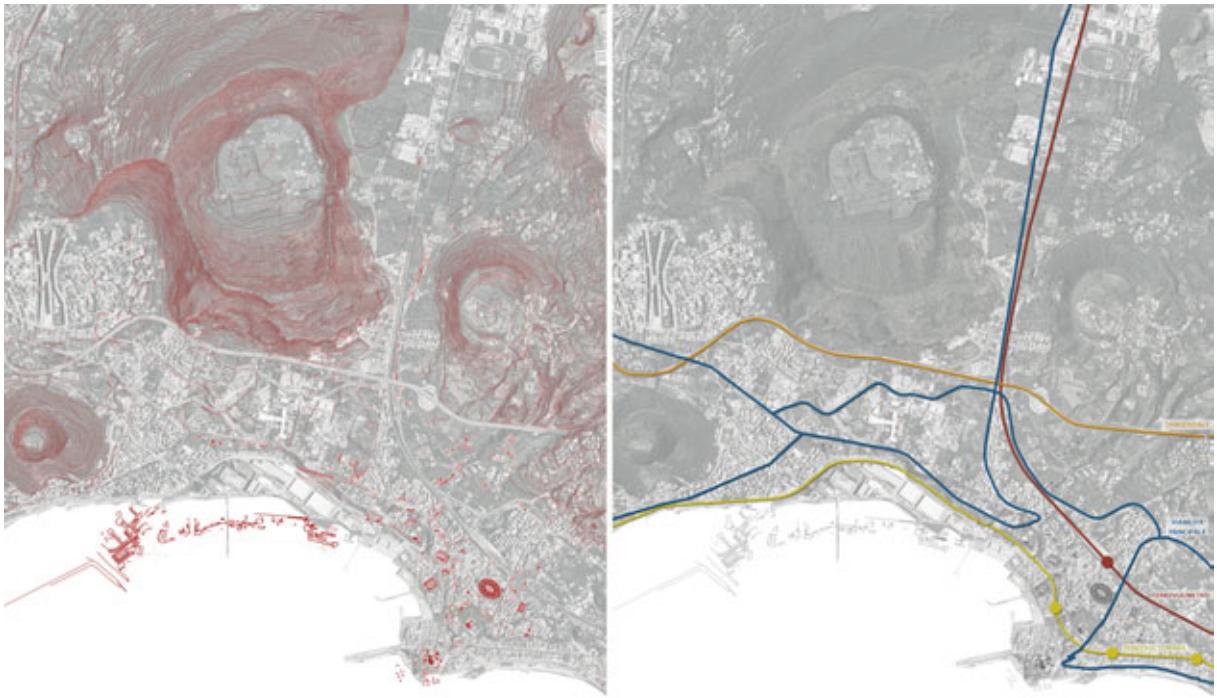

Fig. 2: Morphology and Archaeological areas| Infrastructures.

The plan highlights and shows the archaeological sites of major interest in the study area considered during the Workshop, (the Rione Terra, the Temple of Serapis, the Flavian Amphitheater, the Necropolis of Via Celle, the Necropolis of San Vito, etc.) and it shows the idea of an archaeological trail to connect them together. Currently the area is characterized by a reduced or absent accessibility to archaeological sites, by a lack of integration with the context and with the existing infrastructure, by a strong traffic resulting in congestion of certain road networks. As it is possible to see from the plan the area has a relatively well-developed infrastructural facilities (rail, metro and roads). It is characterized, however, by a lack of sustainable mobility, lack of public spaces, green spaces and urban parks, overload of traffic, inadequate parking system, widespread presence of unused areas that are characterized by spontaneous vegetation and degradation, and the environmental and landscape quality of the context is not adequately valorized. But the same territory is also qualified by the presence of several factors interpretable as strengths that form the basis from which it is possible to define the strategies oriented towards a sustainable redevelopment. The availability of historical and archaeological heritage, the presence of a significant natural heritage and the good existing infrastructure networks, represent strategic factors exploitable in the view of a sustainable process of development to valorize and to enhance the cultural identification of the territory.

2. The Strategies

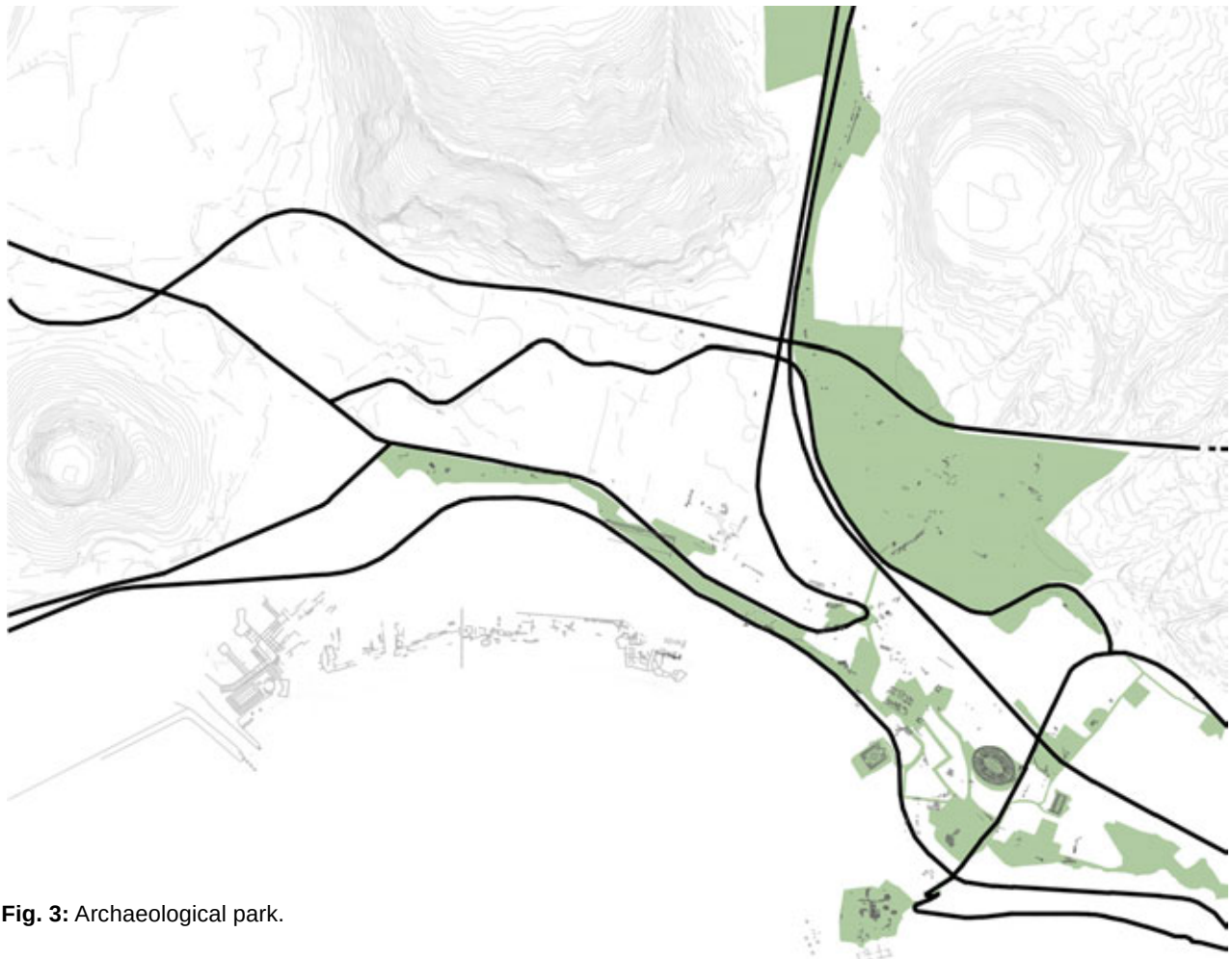

Fig. 3: Archaeological park.

It is 'essential a rethinking of public open spaces that should be reorganized through a unified design that enhances the archaeological areas, improving the management and use. The archaeological park proposed in the plan would have the function of connecting the various archaeological sites scattered across the territory, but also to regenerate unused or degraded areas, provide green spaces, create public spaces and meeting places, increasing the environmental quality of the area.



Fig. 4: Archaeological route.

Like the built environment, the space of mobility is not continuous as a fully connected network; you can read it instead, as an addition of separate layers that have different uses, in the complex urban “palinsesto” (A. Corboz 1985). It is necessary to analyze the infrastructure system to understand the role they have played and still have in creating the shape of the city. It is not seen only as a simple connection element but as real place for socializing and living outdoor. The design approach for the regeneration of the areas mentioned before is characterized by the use of a complex and integrated system of sustainable mobility, which is a hybrid between the traditional public transport (metro, electric bus) and alternative means of transportation (bicycle lanes, bike sharing, electric car sharing, cable car). This system could constitute a valid transport alternative to private vehicles with the result of a strong reduction of vehicular traffic. One of the aims is to change the approach of people to the mobility in the territory, promoting knowledge of the city and a perception of archaeological sites different from those given by the use of the car. The most appropriate strategy in this urban area could be a system of squares and pedestrian paths within the broad areas in the park. It seems of particular interest the study for the connection between the compact urban area (where the greater amphitheatre is located) and the hills to the north of the Via Campana, currently separated by the railway. It is important to note the crucial role of the urban mobility system, as part of the redevelopment of this area that has to deal with the concepts of environmental sustainability and the new social and cultural needs of the inhabitants. Strategic actions on mobility, as well as the reconfiguration of the entire system of public spaces, allow to redefine the structures hierarchies and to bring to fruition the collective abandoned places or the hidden high environmental qualities. Improving the system of

mobility in a sustainable way, through the introduction of alternative forms of transportation, the offering of innovative solutions for the context, the optimization of all the forms of transportation, the integration of different types of collective and individual transportation, and the introduction of pedestrian and cycle paths, together with the rationalization of traffic flows, is a necessary step to improve the quality of the environment and the lives of the inhabitants. Given the high natural and historical value of the interested areas, it has a considerable influence the enhancement of sustainable tourism, through the insertion of paths and tourist routes of large area, resulting in the development of new economic activities related to tourism oriented towards the discovery and the enhancement of historical and natural resources. Another important aspect of the project is the integration of research built with a green project, with the reconfiguration of spaces and the creation of new ecological connections and the improvement of environmental quality. In addition to improving the quality of life of citizens and the environmental quality, these actions could allow greater synergy between different economic sectors (culture, tourism, services, etc.), including through the organization of events capable of giving increased visibility to the territory and to its economic activities

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USE OF A SCALE MODEL UNDER ARTIFICIAL SKY FOR DAYLIGHTING DESIGN

Antonio ROSATO, Michelangelo SCORPIO, Sergio SIBILIO
Seconda Università degli Studi di Napoli, Department of Architecture and Industrial Design "Luigi Vanvitelli", Borgo San Lorenzo, Aversa (CE), 81031 – Italy.
Mail address: antonio.rosato@unina2.it
Mail address: michelangelo.scorpio@unina2.it
Mail address: sergio.sibilio@unina2.it

Abstract
The energy saving has been labelled as "the first renewable energy source" and thus it can play an important role in the reduction of electrical energy use for artificial lighting. A way to achieve this consists in a conscious and careful use of daylight design, within the architectural design process, aimed to evaluate the natural lighting conditions inside a building and for studying the distribution of daylight across a space.
In this paper are presented the results of daylighting measurement performed inside an artificial sky of a "mirror box" type where a scale model of an industrial building was tested to acquire data on internal illuminance levels, daylight factor and luminance distribution of internal surfaces.
Data were then compared with those obtained by a computer simulation software to determine the potential savings due to daylight and to compare the physically accurate simulation results vs. videographic measurements.

Keywords: Scale model, artificial sky, daylight factor, Ecotect, Radiance

1. Introduction
Nowadays the daylighting impact on interior building requires particular attention with reference to the several steps of the design process, due to the “environmental issue”, that claims for energy savings above all and for energy use reduction in the artificial lit environment. To this aim, the daylighting potential assessment can be exploited by means of several tool that offer to architects, the way to evaluate the daylighting performance during the several design choices. Many software are commercially available, and the daylighting calculation can be “physically correct” depending on the capacity of simulating all variables that occur during the process (sky luminance distribution, glazing characteristics, internal wall and furniture characteristics, etc…). On the other hand when the building shape becomes very complicate or it is essential for architects to personally appreciate the luminous environment of a space and to compare several solutions qualitatively, the use of scale models allows to evaluate the light behaviour under real sky or, using an artificial sky, to achieve repeatable data to compare the results for different design solution. The scale model utilization lead not only to an intuitive appreciation but can give, when properly constructed, the distribution of daylight within the model as exactly as in a full-size room with very accurate results. Especially for complex model, it is essential built it carefully to obtain accurate results. To reduce arising errors in the scale model construction and evaluation, several rules and tricks have been developed [1]. The use of scale models offers the opportunity to use real material and, if used under artificial sky, to simulate many tipe of sky condition. Since materials used to built scale models represent a fundamental aspect to get accurate data, it has been developed a tool to help architects and lighting designers to choose suitable materials to build scale models [2].
Daylighting models are used throughout the architectural design process to help make decisions about the natural lighting conditions inside a building and for studying, above all, distribution of daylight across a space, luminance evaluation and quantitative measurement of daylight levels in a space with

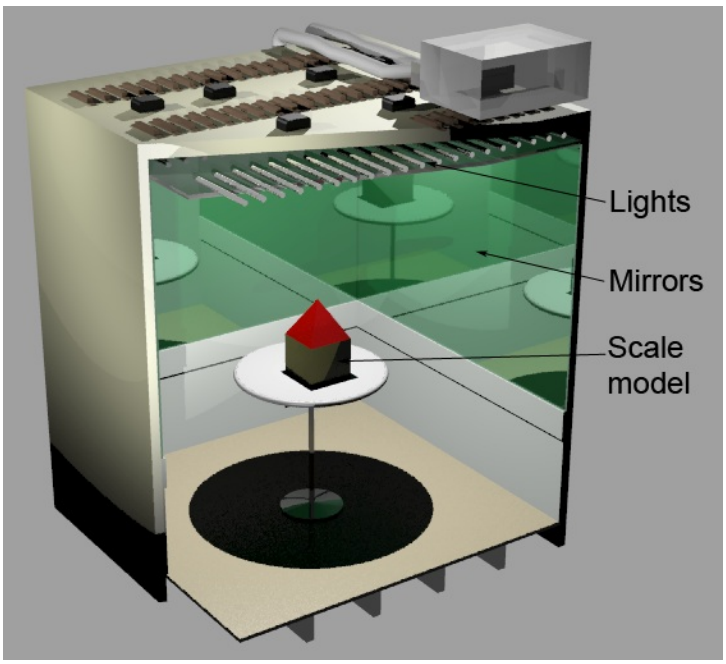

Fig. 1: The artificial sky realized at Department of Architecture and Industrial Design "Luigi Vanvitelli".

its potential lighting savings. Together with other prediction tools, like computer simulations, daylighting models have the advantages of seeing and evaluating the daylighting both qualitatively and quantitatively, modelling spaces with geometries too complex for computer simulation and finally, changing and optimizing for the best lighting conditions.
In this paper are presented the results of a research developed, involving, by several steps, the available “tools” for the assessment of daylighting contribution in a lighted environment.

2. Sky simulator facility

To offer to architects, lighting designers and students the possibility to evaluate lighting performance in buildings, at Department of Architecture and Industrial Design "Luigi Vanvitelli", an artificial mirror sky was realized. The figure 1 represents a reconstruction of the artificial sky realized, in which is possible to identify the position of mirrors, lights, scale model and the other components.
The artificial sky consists of a box (3 m x 3 m) whose walls were coated with mirrors and whose ceiling was realized by a bank of linear fluorescent lamp behind a plate of opal polycarbonate. It was realized and calibrated to simulate the CIE standard overcast sky distribution [3].
To allow the acquisition of data, artificial sky was equipped with illuminance sensors and a luminance measuring camera. When a scale model was tested inside the mirror sky, are acquired the internal illuminance levels, to calculate the related daylight factor (DF) and the luminance distribution of internal surface, to know the distribution of daylight within the model.
The daylight factor, so calculated for different points of scale model, were then compared with those obtained by a computer simulation software “Ecotect” and “Radiance” to determine, with its daylighting features, the potential savings due to daylight while, the luminance distribution, acquired using luminance measuring camera, was compared with those obtained by a computer simulation software “Radiance” to evaluate the physical accuracy of simulation results.

3. Methodology

This paper deals with process of the renewal and refurbishment of the fabric of an industrial building; in particular the building considered housed an old “Opificium”. In figure 1 is reported an external view of the building analyzed. The research has been organized in four steps:

- The first step is to raise information about the state of the structure and the environment in which it was located, the geometry and the photometric characteristics of the material used to realize it.
- The second step is to realize a scale model for reproducing geometry of the real building and the property of materials characterized in the first step.
- The third step is to implement a geometric model of building in a simulation program.
- The fourth step is to compare experimental and simulation data [4] and to verify that the daylight is compliant with italian standard.



Fig. 2: An external view of the “Opificium”.

3.1 Site characterization

To obtain geometrical information about site, building dimension, form and orientation, internal division of space, position and dimension of windows, an on-site survey was realized.
In the same way, the surfaces were characterized by photometric point of view, using a spectrophotometer (Minolta CM – 2600d). The photometric characteristics of walls, ceilings and floors were measured and were archived through graphic data, about colour and reflectance property, and numerical tables, about colorimetric values and indices. The properties were evaluated considering the specular component included and excluded.
The site survey, showed that the building required major repair, especially for the stonework which has weathered or decayed to a structurally unsound or aesthetically displeasing condition.

3.2 Daylighting model and acquisition systems

The investigation target was the evaluation of daylight distribution inside the building and the proposal for an integration with the artificial light. To this aim a scale model was built-up with appropriate scale and materials. The materials photometric characteristics measuring in situ were used to define the property of scale model surfaces.
The model was realized using wood to ensure a very robust structure; to reproduce photometric measured values wood surface was coated with white paint. In this first analysis step, the windows were not considered. To limit the disturbance, that the presence of scale model brings to the artificial sky luminance distribution due to the limitation of the inter-reflexions, the size of model was limited to 0.3 m for height and to 1.0 m x 1.0 m for base.
To guarantee the accuracy of experimental measurements, it was not sufficient to realize with care the model and to choose its size to minimize the disturbance of the artificial sky luminance, but many attention were also placed into collocation of illuminance and luminance sensors. For this reason, several instrument have been employed for scale model experiments [5].
The model, so realized, was then tested under the artificial sky developed at the Department of Architecture and Industrial Design "Luigi Vanvitelli".
To evaluate the distribution of daylight factor, the illuminance values, inside and outside the model, were acquired with miniaturized photometric sensors. The illuminance sensors were made by PRC Krochmann Gmbh and have a small directional error (cosine correction). Similarly, to evaluate the luminance distribution on the inside surfaces of the model, some snapshots within the model were taken using a LMK 98 colour CFA CCD luminance-meter. In the figure 3 is reported a picture of the scale model.

3.3 Daylighting study

Simultaneously, a geometric model of the “Opificium” was implemented in two simulation programs, Ecotect and Radiance. In figure 4 is shown the model developed for simulation programs.

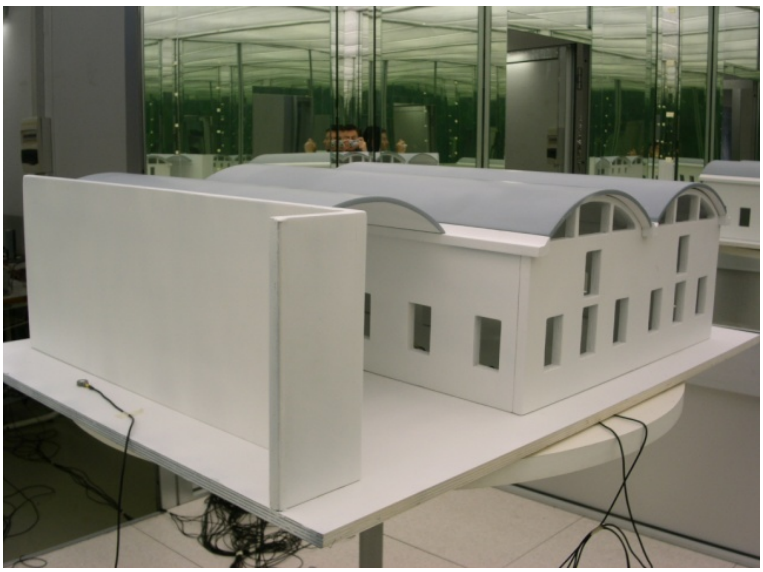

Fig. 3: Scale model of “Opificium” for acquisitions in the artificial sky.

ECOTECT uses the Building Research Establishment (BRE) Split-Flux method that is a widely recognised and very useful technique for calculating daylight factors in a preliminary study (it’s defined as the ratio of the illuminance at a particular point inside a space to the simultaneous unobstructed outdoor illuminance under exactly sky conditions).
This method is based on the assumption that, ignoring direct sunlight, there are three separate components of natural light that reaches any point inside a building:

- Sky Component (SC) - Directly from the sky, through an opening such as a window;
- Externally Reflected Component (ERC) - Reflected off the ground, trees or other buildings;
- Internally Reflected Component (IRC) – The inter-reflection of surfaces within the room.

RADIANCE is a computer software package developed by the Lighting Systems Research group at Lawrence Berkeley Laboratory. It is a research tool for accurately calculating and predicting the visible radiation in a space by using a combination of raytracing and radiosity techniques (it takes into account specular, directional-diffuse reflection of materials). The program uses three dimensional (3D) geometric models imported by ECOTECT to generate spectral radiance values in the form of photo realistic images.
The simulation analysis for “Opificium”, distribution of illuminance and daylight factor, was firstly performed considering a simplified, but faster, approach, and later considering and evaluating the parameters that could affect the analysis to enhance the results obtained in the first simplified approach. To also evaluate the luminance distribution, the model was exported to Radiance Desktop to obtain illuminance distribution.

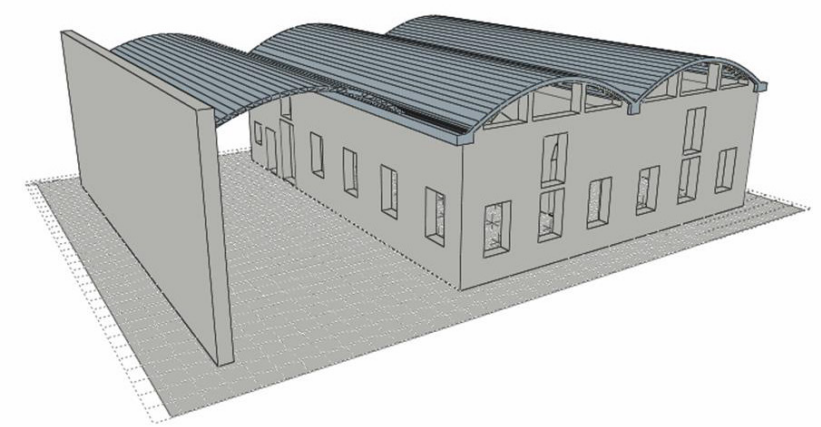

Fig. 4: Geometrical model of Opificium developed for simulation programs.

3.4 Comparison of experimental and simulation data

The experimental data, obtained for the scale model under a mirror sky, and the simulation data, implementing a geometrical model in a simulation program, were then compared to have a indication about the relationship between data acquired under artificial sky and output from simulation. The comparison was conducted in terms of daylight factor and luminance distribution. In particular, for luminance distribution it is interesting to notice the capability of simulation program to predict luminance distribution.

In addition, some pictures were taken within the scale model (illuminated by artificial sky) to evaluate the behaviour of inner light and compared it with light behaviour simulated by using Radiance.

4. Results

In figure 5 the sketch of scale model and the acquisition points are reported. The position of sensors were organized in four rows with seven points for row, with a total of 28 measurement points. The location of sensors were chosen in order to evaluate the illuminance values variation from windows to middle of building. The data was acquired with an external illuminance of 10000 lux. In figure 6 were reported the position of sensors for row #1 and row #3.

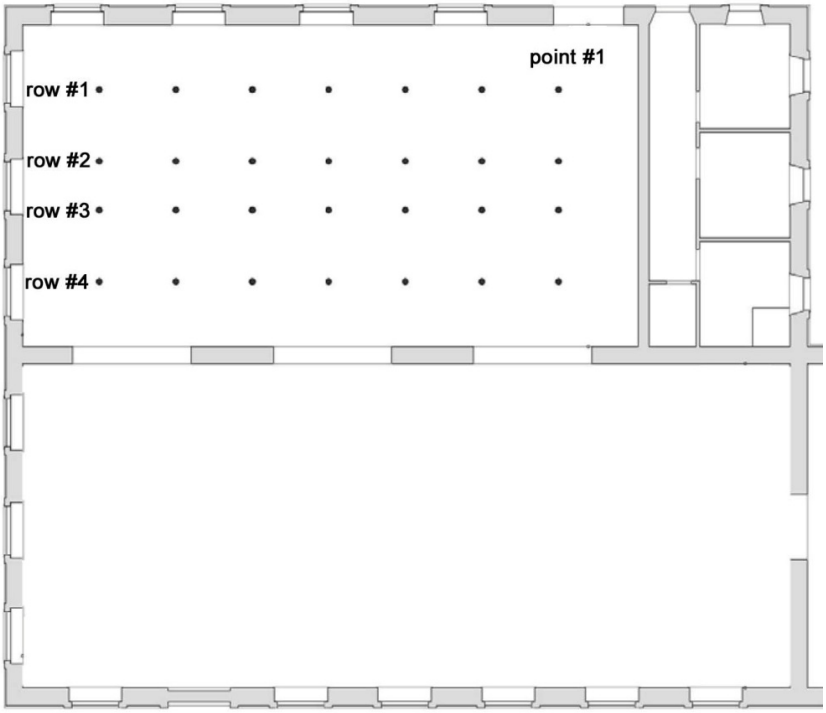

Fig. 5: Map of scale model with acquisition points.

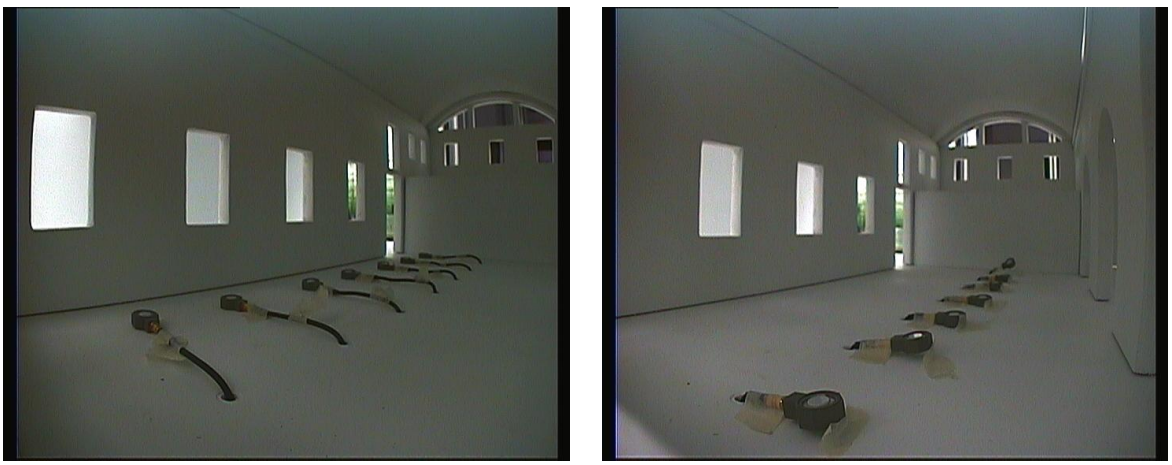

Fig. 6: Photometric sensors placement in row #1 (left) and row #3 (right).

To compare the results of the analysis, both experimental and simulation data are reported in figure 7, where are plotted the values of daylight factor related to the investigation points. The values are showed considering selected rows and the associated measurement points.
From the reported graphs it can be inferred that both measured DF distribution and simulated DF distribution at different rows, show low percentage deviation with DF good uniformity; near the windows and at the back of the room, the deviation among different rows slightly increase. It can be noted that largest deviation occurs for calculation point # 4 on row # 4 for Ecotect simulation; this software simulation also evaluate higher DF values for row # 4 with respect to those evaluated by Radiance and measured.
As one can expect, all compared graphs show higher values near to the front wall aperture, a regular decreasing in the middle points and a very slight increase for the inner placements (points # 1).
Finally the main difference arise from direct comparison of DF values; the Ecotect results largely overestimate the measured DF, giving values that are 100% higher than those acquired. The comparison between Radiance and measured data shows a good agreement for points near aperture (# 7), with Radiance graph decreasing toward lower values (# 4).
The pictures in figure 8 shows the light diffusion in the internal space of scale model (left), and the light distribution simulated using Radiance (right); the comparison is done for two areas of building.

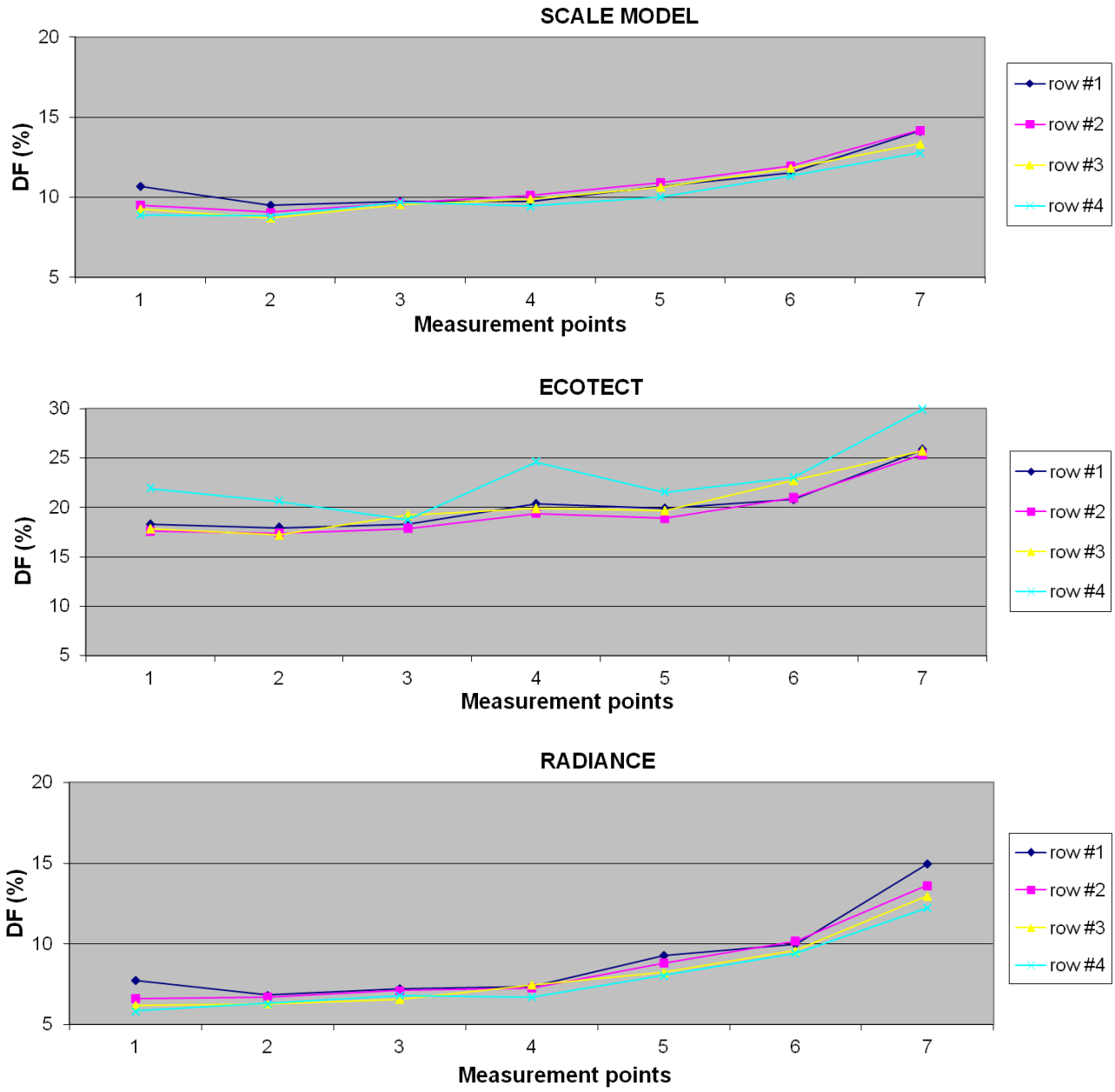

Fig. 7: Daylight factor comparison, obtained from scale model (first), Ecotect (second) and Radiance (third).

In figure 9 are showed the results obtained by the comparison of Radiance internal luminance mapping vs. luminance distribution measured with a CCD videoluminancemeter. The false-colour mapping highlights the influence of model reflexions onto internal mirror wherever the radiance simulation gives an uniform source on the aperture considering also the ground presence; furthermore the luminance value corresponding to the aperture (950 cd/m^2) is greater than that measured (806 cd/m^2).
At the bottom of the aperture the luminance values of software and acquisition appear very close, confirming the results of DF analysis, whereas the luminance values on the room vault by Radiance calculation seems to be significantly lower; this should lead to a minor influence of internal reflection and thus it could partly justify the discrepancy in the comparison with reference to the inner points.
Finally the Radiance mapping shows, above all, a greater homogeneity of luminance distribution patches.

a)



b)



Fig. 8: Internal light distribution comparison scale model (left) vs. Radiance (right), for two building area, a) and b).

5. Conclusion

In the study above are presented the results of a research on daylighting assessment in an industrial building fabric; the research was developed involving scale model DF measurement in a mirror sky box (under CIE standard overcast sky distribution) and its comparison with a computer simulation software “Ecotect” and Radiance; the last supplying the opportunity of evaluating and comparing the internal surface luminance distribution.
The utilization of scale model allows, even if computer simulations can give very accurate results in a reasonable time, the capability of appreciating internal environment and comparing several solutions. This requires the utilization of sky simulator (reproducing standard sky luminance distribution) and a properly constructed scale models that are built accurately and with respect to several rules to reduce the error sources.

a)

b)

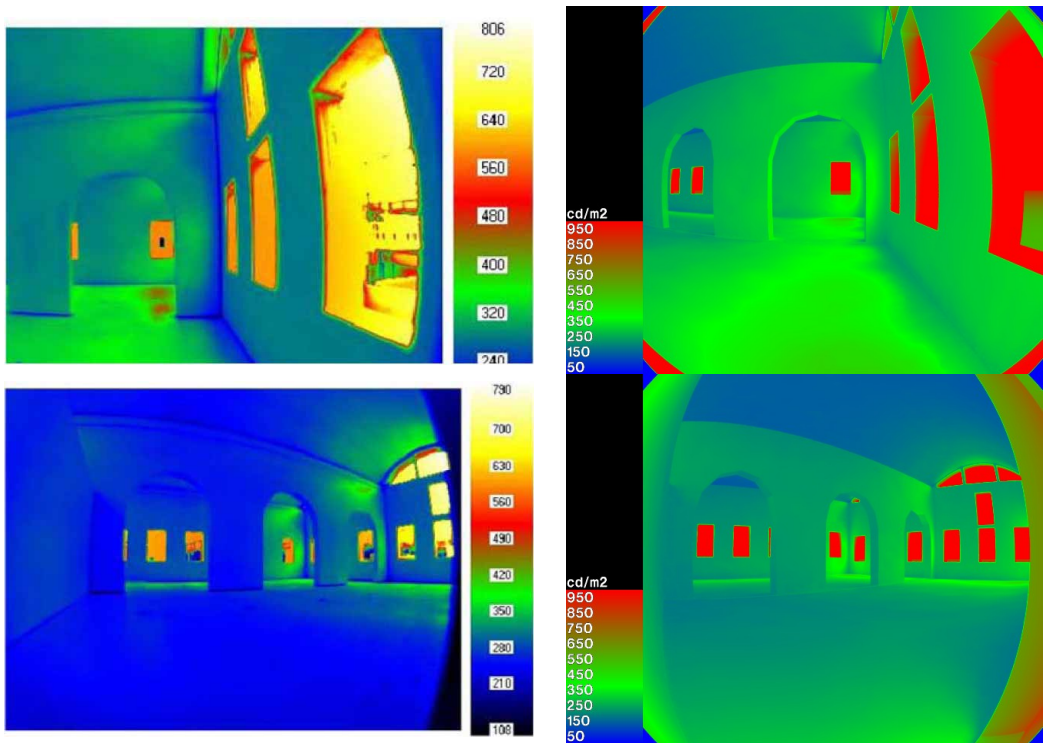

Fig. 8: Luminance distribution comparison scale model (left) vs. Radiance (right), for two building area, a) and b).

The opportunity of measuring the internal surface reflective characteristics can help in reproducing the physically-based lighting calculation.
In our study both software simulation give, with an acceptable accuracy, a quite uniform shape of DF pattern on grid measurement, but Ecotect software greatly overestimates the DF values; this is in contrast with the Ecotect calculation method that use the BRE Daylight Factor method and so it doesn't consider multiple reflections.
The Radiance performances are instead quite close to model measurements both for illuminance calculation and luminance distribution; it seems to be related onto the opportunity to reproduce the theoretical Radiosity-based diffuse reflection calculations reducing the errors source.
The different approaches used to evaluate daylighting performance and the results obtained by their utilization suggest a suitable choice of the better "tool" to be used depending on specific application. A software capability of performing daylighting, solar exposure, insulation, thermal, acoustic, lighting analysis could be very interested in the initial step of design process because of it is able to provide important design decisions. On the other hand a more accurate daylighting evaluation approach (scale model/radiosity based software) has to be carry out for taking into account the variables involved in the complexity of the daylight distribution inside a space.

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Simeto valley

Alessandra MANIACI,[1] Alessandra BRANCATELLI[2]

(1)Department PAU, University Mediterranea , Reggio Calabria, Italia
Alessandra.maniaci@unic.it a_brancatelli@libero.it

A DIRECT LINE TO THE RIVER SIMETO

The result of the third edition of the international workshop *simeto landscape* organized from the founding of order of A.P.P.C. of the district of Catania was the point to starts some considerations, studies and investigations on the Etna area, crossed by the river of Simeto. As a pulsing artery of this area, the river pump energy and provides to the conditions to develop differents systems of settlement for size and morphology. Quiet and discreet, the river reaches a length of over 113 km, it is the main river of Sicily both for its hydrographical and anthropic size. In his path does not cross any major center, but it touch the countries of Bronte, Adrano, Paternò, Motta / Misterbianco to flow at the end in the bay of Catania. The river represents a line of conjunction both morphological and socio-cultural of this territory, but over all it rapresents the cohesion of all different landscapes of this area. Along the way he meets different landscapes, sometimes finds space between the walls of black vulcanic rock, sometimes crawls on rough track of pebbles and red sand, othertimes creeps inside of thick green areas rich of vegetation, in this continuous changement of level, of scenes, of colors and smell, are two the elements that never change, that are always the same at every season and at every hour of the day and the night, and that represent the aim and the power of this landscape: the Etna and Simeto.

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Keywords: riverfront, valley, fortess.

1. The concept of landscape

The implementation policies of environmental sustainability to the term "landscape" has never been associated with a clear definition and agreed until the entry into force of the European Landscape Convention.
The Convention considers the landscape as a "certain part of the territory, as perceived by people, whose character is the result of the action of natural and / or human and their interrelations" is the "essential component of the living environment of the people, expression of the diversity of their shared cultural and natural heritage, and a foundation of their identity".
The term "landscape" then defines a part of the territory which is recognized by the inhabitants of that place.
The link between population and territory is closely related to the spatial and temporal forms of that place, that are perceived by inhabitants and represent the identity of the same place. This character of the landscape is thus related to natural and cultural factors / human factors, it is necessary to clarifying definitively that the concept of landscape is not defined only by the

environment but also the transformations, that people pour on their territories, delineate a combination that allows us to observe "the landscape" and recognize it as such. [1]

2. The river Simeto

The work of the third edition of the international workshop “Simeto landscape” organized by the order of the APPC of Catania was the starting point from which to do some thinking, studies and investigations on the Etna area crossed by the river Simeto. The river is a pulsing artery of this area, pump energy and provides the conditions for settlement systems with different size and morphology. Quiet and discreet, the river reaches a length of over 113 km, it is the main river of Sicily, both anthropic that hydrographic point of view. Born about 10 km north-west of Bronte almost thouches Bronte, Adrano, Paternò, Motta / Misterbianco but his path does not cross any urban center. The whole course of the river is included in the district of Catania, while its basin extends in the district of Messina and Enna.
The river is an element of union and conjunction, both topographical, that morphological and socio-cultural point of view.
The regime of Simeto is typical of rivers of Sicily, extremely torrential floods in autumn and winter, and strong lean in summer. Only the mouth of the river at south of Catania, as well as the industrial area, is the most prone to flood risk (Fig.1) for the illegal buildings that cover indiscriminately this area, and which in 1951 resulted in a devastating flood. This is the area in which the river is close to the biggest town along the rest of its course, going back to the source, the river bed is plenty far away from population centers. For this reason it’s important to think ideas for the redevelopment of riverfront, that is able to rehabilitate a direct relationship between the river and the city. An important point to start is the infrastructure system of the river. A series of bridges of different historical periods through it, but have lost their connection function between the river and the city, and represent metaphorically the bond apparently lost between man and the territory from which itself comes from.

2.1 The passage of Pietralunga

The passage of Pietralunga (Fig.2), which takes its name from the old Roman bridge, its remains are still visible, along with many others, has been included in the list of Sites of Community Interest SIC for the conservation of natural habitats and of wild fauna and flora and a territory which includes the municipalities of Biancavilla, Centuripe and Paterno. In this list we find lava walls of varying heights between 5 and 15 m, excavated by the river in the basalt formed as a result of lava flows from Mount Etna, the largest volcano is in fact very close, and the river touches almost throughout the western part of the base. From the ancient Roman bridge (which dates back to the Roman conquest of Sicily, and at the first Punic war, to tear Messina to the Carthaginians in 264 BC), today remains just a fragment practically abandoned and the name of the bridge was eventually assign to a another bridge more modern, in concrete and iron emblem of speculation of 70s. The new bridge of Pietralunga is an infrastructure disproportionate to the place and its function, it connects the main road nº 137 to countryside, and to private land today uncultivated , but that once housed farms and guestrooms. The bridge despite his total inadequacy in shape and size (Fig.3) in a country setting, unites and divides the two sides of the river, highlighting the differences between the two landscapes in contrast. So on one side of the bridge, we have an agricultural landscape planted with orange trees, well-kept with an irrigation system that takes advantage of the proximity of the river, from the other side instead an arid landscape, with sand's mountains deposited there by the river, dry thistles and indian fig . The bridge seems thrown there by mistake, it is the only element that expresses the relationship between the river and the city of Paternò which is located about 3 km in north. Across the orange groves, beyond the walls of lava's stone and other crops that spread along the valley, stands on a hill the symbol of Paternò city, the Norman tower clearly visible, even from the valley of Simeto.

2.2 The castle of Paternò

The Norman tower also known as the Castle of Paternò was the main tower of a fortress complex , of which today remains just a bastion facing east towards the valley of Simeto. The tower became the symbol of the city, it was part of a castle which was built in 1072 by Count Ruggero to ensure the protection of the valley of Simeto from the Islamic incursions. The castle was given to the daughter of Ruggero, Flandrina, wife of Aleramico Enrico of Lombardia. Around the castle and the

small village the population started to grow thanks to the numerous mercenaries of Norman conquerors and the arrival of settlers coming from Northern Italy attracted by the privileges granted to them. The first nucleus of the manor was soon expanded and original functions purely military were replaced in civilian use and became the seat of the County of Paternò that Henry VI of Swabia in 1195 gave to the noble Norman Bartholomew de Luci kinsman of the king Swabian . The Castle in the following years was the recidence of kings and queens, including Frederick II, Queen Eleanor of Anjou and Queen Blanche of Navarre. The castle of Paternò and territories surrounding, in fact, were included in the so-called Camera Reginale which was founded by Frederick III of Aragon as a wedding gift to his wife Eleanor of Anjou and then was inherited from Queens that followed, until its abolition . After the 1431 belonged to the Special family and from 1456 until the end of feudalism was owned by the family of the vice-regal Moncada. Used as a prison in the eighteenth century began the process of decay and neglect, but by the end of the nineteenth century saw several campaigns of restoration that has returned the ancient majesty. The building has a rectangular plan on three levels and reaches a height of 34 m. Since the Swabian castle was crowned by Ghibelline battlement (as noted in the seventeenth-century Drawing of the view of Paternò) of which at present resist only some stumps. Particularly interesting and enjoyable the effect of bichromatism that is created between the dark color of the walls and frames of openings in white limestone. On the ground floor there are a number of service areas and the chapel of St. John decorated with very valuable frescoes of the thirteenth century. The first floor of the great hall of arms is illuminated by a series of windows. On the top floor there are four large rooms formerly used for the residence of the kings, these are separated by a space with the same size of the living room below, but placed transversely to it, closed on both sides by two large gothic windows, which allow to our eyes to enjoy of the view of Simeto valley and volcano Etna. A most recent restoration carried on by local government in the 80's makes more changes, some of which may be too invasive, as the reinforcement of the reinforced concrete structure in the upper part of the tower, to bear the large and heavy glass windows with its iron frames, which close the huge windows of the royal hall of the tower, which once were obviously open and allowed a good view on whole Simeto valley on one side and on the village from other side. Another restoration it's done on the walls, which were completely plastered and in some point have been created spaces with seats in bricks and mortar, an intervention maybe a little bit too arbitrary and artificial.

2.3 "City - river"

Paternò has a long history and complex, which is expressed clearly through its urban fabric, marked by a significant variety of styles and architectural orders. On the hill stand out sharply the Norman tower and the church of the cemetery, (Fig.4) from where starts a magnificent Baroque stairway that connects the upper part to the lower part of town (Fig.5). Paternò infact is divided into two parts, one consisting of oldest buildings, typical of country houses perched and linked to each other and then there are more modern buildings, without any kind of architectural quality that correspond to the new part of the country, the suburbs, arose under 70s. Behind the tower affords a completely different scenery, contaminated only in the very first part from the skeletons of the paper factories abandoned (Fig.6), and some mills too they no longer in use, the rest is a large land of fields of orange and olive groves,unto shore of river. The Norman castle therefore acts as a fulcrum between these two different systems. From the point of view of landscape was surprising to discover the power of Simeto valley to collect inside a wide variety of landscapes. This river is a "good river", has not very large, it is not full of water, did not cause much distress and have not been registered numerous floods, for this reason seems really possible recover the ancient connection between city and river, to return its true identity at this place. The objective of departure was to connect the two territories, the castle rock, symbol of the city of Paternò, and the downstream area of the river. The Simeto, layered palimpsest of landscapes far in the time, since antiquity was navigable and was the main means of communication between the parts of the urbanized area, has now become a subject of discussion and fulcrum of an hot debate to find an idea that values this place to give a new and stronger identity. The area identified poses a objective: the connection between the river the networks that crossing it and the city. Restore the relationship with the Riverfront identifies three main objective that the project have to connect : the fortress, the valley and the river.

Design a piece of a larger system, the river, where you have to take into account the difference in scale between the urban and the surrounding landscape, was the real challenge of this work. The place itself has suggested the solutions of a project to promote and protect a place of great cultural and scenic value, which must be promulgated and published and must be able to accommodate a larger number of tourists in order to create a new economic resource for the country, which has a great potential for cultural-tourism poorly understood and exploited.

2.4 The fortress

After a pleasant walk through the cultivated fields of Paternò i tried to capture some ideas, find solutions that marry well with the environment and the existent , ideas that the landscape itself could suggest. so I found myself admiring a solution of containment of the soil used by farmers widespread almost everywhere lent itself well to a reinterpretation to resolve the difference in level between the tower and the Simeto valley (Fig.7). This contaiment system uses the typical material of the area, and therefore readily available, the lavic stone. So i thought at a series of lavic stone walls retracing the old defensive walls of the ramparts at the base of the tower, to mark at same time a path which in some places opened by slits to the landscape and in others it becomes parapet of a viewpoint, from where you can catch with look at the beauty of a unique landscape, with the Etna on one side and the sea from other. At a certain level you can also arrive to the only remaining bastion that has an internal path, between the thickness of the two walls, where once stayed the guards who controlled the territory, o you can stay on the top of bastion at the level of another path. these two trails are linked to another zig zag path that winds up from the base to the top of hill. Along the trail it's possible to find several little spaces suitable to hospitality for tourists, simples viewpoints or a series of small "workshops" carved into the hill , with three walls underground and one open on the path, these places provide shelter from the sun, provide a space where you can stop and enjoy a picnic lunch or find a small restaurant.

2.5 The valley

From the parking lot at the base of the castle hill, in the side facing valley, the tourists, who arrive here by car or bus, can pick and choose if climb up to the castle or rent a bike or quad to reach the river. Along the road that leads to the bridge of the 137th Pietralunga, a series of shops may sell wine and food products of the place. Other shops placed also inside fields of orange and olive groves, with the consent of the owners could enhance the activity of direct collection of crops, particularly of blood oranges, typical of Paterno, whose production in some areas, it's unfortunately already been abandoned due to the crisis. More shops that they are simple containers made of wire mesh and stones wasted from working the fields, the trees instead provide shelter from the sun and exudes a intense smell of orange blossom. These activities are offered mainly to tourists but nobody forbids that the citizens can take advantage of these services during feast days and enjoy the wealth of a place and a landscape that belongs to themselves.

2.5 The river

The river is a truly identifier, from here you can enjoy a landscape even more surprising, the murmur of water, the wind in the trees the protected species of fauna and flora, that are and should remain the owners of this place. To have a successful project we know that it must emphasize and enhance the characteristics of the place itself. It certainly can’t think of upsetting the space, it's important to capture strong point of place. Here the strength is unquestionably the direct relationship with nature, an uncontaminated nature that must be safeguarded. A minimal intervention, that allow a cohabitation more "comfortable" between the travelers or visitors and the river. Some rafts made by a wire mesh filled with lava stone,(fig.8) lying on the banks of the river could be a good solution for the use of this site. The rafts from the simple and pure form are very versatile and can be the solarium rather than staging points for refreshment, rather than points in which to read a book or to fish during a camping . Since Paternò is far from the sea but however exposed to the summer heat, a system of phytoremediation (fig.9) allows the purification of river water so in some places the people could make a refreshing bath. This would become a viable alternative for the residents of Paternò, who instead to make many miles to reach the Plaja of Catania, they could have the opportunity to live their river

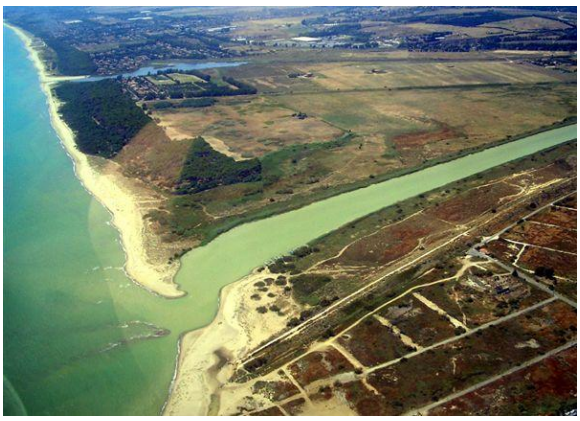

Fig 1: river mouth



Fig.2: passage of Pietralunga



Fig3: brige of Pietralunga



Fig4: hill of Paternò



Fig.5: baroque stairway



Fig 6: simeto valley and paper factories



Fig 7: containment system of soil



Fig 8: rafts made by lava stone



Fig 9: system of phytoremediation

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Towards a theory of impermanence

Silvana SEGAPELI
Researcher, GERPHAU Laboratoire Philosophie Architecture Urbain, Ecole Nationale Supérieure d'Architecture de Paris La Villette
City, State: Paris, France
Associate Professor, Ecole Nationale Supérieure d'Architecture de Saint-Etienne
City, State: Saint-Etienne, France
Mail address: silvana.segapeli@st-etienne.archi.fr

Abstract
The "theory of permanence", formulated by Aldo Rossi drawing on the thinking of French proto-urban planners Marcel Poëte and Pierre Lavedan, has designated, in Italy as in the rest of the European continent, a period in which a founding value has been attributed to the concept of "persistence" and taken up as a essential axiom of western urbanist thinking.
In this contribution, the intention is to start off from the deep groove made by research into urban morphology, and set out the construction of a view on the city that from this highlights the multiplicity of the structures in evolution and the multiplication of the cycles of change. According to this different perspective, the value of transformation, gripped between the diverging demands for conservation and innovation, seems to take on a new allure, especially concerning urban renewal processes.
Rossi's theory, reassessed through the filter of the culture of the ephemeral and "non-conventional", thus constitutes a matrix from which to reconsider the creative process of the architectonic and urban project, in relation to the dynamics of today's society and to the "*régimes sensibles*" pertaining to them.
The theme proposed in this contribution is part of a broader study and represents an extension of that work. The investigation was prompted by a series of reflections on the alternative practices of intervention in the delicate urban and the suburban *maillage*.

