Università
di **Genova**

De_*Sign*
Environment Landscape City

a cura di Giulia Pellegri

2019

GENOVA
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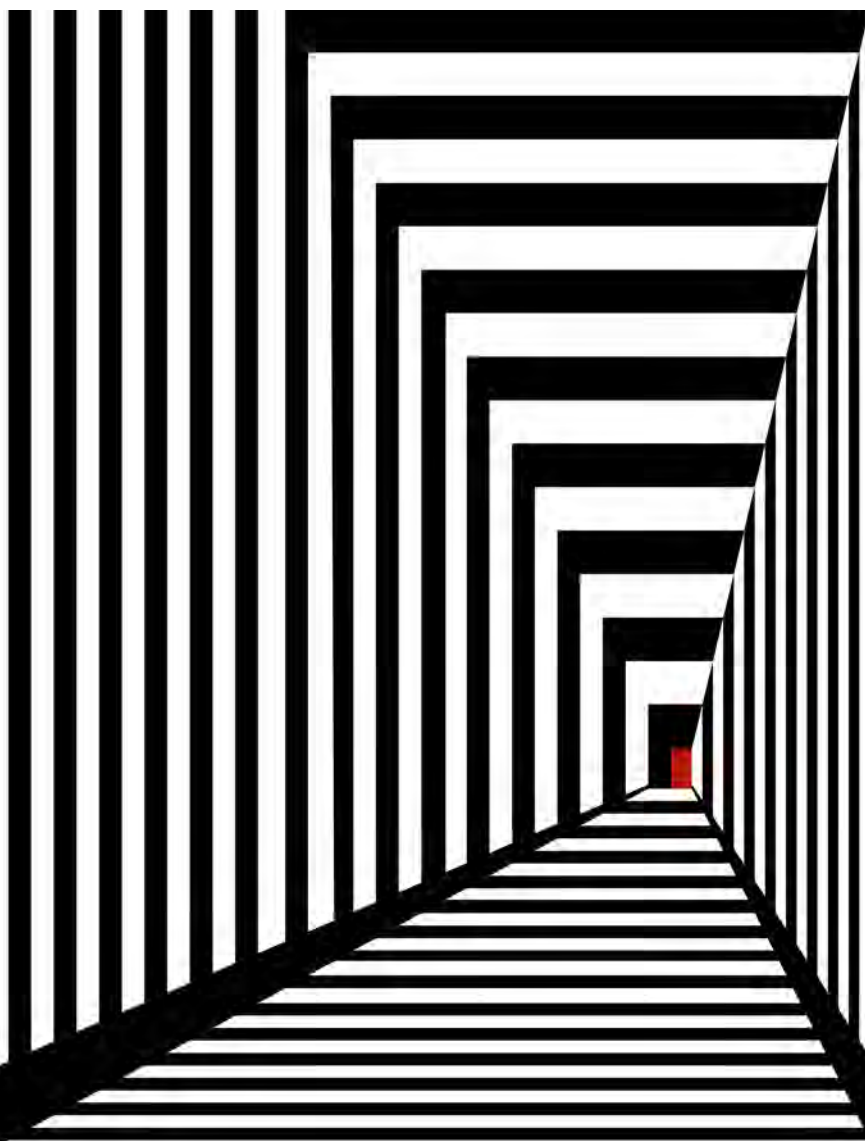
De-*Sign* Environment Landscape City/Di-*Segnare* Ambiente Paesaggio Città

International Drawing Study Day/Giornata Internazionale di Studi

Genoa May 28, 2019 /Genova, 28 Maggio 2019

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De- Sign
Environment Landscape City_ 2019

a cura di

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CONTENTS/CONTENUTI

Una giornata, a livello internazionale, nell'ambito del progetto Di-SEGNARE, certamente importante per gli studenti, gli operatori, ma anche per la città; per questo motivo ringrazio Chris Bangle per la sua Lectio Magistralis e auspico una rinnovata collaborazione con l'Università, nello specifico con il dipartimento di Architettura e Design_DAD scuola politecnica Ingegneria Architettura di Genova, che ha organizzato questo incontro. Una giornata di studi sicuramente importante anche per il Comune, che è l'Ente preposto alla programmazione, alla gestione e allo sviluppo del territorio urbano e dei suoi servizi. Azioni, quelle poste in discussione, che si riversano su tutto l'indotto culturale, economico e turistico della città come stabilito anche dal "codice dei Beni Culturali e del Paesaggio". I Colori e il disegno rappresentano le basi per la valorizzazione e la conservazione dei nostri beni architettonici, in parte riconosciuti dall'UNESCO e sede di alcuni nostri prestigiosi Musei, ma anche della maggior parte del nostro territorio. Non possiamo infatti dimenticare alcune zone della città, in particolare quelle che hanno conosciuto lo sviluppo industriale degli anni '60-'70, pur conservando al loro interno importanti plessi storici. Fra queste anche quelle portate all'attenzione dalla tragedia del ponte Morandi, che ha messo i riflettori sulla quotidianità di questi quartieri genovesi, per cui stiamo lavorando con l'obiettivo di migliorare la vivibilità e l'estetica di queste zone, grazie anche a nuove forme artistiche come il graffitismo o anche a nuovi percorsi organizzati alle fortificazioni della città.