Keywords: Interdisciplinarity, Urban Design, Temporalities, Ephemeral, Trasformation

1. Between analogy and permanence

> "*Le temps ne sort pas du prèsent, mais le présent ne cesse pas de se mouvoir, par bonds qui empiètent les uns sur les autres. Tel est le paradoxe du présent: constituer le temps, mais passer dans ce temps constitué.*" Gilles Deleuze

The "theory of permanence" (*Teoria delle permanenze*), formulated by Aldo Rossi [1] drawing on the thinking of French proto-urban planners Marcel Poëte and Pierre Lavedan, has designated, in Italy as in the rest of the European continent, a period in which a founding value has been attributed to the concept of "persistence" and taken up as a essential axiom of western urbanist thinking.
In this contribution, the intention is to start off from the deep groove made by research into urban morphology, and set out the construction of a view on the city that from this highlights the multiplicity of the structures in evolution and the multiplication of the cycles of change. According to this different perspective, the value of transformation, gripped between the diverging demands for conservation and innovation, seems to take on a new *allure*, especially concerning urban renewal processes.
In Rossi's theoretical evolution, the idea that the city is structured around "hinges", understood as stable and predominant elements or as consolidated urban connections, underwent a change when the notion of analogy began to make headway. The concept of persistence still remains in some way in "*La città analoga*" (The Analogous City), the celebrated table - considered the emblematic critical

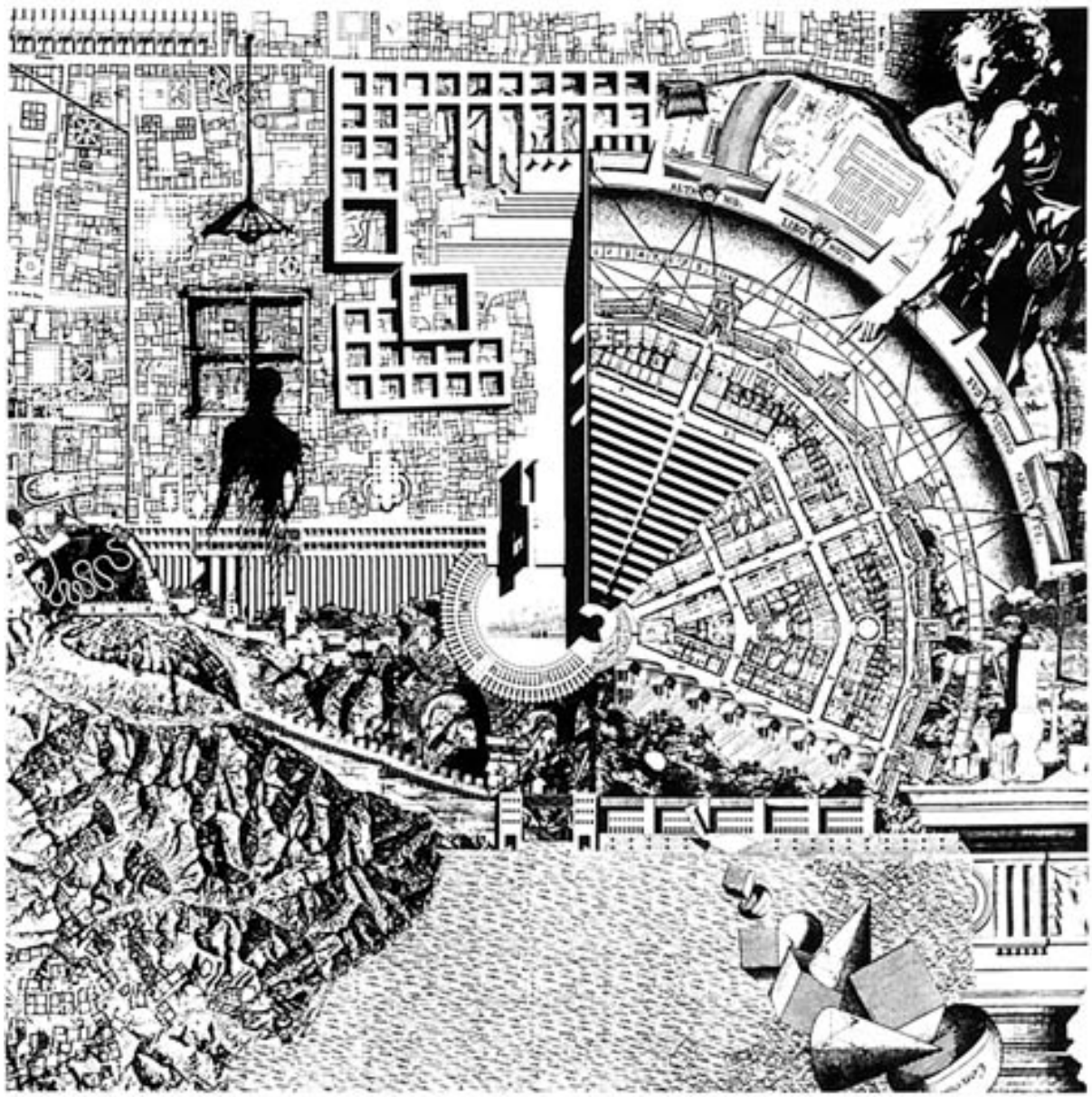

Fig. 1 Aldo Rossi, *La città analoga*, in *Lotus*13, 1976

body of *Tendenza* - that appears for the first time on occasion of the Venice Biennale of 1976. The monuments occupy in "*La città analoga*" the place assigned to them by etymology: memory and warning, but this is no longer the issue of a firmness that celebrates the main features of the urban fabric in permanence and repetition. Neither is it about nodes around which the city's articulation is perpetuated. The stability of the urban system, based on the inexorable traces of history, is visibly compromised by the intrusion of a random logic, that of a paratactic composition, where it is possible to identify an uncoupling between reason and imagination, a *clivage*, like a fracture line between a reasoned structure and invention. The table in question, in the form of urban collage, is the result of an additive composition, revealing a form of flexibility of the city not yet present in the "theory of permanence", where the urban fabric hinges between the persistences and pre-existences of the past.
If "*La città analoga*" is understood as a "*trame agissante*" [2] this is because in Rossi's concept the city is a social fact and therefore it cannot be imagined as a simple repertoire of forms, but as an active "*série d'objets affectifs mobilisés par la mémoire lors de la conception du projet: comme une 'méditation des thèmes du passé'* "[3], and the fact that the monuments are no longer the guarantors of order and continuity Rossi himself expresses in the terms of "the division of things in order to be added up following different rules" [4].
The city idea thus continually moves further away from the image of an accumulation of traces, imprints, sediments and constructions, in a word of "persistences", which add up layer by layer, following both a linear as much as inexorable historical chronology, in order to approach, ever more

so, the allegory of a free co-existence of parallel dimensions [5], a concept to which Rossi returns, several times, in his correspondence with Ezio Bonfanti.
The city changes because everything is impermanent: "I think then that the additive procedure is linked to the knowledge of the city, to the buildings and the monuments, but conceive all of this as a series of fragments" [6]. In Rossi's reply to Bonfanti it is the use of the adversative adverb that provides a key to interpreting this urban collage, full of disjunctions, incoherencies, leaps of scale and type. In the same letter, a few lines later, he writes: "You see therefore the collage procedure also becomes a kind of warehouse of forms (...)"[7], where it is the forms that renounce every kind of "persistence" and open up to a multiplying of meanings.
It is certainly no chance that, a few years after the "adventure" of "*La città analoga*", Rossi is the author of one of the most interesting temporary projects of the architecture of our times: the *Teatro del Mondo* (1980), the sublime floating ephemeral theater on the Venice lagoon.
This questioning the value of transformation is an attitude that we find again becoming more specific in current design practices. Can the contemporary city still be understood as "something that lasts beyond its transformations" [8]? The transition from a culture founded on objects and permanence to a culture hallmarked by flows and instabilities [9] seems to have definitively distorted the paradigm of spatial continuity, highlighted the values of adaptation and flexibility and, as in the Calvino's Sophronia [10], inverted the very statute of persistence. In this paradox, these would constitute the temporary and fragmentary part, the less autonomous and lively segment of the city.
Rossi's theory, reassessed through the filter of the culture of the ephemeral and "non-conventional" [11], thus constitutes a matrix from which to reconsider the creative process of the architectonic and urban project, in relation to the dynamics of today's society and to the "régimes sensibles" pertaining to them[12].

2. The impermanence of places

"*Historicité non pas des représentations de l'espace, mais bien plus profondément de l'espace 'lui-même', qui ne peut plus être considéré comme une donnée pérenne mais qui se modifie en fonction de conditions proprement historiques. C'est là un des enseignements fondamentaux de l'anthropologie, de la sociologie de l'art, et de la phénoménologie (entre autres disciplines) : l'espace n'est pas simplement donné, il se constitue, se construit*". C. Younès

In this study, the word "impermanence" has been considered in its wide-ranging semantic implications, allowing the various interconnected phenomena like the ephemeral, dislocation, deterritorialization, discontinuity, mutation, metamorphosis, transformation, destabilization, fracture, fragmentation, dehiscence, disjunction, and so on, to revolve around this concept. The list is inherently transient and could grow and be modified infinitely. This word, often denoted negatively, and represented as a *dessin en creux* reducing its meaning to the logic of absence or the dimension of loss, designates instead an outlook that is sensitive to the changing reality, beyond every Manichaean determinism and every dual and opposing logic.
The theme proposed in this intervention is part of a wider study and is its continuation.[13] The theme, considered in a wider context, leads to the dissolution of the great principles that have guided design and planning in the modern age, and opens a reflection on the new orientations of urban research around the issues of the "uncertain margin" [14] and the temporary use of the territory.
The investigation is inspired by a series of reflections already under way on the alternative practices of intervention in the delicate *maillage* between the urban and the suburban. The uncertain, the temporary, the vague of the urban interstices or marginal areas, have recently lost the negative connotation that in the past had rendered these zones de facto en attente areas in conflict with the space of the habitat. Where the void and the absence of a coherent morphologic configuration dominate, the insisting of more 'places' in the same space (where space is intended as "*lieu pratiqué*", with the meaning given to this definition by Michel de Certeau [15]) becomes a planning exercise, a multidisciplinary intervention directed towards experimenting an alternative way of conceiving, planning, regenerating and building the city fabric.
But what are the principles guiding the transformations of the city today? Also the dialectic of the stabilizers, these "points or centres" that figure among the "*objets trouvés*" without time of the "urban collage" [16] of Colin Rowe and Fred Koetter has been re-evaluated by diverse spatial topologies, experimental fields in which to establish new types of relationships between the city elements.
To create unexplored bonds, activate unknown aggregations and retrace devices that may translate emotions and collective *desiderata* into forms, today means tending to structure the territory with modifiable models, identifying what Edward Lorenz [17] would have called "attractors", units towards which the dynamic systems evolve in a determined temporal arc.
Beginning with this realization, many issues unfold: would the city planned according to the criteria of a "light" (MVRDV 1997) or "weak" (Branzi, 2006) urbanization, through paths of transformation and

temporary interventions that challenge a determinist planning, be able to generate an evolutionary logic of growth?
And again, is the city conceived with changing scenarios, following waves of probabilities and fluctuating spatiality/temporality, micro-interventions, compatible with the new logic imposed by sustainable development?

3. Towards a culture of the "living project"

"(...) *Créer une architecture et un urbanisme qui, par la forme construite, puissent rendre signifiants le changement, la croissance, le mouvement, la vitalité de la communauté*" Alison et Peter Smithson

The discontinuity of the urban *recit*, the increasingly swift cycles of transformation, the variety of the rhythms, the irruption of the evenementiel, the arbitrary obliteration of the traces – together with the weakening of the idea of transmission of memory that can be read in the urban lacework - are the several ways in which the city today exceeds itself, exhausts the figurative nature associated with the urban and provokes the breach of dominant schemes.
Already beginning from the 1950s, with the advent of anti-urban theories, and in the course of the 60s and 70s, through the vast utopian production, the very idea of the city had been challenged.
Ecological knowledge, the new alliance between organic and inorganic and the developments in biology that have introduced the concepts of self-organization and complexity, have contributed considerably to delineating and orienting new pathways.
At the beginning of the 70s, on the science front, new ideas came forward on concepts of adaptability and reversibility: in 1973 the ecology researcher Crawford Stanley Holling formulated the concept of ecological resilience, bound to the complex systems of adaptation and self-regulation, in terms of the capacity of an ecosystem to take on and model change. Besides, the prolific line of the *Nouvelle Ecologie*, already active during those years, was based on concepts derived from biology and genetics, highlighting cycles and biological rhythms.
The culture of the architectonic and urban project has for a long time been greatly influenced by these studies, as Gregory explains: "The new echo-scapes: projects generated in the search for a connection and deep convergence between the organizing principles of architecture and living systems, explored through differentiated pathways and strategies: here following dynamic and evolutionary conceptions of form, based on ecological-relational, co-evolutive and co-organizing properties; now developing within ever more sophisticated biological analogies the search for an 'animated form' through self-organising and auto-poietic morphogenetic processes; then again highlighting in the continuous evolution the interaction of the form with man and environment through artefacts capable of adaptation and change." [18]
The concept of "Deep Planning" of Vab Berkel & Bos, for instance, is an important starting point for the planning theories based on the adaptability to the environment and self-organization. The "Principle of continuous difference" they postulated opens the world of architectonic planning to the notions of mutation and renewal, conceived according to self-regulating processes.
Following these new openings and mutual contaminations, in the past few years science has extended its field of interest to art, contributing to the improvement of the critical instruments to understand and represent an alternative way of producing and creating.
In contemporary art the deviation between the increasingly important value attributed to transformation and the fear of instability, together with the impasse of the liquid evolution of a society that is losing ever more, and even more rapidly, its points of reference, are by now recurrent issues. A growing number of interdisciplinary collectives are currently concerned with alternative interventions in city areas undergoing major transformation. These new tendencies reveal a different pulse with respect to those that even just recently were defined the 'difficult zones' of the city. « *Pourquoi ne pas vivre dans un chantier permanent ? Il ne faut pas imaginer que les choses sont finies* » [19] challenges provocatively the French artist Fabrice Hyber, stressing the need to invert certain negative logics that affect our way of creating and conceiving of the city.

4. A Case Study: *Saint-Etienne, une ville en transformation*

ATELIER S7|D1, Architectural Lab "*Dynamiques architecturales et urbaines*", 2012|2013
Ecole Nationale Supérieure d'Architecture de Saint-Etienne. Director: Silvana Segapeli, Guest critic: Jean-François Pirson
http://ensaseateliers7d12012.blogspot.fr/
Students: Bekaert Natalie, Berger Elisa, Brodeur Laurence-Emilie, Delangre Arnaud, Garneau Lysanne, Hernandez Joris, Kolesnichenko Marina, Mastroianni Alexandre, Mailhet Sophie, Oams Charlotte, Raynaud Coralie, Rinchet Dimitri, Rodriguez Leon Isabel-Pilar

The terrain of study of this architectural laboratory is situated in Saint-Étienne; this is an industrial *friche* at the juncture between multiple kinds of urban fabric and the different histories that its landscape narrates. It is a void *en attente*, between a compact urban mesh, whose margin is made up of the archipelago of the former *Manufacture des Armes de France*, today *Cité du Design*, and the open weave of the diffused city, lacking a settlement framework and designated by large road infrastructures.

Moving from recent theoretical debate on the transformations of the post-industrial city and the new realities between the urban and periurban, the themes for consideration set out by the laboratory "*Dynamiques architecturales et urbaines*" involve a series of *techniques appliquées*: a long stage of observation of the area, of a sensitive reading of the landscape and sensory experimentation, through the practices of walking and "*transurbanza*" [20]. The objective is to succeed in 'mapping' the landscape in transformation and interpret its mutation cycles following the Close Reading technique.

From a projectual viewpoint, the greatest challenge lies in the attempt to ensure keeping the enzymatic nature of this *entre-deux* space lacking a stable image and with a fluctuating identity. Furthermore, it is hoped to go beyond the very concept of identity, understood as a crystallizing condition with respect to the study's investigation field.

The renewal of the city space takes on the dimension of an emergency in this context. Starting off from the notion of reurbanisation of Oriol Bohigas, that considers the road as the place and the itinerary at the same time, the public square and the block as city matrices, the focus is directed to the field of connections to be established between built space and public space.



Figg. 2-5 La friche de la *Cité du Design* [Credits photos: Dimitri Rinchet, Joris Hernandez]

Quotations

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[2] Jean-Pierre Chupin, *Analogie et théorie en architecture. De la vie, de la ville et de la conception, même*, Infolio, Genève 2010, 173
[3] Jean-Pierre Chupin, Op.Cit., 163
[4] Ezio Bonfanti, *Nuovo e moderno in architettura*, Milano: Mondadori, 2001, in the annexe: "spezzarsi delle cose per sommarsi secondo altre regole"
[5] Jean-Pierre Chupin, Op.Cit.
[6] Ezio Bonfanti, Op.Cit., in the annexe: "Penso allora che il procedimento additivo sia legato alla conoscenza della città, dei manufatti, dei monumenti ma che concepisca tutto questo come una serie di frammenti"
[7] Ezio Bonfanti, Op.Cit., in the annexe: "Vedi quindi il procedimento a *collage* che diventa anche una specie di deposito delle forme (...)"
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[10] Italo Calvino, *Le città invisibili*, Torino: Einaudi, 1972
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[17] Edward N. Lorenz, « Deterministic Nonperiodic Flow »*, J. Atmos. Sci.,* vol. 20*,* 1963*,* p. 130-141
[18] Paola Gregory, *Territori della Complessità. New Scapes*, Torino: Testo & Immagine, 2003. "I nuovi eco-scapes: progetti generati nella ricerca di una connessione e convergenza profonda tra i principi organizzativi dell'architettura e dei sistemi viventi, esplorati attraverso percorsi e strategie differenziate: ora seguendo concezioni dinamiche ed evolutive della forma, basate su proprietà ecologico-relazionali, coevolutive e coorganizzative; ora sviluppando all'interno di analogie biologiche sempre più sofisticate la ricerca di una 'forma animata' attraverso processi morfogenetici autorganizzanti e auto poietici; ora esaltando nel divenire continuo l'interazione della forma con l'uomo e l'ambiente attraverso artefatti capaci di adattamento e cambiamento."
[19] "Fabrice Hyber Interview with Théo Mercier*",* in *Palais* 16, The magazine of the Palais de Tokyo*,* Paris 2012
[20] Francesco Careri*, Walkscapes. Camminare come pratica estetica*. Torino: Einaudi*,* 2006

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HERITAGE ARCHITECTURE LANDESIGN
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LANDESIGN "TRA AGNENA E REGI LAGNI"

Vincenzo POLLINI[1]
(1) Dipartimento di Cultura del Progetto, Facoltà di Architettura Luigi Vanvitelli, Seconda Università degli Studi di Napoli, Italia
vincenzopollini@gmail.com

Abstract
The area of study, placed in the western part of the low flow of the river Volturno, identifies a way of real knowledge, not virtual, where pedology combines with architecture. it's situated between the inferior part of Savona-Agnena and Regi Lagni, where the Volturno flows from Capua to Castel Volturno, hence the title "*between agnena and regi lagni*". The work has started from the studying of lands, exactly from their substratum, and to do it the whole symbology of the *geological paper*, produced by Campania Region-Defence of land area, has been reported. after analysing essential aspects as the land and the pedolandscape, i have passed to a careful analysis of the paper of geological unit reported from the plan of the authority of Liri-Garigliano-Volturno basin, and to the analysis of the climate of this area, to the one of imbalance, in addition to a careful analysis of flora and fauna, of respective biotic poles and an exact swot analysis. i've passed to the individualization of the first stop points called "posts", in the communes of Castel Volturno, Cancello ed Arnone, Santa Maria la Fossa and Carditello. This itinerary has been conceived like a ride along country paths and farm roads, also enjoyable by whom destiny has taken away some perceptive abilities, with two starting/arrival stations, the real hunting of Carditello and the hyppo kampos resort in Castel Volturno. The way develops through Variconi oasis and the areal of cow buffaloes between Cancello ed Arnone and Santa Maria la Fossa.

Keywords: Landesign, the Volturno, learning and representing a landscape.

1) Learning and representing a Landscape "from the past traces to the reconstruction of DNA"

How many times we have said "What a wonderful landscape!", in front of a little town laid down on a hill or in front of a tract of seaside. Probably, we have never asked ourselves what a landscape is really. It comes from the french paysage that in its turn comes from pays and it means the aspect of a place, the whole of its forms and of interaction among them.
Several thought schools discuss about the meaning of landscape but the official definitions are two: 1) european agreement of landscape "a certain part of the area defines it, so that it's perceived by people, whose character derives from the action of natural and human elements and from their interrelation",2) and the code of the arts of landscape "it's defined by a homogeneous part of area whose characters derive from nature, from human history or from their reciprocal interrelation".
Landscape is the whole of typical and distinctive elements of an area. To know a "landscape" we shouldn't stop at appearance but consider a series of elements that cannot be set aside. As a matter of fact, today, every landscape appears in a complex way and so to create a course of knowledge and to represent it we shouldn't dwell upon the addition of several components that form it but it's essential to conduct a more in-depth study. The latter can start from the analysis of physical, biological (lakes, rivers, mountains, etc.) And anthropical (towns, houses, streets, etc.) Characteristics and it can carry on with a study of theoretic, cultural, historical and town planning knowledge of the area, a registration and cataloguing of urban properties. It's also important the study of pedological processes that produce the different nature of grounds and landscapes and their different capabilities of use and abilities, conditioning forms and typologies of landscape. What is really pedology? It consists in

studying the land. Instead, the “pedolandscape” is an innovative and transversal concept: we could think of pedolandscape as an enrichment of the classical idea of landscape, like a “landscape whose lands that support it have been understood too”, or as “a dynamic combination between the exterior aspect of landscape and its inner roots”. Another basic passage is given from the study of aspects that have damaged its image, changes that have taken place in time and the ones that have changed environment thanks to natural and human factors, positively or negatively. Anyway, analysis of changes has got as logical essential antecedent the study of roots in order to explore territory and to look for some signs of its evolution and of its executive elements. As a matter of fact, past marks take on a value of statement that being in harmony with present changes draft the destiny of territory.
To know the geometric origin of the past (“signs of the past”), the way is to examine scraps of architecture, the reasons of its first form, tecnologies and materials, we have to look beyond the material sign to deduce concepts of that construction. With the succession of mutation of human needs, and sometimes with sudden catastrophic events, we live mutation about both natural and built environment, with consequence that these concepts risk of losing their identity.
My research-study is based on the method of reconstruction of dna of territory, moving from the simple geometric relief to the relief of all the elements that make up it: this is the exact objective of the multicriteria analysis. Therefore the main operation of this analysis is to ponder and recognize reality: if it is an object, an artifact, a part of city, an entire territory or more in the large an entire environmental system. Environment, as we know, is a complex and weel-structured system, constituted by areas that are some spaces defined by legal-administrative spheres. For this reason the action of multicriteria analysis aims to a deeper knowledge of the examined object through the integral of competence to contribute to the deep knowledge of environment. The way to rebuild dna of territory is a cultural behaviour that allows the surveyor to understand generating signs both of the context and of the object to examine. Discretization of architecture, in its main parts and elements, constitutes the essential and methological foundation of every case of construction.
The surveyor who works through multicriteria analysis, through the operation of measurement of territory, eplains and discretizes event, it reconstructs the system of relations among the parts, between places and space, between territory and architecture, economy and plan, because the knowledge of signs of what has been already done enables us to plan the frontier of the future. Today, the surveyor, has at his disposal avant-garde technologies; among them, the gis (geographic information system or sit, italian acronym) has taken a particular importance and it’s considered by many people as one of the most powerful instrument among all tecnologies of information, because it enables to integrate knowledge from multiple sources and to create a transversal environment of cooperation. Gis systems are basic instruments to value, analyze and represent every kind of spatial phenomenon; so it is a data processing system that can produce, manage and analyze spatial data associating one or more alphanumeric descriptions with every geographic and landscape element. Essentially, in a smaller time we can obtain bigger properties and results.
In a landscape, it’s necessary to inquire into reality and reconstruct it, describing the infancy of area, places, objects, points of view of memory, every material and immaterial component, this represents an ecogeometric model of reality, a paradigmatic model of the environment and of what has been built.
Behind the progressive change of human needs there is a biological meaning of the plan: bioplan. It consists of an ecological geometry of reality, or the knowledge of what is and what will be, through the transformation of all the components that form reality. Drawing the knowledge of what is and what will be becomes the most fascinating part of architecture and especially of landscape architecture, because during our linear course we’ll find that surprise, that deflection that will cause crisis amidst the ideas of our unreal journey.
The ways of the knowledge of architecture should be the model of the right approach for recovery and improvement of this complex system that, with different facets, from time to time we call environment, territory, landscape and that includes cultural and artistic heritage of man. Gradually, this research-study must teach how much human environment needs to reach an equilibrium with nature, regain possession of its times, its rate, of feelings that are peculiar to human sphere that produce a real and no more apparent wealth.

1.2 Study case “Landesign between agnena and regi lagni”

In the journey of my life i’ve deepened the importance of landscape, since they have labelled the land of Caserta, where i come from, like paradigm of deterioration of the environment, of camorra’s abuse of power and of cultural vacuum. In particular if they refer to the low area of Volturno-Domizio coast, nothing can be more false and insulting both towards honest citizens and toward environmental, achitectural and historical goods, of which the land of Caserta is rich.
There are two solutions: or to suffer, abdicating to civilization and giving natural, cultural and physical property in the hands of speculators, or to rise up investing really in that property that we want to ignore, giving back it the removed and denied value and dignity. This analysis is a flexible method,

applicable to the different territorial and landscape areas. In the point of view of how much and how we can work to recover the territory, this project of landesign originates to identify a way of real knowledge, not virtual, where pedology combines with architecture, integrating the study and knowledge of territory in its geological, climatic, pedological, socioeconomc and historical elements. The analysis i've conducted signs a way in the land of work, from agnena to regi lagni, starting from the land to reconstruct the marks of our belonging to a place and a local, real community, preserving the extraordinary difference of it that is the biggest creative power. Landesign is drawing, taking part, doing, telling, communicating, popularizing the land. Land + design = drawing of land; lan + design = local area network design. Local, a project that dips its roots in the place, in the land of reference in, for and from which it takes out traces, signs and fragments for the project of things that become events; area, land as common property, limited not renewable, as defined surface, area as phisycal surface that it's seen, touched, listened, enjoyed, perceived; network as system of meeting, of real spurs for people who, all together, take part to a local project of regeneration that comes from the land.[1]

Landscape represents a document, an idea, an image, a word, but expecially an emotion. As a matter of fact it's the complex whole of pedogenetic factors and components that produces the different nature of grounds, of landscapes and their different abilities and aptitudes, conditioning forms and typologies of settlement and management, after all, the courses of social and artistic development.

The study area, set in the western part of the low course of the volturno, is situated between the inferior part of Savona-Agnena and regi lagni, where the river Volturno flows from Capua to Castel Volturno. From here the title "between agnena and regi ragni", that tells about the study conducted on this rectangular-shaped area marked by the agnena channel, by the territory in the east of Capua, by mediterrean sea in the ovest, and it extends for about 30.000 hectares. The division of territory doesn't represent a discontinuity of system but there is just a change, first of all territorial, because pedolandscapes are different, because the geolitologycal substratum is different and because grounds on the top are different.[2]

The study started from the analysis of grounds, exactly from their substratum, and to do it i've related the whole symbology of geological paper produced by campania region-defense of land area. On the base of available data, for the study area under consideration, it's possible to sketch this statigraphic structure of the substratum from the top: [3]

- Sandy lands, dunes of seaside and silt-clayish sediments of interdune**,** that emerge in a 1-3 km belt, overlooking the sea;
- Silt-sandy sediments, marshy rivers associated with peaty sediments that emerge in most area under consideration and they reach the biggest deph near the flow of the Volturno;

Geomorphological events are typical of a ground. So the ground is a living body in continuous becoming, it's made up of inorganic particles, organic substance, air and water, where biogeochemical cycles carry out. These cycles are necessary to the support of organisms on the planet surface. It derives from complex and continuous events of interaction among aria (atmosphere), water (hydrosphere), geological substratum (lithosphere), living organisms (biosphere), human activities (antroposphere) and it represents the "membrane" through which exchanges of energy and matter with lithosphere and the other environmental sections happen.

"Pedolandscape" is an innovative and transversal concept: we could think of pedolandscape like an enrichment of the classical idea of landscape, as "a landscape whose support grounds we also understand", or even as "to the dynamic union between the exterior apsect of the landscape and its deep and pedogenetic roots". The pedolandscape function is the most prosperous and complex function the grounds carry out in ecosystem, going beyond the purposes of production or protection, to include the balance of environment in its complex, involving, moreover, cultural, sociological, naturalistic and historical aspects. It's the ground to define the use of ground, that in turn defines the development of civilization.



Fig. 1: LANDesign



Fig. 2: Analysis of the area



Fig. 3: Geology and soils

To understand better the links “ground-use of ground” i’ve realized some diagonal and longitudinal sections of the area that is the subject of the study, even to understand the elevation profile of area. The bends of level are low on all the area because of recovery on the right and on the left of the Volturno that has contributed to determine the pedologic and geomorphological state of grounds strongly. [4]



Fig. 4: Section

After analyzed the basic apsects, as the ground and the pedolandscape, i’ve have passed to a careful analysis of the paper of geological unit related from the plan of authority of Liri-Garigliano-Volturno basin. The area of my study is crossed by the Volturno that, with its 6342 km of surface, represents the sixth hydrographic basin in Italy. The plain of the Volturno represents a significant part of the prolific field, full of water, that has been called Felix Campania [5] since ancient time. From a partial swot analysis [6] of the area “ also known as swot matrix, it’s an instrument of energy planning used to consider strengths, weaknesses, opportunities and threats of a project or of an enterprice or of another situation where an organization or a person must make a decision to reach the purpose”, we can see how the most important strenghts of this area are characterized by the presence of an environmental, historical-landscape, natural and momentous heritage, the presence of local agricultural products as campania’s annurca apple, milk derivatives as buffalo mozzarella, to which, thanks to strict supervision of european union, has been given the dop wording, buffalo butter, ricotta and dop caciocavallo, that are exported products in all over the world and they give to these areas a big-relief image, another strenght of these places is an elevated presence of buffalo breeding factories. If on the one hand we have described strenghts on the other hand we have to put in some opportunities that have to be considered as the biggest sensitization of man to protect this huge wealth that our land offers us, trying to increase the value of watercourses, staking on the growth of these revies as dop and doc, increasing the value of tourism through initiative turned to point out

weaknesses of these lands as the strong presence of clayey grounds, high percentage of degraded areas that can lead to some threats as the neglect of traditional farms and theincrease of pollution. Another strenght of this area is the presence of a temperate hot climate that makes this area one of the most fertile of the whole region, constituting a habitat propitious to the presence of fauna and flora along all the low course of the Volturno. [7]



Fig. 5: Attractors biotic

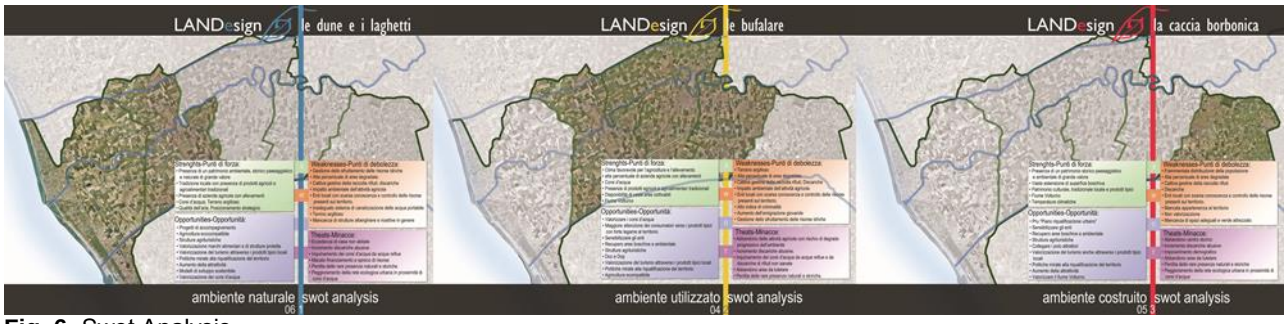

Fig. 6: Swot Analysis

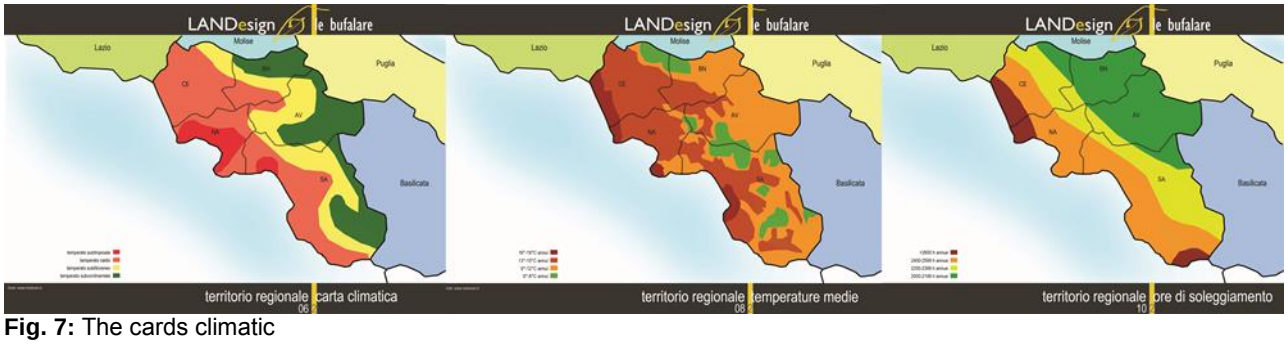

Fig. 7: The cards climatic

After analysing the general organization of this area i have passed to specification of the first stop points called “posts” [8], in the communes of Catsel Volturno, Cancello ed Arnone, Santa Maria la Fossa and of Carditello, every five analysed post differs from the other one for fauna, flora, music, attractor poles and typical products, besides for different structural and environmental characteristics.
In these communes a further analysis has been developed, arteries, the use of agricultural land, hydrography, hydrogeological sensitivity, an analysis both of current ties and of description provided in town-planning schemes that are in force in the communes. Through diachronic cut i have done a research related to territorial development since 1951, through 1984, until 2004.[9] From here the course that bounds the river banks starts, with the aim of sensitizing fruition of these areas both for tourism and inhabitants of this place. The way of knowledge isn’t dedicated to the banal superficial tourism that still characterizes area of Caserta but to intelligent and sensitive traveller who is able to seize , preserve and transfer all the emotions he has observed and known during his physical and emotional way. Itinerary has been conceived like a ride along country paths and farm roads enjoyable also by those whom destiny has taken away some perceptive abilities, with two starting/arrival stations, the real hunting of Carditello and the hyppo kampos resort in Castel Volturno. The way develops through variconi oasis and the areal of cow buffaloes between Cancello ed Arnone and

Santa Maria la Fossa, involving all the traveller's senses , not only through brackish smells of lagoon , smells of soil, scents of vegetation, recalls of birds, change of pedolandscapes and of perspectives. To sailor tradition and to baroque neapolitan culture will be dedicated dinners in the posts of Castel Volturno and Carditello, in the stops of the areal of cow buffaloes, recipes of the land of work and villanelle. [10] In the search of a concept, an idea, communicative metaphor that contains in itself the whole project, we have thought that from the traced way a tree could take shape. The trunk is rooted in San Lorenzo's orchard and from it three main ramifications start: one for every analysed post; from each of these three branchs other secondary ramifications start, each of them regards one of five senses. Essentially the post is analysed through a sensory way that crosses sight, olfaction, hearing, touch and taste. So we have tried to carry out an in–depth study or branched from our territory that comprises also flavours, smells, and all the other peculiarities that characterize the culture, environment and traditions of this area. [11]
For a deeper knowledge of territory it has been created a masterplan that represents geologycal, climatic, pedologycal, socio economic and historical elements of territory. It wants to be a moment of knowledge, a sensorial journey, directed to exalt visitor's five senses. [12]
"Landesign project; ways of knowledge from pedology to architecture" wants to be the antithesis of paradigm of desolation, the model of correct approach for recovery and improvement of that complex system that, with different facets, from time to time we call environment, territory, landscape, and that includes man's cultural and artistic heritage. It's the indispensable method for the correct defense and management of natural and built lands, conscious that the theorem of ecocentric isolation of nature from its territorial context, with interdiction of matter and energy fluxes, is not only lacking in scientific foundations but itself is a source of depauperation as much of food chains and biodiversity as of wealth and culture.



Fig. 8: Post

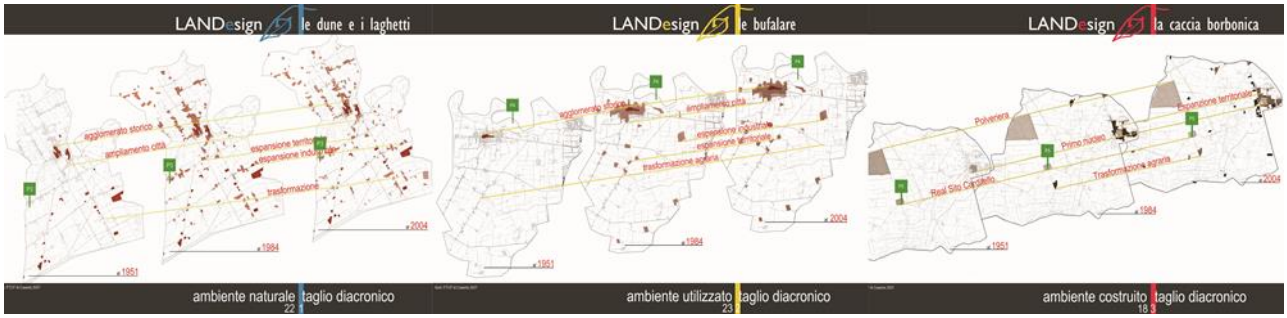

Fig. 9: Cutting diachronic

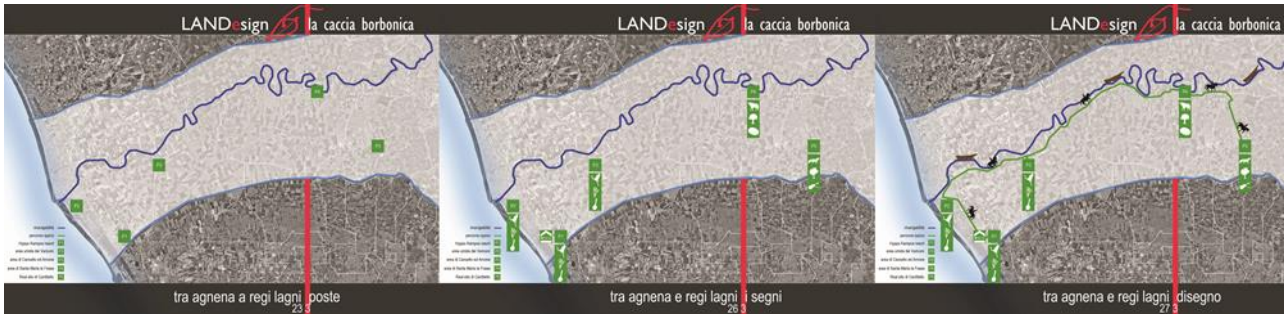

Fig. 10: Course

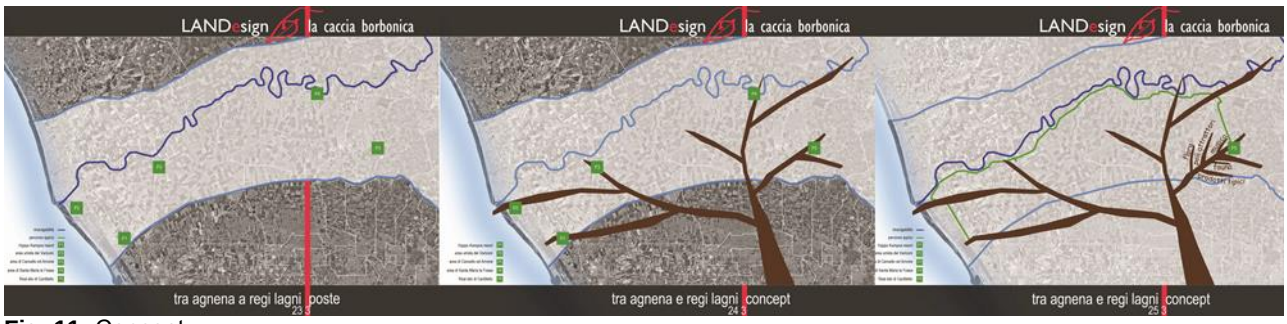

Fig. 11: Concept



Fig. 12: Masterplan

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THE PROJECT EXPRESSION OF AESTHETIC QUALITY IN THE CULTURE OF PHYSICAL TRANSFORMATION

ID 170 Arch. Paola Giannattasio [(1)]
[(1)] Department DSAT, University of Architecture of Reggio Calabria, Italia paolagia@alice.it
[(2)] The project editing of Furore's PUC is still in progress with the collaboration of arch. Francesco Montella and Arch. Lycourgos Lambrinopoulos

Abstract
Cultural awareness of the right to a quality which is also aesthetic has re-emerged in the process of territorial transformation, in administrative organizations, in the collective desire, as well as in the challenge of territorial competitiveness and landscaping that requires that the 'places' need to attract, seduce and be agreeable. Some aesthetic and idealistic theories have influenced the understanding of 'quality', simplifying its content and identifying it only with its formal significance. In fact, "quality" can not just be reduced to the value of the territorial planning, of places or landscapes, assuming the architectural project as the sole holder of the 'quality' territorial integrity and of the ability to give meaning to spaces. In the belief that the development of the identity of a specific territory enhances individuality and the identity of places, strengthens the landscape, contributes to its uniqueness and its durable and steady peculiarities, the project characterizes as a new regulatory guide ordering element of physical changes. In this direction it establishes the basis for a planning (of rules) that underlies among the rules, the exception, the irregularity; that underlies among its permanent features the creation of novelty that evokes variations, among its previsions the strength to imagine unpredictable scenarios, that is, to think the reality as it is with its unreality that gives new prefigurations to the mind of the architect.
Therefore the project, refusing standard scopes, becomes itself a value producing complexity, capable to capitalize an aesthetic quality that does not adorn, but instead becomes a second nature to the needs of humanity.

Eco-museum - Aesthetic Quality - Cultural Landscape - Resource - Territory

1. New unexplored potential besides the crystallization of forms
We live in a time when the global commodification of land produces phenomena of standardization and trivialization of 'places', of their distinctive features and peculiarities.
Consolidated are those that Marc Augé has defined as non-places, serial landscapes which can be duplicated in all areas of the territory. The standardization and reproducibility of urban landscapes is a peculiar characteristic of this process, leading to the cancellation of local history, of the historical memory of a place, of a sense and a direction that is historically expressed by living in those places.
Unfortunately, this is a worldwide process with spatially different results depending on how a given territory responds to these dynamics. The global process of commodification has not the same standardization-trivialization effect on the relation between space and time in all places. In fact, if the pressure of the world market expands the rate of production, distribution and consumption of goods, to increasingly occupy not commodified spaces, to make more and more use of natural resources, local communities do not adapt in the same way to this process which increasingly drains two fundamental goods: Space and Time. An open space, enjoyable, that can be used collectively, and a time other than that arrhythmic one the time of the clock that, as Georgescu Roegen says, replaced the biological time, the time as distension of the soul, the individual time, unrepeatable, the time which marks all life. Any form of differentiation is generally tied to the strength of the history and of local identities. There are areas where alongside the process of 'modernization' there are forms of resistance and original solutions of the local / global relation. In these situations, local communities conserve and preserve the

common areas, the ethical / aesthetic dimension of living, the natural, historical, architectural and landscaping heritages. In the 'places', however, where there is no history sedimented in conscience nor in the territory, where there is a lack of stories and local identities, where local communities have internalized an inferiority complex and live in the myth of the great capitalist metropolis, the process of commodification affects the peculiarities and the fragmented, residual stories, together with the fragile and uncertain local identity. In these areas it activates a process of modernization-physical transformation that compromises their cultural aspects and creates only new forms unrelated to contexts, and that absolutely do not generate opportunities for development.
While agreeing that the changes are not only those we consider to be 'real', physical, visible, but also the cultural ones, related to the way in which we interpret the same phenomena, and indeed we can say that it is the interaction of these two dimensions to express and give shape to the 'change', this cultural process must be controlled, managed in accordance with the cultural geography of the places.
The global scale of the changes brought about by the actions of transformation and by the model of development inextricably linked, has generated new forms, threatening and compromising the identity of the landscapes. Actions that generate discomfort and demand a stronger and stronger control. The attention to the visible, to the images of forms, without understanding the causes of the ways of being of which every action is a physical expression, limits the understanding of the processes and affects the objectives, neglecting some conceptual categories such as aesthetics, environment, sustainability and compatible development. The cultural geography of an area, result of a process stratified in time, must be identified and recognized as a new space, a creative opportunity for new interpretations, as strategic direction to be taken for interventions of modification compatible with the system of resources made available by the history of the places and the new culture of competition.
To understand and exploit the new unexpressed energies and the potential of places, it is necessary to know and take the cultural armor of a territory, origin of its historical identity as renewed declination of its development by recognizing the project as the only means of enhancement and conservation of the local cultural system; it is only possible through the project to identify and interpret the historical identity, the local belonging which denotes relationships, the permanence that expresses the power, the exclusivity confirmed by the persistence of a local cultural system, categories that allow to preserve and enhance the territorial dimension of a landscape whose space, expression of new necessities, will be rethought in a relation of continuity, of memory. Functions, 'parts', and the objects of the territory to which then award a sign of recognition and appearance will be chosen according to parameters which aim to a 'wise use of land', a use that does not destroy the essential features, the physical structure, the form, function and beauty. It is necessary to explore the territories of the present to prepare to 'meet' what has not yet been mapped. It is necessary to methodologically take on new practices to capture and understand the new energies, the potential, the raw materials that await 'expression'. To explore these unexplored potential requires a reversal of the trend, to take interpretative analysis other than conventional: to overcome the panoramic and contemplative sight from the outdoor; that 'zenithal view of the forms' that precludes the understanding of the invisible meanings of changes. It is necessary to restart looking at the places from a reverse perspective, learn again to feel them leaving the contemplative attitude which prevented in the normal practice to understand and interpret the personality of existence. It is away from the rigidity of plans and pre-established order that it is possible bring out a widely spread creativity; it is in this dimension that new spaces, new centralities can take shape, new spaces fragmented in the conflict and contradiction of complex places. It is in these spaces that "(...) may arise unexpected forms of beauty, able to shine in new constellations." Planning is behind the representation of what is emerging in the territory. Each local project must begin with a 'map' of these fluidity that characterize the consolidated spatial structure. A cognitive map of this kind requires a practice of cognitive exploration across the space: from local to global (and vice versa), from solid to fluid, from necessary to indeterminate.

1.1 How the cultural project becomes a project of physical modification

The urban project is complex, born as a cultural project and finalized in its implementation as a territorial project, to relate the values of the program with the materiality of form. In defining the relationship between formal and programmatic values attention should be focused on enriching with the aesthetic quality of the environment built both the elements of complexity typical of general and cultural formulations, and the values expressed by social languages and literature. The transition from cultural project to territorial project must be built on the assumption that a plan, as a process of knowledge and organization of the territory, should be entrusted to a process of significational planning based on sustainable and qualified activities undertaken as new conceptual categories: an alternative operating model in which uncertainty, pluralism, disorder and contradiction are the new informative concepts, becoming a tool of complexity production. To accept and share this 'transition' from cultural to territorial project involves taking on two paradigms within the process of transformation, that are, nature and culture, as both unique and essential for the ability to organize and shape the territory starting from the environmental, cultural and natural resources we want to characterize an area, in

which the sedimented culture of places becomes the polar reference in redesigning the territory. When in spatial design the themes of belonging, local identity, and knowledge, which define the relationship between local and global, arise, the territorial project exceeds the sole purpose of spatial organization, becoming the central engine of a physical and cultural reorganization of economic and social resources. This means that the focus shifts on the whole territorial system, starts from the natural and cultural resources taken as characteristic features, measuring and expressing planning in the area through its forms of urban planning and architectural design. A territorial project is configured as the organization of a place, based on the relation among architectural, ecological, historical, cultural values, measured over the important denominators of the urban landscape and the natural environment. The intense encounter between naturalness and architecture is the general principle of transformation. Today there are many reasons if our territory includes marginal and degraded urban areas where spontaneity and aggressiveness of the educational process have weakened and contaminated the landscape: these are political, social, relating to the general history of the South, but also a great territorial reference has been lost, that is, aesthetic quality. Cultural awareness of the right to a quality which is also aesthetic has re-emerged in the collective desire, and has become an important parameter of appreciation, requiring that the 'places' need to attract, seduce and be agreeable. Aesthetic quality must be meant as the relation between morphology and function; therefore, it appears that only the project, intended as a comprehensive proposal of changes, is able to fully consider and reinsert the aesthetic quality as an essential requirement for sustainable urban and territorial planning. Quality then must be researched in the preparation and planning of spaces, weather empty or not, which are used to produce new models of relationship with nature and the external environment. A deep understanding it is needed of the character of the element on which we must work on in order to define links, interactions and effects which are not only physical and visual, but which also arise from the history, traditions and the whole background that forms indeed the broader concept of landscape.

2. Construction of the landscape

The most immediately visible result of history is the intense transformation of physical space, its widespread humanization, the capacity allocated to the immaterial to speak the language of culture, or better said cultures. Men are and represent the physical part of the landscape invisible horizon. The landscape is a complex intricate relation of elements, where everything is always connected in a constant osmosis of emotions, sensations, vibrations, and it is affected by any action or intervention undertaken, it can never be independent, it will have effect over time and space. The visual spectacle implied in contemplating the elements of a landscape, whether flowers, mountains, rocks, any human evidence, must be admired with serenity to enjoy it, so blend in its beauty, to understand the harmony among all its parts. Over the years, societies have built human landscapes, radically different from natural spectacles, which are nothing but the organization of the natural elements: sun, sea, rocks, beaches, rivers, elements that contain in their forms and matter an invisible and latent part, which only careful spectators can see, provoking strong emotions. According to Pierre Gentelle, human landscapes are the product of the transformation of nature by man, and they all contain a part of nature and a part of the culture, of the civilization, and are available in a wide diversity depending on the society. The metaphorical reading of the landscape as a theater, where nature and culture interact becoming a unique example of social expression, is the key that opens the reflection on the importance of environmental scenarios in which man moves and reflects. In this way the landscape performs the role of synthesis and verification of the actions that converge on it and overlap. The review of the paradigms research is dealing with facing aesthetic judgment compared with scientific one, the importance of formal-aesthetic assessment, incidental in the landscape culture, assumes the role of a moment of synthesis also containing subjects which could be more objectively classified in ecological, environmental, economic and historical perspectives. The construction of the landscape is based on the interpretation of places formed, on territorial identities built over time; the project comes from the recognition of the values of the place and from the social, cultural and technical energies that enable the transformation of memory into innovation. The idea that the landscape is culture, that is, a phenomenon of signification and communication, underlies the Resolution 53/97 of the European Council, which called it "a certain portion of land which is perceived by the man, whose appearance is the result of action of human and natural factors and their interrelations", pledging to "consecrate it by law as common good, foundation of the cultural and local identity of populations, an essential component of quality of life and an expression of the richness and diversity of cultural, ecological, social and economic heritage". In the construction of this complex meaning of the landscape, and its subsequent inclusion in the process of transformation and government of the territory, the scientific support of landscape ecology is considered fundamental, together with the consideration of aesthetic, semiotic, ethical, symbolic, historical and cultural values. The project "Landscape Convention", approved in 1998 by the European council, highlights the transition from the identification of single "cultural landscapes" to recognition of the "cultural value of the landscape". Landscape is seen as "an

essential part of people's life, contributing to the formation of local cultures and representing a key factor of European cultural and natural heritage". In addition to the meaning "culture" referred to landscape, there are two more assignments granted with this strategic shift: the explicit attribution of an economic value to the resource 'landscape' and the extent of landscape values to the whole European territory from "remarkable landscapes" to "ordinary landscapes". This consideration addresses the attention from simple protection problems more complex management problems, implying a deep review of policies and tools that relate to the landscape heritage. The assumption of the landscape as a reference for policies regarding the local development of the territory, urban planning, culture, environment led to an evolution of the protective activity, from mere obligation to strategic choice. Most of the strategies to be undertaken must be designed to consider and to affirm the 'landscape' as reference for efforts in favor of sustainability and protection of diversity as a richness to oppose to territorial standardization. The preservation of differences is presented as priority for actions involving the governance of the territory. Through an interpretive reading of the qualitative differences of the landscape, knowledge is the basis of the territorial project aimed at production and management of 'high' environmental quality in the process of territorialization.

2.1 Emotions of a landscape

Assuming the attention to diversity as a richness that creates and preserves the environment, this approach has been tested in a experience related to professional and research activities, by building a path aimed to reconstruct the bonds that tie man to territory, turning it into the landscape. The case study presented here is a synthesis of a scientific reflection and a professional experience, combined on the issue of territorial planning and the aesthetic quality of the landscape, to check both the scientific validity that the practicality, towards those activities and innovative planning processes that lie ahead. The territory of the municipality of Furore lies within the Amalfi Peninsula, an environment among the most fascinating of our country as a result of a well-balanced connection between natural shape of places and human intervention, which over the centuries has adapted to the geomorphological conditions of the area producing a wonderful synthesis environment. In addition to the inherent natural value of the places and the widespread consolidated human adjustment to the environment, the landscape has unique characteristics: the geological features, thanks to the presence of cliff edges, the waterways' pattern, bridges, springs, lush vegetation; although the land is very close to the sea, the mountain indeed has influenced the history and the landscape settlement. The interpretation of landscape as a social-historical expression leads the need for a broader debate that clarifies the importance of protecting the different types of 'diversity' that form the landscape. Therefore the conservation of the differences must be a priority for action involving territorial governance. The proposed strategies have been addressed in considering the landscape as a reference for sustainability and protecting elements diversity such as shape, connectivity and heterogeneity, indicators of ecological and human processes. The reading of the qualitative differences of the landscape provides the basis to re-establish a territorial project aimed at the creation of an high quality environment: proportional organization, as explicit expression of the space,, is an interpretive requirement for a landscape knowledge. This has resulted in the possibility of representing the system in a combined framework of different units, at different scales, with a characteristic resolution of heterogeneity, which proportional domains correspond to the habitats of existing species and the processes inside cosystems.

The emphasis on the construction of a cognitive process bonded with the territory and the search for the involvement of local energies, turns this local urban project into a projects-park, from which tangible initiatives of landscape and cultural heritage recovery arise. The methodology developed in building the project gives it dual meaning, the whole work of research and analysis has an intrinsic value and an autonomy from the hypothesis of connection that it activates with the areas of the entire coastal district. The specific contents of the project concern the problem of conservation and restoration of rural buildings, the restoration and revitalization of the old town, the transformation of publicly owned spaces into accommodation, the production of equipment for pedestrian routes to be implemented on ancient routes.

In a particular attention to diversity as a resource that forms a landscape, one of the proposed and viable strategies was represented by the Eco-museum. Its idea was born as proposal of a new interpretative model of the coevolutionary action of man with nature.

The attention to the presence of human marks over the territorial plan, implies a conception of the museum which is more innovative than the traditional action of pure conservation linked to the transfer of objects from the past. The Eco-museum is a museum of knowledge, a cognitive, selective and interpretative tool of rural and urban evolution process, becoming over time 'home' of the appreciation of material and cultural heritage.

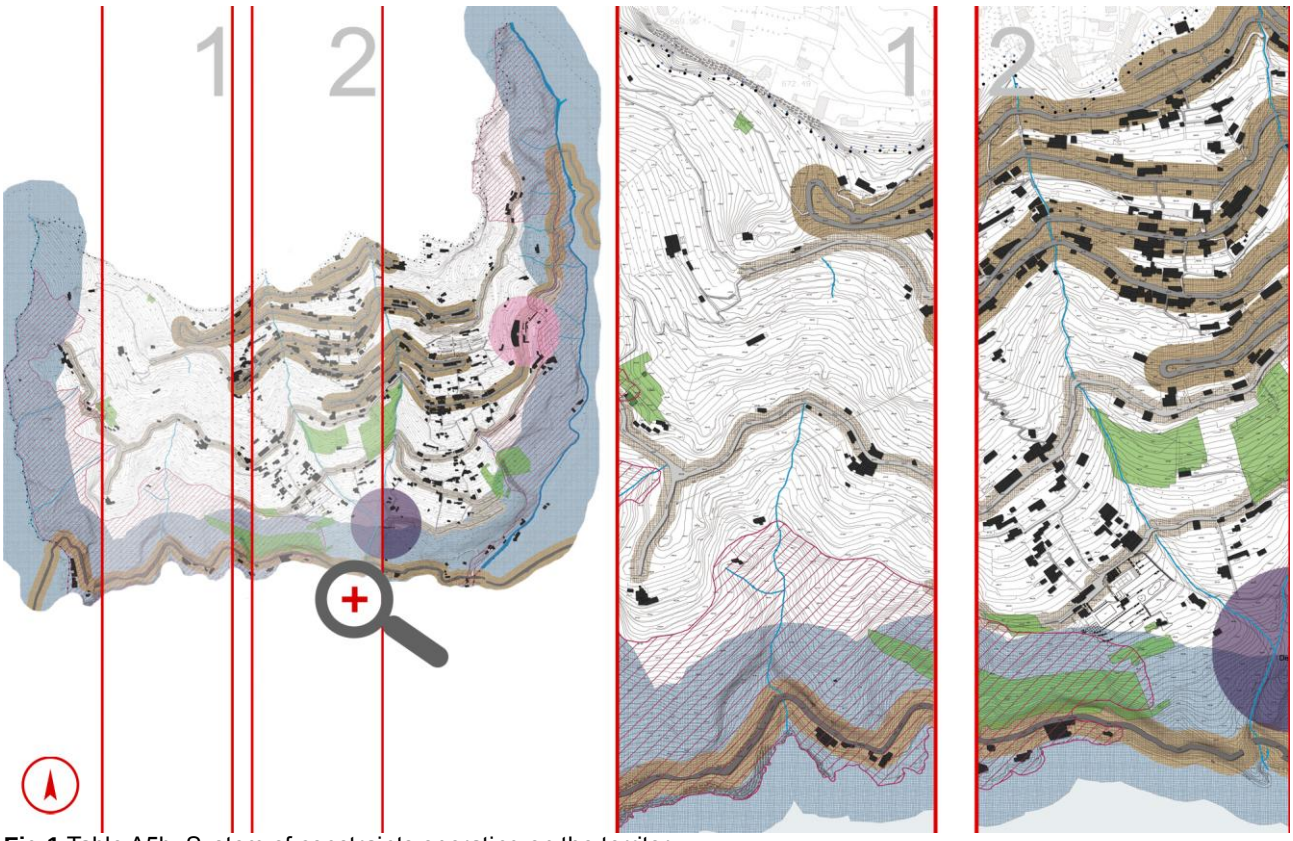

Fig 1 Table A5b: System of constraints operating on the territory

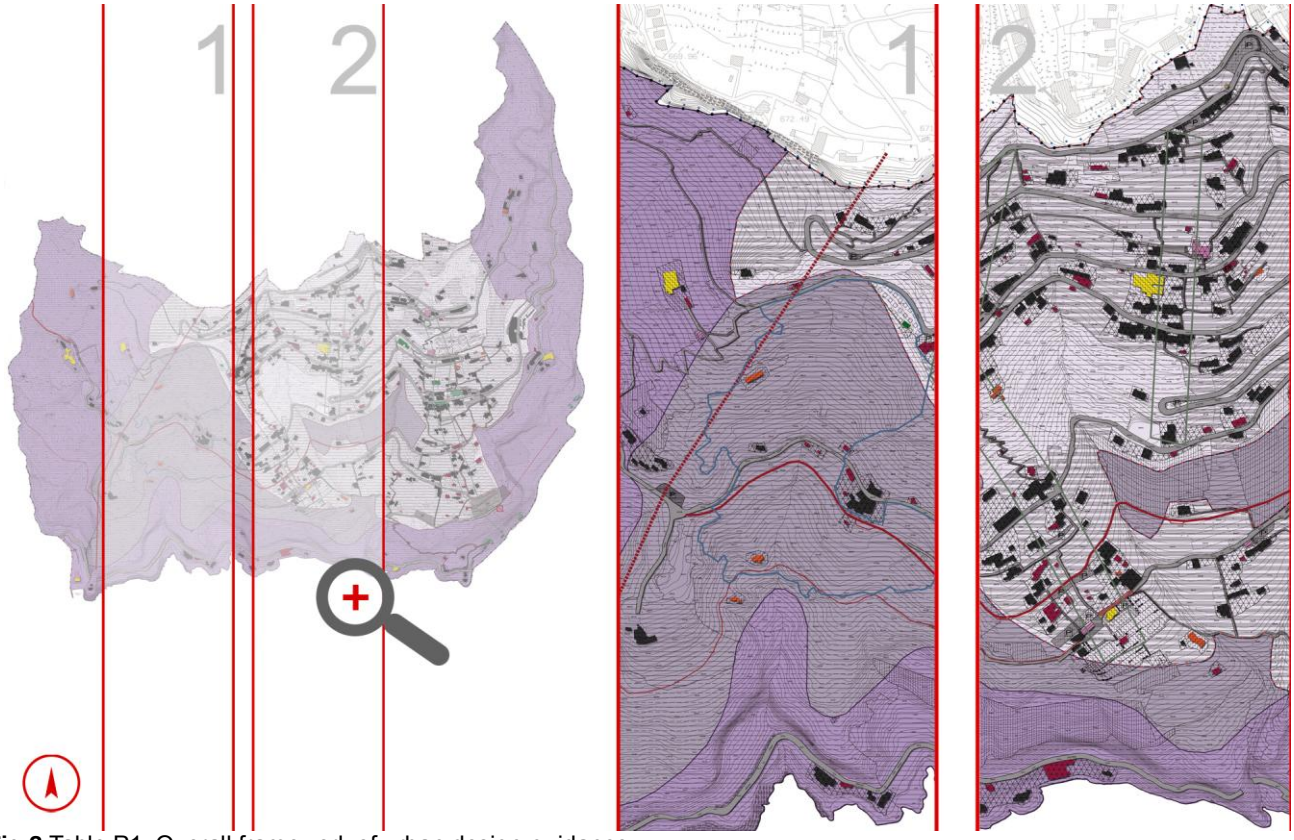

Fig 2 Table P1: Overall framework of urban design-guidance

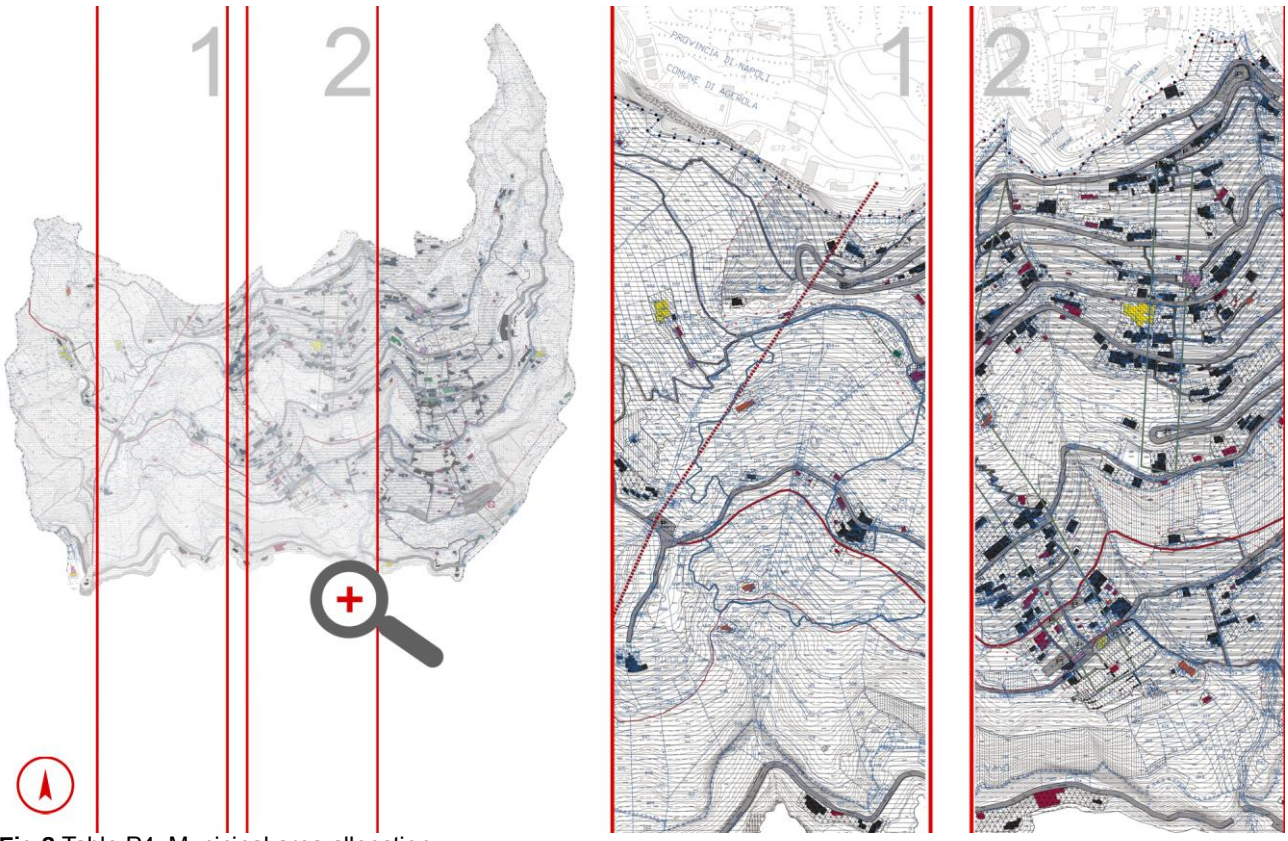

Fig 3 Table P4: Municipal area allocation

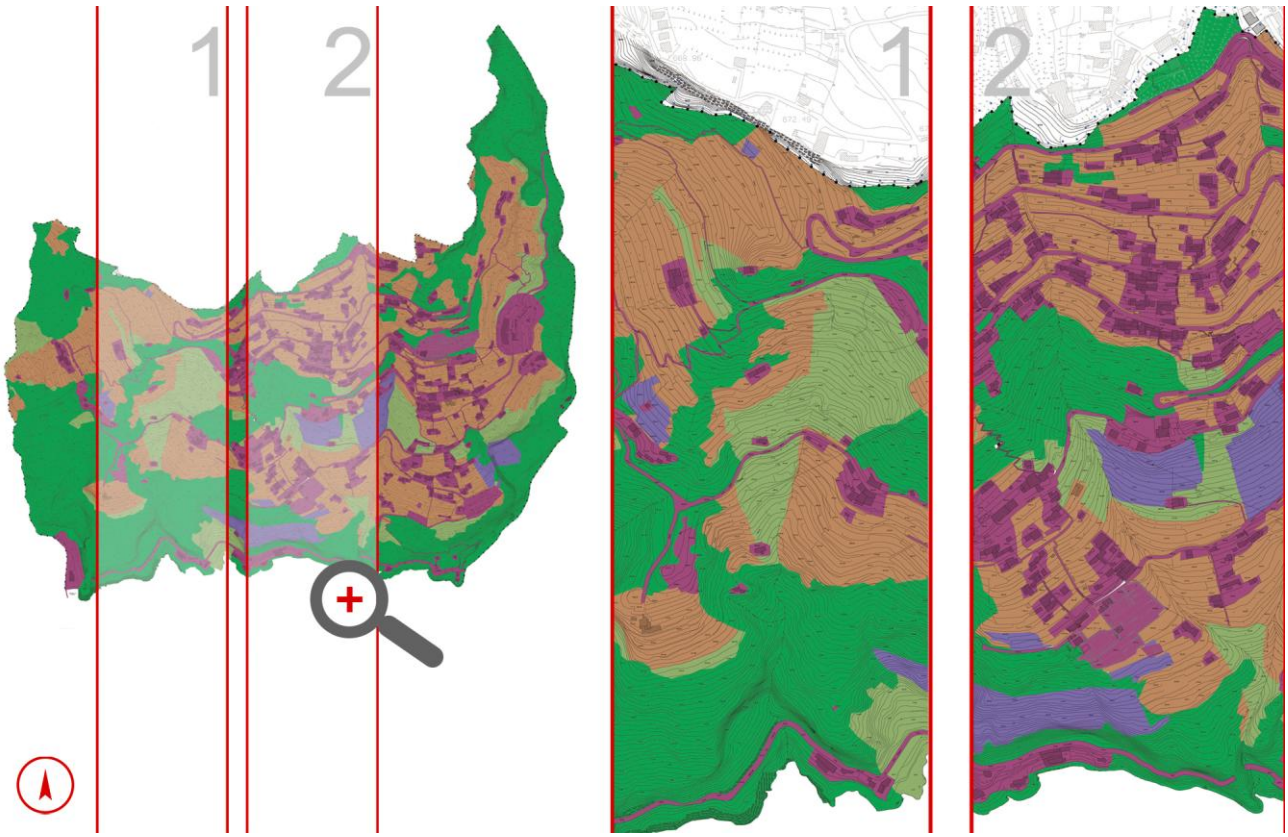

Fig.4 Table P7: Paper Unit Landscape

The Eco-museum is one of the most privileged places, both on a communicative and symbolic level, of a new belonging desire and of a social identity need, to reestablish the sense of man-land combination.

The museum becomes then a studio in which the knowledge of physical objects adds a new cognitive' function to indicate the compatibility of transformation processes regarding cultural-territorial heritage. The museum must be read in accordance with all the codes and categories that allow to understand signs men have used to communicate in history; it is not only about recovering and restoring 'old' values, as rather to understand if the values responsible for the contemporary spatial structure are still effective. The methodological action of tracing those elements which are essential to ensure a dialogue between the past and current values allows to: "reopen the dialogue with the hidden geometry of places, with the signs of local stories and geographies, with images of the collective memory in which occur opportunities and resources to reinvent, in the structure of the signs and of the existing settlements, new territorial identities which can make (or enhance) landscape".

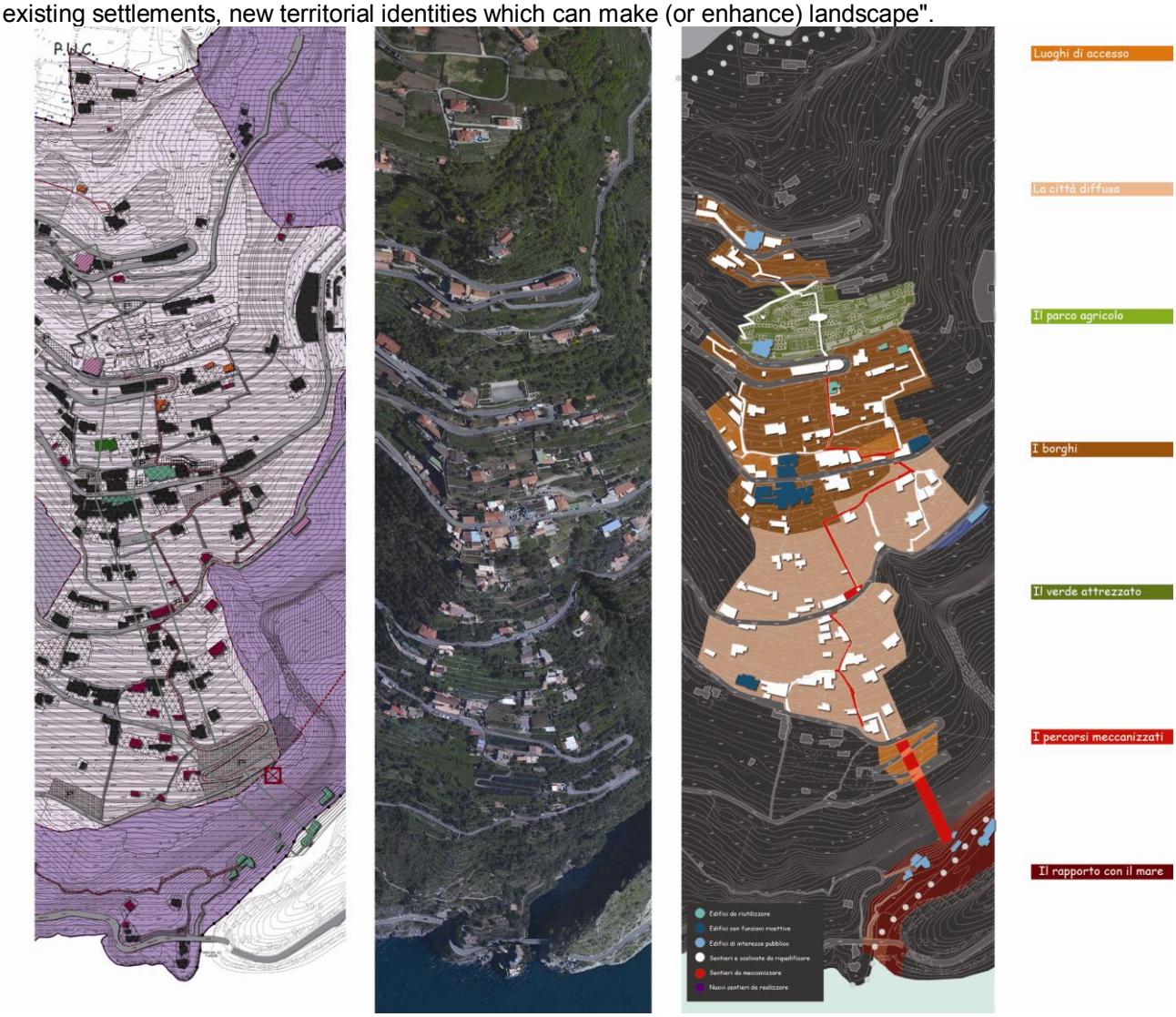

Fig.6 Table P1a3: tourism development axis - Route 3

3. The aesthetic quality

... we realized, in landscape cities and territories are a presence of history in nature : history as the time of which city is the spatial image, in nature as the time whose spatial image is landscape. The story begins in nature, as city arises in landscape; and nature has its epilogue; epilogue, also, of the historical city ... (Assunto, 1973, p.103) The beauty of the Italian landscape is today largely damaged, if not lost, in many places, where heavy speculation and lack of planning 'rules' have often diminished the historical memories and natural landscapes. The territorial system has been attacked, vexed in its topography, morphology and aesthetics; for long time planning policies have focused only on how to preserve, forgetting that quality today needs to be justified in order to be used. The failure of only conservative policies has not allowed an understanding of the reasons behind degradation nor to propose new conditions for this process to be changed. The project measured on landscape values represents the formal return of the transformations they happened. As formal synthesis of the places, in architecture and urban planning it can be the reference against which to measure subsequent changes required by social demand. Not only an element of cultural reference, but also an organizational and functional element fulfilling a specific task: bringing interventions back to places and measuring them in relation to their identity. At the same time, the local landscape is a cultural

factor: if each place is expression of the natural and artificial actions there produced, the interpretation of these expressions, their study, the assignment of value, are an expression of the culture that interprets and creates the place. These two cultures often do not match in the historical phase or for social and economical prominence; it is that the time when the history of the place lives in full this contradiction. Today, in our territorial readings, there is a clear history of fast overlapping, of replacement induced by behaviors and manners which often were not completely assimilated, by new entries that deeply shock the system of relations and the energy exchange, which test trough the mill the limits and the ecosystems carrying capacity. The social demand of reorganization, recovery and restoration of the environment is growing, and expresses a need for actions too often ignored. It is to combine the culture of urban planning with the holistic method to interpret reality and with the cultural attention to places that we take on landscape as a regulator, formal assumption for interventions and constraint for transformation processes' aesthetics and dynamics. If the landscape is the formal synthesis of changes and the project is a tool that allows its interpretation through the knowledge of the past of the area, the planning process can not be separated from the value of landscape as a historical-visual continuity, which can be culturally interpreted, of the transformation that took place and those that has been proposed. 'Project' does not only mean the autonomous intellectual and professional act of interpreting the social and institutional demand for transformation, but the transformation process of the activities of the places which has been socially requested organized. Until the emergence of modern city there was a full correspondence between social and economic process that constitutes the city and its organizational form: the form urbis corresponded to the structure that had generated it. The contemporary city does not only expand in space where it has been built but, in its consolidated form, there is a the prominence of the recovery actions and restoration against new constructions. The space in front of which we are standing is not material and it is only expressed in always visible forms, but it can also take much more subtle characters that need, in order to be investigated and shaped, manners capable of going beyond the sight. Territorial space is currently inhabited by qualitative multiplicity that are not only metric, which occupy it without counting, and which can be identified only walking on them. Therefore, the methodological path taken has been on experimental basis, a path that has not led to seek for regularities, but has rather discovered 'vague essences' and differences, strengths and intensity, energy and new individuality.

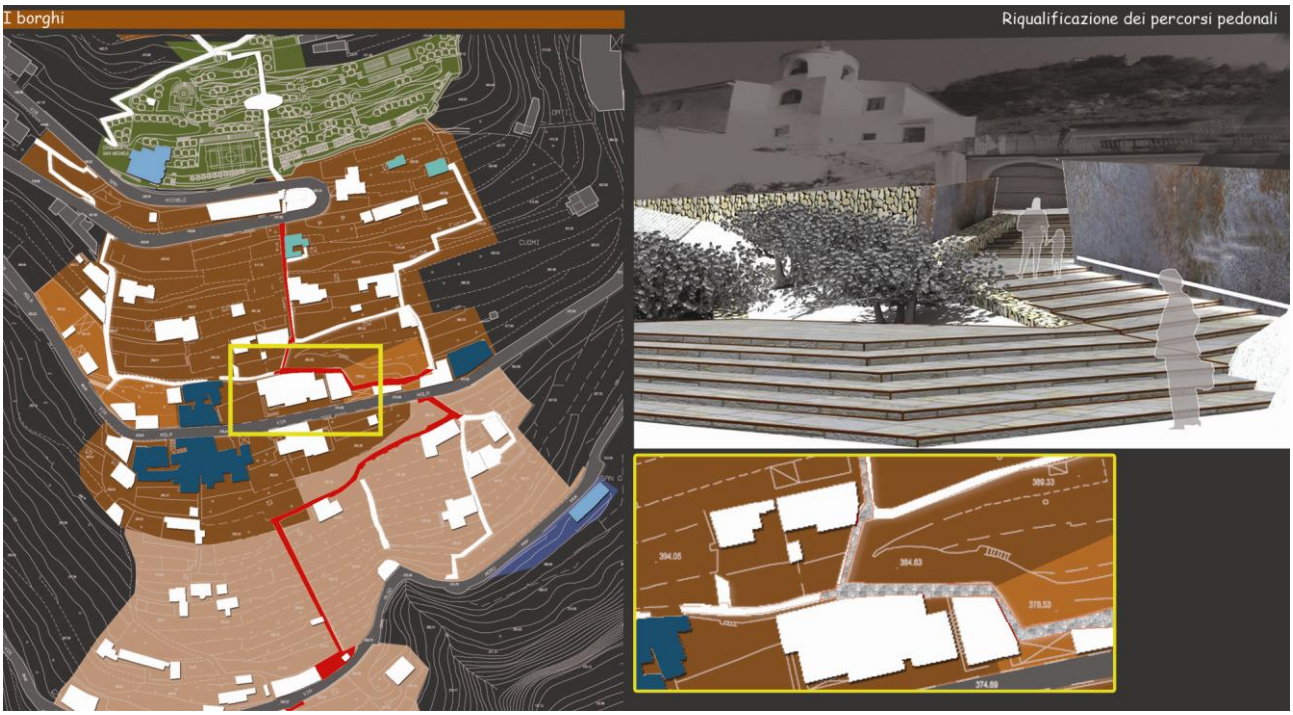

Fig. 7 Table P1b3-villages: tourism development axis - Route 3 - in-depth design project of the "villages" element - Restoring of pedestrian route

The ways of conceiving the (territorial) project are a key factor. In the first place, the sense of the project is mainly in the ability to activate constructive processes, production processes of 'meanings' and, in particular, to establish an interaction between the "instituting" dynamic of societies, and in these urban communities, and the tendency of institutions to self-preservation and self-reorganization. The project then becomes the place of collective imagination, mainly characterized by: Relational contexts within which the different interacting actors are themselves the planning subject; Contexts and situations that are able to involve these same subjects, from all points of view (emotional,

symbolic, imaginary); which are able to activate and maintain vital the motivations of 'designers', developing simultaneously empowerment and, on the other hand, accountability; Ability to develop critical knowledge together with the dynamics of interaction, that is, assuming a 'political' feature, which means above all the ability to develop and revise the inner meanings of "collective magma". The project, as an act of physical transformation, is unique in its reflection of freedom, man is then the actor who, in an ecological sense, transforms the environment, the landscape of life, marking it with the sign of its action, entrusting to his skills the feeling of power towards nature. Territories, cities, or fragments of cities, everything is landscape, and they become the means, the instrument to activate these processes, the object around which the motivations of individuals and their planning skills are kept alive, in a projection of usability and enjoyment of the rich architectural and natural heritage. It is a cultural experience that must be encouraged against any form of physical standardization, and that forms in the interaction between history and nature.



Fig. 8 Table P1b3-villages: tourism development axis - Route 3 - in-depth design project of the "villages" element - Restoring of abandoned buildings



Fig.9 Table P1b3- villages: tourism development axis - Route 3 - in-depth design project of the "villages" element - Eco-museum



Fig.10 Table P1b4-agricultural park: tourism development axis - agricultural park - detailed development

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3. See Geogescu Roegen N. (1971), The Entropy Law and Economic Process, Harvard University Press, Cambridge Mass, the first economist who introduced the law of entropy in the economic circuit with the questioning of granted certainties as opposed biological time.
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5. Bodei, 1956
6. This new space is not material and it is expressed in always visible forms, but it takes more and more subtle characters which, to be investigated, require manners capable of going beyond the sight.
7. Complexity expresses in a variability and diversity of the system and makes it impossible to think of uniform and homogeneous rules, directions, and tools for the control of transformations.
8 See statement of Giovanna Melandri, Minister of Heritage and Culture, "The Italian landscape is not only the background, the pattern of our future, it is not outside us. (...) To our generations, we must deliver not only a complex map, but also an ethic to read it".
9. In ecological thinking, the 'difference' is the evolutionary foundation of life and through it we determine the relationships between living organisms; the term 'Eco-museum' was coined in the seventies by Huges de Varine, General Secretary of ICOM (International Council of Museums), as opposed to the traditional concept of "fortress museum". The addition of 'eco' to the root 'museum' reiterates its willingness to maintain a link between the material and cultural expression of man and the environment in which the production of this made sense. But this bond is inseparable from the early nineteenth century, when supporters of popular culture give the meaning of museum to humble, poorer artifacts; the 'museum of arts and popular traditions' were born, having dynamic and evolving characteristics, as an alternative to the static exposition of traditional museums.
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Design of energy systems through the crop circle geometry

Claudia CENNAMO,[1] Rosanna DRAGO[2]
(1) Department of Architecture and Industrial Design, 2nd University of Naples, Aversa, Italy
claudia.cennamo@unina2.it
(2) Drago&Gaeta, Company of Architecture and Design, Via Saverio Altamura, 2, Naples, Italy
arch.rosanna.drago@archiworld.it

Abstract
The crop circles, images in the grain that appear mysteriously during the night, in the country sides mostly British, from hundreds of years fascinate and intrigue scientists around the world. Their origin is unknown, although they declare an evident geometric matrix, which brings to mind an ancient symbolism, essential to every earthly worship.
Many are the theories in this regard, including the one that arouses most interest is that they are a symbolic forms explicitly registrants energy, i.e. that serve to represent and to tell the origin of all things: the energy that permeates the Earth.
Crossing the symbolism of numbers, considered as (but not only) "signs", the present work intends to investigate the possibility of an analytical link between the physical concept of mechanical energy, as it is understood in classical mechanics, so in the sense of work done by a system of forces for a system of displacements (dual of a system stress -strain), with the evocative images suggested by the mysterious signs in the grain, chosen basing on the most functional representative form, with the aim to re-find (or re-invent) a new representation of the energy.

Keywords: crop circles, signs, numbers, energy, physic

1. Introduction
It is known that from the point of view of Eastern philosophy, the cosmic energy is the source of all the living things, and it is the essence of the movement, processing and life. The primary energy is manifested in heaven (Yang) and in the earth (Yin). So the meeting of the cosmic energies with the nutrient energies of terrestrial, generates man and woman, mediator principle of Yin and Yang.
In Western philosophy, the word "energy" derives from the late Latin energīa, in turn, from the Greek ἐνέργεια (energheia), a term used by Aristotle in the way of effective action, consisting of en, particle intensive, and ergon, capacity to act.
During the Renaissance, inspired by the thought of Aristotle, the term was associated with the idea of expressive power. But only in 1619 Kepler [1] used the term in the modern sense of energy, namely as the ability of a body or system to do work.
In classical physics, the energy is defined in various forms, each of which has its own energetic equation. The main forms of energy (each expressed through its own equation) are: mechanical energy, classically defined as the sum of potential energy and kinetic energy, chemical energy, biological energy, electricity, light or radiant energy, thermal energy, electromagnetic energy, nuclear energy.
Such forms of energy can be transformed one into another, but each time that such transformation occurs, a part of energy (more or less consistent) is inevitably transformed into thermal energy (that is, it produces heat); one speaks in this case of "dissipative effects".
At the beginning of the twentieth century, Max Planck [2] introduced a new theory, based on the fact that some quantities of certain physical systems, such as energy or angular momentum, can vary only of discrete values, also called "quanta". So, if energy in classical physics is a continue scalar property stored in a system, in quantum mechanics the energy is "quantized", i.e. it can take a number of

discrete values (or "energy levels"), all multiples of a quantum of energy, which represents the lowest amount of energy that can be stored in the system. These systems are called "linked", because the energy of the particle never exceeds the potential barriers.

2. Brief compendia of links between mathematic and signs

Only two things are infinite, the universe and the human stupidity, and I'm not sure about the former (Albert Einstein)

The infinite symbol ∞ was probably created by John Wallis, that used it in one of his first texts, *De Sectionibus Conicis* (1655), where is was called to express himself about the concept of "bent infinite", and then in *Arithmetica Infinitorum* (1656), when he ideated a simple infinite product able to find the π value

$$\frac{\pi}{2} = \frac{2}{1} \cdot \frac{2}{3} \cdot \frac{4}{3} \cdot \frac{4}{5} \cdot \frac{6}{5} \cdot \frac{6}{7} \cdot \frac{8}{7} \cdot \frac{8}{9} \cdot \ldots \qquad (1)$$

Between the various hypotheses before his death, the most reliable is that his inspiration was founded on a very similar image used by the Etruscan to indicate the number thousand, often used to say "many".

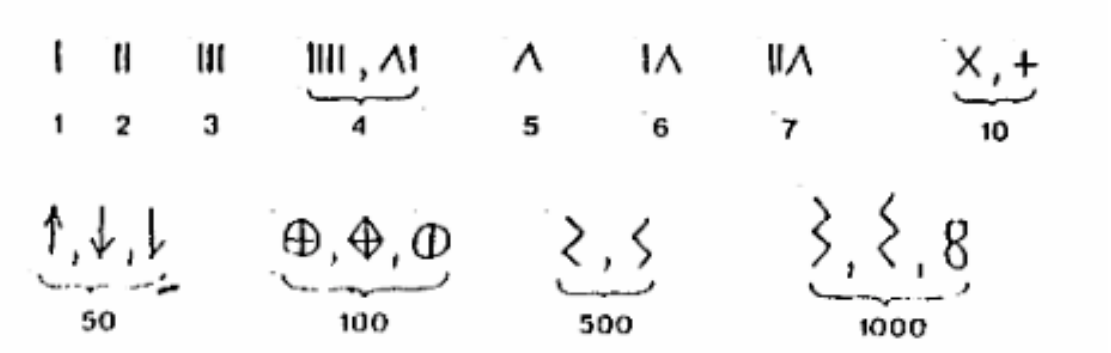

Fig. 1: Etruscan system of numeration

But considering the various hypothesis, the most fascinating is the association of the infinite to the alchemic ancient symbol of οὐροβορῶσ, the snake that bites its own tail, from ever associated to the cyclical nature of all things, the neverending return, base of Gnosticism and Hermeticism [3].

The following picture shows a crop circle formation appeared Liddington Castle (Wiltshire) in June, 17 2001. It could represent the Uroboro around the Earth, and if we like to work with the imagination, we can see also the famous Lay Lines [4] that wrap around the earth.

The Lay lines (or "pathways of the dragon", according to the principles of Feng Shui [5]) are currents of vital energy that cross the Earth in the direction of the parallels and meridians.

In realty, the Ley Lines are alignments of a number of places of historical and geographical interest such as ancient monuments and megaliths, especially belonging to the British area, within which a large amount of energy is suspected or imagined that is given off. Flows of energy similar to rivers that intersect in a straight line on the Earth's surface, according to the Geobiology they have a variable width ranging from 3 to 30 or 40 meters, and an estimated length from 5 to 30 meters.

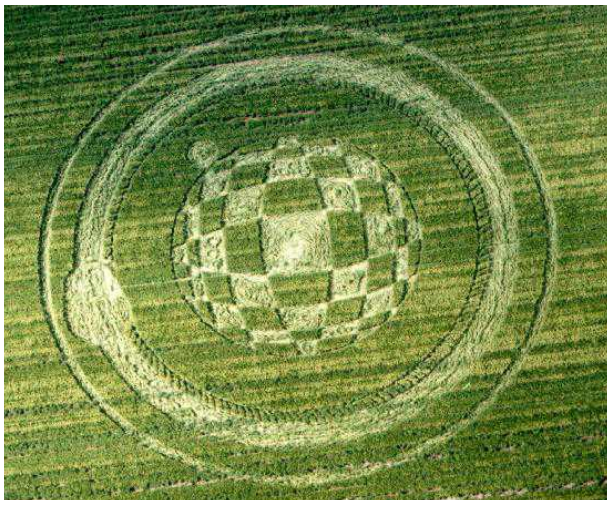

Fig. 2: Liddington Castle (Wiltshire), 2001.

One of the many theories on the causes of location of crop circles, is the one linked to the presence of Lay Lines just in that position.
In some pictures, the snake is shown half white and half black, recalling, in this way, the ancient oriental concept, pivotal of Tao philosophy, represented by Yin and Yang, that means the dualistic nature of all things, and above all the concept that the opposites aren't in conflict with each other, but their existence is necessary for the equilibrium of all creation, phenomenal and not.
It's interesting also emphasize that the notion of infinite, in the "rational" sense of the term, rooted its raison d'être only in 1400, as dichotomy of finite.
In fact, already from the Pythagoreans, the only concept that was taken into account was the idea of finite, as synonymous with perfection and completeness. So, extending this doctrine toward the numbers, only odd numbers were considered perfect, because their geometrical representation gives definite figures.
With Democritus (450 b. C.), in *Testimonies and Fragments*, the idea of infinite began to take a form in the philosophical thought, and an overcoming of the ancient archaic vision has been beginning, and the cosmos has not been considering anymore as a finite and limited reality.
But the real inclusion of the infinite notion as base of metaphysical philosophy will occur only in late Hellenistic period, of Neoplatonic tradition and culture, when the **metaphor** was used in religious matters with the aim to collimate the principles of faith and the rational human thinking.
This concept became more significant through the ideas of Nicola Cusano, who in *De Docta Ignorantia* (1440), tried a reconciliation between infinite and infinite, between man and God, stating with his theory of *coincidentia oppositorum* that it is possible to transform the infinite into an absolute dimension in which man will be able to increase his knowledge.
Naturally, man for his nature (finite), can be never fully understand the secrets and the knowledge of the absolute, but reasonably and potentially he will be able to have this perfection through the progression of one's spirit.
With Giordano Bruno (1548-1600) the metaphysical and mathematical developments of the infinite concept are significantly radicalized in the naturalistic and pantheistic sense.
In his famous *Cosmological Dialogues*, Bruno [6] processes his own idea, as infinite space and time. The Universe is not simply a finite region, but it extends itself without limits in all directions and in a-temporal manner.
His conception had a great extension: he arrived to conceive the existence of infinite worlds, infinite solar systems, infinite living species and intelligences.
These statements so daring for those times, caused many problems and theological debates. Already St. Augustine thought and stated that it was not possible to conceive that there was life on other planets, because if that were the case, we would have to accept the idea of a God willing to incarnate in other worlds, with a pietas and crucifixion repetitive in time, which would have declassified the idea of the divine in the service of men with the aim to redeem they from sin.
This concept of a God subservient to the cross and with the ability to incarnate whenever there had been a need, was inconceivable for the Church to such an extent as to define heretic anyone would embrace such assumptions.
It is true that even Cusano somehow came up at these theories, but he was a Cardinal, therefore equipped with a high power in the sphere of the Church, and this fact gave him the possibility to enjoy of some privilege.
For Giordano Bruno was not the same, and therefore the idea of infinite condemned him to the stake at the dawn of the 1600s, however leaving, despite death, his conception of parallel universe, that comes to be part of the Copernican theory which marked the birth of modern astronomy. A momentous time, if we consider that the concept of infinite abandons the philosophy for enter in science.
And in fact, in such a revolution, the thought of the philosopher Spinoza has been stating, who conceived the idea of infinite as an immanent attribute of reason, fulcrum on which he will argue the current of the German idealism, promoter of the great debate about the absolute, to which, in recent times, reflections of Auguste Blanqui and Borges will be joined.
And it is the latter, Borges, who in the Metamorphosis of the turtle, in Otras Inquisiciones (1952) writes about the concept of infinite from which was totally fascinated.
"*... I'm speaking about Infinite. Sometimes I whished to fill its moving history. ... The great Hydra* (swamp monster that is like a foreshadowing or emblem of geometric progressions) *... that should crown the sordid nightmares of Kafka, and his central chapters not ignore the guesswork of that remote German Cardinal Nikolaus Krebs* (Nicola Cusano)*, who saw a polygon with an infinite number of angles in the circumference, and he wrote that an infinite line would be a straight line, it would be a triangle, it would be a circle, it would be a sphere... Five, seven years of apprenticeship metaphysical, theological, mathematical, could put me in a position to plan decently perhaps this book. Needless to say, life prohibits to me the above hope and also this adverb. ...* "

But Borges did not disdain even the enumeration, that exercised a great interest over him, to the point that he wrote:
"Theoretically, the number of numeration systems has no limits. The more complex, in use to the gods and the angels would record an infinite number of symbols, one for each integer. The easier requires only two of these: zero is written 0, one 1, two 10, three 11, four 100, five 101, six 110, seven 111, eight in 1000 ... " (Leibniz's invention that apparently had been stimulated by the celestial hexagrams of I CHING).
It' impossible to enumerate all the logical-mathematical paradoxes about the infinite: we would like to remember the Paradox of Albertus de Saxonia (1316-1390), which speaks about of beams of infinite length, typology often taken as pattern in the texts of Structural Mechanics [7] where, of course, there is no reference to the paradox. It is: *the volume of a beam of infinite length is equal to the volume of the whole Space*.
Undoubtedly related to the concept of infinity are both the representation of the number 8 and a particular algebraic curve in the shape of eight inverted, the Lemniscate of Bernoulli that is, as it is known, a particular case of the *oval of Cassini* (1680).

2.1 The enigma of the number eight
The graphic representation of the number eight (as well as the infinite symbol) is a curve that the human hand can repeat indefinitely, without ever disconnect the pencil out of the paper.
The cases in which the number eight achieves a particular importance (not only symbolically) are various and heterogeneous: from the Esoterism to the Metaphysical Sciences, to the Mathematic, to the Classic Physic etc. Some examples of what, are listed below, between science and no-science:

- 8 rotated 90 ° is the symbol of infinite
- the number 8 is universally regarded as the cosmic number
- 888 is the number of the portal toward the infinite, the eighth dimension!
- 8 Hertz is the Schuman's frequency, the heartbeat, or the pulsation of the Earth
- 8 hertz is the frequency of the mystics healers

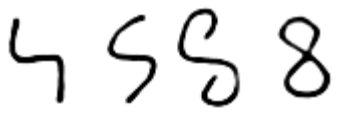

Fig. 3: Evolution of the number 8 from the Indians to the Europeans [8].

Apparently, among other things, the symbol has taken inspiration from the shape of the Via Lactea, since in some ancient texts it was considered a huge serpent of light residing in the sky and that circled the Earth.
Then, it was widely used by mathematicians from all over Europe, but in a rather random. In fact, until the mid-nineteenth century, the dominant philosophical idea was derived from Aristotle, so that the actual concept of infinite, not only was not included, but there was neither in the empirical sciences, nor in those math. The sign of infinite was only designed to express a numerical continuity, endless, inaccessible and unattainable, function and domain of a single Almighty Creator.
Additionally, the use of rigorous symbols to express concepts, was equivalent to the alchemical invention of complex codes, through the which use it was possible to achieve solutions, decipherments that in a sense revealed the secrets of God.

2.2 The Lemniscate
In mathematic the Lemniscate is an algebraic curve approximately with the form of an 8 rotated of 90°. It has a node in the origin and two double nodal points in its cyclic parts [9].
In Cartesian coordinates it is described by a rational quadric

$$(x^2 + y^2)^2 = a^2(x^2 - y^2) \qquad (2)$$

The graph of this function produces a curve similar to the infinite symbol, which, in turn, is often called just Lemniscate.

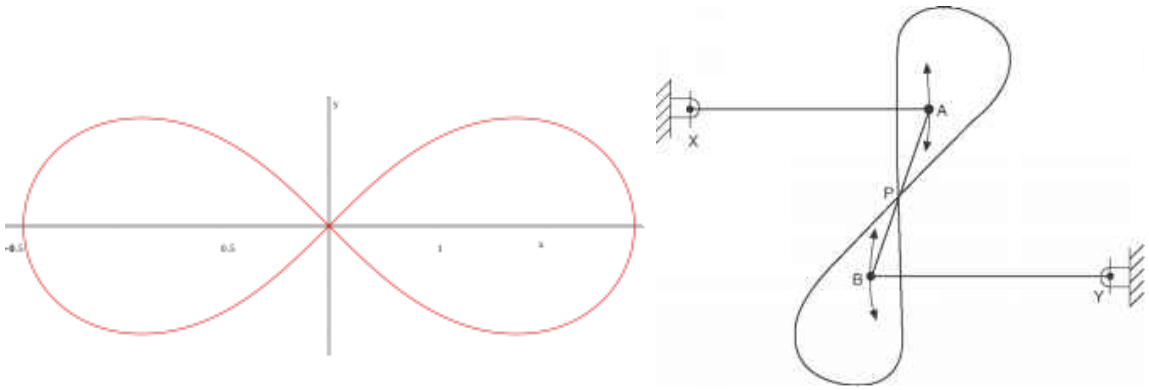

Fig. 4: Graphic representation. a) Lemniscate; b) Watt's system

A famous type of Lemniscate was described for the first time in 1694 by Jakob Bernoulli, as a modification of the ellipse, which is the locus of points for which the sum of the distances from two fixed points (called foci) is constant. A Lemniscate, vice versa, is the locus of points for which the product of these distances is constant. Bernoulli called it Lemniscus, which is the Latin equivalent of "pendant ribbon".
The Leminiscate can be drawn with the system devised by James Watt (1736-1819). The Watt's parallelogram is a mechanical connection, in which the movable central point of the system is forced to move approximately in a straight line.
It consists of a series of three bars, two longer and measurement equal between them, both connected to a smaller central bar. The outer ends of the long bars are pivoted in fixed positions between them, while the two joints between the three bars are free to rotate. Taking into account the fixed distance between the outer ends, the system is an example of a "connection to the four arms.
A strange formation of crop circle appeared the August 8, 2008 (8-8-8) in Wiltshire (U. K.), and naturally this fact interested very much all the Ufologists, that spoke about a mysterious signal came from the sky. They though, perhaps, that the portal toward the infinite has been opening just that day [10].



Fig. 5: Formation of crop circle appeared the August 8, 2008 (8-8-8) in Wiltshire. a) Preliminary diagram; b) overview.

3. The spirals

An Archimedean spiral is a curve which can be described in polar coordinates (r, θ) by the following equation

$$r(\vartheta) = a + b\vartheta \tag{3}$$

with *a* and *b* real numbers, and *b* strictly positive. The change of the parameter a rotates the spiral, while *b* controls the distance between the arms.
The spiral of Archimedes [11] is distinguished from the logarithmic spiral for the fact that the subsequent arms have a fixed distance, while in a logarithmic spiral the distances follow a geometric progression.

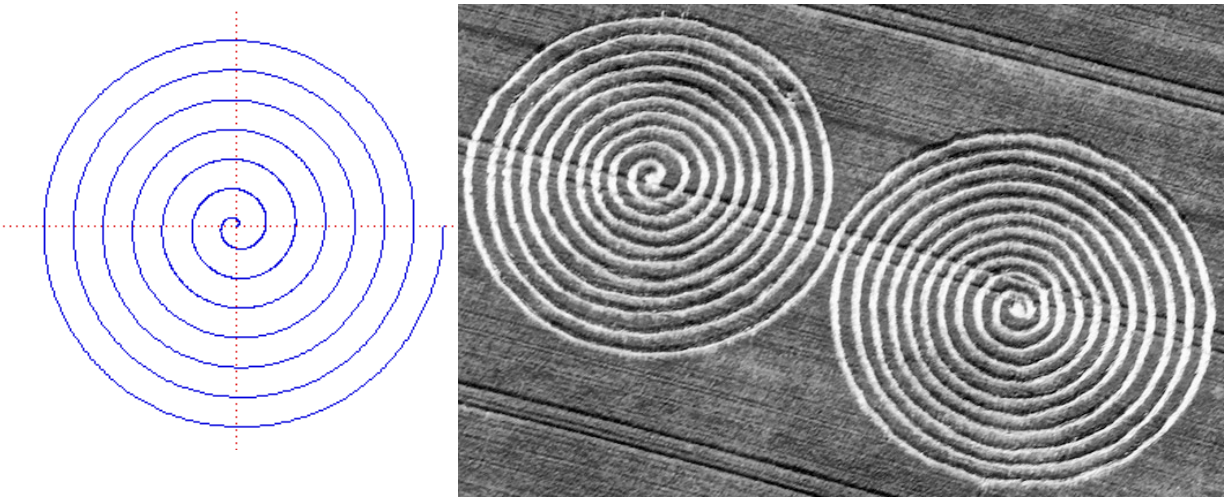

Fig. 6: a) Spiral of Archimedes; b) Crop circle in the Wiltshire countryside.

A logarithmic spiral, equiangular spiral or growth spiral is a special type of spiral that is often found in nature. The logarithmic spiral was first described by Descartes (1596-1650) and later extensively investigated by Bernoulli, who called it *spira mirabilis*, "the marvelous spiral".
In the logarithmic spiral, the radius grows while it turns. As it approaches the pole, the curve "wrap itself" around this without ever reaching it.
In polar coordinates, the curve can be written as

$$\vartheta = \frac{1}{b}\ln\left(r/a\right) \tag{4}$$

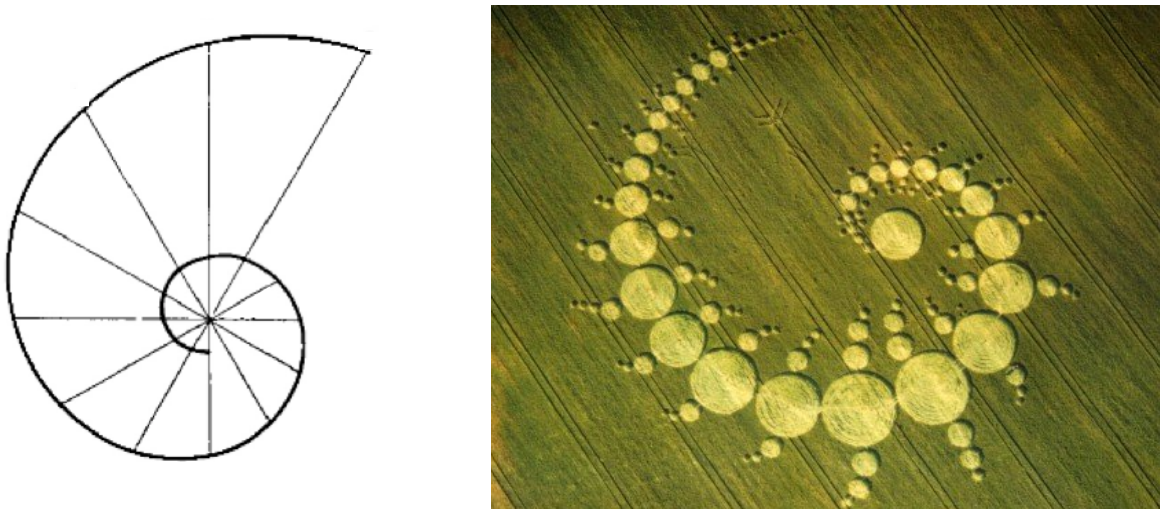

Fig. 7: a) Logarithmic spiral; b) Stonehenge, July 7, 1996.

The problem of rectification of the circle, which cost much effort to the ancient surveyors, was also solved by Archimedes, with the introducing of a new curve, over than those that can be generated

using only a straightedge and a compass, that is his spiral. He was able to produce a result that, if one thinks of mathematical tools of the time, is incredible.
Consider the first circle of Archimedes (figure 8). Draw the line s normal to the radius of the first circle AH and passing through the origin of the spiral A. Consider, then, the straight line tangent to the spiral in H that intersects the line s in a point called F. Archimedes shows that the segment AF is the rectification of the circumference of the circle of radius AH. So doing, Archimedes moves the problem of rectification of the circumference to tracing the tangent to the spiral, which with the only use of a ruler and compass it's impossible [12].

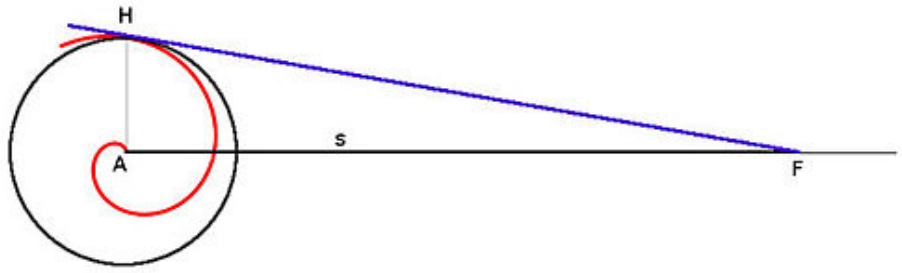

Fig. 8: Archimedean construction

In geometry, a logarithmic spiral with factor of growth b and growth equal to φ, with

$$\varphi = \frac{1+\sqrt{5}}{2} \approx 1{,}6180339887 \qquad (5)$$

that is the golden section, is called "golden spiral" [13, 14]. The graphical representation of this spiral is based on a series of squares that can be insert inside the golden rectangle (Fig. 9 a). The realized construction can be related to the Fibonacci sequence, because the squares have, as sides, just the values of the series: 1, 1, 2, 3, 5, 8 ... See Figure 9 b

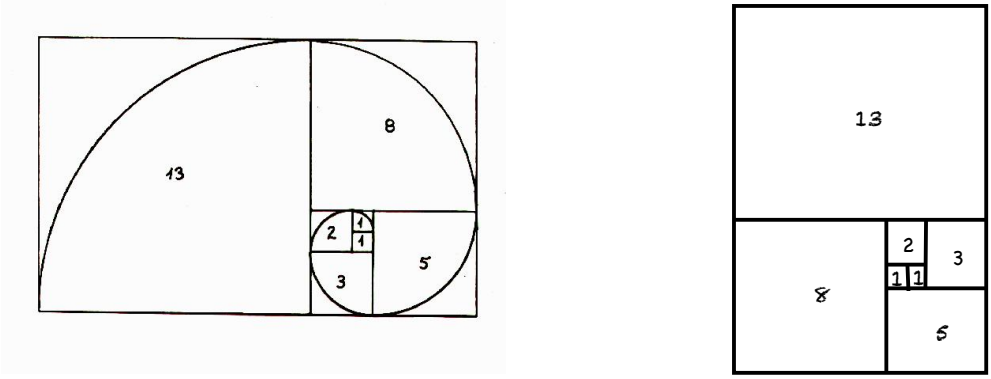

Fig. 9: a) The construction of the golden spiral; b) relation with the Fibonacci sequence

4. Conclusions

A researcher that approaches the study of the crop circle formations, will find a lot of arguments about the "energy". But in literature we cannot find anything that treats the question in really "scientific" terms.
In particular, the following figure had us intrigued (Fig. 10): it is clear that it is an expression of energy, but is it connected or not with the actual scientific knowledge about the matter? Or is it just a legend by esoteric culture?
So, we wanted to verify if a similarity, in terms of algorithmic expressions between crop circles and energy functions, really exists. And if we could found this similarity, perhaps we could transfer it to the stones of Stonehenge, which most probably represent in "up", what the crop circles represent on a bi-dimensional plan.
This aim was very ambitious, in fact the calculations that we have addressed while we have studying the question, have been very onerous [15].



Fig. 10: June, 17, 1996. Alton Barnes (Wiltshire)

Hitherto, a result has been achieved, because we found no algorithmic link between the formations and our studies about mechanics, but since doing research is also formulate hypotheses and then exclude themselves, the material collected there seemed enough to a conclusion.
At the time the studies are still in progress, and we cannot exclude that other researchers might find new objective a part from this work, or that ourselves may achieve more results about the argument, afterwards.
Moreover, in this paper we cannot formulate any hypothesis about the origin of crop circles, because this is not our aim, so in conclusion we can only emphasize that the link that from ever joins men and Universe, expresses itself by the Signs and tries to explain itself with the Mathematic.
These are the only two tools (apart from the mind that govern them, naturally) through the which the men can try to understand their provenience.
So beyond the algorithms, the Energy is contained in the effort of the humanity to express and to explain oneself.

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THE ANALYTIC NETWORK PROCESS (ANP) AS ENVIRONMENTAL ASSESSMENT TOOL TO DESIGN AN ECO-MUSEUM IN POMPEI

Maria Cristina MIGLIONICO, Giuseppe D'ANGELO
Department of Architecture and Industrial Design "Luigi Vanvitelli"
Aversa (CE), Italy
mcristina.miglionico@unina2.it
giuseppe.dangelo@unina2.it

Abstract

Modern society is a complex system, where the transformations of the urban environment are characterized by growing interdependence of parts.
This interdependence leads to the necessity in solving simultaneously a multitude of problems. These social, economic or political problems can't be understood using a classical approach, for example a sectorial approach is not capable to explain this kind of problems.
The space, where these problems are developed, is not static but it is dynamic. In this context, multi-criteria analysis constitutes a powerful tool to improve the procedural rationality, underlying complex decision problems, ensuring an integrated, multidisciplinary and transparent entire evaluation process.
The ANP in particular, thanks to its dynamic approach, is systematically capable to manage all types of dependence without the need to specify levels. The ANP approach results to be the most promising tool, available in the field of strategic decisions. It can be considered as a technique capable of grasping and properly reflecting not only the multi-dimensional profile of the problem of choice, but also the complexity inherent to real problems.
Multi-criteria analysis is a tool to support this integrated approach capable to insert different stakeholders' points of view. This tool is capable, in the development processes, to improve the procedural rationality in the context of assessments and decisions concerning complex systems; therefore playing a role of fundamental importance in the path towards sustainability.

Keywords: Enviromental, Decision making

1. The analytic network process

The Analytic Network Process is a multi-criteria technique of decision system designed by T. L. Saaty. This technique is well known as the implementation of the best-known Analysis of Hierarchy (AHP), in order to overcome the linear structure of traditional evaluation methods. These methods are unable to reflect the complexity of real problems, structuring and embracing a more dynamic one and better reflecting the complex interactions related in the various components of a system. Using the ANP approach, every decision problem is structured as a network of elements, arranged in groups, according to multiple relations of influence. This configuration allows to implement a structure capable of incorporating interdependencies and feedbacks, both within each group of elements and between various groups of elements. By considering the existence of feedback, in fact, not only the alternatives depend on the criteria, such as in a hierarchy, but also all the factors above taken into consideration.
The network structure is the base of an ANP model and it is defined as a set of components (cluster) and elements (nodes), linked together by a relationship network. Such interactions can occur between both elements belonging to different clusters, and by elements belonging to the same cluster. Furthermore such a

type of relationship makes possible the existence of feedback mechanisms (feedback) between network elements. Depending on the examined case, there are two different types of models: the "simple" structure and the "complex" one. The first consists of a network of relationships which develop between clusters and within the same cluster, with each cluster consisting of a number of specific elements and with a cluster reserved for alternatives of choice. The structure of "complex", presupposes the existence of a hierarchy of control that gives rise to sub-networks, each organized according to the "simple" structure. This structure contains groups, elements and alternatives.

2. ANP model definition

Due to the high complexity of the decision problem, the more suitable model to the development of Analytic Network Process, seems based on the complex structure. The decision problem has been split into 7 clusters (alternatives, environmental, economic, energy, logistic, social and urban, planning factors) organized into BOCR (Benefits, Opportunities, Costs, Risks) subnets.
Benefits and costs have been identified with known aspects, respectively positive and negative. These aspects are due to their transformation evaluated at present but looking at a medium-and long-term future forecasts, which has been developed in a quite detailed way. The opportunities and risks have been considered to be less in certain aspects. These aspects, positive and negative respectively, have been evaluated when the transformation has taken place and looking at an even further away future, for this reason it is more difficult to predict. The alternatives, whose analysis has focused on, are two: the "inertial" alternative and the "eco-museum" one. In both the cases the design options are related to the future. The first alternative is defined inertial because it represents the evolution of the current situation in the absence of the eco-museum and is therefore characterized by long periods and uncertainty. The second is based on the implementation of the eco-museum, a catalyst element characterized by transformations and at the same time an innovative urban symbol.

	Alternatives	
	Ecomuseum	Inertial
Tourist attraction and heritage	It multiplies the value of existing assets, we take into account new opportunities	We don't develop new projects, but we enrich existing ones
Transport and mobility	Strengthen the efficiency of transport networks through eco-friendly's works	Maintenance of existing transport networks with routine maintenance
Identity and local firm	The local community is more cohesive, conscious and vital	we don't seek new roles for the area as a potential producer of wealth

Fig. 1: Alternatives, inertial and ecomuseum

3. Cluster and elements of decision-making network

The most common case of complex model, based on control hierarchies, is the model called BOCR (Benefits-Opportunity-Cost-Risk). The multitude of factors that characterize this analysis can be simplified, every decision problem is characterized both by positive and negative aspects. Some of these factors are certain, others are less certain and are characterized by having a probability to be realize. Some favorable aspects can be considered as "benefits", instead the negative ones are considered as "costs." Also uncertain aspects of every decision can assume a positive connotation and therefore become "opportunity", or a negative and turn into "risk".

BOCR	CLUSTER	NODES
BENEFITS	Logistics	Effectiveness and efficiency
	Energetics	Renewable energy sources usage
		Power Consumption optimization
	Social	Degree of comfort in the attraction places
	Urban	Urban redevelopment
	Economic	Enhancement of the best for a tourist
OPPORTUNITY	Urbans	Sustainable networks creation
		New simbols and landmark creation
	Economics	Creation of attraction poles for the development of the area
		Environment enhancement
	Environmental	Long-term performance and functionality
		Quality of degraded areas improvement
COSTS	Logistic	Urban restructuring
	Energetic	Raw materials consumption
	Economics	Construction and maintenance
		Archaeological maintenance
	Environmental	Environmental impact
RISKS	Logistic	Malfunctions
	Social	Project support failure
	Urban	Lack of integration with the urban context
	Economic	High managment costs
	Environmental	New traffic flows

Fig. 2: Diagram of complex model called BOCR

Once the decision problem has been structured in clusters of elements, according to a more suitable scheme, it is necessary to connect every cluster or component with all the elements where is possible to establish some inter-relationship.
The definition of these links is a very important operation in order to perform a correct evaluation process.
In fact, the setting of pair wise comparisons, through which can then express their preference judgment, solely and exclusively, have been defined as connections between various elements of the network.