Ringrazio quindi tutti gli organizzatori di questa importante giornata di studi che certamente porterà a nuove idee e prospettive per il decoro di Genova.

Barbara Grosso

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An international day, within the De-SIGN project, certainly important for students, operators but also for the city; for this reason I thank Chris Bangle for his Lectio Magistralis and I hope for a renewed collaboration with our University, specifically with the Department of Architecture and Design_DAD Polytechnic School of Architecture of Genoa, which organized this meeting.

A day of studies is also of importance for the Municipality, which is the body in charge of planning, managing and developing the urban territory and its services. Actions, those brought into question, which are poured on all the cultural, economic and tourist satellite activities of the city as established also by the "Code of Cultural Heritage and Landscape". The Colours and the design represent the bases for the promotion and the conservation of our architectural assets, partly recognized by UNESCO and home to some of our prestigious Museums, but also to most of our territory.

We cannot forget some areas of the city, in particular those that experienced the industrial development of the 60s and 70s while retaining important historical buildings, including those brought to the attention of the Morandi bridge tragedy. The event put the spotlight on the everyday life of these Genoese neighbourhoods, for which we are working to improve the livability and aesthetics of these areas, thanks also to new art forms such as graffiti art or even to new routes organized at the city fortifications.

I therefore thank all the organizers of this important day of study that will certainly lead to new ideas and perspectives for the decorum of Genoa.

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Digital survey: three- dimensional modelling and representation of a vessel

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Abstract

The science of Metric Geometric Survey, together with surveying, implements the analysis of an object of study including the characteristics of position, shape and geometry.

The tools and advanced surveying techniques available today increasingly meet the needs of data acquisition and highly precise metric description and, in order to obtain a multi-dimensional display that responds to an accurate metric description of the asset analyzed.

The acquisition and processing of data follows appropriate methodologies, taking into account the characteristics of each technique both in terms of intrinsic capabilities, such as accuracy, precision and format of data, with the aim of including all products in a common database, even for documentary and popular purposes. This study investigates the techniques of threedimensional scanning in the naval field, but specifically meets the current needs for data acquisition and cataloguing of historical ships. The three-dimensional scanning is then tested in particular on medium-sized historical vessels, aimed at the preservation and archiving of data acquired on multiple levels of interest, for the creation of an appropriate cataloguing of existing heritage.

Abstract

La scienza del Rilievo metrico geometrico, unitamente al rilevamento, pone in essere l'analisi relativa ad un oggetto di studio includendo le caratteristiche di posizione, forma e geometria.

Gli strumenti e le tecniche avanzate di rilievo, ad oggi a disposizione, sempre più rispondono alle esigenze di acquisizione dei dati e descrizione metrica altamente precisa e, al fine di ottenere una visualizzazione a più dimensioni che risponda ad una descrizione metrica accurata del bene analizzato. L'acquisizione ed il processamento dei dati segue appropriate metodologie, prendendo in considerazione le caratteristiche di ogni tecnica sia in termine di capacità intrinseche, come ad esempio precisione, accuratezza e formato dei dati, con lo scopo di inserire tutti i prodotti in un comune database, anche ai fini documentari e divulgativi.

Questo studio approfondisce le tecniche di scansione tridimensionale in ambito navale, ma nello specifico incontra le attuali esigenze di acquisizione di dati e catalogazione del naviglio storico. La scansione tridimensionale viene quindi sperimentata in particolare sulle imbarcazioni storiche di medie dimensioni, finalizzata alla conservazione e l'archiviazione dei dati acquisiti su più livelli di interesse, per la realizzazione di una appropriata catalogazione del patrimonio esistente.

Introduction
The importance of survey for nautical design and nautical restoration projects

Starting from 2000s, the economic, social and cultural evolution linked to the boating industry finds new interests in the project of the existing. This practice finds place alongside projects of new vessels, closing the circle of the design of the entire life cycle of boats, including their end of life and, furthermore, a new life for boats apparently abandoned.

The design of the existing is divided into two main areas: refitting and restoration.

The first allows a full freedom of transformation of the boat in total harmony with the will of the owner; conversely, the second is focused on boats characterized by important historical and cultural values that, following the peculiarities of restoration projects, should be preserved and passed down to posterity (Zignego, 2012).