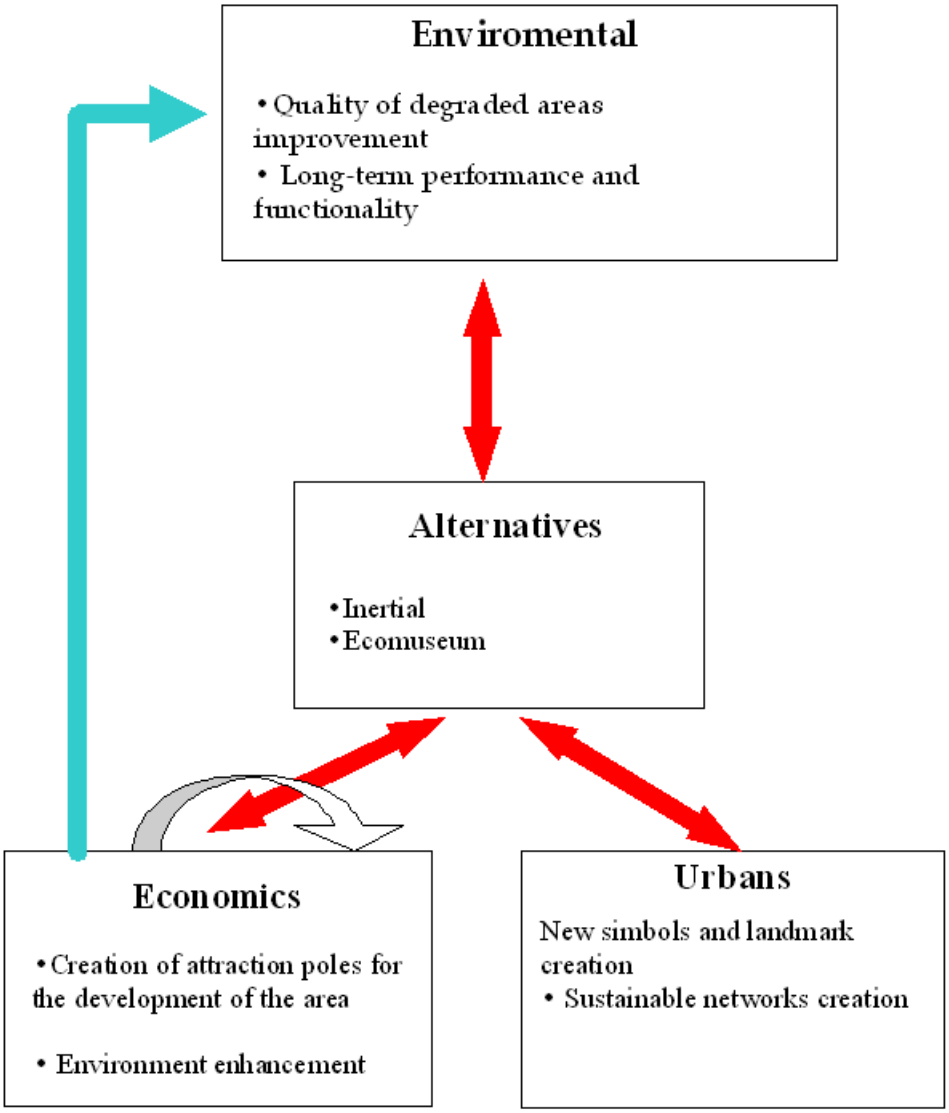
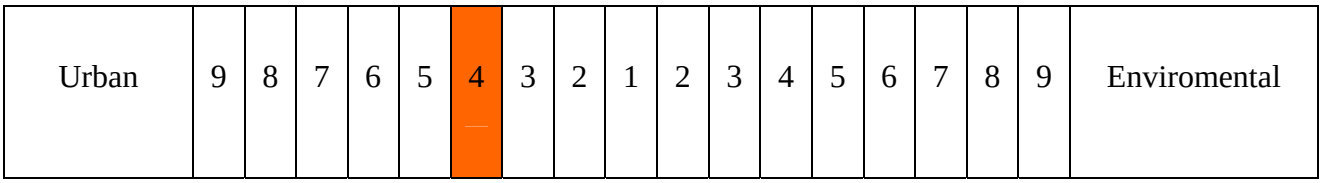
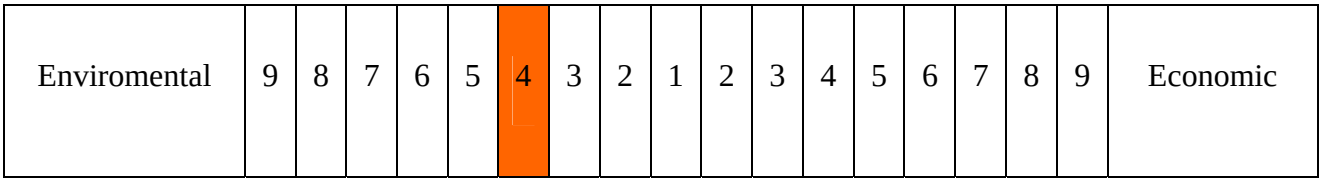


Fig. 3: Diagram of opportunities subnet

4. Analysis

Established the decision-making networks are necessary to compare them in pairs at the level of clusters. Considering the overall objective of the model as "Parent Node" the questions that must be answered for the compilation of pairwise comparison matrices are the ones depicted in the following. With reference to the identification for the best solution to creating an eco-museum in the Pompei area, the aspects depicted in the following aspects must be analyzed.





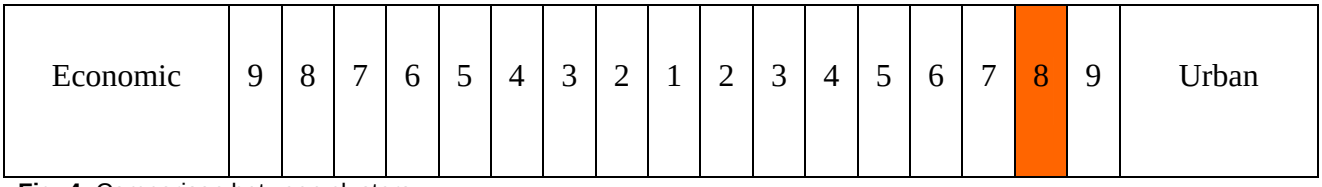


Fig. 4: Comparison between clusters

Evaluation results of the comparison between clusters have produced the values suitable to be included in columns of the matrix.

	Enviromental	Economic	Urban	Priority
Enviromental	1	4	1/4	0,223
Economic	1/4	1	1/8	0,070
Urban	4	8	1	0,707

Fig. 5: Comparison matrix between pairs cluster (opportunities subnet)

Once obtained the priorities of all the clusters, it is possible to build the so-called matrix weight. This matrix is constituted of priorities arrays extracted by every square matrix of pair wise comparison at this level.

	Alternatives	Enviromental	Economic	Transport
Alternatives	0	1	0,188	1
Enviromental	0,223	0	0,73	0
Economic	0,07	0	0,081	0
Transport	0,707	0	0	0

Fig. 6: Weight matrix

After the analysis of each subnet-model, clusters layer, it is necessary to deeply exam the results and consider various elements, concerning to the influence and interdependence relationship at the network nodes level.
Always with reference to the Opportunities subnet, in the following, is shown a comparison between nodes as parent node having the inertial alternative and as child nodes the elements of the cluster of environmental aspects connected to it in the assumed model.
This type of comparison is used to assess the influence of various elements on the considered alternatives. This topology of comparison is useful to evaluate the influence of various alternatives elements and represents the so-called available feed-backs generated by the ANP methodology.
The question which needs to be answered to is the following: With reference to inertial alternative will their weight more to improving the quality of degraded areas (A) or the long-term performance and functionality (B)? How much?

A	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	B

Fig. 7: Comparison between alternatives

Once the comparison and evaluation phases are ended, it is possible to build three super-matrices for every subnet of sub-model.

		ECOMUSEUM	INERTIAL	1	2	3	4	5	6
Alternatives	ECOMUSEUM	0	0	0,875	0,833	0,875	0,5	0,875	0,875
	INERTIAL	0	0	0,125	0,167	0,125	0,5	0,125	0,125
Urban	1	0,8	0,5	0	0	0	0	0	0
	2	0,2	0,5	0	0	0	0	0	0
Economic	3	0,833	0,125	0	0	0	0	0	0
	4	0,167	0,875	0	0	1	0	0	0
Enviromental	5	0,25	0,875	0	0	0	1	0	0
	6	0,75	0,125	0	0	0	0	0	0

1	New simbols and landmark creation
2	Sustainable networks creation
3	Creation of attraction poles for the development of the area
4	Environment enhancement
5	Quality of degraded areas improvement
6	Long-term performance and functionality

Fig. 8: Initial super-matrix

With the reference to the Opportunity sub-net, the first matrix must be multiplied by cluster matrix in order to obtain the weighted super-matrix.

		ECOMUSEUM	INERTIAL	1	2	3	4	5	6
Alternatives	ECOMUSEUM	0	0	0,875	0,833	0,611	0,103	0,500	0,875
	INERTIAL	0	0	0,125	0,167	0,087	0,102	0,500	0,125
Urban	1	0,566	0,353	0	0	0	0	0	0
	2	0,141	0,354	0	0	0	0	0	0
Economic	3	0,058	0,125	0	0	0	0	0	0
	4	0,012	0,875	0	0	0,301	0	0	0
Enviromental	5	0,056	0,195	0	0	0	0,795	0	0
	6	0,167	0,028	0	0	0	0	0	0

Fig. 9: Weighted super-matrix

Once obtained the weighted super-matrix, it is necessary to multiply it by itself a number of times versus to infinity in order to obtain the so-called limit super-matrix.

		ECOMUSEUM	INERTIAL	1	2	3	4	5	6
Alternatives	ECOMUSEUM	0,403	0,403	0,403	0,403	0,403	0,403	0,403	0,403
	INERTIAL	0,086	0,086	0,086	0,086	0,086	0,086	0,086	0,086
Urban	1	0,259	0,259	0,259	0,259	0,259	0,259	0,259	0,259
	2	0,088	0,088	0,088	0,088	0,088	0,088	0,088	0,088
Economic	3	0,024	0,024	0,024	0,024	0,024	0,024	0,024	0,024
	4	0,017	0,017	0,017	0,017	0,017	0,017	0,017	0,017
Enviromental	5	0,053	0,053	0,053	0,053	0,053	0,053	0,053	0,053
	6	0,070	0,070	0,070	0,070	0,070	0,070	0,070	0,070

Fig. 10: Limit super-matrix opportunity sub-net

The final priorities of the obtained alternatives from the limit super-matrix of each subnet are normalized by constituting the alternatives sorting.
A greater value of preferability in the sub-net Benefits and Opportunities list means that the alternative leads to higher benefits or opportunities and consequently is preferable. On the contrary a higher value in the list on the Costs and Risks subnets means that the alternative involves higher costs or risks and consequently is less desirable.

ALTERNATIVES	BENEFITS	OPPORTUNITIES	COSTS	RISKS
INERTIAL	0,18	0,176	0,36	0,2
ECOMUSEUM	0,82	0,824	0,64	0,8

Fig. 11: Final result

5. Conclusions

The application has showed a clear preference for the option in making an eco-museum in Pompeii area against the option in maintaining the nowadays structures. The aim of this work is to show the potentiality of the ANP methodology. This methodology is capable to solve cases of partial data availability with the presence of unknown factors using the decision-making process.
This methodology is capable to include dependencies, incorporate feedback in modeling, taking in count the uncertainties in the decision-making process. At last the proposed methodology is capable also to include consequences of a given action between the factors exerting an influence on a decisional process.

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Sustainable Design and sense of funny
Cognitive survey methods and ri-assertion of identities

Antonino CALDERONE[1]
(1) Culture of the project, Second University of Naples, Aversa, Italy
(2) antonino.calderone@libero.it

Abstract
Small children are a mere example of virtue in the matter of inventiveness: bear in mind that they are able to reuse and recycle any domestic object or accessory belonging to a more jointed system of technological as well as handmade things. With their unaware like extraordinary operations of "ready made", they are able to create new extemporary habitats, thanks to their play world and play relationships, where "new objects" acquire a clear and precise identity through a series of unthinkable combinations between form and function, utilizations. In this way they can develop the knowledge of external world and self awareness and learn the importance of roles and rules through the play functions. To design an object, equally an architectural space, means a little to take away children's innocence and ability of converting spaces and objects in order to create instruments of cognitive survey besides comfort. At the same time, on the one hand is essential to reaffirm once more the importance of the smart reuse as an ethic measure as well as a significant part of a responsible task that includes the respect for the life cycle product and the sustainable relations among production, environment and man.

Keywords: fun, irony, measure, memory, smart reuse.

1. Comic design. Memory between fun and benevolent irony
On the other hand, in a post global age how it is the present one, meeting the demand of a share of the market is also to say that the plan must be a way to design in full compliance with a new kind of needs like to take possession again of nature, to rediscover own identities, collective memories concerning peculiar places and customs, combining allusive cross - references and technology, possibly with nonchalance. In a similar context where doesn't exist more an absolute reference point we can see a great share of designers, architects, artists - not only belonging to younger generation -, which express playfulness in their works, trying to reach a new manner of converting, mixing and de-contextualizing functions, shapes, materials, colours and finishes through a sense of funny - that belongs not only to the play or toy design planned for the children - united to a certain irony and self irony. Design for funny as well as the "comic opera of design", mentioning the case of the Neapolitan artist - designer – architect Riccardo Dalisi, don't come from a mere desire of debunking and desecrating, but represent a peculiar manner of meaning design an life and reveal a particular way of involving the user – consumer. Sometimes this concept, taken out of didactic and serious impositions, seems to be one of the most appropriate vehicle of information, knowledge and at least, it is a cause for reflection. Dalisi writes that "everything, even the most serious thing, has its moment of play, during which, it is transmuted and transformed. For design, this happens in the deadly serious design for children's and adult's games – and in others areas" [1] He speaks about the comic design and the similarity with other fields, in particular the musical one: he alludes to Pergolesi, the father of comic opera and in this sense he affirms that his "comic opera of design" came into being quite spontaneously and that "from the intense lengthy research regarding very serious technical and experimental coffee-pots for Alessi emerged, at a certain stage, an ironic and playful vein" united to a



Fig. 1: R. Dalisi and “the Comic Opera of Design”: Neapolitan copper coffee - pots**.**



Fig. 2: *Domus* (Archive | Munari) 202, October 1944. MUNARI, Bruno, *A person comes back home tired having worked the whole day and finds an uncomfortable armchair* . This is an ironic provocation addressed to the he over productive design.

great passion for the Neapolitan coffee – pot. Through Dalisi this particular object conquers a proper life and seems to narrate the stories of heroes, real and / or imaginary, such as Pulcinella, Geppetto, “Totocchio” - a combination of Totò and Pinocchio - and so on. Through almost childhood sketches and very amusing artifacts, the Neapolitan artist underlines not only the value of memory and the importance of the discovery of the original functions, but also the object’s communicative possibilities, included the sense of tenderness and curiosity; at least, he carries out a sort of humanization process



Fig. 3: Down, on the right, Dalisi wrote me with fun irony: “Tu devi essere insoddisfatto per essere soddisfatto e non sfatto” that in English it should be something like that: “You must be always dissatisfied to be satisfied and not destroyed”. (1999)

of his objects, suspended between comic sense, fun and benevolent irony. To this end I remember a personal experience with Riccardo Dalisi – in the Neapolitan period of my Industrial Design courses: the theme of the project - exercise was the car, one of the most dear to him: down a my disengaged sketch, he wrote: “Tu devi essere insoddisfatto per essere soddisfatto e non sfatto” that in English it should be something like that: “You must be always dissatisfied to be satisfied and not destroyed ”. Then I was rather young and just later I have understood deeply the sense of those words I remember even now.. In the past many designers have worked with intelligent and subtle spirit of irony: for example bear in mind Bruno Munari who designed, with subtle sense of healthy provocation, the chair that has to dissuade the unwelcome guests. This one underscores the question of the (un)comfortable seat, as well as the ancient matter of relation between esthetic and functionality, shape and use. In the forties, formerly Munari have affirmed that sometime it’d be better to perfecting some comfortable existing prototypes and models – often very economic too, such the classic and simple deck chair - instead of inventing new models to infinity; on the contrary, as in a perverse practical joke, designers keep designing thousands of seats, chairs, armchairs and every kind of poufs, that change shape and style continuously with the trend, but are often less and less careful to their final chief aims: functionality, duration, comfort, cost | price.

2. Irony & Ecology. It is not a matter of trend

Maybe it is not excessive to underline that generally irony diverges from laughter and comic sense: the first one is more subtle, a sort of “intellectual exercise” that doesn’t let the rumbling laughter, but leads us to smile at the thought of man and life relativity that the designer desires to express through his artifacts. Through an “ironic” artifact he proclaimes, clearly or implicitly, human inconsistency and incoherence in despite of feel of organizing and controlling everything, but without aggressiveness, provoking - as obvious consequence - a reflection that leads designers to realize (and metabolize) the consciousness of our inability of dictating (and communicating) any absolute truth. Some researchers define irony as the result of a kind of dialogue with “our and other people’s intelligence”, that, finally,

bring us even to enjoy the sense of relativity. However to be or not to be ironic is a matter of natural attitude, not a forcing; to be ironic at all cost doesn't make sense. Even it appears contradictory, to be ironic means to have a certain dose of freshness, candor, openness. In other words to be ironic means not having the consciousness to be that. Unfortunately, on the other side, it is possible to perceive that in many cases the tendency of irony tout court has become just fashionable; it's a kind of manufactured pass to parade "simplicity" – but irony is not just simplicity -, that often, is none other than the result of a well structured economic plan that doesn't knows anything other rule than the market's one. In other words irony becomes just a way, unnatural and deceiver, to impose one's artifact on consumers, maybe belonging to a more sophisticated target or to a more culturally refined group. Nowadays, there is a great confusion in social political and cultural fields, so even in the design world always more frequently the cheapness reigns and every kind of artifact, every time justified by different principles and theories, becomes a truth carrier example.
In despite of that, we have several examples of coherent design artifacts in which, furthermore, irony is adjoined to a very good dose of ecology, producing one of the most interesting binomial. Bear in mind Gehry's long chair named "Little Beaver" (designed in 1980, produced in 1987 by Vitra), exhibited at the Vitra Museum by Herzog and De Meuron: its irregular form of flat-cut blocks of corrugated cardboard underside with metal plaque, is the spark for a series of considerations about the innovative and smart way of using this material, its cheapness, besides all the questions pertaining to relationships between functionality and esthetic. We cannot remain speechless in front of the deep erudition lavished in the innovative treatment of material (the corrugated cardboard). Certainly Gehry's revolutionary sense of esthetic, in his design products reflects full well his continuous tension towards a limitless space vision as in his sculptured architectures projects, that, following on from some critics, represent a kind of landing place in a New Baroque Era. Certainly as is common knowledge, we aware of the importance and the weight of the economic strategy plans existing in back of these kind of brand merchandise, but, at least, it is impossible to sit indifferent in front of artifacts like that have all the features of a product that is the result of a bright and fascinating working process that starting from complexity awareness reaches a fresh ironic synthesis, and joins with our individual (and collective) imagination presenting an entire satisfaction to our eyes, touch, and comfort. In substance we can perceive that very special feeling that only certain high - evolved design by some (not all) sensitive designers and architects can emanate. In the matter of irony (and practicality), in particular, as Prof. Volker Albus (teacher at the Hochschule für Gestaltung in Karlsruhe) writes: "The



Fig. 4: From the left. A Japanese restaurant; some interiors made by cardboard elements.

'Little Beaver' chair provokes *oohs* and *aahs*, but not when you first see it, and not even when you realize that the corrugated cardboard it is made out of is actually warm and comfortable, but when you realize that any stain, be it caused by Fido or visiting grandchildren, can be cut away: quite an advantage over other upholstered seating! To the profane however, the non-conventional essence of these objects remains incomprehensible. And not only. They are incapable of participating even minimally in their subversive quality or of understanding the complex creative process behind them. Because what we have before our eyes is not just a chair, a shelf or an armchair made out of unusual materials. No: thanks to their simple, even banal components, which are just as subtle and brilliant, these projects raise questions about our traditions of function, conformation and use of materials that are deeply rooted in our furniture culture. In other words: once you have seen the 'Little Beaver' chair,



Fig. 5: On the top. F. O. Gehry and his corrugate cardboard chaise longue and armchair “Little Beavier”. At the middle in time sense: different colour versions of “Little Beavier” with pouf; Ghery in his American atelier while makes some component prototypes of his “sculptured” architectural design; the “Easy Edges” in flat cardboard Down from the left: the new Guggenheim Museum in the Cultural District of Saadiyat Island in Abu Dhabi United Arab Emirates (UAE); from the past an example of organic architecture by A. Gaudì, “ Casa Mila”, Barcellona, Spain.

all you can do is crack a malicious smile at all those people dusting and cleaning the upholstered seating in their formal living room"[2]. Gehry chose a different method, which gave birth to sturdy cardboard furniture like cardboard sculptures: "One day I look in my office at a pile of corrugated cardboard, the material I normally used to make architecture models, and I began to experiment with it, to stick it together and to cut it into shape with a hand saw and a penknife"[3]. After his "Easy Edges" from 1972, a series of cardboard furniture with flat surface, Gehry proceeded to use corrugated cardboard for making furniture and gave life to "Experimental Edges" a series of surprisingly comfortable chairs and easy armchair with an unrefined, raggedy - looking surface.

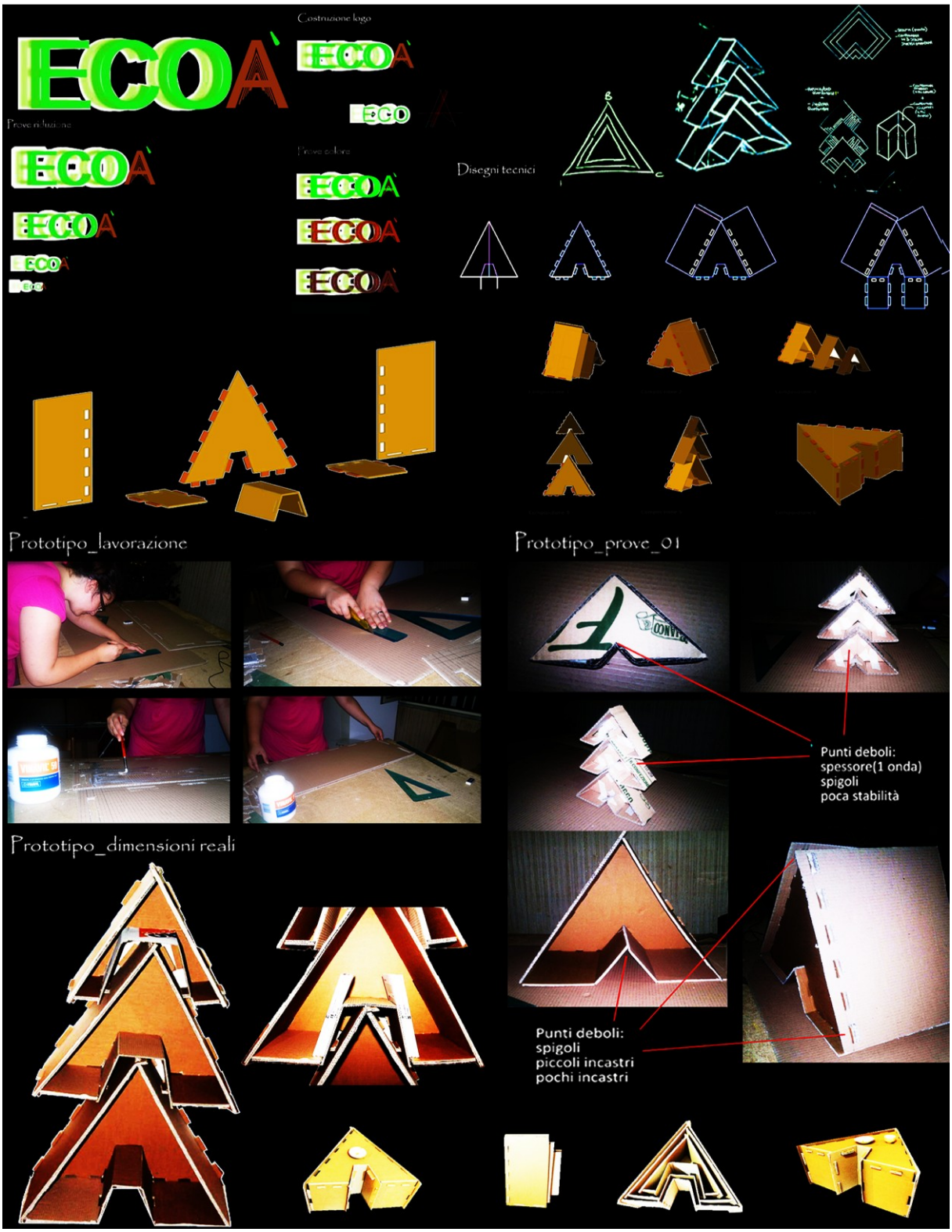

Fig. 6: Design of a recycled cardboard reversible book case - table: sketches, drawings, virtual renderings, prototypes. This project has been drawn and made by students of SUN | Second University of Naples_ Department of Architecture and Industrial Design_Course of Prototyping.

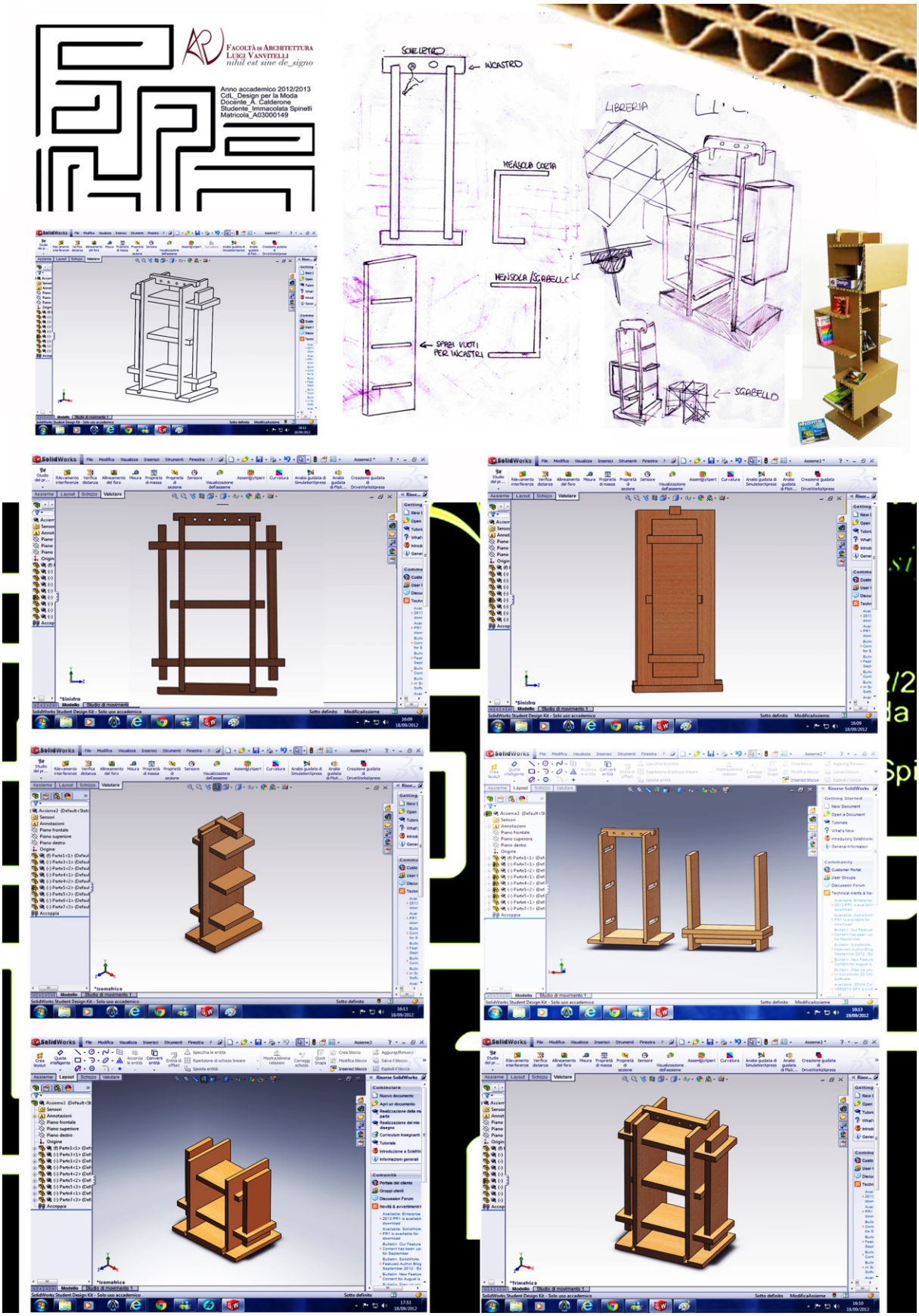

Fig. 7: Design of a recycled cardboard book case based on existing models: sketches, drawings, virtual renderings. This project has been drawn by students of SUN | Second University of Naples_ Department of Architecture and Industrial Design_Course of Prototyping.



Fig. 8: Recycled cardboard bookcase book case. Work in progress of laboratory method prototyping made by students of SUN | Second University of Naples_ Department of Architecture and Industrial Design_Course of Prototyping.

3. Sustainable design and green architecture. No paternalistic worldviews

Certainly, irony and fun apart, ecological design, sustainable design, green architecture are not recent discoveries. From time immemorial nature represents the most incisive living model for architects and artists besides poets, scientists, mathematicians, physicists. Be enough to remember the Ancient Greeks and their deep relationship with nature as a source of inspiration, a terms for comparison of which to emulate perfection and beauty. Be enough to give thought to Italian Renaissance that assimilated Greek aesthetic theories through Latins, in particular Vitruvio: in other words the ancient "designers" took the cue from nature and natural events to resolve the planning questions and to create balance between appearance and substance. In the twentieth century many architects and designers have theorized and exercised organic and "ecological" architecture; in the States, first among all, we remember Frank Lloyd Wright, founder of Taliesin, the School of Architecture (1932) such as the Italian Paolo Soleri, founder of "arcology" (architecture + ecology); in Europe, even before, Antoni Gaudì, an then Hans Poelzig, Hans Scharoun, Rudolf Steiner (architect and anthroposopher), the Finnish Alvar Aalto; successively Lucien Kroll, Makovecz Imre, Roger, the Italian organic architects and designers G. Michelucci, B. Zevi, C. Scarpa, G. De Luca, A. L. Rossi and many others. Unfortunately - even though in recent times, it is possible to notice a greater ecological awareness - in different circumstances designers show us just an illusory development in this direction: their solutions and proposals seem to be the result of an exterior examination well away from the essence of material requests, and reveal a paternalistic and restricted worldview that puts western man at the middle of universe, an universe chiefly based on technological and industrial values. In other words they neglect ecological questions from more complex and global perspectives, retracting, at the end, the final objective as well as leaving aside the ethic question. Nowadays it is indispensable to develop a genuine deep green consciousness that means to know that every choice has its own corresponding effects, often negative on other latitudes, for other communities: everything is strictly interconnected. We need to acquire a holistic worldview in which technology must not be invasive, it has to be respectful of nature and sustainable as much as possible to not impair any people on the globe.

Nowadays for designers to have an “ecological awareness” ought to mean more than ever to return to nature, to fight colored socio political economic supremacy and prejudices, to avoid unnecessary, aggressive and invasive technicality, to overcome arrogance that causes vain wishes of omnipotence. Furthermore, to stimulate an healthy environment of a geographical area it is necessary to keep away from summary survey methods of modern eco design movement that generally underestimates regional problems and tends to superimpose external, standardized global project solutions, exclusively on the strength of fashion wind and market trend; it is indispensable absolute knowledge of historical, geographical, physical, cultural, socio - economic territorial features, contextualizing solutions in local scenarios, above all not neglecting deep and detailed studies about regional standards, human problems, demands, requirements, needs, necessities, rights. Every context needs its appropriate plan choice and it is improper to adapt to an Italian town projects designed to an American metropolitan area exclusively on the base of prepackaged modular schemes or own personal practice.



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Fig. 9: From the left. Ironic chairs and armchairs: John Krubsack (Wisconsin, U.S.A.), naturalistic chair grown by tree shaper, 1919; Achille & Pier Giacomo Catiglioni, “Sella”, Zanotta 1957 and “Mezzadro”, Zanotta 1971; Jonathan De Pas, Donato D'Urbino, Paolo Lomazzi, “Joe”, Poltronova 1971; Philippe Stark, “Gnomes”, Kartell 1993.

3. Toy design_Children and adults. Matters of ethic.

Returning to irony, and sense of funny, it’s important not to lose the taste of playing in any project aims to explore unconventional scenarios or materials. Sometimes in planning approach it is necessary to become like little children again finding to invert order of elements. Unfortunately this ability is always more rare in the toy design world, that instead of being oriented towards the child perception, always more frequently, is governed by a sort of incapability of respecting children’s world: every choice is governed by market oriented adults and “children are in background, a long way off, out of focus, as would be appropriate for minor parts in films”. In this way the author[4] of a written published in the review Modo a few years ago, expresses his uncertainty, adding that toys, “to be useful, should be destructured and simple. They should not require assembly instructions. They should be intuitive, innovative. They should be published not on television, but in daily papers”. Perhaps, it is for these reasons - explains the author - that Bruno Munari, a great supporter of sustainable toy design, is neglected by the chief companies that are exclusively occupied in increasing sales.



Fig. 10: Eco toys made by wood, cornstarch, recycled plastic and other biodegradable materials.

Toy and game design are very important for children education and training opportunities. Play is a basic moment at root of intellectual and social child development. “Design can do a lot to help society change course, and it can do this by thinking about the importance of play, even before considering the toys as an object. Play should not be associated with just the period of infancy. Design can also foster reflection on age an time in a philosophical sense. Is there a thread that links the chapters of life, connecting infancy to adolescence and then to adult hood? Are these instrument for play suitable

for each of these ages, or is it possible to conceive toys that surpass these definition and bring people together regardless of age, educating and amusing at the same time?"[5] The issue is very delicate and concerns deep studies about psycho – physical interaction on children growth, sustainable use of materials, their ambient impact, effects including the matter of packaging and the themes regarding the different ways of recycling waste materials.

4. Play and plan in urban scenarios. New research processes

The participation of people, included very young people and children in the architectural and design planning and activity is well understood by a significant number of academics and researchers in the world. They assert to corroborate and analyze in depth potential resolutions of problems, tied to real people needs and requirements, it's necessary to listen the user – consumers through a tangible strong emotional involvement. In this direction, the importance of play not only in domestic design, but also in architectural and urban one, has been explained and experimented by the Newcastle University (U.K.) researches that in 2012 have conceived an ideal "mini – city" erected by more than 110,000 blocks of Lego. Through the interactive exhibit called "The Great North Build" lodged in the New Castle's North Museum (April, 14, 2012), the English researchers invited citizens, "architects, practitioners, old men, children, students to take part in the sets of problems related to the urban development of the city"[6], and to contribute and find correct answers and appropriate solutions to questions such as urban expansion, demographic development, life quality, green areas, old town centres, hospitals, conversion and modification of industrial areas: in other words all possible elements necessary to improve the urban context on the bases of citizens' requirements. Through a thought-provoking platform for discussion they wanted to look for answers to searching questions, such as how does a city plan for a growing population and how can urban design improve the environment. Although the great enjoyment that this event has assured to all aged participants, citizens have been challenged in work in progress and stimulated from time to time to study and purpose new solutions related to unexpected planning hypothesis and emergency ones. In conclusion, instead of usual planning means, the experts have chosen the game and the exhibition to corroborate new interesting studies and cognitive methodologies aimed to explore the impact on people's everyday lives and to find key to society's big questions to translate in urban sustainable plans..



Fig. 11: "The Great North Build", an ideal "mini – city" erected by more than 110,000 blocks of Lego by the Newcastle University (U.K.) in 2012.



Fig. 12: Logotype studied for **"**Puzzle Pieces' Design", a children cardboard furniture exercise – project based on puzzle game principles designed by students of SUN | Second University of Naples_ Department of Architecture and Industrial Design_Course of Prototyping.

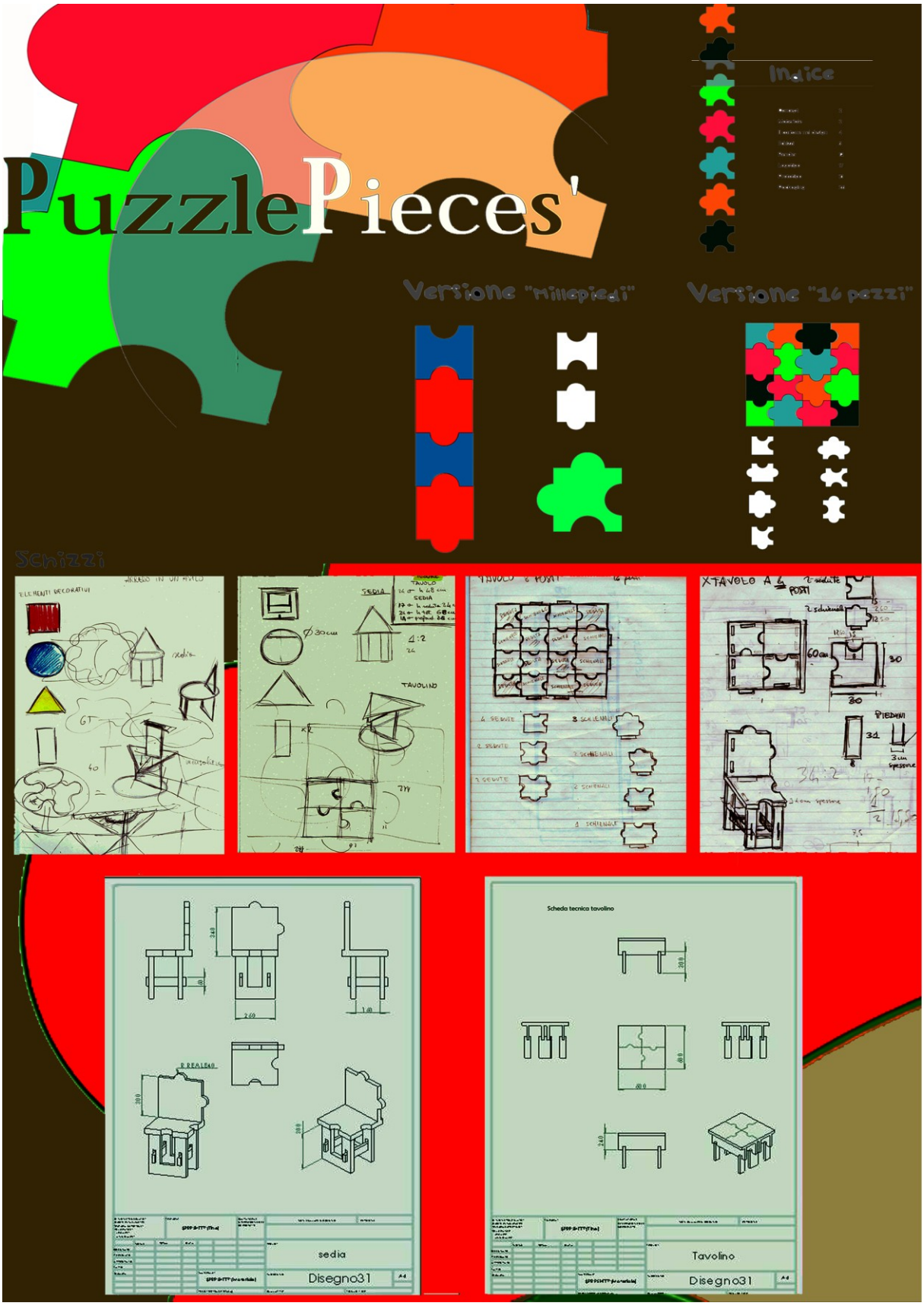

Fig. 13: Puzzle Pieces' Design. Sketches, drawings of recycled cardboard preschooler furniture based on the modular principle of puzzle's pieces and founded on the themes of reuse, play and flexibility. This project has been drawn by some students of SUN | Second University of Naples_ Department of Architecture and Industrial Design_Course of Prototyping.



Fig. 14: Puzzle Pieces' Design. Work in progress of laboratory method and prototypes of recycled cardboard preschooler furniture based on the modular principle of puzzle's pieces made by some students of SUN | Second University of Naples_ Department of Architecture and Industrial Design_Course of Prototyping.

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Representing urban landscapes
Narration and sense-making

Alessandra CIARIFICI, Caterina Cristina FIORENTINO
ARV_'Luigi Vanvitelli' Department of Architecture and Industrial Design _
Seconda Università di Napoli, Naples, Italy
(1) alessandra.cirafici@unina2.it
(2) caterinacristina.fiorentino@unina2.it

Abstract
The paper seeks to offer some observations about the relationship between the complex connectivity of contemporary reality and communications strategies by seeking a field for reflecting on issues of the representation of the city within the general theme.
Representing the city has always meant 'presenting it'' using visual systems that can capture its identity and transform it into an image. The state of the contemporary city makes this work more complex and suggests new forms of representation that take account of change and represent the complexity of experiencing a situation in constant flux. It is therefore crucial to abandon 'assertive' approaches towards viewing the city, and put forward new and multiple 'perspectives' which can create narrative schemes by weaving together individual stories, urban tactics, temporary uses and descriptions of places. Like modern-day *flaneurs*, these new perspectives should focus on experience rather than interpretation. They involve creating dynamic maps of a discontinuous present created through forms of listening and the production of communicative artifacts which are not always conventional but are capable of re-orienting the exploration of places and promoting strategies of signification and possible future uses.
Keywords: sense-making, social interaction design, narrative tactics

1. Representations change the landscape
This paper examines our relationship with the city and the urban landscape. The contemporary urban landscape is changing rapidly and these changes are forcing all of us to reflect on the thought structures that enable us to interact with its complex series of connections and on the need to redefine interpretative strategies and representative paradigms.
The theme will be examined from the viewpoint of an academic who is interested in 'representing' reality. 'Representation' is a discipline that is traditionally concerned with interpreting architectural and urban phenomena and transcribing them into images. However, representation is never neutral and not even just 'presentation'; much more often it a complex action that leads to various possible scenarios. At times, it constructs these scenarios and produces collective imaginary worlds, creating reality and can therefore be regarded as a constructive rather than a descriptive action.

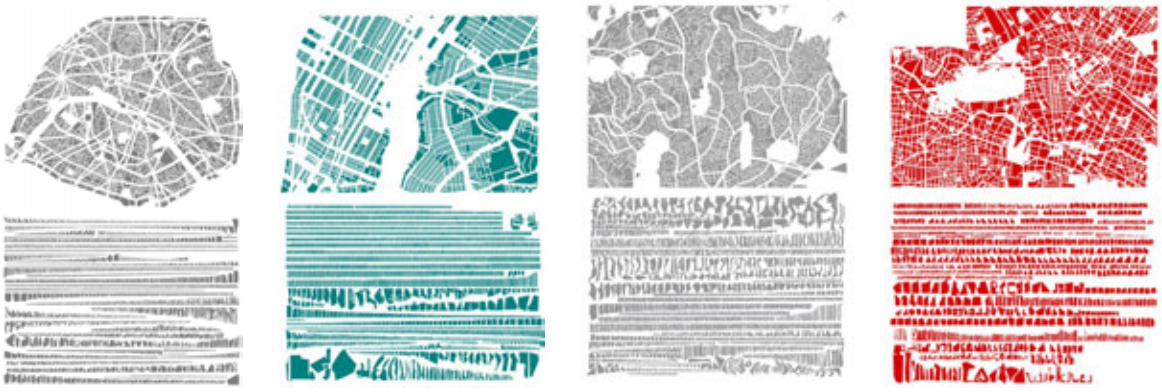

Fig. 01_ Armelle Caron, *Tout bien rangé*, 2009. Graphic anagrams of maps of the city

As Henri Lefevbre has persuasively argued, ***"****inhabiting a place is an anthropological fact consisting of objects that represent relations*" [1].

It therefore constitutes a starting point, in a certain sense, the assumption of these reflections, the abandonment of the notion of space – and, in particular, the space of the city – as a series of places corresponding to functions rather than people, and the adoption of a concept of space as a network of relations and thus in a broad sense as a 'space for living'. They configure the 'life space' of the city, which is a fascinating maze of signs, symbols, codes and metaphors of living. It is a complex system whose signals should be intercepted in order to understand the sense of individual or collective actions. These actions have the power to modify the physical structure and relational components of urban space through a process that often spontaneously activates behavioural strategies that give new possibilities of meaning to inhabiting space [2].

The focus will initially be on the alterations affecting forms of contemporary living and its own vocabulary, which are leading to a general rethink of the methods and strategies involved in the rigid paradigm concerning the representation of the city and its territory. The visual conventions of the representative processes of urban space have experienced an unstable and turbulent period for a considerbale time. This is not principally due to the major innovations in digital representation systems, but rather due to the fragility they demonstrate in adequately expressing the accumulation of differences and contradictions that characterise the new forms of living and the new tactics of using urban places. New ways of interacting with the territory are emerging, in which the processes of signification of space multiply and overlap. Unprecedented temporalities regulate individual and collective experience. Interconnections are intensifying and the processes of globalisation are radically altering the relationship between space and time, leading to a new condition of an elsewhere that is simultaneously everyhere or nowhere.

Representing this complex polyphony is a crucial challenge for understanding contemporary life, but also for addressing its modifications with greater awareness. Representations have the power to construct meanings, to institute and shape forms of knowledge, and to transform the collective perception of reality. Galimberti is absolutely right when he argues that "men have never inhabited the world, but only the description that religion, philosophy and science have, in turn, given of the world" [3]. One inhabits representations of reality and these "founding tales or maps have the power to construct belonging and relations, stratifying images and common sense, embodying desires and the possibility of control"[4].

2. Tuning into the city: circumstantial perspectives

Within this context, which involves both 'representation' and 'self-representation', the contemporary city displays its most distinctive feature: it simultaneously belongs to multiple collectivities, involved in a constant state of flux where local affairs and global affairs, near and far, past and present all coexist. Plural cities encourage anyone who is interested to tune into their significance and to adopt new perspectives, considered to be the most suitable for portraying this ever-changing world.

There are people who place their trust in a wholly virtual approach. One such example is the research carried out by Carlo Ratti and his SENSEable city Lab, the multimedia laboratory of MIT in Boston which formulates strategies for representing urban reality. All the strategies are based on the possibility created by the space of the network (platforms, portals, virtual piazzas...) in order to portray the city as a series of 'information flows' in the form of interactive maps which can represent the vibrancy of life and activities in real time. Some believe that the multi-scale approach, with the infinite possibilities for gathering data provided by GIS (Geographic Information Systems), is an exhaustive and comprehensive solution.

However, others are firmly convinced of a 'lateral' approach that uses a perspective which, above all, perceives the distance between itself and observed reality and is careful to explore urban processes through multiple viewpoints (perceptive, sociological, anthropological….). All are equally useful for investigating reality and providing representational images that are highly subjective and unconventional: installations, cognitive maps, eclectic atlases, an occasionally surprising result of combining different levels of reality.

The project-installation entitled USE Uncertain states of Europe proposed by Stefano Boeri and his Multiplicity research team is an excellent example of this 'lateral' approach to depicting reality.

Lastly, there is an approach which could be defined as a 'nomadic' point of view which is far more capable of prompting a mobile view of a space that is in a constant state of becoming and manifests itself essentially as the space of relations and connections, a space of interferences. An approche that seems tobe much more capable of understunding this dynamic, which refers simultaneously to 'representation' and 'self-representation', the contemporary city displays its clearest aspect: the state of belonging simultaneously to multiple collectivities, involved in a permanent flow in which there is a coexistence of local and global, near and far, past and present.

As can be seen, these approaches are not traditional and contradict the descriptive anxiety that has marked the recent analysis of urban processes which has used top-down morphology as an almost exclusive paradigm.
This latter paradigm essentially as the space of relations and connections, a space of interferences. The descriptive anxiety that has marked the analysis of urban processes in recent history has adopted a zenithal morphology as its almost exclusive paradigm. This paradigm attributes meaning only to the figures that express themselves in complete form within a two-dimensional surface. According to this paradigm, it is desirable to establish an observation point in an absolute position, remote from the observed object, almost as if the impersonal and synoptic gaze of the observer somehow guarantees the 'objectivity' of the process of investigating the city.
This kind of visual paradigm finds it hard to recognise that urban reality is not a simple overlap of levels of information, ascribable to flat two-dimensional representations, but rather a "collective way of conceiving space"[5]. In order to represent it, it is essential to combine different languages, adopt alternative forms of representation, alternative visual conventions and alternative investigative strategies.

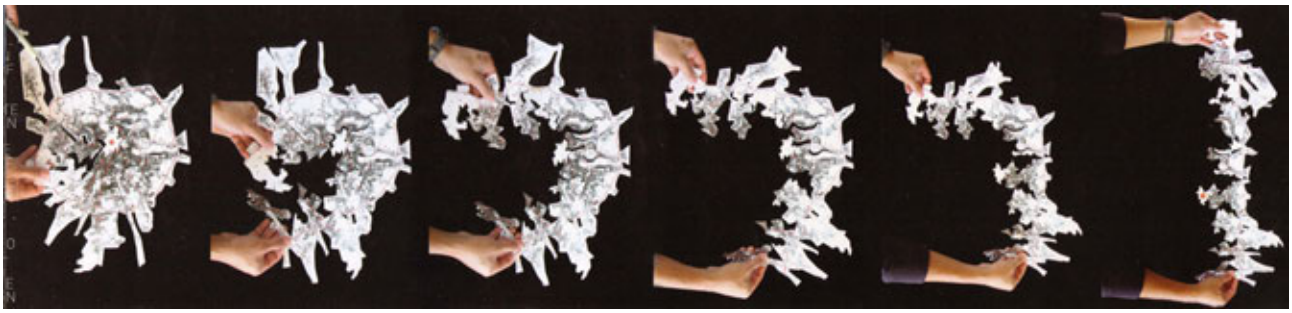

Fig. 2.0_Off-center On-line , Koning Eizenberg, 2008 (in Uneternalcity, Urbanism beyond Rome, Section of the 11th International Exhibition of Architecture curated by A. Betsky)

Recognising the opaqueness of zenithal representation is the first step towards discussing the relationship between the map and the territory and the need to adopt a circumstantial approach to viewing, a sort of lateral approach to the observation point which makes it possible to create other maps. They are provisional maps which are at times incomplete but capable of expressing subjective points of view. "The map is not the territory" as Bateson reminds us [6], but merely a way of interpreting it and codifying it. From this perspective, mapping a city means "organising one's own spatial experience through highly subjective operations of selective representation"[7]. It is no mimetic seduction nor surrender to a passively descriptive approach, but rather a reinterpretation and transfiguration into image and narrative. From this perspective, maps and territory interface according to relations of sense rather than mimetic analogies. The adoption of an intentionally lateral and circumstantial view means choosing a self-reflexive and, in a certain sense, 'biased' condition of a representation that deliberately avoids adopting, as an operational category, the objectivity that "leads the observer to keep a distance from the territory and delude him or herself into employing the same impersonal and powerful perspective that he or she uses" [8]. However, this relational dimension should not be considered as conflicting with the physical dimension of urban reality. On the contrary, physical space and relational space should be explored in dialectical terms because both define the plot that connects humans to their surrounding environment. It is a scheme in which perceived space, conceived space and experienced space are intertwined [9]. Concerning this point, Soja's observations in his theory of 'third space' are particularly illuminating [10]: while the first space is the material space of spatial forms and the second one is the perceived space that derives from mental representations, the third one is the space of experience and practice, a conceptual category in which materiality, perceptions, imaginary worlds, desires and actions merge with each other. It is a space whose representation does not simply involve enriching previous paradigms with 'new images' but, instead, involves developing "a new spatial thought made up of interconnections, short circuits, fluidity and dynamic tension"[11]. This form of representation should be sensitive to processes of signification and focus on qualitative rather than quantitative methodologies, examining differences with far more interest than invariant features. What is therefore required is a truly pluralist form of representation.

3. Interaction and *Sense-making. Towards hypermedial interaction*

By abandoning the top-down perspective and entering the wrinkled folds of reality, it is necessary, to quote de Certeau, "to think the very plurality of the real and to make that way of thinking the plural effective". This implies employing multiple viewpoints in the field. Above all, it means considering the city as a 'social construct' rather than as a construction, a dimension where an important part is played by the flow of social practices, behaviour, relations and signifying. In this context, they take on the meaning of forms of discursive

and interactive knowledge, accounts and stories of life. These forms of self-representation constitute an extremely important element in the process of constructing the image of the city as a dense, stratified and changeable scenario. Giving people the chance to appear and represent themselves offers a precious opportunity for self-determination; it provides the project about the city with a formidable innovative significance that draws more on individual experience rather than a team of experts summoned to solve a problem.
Asserting the importance of narration in analytical and decision-making processes means acknowledging that social interaction de-structures the relationship between, knowledge, decision and action. It implies emphasising the relational aspects and interaction between players and implementing a complex process that can be defined as *sense-making*: in other words, a process of constructing meanings that acts as an ideal link between individual, subjective perception and collective symbolic norms. A similar approach could be applied to the world of objects, considered as relational devices that, in their own way, narrate stories about the spirit of places and their destiny. Narrative thought would thus enter the sphere of urban practice and narration could be transformed into planning. In representative terms, the biographical approach and qualitative research procedures have extraordinary allies in the potential of new audiovisual methods and the recent inclusion of new technologies which give an even more interactive quality to what is defined as the "rhetoric of scientific argumentation" (the way the results of research are communicated).
Audiovisual language offers interesting opportunities in the sphere of urban analysis. Multimedia devices provide an extraordinary tool for representation for the theme of relational research itself since they hybridise languages and create complex narratives which are hypertextual rather than linear or one-directional. Due to their open structure, these narratives create a field of multiple signification which is undoubtedly superior to any form of paper-based support, giving rise to narrative structures where multiple viewpoints find a clear form of expression.
The temporal dimension enters representation, showing the rhythm of urban life, documenting the process of becoming by focusing on the timescale of the elements in an account, the timescale of the story and the timescale of knowledge.



Fig. 3.0_ *Sensitive City. Portatori di storie*, Studio Azzurro.
Sensitive environment, Shanghai, Italian Pavilion EXPO 2012. "The idea of Sensitive City stems from the request for the Italian Pavilion at the Universal Expo in Shangai 2010 and draws on the great tradition of imagined cities, from Tommaso Campanella's city of the sun to the invisible cities of Italo Calvino. Rather than remaining a suspended model or a literary invention, it is ideal merely because it still does not exist but potentially could. Siracusa, Matera, Lucca, Chioggia, Trieste… all differ from each other and it would be necessary to explore them all and travel round them repeatedly to have the chance of describing them. There is an increasing interest in using the idea of the anti-utopian city as an opportunity for offering ideas, stimulating points for discussion to create a vision of what a city in the near future might be like". www.studioazzurro.com

5. A case history_the area of Porta Nolana in Naples. Representation and pluralist thought

Exploring the depths of urban reality and examining the variety of worlds and stories within it means, to use the words of de Certeau, "thinking of the pluralist nature of reality and making this pluralist thought effective"[12]. This is the spirit that lay behind the analysis of the 'urban experience' of 'Porta Nolana' and the definition of the narrative strategies and planning actions capable of capturing the spirit and profound link with the sense of place.
It is not completely obvious that an urban plot can generate a coherent narrative.



Fig. 04 _ Babelfish, image processing.
Spaces and people overlap in an alternation of uses and customs: 4.00 pm, via Sopramuro is empty, the shops are closing and while in the morning there is smell of fresh fish and the cries of fishmongers, in the evening the area is "taken over by foreigners". There's a person who says he is Sicilian to explain that women are not welcome where he is going; because it is time for prayers and he is going with other "Sicilians", dressed in his thobe, felt hat and a western style men's racket that is slightly too tight for him.
[Cf. Maria D'Uonno, *Babelfish*, degree dissertation, degree course in Fashion Design, SUN 2011/2012, supervisors A. Cirafici, C. C. Fiorentino]

In the case of Porta Nolana [13], which is a market area because it is a frontier zone, this has been clearly confirmed over the centuries. In a period of little more than a hundred years, the urban frontier has shifted considerably. The marshland to the east – flourishing areas dotted with mills – has witnessed the invasion of the industrial structures of modernity which were unrealistic and have already been dismantled in a squalid landscape. The eastern port has been handed over to Chinese containers. The new social fabric outside the gate is an area of commerce, much of which is of an unmentionable nature. However, the fish market is almost identical to how it was in the past and the activities of the people who crowd the area of Porta Nolana are, now as then, marked by precariousness. There is a sense of precariousness where everything is at the very limit. This is the state of frontiers, a feature of places where the distinction between power and freedom is blurred There is a precarious balance between law and regulation, of something within bounds that goes beyond bounds. It is both a threshold and customs barrier. This function has been obsolete for a long time and yet it has left an imprint that still remains to this day. This genius loci is perceptible each time one passes through the gate because although one is aware that one is neither leaving nor entering, the imposing stones still reflect a sense of adventure and leave-taking. A gate is a gap in an enclosure, a break in a journey, routes that branch out, warehouses and display counters. The names speak for themselves: Via Soprammuro ('above the wall', linked to the larger defensive walls built by the Anjevins) and via Carriera (a street where carriages can pass); via Gabella della Farina (Tax on flour); vico Forno (Oven) e vico Molino (mill) e, poi vico Vetreria Vecchia (old glassworks), vico Ferze (cloth) e via Croce al Lavinaio. If there is one apparently significant alteration to the scene, then it regards the way spaces originally designed as a single urban structure, a busy place for 'staying within the walls', have been transformed into a series of places that are rapidly crossed in the chaotic and feverish flow of people.

The large historic market of Naples was located nearby. Piazza Mercato, a large square with the church of Madonna del Carmine, the famous bell tower on the side and the scaffold for executions or hangings in the centre, braziers to keep warm in winter and large tents or marquees to provide shade in summer. The Mediterranean city preserves many such sites: waterfronts and ancient gateways to the east. These cities have always been home to many different languages. Places for meeting, places with no clear membership

of a state, foyers for foreign travellers, free-trade areas, places for prositition and places of excess for various social orders. They are incertain and contradictory places, full of new anthropological features, linguistic crossovers with surprising accents. In these places, where there is considerably more than just colourful tradition, all references to identity should be tentative because they are places where the rapid acceleration of historical events has brought about change. They are places for experiencing the dynamics of mutual tolerance, getting an initial idea of others, of welcome and betrayal. With the persistence of the same activities and customs, the inhabitants and activities of the market represent a unique cultural heritage. However, this cultural heritage should not be sought in a single identity. This would only be possible if there were a coherent community which is certainly not the case today.
This is not all. The fish market at Porta Nolana in Naples is a place where fish is sold and where a market is held, not just during the period around Christmas Eve, something which is quite clear to every foreign passer-by or resident.
It is a market that has always thrived and functioned without the area where objects and people are situated being legally recognised by the appointed authorities as a market. This instituional vacuum has led to the use of a degree of discretion, as well as the possibility of blackmail, neglect and abandonment. The people who live here, or merely work here, are not protected by the legal authorities and are not free outside it [14].
The truth comes out is that today the area of Porta Nolana is a piece of heritage that simply deserves to exist in civic freedom and to be run independently [15].
The aim is to recount this multi-faceted situation and recognise the site's vocation. It is a situation that is chaotic and stationary, surreal and iconic, stratified and anarchic, conspiratorial and circumstantial, multi-ethnic and a linguistic melting pot, supportive and marginalising ... this existential space has been the subject of narratives in a context where individual 'stories' have taken on a special significance and the biographical approach [16] has become a consolidated method. The aim is not just to explore a context made up of fluid identities and emerging forms of citizenship, but also to ensure that life stories represent a form of dynamic and interactive knowledge where it is possible to trigger processes of sensemaking that can reveal unprecedented imaginary worlds and the potential for change. These micro-narratives are full of meaning and tell the story of people and their relations with the city's space.



Fig.5.0_ To lead Nolana Images processing.
The images represent the activities in the area of Porta Nolana over a 24 hour period and describe the alternation and overlapping between commercial activities, leisure activities and meetings, together with the "incursions" of tourists. The representation is part of the analysis conducted to design a blog about the inhabitants of Porta Nolana aimed at re-establishing coexistence between people.
[Cfr. Raffaella Iavedaria, *Porta Nolana: identità narrate e nuove immagini di città*, dissertation, Design and omunication degree course, SUN University 2011/2012, supervisors A. Cirafici]

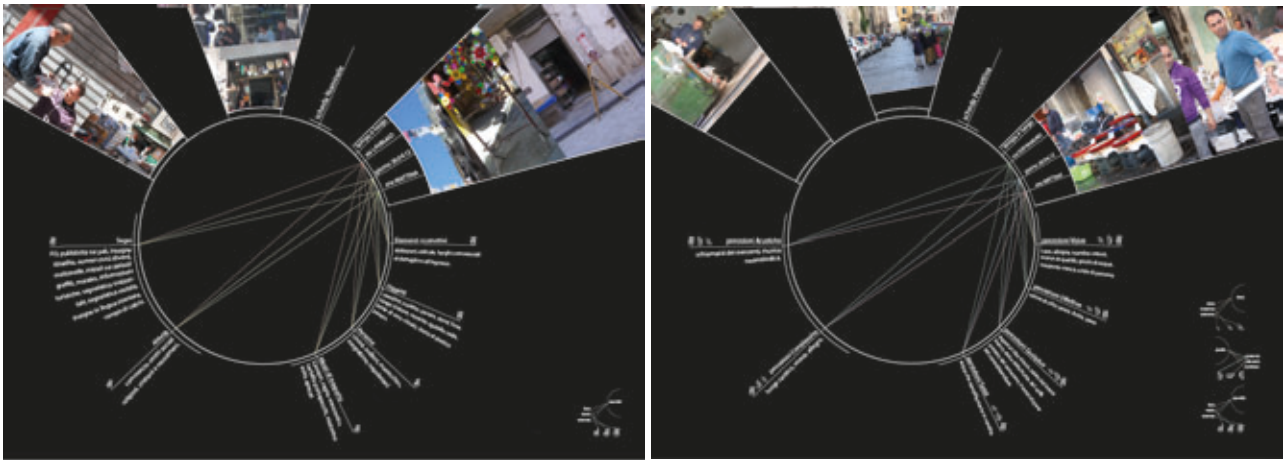

Fig. 6.0_ *Babelfish*, Maps of nominal and perceptual analysis
The map recounts the sensations experienced during surveys in the area of the Porta Nolana fish market. Before creating the map, files were prepared in which some of the data from the 'sensitive survey' [Cf. Marichela Sepe, Il rilievo sensibile, Franco Angeli Urbanistica, Milan 2007] contributed to defining the map of sensations. The map indicates the areas and itineraries of the market, together with objects that are present there and the sensations linked to their functional and 'expressive' use.
[Cf. Maria D'Uonno, Babelfish, degree dissertation, degree course in Fashion Design, SUN 2011/2012, supervisors A. Cirafici, C. C. Fiorentino]

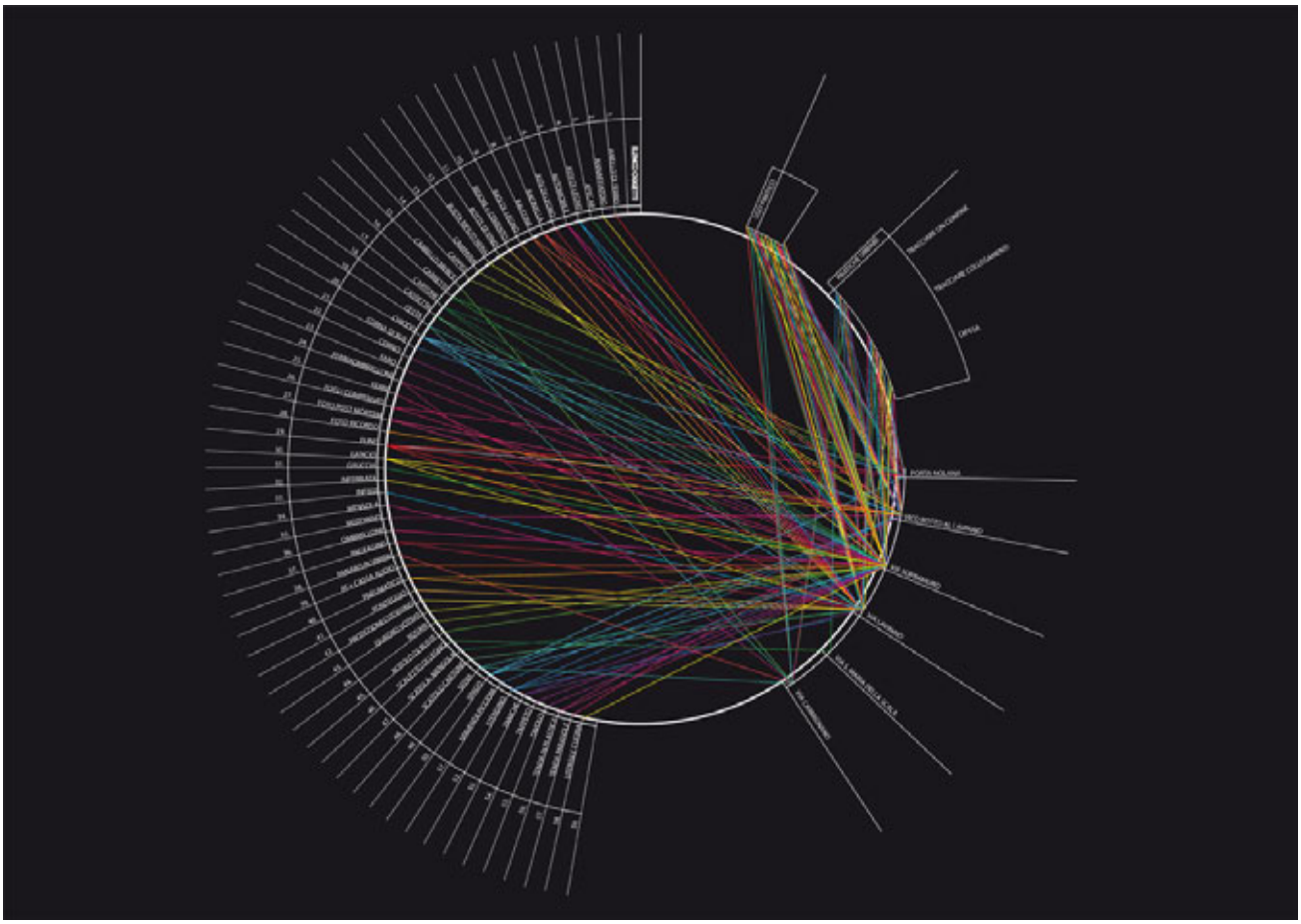

Fig. 07_ *Babelfish, the map of objects.*
The map describes objects in the area of the Porta Nolana fish market as relational devices. The cataloguing of 58 everyday objects was carried out using individual files. Their functional and relational uses were then linked to the places of Porta Nolana in this map, from which it emerges that the practical uses and uses related to urban practices overlap and are repeated in different areas of the market. Indeed, besides its strictly functional use, the same object may be used to mark out a boundary, as a means of defence, or to indicate links.
[Cfr. Maria D'Uonno, Babelfish dissertation, Fashion Design degree course, SUN University 2011/2012, supervisors A. Cirafici, C. C. Fiorentino]

The awareness of being inside observers of a field that ‘contains’ and ‘interacts’ strongly with the observer - rather than external observers - has inspired a representative approach that is organised into cognitive maps, infographics and hypermedia products. The perceptive, nominal and biographical dimension is intertwined in a ‘space with different perspectives’, rattling off a pluralistic account of observed reality. It requires an investigation that is careful to recognise systems of objects, sensations, signs, symbols and traces that define identity. Besides creating an effective map of reality, the accurate association between places and objects, places and sensations, places and signs, and places and stories has given the observed data the significance of an ‘informative piece of evidence’[17] which is somehow geolocated, from which precious clues can be detected in the process of interpreting the meaning of a place. The recurrence of disarming strategies of decontextualisation of use objects gathered in eclectic lists has inspired endogenous devices where the hypermedia aspect of interactive communication has become the medium for the discovery and translation of the authentic urban ready-mades that make up the experience of Porta Nolana. The tendency for self-production in the systems of informative or directional signs, the habit of symbolic as well as physical appropriation of collective space as highly ‘personalised’ space, the gesturing that becomes a ritualised part of the daily mounting of the urban set, have all been transformed into various categories of a ‘collective form of conceiving urban space’. This approach regards self-production and adaptation as the inspiring feature and underlying idea of a militant design where sense-making and framing operations activate processes of attribution of meaning and define the transition from an analytical approach to an interactive, problem-solving approach.



Fig.8.0_ Urban type. System of local road signs self-produced for the market at Porta Nolana.
The graphic system that could be used autonomously by shopkeepers to create their own signs is that of stencils created on a punched mould and with the use of non-toxic water-based paints. This easy, rapid and amusing system does not conflict with the tradition of self-produced systems of local signs which is so widespread at Porta Nolana.
(Cf. Ludovica Saccenti, dissertation, Fashion Design degree course, SUN University 2011/2012, supervisors A. Cirafici, C. C. Fiorentino]

The use of surprising and eye-catching strategies for de-contextualising everyday objects in eclectic lists has inspired endogenous devices where the hypermedial dimension of interactive communication has become a means for discovering and translating the urban ‘ready-mades’ that are an integral part of the experience of

Porta Nolana. (For the project strategies, see the same volume C.C. Fiorentino, A. Cirafici *Authenti-city. Un progetto di design militante*).



Fig. 09_ Babelfish, drawing of one of the possible configurations of the endogenous device.
Babelfish is a sort of "useless machine", an accumulation of obsolete electronic "devices", such as cathode ray televisions, old generation computers and inkjet printers. The project aims to orient the user towards the discovery and translation of the code linked to the functional and communication uses of the objects in a place. The information can be consulted, printed, downloaded or uploaded. Anyone can contribute to extending the know-how of installation through audio, video or text files that are added via bluetooth or USB ports. Babelfish is a device that consists of a computerised system comprising the following elements: video cards; electric generators, the Arduino open-source framework; a series of USB links; processors and a series of peripheral devices: monitors, or video output; loudspeakers or audio output; video cameras; Hello Little Printers (2012). These elements were supplemented by the software and the supports that consisted of materials and objects available in situ such as the following: fruit or vegetable crates, wine barrels, wooden planks, rubbish bags, tyres, chairs and old furniture, cardboard boxes; …
[Cfr. Maria D'Uonno, Babelfish dissertation, Fashion Design degree course, SUN University 2011/2012, supervisors A. Cirafici, C. C. Fiorentino]

What emerges is the awareness that the rhetoric of representation is a crucial issue for strategies of urban projects. Once an exclusively deterministic perspective has been superseded, the experimental production of dialogue-based representation, designed to encourage interaction and dialogue between the producer and the target user, opens up new opportunities for the relationship between analysis and the project. The rhetoric of representation becomes a language in which complex languages, forests of signs and communicative metaphors refer to each other reciprocally. Through the use of techniques of editing, mixing, superimposition, spatial combination, temporality and the contamination of expressive languages, the new types of media accurately represent the multiplicity and connectivity of the contemporary city in multiple expressive narratives which can filter reality in a creative way.
The result is the transfiguration of the world into a narrative of 'visual metaphors' and communicative, relational 'devices' that encourage the development of social bonds through the exchange of knowledge. These forms of 'semiotic engineering', to use Pièrre Levy's definition, make it possible to explore reality in ways that are not just discursive but also sensitive, using approaches and associations that are full of meaning where the aesthetic quality of the artifacts takes on an unexpected significance.
In order to create communicative spaces and encourage action, description is not sufficient. It is necessary to convey energy and give vibrancy to feelings. Emotions need to be stirred which explains why aesthetic pleasure is not an accessory but a crucial underlying element in any communicative process. This is the final thought I would like to leave you with. It is vital that we all rediscover the importance of aesthetic and poetic sensations in communicative processes as well as in those involved in the project.

After all, the sense of 'wonder' lies at the origin of knowledge!

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[13] The area of 'Porta Nolana' is a fragment of the urban fabric of the historic centre of Naples, situated near to the infrastructural junction of the central railway station and the old piazza del Carmine. The area is clearly bounded to the east by the presence of the gate, the traditional access point to the city, and the remaining part of the Aragonese defensive wall system of which the gate was a part, and is closed off to the west by the irregular layout of the road network of Lavinaio – which can be clearly distinguished from the right-angled layout of the late fifteenth century urban fabric. The Lavinaio was an old water course that flowed close to the old Angevin walls and collected the rainwater from the hills of Capodimonte, taking it to the nearby sea. Over time the area has maintained its ancient nature as a 'market area', in particular a fish market. However, it is now crossed by flows of migrants and is marked by distinct alterations in the relational systems between different social and cultural contexts. New interpretations of the sense of places move restlessly in an urban context which, each day, invents and stages strategies and devices for individual and collective survival. This area represented the opportunity to examine the above-mentioned cultural assumptions and pre-conditions and rethink the forms of a 'view' of the city that can interpret its vocation and encourage collective actions.

[14] This calls to mind the film A day without a Mexican [13] in which the xenophobic desire on the part of many US inhabitants to free themselves of Hispanic immigrants – both illegal and legal – is transformed into the complete paralysis of the state of California. The region is forced to declare a state of emergency due to the lack of drivers, plumbers, home helps, painters and decorators, gardeners, babysitters, singers and musicians, husbands and wives, farmers, nursery and primary school teachers, supermarket assistants, journalists, weather forecasters, communications technicians, rubbish collectors, fast-food sellers, cooks, parking attendants, waiters, researchers, tattooists, athletes and actors: in a nutshell, a third of the population of California.

What would happen if the law was enforced and the market of Porta Nolana disappeared? It is very likely that no one would die due to the bite of a rattlesnake, as happens in Sergio Arau's film, but it would nevertheless be interesting to see the consequences of conforming to the law, a law which has not come to terms with reality.

[15] For a more detailed analysis of the aspects of life in Porta Nolana, see the same volume C.C.Fiorentino, A. Cirafici, Authenti-city, Per un Design militante)

[16] The bibliography on the theme of the biographical approach in the field of social studies and town planning is fairly extensive. For an overview of the subject, see the previously mentioned volume by Attili G. (2008) *Rappresentare la città dei Migranti*. Other works of interest include Albini, C.(1998) *L'intervista qualitativa*, in Melucci A. (1998) *Verso una sociologia riflessiva*, Il Mulino, Bologna; Cavallaro R. (2000) *Sociologia e storie di vita: il 'testo' il 'tempo, lo 'spazio,* in Maciotti M.I. (ed.) (2000) *Biografie, stori e società. L'uso delle storie di vita nelle scienza sociali,* Liguori, Naples

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Authenti-city. A militant design project.

Caterina Cristina FIORENTINO[1], Alessandra CIRAFICI[2]
ARV_ Department of Architecture and Industrial Design *Luigi Vanvitelli*
Seconda Università degli Studi di Napoli, Italy.
(1) caterinacristina.fiorentino@unina2.it
(2) alessandra.cirafici@unina2.it

Abstract
The paper describes the state of progress of the work presented at X Forum. It aims to identify the general indications for the militant design project which will be carried out in the market area of Porta Nolana in Naples. The theoretical basis of the project owes much to the ideas of Denis de Rougemont and the work of other personalists. It is also influenced by a series of case studies that refer to the practices of so-called spontaneous urban planning and, above all, to self-design as defined and practised by Enzo Mari in the 1970s. The design proposal is known as AuthentiCity, in which the notion of authenticity refers to its original etymological roots, namely being in control of oneself and thus responsible for one's own actions. In this context, the Greek etymology is interesting because the word 'authenticity' derives from αὐθέντης, i.e. author, the person who acts by him or herself and has authority over him/herself. Further references in the text underline the importance of multiple stories linked to the search for the spirit of places, such as the importance of objects - defined as relational devices - and as a contrast to official history which requires the carelessness of the interlocutor at least as much as the global market requires ignorance. The proposal related to the market area of Porta Nolana therefore involves a series of actions regarding both socio-economic management and the production of endogenous objects, through participatory workshops where knowledge-sharing is free.

Keywords: militant design, social interaction design, self-made design

1. The importance of multiple stories
While explaining how she found a way of expressing a voice that was culturally appropriate to her own personal needs and to the narration of stories that were truly expressive of her cultural background, Chimamanda Ngozi Adichie warns us of the risk of *a single story* **[1]**. She highlights the damage caused by adopting a single viewpoint, whether institutionally rooted and/or widely shared, especially when linked to the practice and contents of storytelling.
Her suggestions, if applied to the narration of the spirit of places **[2]**, help to define the relationship between the analysis, reading and interpretation of urban contexts and systems of reference. They help to outline the steps of a method of investigating urban contexts with a view to practical intervention, where the bias of multiple stories taken together and the simultaneous rejection of a single story imply a type of analysis that does not lead to standardisation. Urban areas will therefore not have their boundaries marked, circumscribed and closed in fixed, stable perimeters.
Chimamanda Adichie began to write and illustrate stories at the age of seven. Born and raised in Nigeria until the age of 19, she lived within a university campus and her education, as a precocious reader, brought her into contact with the dominant culture of the Nigerian middle classes, so that she has an Anglo-Saxon cultural background. The main characters of her early stories had pale skin and blue eyes; they used to eat apples and play in the snow and talked about a day of sunshine as though it were something to be treasured. However, most people ate mangoes in the environment where she grew up as a girl. There was no need for remarks about the weather and no one knew how to describe the flavour of ginger beer. Chimamanda's stories are very revealing about the way reality is interpreted and how narratives and representations are, inevitably, always intentional. They show how the bias of each narrative is its distinctive feature as well as its own limitation. Above all, the words of the young author indicate how this limit is likely to lead to misunderstandings, especially when the interlocutor is

not particularly wary. Indeed, the writer describes a meeting with a poor family of a young man who used to help her parents with household chores: Chimamanda had only heard stories about the difficulties of these people linked to the lack of money and opportunities. When she had the chance to meet this family, who lived in a rural zone of Nigeria, she saw the handcrafted objects that they made and discovered that stories had conditioned her views. The stories had not enabled her to imagine these people as producers of anything because their poverty was the only story that she knew about them. Likewise, her first room-mate in college in the United States initially took pity on her before getting to know her since she only knew one (hi)story of the African continent and Africans. Her room-mate was astonished when she discovered that what was generally discovered as authentic - in other words, intimately linked to a place - was the result of operations designed to simplify complexity when not intentionally widespread for manipulative purposes influenced by interests.

Hence the sense of embarrassment and surprise about the extent to which the bias of stories creates prejudices and reduces the capacity for understanding. It also led to the awareness that stories and representations are a crucial vehicle that can compensate for the impossibility of gaining the varied personal experience that is necessary for knowledge. These reflections become even more pertinent when reading and interpreting either an urban or local context which, by their very nature, consist of complex data and are in a constant state of transformation. Due to its intrinsic nature, the *spirit of places* is generated by previous readings and interpretations; it is intimately linked to the lives of people from the past and the present who acted or continue to act in these places and who have modified both the real and perceived image of these places. If the aim is to interpret the spirit of places, the distance between official history and multiple (hi)stories becomes even more striking. Therefore, for urban narratives, especially if they serve as the basis for shared transformation projects, the personal responsibility of the author is inescapable. The author highlights several aspects of reality, or rather his or her interpretation of reality, in having to add incredibly explicit methodological notes, even in the description of how limited, as well as complex, the process has been. Although the "stones" and their official history already represent precious and eloquent materials for narrating/interpreting an urban environment, another potentially rich and untapped resource consists of the lives and works of those who, prior to a new story, have remained the "silent" protagonists.

The perspective from which Chimamanda writes can also be linked to another author, Neil MacGregor and his text *History of the World in 100 objects* **[3]**. These stories are based on objects of different provenance and date, ranging from two million years ago to our own era. The book stems from the author's work with Mark Damazer, the director of Radio4, and is the result of a series of radio programmes broadcast in 2010.

MacGregor's book begins from the assumption that the museum's role is to *recount history* through the objects on display and that a historical account inevitably involves interpretation and translation.

Both MacGregor and Damazer are aware of the fact that history consists of stories and that, far too often, official history does not consider all aspects, since it is the history of the rich and the powerful, written by the victors, because the history of monuments is the version put forward by those in power.

MacGregor's book has the merit of telling stories through objects. These stories help to shed light on controversial and hidden aspects of official history. It is also a work with many authors. During the radio programmes, experts with different backgrounds and skills were asked to comment on the objects. Another point is that the100 objects were only visible in the British Museum prior to the publication of the book. However, the authors ensure that although it was not possible to show the objects on the radio, the narrative skills and the imagination of radio listeners contributed to the success of the programme. The authors emphasise this point, attaching great importance to the aspects linked to the imagination and oral narratives, because a story linked to objects - an unwritten story - is intimately linked to the narrative capacity of the broadcaster and also because writing (let alone printing) is a recent accomplishment of humanity; by contrast, many of the objects featured in the book are extremely ancient and come from worlds where oral storytelling was crucial, even for the objects' own existence. In order to explain the difference between written history and "speaking objects", it is worth mentioning one of the objects in the book: an aboriginal wooden shield from Australia whose "discovery" dates to 1770. The main character in the story is the wooden shield while the "co-stars" are Captain James Cook – British explorer, cartographer and navigator – and the aborigines of southern Australia (which corresponds roughly to modern-day Sydney). Captain Cook arrived on the Australian coast on April 29 1770. On landing, he was greeted by a group of native people. Rather startled, he fired a shot to intimidate them while the aborigines threw stones to dissuade them from coming ashore. The aborigines fled, leaving the wooden shield on the ground.

This is a brief summary of the entry in the Captain's log and therefore part of official history. However, these facts are just the beginning of something much more complicated: on his return to Britain, Cook suggested using Australia as a Penal Colony, and this marked the start of a long process of transformation of Australia which damaged aboriginal culture and led to the destruction of many communities. Some regard Cook as the founding father while others consider him a usurper.

Only in the 1960s and 1970s did Australian aborigines, the survivors of the events that took place in the areas they had originally lived in, begin to fight for their rights and force a debate to be opened about aboriginal culture. Today this shield provides precise information about this story: the object is made of red mangrove wood, about a metre high and about thirty centimetres across at the widest point; it has an elliptical shape and a handle, also made of mangrove but of a more flexible species which comes from another region. This object has been crafted by skillful hands and has distinctive marks (the shape and residual traces of colour) which identify its provenance and the people to whom it belonged. It demonstrates that the people who made it were travellers who were ready to exchange objects since the wood comes 300 kilometres from the bay that Captain Cook named Botany Bay, in honour of Joseph Banks, the botanist who took part in the expedition.
The shield bears witness to the encounter/clash between two civilisations where nothing particularly civilised took place and which had enormous consequences; 'listening' to what the shield has to tell us gives us a better understanding of the culture of Australian aborigines who were initially crushed by gunpowder, which they had never seen nor even heard explode, and then by British colonialisation.
With other 99 stories, MacGregor's book is an invitation to look at the "biography" of objects and re-establish the relational role so that new light is shed on the events of official history. Moreover, if objects are considered as relational devices, the interpretation of objects – placing them within their socio-cultural context and their historicisation - helps to reassess issues which have been taken for granted, to dispel misunderstandings and preconceived ideas, or at least cast doubt on the notion of a single (hi)story.
The very nature of the relational device involves the capacity to shift attention from traditional viewpoints and, in this sense, it is also worth consulting the work of Daniele Pario Perra **[4]** and Vladimir Archipov **[5]**, in which self-produced objects tell the story of cultures which are seemingly or actually marginalised.
The need for a single (hi)story is always linked to wielding power and the repetition of a single, simple concept is one of the practices exercised by power structures as a means of persuasion and seduction. The similarity with advertising practices is both immediate and disquieting and this sense of unease grows when looking at studies of local or urban marketing. Indeed, advertising and brand design strategies tend to reduce complexity in favour of clichés, emphasising uniqueness and tradition which, even when avoiding folklore, is of little help in defining the spirit of a place or identifying its vocation. The issue of the authenticity of urban places is a thorny question because it involves investigating the relations between borders and contexts. In other words, circumscribing research is essential for the analysis of urban contexts, although reading and interpretative practice makes it necessary to move beyond physical and temporal boundaries. The search for the spirit of places is therefore an operation which, when identifying an object of investigation, offers as many links as possible, depending on the nature of the object and the expertise of the researcher. This implies the need for systems of reference which are appropriate to the reading of spaces, such as the interpretative possibilities aimed at transformational actions and the desired participation in a dialogue between local analysis and the readings that connect single works and/or urban contexts to wider places or cultural environments until they are put forward in the interpretative phase as design proposals. Two points emerge from this: one is rather futile but suitably discriminating since it is linked solely to the capacities and skills of the operator while the other may be of wider interest since it is closer to more general methodological questions. The ambiguity of the objectives linked to the definition of a cluster poses risks when searching for the spirit of places. The customary use of association by proceeding according to systems of similarities is not particularly fruitful unless the similarity of certain urban spaces is not part of their original vocation as places; in other words, the definition of homogeneous areas and clusters is part of a method that restricts a priori the chances of a real understanding and rational transformation of urban spaces. The same is true of people: circumscribing people into homogeneous groups is a practice that belongs to cultural segregation whereas one of the possible solutions is to focus on multiple stories and possible affinities which make a system recognisable, provided the system is treated as the expression of different answers, both in terms of form and function, to a single question. This idea goes back to solutions proposed by Jamie Lerner and Marco Casagrande **[6]**, and those who follow tactical urbanism or so-called spontaneous intervention **[7]**, as examples of opposition to the construction of standardised clusters and single dominant histories.

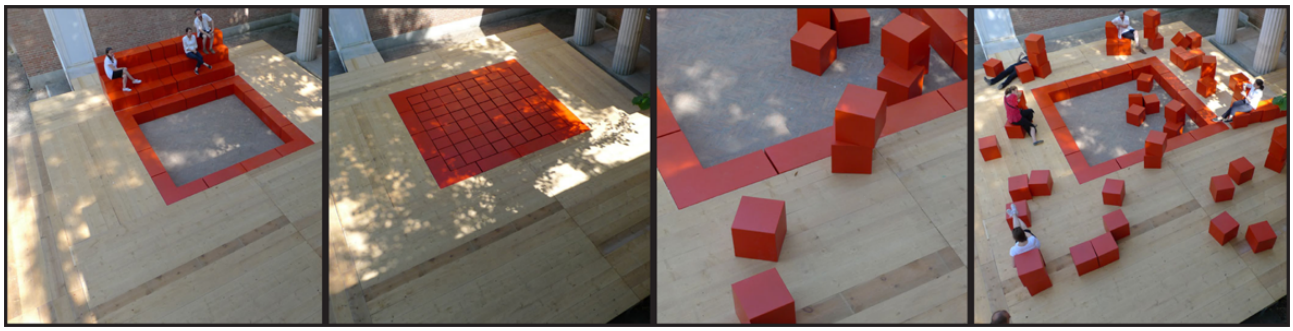

Fig. 01 _ Examples of spontaneous Intervention.
Design actions for the common good, at the U.S. Pavilion, 13th International Venice Architecture Biennale, 2012.

2. The area of Porta Nolana in Naples

It is not completely obvious that an urban fabric can create a coherent account.
In the case of Porta Nolana, a market area since it is a frontier zone, this has been clearly confirmed over the centuries. In just over a hundred years, the urban frontier has shifted. The marshland to the east – fertile areas dotted with mills – has witnessed the invasion of the industrial structures of modernity although they have proved to be unrealistic and have been largely dismantled, leaving relics and squalid skylines. The port to the east has been taken over by Chinese containers and the new society outside the city gates consists of traffic of a frequently unmentionable nature. Nevertheless, the fish market is almost identical to how it used to be and the actions and activities of people who frequent the Porta Nolana area are still marked by precariousness.
This precariousness has ancient origins. Everything here takes place on the edge. One aspect of this condition as a border area is part of the history of the area, the walled edge of the eastern area facing the sea. On this subject, it is worth looking at the studies regarding the analysis and interpretation of the context of Piazza Mercato and Porta Nolana **[8]**, which only mention the fact that an understanding of the area is linked to the coastal system. However, while neglecting the hermeneutic process carried out in the study of *La Piazza d'Acqua*, it may be interesting to recall the account written by Bartolomeo Capasso **[9]** about the life of Masaniello, the true protagonist of piazza del Mercato who lived "in the first houses after vico Rotto", in other words the northern corner of the eastern sector. It is here that he is described by Capasso in the scene portrayed by Gargiulo **[10]**, as he harangued his followers from a wooden platform placed there by a company of acrobats and tumblers who often appeared alongside the fisherman from Amalfi and leader of the tragic revolt (6-16 July 1647). Ultimately it was Capasso who conveyed the true image of the square as an area of craft activities and humble dwellings of the common people: an image that is rooted in houses and shops with public use located in the residual space for the punitive displays of power to which the rebels themselves were forced to conform. On the night between 7 and 8 July, in the most depressed areas of the city - Mercato, Lavinaio, Conceria and San Giovanni - the "pueblo inferior", divided into corporations and the poorest inhabitants of the area, revolted against the excises under the leadership of Masaniello. The women from Lavinaio also protested and attacked the bell tower of San Lorenzo and set fire to the house of the governor of the pawnbroker's, although the main scene of the revolt remained piazza Mercato, the "reggia dei popolari" (palace of the common people), where Masiniello played the leading role and also met his end. Even in the days of his so-called madness – actually a lucid moment of self-awareness - Masaniello stirred the piazza as the symbolic place of the revolt: "The signs and 'plans' of madness are countless: the knife hurled into the crowd, the great rides on horseback, the nocturnal swims in the sea; and, as if this were not enough, the fisherman wanted to create the port within the market and a bridge stretching from Naples to Spain" **[11]**. Masaniello's vision of the *square as a bridge* is precisely one of the possible interpretations of the spirit of the place which, as a frontier site, possesses the features of those indistinct spaces between power and liberty, between rights and regulations, a place where one constantly oversteps the boundary between inside and outside, where the walls and its passageways are threshold places and customs gates where something of value is cleared through customs: this function has been obsolete for a long time and yet its imprint still remains today. This *genus loci* can be perceived each time one passes through the arch because, even though one is aware that one is not leaving the modern city, the imposing masonry, like its remains, still testify to a sense of adventure and leave-taking, a passage towards a space that is not controllable. Although its function as a transitional place and gateway no longer exists, one is aware that the transit in the two directions does not have the same significance: the exterior does not offer a way in or a means of interpreting the places that exists in the area within the walls. A gate represents a break in an enclosure, an interruption in an itinerary, routes that branch off, warehouses and display counters. Within the walls, the names are evocative: Via Soprammuro ('above the wall', linked to the larger defensive walls built by the Angevins) and via Carriera (a street where carriages can pass), as well as via Nolana along the same axis; via Gabella della Farina (Tax on flour); vico Forno (Oven) and

vico Molino (mill) and via Croce al Lavinaio. The large historic market of Naples, the setting for Masaniello's actions, was located nearby. Piazza Mercato, a large square with the church of Madonna del Carmine, the famous bell tower on the side and the scaffold for executions or hangings in the centre, braziers to keep warm in winter and large tents or marquees to provide shade in summer; Piazza Nolana, outside the city gates, with the church of SS. Cosmo e Damiano, provides access to Borgo di Loreto, which was already not urban although it was part of Naples. The spaces convey the identity of the Mediterranean city which preserves many such sites, waterfronts, bridgeheads, seafronts of various sizes and ancient eastern gates; in these cities the spirit of places speaks many languages, in places for meeting and with no clear membership of a state, halls for foreign travellers, free trade areas, places for prostitution, the worst examples of capitalism, arenas for shows, extreme places for different social groups. These are uncertain, contradictory places, full of new anthropological features and linguistic crossovers with surprising accents, where there is considerably more than just colourful tradition. Considerable care is required when talking about identity because these are places which have witnessed the acceleration of historical events, the promise of change, and the risk of a search together with random attempts. They are places with dynamics of mutual tolerance, getting an initial idea of others, of welcome and betrayal.
With the persistence of customs and traditions, the people and activities of the market represent a culture although it would be pointless to seek a single identity because this would be the result of a coherent identity which is not currently the case.
It is important to avoid confusion between coherence ad homogeneity.
The market at Porta Nolana is renowned in other districts. Trips are arranged to go and buy fish or to eat it in informal eateries nearby. Its function is not dissimilar to the role still played by the Vuccirìa market in Palermo, even though Porta Nolana is situated between walls, masonry and structures that have played a part in the history of Naples, together with others which, in the same area, have devastated and damaged the city in the name of urban planning over the last 150 years. The authentic parts are hidden by the superficial lovers of folklore and, in particular, have been broken up and threatened by urban planning schemes. This town planning policy led to the construction of the eyesore that is the Circumvesuviana light railway station **[12]**, designed without due reflection. Similarly brutal mutilations had previously been carried out as a result of the *Risanamento* (Redevelopment) scheme, an example of class speculation and plunder perpetrated by the influential middle classes at the time of Umberto I.
The fish market at Porta Nolana is renowned in Naples as a place for buying fish, not just in the evenings prior to Christmas Eve. This is clear to every foreign passer-by or resident.
It is a market that has always thrived and functioned despite the fact that the area where objects and people are situated has not been legally recognised as a market by the authorities.
This institutional vacuum has led to the use of a degree of discretion, as well as the possibility of blackmail, neglect and abandonment. The people who live here, or merely work here, are not protected by the legal authorities and are not free outside it. This calls to mind the film *A day without a Mexican* **[13]** in which the xenophobic desire on the part of many US inhabitants to free themselves of Hispanic immigrants – both illegal and legal – is transformed into the complete paralysis of the state of California. The region is forced to declare a state of emergency due to the lack of drivers, plumbers, home helps, painters and decorators, gardeners, babysitters, singers and musicians, husbands and wives, farmers, nursery and primary school teachers, supermarket assistants, journalists, weather forecasters, communications technicians, rubbish collectors, fast-food sellers, cooks, parking attendants, waiters, researchers, tattooists, athletes and actors: in a nutshell, a third of the population of California.
What would happen if the law was enforced and the market of Porta Nolana disappeared? It is very likely that no one would die due to the bite of a rattlesnake, as happens in Sergio Arau's film, but it would nevertheless be interesting to see the consequences of conforming to the law, a law which has not come to terms with reality.

3. Partaking and taking apart

"*The only real questions are those posed by existence, certainly not those that we posed to avoid responding to the present*", Denis de Rougemont, *Journal d'un intellectuel en chômage*, Albin Michel, Paris 1937. Italian translation.: *Diario di un intellettuale disoccupato*, Fazi Editore, Roma 1997, p. 114.

Is it acceptable that a monumental part of the historic centre of Naples, which has already been violated on several occasions by official history, is left to the mercy of town planning policies which are extraneous and derive from elsewhere? Is it fair that, rather than compensating for the damage done over more than a century and providing opportunities for civil coexistence in an environment guaranteed by hygiene and social effectiveness, an attempt is made to present a facade that contains nothing authentic except for a misrepresentation of its own origins in favour of a marketing exercise?

Today Porta Nolana is a piece of heritage that simply deserves to exist in civic freedom and to be run independently. There is a middle way between taking part and taking apart which presents a precious opportunity to conduct an intervention in the Porta Nolana area.
It would be advisable to take part in the spirit of the place and discard a false notion of identity.
Porta Nolana is partly Neapolitan and partly not (Partenopea e parte no), a place where individual stories should be listened to, told and shared in an atmosphere of lively coexistence among people who come from different places and cultural backgrounds. Rather than referring to intercultural exchange, it is far more important here to focus on people and the consequence of this ethical approach leads to collective action and the possibility of *thinking with one's hands* **[14]**.
The text by Denis de Rougemont was written in 1936. It stems from a precise question: what is culture?
While attributing decay to a separation between *hand* and *intellect*, the author expresses his personalist stance. In the process he defines the elements for a culture that is antithetical to the dominant belief whereby the common good does not come before the specific good because the "purpose of society is the person" **[15]**. Together with the work of Jaques Maritain, Alexandre Marc and Emmanuel Mounier **[16]**, these ideas underlie personalist culture which reveals the contrast between the individual and the person and between society and community. Within this ethical and theoretical framework, *thinking with your hands* is described in its best version and in its worst which consists in *frenzied action that merely brushes the surface of things*: "If only thinkers had large hard hands! Hands made for carrying and weighing, Hands that possess know-how, that achieve and sculpt: hands that can create" because "frenzied hands scarcely leave a mark on the surface, where you can recognise the thief, the person who goes around touching everything and touching other people's property. Because someone who touches an object without leaving a profound imprint and without making it his or her own can only touch the property of others. What he has not taken can never be his: it is outside the power of being able to take possession of it. Scholar and those who use quotes take advantage of great achievements on which they are unable to leave a trace but merely leave them tarnished with their imprint" **[17].**

With regard to the people who live, work and hang around in the market area of Porta Nolana, the desire to talk about people who have their own origins and history but more importantly a name and personal identity is neither an intellectual whim nor an attempt at political correctness but a chance to avoid stereotyping. It is an alternative to referring to people who inhabit the Porta Nolana area as Neapolitans, Chinese or Arabs, which immediately conjures up a jokey atmosphere. The French-Turkish writer Elif Shafak describes the term multicultural, with the benefit of personal insight, as a political fiction **[18]**. Indeed, the point is not to conceal the identity of a person's background but to understand that multiculturalism did not originate from the combination of individuals from different societies but from the coexistence of people which takes place here and now, in a specific place and time. Their needs and satisfactions depend much more on current circumstances rather than those linked to their native countries. An understanding of multiculturalism passes through an idea of identity as an entity that is not formed once and for all but is in a constant state of change. The seductive appeal of a stereotype is extremely powerful, primarily because stereotypes contain elements of truth. They simplify both the questions and answers related to transformation. However, it should not be forgotten that behind the power of a cliché, which leads to the definition of an identity, lies a distorted concept of the term 'identity' which is regarded as immobile and clearly defined rather than as it really is, namely elusive and changeable. The real problem of stereotypes is that they are incomplete and ensure that stories are obscured and flattened by a single story and that people are demeaned. "The consequence of the single story is this: it robs people of their dignity", explains Chimamanda Ngozi Adichie.

De Rougemont points out an uncomfortable truth which challenges systems of power and is difficult to follow even for those with an ethical sense: "thinking with your hands is thinking about the potential for action, it means thinking during the action where the spirit is actually involved, like someone who is ordered to judge, choose and transform the conditions he is provided with, and who refuses. Thinking with your hands means conceiving of ideas in actions, and this goes against the rationalist notion of a thought that is no more than a tardy comment on the actions of others. Lastly, thinking with your hands is not the exact equivalent of acting through one's own thoughts. This is because it is not the action that is of prime interest – with thought merely considered as its assistant – but quite the opposite; if I want to think through actions, then the thought only seems right and perfect in the moment when the action testifies to it and endows it with seriousness. There is no real action without thought and the formula implies the primacy of thought in every action, as well as the necessity of this action for thought" **[19]**.

These ideas constitute the premise for the proposal for the market area of Porta Nolana. The proposal considers elusiveness and changeability as precious concepts that underlie any possibility for innovative transformation. They should be preserved and supported as interpretative categories for the definition of design proposals. In this sense, the importance of single stories, the awareness of objects as relational devices, the deceptive nature of the much-praised concept of multiculturalism all help to formulate an ethical and operational approach whose foundations are to be found in the ideas of Denis de Rougemont and which finds the space and perspectives for operating within personalism and the needs of the community.

4. Authenti-city. A project of militant design.

Something is clearly missing: for the inhabitants, for those who chose the Porta Nolana market area as a place for work or for passing through, and for the users of the market; for all these people, the place lacks something. Elusiveness and changeability are assured, both in terms of the code that accompanies the use of objects, the activities linked to the market and what remains, or can still be perceived, of the past.

The design proposals involve creating a reconnection, on a larger scale, between this area and the coastal system. They seek to look beyond the eastern area of the city, considering the possibility of reconstructing a map of memory where pride of place is occupied by the traces of the walls, the different types of fabric together with individual architectural structures, in the light of an idea represented by Piazza D'Acqua. The proposals are therefore aimed at providing various solutions which the single stories of the frontier spaces of Naples offer to those who know how to interpret them.

Besides this, there is also the possibility of more precise forms of intervention which, in theory, could be carried out more rapidly. This type of intervention takes account of the needs of smaller spaces and, despite involving a reduction of the physical area of intervention, displays equal awareness of the complexity of the urban fabric and the relations that exist with the coastal system.

Once the scale is reduced, the design proposal for the market area of Porta Nolana is based on two elements, one of which is related to management while the other is more immediately linked to design practices. In terms of the first point, the general idea is to give official recognition to the market at Porta Nolana and to entrust the organisational and economic management of it to the people who are directly involved in its existence: the proposal is therefore designed to give priority to the inhabitants, the shopkeepers and those who would no longer be illegally occupying public space: transport workers, suppliers and even the users of the market. They would be part of a community with responsibility for running the market area.

In terms of ideas for the practical side of the project, the solution is simpler and refers to Enzo Mari's writings and activities in the 1970s regarding *self-design* **[20]**. Based on the elusive and changeable aspects of the market area, a restricted area of intervention will be chosen in order to try out the contents of Enzo Mari's proposal. The objective is to assess the feasibility of setting up permanent workshops for designing and making objects with the participation of the newly established community and those who wish to, and can, share their know-how with the aim of *thinking with your hands* and therefore attributing the right significance to things. "History has much to say about the power of things. It forgets that there is no action except through the action of humans, through the use of people's hands; thought never acts upon an era but rather on people who think with their hands, or on some of them" **[21]**.

The self-design of the elements required for the Porta Nolana market area could be the appropriate design solution to avoid the risk of standardisation whereby a successful design could be repeated in a different context. Mari's manifesto, drawn up in 1974, aimed to raise people's awareness of the possibility of creating objects by following, modifying and improving his 19 self-design projects according to new needs. It contains the explicit need for the actual construction of the work which harks back to *thinking with your hands*, and the pressing need therefore of acting in an *unflustered* way, passing from model to model. It is in this sense that the models, or rather the sequence of models, play(s) a part in a dialectic process in which "knowledge is achieved through hard work", while merely producing sketches and drawings makes you "slaves to the economic system" **[22]**.

As well as Mari's work, there are various experiences and case studies **[23]**, all of which have the merit of having tested out a series of new possibilities related to the participation of inhabitants in transforming urban contexts. They have all reflected on the definition of urban space and the sense of community and membership in search of shared knowledge which is opposed to the ignorance necessary for the global market **[24]**, and the carelessness required for writing official history. These references constitute the basis for formulating an intervention proposal which undoubtedly requires more time than that used by a designer to work out a final design in a studio. Workshops could be set up involving people from different backgrounds and with different skills and could lead to designs and objects that are suitable for the needs of the place and are the product of the activity of designers and, in particular, of 'prosumers'.



Fig. 03 _ Enzo Mari making a chair in collaboration with Artek, 2010. [25]

These are the general contents of AuthentiCity, a project that seeks to bring about change based on authenticity and thinking with one's hands. The notion of authenticity refers to its original etymological roots, namely being in control of oneself and thus responsible for one's own actions. In this context, the Greek etymology is interesting because the word 'authenticity' derives from αὐθέντης, i.e. author, the person who acts by him or herself and has authority over him/herself.
In this sense, the proposal involves a project that uses the narrative of many different stories which make the Porta Nolana market what it is. The aim is to modify the area through the criteria of self-design and militant design by forming a community.

We conclude with a brief note about a project that seeks to create an endogenous device to be created close to Porta Nolana. As a useless machine **[26]**, made up of a group of obsolete electronic "devices" (such as cathode ray televisions, old generation computers and inkjet printers), the device translates the expressive code linked to the different uses that the same object can have in the market area of Porta Nolana. This project, named *Babelfish* **[27]**, is one of the possible narratives that can contribute to the definition of AuthentiCity. It is aimed at orienting the user towards the construction, discovery and translation of the code linked to the functional and communication uses of the objects in a place. The information provided by Babelfish about the objects in the area is the result – albeit temporary and in a state of constant evolution – of surveys, sensorial maps **[28]** and interviews and can be consulted, printed out, downloaded or uploaded. Indeed, anyone can contribute to increasing the know-how of the installation by adding information in the form of audio, video or text files that are added through Bluetooth or USB ports.

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[03] MACGREGOR, Neil, *La Storia del mondo in 100 oggetti*, Milan: Adelphi, 2012. (A History of the World in 100 objects, Penguin Books, London 2010)
Neil MacGregor has been the director of the British Museum in London since 2002 and was previously director of the National Gallery, also in London. The book is the result of a year of programmes broadcast by BBC Radio 4 in 2010.

[04] PARIO PERRA, Daniele, *Low Cost Design*, Milano: Silvana Editoriale, 2010-2011, 2 voll.
Daniele Pario Perra is a relational artist, researcher and designer. He has been involved for some time in spontaneous creativity, cultural trends and urban development, in a constant relationship between material culture and symbolic heritage. In 2001 he began creating the database *Low Cost Design* which contains over 7,000 photographs of the transformation of objects and public spaces in Europe and the Mediterranean area, published in two volumes. *Low Cost Design* is also a travelling exhibition with over 100 objects gathered from all over the world, beginning from the same year.

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[07] Cf. Web: www.spontaneousinterventions.org *Spontaneus Intervention, Design Actions for the Common Good,* at the ChicagoCultural Centre, 24 May-September 1, 2013. This exhibit was organized by Cathy Lang Ho for the Institute for Urban Design and selected by the U.S. Department of State Bureau of Educational and Cultural Affairs (ECA) to represent the United States in the U.S. Pavilion at the 13th International Architecture

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[09] CAPASSO, Bartolomeo, *La casa e la famiglia di Masaniello,* Naples 1919.
[10] Cf. the famous painting by Domenico Gargiulo (Micco Spadaro) portraying *The revolt of Masaniello* (1647). The painter depicts the scene from the perspective of the church of S. Eligio to include Vesuvius in the background but also from a mid point in the square which offers close-up views of the two rows of buildings. The lack of a row of buildings on the left, which constitutes the upper edge of the square (for those looking from the side close to the sea), is a device to gain an enlarged image of space. In the front row it is worth noting the arrangement of blocks of houses lying alongside each other on the short side and therefore belonging to horizontal plots of land. To the right, continuing from the bell tower of the Church of S.Maria del Carmine, the façades of the quadrangular blocks of houses are visible. The portrayal corresponds perfectly to the architectural forms recorded in drawings dating to the mid eighteenth century. Similar views, enriched with the presence of row of buildings on the left, can be seen in two paintings by Carlo Coppola, *The surrender of Naples to Don John of Austria in 1648* and *Piazza Mercato at the time of the plague in 1656.* The limits of the square also feature the upper row of buildings with blocks of detached houses, as they were destined to remain, and the Porta del Carmine, to the left of the church, a fixed point in the design by Securo for the proportioning of the row of houses and shops.
[11] MUSI, Aurelio, *La rivolta di Masaniello nella scena politica barocca,* Naples: Alfredo Guida Editore, 1989, p. 146; where the author refers to a passage by Donzelli: G. Donzelli, *Partenope liberata,* (ed) A. Altamura, Naples 1970, pp. 98-99.
[12] The design, by Giulio del Luca and Arrigo Marsiglia, was done in the period 1972- 75, demolishing the station building which dated to the foundation of the railway line in 1843.
[13] *A day without a Mexican*, directed by Sergio Arau, USA-Mexico-Spain 2004.
[14] DE ROGEMONT, Denis, *Penser avec les mains*, Paris: Albin Michel, 1934;
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[15] DE ROGEMONT, Denis, *Politique de la Personne*, in "Je Sers", Paris, 1934.
[16] Jacques Maritain (1882-1973); Alexandre Marc (1904-2000), Emmanuel Mounier (1905-1950), Denis de Rougemont (1906-1985).
[17] DE ROGEMONT, Denis, *Pensare con le mani*, Massa: Transeuropa, 2012., p. 136.
[18] Elif Shafak, *The politics of fiction*, Web: www.ted.com
[19] DE ROGEMONT, Denis, *Pensare con le mani*, Massa: Transeuropa, 2012, p. 137.
[20] In 1974, Enzo Mari published *Proposta per un'Autoprogettazione*, a work that consisted of a manifesto and 19 designs to send to anyone who sent a request with a self-addressed stamped envelope.
[21] DE ROGEMONT, Denis, *Pensare con le mani*, Massa: Transeuropa, 2012, p. 167.
[22] MARI, Enzo, *intervento al Cersaie*, Bologna 10 September 2010.
[23] e.g.: In 2011 during a lecture entitled *Proposta per una Autoprogettazione (Proposal for Self-Design)*, Enzo Mari took part in the activities of the ATTICA project - Archaeologies for self-management, promoted by NABA within the framework of the European project *The Art of Urban Intervention*. *The Art of Urban Intervention* is a European research project that involved various institutions from 2009 to 2011, Naba – Nuova Accademia di Belle Arti, Milan; ICA – Sofia Institute for Contemporary Art; The Blue House, organization, Netherlands; Rotor, organization, Austria; UJEP, organization, Czech Republic, BLOK_ Local Base for Cultur Refreshment, organisation, Croatia; DelVe _ Institute for Duration, Location and Variables, Croatia. Other references are to be found in the definition of *Design Libre* by Cristophe André: Design Libre is a practice that seeks to apply the free production model to the manufacture of material objects. Its aim is to describe the transition from the role of the consumer to that of the prosumer (producer and consumer), a person who takes part in the production process of objects in order to regain possession of techniques and know-how, and it is a practice for the free sharing of knowledge. See also the Download Design project by the Droog Design team dating to 2011.
[24] Interview given at the Triennale in Milan as part of the public meeting: "Enzo Mari, il lavoro del design" with Enzo Mari,Vanni Pasca and Vincenzo Basile.The interview was conducted by "B-Students TV", a multimedia channel created by the students of Bocconi University, Milan.
[25] 35 years later, in 2010, Artek asked Enzo Mari to "produce" the design for the chair that can be seen in the photographs. Besides the bewilderment that may stem from the fact that the design only became a product after 35 years, and that the price is far in excess of the cost of the materials, it is possible to dismiss this aspect as a necessary evil caused by sadly changing times. Perhaps we can continue to believe that, despite the compromises required, the popularisation of an idea linked to the concept of self-production still remains valid today. It can offer space to streets and places where the experimental work can take place, in the name of renewed attention placed on people and the community, and recalling that Mari himself has written that the last thirty years have been a period marked by an *increase in decay*, MARI, Enzo, *25 modi per piantare un chiodo*, Milan: Mondadori, 2011.
[26] Cf. MUNARI, Bruno, macchine inutili, 1930-1933; Bruno Munari's 'useless machines' are portable devices with only an aesthetic function; in this sense, the quotation regarding the endogenous device is intentionally imprecise and refers to precariousness, the combination of already existing elements, which have therefore been adapted and not designed for the purpose. It also alludes to the mobility of Munari's machines which, being built of lightweight materials, could move with minimal windpower, so the name also refers to the powerful influence that the context exerts over the device and its potential for modification.
[27] *Babelfish* is the title of the project of the degree dissertation by Maria D'Uonno. Cf. D'UONNO, Maria, *Babelfish*, degree dissertation, Fashion Design degree course, SUN University 2011/2012, supervisors Alessandra Cirafici, Caterina Cristina Fiorentino.
Cf. Web: www.arduino.cc

Babelfish is a device that consists of a computerised system comprising the following elements: video boards; electric generators, the Arduino open-source framework; a series of USB links; processors and a series of peripheral devices: monitors, or video output; loudspeakers or audio output; video cameras; Hello Little Printers (2012). These elements were supplemented by the software and the supports that consist of materials and objects available in situ such as the following: fruit or vegetable crates, wine barrels, wooden planks, rubbish bins, tyres, chairs and old furniture, cardboard boxes, … the Arduino open-source framework, for the Babelfish device, makes it possible to manoeuvre the televisions and control the touch screen displays, as well as connecting to the project software. Original designers: Massimo Banzi; David Cuartilles; Tom Igoe; Gianluca Martino; David Mellis. The project began in 2005, with the aim of providing a control device for interactive design projects which was cheap and free from the laws of market forces. Arduino consists of a hardware platform for the physical computing developed at the Interaction Design Institute in Ivrea, set up by Olivetti - Telecom. The name of the board derives from the name of a bar in Ivrea attended by the founder members of the project which, in its turn, recalled the name of King Arduin of Ivrea. The board is based on a printed circuit which combines a microcontroller with a PIN connected to the I/0 ports, a voltage regulator and, when necessary, a USB interface. The Arduino hardware platform is available in a pre-assembled version and can be purchased online or at specialist stores. The hardware is supported by an Integrated Development Environment (IDE) which is multiplatform (Linux, Apple Macintosh, Windows). This software also makes it possible, even for beginners, to write programs with a language derived from C and C++ called Wiring, which can be downloaded and modified. Arduino makes it possible to create prototypes rapidly as well as enabling rapid learning of the basics of electronics and programming. It can be used to develop stand-alone interactive objects but can also interact with software programs installed on computers such as Adobe Flash Player, Processing, max/MSP, Pure Data, Super Collider etc. The unusual aspect of the project is that both the information about the hardware and the projects developed over time are available to all, since Arduino is an open-source hardware distributed under the terms of the Creative Commons Attribuition- Share Alike 2.5 licence. In this way, it is possible to reconstruct a clone of Arduino or create a modified version by downloading, free of charge, the electric board and the list of necessary electronic components. This opportunity has made it possible for Arduino-compatible products to be developed by small and medium-sized firms or by individual designers worldwide. It is now possible to choose from a wide range of Arduino-compatible boards. The common feature of these products, based on experimental electronics and development, is the source code and the resident library which are available according to the legal terms of a free GPLv2 licence. Due to the shared software, an Arduino community has been established which has developed programs to connect hardware to electronic objects, computers and sensors of various kinds. After years of experimentation, it is possible to make use of a vast database.

[28] The maps recount the sensations experienced during the surveys in the area of the Porta Nolana fish market. Before creating the map, files were prepared in which some of the data from the ‘sensitive survey’ [Cf. Marichela Sepe, *Il rilievo sensibile*, Franco Angeli Urbanistica, Milan 2007] contributed to defining the map of sensations. The map indicates the areas and itineraries of the market, together with objects that are present there and the sensations linked to their functional and ‘expressive’ use. Other maps also form part of the analyses carried out to plan the project, such as one that describes the objects in the area of the Porta Nolana fish market as relational devices. The cataloguing of 58 everyday objects was first carried out using individual files. Their functional and relational uses were then linked to the places of Porta Nolana in this map, from which it emerges that the practical uses and uses related to urban practices overlap and are repeated in different areas of the market. Indeed, besides its strictly functional use, the same object may be used to mark out a boundary, as a means of defence, or to indicate links.

The video, made using Adobe After Effects and Movie Maker software, is an audiovisual prototype of the information provided by Babelfish. The various displays capture the different “ready-mades”, which consist of objects in the fish market area of Porta Nolana, showing their different uses through the superimposition of images in order to describe the contents of the expressive code linked to the various communicative functions or the use of individual objects. The video therefore appears as a document of the surveys carried out and can be continuously updated by users. The software makes it possible to isolate certain frames in order to print them, or to send them via email or download them using USB ports and Bluetooth in order to store both the images and the information related to the denomination, collocation, materials and uses of individual objects.

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Hyperspectral and thermal airborne surveying for the characterization and the monitoring of natural and anthropized environment

Carmine GAMBARDELLA, Pasquale ARGENZIANO, Alessandra AVELLA
Department of Architecture and Industrial Design, Second University of Naples, Italy.
carmine.gambardella@unina2.it, pasquale.argenziano@unina2.it, alessandra.avella@unina2.it
Stefano BASTONI, Giuseppe CASBARRA, Flaviano TESSITORE
Gruppo Esplorazione Aeromarittima (GEA-GdiF) of Guardia di Finanza, Italy
Bastoni.Stefano@GdF.it, Casbarra.GiuseppeAntonio@GdF.it, Tessitore.Flaviano@GdF.it

Abstract
This paper presents the results of the research work conducted by a team of researchers and teachers of the Department of Architecture and Industrial Design "L. Vanvitelli" of the Second University of Naples (SUN), and by the staff of Gruppo Esplorazione Aeromarittima (GEA-GdiF) of Guardia di Finanza, on the airborne surveying activity aimed at the characterization of natural and anthropized environment, through the visible, thermal and hyperspectral analysis.
Airborne sensors used in aerial exploration - which are part of a broader technological assets owned by the university department - are installed on military aircrafts of GEA-GdiF as part of a supporting and technological transfer to Public Administration made by University.
Those technological professional and scientific synergies, between the University and GEA-GdiF, are outlining an experimental definition of a technical-operational Protocol on multi-dimensional Territory knowledge as an essential instrument for a deeper economic-financial investigation and its relation to the socio-urban fabric to achieve fiscal equity and social justice.
The first scientific validation of these procedures took place during of the aerial exploration of the Italian and Albanian territory (2012, July) as part of the Italy-Albania Operational Protocol.
The airborne surveying activity on territories mentioned above - aimed for the discrimination of large areas intended for the illicit cultivation of cannabis - has been a dual-purpose success: it has allowed GEA-GdiF to reassert itself as an essential institutional instrument for economic and financial governative investigations that can the underlying economic fabric and its dynamics in international settings too; and it has also allowed University to write, test and verify the technical and operational protocol, object of this paper, which enables researchers to form a digital knowledge 3D atlas of the Albanian territory where deeply analyse hyperspectral and thermal data.

Keywords: Airborne Remote Sensing, Multidensional Analysis, Hyperspectral survey, Thermal survey

1. From methodological approach to Scientific and Technical Protocol (C. Gambardella)
This paper represents the first official occasion of reading to Academia, and to Public, the multiannual team work, conducted in collaboration between the Department of Architecture and Industrial Design "Luigi Vanvitelli," and the GEA - Guardia di Finanza, on the concrete actions prevention of the degradation of the landscape, the city and Territory, tangible manifestation of a deeper social decay.
Thanks to the synergy between Knowledge and Laboratories of the University and the great institution of Guardia di Finanza - in which men of unimpeachable moral and high professional profile work every day - was further possible to realize the scientific and methodological innovation of Knowledge Factory, which is anchored on Eco-Geometry's intuition. In particular, it has been possible to realize concrete actions for the community in the re-establishment of the Heritage crossed from Knowledge, and available for the Public Administration to undertake the development and promotion of Environment, Land and City, with a appropriate interventions' hierarchy, no longer random.
Naples, Caserta's Province, Pompei, Molise, and recently Taranto, are emblematic cases where the absence of a synergy between institutions (Academy and Research, Public Administration, the

Business Community and State Institutions) produced a short circuit that has degraded not only the landscape but also created an unbearable squandering of public money. This research is based on the belief that, nowadays, any action to protect and enhance places cannot be separated by preparatory activities of multidimensional knowledge based on discretization and measurement of the heritage.
The currently available knowledge tools come from modern information technology, which expands the traditional notions of geometry and measurement, enabling a multidimensional representation, in which every element, tangible and intangible, has a represented dimension. The methodological support to this cognitive action comes from Eco-geometry, intended as a technological echo of reality, a model in which it is possible to measure all the components and relationships between the tangible and intangible assets, with the territory resulting as a constantly evolving, dynamic entity.



Fig. 1: Airborne digital sensors for multidimensional surveying. (C.Gambardella 2012)


Fig. 2: Airborne digital sensors: from left to right, Itres TABI-320 and CASI-1500, ready for remote sensing missions; Leica ADS40 during installation tests.

The Eco-Geometric approach therefore makes it possible to “measure the whole”, i.e. to recognise the basic characteristics of local identity through the reading of the long-term signs that relate to the environmental systems, ecological networks, watersheds, coastal systems, historic landscapes, settlement and production types, agricultural fabrics, socio-cultural models, and so on. In other words, all the features whose loss or degradation could undermine the sustainability of development, which must be based on the assumption of these assets as resources, declined as a profit and loss account.
The multidimensional representation is, at the same time a project of what has already been made and what is to be made, in the sense that it includes all the dimensions of the knowledge of an object already contained in the prediction of possible changes, proposing future scenarios. It is therefore the most effective means not only to analyse a territory, but also to plan its management by defining a hierarchy of interventions for sustainable development.



Fig. 3: The Ministers Mr. Francesco Profumo (Ministry of University and Scientific Research) and Mr. Renato Balduzzi (Ministry of Health) visit the stand of Benecon/Guardia di Finanza, during the "Forum della Pubblica Amministrazione" (Roma 2012).

This research and the Scientific and Technical Protocol proposed (still in testing phase and verification) want to be a stem cell that, just because coming from the integrated knowledge of the genetic heritage and identity of places, can modify and create development, through working with Art and restoring quality of life to citizens.
The first scientific validation of these procedures took place during of the aerial exploration of the Italian and Albanian territory (2012, July), as part of the Italy-Albania Operational Protocol.
In particular, the aerial exploration over Albanian territory - aimed at discrimination of large areas intended for illicit cultivation of cannabis - was anchored on two fundamental values: the first is human, that is, the establishment of a surveying team involving university researchers along with military Officers and NCOs; and the second is technology, an innovative platform that is composed of hyperspectral and thermal sensors (Itres CASI-1500 and TABI-320), on GEA's aircraft; and GNSS permanent stations by TOPCON, positioned on the roof of our Laboratory in Tirana.
While the working group was immediately characterized by common passions and precise objectives; the research has been directed first to the identification of appropriate technologies - the aforementioned sensors - particularly interesting, because they allow you to discretize the characteristics of natural and artificial materials on the ground, from high-altitude flight.
In this research, therefore, the discretization of the spectral signature assumes centrality, as reflectivity characteristic of each material (natural or artificial), in function of incident radiation wavelength, in comparable environmental conditions. Being able to isolate the spectral signature of a material means, in other words, to know his fingerprint, an element that clearly identiffy it. Being able to isolate the spectral signature of a material means, in other words, know your fingerprint and then identify it with scientific objectivity. Just as was done for Albanian and Italian plantations and for polluted materials in various Italian scenarios.
Scientific research in these topics continues inexorably towards of continuous verification of scientific protocol proposed, and the realization of desirable multitasking aircraft of GdiF-Benecon that will fit out Lidar, photogrammetric, hyperspectral, thermal and SAR sensors.

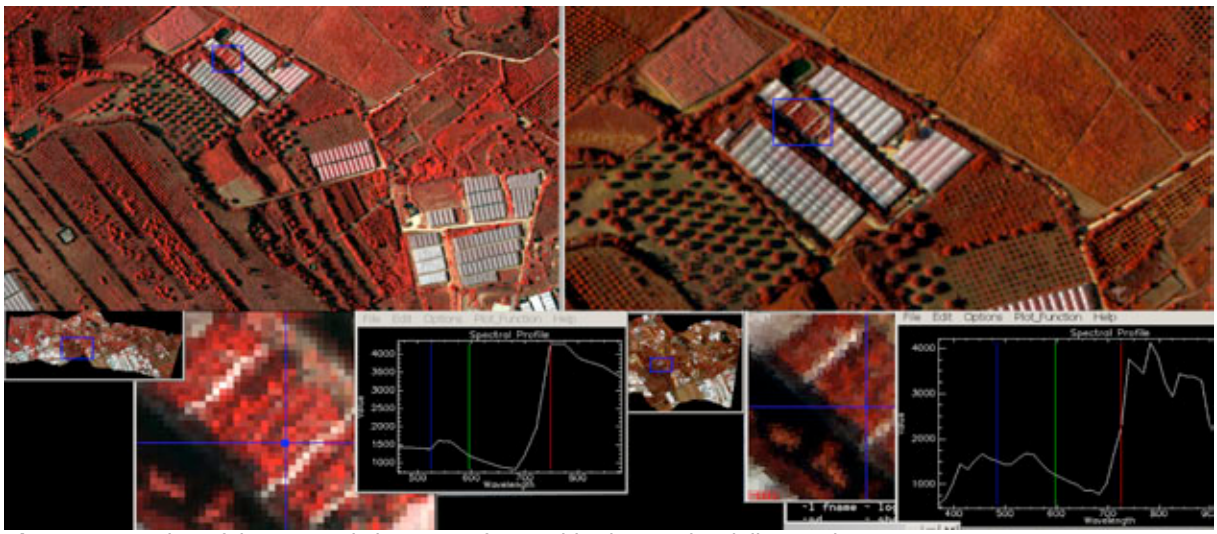


Fig. 4: Processing of the spectral signature of cannabis. (C.Gambardella 2012).

2. Geo-intelligence as new frontier for an effective economic and financial police activity (S. Bastoni, G. Casbarra, F. Tessitore)

On the 19th July 2007, in the city of Tirana was signed an agreement between the Italian Government and the Albanian Government in order to strength the cooperation between these two countries against racquet and especially against international drug trafficking and illegal immigration.
On May 16th 2012, in Tirana again, was signed an Operational Protocol between The Public Security Department of the Italian Home Office and the Central Department of the National Police of Albania.
Among all the activities considered in the protocol, particular importance is attributed to the opposition to the massive production of cannabis and the racquet connected with it. The production cycle of the Balkan marijuana starts with the cultivation of the plantations and ends with the marketing of this drug in Italy and in Europe through our ports and coasts.



Fig. 1: Piaggio P180, Piaggio P166/DP1, ATR 42MP.

Before starting the operation the Headquarter of Guardia di Finanza – Centre of Operation with Operation Department of Criminal Police of the Home Office-International Cooperation Police Service, examined all the aspects connected to the kind of support they could give to the Albanian authorities, considering all the risks and the best operative approach.
Previous experiences in checking the Albanian territory made by helicopters have given safety problems, some shots of Kalashnikov were fired against them from the ground. Luckily they failed their targets but these incidents created a particular attention on the " risk factor" in flying low over the Balkan territory.
In 2012, there was a big novelty in the Operative Protocol, the use of the airplane with airborne remote sensing in order to research and identify cannabis plantations. It quickly demonstrated its efficacy on the Albanian territory : both for safety in research operations and for the innovative scientific results it gave.
When the new operative Protocol was signed, the Operative (Air and Sea) Aeronavale Headquarter of Guardia di Finanza and its planes were directly involved, in particular the airplanes of the Gruppo Esplorazione Aeromarittima, with their equipment of hyper-spectral sensors CASI 1500 and thermic sensors TABI320.All this was possible thanks to the installation on Guardia di Finanza planes of the university devices for remote sensoring. The cooperation of two different and quite distant organizations gave unexpected results. Guardia di Finanza and the Centro Regionale di Competenza BENECON S.C.aR.L. established in the Second University of Naples (SUN), signed together the Operative Protocol with the Albanian, on the 21st May 2011.
The operative-scientific partnership between Guardia di Finanza and the research centre Benecom allows to create high resolution thematic geo referred cartography, very useful in the research of cannabis plantations.



Fig. 2: Four preliminary phases to the first flight of remote sensing: the electromagnetic test in an anechoic room, 3D point cloud model of the aircraft, the sensors calibration, the improvement of the installation components.

In 2012 a mixed team of members of Guardia di Finanza and scientific researchers of Benecom started working together in Albania. The operative target of this international mission was to focus on the research of the wide, hidden and often unreachable cannabis plantations whose massive production represents a big threat for the European social and economic order.
Cannabis is the most popular drug in the world : genetic studies have produced easy-fitting seeds for every latitude. They give strong plants and abundant harvest. A U.N. survey states that 1/3 of the terrestrial surface is suitable to the cannabis production: a plant grown outdoor in good conditions can guarantee to the producer about 700 or 1000 grams of drugs. So it is easy to understand the reasons why criminal organizations have started a very thick net made of thousands of small growers regularly involved with the supply of their crops.
According to the annual report of the United Nations Office on Drugs and Crime (UNODC) of 2008 the production and the consumption of cannabis , which is grown in 172 of the 198 countries and territories for which the UNODC obtained information, attracted close to 160 million customers annually. The cultivation of cannabis herb is still concentrated in North America and Africa but nowadays something is changing and the Balkan area, Albania specifically, is among the 5 biggest areas of production in the world.
The mission in Albania took place in July 2012 with the support of Interpol and Guardia di Finanza with the researchers of the CRDC Benecom. The Ambassador of Italy in Tirana, Massimo Gaiani, really appreciated this experiment of international cooperation and the synergy between the university and the public institutions. In this mission there were pilots, technicians, flight engineers and university researchers working in Tirana, in a lab made on purpose where all the data collected by the sensors, placed on the plane, were processed, decoded and evaluated.
The activity of airborne survey was addressed to those areas of the Albanian territory particularly suitable to the illicit plantations of cannabis. These areas are usually far from towns and villages and they are hubs of criminal organizations. In particular the prefectures of Shkoder, Gjirokaster and Vlore were scanned.

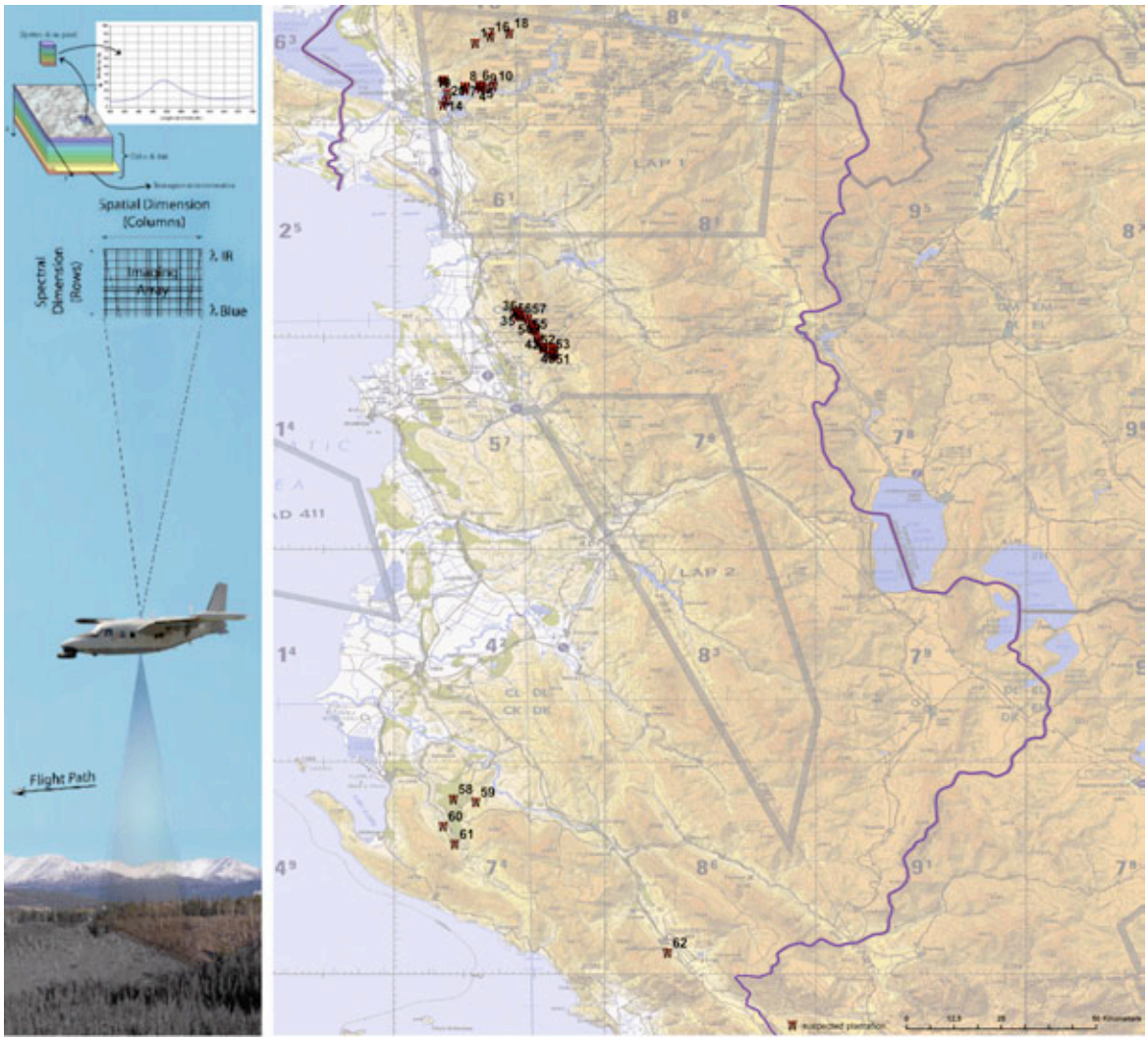


Fig. 3-4: Example graphic of hyperspectral scanning; cartography of cannabis plantations.



Fig. 4: Summary graph of a remote sensing flight, and mapping of cannabis plantations (red stars).

The aircraft P166 DP1 flew 16 missions and with the post processing of its data it was possible to locate 62 plantations for more than 403.530 square meters. The CRdC Benecom kept processing data in its labs in Italy and it identified other 193 areas of possible cannabis plantations. At the end of the mission 255 plantations were been identified for about 403.530 square meters.
This experience was totally new, there weren't other previous experiments of this kind. For this reason it can be considered immediately a "best practice".
Planning was of relevant importance. Everything was new and needed to be organized, studied, considered and evaluated. Our aim was, above all, to create a technical-scientific protocol reusable in other operative missions.
Great difficulties came from the huge amount of data collected by the sensors on which it was necessary to operate a regular post processing work. All these analysis were something absolutely new for a team made of university researchers and Guardia di Finanza members involved in an international partnership of police activity.
After the conclusion of the Albanian mission, on July 20th 2012 , the local police made a raid with their special units, called Delta Forces. It was widely successful . They could go directly to the target finding in the pointed out sites plantations of about one thousand plants taller than 2.00 meters ready to be harvested. Albanian mass media gave important relevance to the monitoring activity made by the Italian group of work of Guardia di Finanza and University researchers. Above all they appreciated the usage of the aircraft both for safety and for effectiveness.
The Albanian kept using our data in the schedule of their activities and from their reports the success of our work is clearly confirmed. The percentage of cannabis in the pointed out areas was almost equal to 100%.
This important operative result shows the high quality of the level of competences that Guardia di Finanza has achieved in the rather new field of air remote sensing, becoming an international benchmark against drug trafficking and crimes against the worldwide community.
Airborne survey missions in Albania were excellent examples of effective synergies of different and complex abilities and skills of public authorities and national and international headquarters.
This experience enhanced the added value of the union of different skills and abilities. In only 17 days we got results far more effective than we could hope and it gave us the possibility to learn and improve our knowledge about airborne remote sensing.
In the late years the remote sensing, above all in the scientific research, is using satellites. Satellite remote sensing, however, has some limits when you need very deep, precise and geo-referred scans useful immediately in gathering evidences before criminal trials.

Airborne remote sensing, in the thermal or hyper-spectral field, on the other hand, can produce more precise data and the activity of sensing itself is more adaptable to the different requests and needs of detective work against any kind of illegal activities.
The hyper-spectral technique is the real novelty of the activity of geo-information: the creation of a specific algorithm associable to a specific material or plant, such as the asbestos or the cannabis would be the best result in the scientific and investigative field, giving the possibility of locating and analyzing data in real time.
CRdC BENECON gave to Guardia di Finanza, for the first experience in Albania, a hyper-spectral sensor CASI 1500 and a thermal sensor TABI 320. Now they have added other two sensors :laser scanner ALS50II e the aero photogrammetric digital camera ADS 40.
The installment of these other two devices has been processing by the technicians and it will give the possibility of scanning the territory in 3 D, opening new horizons of police actions against unlawful building and illegal activities in general.
Nowadays the Airborne Remote Sensing represents for Guardia di Finanza the opprtunity of widening its operative context, going beyond drug trafficking and clandestine immigration research
The usage of the geo intelligence can become the source and the preferential means for a systematic opposition to unlawful building and ghost buildings.
Scanning the urban territories will be a means of fundamental contrast against the criminal organizations and on their strong control on the territory as an alternative to the state power.
This systematic and precise scanning of the National areas will create a territorial data base useful for the investigation activity of Guardia di Finanza.
The creation of the 3D thematic cartography is the starting point for the improvement of an information data base, essential for the daily investigative activities of Guardia di Finanza and of all the other police Organizations.
We are sure that the key words for the future of the techniques of national and international investigations are: geo referred cartographic data base. With these information the geo-intelligence will open new frontiers for an effective economic and financial police activity.
In 2013 the operative protocol with the Albanian Republic has been renewed .Guardia di Finanza with the aircrafts of the Gruppo di Esplorazione Aeromarittima equipped with the Benecon sensors is going back to Albania to continue his work for legality.



Fig. 5: A cannabis plantation, hidden by the surrounding vegetation, but clearly visible from above.

3. The hyperspectral and thermal survey of the territory: from three-dimensional representation to the multidimensional modelling. (A. Avella)

Aerial exploration aimed at the acquisition data to be used for the visible, thermal and hyperspectral representation of the territory is planned in relation to the object of the survey as well as the morphological and connotative characteristics of the area under study.

An airborne hyperspectral and thermal survey of the selected territory, carried out by means of the Itres CASI 1500 (Compact Airborne Spectrographic Imager) and of the Itres TABI 320 (Thermal Airborne Broadband Imager) sensors, capable of recording the electromagnetic response of the naturalistic and anthropomorphized environment, produces data that, after having been appropriately processed, contribute to the implementation of a technological platform, the results of all analyses carried out in the area under study are integrated in. This geo-referenced information system, capable of organically handling the multidimensionality of the environment, is an open and dynamic system of knowledge of the 'land patrimony' under study.

In the planning phase of the process of airborne surveying the first action is to find and systematise the numerical maps or in raster form (to be digitally edited), official orthophotos and three-dimensional models as well as of every certified geodetic reference of the territory under investigation, in order to "structure" the geographical data base upon which to articulate the planned airborne acquisitions and subsequently analyse, diachronically, the recorded data. The anthropogenic and natural processes that are layered progressively over a territory can be rebuilt and documented through the integration of data from direct investigations as well as the subsequent critical comparison with the cartographic material acquired and examined. The diachronic reading of the cartographic sources found, custodians of a precious archive of signs, therefore makes it possible to reconstruct the history of these places, interpret the territory that is modelled over time as well as understand the evolutionary processes that give the area studied a particular aspect.

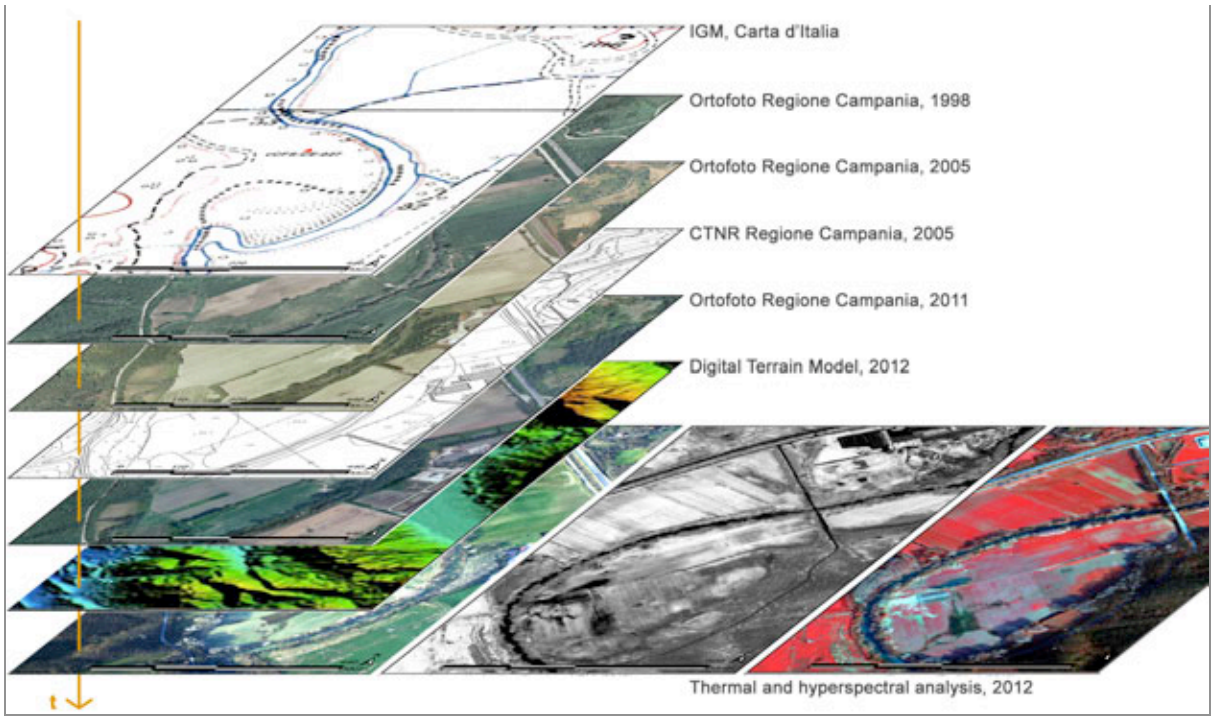


Fig. 1: Diachronic reading of the cartographic documents retrieved and thematic maps produced as a result of the hyperspectral and thermal scanning (A. Avella, 2013).

Official digital maps and models – useful in documenting a flown over area which falls in Italian territory – are published by the Military Geographic Institute, the Land Registry and the Navy Hydrographic Institute, that, since 1960, carry out the functions of cartographic organizations of the State. Even the Regions, Provinces and Municipalities are highly active in the production of cartography, especially at large scales (very detailed scales). Official numerical maps or rasters are available throughout the country at different scales, providing a representation of the territory adapted to different types of investigation.

For remote-sensing activities, carried out in order to guide the planning, management and monitoring of the national territory in question, as part of the wide range of cartographic material available – maps

at a scale of 1:25000 were acquired, produced by IGM as well as numerical and ortophoto versions at a scale of 1:5000 from the National Technical Map, which efficiently represent the forms the ground.
For a proper planning of airborne surveying activity, it is essential to have in addition to the digital cartographic documentation described above, archived according to mapping plane element coordinates in UTM-ED50 in relation to the area, also a digital terrain model (DTM or also called DEM, Digital Elevation Model) or LIDAR data.
The experience gained on national and international territories by a survey team which includes university researchers, as well as the author, along with military officers and pilots, on board operators and technicians of the GdiF, highlight the need to systematise the digital maps and three-dimensional models in order to build the cartographic base of a Geographical Information System, structured 'ad hoc' to accommodate the survey data to be integrated and compared with those of the archives. In fact, the GIS is the technological platform which contains the thematic maps produced as a result of the interpretation critical of the surveys performed with hyperspectral and heat sensors, making them easy to read and highlight the spatial interrelations of the n themes elaborated with others phenomena mapped on the geographic database, including aerial and/or satellite images.
It should therefore be noted that the airborne sensor platforms, tested by the scientific-technical survey team mentioned above, does not replace the satellite sensors but increases the definition of the resolution of the ground images, and through the particular configuration designed, multiply the combination of data by providing precise information for the study of the evolution of the building work, unauthorized too, as well as for the study of the phenomena of degradation and pollution of the land, landfills, rivers and coastlines. Satellite images (which are transmitted on the Earth in raster form), or aerial photographs, scanned and entered into a geographic database, are corrected with an orthoprojection of the image, placing, in addition to information on the shooting mode (altitude, focal, or orbit, etc.), the digital terrain model that gives three-dimensionality to the GIS and makes it possible to correct those planimetric displacements that are due to the surveying. In addition to the contour lines and the digital model of a square matrix (DTM or DSM) of the area under study, other digital models may be useful to process the data acquired. One of the most popular models is the triangular mesh models (TIN, Triangulated Irregular Network) that are semi-automatically obtained with digital restitutions.
The copious official cartographic sources available on the Italian territory have made it possible to structure a geographic database of "'support" to the activities of airborne hyperspectral and thermal surveying carried out on national territory by the University in collaboration with the GdiF aimed at monitoring the environment. The air mission in Albanian territory (July 2012) was a lot less fortunate. Carried out as part of the Operational Protocol Italy - Albania, between the Department of Public Security of the Ministry of Internal Affairs of the Italian Republic and the Directorate General of the State Police of the Republic of Albania, it aimed to discover large areas intended for the illicit cultivation of cannabis. During the planned hyperspectral and thermal remote sensing of the Albanian territory, it was possible to validate the scientific procedures of the technical-scientific protocol that is the subject of this paper, with it being necessary to deal with the difficulty of finding and systematising of digital maps and models of the territory flown over through traditional institutional and private channels. These difficulties were resolved thanks to the acquisition of cartographic material provided by the CIGA (Aeronautical Geotopographic Information Centre) of the Italian Air Force, listed in the table below.

Map Reference	Year of publication	Representation scale	Resolution
National Geospatial-Intelligence Agency, CADRG Coverage of ONCTPC05	Marzo 2010	1:500000	1 metro
Italian Air Force - Centro Informazioni Geotopografiche Aeronautiche, CADRG Coverage of 5NINM3134	Aprile 2012	1:500000	1 metro
National Imagery and Mapping Agency, CADRG Coverage of the Balkans (TLM-50s)	Novembre 2002	1:50000	5 metri
National Imagery and Mapping Agency, CIB (Controlled Image Base)_Albania	Luglio 1998	1:5000	1 metro
National Geospatial-Intelligence Agency Digital Aeronautical Flight Information File	Maggio 2012	1:5000	1 metro
National Geospatial-Intelligence Agency, SRTM DTED Balkans	2012	-	1 metro

Fig. 2: Cartographic database organized for the aerial exploration in Albanian territory, July 2012.

In addition, the comparison with the military authorities of the IGM and the CIGA, as well as the Albanians, highlighted that the geodetic network IGMGPS95 on the Albanian territory - materialized by the Italian Institute – has not been working for some time, and that the acquired mapping archive

produced only for the main urban centre of the territory, has such little reliable specificity (insufficient scale of representation, partial coverage, etc…) as to exclude the possibility of taking it into consideration when structuring the geographic database to support the investigations carried out.
The definition of the geographic database, specially structured in order to carry out the air missions both on the Italian and Albanian territories, followed by the location on the military maps of the areas of greatest interest for the purpose of the inquiry and the identification of the Permanent GNSS Station (Global Navigation Satellite System) next to the study area, or, in the absence of a Permanent Station, the materialization of an 'ad hoc' Station.
It should be noted that the registration of the GPS data during remote sensing flights is fundamental and indispensable for the success of the missions, equal to the efficiency of the aircraft and the aerial, geometrical-inertial and photographic, sensors.
In the case of the missions carried out on the Italian territory, it was possible to geo-reference the surveys by acquiring the differential corrections from the nearest GNSS Permanent Station to the area flown over with a recording per second from the satellite navigation data from the takeoff to landing of the aircraft.
In the case of the mission on Albanian territory, however, in the absence of a network of GNSS permanent stations, either working or next to areas flown over, two GPS stations were set up so as to record the satellite navigation data synchronously to the remote sensing activities. The Benecon researchers, on a mission in Tirana, continuously checked the GPS Base Station installed for this purpose and materialized with a pair of Trimble R5700 antennas/receivers.
The inertial (IMU) and GPS antenna unit, which combined, recorded in real time the structure and location of the aircraft during the remote sensing flight provided data that properly processed returned the route taken by the plane and its geo-referenced disposition so that the thermal and hyperspectral images could be corrected automatically and geometrically related to the area surveyed.
When the variations in terrain height is considerable, to perform the geometric correction of the thermal and hyperspectral image data is equally necessary the digital terrain model (DTM) in appropriate representation scale. Ultimately, the positional accuracy of a geocoded or orthorectified CASI and TABI dataset is dependent on the following factors: the quality and precision of the attitude data, the quality and precision of the position data (X, Y, Z coordinates), the quality and scale of the DEM, the ruggedness of the terrain, the use of a bundle adjustment procedure to correct for linear and angular misalignments in the installed sensors (IMU, GPS, and CASI/TABI sensor head).

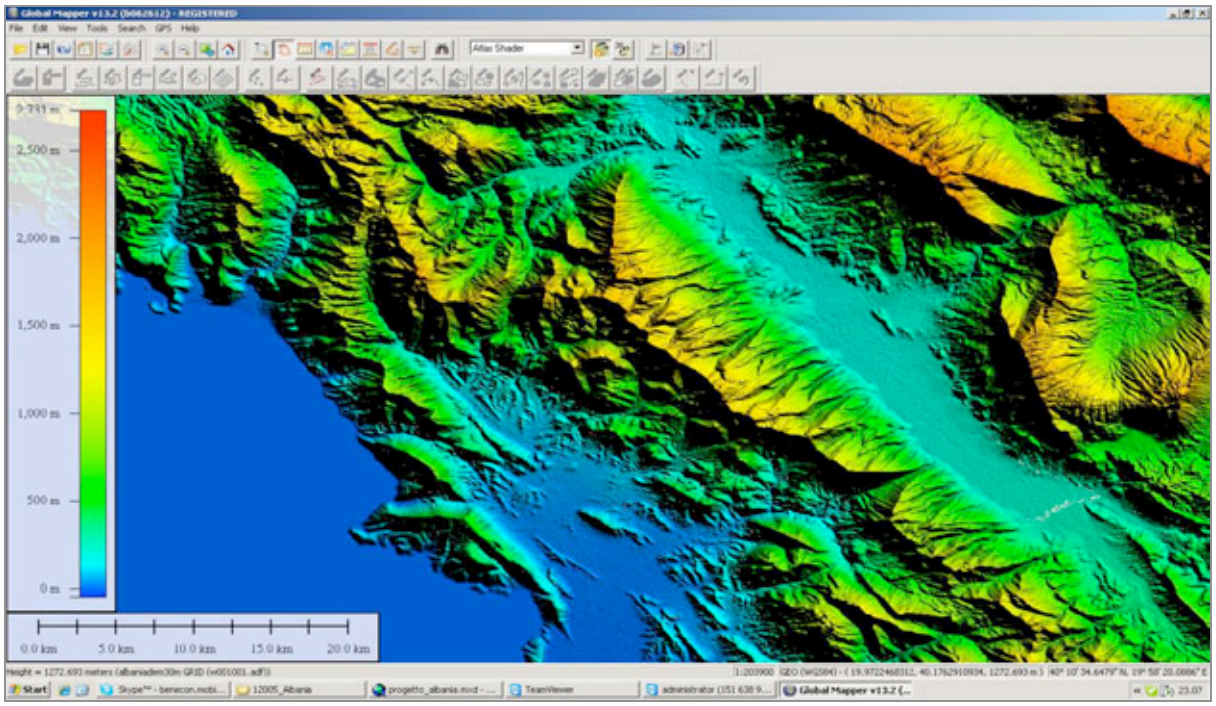


Fig. 3: Digital Terrain Model (National Imagery and Mapping Agency, 2002), Albania.

Using data from the POS-AVTM IMU, dual frequency GPS (differentially corrected), a good quality DEM, and performing a bundle adjustment in the orthocorrection of CASI and TABI image data, is possible to operationally attain output positional accuracies on the order of 1 pixel RMS (to 1 sigma) for 1 m resolution CASI and TABI data acquired.

It should be noted that the GPS antenna, establishing the geospatial position of data recorded during the airborne surveying activity, and the inertial system (IMU, Inertial Measurement Unit) for controlling the attitude of the aircraft, installed on board the military aircraft 'Grifo 10 P166-DP1' of GdiF in occasion of aerial exploration mentioned above, have a geometric configuration that is rigid and integral not only to the aircraft on which they are installed, but also in relation to the hyperspectral and thermal sensors that make up the platform. In particular, the GPS antenna is installed in the cabin of the aircraft so as to perform a reading of the satellite navigation data without interruption, even in case of not completely horizontal attitude assumed by the aircraft during the scanning phase and / or during phase alignment to 'runline' scan calculated and designed on the map. The IMU, also installed on the aircraft, describe any change in orientation of the aircraft with respect to the planned flight line in terms of the following three quantities (Euler angles): roll, pitch and yaw. When a precision geocorrection system such as the POS-AVTM is used, small physical offsets (both linear and angular) are present between the installed location of the CASI sensor head, TABI sensor head, GPS antenna, and IMU. The result is that each of these devices (each providing one of the data streams necessary for geocorrection) senses its environment from slightly different positions in 3D space. These small differences can lead to increased positional errors when blended together. To measure these offsets, a photogrammetric bundle adjustment procedure is run after each new instrument installation.
In this regard, it is worth noting that the geometric configuration of the sensors on board the platform components - GPS, IMU, CASI, TABI – prior to being installed must be subjected to specific protocols in order to achieve military aircraft certification.

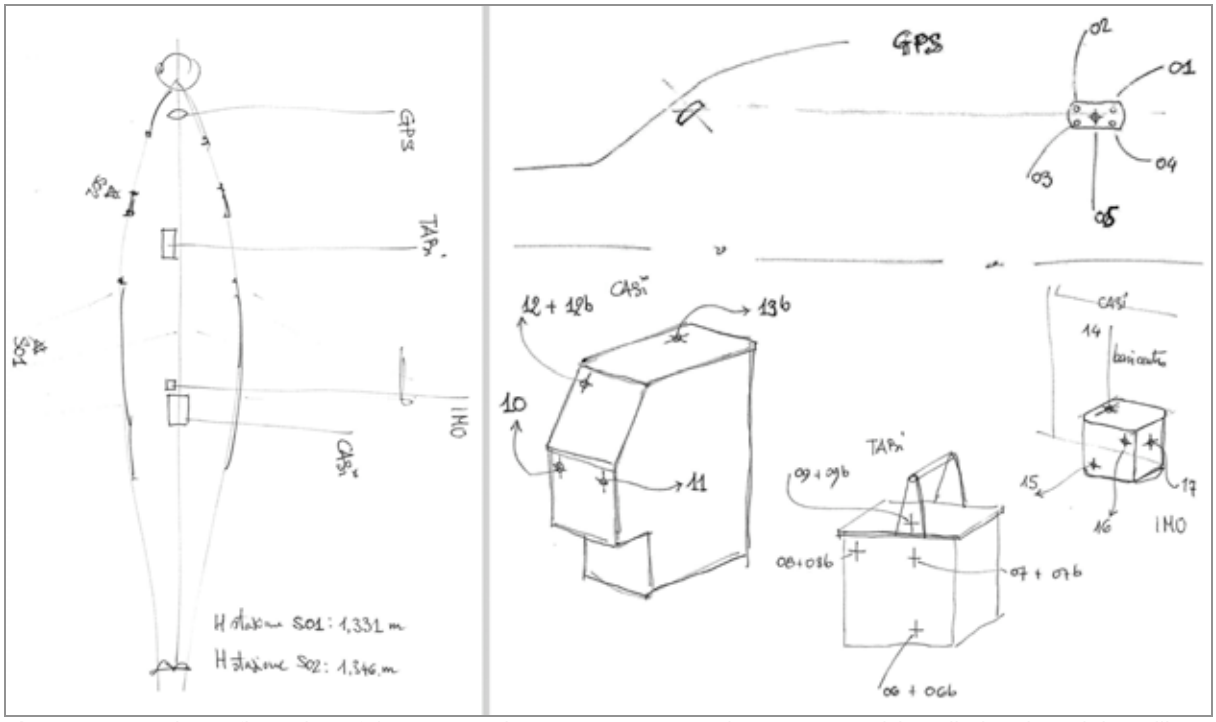


Fig. 4: Geometric configuration of the sensors (GPS, IMU, CASI and TABI sensors) installed on board the military aircraft 'Grifo 10 P166-DP1' of the GdiF, sketch (A. Avella 2012).

To measure the relative distance (offset) between the digital sensors installed on the 'Grifo 10 P166-DP1' and apply the bundle adjustment procedures, the researchers carried out the surveying with a Total Station type Trimble VX. During the data acquisition, the researchers had to face real time difficulties. On the one hand, the specific technical characteristics of the Total Station used that prevented the sensor from measuring distances less than 1.5 m, while, on the other, the difficulties linked to the limited spatial dimensions of the cabin of the aircraft in which the sensors are allocated. The introduction of a topographical Station on board the aircraft was solved by acquiring the points to be measured – according to standard procedures with readings conjugated places back and forth with respect to the reference station point - fixing two stations outside of the aircraft, planning and realizing in real-time in conjunction with the aeronautical technicians of the GdiF, a supporting the head of the topographic sensor, thus replacing the traditional tripod, ensuring high stability and at the same time reducing the space needed to operate within the aircraft.



Fig. 5: Topographic survey by Total Station type Trimble VX in order to measure physical offsets between the sensors installed on board the aircraft.
Support of the Total Station VX designed by university researchers and built by aeronautical engineers of GdiF.

A three-dimensional model of the spatial arrangement of the on board sensors was obtained from the topographic data, making it possible to carry out high-precision calculations of the relative distances between the sensors installed and re-enter the offset into the software.

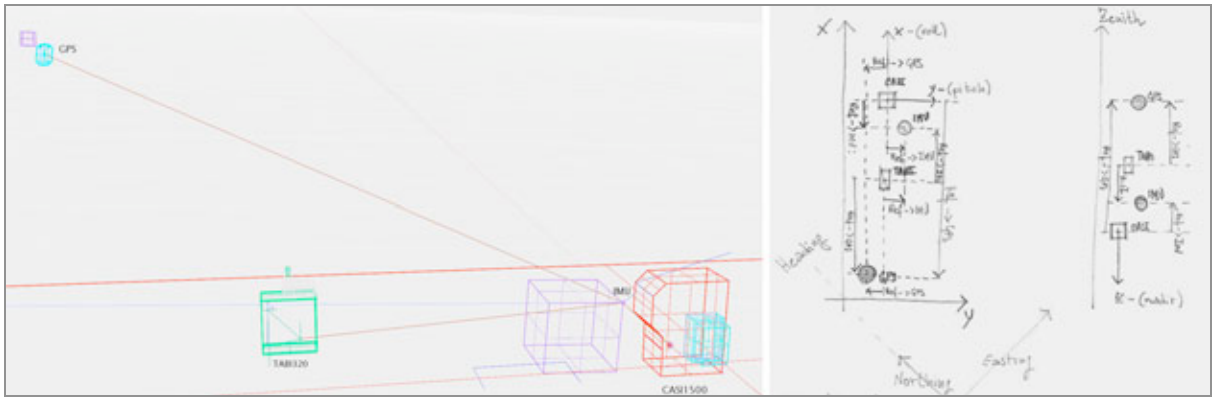


Fig. 6: Three-dimensional model of the spatial arrangement of the sensors on board the aircraft. Measurement of the offsets between the sensors installed on board the aircraft, sketch (A. Avella, 2012).

In the preparing of the hyperspectral and thermal remote sensing, the planning of the flight over the area under study takes into account the orography, the average altitude and exposure of the soil under investigation. These parameters are functional to the correct definition of the digital hyperspectral and thermal scanning images. In particular, for the determination of the spectral bands of acquisition and the writing of the configuration file, it is necessary to emphasize that the hyperspectral sensor Itres CASI1500 passively records the radiation emitted by the land below in specific segments of the light spectrum (hyperspectral with 288 channel, ranging from the visible to the infrared), while the thermal sensor Itres TABI 320 records the radiation emitted by the area below the thermal infrared spectrum (surface temperatures in a range from -20 ° C to 60 ° C).

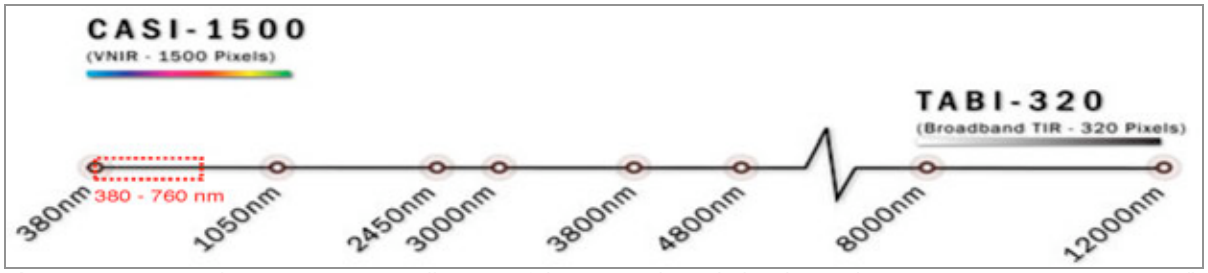
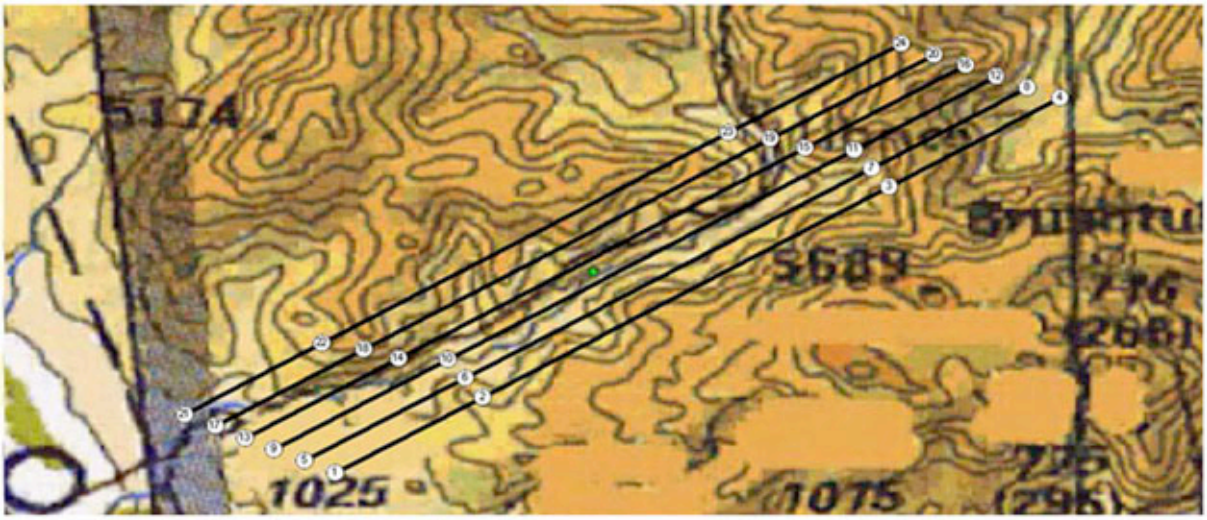


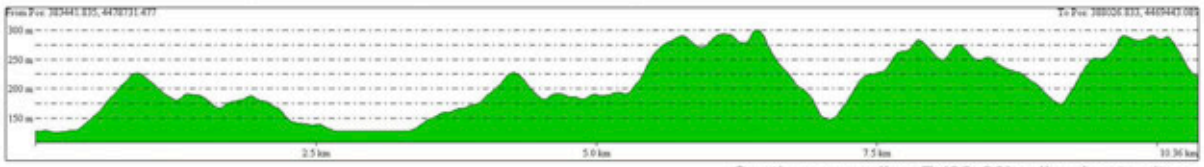
Fig. 7: CASI1500 and TABI320 sensors, diagram of the spectral resolution (see: The CASI1500 Instrument Manual)

During CASI 1500 operation, all 1474 light-sensitive spatial columns and 288 spectral rows of the CCD imaging area collect spatial and spectral information about the scene. However, it takes a lot of processing power to read out and record all this data. Longer processing times result in longer integration times, which are not always desirable. To manage this data volume, three modes are used: Spatial Mode (operational use), Spectral Mode (operational use) or Full-frame Mode.
Each mode is used to optimize the acquisition of the data in a particular manner. The mode that is chosen is dependent on the project data requirements. Spatial mode is typically chosen when high spatial pixel resolution data or spectral programmability is desired. Because a smaller spectral subset is acquired (though at full spatial resolution), integration times in spatial mode are typically shorter than in spectral mode.
The hyperspectral configuration (Spectral mode) of the CASI is useful when detailed spectra is needed, and reduced across-track spatial coverage is acceptable. In particular, spectral mode is well suited to identifying the spectral signature of a target that is not well quantified.
The flight planning also requires the calculation of the medium resolution of the scan, the speed of the aircraft in acquisition, the flight altitude and the areal coverage of the scans. These parameters can be determined by the relationships between them. For example, the along-track spatial resolution of the acquired data is dependent on both integration time (IT) and aircraft speed. The integration time is clearly dependent on the instrument's configuration. The more spectral and/or spatial information that the system must readout during a given integration time, the longer this interval must be.
Therefore, the selected the capture mode and established, as a result, the integration time is possible to calculate the other parameters of flight. The pixel size (which determines the spatial resolution of the data) refers to the projected spatial extent of an individual pixel on the ground; in other words, its ground 'footprint'. The chosen resolution is usually dictated by the requirements of the project. For instance, if ground features are to differentiated on the basis of their spectral characteristics alone, this may dictate that a finer spatial resolution is used (meaning that the ground 'footprint' of a single pixel is smaller, resulting in less spectral mixing). Spatial resolution is measured in two dimensions (along-track and across-track), both which are measured with reference to the aircraft's flight direction. Both dimensions are independent of one another, and may differ based on such factors as the chosen flying speed, integration time, and lens field of view. In fact, the along-track resolution of an image pixel is a function of the aircraft (or other platform) ground speed (S) and the chosen integration time (IT). The variable 'S' (typically a value between ~80 and 180 knots) will depend on the chosen aircraft.
In this regard it should be noted that the aircraft 'Grifo 10 P166-DP1' of GdiF, on which sensors are installed, on the occasion of aerial exploration on Italian and Albanian territory has had a steady flight speed of about 110 knots.
The across-track pixel resolution, however, can be easily calculated using simple trigonometry, because this value is a function of the field of view (FOV) of the instrument lens (of 0.028° along-track and a maximum of 40.4° across-track) and the flying height above ground level (AGL).
For the thermal acquisition, the range of the chosen aircraft is important. It influences not only the time required for the data collection, but also the ferry to and from the target region and between acquisition targets. To calculate the flight parameters is necessary to remember that the pixel size (which determines the spatial resolution of the data) refers to the projected spatial extent of an individual pixel on the ground; Spatial resolution is measured in two dimensions (along-track and across-track), both which are measured with reference to the aircraft's flight direction. Both dimensions are independent of one another, and may differ based on such factors as the chosen flying speed, integration time, and lens field of view. The IT is fixed for the TABI-320 at 17 ms. This value can not be changed.
The ground resolutions achievable with the TABI-320 are based on the FOV and sensor specifications. For example, in Albania to achieve 1 meter square pixels the data should be collected at 115 knots at an altitude of 1200 feet above ground. Note that once the flying height is known, this value must be added to the average height of the terrain (measured ASL - Above Sea Level) to determine the altitude that the aircraft must fly at (ASL) to achieve the specified resolution.
After the definition of the flight parameters it follows the drawing on the map of the scan runline, that is a series of "leg" to cover along the flight according to a relative 30% overlap that depends on the orography of the site. For this, sections of the landscape are executed for each scan runline.
These have a direction as much as possible parallel to the land orography in such a way that it is possible to evaluate the flight height on each "leg" as far as the land height changes. The runline, designed to cover all the flight area, are extended for a mile so the aircraft can easily align itself in the direction reported and it can keep the speed fixed for the scan.
The flight plan ends with the draft of a timetable of the acquisition campaign, which depends on the characteristics of the sensors installed on the aircraft.



Table_coordinates_flight plan

ID start	ID end	runline	feet above ground level	notes
2	3	A	2090	
6	8	B	1420	
10	11	C	1150	la vetta 600m slm è verso il punto 9
14	15	D	1210	
18	19	E	1600	
22	23	F	1960	



Section on runline F (22-23), albanian territory.

Table_coordinates_flight plan

ID	ArcGIS Y LATITUDINE NORD *inserire le coordinate in gradi decimali*	ArcGIS X LONGITUDINE EST *inserire le coordinate in gradi decimali*	LATITUDINE NORD DD	LATITUDINE NORD MM	LATITUDINE NORD SS	LONGITUDINE EST DD	LONGITUDINE EST MM	LONGITUDINE EST SS	ID	LATITUDINE NORD	LONGITUDINE EST	ID
1	42,11069880330	19,61415853400	42	6	39,24	19	36	50,97	1	42° 6' 39,24"	19° 36' 50,97"	1
2	42,12902839900	19,64917197800	42	7	44,50	19	38	57,02	2	42° 7' 44,5"	19° 38' 57,02"	2
3	42,17915169970	19,74618481810	42	10	44,95	19	44	46,27	3	42° 10' 44,95"	19° 44' 46,27"	3
4	42,20026526210	19,78714272060	42	12	0,95	19	47	13,71	4	42° 12' 0,95"	19° 47' 13,71"	4
5	42,11372086180	19,60690089420	42	6	49,40	19	36	24,84	5	42° 6' 49,4"	19° 36' 24,84"	5
6	42,13346466400	19,64502851240	42	8	0,47	19	38	42,10	6	42° 8' 0,47"	19° 38' 42,1"	6
7	42,18359147890	19,74204468730	42	11	0,93	19	44	31,36	7	42° 11' 0,93"	19° 44' 31,36"	7
8	42,20289094160	19,77947993990	42	12	10,41	19	46	46,13	8	42° 12' 10,41"	19° 46' 46,13"	8
9	42,11654245030	19,59964261920	42	6	59,55	19	35	58,71	9	42° 6' 59,55"	19° 35' 58,71"	9
10	42,13790076770	19,64088446420	42	8	16,44	19	38	27,18	10	42° 8' 16,44"	19° 38' 27,18"	10
11	42,18803109750	19,73790397310	42	11	16,91	19	44	16,45	11	42° 11' 16,91"	19° 44' 16,45"	11
12	42,20551609970	19,77181653400	42	12	19,86	19	46	18,54	12	42° 12' 19,86"	19° 46' 18,54"	12
13	42,11924236400	19,59269561340	42	7	9,27	19	35	33,70	13	42° 7' 9,27"	19° 35' 33,7"	13
14	42,13821324660	19,62931981240	42	8	17,57	19	37	45,55	14	42° 8' 17,57"	19° 37' 45,55"	14
15	42,18835323790	19,72633041550	42	11	18,07	19	43	34,79	15	42° 11' 18,07"	19° 43' 34,79"	15
16	42,20802797510	19,76448181370	42	12	28,90	19	45	52,13	16	42° 12' 28,9"	19° 45' 52,13"	16
17	42,12201589230	19,58555743350	42	7	19,26	19	35	8,01	17	42° 7' 19,26"	19° 35' 8,01"	17
18	42,14038050220	19,62100568600	42	8	25,37	19	37	15,62	18	42° 8' 25,37"	19° 37' 15,62"	18
19	42,19052746230	19,71801281420	42	11	25,90	19	43	4,85	19	42° 11' 25,9"	19° 43' 4,85"	19
20	42,21060825780	19,75694529320	42	12	38,19	19	45	25,00	20	42° 12' 38,19"	19° 45' 25"	20
21	42,12488546390	19,57817018930	42	7	29,59	19	34	41,41	21	42° 7' 29,59"	19° 34' 41,41"	21
22	42,14187857640	19,61096506350	42	8	30,76	19	36	39,47	22	42° 8' 30,76"	19° 36' 39,47"	22
23	42,19203393790	19,70796630340	42	11	31,32	19	42	28,68	23	42° 11' 31,32"	19° 42' 28,68"	23
24	42,21327780650	19,74914585590	42	12	47,80	19	44	56,93	24	42° 12' 47,8"	19° 44' 56,93"	24

Fig. 8: Flight plan, Albania 2012 (A. Avella, 2012).

In fact, the operative flights with the hyperspectral sensor, to be efficient, need the presence of the lighting source (Sun) at the time of its maximum radiation, that is at the solar midday in which the spectral distribution of the light is close to the “White”.
On the other side, for the operative flights with the thermal sensor, the presence of the lighting and thermal source (Sun) can introduce an error connected to the reflected radiation component. For this it is better to use the sensor at the sunrise and sunset time; in such time the solar radiation is negligible respect to the infrared radiation emitted by objects.
For these peculiarities, and also for reasons connected to ground resolution, it is impossible the acquisition at the same time with the two sensors and as a consequence, for each investigation area it is necessary to plan a double acquisition campaign.
The data input (geographic coordinates and spectral configuration of the system on board) phase is followed by a phase in which hyperspectral and thermal scan is conducted and the data processing is done.

The adoption of technical-scientific protocol makes possible to handle a complex flux of data during the process from the flight for the hyperspectral and thermal acquisition to the draft data elaboration to the build up of multidimensional model.

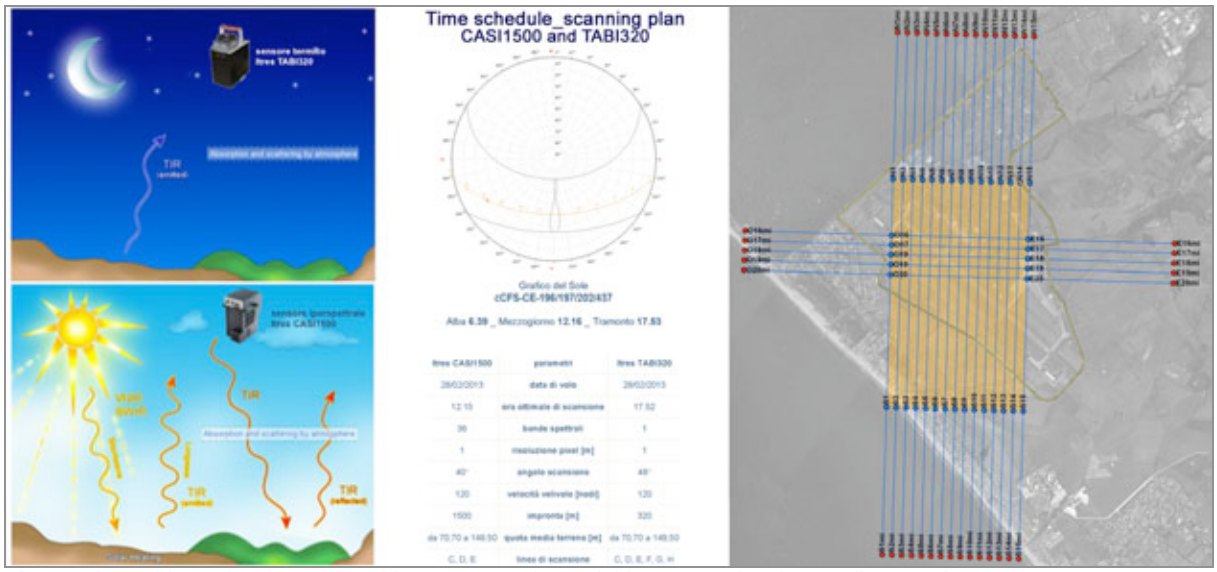


Fig. 9: Timetable of the thermal and hyperspectral acquisition campaign (A. Avella, 2012).

In conclusion, the elaborated multidimensional model is composed by several spectral layers which, classified in according to the type of survey to execute, give back thematic maps useful to handle planning and strategic monitoring actions and that are connected to the natural and anthropic investigated situation.

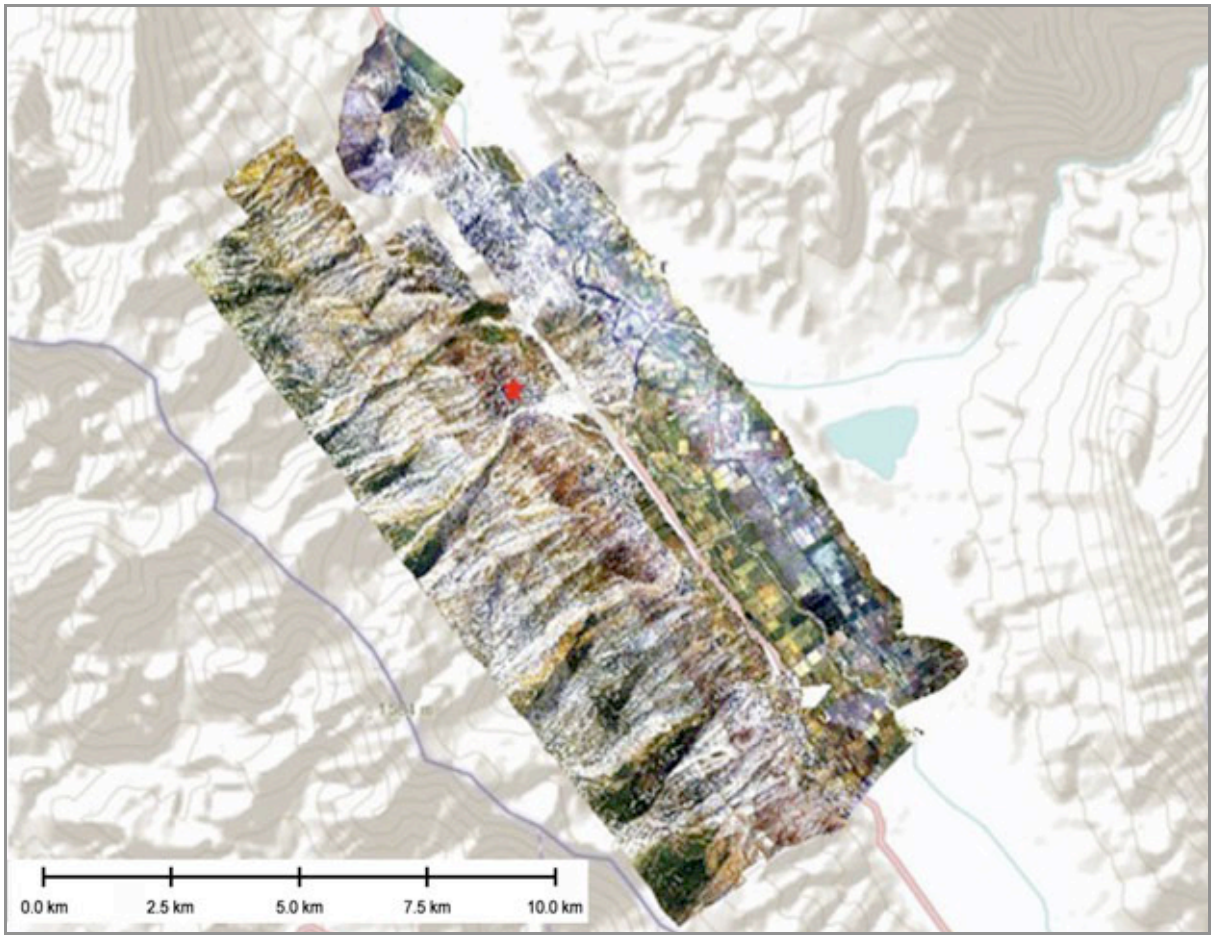


Fig. 10: Hyperspectral surveying in albanian territory (P. Argenziano and A. Avella, 2012).

4. Multidimensional mapping of the territory by hyperspectral and thermal scanning. (P. Argenziano)

In any direct or instrumental survey, analogical or digital, planning, acquisition and processing should have a role in mutual equilibrium. In other words, the strengths of the first step can propagate a positive effect on subsequent phases; and conversely, the weak points of each action can disrupt the entire process.
Airborne remote sensing's process, object of this paper, was not a simple juxtaposition of standardized actions, relating to the correct use of various sensors. It was based mainly on the establishment of a surveying team involving university researchers (including the writer) along with military Officers and NCOs (pilots, airborne operators and aeronautical technicians).
A motley crew blended by common passions, precise objectives and companion human relationship. The crew had a pivotal role in the articulate process, ensuring the balance of the trinomial planning-acquisition-processing.
If the planning phase, collaboration between pilot and researcher, to organize flight plans, may seem obvious (but it is not), the central role of the crew is exalted during the flight data acquisition.
During this phase must align a long series of procedures that involve ground staff and the on board one, as protagonist of remote sensing.

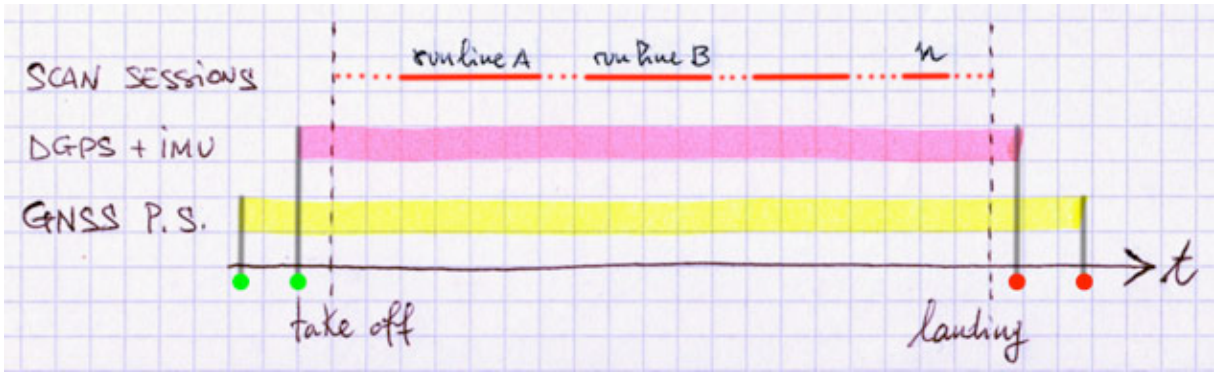


Fig. 1: Time line of key acquisitions for the remote sensing flight. (sketch by P.Argenziano 2013).

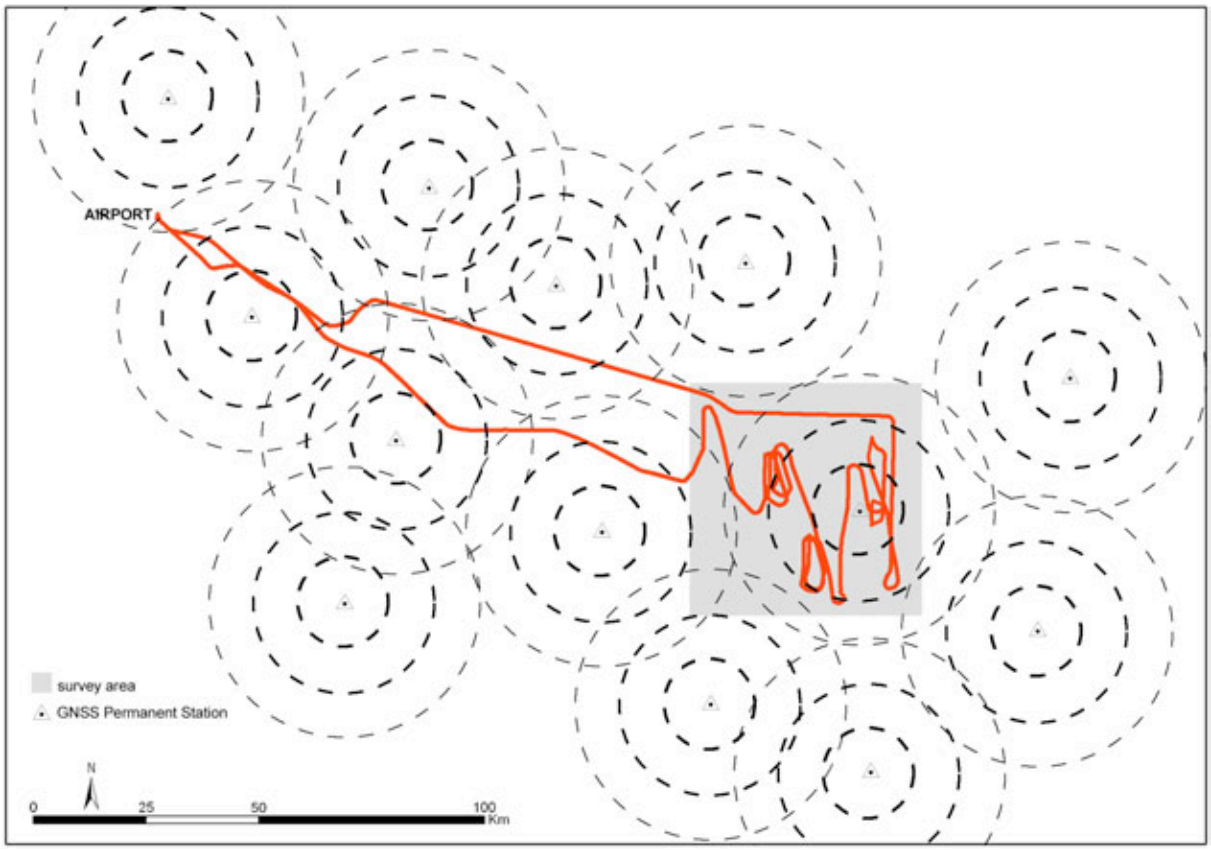


Fig. 2: GNSS permanent station coverage during a remote sensing flight. (drawn by P.Argenziano 2013).



Fig. 3: Two instants of hyperspectral acquisition phases on board.

The airplane must be in perfect working order, guaranteed by aeronautical technicians and tested by pilots. The airspace (above the study area) must be optimal for proper execution of the mission, as well as scheduled during the survey planning and guaranteed by the inspection airspace Office. The weather conditions must be appropriate to flighting, to sensors' functional characteristics and to overall aims of remote sensing mission. GNSS permanent stations, next to the airport and the area of study, must be functioning and operating in a time line that includes the remote sensing flight.
Before takeoff, the staff on board controls all sensors' functionality, ensuring that GNSS on board antenna and Inertial Motion Unit are active in a time line longer than flighting but smaller than GNSS permanent stations acquisition.
Remote sensing supervision is assigned to the operators on board (non-pilots), a military and a university researcher, as well as programmed in the navigation files, and in hyperspectral and thermal setting files. The operators are also required to perform effectively hyperspectral and thermal scans - operating on dedicated computers - when the plane flies over the study area, according to planned runlines. Each flight and acquisition phase is recorded automatically in log files of each sensor; while this effect shall be made on special forms by the two operators, for verification.

Project: calibrazione 13001_CaveCE	**Sensor: TABI320** - FILE Default.ccf	**Weather Conditions:** visibilità 8 km - vento 0°/0kts copertura SKC
Date: 28/02/2013	**Air. T° 11°C - STRISCE S-N**	
T. Take Off: 17.00Z	**Landing T.: 20:00Z**	
Acc. POSAV: 16.55Z	**Speg. POSAV: 20.05Z**	

#Flt	Line In	start T	Ending T	Gs	Alt	Heading	Aperture	IT	Varie
A 2-3	17.59.24	18.00.12	18.00.45	122	1470	360°	Opened	17	S-N Degradata
C 10-11	18.07.19	18.08.10	18.08.59	124	1368	335°	Opened	17	S-N
D 14-15	18.12.56	18.13.37	18.14.25	125	1450	353°	Opened	17	S-N
E 18-19	18.18.57	18.19.50	18.20.35	122	1440	360°	Opened	17	S-N
F 22-23	18.24.38	18.25.36	18.26.25	121	1430	355°	Opened	17	S-N
G 26-27	18.30.18	18.31.11	18.31.46	120	1500	353°	Opened	17	S-N
H 30-31	18.35.21	18.36.13	18.36.45	119	1550	348°	Opened	17	S-N
L 38-39	18.46.33	18.47.28	18.48.02	122	1260	356°	Opened	17	S-N
M 42-43	18.52.20	18.53.23	18.53.57	121	1260	357°	Opened	17	S-N
N 46-47	18.58.11	18.59.14	18.59.46	124	1240	001°	Opened	17	S-N
O 50-51	19.03.42	19.04.40	19.05.27	121	1230	360°	Opened	17	S-N
P 54-55	19.09.03	19.10.00	19.10.30	120	1260	359°	Opened	17	S-N
Q 58-59	19.13.36	19.14.35	19.15.20	118	1250	358°	Opened	17	S-N
A 2-3 BIS	19.27.33	19.28.38	19.29.15	121	1460	360°	Opened	17	S-N Buona

Fig. 4: Summary table of basic data of a remote sensing flight, required for processing.

Generally, during direct or instrumental survey, each acquisition phase is complex and presents some variables sometimes unpredictable. Specifically, a remote sensing flight presents difficulties and variables, such that two operators have to maintain high concentration and are ready to remodel the main acquisition parameters, where the circumstances make it necessary.
The quality estimation of airborne remote sensing starts, therefore, in the preliminary phases and continues during flight: all planning parameters and all mission basic actions must be met; all boundary conditions must be provided and solvable. To meet a high standard of remote sensing, at the end of flight, operators shall ensure the goodness of the recorded data, through a sample pre-processing, and provide the same data archiving; finally, they draw up an analytic report of flight that will serve as index to the next processing phase.

In a schematic way, processing is based on the integration of four data groups: the hyperspectral or thermal images; aircraft inertial and position data; GNSS permanent stations data; DSM or DTM models of the territory, object of study. Processing is conducted by university researchers through three software processes, distinct and sequential: calculation of aircraft position and attitude every second; radiometric correction of hyperspectral or thermal images; geometric correction of the latter.
Processing result is an multilayer orthophoto paper in which each layer corresponds to a wavelength reflected by the ground objects scanned and recorded by airborne sensors. The classification of various selective layer allows drawing thematic maps, as interpretation of case study.
Position and attitude processing runs through the integration of GNSS permanent stations data (static acquisition) with inertial and GNSS on board sensors data (dynamic acquisition). As is known, the first ones record the satellite coverage of the wide zone, including the airport and the study area; the second ones are a combination between position and attitude data (roll, pitch, yaw), registered every second during the flight, from takeoff to landing. The integrated processing of all these data reproduces the geo-referenced flight path, so that all thermal and hyperspectral images can be automatically referred to scanned area.
The experiences, gained through national and international missions, show that data quality (described above) is directly proportional to piloting actions. Id est pilots - as remote sensing protagonists as any other crew component - apply special flight techniques: the turns between sequential runline are very large and with a minimum angle, the flight speed is constant along runlines, also in the presence of adverse wind.
This underlines once again that remote sensing is unanimous action comparable to a symphony concert in which the perfect execution can only be achieved if each orchestra conductor knows the potential of his instrument and plays the musical score to the best of its ability.
Image processing is developed through two consecutive software procedures: radiometric correction is technically different for CASI sensor (Compact Airborne Spectrographic Imager) and TABI one (Thermal Airborne Broadband Imager); geometric correction is the same for the two types of images acquired.

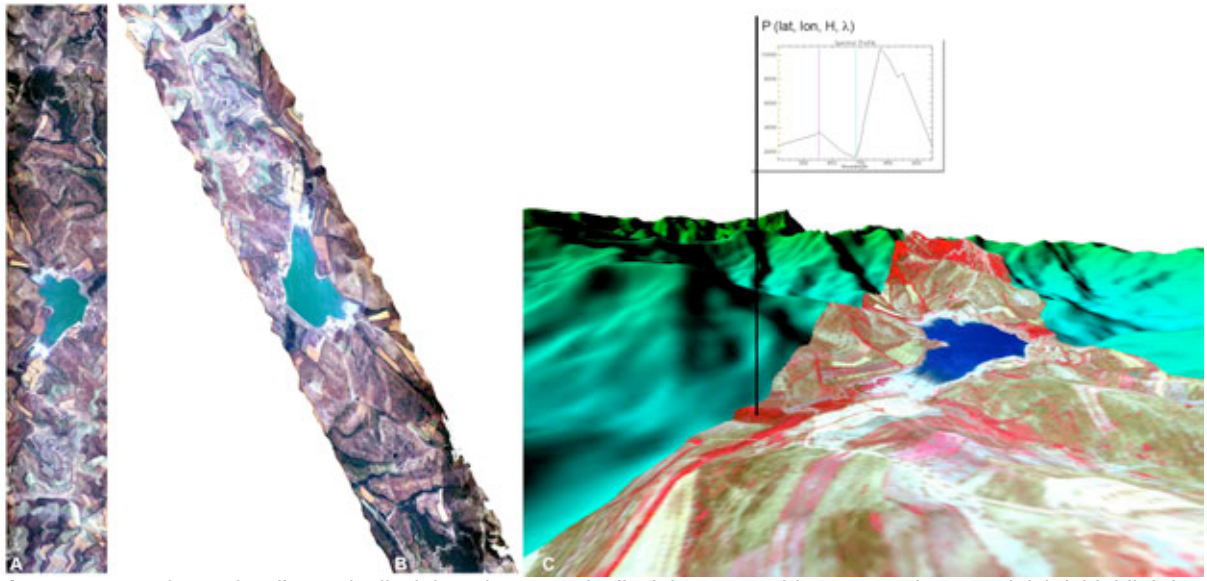


Fig. 5: Comparison of radiometrically (A) and geometrically (B) corrected images and 3D model (C) highlighting the geographic coordinates and spectral ones. (created and drawn by P.Argenziano 2013)

During radiometric correction of CASI images, the raw digitized pixel intensities are converted into units of spectral radiance, thus estimating the true brightness of the target. Conversion of CASI data to units of reflectance requires that ground spectral measurements be collected coincident to the airborne image data. While, during the radiometrical correction of TABI images, the raw digitized pixel intensities are converted into units of Celsius degrees (°C), thus estimating the relative temperatures of the imaged target. Processing of TABI data to absolute measures of temperature requires that some form of thermal calibration targets are flown at the time of data collection.
Estimate by scientific objectivity the radiometric value of each image pixel is very important in the remote sensing aimed at territorial policing or monitoring. So the opportunity to correct the radiometry of the images, acquired in real time during the flight, becomes strategic. This hardware configuration is currently being studied for multitasking aircraft of GdiF-Benecon who will fit out Lidar, photogrammetric, hyperspectral, thermal and SAR sensors.
During geometric correction, the image (radiometrically corrected) is aligned to position and attitude

data. At this stage, any across-line image, acquired in a known flight time is redrawn and shown in an orthographic XY plotter (by a chosen DATUM) thanks to a software integration with territorial DEM model. The comparison pictures show the difference between radiometric image and geometrical correct one; the third picture is a 3D model of the last one made by DEM used for the ortho-projection. The remote sensing activity ends with plotting of multilayer digital orthophoto maps of the territory.
A particular type of digital image whose representation in real colors (hyperspectral scanning) or in gray-scale (thermal scan) - similar to the traditional orthophotos - is one of the possible spectral classifications. As anticipated, orthographic image of the territory scanned contains a specific spectral 'depth', in proportion to the spectral bands were selected during planning or related to sensor used. The CASI-1500 measures the spectrum for each location on the ground for each VNIR spectral band chosen by the operator. These light intensities may be recorded for up to 288 separate spectral bands. The bands may be placed anywhere within a ~680 nm spectral range, which itself may be placed anywhere between ~380 and 1050 nm. The CASI is thus sensitive to wavelengths in the Visible part of the electromagnetic spectrum, as well as in the Near Infrared. This means, about an hyperspectral orthographic image, 288 spectral layer may be added to XY dimensions, at most.
Instead, thermal orthographic image (acquired with Itres TABI-320) are 'simply' three-dimensional, because the temperature recorded at each image pixel can be added to XY dimensions. The nominal temperature range of the TABI-320 is -20 through 110 °C (in low resolution mode, up to 1000 °C) and it is capable of resolving temperature differences of 0.1°C. Every pixel on the sensor contains both spatial information about the scene and thermal information from the 8- 12 micron region, processed in Celsius degrees.As the specificities of these spectral sensors, orthographic images have intrinsic features more relatable to satellite ones rather than topographic maps or traditional aerial images.

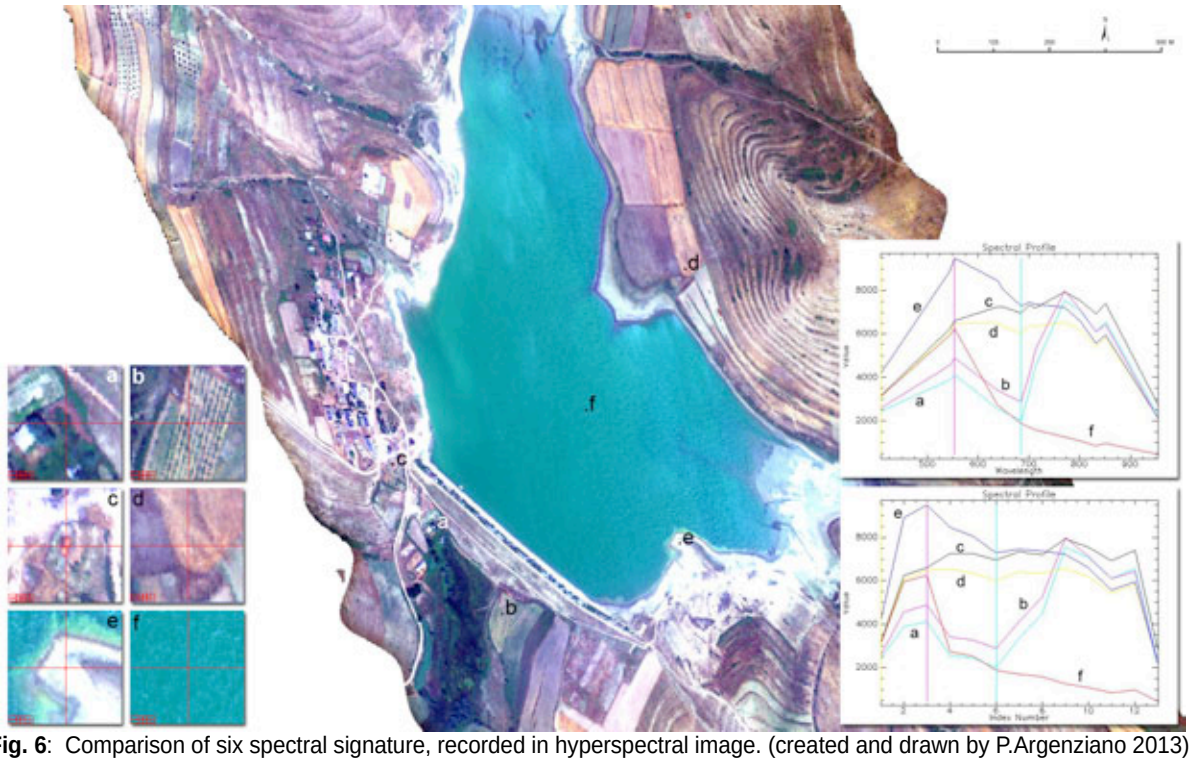


Fig. 6: Comparison of six spectral signature, recorded in hyperspectral image. (created and drawn by P.Argenziano 2013)

An hyperspectral (or thermal) orthographic image is processed according to a **mapping DATUM**, chosen for two-dimensional representation (for Albania WGS84-UTM34N); it has its own **geometric resolution**, which corresponds to pixel size projected to the ground; continuing, it has its own **spectral resolution,** about the number (or size) of electromagnetic bands that have been stored in its digital frame; and again, it has its own **radiometric resolution,** about sensitivity of airborne sensor to detect the difference in the radiant flux that propagates from ground to flighting aircraft. If you wish to approach multi-temporal analysis of a specific territory, comparative reading of airborne data must be performed both in relation to the critical spectral region and in relation to these variation in the time "t" (**time resolution**).
Each pixel that makes up the orthophotos, records within itself wide range of information about the object present on the ground, of which that particular pixel is the corresponding hyperspectral and/or thermal discretization. The critical analysis, that results, is aimed to investigate the data recorded in the various pixels, in different ranges of wavelength, characterizing each pixel compared to those next, and by extracting the spectral signature (ρ) for each of them.

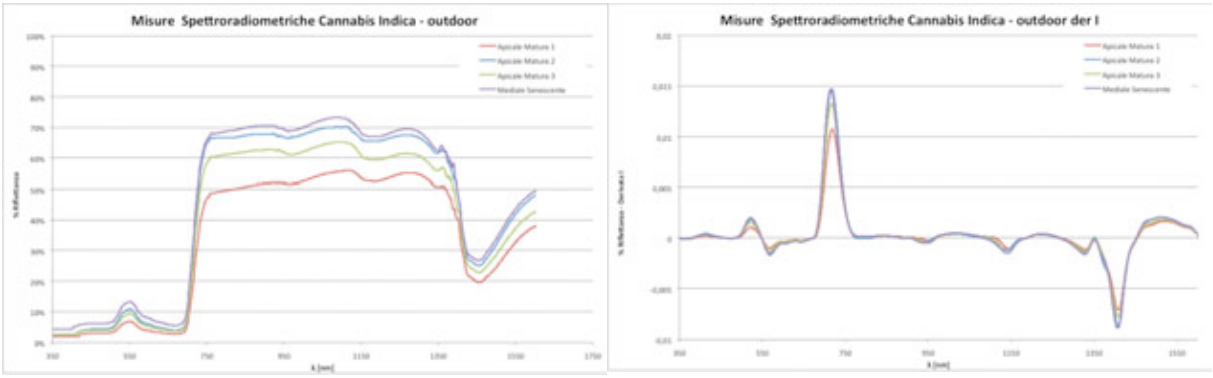


Fig. 6-7: Two spectral diagrams of cannabis, registered in Benecon Laboratory (A.Buondonno, and G. Serroni 2012)

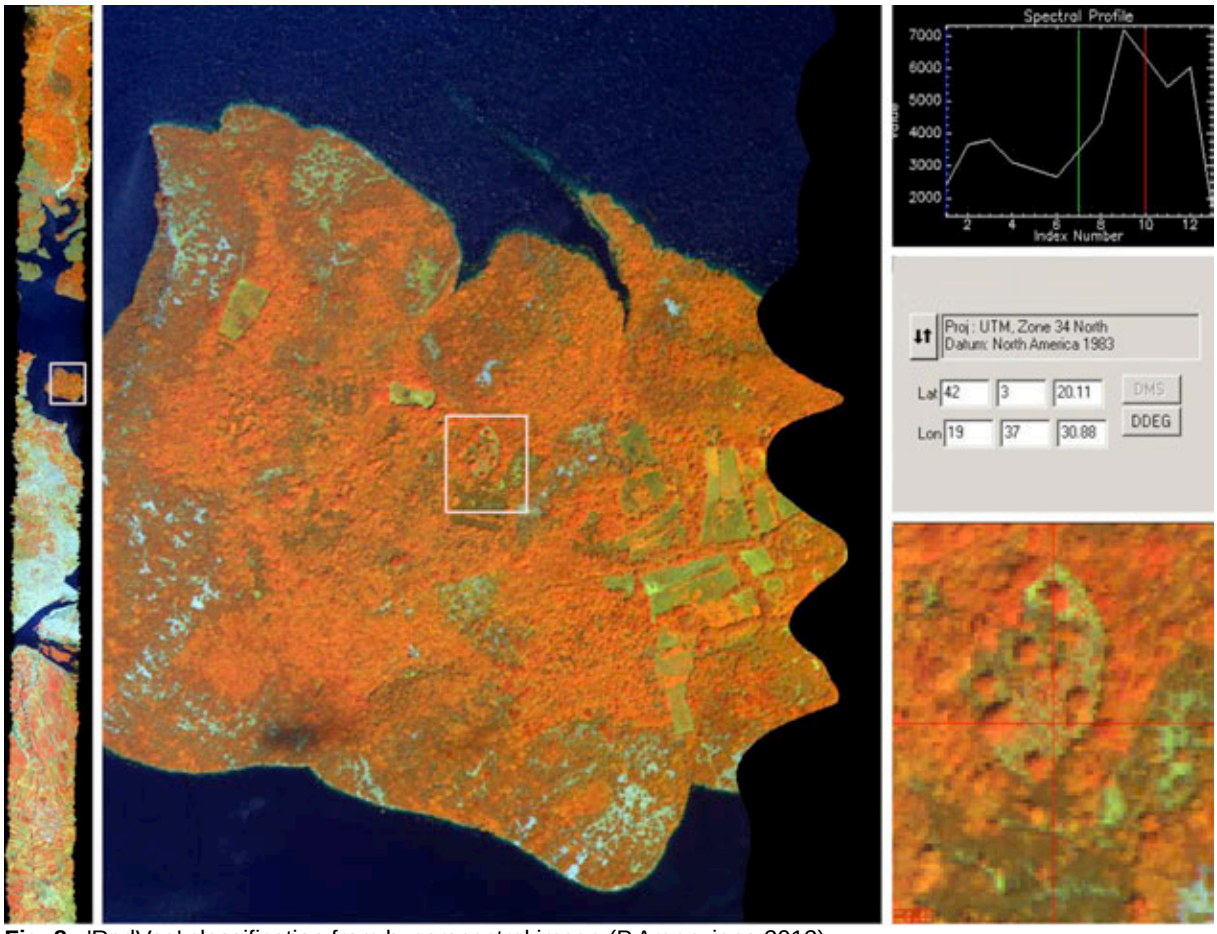


Fig. 8: 'RedVeg' classification from hyperspectral image (P.Argenziano 2012)

The spectral signature - as known from scientific literature - is the reflectivity characteristic of each material (natural or artificial), in function of incident radiation wavelength, in comparable environmental conditions. Being able to isolate the spectral signature of a material means, in other words, to know his fingerprint, an element that clearly identiffy it.
A critical analysis, so based, has a preventive approach already in remote sensing planning phase, because it must be clear what is the project goal, and especially what are the factors to be analyzed on the ground. Or, in the case of a water course, to evaluate the presence, identity and the distribution of pollutants, algae, this is different from the study applicable to a forest, assessing the individual location, species identity, size, and health of trees. And yet, for agricultural soils, assessing the spatial distribution, species identity, maturity, and health of crops; identifying the types, wetness, and salinity of soils is different from assessing the impact of cattle grazing on vegetation, or is different from assessing the surface scattered land mines and unexploded ordnance in the military.
Referring to the experiences developed in the national and international scenarios - about plant species identification and weeds mapping - it should be noted that the reflectance curve (spectral signature) may change its geometry, depending on many factors among which the most relevant are:

plant type, leaf density, leaf structure, seasonal phenological phase, moisture content. This question is crucial in the study of vegetation cover, which have a specific phenological cycle throughout the seasons. For example, wheat can be distinguished from corn, because the two cultures have different phenological cycles. In contrast, the discretization of wheat from barley is difficult, because their cycle differs only a few days. Continuing, the spectral curves of the corn and soybeans are very similar because they have almost identical cycles throughout the period of greatest vegetative growth, although, the different morphology of the two crops can be a discriminating factor.
In scientific literature, it is known the relationship between the reflectance curve (characteristic of vegetation in different segments of electromagnetic spectrum) and leaves pigments (visible spectrum), as well as in comparison with cellular structure (near infrared spectrum) and water content (mid-infrared spectrum, not registered by CASI).
About plant elements of medium height and average leaf density, soil influences the overall electromagnetic reflection, recorded by the sensor, because within the same pixel leaves reflections are added soil ones, which can be seen through the same leaves sparse.

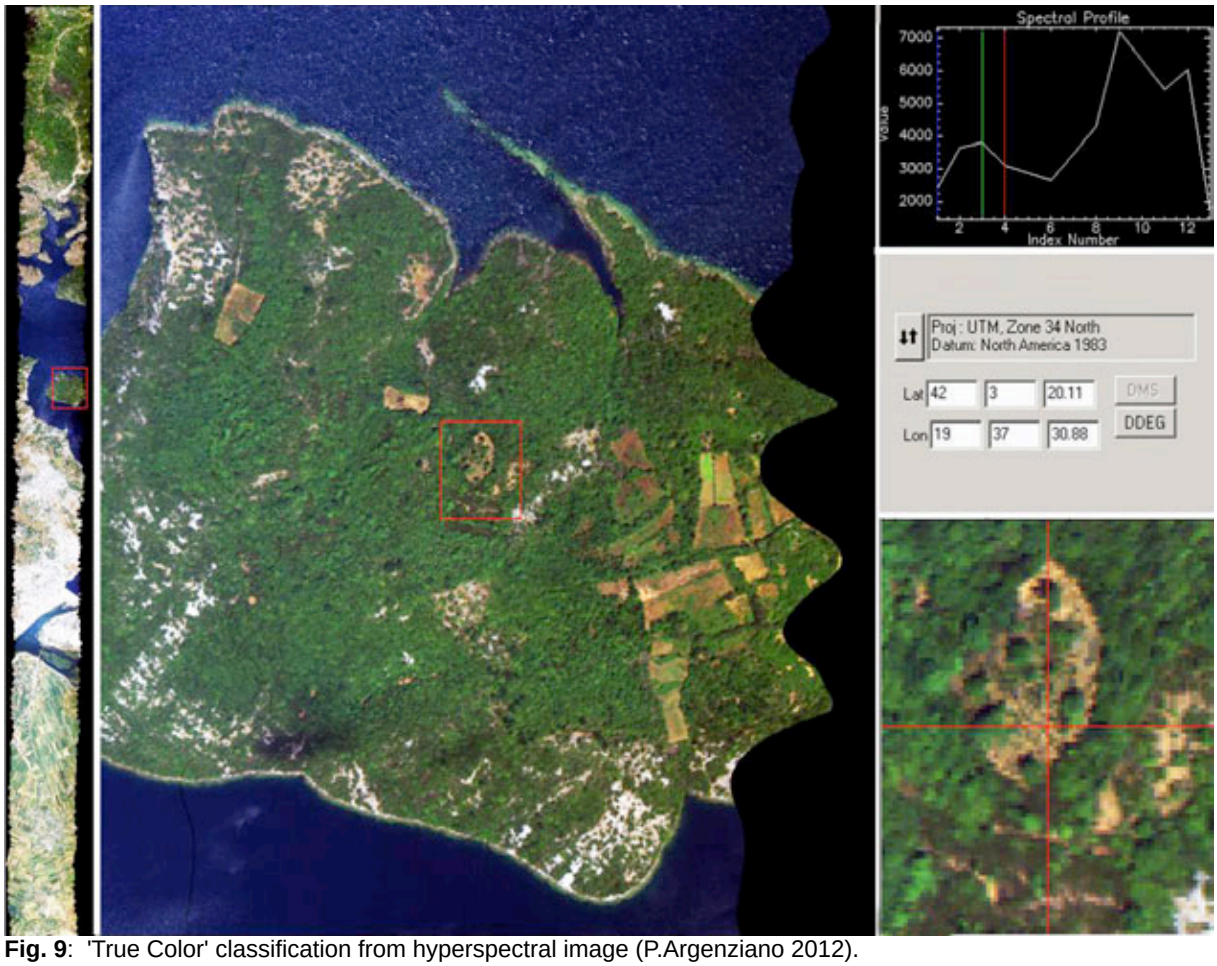


Fig. 9: 'True Color' classification from hyperspectral image (P.Argenziano 2012).

Spectral element of soil varies in function of its nature, of its coverage density (linked to the phenological stage), of vegetation type present, of water conditions, of growing techniques. The spectral curve of plant species differs, also, in relation to plant structure and its leaves. The algebraic combinations (Vegetation Index) of reflectance measurements in two or more spectral segments, near infrared and in the red, provide information on the amount of plant biomass present, allowing the continuous monitoring. All vegetation indices exploit the marked difference between the low reflectance in the visible range, and the high response in near infrared one.
Vegetation indices, therefore, are very related to health and productivity parameters of crops, as well as to density and green biomass, to Index of Chlorophyll, to Leaf Area Index (LAI), to Normalized Difference Vegetation Index (NDVI), to PVI (Perpendicular Vegetation Index) and to WDVI (Weighted Difference Vegetation Index); mentioning only the most significant ones in relation to the experiences carried out.
For the discretization of cannabis sativa cultivation, the analysis of scanned data was inductive type, given the overall extension of hyperspectral and thermal scans of more than 778 sq km.

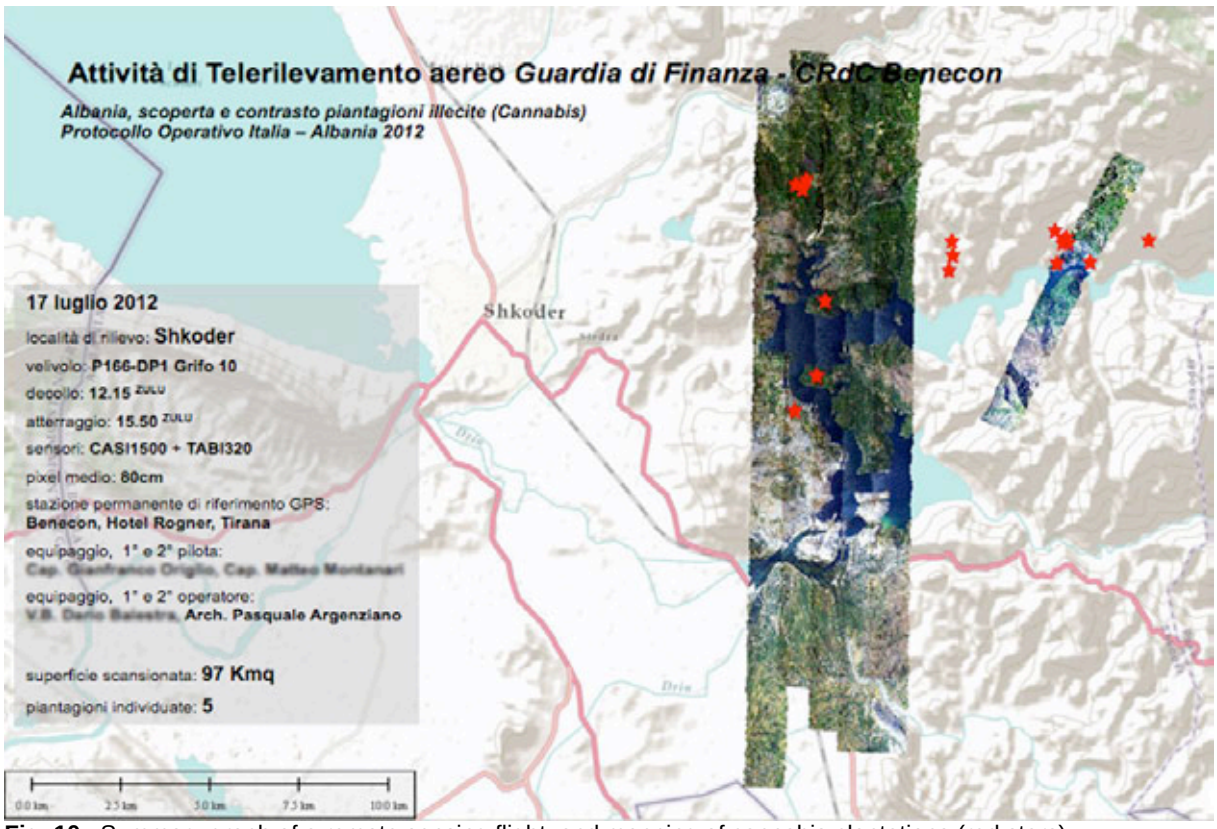


Fig. 10: Summary graph of a remote sensing flight, and mapping of cannabis plantations (red stars).

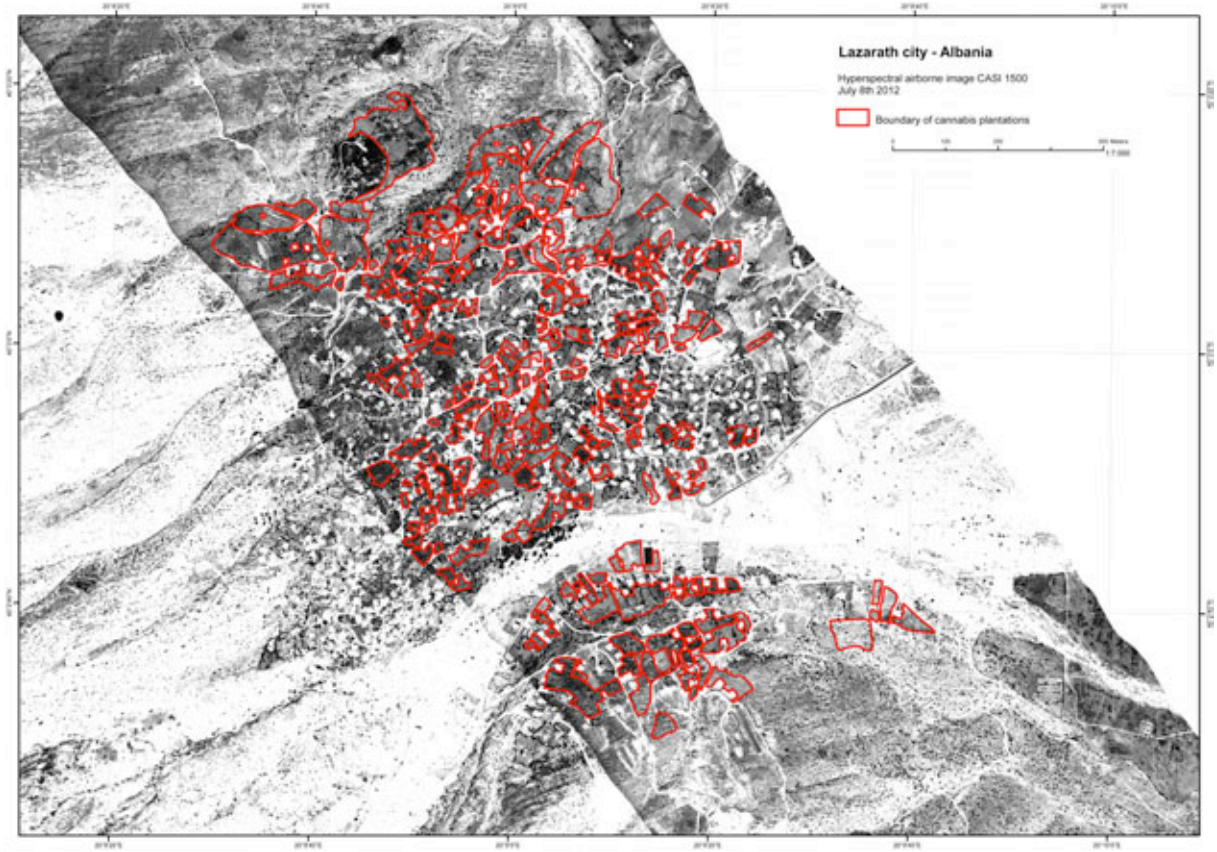


Fig. 11: Cannabis plantations in Lazarath city (map by P.Argenziano 2012).

Starting from orthographic images, by 3D software procedures, large favorable to the cultivation areas have been limited according to the exposure of the slopes and to the average altitude above sea level. On each macro-area identified, a combination of variable indices (described above) has been applied according to experimental procedures, in order to carry out the classification compared to cannabis spectral signature. The cannabis spectral signature has been previously analyzed from freshly cut plant specimens, in Benecon Laboratory. The discretization of cannabis cultivation was also

experienced through the application of a morphological filter, chosen according to cultivation techniques, and to the integration with thermal data for highlighting drains.
Selective application of Vegetation Indices to hyperspectral and thermal images, applied to architectural heritage, can promote new researches, and especially can solve problems about building maintenance and heritage preservation. The classification of density and green biomass, through critical comparison with NDVI can be the first step for weeds discretization on pitched or flat roofs - difficult to inspect - or on summits of ancient walls in archaeological areas, which cause a slow and inexorable decline. This approach can be done a territorial scale, through thematic images of large archaeological areas or large urbanized ones, ensuring sub-meter pixel resolution.

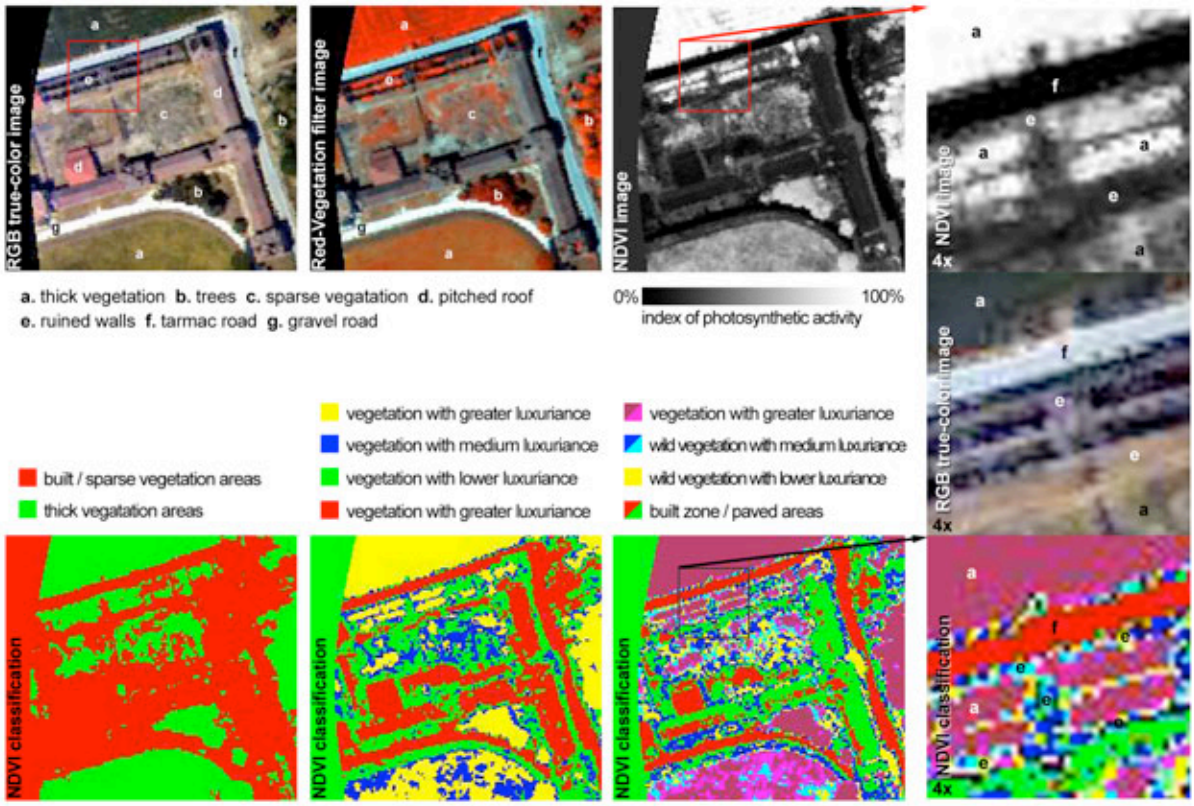


Fig. 12: First draft of the procedure for identification of weeds in the abandoned architectural heritage. The application case concerns some parts of the Royal Palace of Carditello, XVIII century (created and developed by P.Argenziano, 2013)

With reference to the table, in upper images, from left to right, the hyperspectral data were classified into real colors (RGB), into vegetal range colors, and according to NDVI algorithm. In particular, this index - integrated to the ground temperature data - can be classified by successive approximations to highlight the weeds, who lives on top of walls' ruins, or on pitched roofs not being maintained. The three NDVI images show the sequential classification of chlorophyll index, from two classes (red/green: vegetation areas or not), to seven classes that allow the identification of minimal presence of weeds. From the images' comparative reading, it was possible to highlight the weeds on walls' summits and on pitched roofs, in application to an emblematic case of Italian architectural heritage, now in neglect and decay state. By generalizing, the airborne hyperspectral and thermal sensors, and their integrated processing data, can also be applied to weeds' mapping at urban scale, thanks to a high spectral resolution and submeter accuracy.

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HERITAGE ARCHITECTURE LANDESIGN
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New Landscapes

Mario Pisani
Department Architecture e design. II° University of Naples
mario.pisani@unina2.it

Abstract

I would like to report the appearance of a design culture with sensitivity and attention that is able to step into existing landscapes in order to enhance the quality as well as propose a new way of reading them. This culture makes it possible to perceive the identity and beauty of the area, while stimulating the building of a better society, environmental, historical heritage but also devoted to promoting solidarity networks. The search for a solution not only on face value of the environmental problem calls for a different approach to the transformation project of the territories. It is not possible to solve problems if the way of thinking that created them is not abandoned: hence a "strategy of caring", which not only stems from the awareness and sense of belonging, but also refers to the principle of responsibility, anticipated by Hans Jonas in 1990. It is fundamental to an "architecture of the earth". It allows us to rethink this discipline and its historical identity at the service of society. An architecture modeled on nature and location can help humanity in its slow realization. An architecture that, even before being built, represents a new way of reinterpreting the deep sense of living.

"It is in us that the landscapes have landscape. So if I imagine them I create them, if I create them there, if I see them there."

Fernando Pessoa

"Works of art require interpretation because to be interpreted is their essence."

Arthur C. Danto

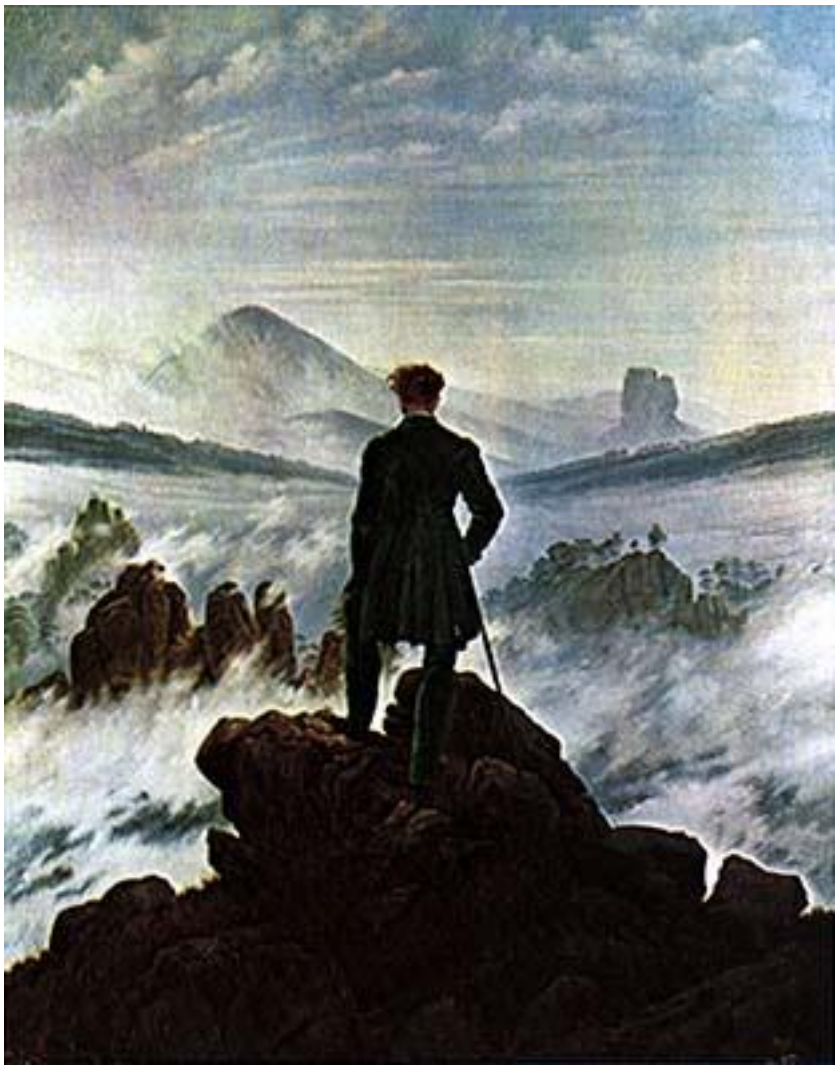
Landscape refers to the particular expression of an area determined by the physical, human, biological and ethnic, and - as noted Pessoa - it is essential to who observes and then the way it is perceived and experienced. As claimed by Claudio Magris[i1], "... the landscape where what is in front of you catches you, it identifies and calls for a reply, your recognition. It is the double evocation between the viewer and the scene. "

According to some sources, the term originates from the French *paysage*, for others from Italian, which in turn comes from the Latin *pagensis* or *countryside*, territory, while its meaning appears in painting with references to the realism of some views and in literature, with the description of places.

One of the most representative images of a landscape painting is that of *The Wanderer Above the Sea of Fog* (Der Wanderer über dem Nebelmeer, 1818), symbolic painting by Caspar David Friedrich, one of the greatest German landscape artists. There is a man, seen

from behind, in a solemn loneliness, standing on a rock, the abyss that extends in front and misty peaks that emerge from the blanket. He looks absorbed in the sublime natural spectacle that unfolds before his eyes. He is trying to grasp something that is beyond human comprehension. The theme of the wanderer reflects the restless wandering and poignant metaphor for human existence, to something unattainable and the inevitable stop of those who, suspended between the finite and the infinite, in a precarious balance between being and non-being, has reached the limit of the earthly experience, aware of the unbridgeable gap between man and nature, but at the same time also their deep union.

The European Convention on the landscape has introduced a new way of thinking of the landscape dimension of the area, characterized by having attached to it the status of an autonomous concept which is an essential element of individual and social welfare, and its preservation, management and planning entail rights and responsibilities for each individual. There is therefore a right to the landscape.



Caspar David Friedrich, Der Wanderer über dem Nebelmeer, 1818

The landscape configures the shape of the country, created by the conscious and systematic human community that has settled in it, so intensive or extensive, either in the city or in the countryside, which acts on land and produces the signs of its culture, which then lives in this landscape. It is no longer the semantic equivalent of “natural beauty” which placed a

narrowing of the scope of the protection to the areas of landscape value, similar to the things of historical and artistic interest, belonging to the goods of public interest.

The landscape is, however, one of the components of the environment that is affecting large portions of the national territory, thus the landscape is an asset that must be recognized and legally protected. Its protection becomes the primary constitutional value, which must submit any inherent interest, and should be paid to conserve and maintain the significant or characteristic features, in terms of its heritage value derived from its natural configuration and human intervention. In the present time, there is a design culture that, starting from landscapes, with great sensitivity and attention is able to immerse into the existing ones so as to enhance their quality and propose a new way of both reading them and enjoying their beauty. We have selected a series of interventions that are able to witness this, or a new way of understanding the landscape, not only to read and understand it but starting from its virtuality that plays with its consciousness.

I think, a useful lesson can be learnt for architecture tour court.

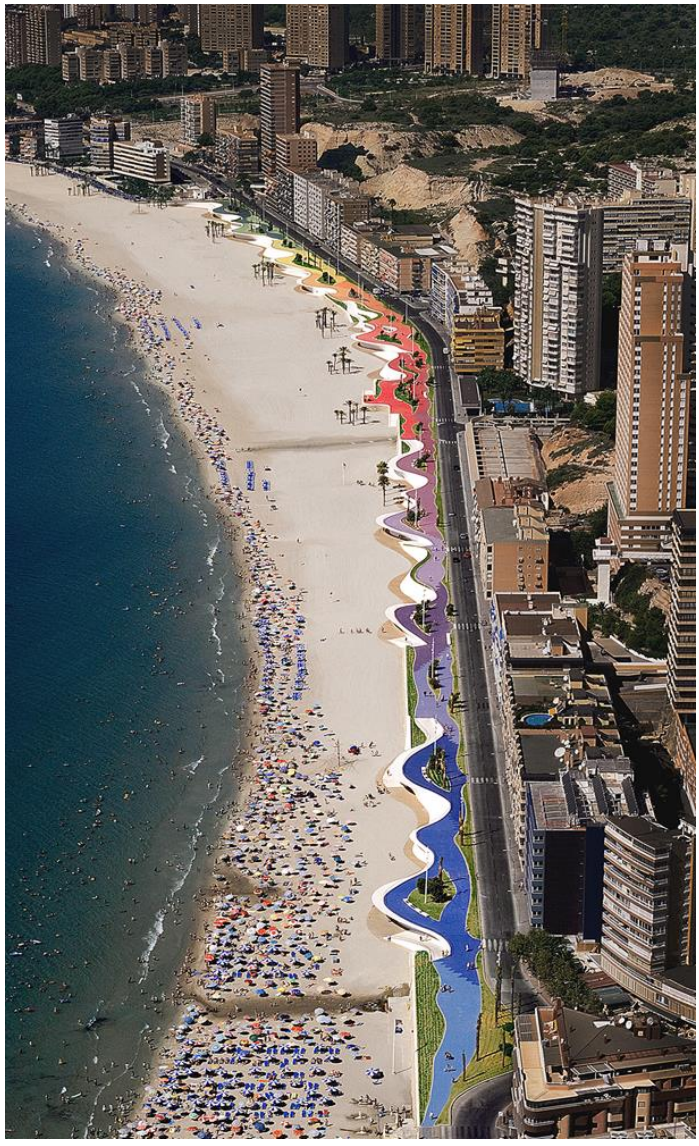
We have put together examples of how small the extraordinary gaming experience, a cheerful invitation to play and have fun due to the fertile ingenuity of the study of designers pay particular attention to the landscape: ANNABAU in Wiesbaden. They have invented a spatial sculpture, to be explored, inviting you to climb on the curved steel pipes, painted green, to cling to the rope net that stands beside it. It is an endless game, an invitation to live a new experience outdoors and in touch with nature and the trees, watched from various different points of view. Or the hotel on the shaft, which aims “to get the most with the least”[ii], or with minimal resource consumption, minimal environmental impact, minimal waste production, to represent a sort of oasis for the mind. However, the project constructed in Xian, China, from Topotek 1, which represents the implementation of the unconscious dream of crossing the entire globe, starting from Berlin to land on the opposite side.



ANNABAU in Wiesbaden

There are projects that have created a new landscape as the one for the sea front of Benidorm, the most paradigmatic example of the city intended for holidays, tourism, fun and sea. Carlos Ferrater has developed an intervention that assumes its own specificity and size through a series of fabrics that are intertwined with each other and have few geometrical standards, thanks to the input initial resulted from the image of a braid of hair that follows the outline of the coast. Then, there is the new port of Tel Aviv in 1965, which was abandoned as a docking port and suffered a continuing deterioration until a new project which restored it back to life. Surprisingly, despite the fact that urban planning was dominated by market forces, for the immense popularity of the proposal that we present in the audience, the project was able to circumvent the development programs intended for the area of five hectares creating a precedent for an urban transformation not propelled by building rights but by a unique strategy that has renewed the existing buildings and invested in the regeneration of public space.

We could go on to cite a number of projects that have shown us how we can intervene in particular areas with sensitivity and commitment, with the understanding that: “The forms of cultural expression construct their own public when it induces a desire to acquire the tools that



Carlos Ferrater, Sea front of Benidorm

are necessary to give meaning to the experience itself: when that happens, the experiences continue to produce value and meaning. In contrast, when the cultural experiences that are not trivially replicate the skills and expectations of the public they serve, while producing immediate feedback, they lose interest very quickly and become obsolete, almost at the same time as their production[iii]."





Mayslits Kassif Architects The new port of Tel Aviv

[i] Claudio Magris*, L'infinito viaggiare*, Arnoldo Mondadori, Milano 2005
[ii] Cfr. Maurizio Pallante, *Meno è meglio Decrescere per progredire*, Bruno Mondatori, Milano-Torino, 2011
[iii] Christian Caliandro Pier Luigi Sacco *Italia Reloaded Ripartire dalla cultura*, Il mulino contemporanea Bologna 2011

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THE SEEM PROJECT: A SOLAR ECO-EFFICIENT ENVELOPE MODEL

Stefano ALBRIZIO[4], Bernardo BUONOMO[3], Lorenzo CAPOBIANCO[2], Corrado DI DOMENICO[2], Amedeo FIORE[4], Walter FIORE[4], Rossella FRANCHINO[2], Caterina FRETTOLOSO[2], Carmine GAMBARDELLA[1], Luciana MAINOLFI[2], Oronzio MANCA [3], Francesca MUZZILLO[2], Sergio NARDINI[3], Paolo ROMANO[3], Antonella VIOLANO[2]

(1) Benecon scarl /Dipartimento di Architettura e Disegno Industriale "L. Vanvitelli" SUN
(2) Dipartimento di Architettura e Disegno Industriale "L. Vanvitelli" SUN
(3) Dipartimento di Ingegneria Industriale e dell'Informazione SUN
(4) Tecn.av srl

Abstract
The Solar Eco-efficient Envelope Model is an innovative research of three research unities, TECN.AV Srl, BENECON scarl, Seconda Università degli Studi di Napoli (Dipartimento di Restauro e Costruzione dell'architettura e dell'ambiente, Dipartimento di Ingegneria Aerospaziale e Meccanica), with funds of Italian Ministry of Environment. SEEM is a research focused on an experimental model for analyzing the effect of heat flux on heat transfer and flow of air into a chimney, in relation to air temperature and velocity, also in order to use the results with the objective of an adequate energetic refurbishment. With strict relation to the emerging data of variable fields and the profiles of air temperature and velocity are analyzed. Ssimulations onto the plane of perceptive experience consider mutable prevailing conditions of air movement which, with its dynamic movement, connotes morphological aggregation.

Keywords: solar chimney, energy, bioclimatic architecture, experimental model

1. Introduction
The increase in world population and the improvement of living standards have led to a growing demand for electricity. The limited availability of fossil fuels and environmental pollution caused by them, push the development of new technologies for the production of electricity from renewable energy sources. With a view to sustainable development, therefore, the energy future must have as protagonists renewable sources (solar, geothermal, wind, etc.), which are not exhausted and have no environmental impact because they do not produce greenhouse gases.
Buildings as big energy-consuming systems require large amount of energy to operate. Globally, buildings are responsible for approximately 40% of total world annual energy consumption. Sustainable design and construction are gaining significant momentum in the construction industry. Designers and owners are learning that with smart design, buildings can save energy and have a decreased impact on the environment. Sustainable buildings with renewable energy systems are trying to operate independently without consumption of conventional resources. This reduces impact on the environment throughout buildings' lifecycle. Renewable energy is a significant approach to reduce resource consumption in sustainable building [1] and integrated solar chimney systems could represent a possible solution [2].
A solar chimney is essentially divided into two parts, one – the solar air heater (collector) and second – the chimney. Two configurations of solar chimney are usually used: vertical solar chimney with vertical absorber geometry, and roof solar chimney [3]. For vertical solar chimney, vertical glass is used to gain solar heat. Temperature difference between vertical glass duct and interior room produces a pressure difference. An interior air will go out through inlet because of this pressure difference. The temperature difference is a determining factor of performance of solar chimney [4].

Designing a solar chimney includes height, width and depth of cavity, type of glazing, type of absorber, and inclusion of insulation or thermal mass. Besides these system parameters, other factors such as the location, climate, and orientation can also affect its performance [5-7].
The solar chimney power plant uses solar radiation to raise the temperature of the air and the buoyancy of warm air to accelerate the air stream flowing through the system. This is an energy conversion system from solar to mechanical. A component, such as a turbine, set in the path of the air current, converts the kinetic energy of the flowing air into electricity.
Schlaich [8] in the late 1970s was the first to propose the solar chimney concept. Less than 4 years after he presented his ideas at a conference, construction on a pilot plant began in Manzanares, Spain, as a result of a joint venture between the German government and a Spanish utility. A 36 kW pilot plant was built, which produced electricity for 7 years, thus proving the efficiency and reliability of this novel technology. The chimney tower was 194.6 m high, and the collector had a radius of 122 m. Haaf [9] reported fundamental investigations, design criteria, and cost analysis for the Spanish system. Bernardes [10] presented a theoretical analysis of a solar chimney, operating on natural laminar convection in steady state. Von Backström and Fluri [11] investigated analytically the validity and applicability of the assumption that, for maximum fluid power. Von Backström and Gannon [12] were interested mainly in a one-dimensional compressible flow for the thermodynamic variable as dependence on chimney height, wall friction, additional losses, internal drag and area exchange. Pretorius and Kröger [13] evaluated the influence of a developed convective heat transfer equation, more accurate turbine inlet loss coefficient, quality collector roof glass and various types of soil on the performance of a large scale solar chimney power plant. Ming et al. [14] presented a mathematical model to evaluate the relative static pressure and driving force of the solar chimney power plant system and verified the model with numerical simulations. Maia et al. [15] presented a theoretical analysis of a turbulent flow inside a solar chimney. They showed that the most important physical elements in a solar chimney system are the tower dimensions as they cause the most significant variation in the flow behavior. Tahar and Mahfoud [16] presented a numerical simulation of natural convection in a solar chimney. They examined the effect of the system geometry on the natural convection phenomenon in the solar chimney.
In this paper a numerical investigation on a prototypal solar chimney system integrated in a south facade of a building is presented. The analysis is carried out on a three-dimensional model in air flow and the governing equations are given in terms of k-ε turbulence model. The problem is solved by means of the commercial code Ansys-Fluent and the results are performed for a uniform wall heat flux on the vertical wall is equal to 300 and 600 W/m2. Results are given in terms of wall temperature distributions, air velocity and temperature fields and transversal profiles in order to evaluate the differences between the two base configurations and thermal and fluid dynamic behaviors. Further, the ground effect on thermal performances is also examined.
The present study considers steady, turbulent, three-dimensional natural convection flow in a solar chimney as shown in Fig. 1.

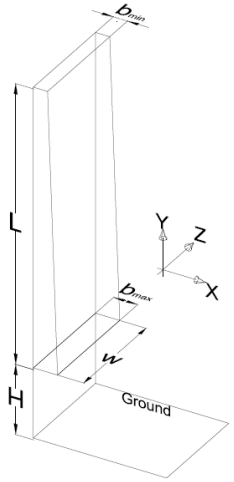
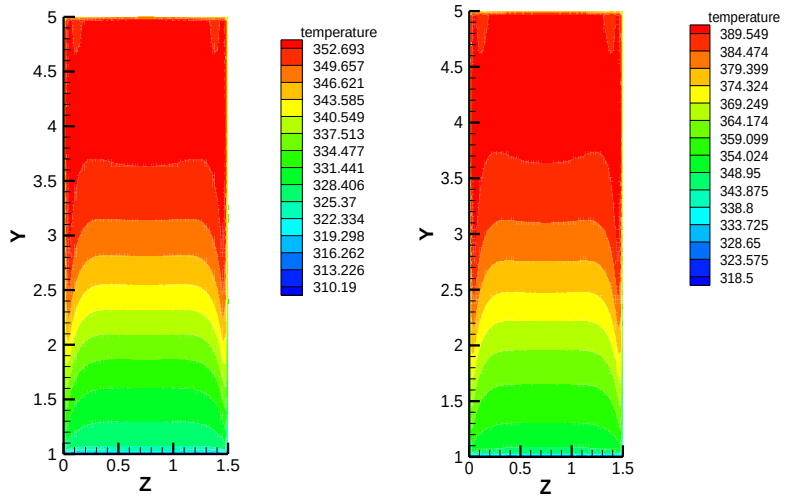


Figure 1. Geometry.

All the thermophysical fluid properties are assumed to be invariant except for the density in the buoyancy force term which can be adequately modeled by the Boussinesq approximation. The compression work, viscous dissipation and radiative transport are assumed to be negligibly small.
The geometrical model and the step of preprocessing were realized with the software Gambit.
The boundary conditions imposed at the solid walls are mainly the no-slip and impermeability boundary conditions in addition to the specified wall heat flux. The conditions assumed at the inlet and outlet sections are those of ambient conditions (ambient pressure and temperature).
The governing equations given represent a set of coupled, non-linear, elliptic partial differential equations. In the present study, the numerical solutions of these were carried out using the commercial code FLUENT 6.3[18].
The operating temperature was set equal to 300 K; the acceleration of gravity was considered, and its value was set equal to 9.81 m/s2. All the non-heated surfaces were considered adiabatic whereas in the first analysis an uniform heat flux of 300 W/m2 and 600 W/m2 on the heated surface was considered.

1.1 Results and discussion

Our objective was to analyze the effect of heat flux on heat transfer and flow of air into the chimney. For this reason, we presented the fields and the profiles of air temperature and velocity.
Figure 2a shows the field of temperature of vertical surface in case of heat flux equal to 300 W/m2. The wall temperature increases from the bottom upwards due to the progressive heating of the air in the channel. Furthermore, it can be seen also that the temperature assumes an uniform value, about 350K downstream the middle of channel height.



2a) q=300 W/m2 2b) q=600 W/m2

Fig 2. Temperature field vertical surface.

Increasing the heat flux from 300 W/m2 to 600 W/m2 the wall temperature fields are very similar, but in this case the values found are more higher than before.

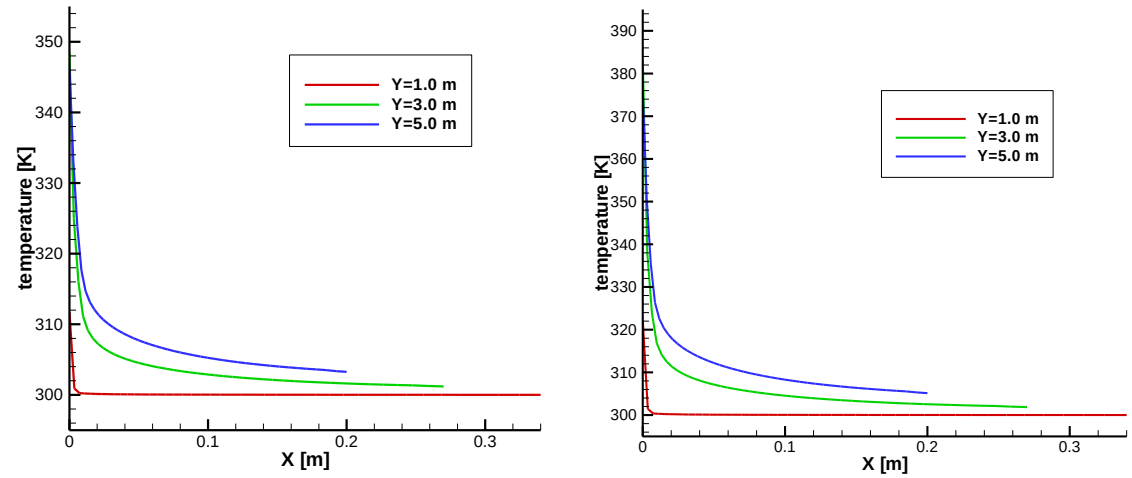


Fig 3. Air Temperature profile in the channel spacing, at the mid-channel section (Z=0.75 m) and several heights.

The air velocity fields, Figs. 4a and 4b, show an increase of it from the bottom upward to the progressive heating of the air in the solar chimney, and analyzing the velocity profile, Figs. 5a and 5b. for three different values of Y, it is noted that the maximum is reached in the outlet section in proximity of the vertical wall. The maximum air velocity is equal to 0.92 m/s for q=300 W/m2 and 1.18 m/s q=600 W/m2 . Another important parameter evaluated in this study is the mass flow rate of air in the outlet section, it is equal to 227 g/s for q=300 W/m2 and 289 g/s q=600 W/m2.

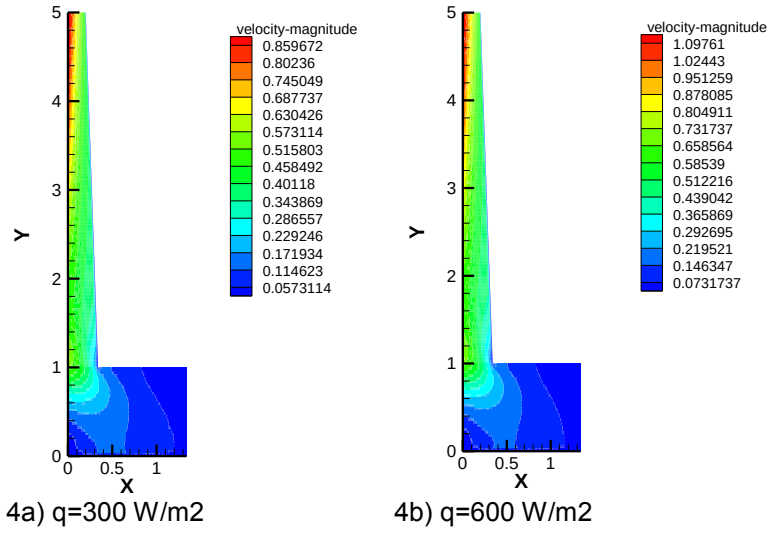
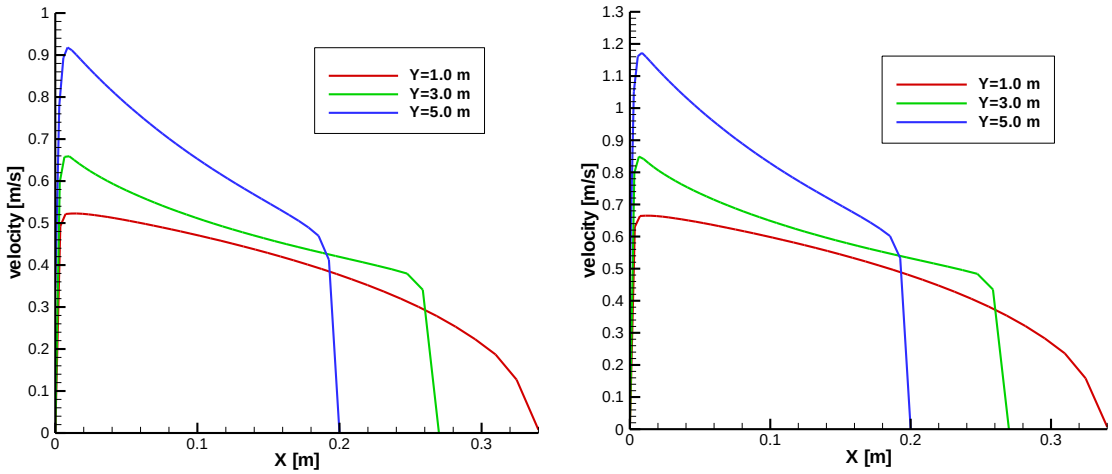


Fig 4. Velocity magnitude field, at the mid-channel section (Z=0.75 m).



5a) q=300 W/m2 5b) q=600 W/m2

Fig 5. Velocity magnitude profile in the channel spacing, at the mid-channel section (Z=0.75 m) and several heights

From the comparison of the results, it is noticed that doubling the heat flux assigned on the vertical surface, there is an increase of all parameters. In particular there is an increase of almost 30% of the mass flow rate in the outlet section of the duct; an increase of almost 30% of the maximum speed of the fluid, and by about 10% of the maximum temperature of the wall.

2. Architectonical considerations about the SEEM System

2.1 Architecture and Chimneys: consideration at the territorial scale

SEEM is firstly considered in relation to the environment in which the technological system and the adjacent building envelope. The building represents an important central element of the environmental network on the territorial scale, seen as an integration among the infrastructural, and the ecological and landscape networks. So a transposition of such a concept has been made on the scale of the building in order to be able to make an accurate study of the energy-environmental quality of the local networks and to allow that the proposed system can be part of an environmental network on a scale of the building. This has oriented particularly the initial phase of the analysis made using the survey of the "territorial audit". Such an analysis aims at studying, from a methodological point of view, the environmental compatibility of the intervention proposed, above all, as it regards the relationships between the building and the system of the networks, with which it is related.

The design of the solar-wind chimney SEEM, representing the testing of so-called Solar Tower at the scale of building, raises the question of the compatibility between the modular element and the wall with which it must interface. Therefore, it is necessary, a data acquisition phase aimed at identifying the main features regarding both the environmental surrounding and the building envelope. The required data are not exhaustive of eco-technological analysis but it is closely relevant to the objectives of the project, and refer to three different issues: the first relating to how the external factors of the building can interact, positively or negatively, with the behavior of the new energy system; the second regards the energy performances of the existing building envelope; the third concerning the relationship building - infrastructure networks.

2.2 Architecture and Chimneys: considerations at the building scale

Speaking of “architecture” and “air”, different mutable prevailing conditions are given by the nature itself of air, which is dynamic into aggregation. We must remember that often historic net of architecture with a net of patios and open arias, with up-and-down composition of areas and interconnections, is what reminds this sensation of thermal wellness, due to air movements.

As an alternative to mechanical ventilation, various technologies are today investigated. We know that indoor air is heavier than outdoor one, so we can drive air movements through a chimney; the movements, based on the temperature difference among the various air levels, with air going upward from a higher pressure to a lower one and finally towards the open air, are connected to the architectonic shape of the air conduct. The data to be considered are both the height, and the section dimensions, in order to let the air moving from the bottom to the top. Sometimes in the past a different strategy was used and an alternative strategy let air moving into architecture from top. So we can say that the air movement had different typologies: ascending, descending or partly ascending and partly descending.
Innovative systems, differently from the past, can be predictably exactly and air movements are predictable all the way through dynamic thermal models with variable performance evaluations, considering the alternatives among section choices and eventually individualizing the first-rate designs in order to promote air movement inside a chimney.
Differently from a "traditional" approach to design that interprets the question of integration of plant design in an organic vision of the relationship between environment/area/shape, in the case of the project SEEM, the architectural theme is that of identifying formal solutions, energetically performing, that, in the comparison and in the need for integration with pre-existing buildings, can achieve the dual objective of improving energy performance and presents itself as an opportunity for redevelopment of the urban habitat.
It is, therefore, to interpret a "plant" beyond its technical content, assuming the character of formal autonomy as an element able to communicate with the building called to host it. The definition of the basic geometries of the prototype represents a real experimental work in progress which involves, actively, multidisciplinary skills and that is started from the first formulation of a concrete case study that focused on the south side facade of the Laboratory Benecon-Ars in Frignano

2.3 Meta-design: Requirements for glasses of solar-eolic chimney at detail scale

Technological research engaged in the production of components for the transparent envelope is based on the study of performance improvement, correlating needs of the system and offer of energy (solar radiation) at different wavelengths to capture or to screen. The wavelengths in the visible range are designed to control the component light and the wavelengths in the infrared range are more directly related to the thermal behavior. This study is conducted in the second phase of the Project SEEM (Solar Eco-efficient Envelope Model) and it analyze the best glass components to guarantee performances demanded by system.
In order to make a comparison and thus a weighted evaluation about the products meeting the premises needs, it is appropriate to establish what the criteria for the selection of the companies were wide spread on the domestic market, vast offer productive, clarity of information and technical performance, availability of contact and certified performance.
The analyzed and compared glasses are produced by the most famous companies (Saint Gobain, Pilkington, Guardian, Isolar Glas; AGC and Finstral) and the technological solutions adopted for the comparison take into consideration common double-glazing (low-emission and solar control), ignoring the more sophisticated components still being tested.
The SEEM system, designed to be positioned adjacent to the opaque envelope of new or existing buildings, requires specific performance to maximize the heat flow and the resulting increase in temperature of the air inside the chimney's channel.
Therefore, the needs of the external transparent component are :

- Maximum input transmission of infrared radiation toward the air channel
- Reduced output transmission of infrared radiation toward the external environment
- Self-supporting structure
- Minimum adherence conditions (in ventilated cavity) in order to reduce the turbulent flow inside the solar chimney,

and the needs of the internal component (in adherence to the building) are:

- Reduced solar output transmission (thermal radiation) toward building
- Self-supporting structure (structural glass).

Therefore, the requirements of the external transparent component are high Solar Factor g (> 70%) and high Direct Transmission (> 60-70 %) in order to gain solar heat. At the some time, since the temperature is a

determining factor of performance of the SEEM system, the heat in the channel must to be conserved. So, regarding to needs identified, the glass should have neutral colors (high internal transmission and low external reflection).and it should be with pyrolytic coating (economic and workable low emissivity film) on the inner pane. Considering the normal emissivity of the classic glass is equal to 0.837 (UNI 10345), the low-emissivity glass SEEM can reach 0.03.
The requirements of the internal transparent/opaque component follow a different select logic. The heat accumulated in the channel must not be transmitted to the building where the SEEM system is integrated. Therefore, this component must to be characterized by low thermal transmittance (< 1W/m^{2}K), low thermal absorption and high Reflection Coefficient that maximizes the thermal conservation in the canal.

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Regina Viarum, Appia Antica

Gilda EMANUELE
Department of Architecture and Industrial Design "L. Vanvitelli"
gilda.emanuele@gmail.com

Abstract
The construction of the Regina Viarum represented in ancient times an event of extraordinary importance. The historical implications of its construction involved more than half of the population of the Mediterranean for over a millennium.
“He dug the hills, valleys and chasms, drew terraces with wonderful minds; spent all the state revenue, but he left himself in the immortal memory for having been ambitious in the “public interest”. Diodorus of Sicily with these extraordinarily encomiastic words celebrates the virtues of the censor Appius Claudius Centemanno the Blind, recognized as the architect of the Via Appia: An infrastructure that not only constituted the first major road linking Rome and the Greeks, as well as the excellence of construction techniques adopted, but also represented a masterpiece of road engineering that for a long time was unsurpassed.
The Regina Viarum was built in several stages: the first stretch from Rome to Capua around 312 BC, the second around 268 BC extended to Benevento, while the third section was built around 191 BC., reaching Brindisi.
In particular, in the stretch of the Province of Caserta, the Via Appia knows situations of degradation, a fundamental action for the regeneration of one of the first objectives would be to restore its main function which is to link vehicular, pedestrian and cycle traffic and recreate Via Appia parking areas, typical of the Regina Viarum for the refreshment of new travellers.

Regina Viarum

Via Appia Antica

The construction of the Regina Viarum represented in ancient times an event of extraordinary importance. The historical implications of its construction involved more than half of the population of the Mediterranean for over a millennium.
“He dug the hills, valleys and chasms, drew terraces with wonderful minds; spent all the state revenue, but he left himself in the immortal memory for having been ambitious in the “public interest”. Diodorus of Sicily with these extraordinarily encomiastic words celebrates the virtues of the censor Appius Claudius Caecus, recognized as the architect of the Via Appia: An infrastructure that not only constituted the first major road linking Rome and the Greeks, as well as the excellence of construction techniques adopted, but also represented a masterpiece of road engineering that for a long time was unsurpassed. [1]
The Regina Viarum was built in several stages: the first stretch from Rome to Capua around 312 BC, the second around 268 BC extended to Benevento, while the third section was built around 191 BC., reaching Brindisi.
The Via Appia, being strongly linked to the process of Romanization of southern Italy, was prolonged as the Empire conquered southern Italy: first to Benevento, shortly after 268 BC, then through the Apennines to Venosa and onto Taranto . Finally, in the second century BC, it reached Brindisi, the main port for ships bound for Greece and the East. Over the years, the original course from Benevento to Brindisi was gradually replaced by a shorter, easier through the region of Puglia until, in the early second century AD, the Emperor Trajan turned it into an alternative route and gave it his

name. The new Via Appia Traiana allowed travellers to go from Rome to Brindisi in 13-14 days for a total of 365 miles, a little less than 540 km.
For the first 90 km, the Via connects Rome and Terracina with a straight road. After Terracina, the road heads towards Fondi, through towering gorges of Itri and then down to Formia, Minturno and Sinuessa (today Mondragone), from there straight back to Casilinum (now Capua), on the Volturno River and then to the ancient city of Capua (today Santa Maria Capua Vetere).
The construction of the first section was in the middle of the Second Samnite War and the Roman expansion in Campania. Its creation represented a significant political act of the Roman settlement process in Campania. Appius Claudius, in fact, intended to reach as quickly as possible Capua, goal of military operations, providing an alternative to the path traced by the Via Latina (i.e., approximately the current Casilina) The Via Latina, like all the roads at that time, was not formed by a path but had developed spontaneously from the connection between the centre and the contiguous centre, so as to be in the end a long and tortuous route.
The maritime side was however, until then, almost impassable, being barred from the Pontine Marshes, the mountains Lepini, Musoni ed Aurunci, the marshes and estuaries of major rivers such as the Garigliano and Volturno. The Via Appia, being realized through these territories, immediately formed a completely new model in the context of communications. It was designed as a main highway, through a geographical area that was so difficult, not only from an environmental perspective, but also that time showed supra. This road was an extraordinary technological and engineering achievement, with the emergence of a rational design even at the cost of extreme sacrifices, above adversity, which however was not disarmed by wanting to carry out the construction.
It can be compared conceptually to modern motorways, with the major cities encountered along the route being connected by means of secondary roads. Brindisi was seen as the ultimate goal of a long distance. The course was led to this on a perfect straight lines, pointing and passes the steps required by the geography of the local landscapes, not worrying about the technical difficulties that may be encountered during its implementation in order to make quick path.
The fate of this original stretch of the Via Appia was related to the hydrogeological nature of the vast alluvial area. The particular clayey nature of the soil and the trend of the plain to be periodically flooded by the river that passed through, had induced the Roman builders to remove it from the wetlands. This led to a lengthening of the path and away from the straight path (preferred by the Romans), leading to a gradual bend in order to reach Capua.
Since Roman times the main road was the Via Appia that crosses the plain below while staying parallel to the river Volturno.
The last short section that is located in Capua reaches an area of lowlands, formed by alluvial sediments, consisting mainly of clayey – lime soil, strongly influenced by the rivers Volturno (south) and Agnena (north). These with their floods have made the inhospitable wetlands, so that the work carried out over the cenutries mainly focused on recuperating it.
The Via, near the Roman bridge of Capua on the Volturno, joins the Via Latina that descends from the north and connects the plains to the mountains.
Currently, while the route of the Via Latina is retraced in part by State Route 7, one part of the Via Appia is retraced by the main road Capua-Brezza which still constitutes an important artery of the territory along this road between Capua (more populated centre) and Brezza (a small hamlet consisting of a few houses, but with consistent Roman traces, known by the name of Villa Bretiae), where the houses are mostly distributed according to the Fascist land division plan, which also fill the areas near the road branches off to the north and south.
The lowland area between the two towns has always aroused the curiosity of many scholars who have interested in identifying the route of the Via Appia, since the eighteenth century. In particular, the most interesting findings of this stretch of the Via Appia are from G. Novi, who in the nineteenth century, during the excavation for the construction of the road Brezza - Capua, recognized several remains of the pavement of the ancient Via Appia, finally clarifying this part of its course.
Currently, scientific interest has increased, expanding from Roman times to the protohistoric period, thanks to important archaeological discoveries in response to other excavations carried out prior to construction of the Italian Aerospace Research Centre (CIRA) and the high-speed railway line (TAV).
Another stretch near Casilinum (ancient Latin name of the river port of Capua, where the Civitas capuana found refuge following the incursions of the Saracens) was reported by G. Novi. In fact, in 1858, in Poliorama Pittoresco G. Novi writes, “the new road from Capua leads to Brezza, it has laid bare a beautiful stretch of the Via Appia, so that in constructing the ditches of this new road, about three feet below ground level of the campaign (so about 1.20 am) magnificent remains of the Regina Viarum appeared. The new track of the ancient road axis, coinciding only for about half a mile along the defenses of Nunziatella and Frascale. "
Currently, the route of the Via Appia is traced by the main road Capua-Brezza, which is still the main artery of the area.

The most interesting findings on the Via Appia are due to G. Novi, who in the nineteenth century, during the excavation for the construction of the road Brezza-Capua, acknowledged that below it there were some remains of the paving of the Regina Viarum, clarifying definitely part of its course.
On the west side of the Via Appia, Casilinum consists of two straight paths, which meet near Masseria Bosco. The two sections are along the route of the nineteenth-century modern road Brezza – Capua, below which were found paving remains. The news reported by G. Novi about this discovery is very clear: “The track is composed of a layer of strong rubble laid by hand with great art ... the cover is a layer of rubble thicker than half a palm (12.5 cm), which combined with the aforementioned framework, presents a consolidated thickness of an inch and a half (37.5 cm). The road is crowned by both sides from the edge of travertine of the width of two feet. Towards the Brezza valley, there are big tufa stones.”
According to reports from the nineteenth century and the recovery of the paving remains, it is assumed that the path of the road Capua - Brezza largely coincides with the ancient Via Appia.
This hypothesis is confirmed in the study of cartographic data and the archaeological discoveries that prove the presence of perpendicular streets with Appia and the function of decumani.
Despite the Via Appia appearing to have been the scene of historical movements of particular importance: road for the Roman troops bound for Constantinople, a transit route for the merchants who came from the East to the Ionian cities, vital artery crossed by pilgrims in the Holy Land and Christians during the Crusades and today, it sees its archaeological, historical, monumental and landscape completely obliterated.
There is therefore a real need for a regeneration that leads to the never silenced roots, re-giving it the dignity of Regina Viarum.
For the regeneration of one of the first objectives, its main function should be to restored, that of carrying vehicular, pedestrian and cycle traffic and restoring ancient stop off areas, typical of the Via Appia, for the refreshment of new travellers.
Along the Regina Viarum, places for parking and admission of travelers and media have been recognized. The best preserved is located just downstream of the fort of St. Andrew, made from a hollow rectangular area on the uphill side of the road, while the downstream side is supported by a powerful wall in rectangular blocks taken from the same quarry and strengthened with concrete. The area is about fifty metres long and about fifty-two wide. This is not the only one along the Via Appia.
It could also serve to create a break in the traffic in case of overcrowding of the sanctuary of Apollo just above, with the road blocked by ceremonies of worship.
There are other laybys at regular intervals.
Despite the lack of maintenance even in 540, during the Gothic wars, the road was used daily and with no problems, and Procopius had words of admiration for the perfect state of basalt, saying: “Of all the roads, it is the most wonderful. The stones are joined so firmly as to give the viewer the impression of not being connected to each other, but to form a whole. Over the years, many have passed over them, day after day, cars and all kinds of people – however their structure has remained unchanged and not even one of the stones has split or torn, and they have not even lost their luster”.
Many changes were made on the Via Appia in 1500, most of which concern mainly the stretch from Rome to Capua. [2]
The stretch of the Via Appia between the Garigliano and Volturno is constituted by a series of tracks, almost shreds, which have nothing of the suggestiveness and monumentality of the road. They are, however, important fragments as elements for the reconstruction of route in Campania, that had yet to be finally drawn to this area where until a few years ago, when there was had occurred on rare occasions investigations particularly in the areas traversed by that road.
In the stretch of the Province of Caserta, the Via Appia knows both situations of extreme deterioration in the sense that it is entirely obliterated and its path is realized only by the presence of funerary monuments and situations of possible enhancement, since, in addition to neighbouring monuments, if they do not retain only the path but the complete paving of sidewalks, as is in the case of Sessa Aurunca and Mondragone.
The funerary monument that marks the path along the Via Appia Antica near Ancient Capua (today Santa Maria Capua Vetere) is the mausoleum of the Distaff, or simply the Distaff, The monument consists of three layers. The lowest, which contains the burial chamber, has a simple structure that supports another square body with rounded edges to form four columns at the sides and concave walls, in each of which there are formed a central niche with gabled roofs and two smaller side with arched vault. The upper drum, is divided equally in half-columns protruding and niches. Inside the base, a square-shaped burial chamber is of the type columbarium. Made from a single row that runs along the walls are eleven niches designed to accommodate the jars or urns containing the ashes of the deceased.
The long route of the Via could be structured with the inclusion of laybys for relaxation of travellers and small green areas to brighten the pedestrian promenade.

Small elements with educational and informative information on the historical route of the Via Appia could also be introduced. Thus, the journey becomes a journey aware thanks to multimedia videos that trace the Via Appia Antica.
The above described could be part of a larger project, which also includes areas, for the regeneration of the traveller, dedicated to physical well-being based on the judgement of fundamental importance for the Romans, from a line in Juvenalis (Sat. X, 356): Orandum est ut sit mens sana in corpore sano.

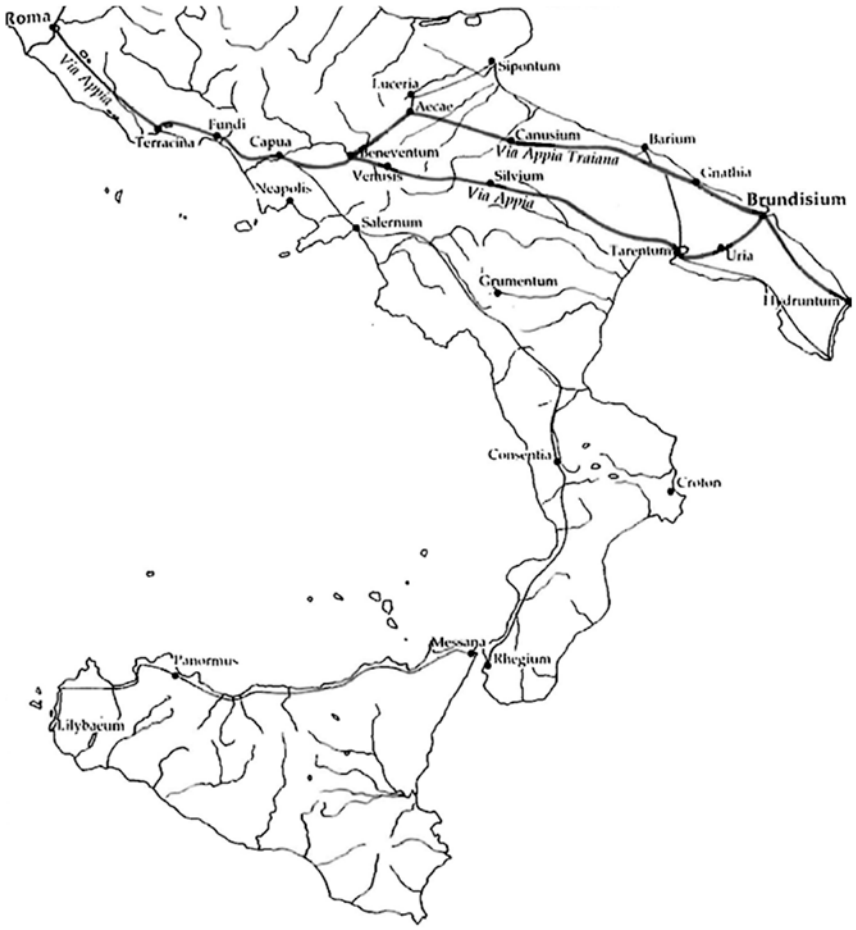

Fig. 1: via Appia Antica and Via Appia Traiana



Fig. 2: via Appia Antica _ Roma

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Landscape design and sustainable development: from smart City to the smart Land

Tatiana Kirilova Kirova[1], Davide Mezzino[2]

[1]Full Professor of Restoration, Department of Architecture and Design (DAD), Politecnico di Torino, 10125, Torino, Italy
[2]Ph.D. student in Cultural Heritage, Interuniversity Department of REGIONAL AND URBAN STUDIES AND PLANNING (DIST), Politecnico di Torino, 10125, Torino, Italy
tatianakirova@tiscali.it
davide.mezzino@gmail.com

Abstract

The paper aims at discussing the issues of the integration between planning, landscape and sustainability. These themes are nowadays very much debated internationally.

By now the cities' progress cannot be considered regardless of the territorial planning and Landscape design, dealing with different aspects such as sustainability, preservation, valorization of local specific features and attractions and the urban and territorial development.

These matters are considered in two recent debates: on one hand the Proposals concerning the desirability of a standard-setting Instrument on historic urban landscapes, General Conference, 36th Session, Paris 2011 and on the other hand the Sustainable Development Goal (SDGs) and the following updates from the United Nation Conference on Environment and Development (UNCED) in 1992 - also known as the Rio Summit - the last of which is the United Nations Conference on Sustainable Development held in 2012 - commonly called Rio+20. These statements are only an exemplification of a major debate that has originated the trend of including in the planning practices different themes. It should include technological solutions, social aspects, use of the new Information Communication Technologies (ICTs) to preserve and promote the local specific features and attractions as drivers for the growth and the territorial competitiveness.

Following the previous considerations it is necessary to move from the concept of *'smart City'* to extend the point of view in a territorial scale, disregarding political boundaries, considering elements of identity as well as historical, geomorphological and territorial features. The latters have characterized the territory and its development and these are potential elements for the definition of compact, connected and competitive areas: the '*smart Lands'.*

Subsequently to this initial stage of knowledge, a planning phase should follow as well as a communication strategy in the last stage. All these steps have to exploit the potentialities of the communication and information tools available, after having established a proper oversight interdisciplinary team. This working group should be able to supervise the integration among agriculture, food, cultural landscape planning, environmental preservation, sustainable regeneration and local development in order to guarantee an enduring growth. The suggestions outlined would allow a development both in the social and economic sphere that should not run out in the short period, in opposition with the unscrupulous logic that has dried out the territory, the landscape, the cultural heritage and has led to a loss of identity of the places, justified by a misleading economic profit.

Keywords: landscape, enhancement, sustainable development, smart Land.

1. Introduction

Being aware of the necessity to orientate into the same direction Landscape Design, Urban Development and Economic Planning, the paper will provide some different case studies to show how these leanings could be developed in practice.

First of all we will present the set of problems of sites in danger, which have been affected by catastrophic events as earthquakes, conflicts and wars. Following the analysis of different examples we will try to outline possible suggestions to develop '*best practices*' exploiting these tragic events as opportunities, quoting the philosopher Gian Battista Vico[1]: *"Paiono traversie ma sono opportunità*". Indeed it is important to exploit these tragic episodes changing them into possible drivers of a new territorial development through an innovative reconstruction. Features of innovation are represented by the integration of different aspects, as the environmental and sustainability issues, the social integration, the smart infrastructures and the promotion of the material and immaterial heritage. The second part will focus on the reuse of urban and territorial areas, offering two different examples of how a territorial development guided by the recovery of the spirit of the places could have positive effects in terms of growth and employment.

2. Sites affected by tragic events: reconstruction and innovation

The first case study is the UNESCO site of the city of Kotor[2] and surrounding territory. This natural harbour on the Adriatic coast in Montenegro was an important artistic and commercial centre with its own famous schools of masonry and iconography during the Middle Ages, it was seriously damaged by the 1979 earthquake but the town has been restored, largely with UNESCO's help.



Fig. 1: The city of Kotor within its natural harbor, strongly damaged by the earthquake of 1979.

After the tragic event of the 15 April 1979 the city was evacuated. Most of Kotor's palaces and houses, many b churches, all of Dobrota's palaces and Perast's main buildings have all suffered because of the earthquake and some of them have been partly destroyed. An intensive restoration and reconstruction programme has now been completed and the city is flourishing again. This operation has been successful because of the general aim of preserving the cultural features for a new birth. Another similar case is the city of Bam[3] and its Cultural Landscape, situated in a desert environment on the southern edge of the Iranian

[1] Giovan Battista Vico (1668–1744) was an Italian political philosopher, rhetorician, historian, and jurist.

[2] Throughout the centuries, many empires battled to control of the city. In the 10th century, it was an autonomous city of the Byzantine Empire. From 1186 to 1371, it was a free city of medieval Serbia. It was under Venetian and Hungarian control for brief periods, an independent republic from 1395 to 1420, and then returned to Venetian control once again. French occupation from 1807 to 1914 was followed by Austrian rule until 1918, when Kotor finally became part of Yugoslavia.

[3] The origins of Bam can be traced back to the Achaemenid period (6th to 4th centuries BC). Its heyday was from the 7th to 11th centuries, being at the crossroads of important trade routes and known for the production of silk and cotton garments. The existence of

high plateau, inscribed in the World Heritage List (WHL) in 2004. Following 2003 earthquake, a team of experts coordinated by UNESCO Tehran Cluster Office, Iranian Cultural Heritage, Handicraft Tourism Organization (ICHHTO) and the main management authority prepared a Comprehensive Management Plan, 2008-2017, which covers the World Heritage property and was developed through a process involving local authorities of the County, the five Districts and the municipalities of Bam and Baravat.



Fig. 2: The Site of Bam, before and after the reconstruction.

Conservation and management actions in the sites need to guarantee the preservation and communication of all key characteristics of the Citadel and the other architectural remains in the inscribed Site. The re-establishment of some of the pre-earthquake conditions will need to follow international conventions and charters to ensure that the conditions of authenticity and integrity continue to be met. At the same time, conservation and protection of the World Heritage Site requires a balanced approach in order to confer it its own place in the living culture.

The most emblematic Italian case of reconstruction, still in progress, is taking place in the city of Aquila. The first steps towards the 'smart reconstruction' after the devastating earthquake that affected the city in 2009 have been taken, introducing an innovative and updated urban system to optimize the management of water, energy, public and private space, time, traffic, green spaces and general services.

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life in the oasis was based on the underground irrigation canals, the *qanāts,* of which Bam has preserved some of the earliest evidence in Iran. Arg-e Bam is the most representative example of a fortified medieval town built in vernacular technique using mud layers (*Chineh*). Bam and its Cultural Landscape represents an outstanding example of an ancient fortified settlement that developed around the Iranian central plateau and is an exceptional testimony to the development of a trading settlement in the desert environment of the Central Asian region. This impressive construction undoubtedly represents the climax and is the most important achievement of its type not only in the area of Bam but also in a much wider cultural region of Western Asia. Bam is located in an oasis area, the existence of which has been based on the use of underground water canals, *qanāts,* and has preserved evidence of the technological development in the building and maintenance of the *qanāts* over more than two millennia. For centuries, Bam had a strategic location on the Silk Roads connecting it to Central Asia in the east, the Persian Gulf in the south, as well as Egypt in the west and it is an example of the interaction of the various influences. The cultural landscape of Bam is an important representation of the interaction between man and nature and retains a rich resource of ancient canalizations, settlements and forts as landmarks and as a tangible evidence of the evolution of the area.



Fig. 3: The city of Aquila after the earthquake.

Some examples are the smart street lights[4] that have to be realized around the city centre, the so called '*smart-ring*'.
Another one of the many projects in progress is VITALE (Visiting Abruzzo: an intelligence experience). It consists in an application of augmented reality that allows users an open access to all useful information related to the historical and cultural features of the monuments and most representative places of the city. News always updated about the work in progress in the restoration site are also available. An additional initiative is the platform *Capoluogo.com*, a research driver continuously updated, engineered with the purpose of making available useful materials on the web: documents, interview, pictures, historic information, etc., related with the political, social and cultural history of the Abruzzo Region.



Fig. 4: The surrounding urban areas of Aquila strongly damaged by the earthquake.

As technologies and material capacities are provided, it is necessary to develop the *know how* in order to start a crucial challenge also considering the opportunities given by the European Capital of Culture 2019, important driver for potential economic and social income. Enterprise business sector is an unavoidable element for the success of the actions presented, as its involvement is a key element in the strategy along the architectural-cultural, planning and technological ones. All the choices must take into account the territorial social aspects and the local authorities will have to coordinate these actions together with others interlocutors. Very important indeed is the creation of public-private partnerships involving all the actors that work together for the preservation of the common goods within urban and territorial areas.

[4] '*Smart*' because they modulate the light intensity automatically depending on the passage of cars and pedestrians. In addition they have integrated system to monitor air quality and traffic flow as well as cameras to monitor and guarantee urban security.

3. Urban and territorial reuse: identity and development

Other interesting experiences are those related to the reconversion of urban and territorial areas through culture and landscape, intended also in their productive meaning, as drivers for growth and development. The city of Matera, a small size provincial capital in the region of Basilicata in the southern part of Italy, is an example of these transformations. It is quite known for its UNESCO site[5] - the old town of the so-called Sassi, literally "rocks" - which has been the first World Heritage Site recognized according to the category of cultural landscape. This recognition is due to the outstanding value of the historic town development and its relationship with the natural environment. After having been used for centuries to host inhabitants, animals and activities, the development of a new urban center and later of rural neighborhoods and suburban districts started the process of marginalization and the rise of dramatic living conditions within the historical Site. The Sassi suffered a complete decay until the recent rehabilitation projects where started, converting them into cultural and touristic venues. Meanwhile, Matera settlement was completely transformed, following the economical booming and the belief in the industrialization of southern Italy's former agricultural centers. Recently (January 2013) through the Piano Nazionale Città the municipality of Matera obtained by the government funds to regenerate urban areas[6]. A combination of "soft" projects working together could start giving the city visibility in the touristic circuits. The main orientations should be addressed to reconnect the urban fabric with the countryside, working on the peripheral belt and, at the same time, to prevent the urban sprawl, supporting the renovation of the inner city, also reusing and reactivating the large number of empty spaces and buildings, not just in the Sassi, but also in the more recent districts.

3.1 The metropolitan areas: local identities and networking against the de-growth

One of the reforms adopted to face the current economic crisis by the Italian government under Mario Monti this year is the bill 35/2012 converted to law 135, also referred to as the final part of the spending review. This law decrees the abolition of 64 provinces[7] and from 1st January 2014 the suppression of the provinces of Roma, Torino, Milano, Venezia, Genova, Bologna, Firenze, Bari, Napoli and Reggio Calabria, and their conversion into counties (città metropolitane). This is part of process aimed at increasing economic competitiveness on an international level. Indeed nowadays in the worldwide geography of development, the territorial system of growth around large urban realities has gained importance as a global economy factor. An example of application of these processes can be the metropolitan area of Turin, where the change of its status from provincial administration to county would bring about a simplification of the procedures of intervention and an improvement of the coordination - for example - at the level of common infrastructures, networks, planning, economic development and transportation policies. In the metropolitan area of Turin it would be interesting to consider how to re-shape the new infrastructure network (by re-using where possible the already existing tracks) to connect the sprawl of the urban monuments to the clusters in regeneration. For instance the network of the 'Residenze Sabaude'[8], consisting of sixteen Castles located in the metropolitan area of Turin, thanks to the county authority could have the possibility of improve their value within their clusters and enhance their promotion through the creation of new infrastructures to connect (in a more efficient way) between themselves and with Turin.

[5] The UNESCO protected site includes the old town and the Parco Naturale della Murgia Materana, a natural park facing the Sassi and extended along the Gravina, the river and the canyon it created in the millennia.

[6] For a total amount of 17 millions Euros.

[7] With less than 350,000 inhabitants, or an area smaller than 250 km2.

[8] Residences of the Royal House of Savoy in and around Turin represent a comprehensive overview of European monumental architecture in the 17th and 18th centuries, using style, dimensions, and space to illustrate - in an exceptional way - the prevailing doctrine of absolute monarchy in material terms.

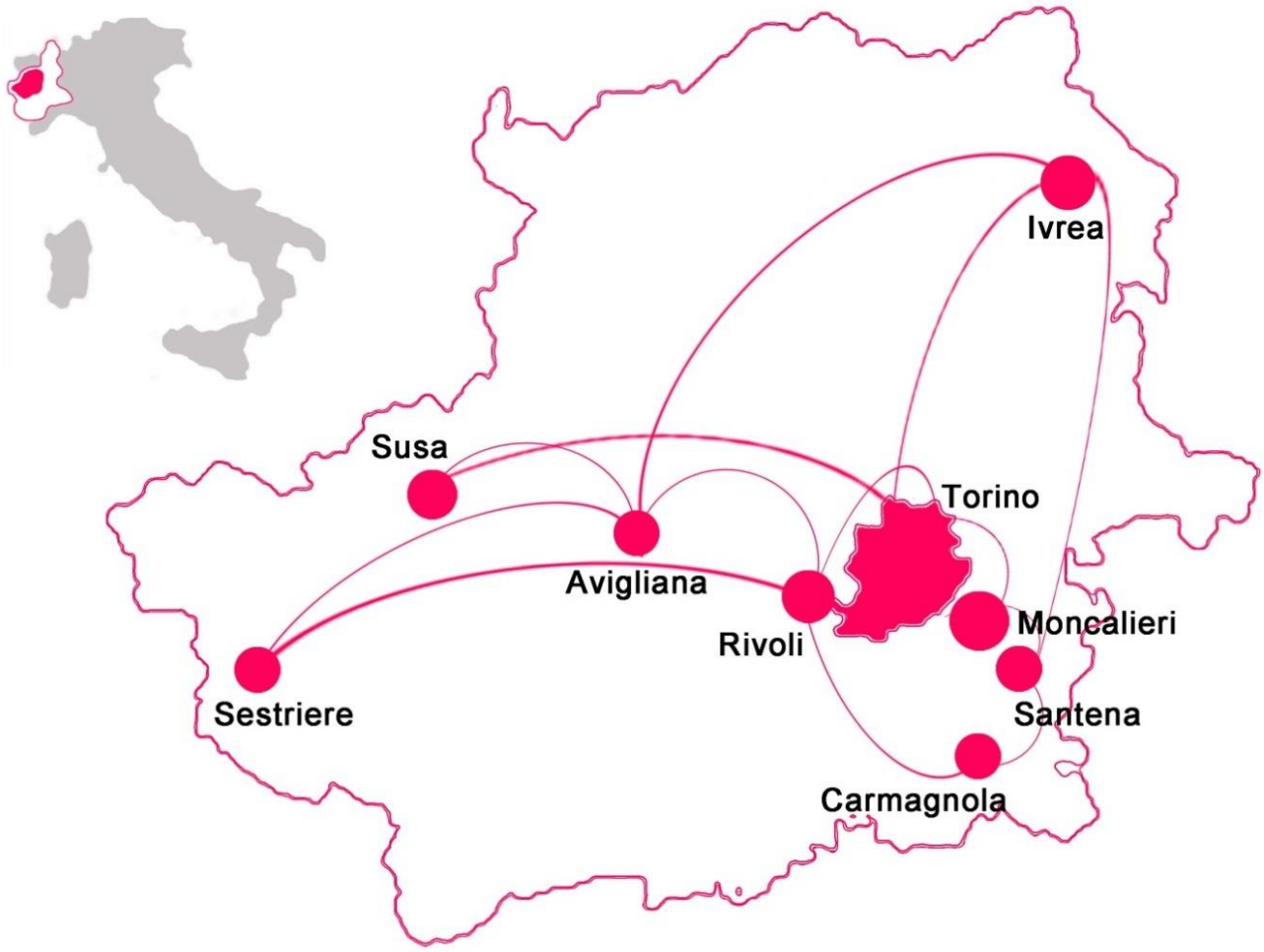

Fig. 5: Net of the Residences of the Royal House of Savoy in the Turin metropolitan area.

This could be feasible because of the new competences of the county in territorial planning, the creation of system of coordinated management of public service and organization of public services of general interest for the urban area. In addition this cultural net could interconnect other clusters with a territorial value, strongly linked with the local inhabitants i.e. ex industrial-productive areas. For instance in Turin the old 'Manifattura Tabacchi' is an example of district developed totally in dependence of this big factory, specialized in the production of cigars. After the closedown of the fabric, in 1996, the area was affected by a big depression. The following years witnessed some initiatives aimed at reusing this area by starting to rent it to private enterprise (Rete7 S.p.A.) or to public institution (Università di Torino, UNITO). Despite this, wide sectors of the area are still abandoned. New initiatives carried forward by partnership public-private, could give efficient solution in reusing the spaces and could bring new life to the area, having as central engine of this action the Manifattura Tabacchi, a building still strongly felt by the local population as an element of aggregation. Furthermore the building is located on the foundation of the '*Castello del Viboccone*', a castle of the Savoia dynasty[9], part of the original project of the '*Corona di Delizie*'[10], fact that makes stronger and more interesting an interconnection with the other 'Residenze sabaude' by creating new infrastructure to connect the cluster rethought and concentrated around them as elements of aggregation, and by reusing and re-establishing the existing ones when possible. This could be an example of how in a framework of contraction and re-thinking of the urban space, within the statement of the new county authorities, it is possible to integrate different clusters that, despite different identities, can be connected in some way between them with mutual benefit. The cluster regeneration in this framework is the goal to reach by

[9] Destroyed in 1706 by the French army during the siege of Turin.

[10] Term introduced by Amedeo di Castellamonte to define the system of the Royal Residences within his book ""La Venaria" 1674.

engaging with the inhabitants through a conscious territorial analysis, including all its aspects (social, economic, cultural, etc.) for a new physical arrangement and new social opportunities at the same time. In this way it would be possible to face the de-growth, not with previsions and models of an improbable future new growth but within a conscious de-growth framework, rethinking the territorial entities starting from their history and distinctive elements.

4. Conclusions

The setting of proposals presented is oriented to explore the issues related to sustainable regeneration, to the exploitation of local resources, offering some examples of intervention in different contexts. We do not need cities showing off big works, buildings and infrastructures of questionable utility, but territories capable to take advantage from their own local features, using them as points of strength in order to renovate themselves. In conclusion it is necessary to define innovative participative models for the reconstruction, reuse and development of urban areas within their territorial context, using the cultural heritage as drivers for social and economic growth.

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