Contextualizing the paper on historical vessels, recent events such as the constitution in October 2019 of FIBaS (Federazione Italiana Barche Storiche - Italian Federation of Historical Boats) show the consolidated interest in this sector[1].

This has considerable consequences for the industry: shipyards acquire orders deriving not only from new constructions but also from the recovery. As a consequence we can see a diversification of the offer and greater development possibilities; in the same way, the few shipyards specialised in wood constructions still existing today, acquire new orders; the figure of the shipwrights, a historical personality strongly rooted in the culture of our country that seemed almost extinct, finds a renovated purpose in life, becoming attractive to younger generations; from the cultural point of view there is

[1] Since 1982, year of foundation of the Associazione Italiana Vele d'Epoca (AIVE) and of the first Veteran Boat Rally Porto Cervo (Morozzo, 2018, p.34-35), in Italy there have been numerous sporting and cultural events aimed at enhance the historical boating industry, a sign of the growing interest in the sector. The constitution of FIBaS in 2019 consolidates this feeling by bringing together for the first time the great number of Italian associations dealing with nautical heritage.

an emerging interest in the history of ancient boats and in their tangible and intangible heritage that distinguishes them.

These premises lead to the need for professional figures dedicated to the recovery project. Therefore, the training of the naval and nautical designer is recently completed by requirements also aimed at recovering the existing.

For the project of recovery, whether refitting or restoration, skills and tools more focused on analysis and survey are[2] needed. In this type of design, we cannot start from a blank sheet, quite the opposite. The analysis of the history, of the construction typologies and therefore the knowledge of the constraints deriving from the historical-cultural value of the boat assume a role more important as closer we get to the field of restoration and away from that of refitting.

Therefore, in this context the importance of surveying the vessel is of fundamental importance.

In the case of refitting, the primary purpose of the survey is to obtain a basis for designing. Here, there is no need for a complete survey if the boat already has got full documentation.

In the case of the restoration, the survey assumes at the same time the role of an instrument of investigation, design, conservation and enhancement: it allows the freezing of the state of the art of the boat; it is useful to make comparisons between the current state and the original state; it allows to obtain the reference drawings for designing the interventions; it provides material for the enhancement and cultural dissemination of the boat.

The research group of DAD (Department of Architecture and Design of the University of Genoa) recently proposed to set up a Portal of Nautical Heritage, a digital archive of maritime heritage that glimpses in the creation of virtual models visible with augmented reality technologies a strong potential for enjoying cultural heritages that are not usually accessible (Morozzo della Rocca, 2018). Today, the most commonly used instruments for the survey of historical boats are the traditional ones. Therefore, the process that we usually follow to obtain two-dimensional and three-dimensional drawings is: planning of the survey; production of eidotypes; preparation of the boat (positioning of landmarks); measurements; production of the drawing; verifications and further surveys; completion of the 2D drawing; production of the 3D model.

The process just mentioned, leads to two-dimensional drawings and 3D models whose accuracy depends on the experience and the ability of the operator. Some cases studies of application carried out at the university with the participation of students of the Master's Degree Course in Naval and Nautical Design (University of Genoa, Polo Marconi della Spezia) have shown a margin of error of less than 5 cm on boats of about 15 meters in length[3].

The time needed for surveying is directly proportional to the size of the vessel, to the level of detail required and to the number of workers. For the same case studies mentioned above, we have registered a timing of about 8 hours only for positioning the references and for taking the measurement with the work of two or three persons who surveyed the hull shapes, the deck and, for what concerns the interiors, the scanning of the bulkheads and the positioning of the main blocks.

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[2] As regards the specific sector of nautical restoration, to consolidate its importance in this context, the survey is a specific phase of the "guidelines for the nautical restoration process", an instrument that accompanies the designer through all phases of research, design and restoration of a boat (Zappia, 2019).

[3] The students of the Course of Industrial Design 1, Prof. M. C. Morozzo della Rocca, Master's Degree Course in Naval and Nautical Design (Unige) a.y. 2017-2018 surveyed the 1955 Forban V, cutter by the French designer E. Cornù. The students of the same course, a.y. 2018-2019, surveyed the motorsailer San Giuseppe Due, the first Italian boat to reach Antarctica led by Captain Giovanni Ajmone-Cat in 1969.

Within the nautical sector and particularly within the sector of historical vessels, the survey is assuming, day by day, greater importance. Similar sectors such as architecture and cultural heritage regularly use digital surveying techniques. The use of those techniques, although they achieved the nautical sector since a long time, is nowadays limited to a few cases and it is still often subordinated to traditional surveying techniques. The aim of this paper is to start a series of experiments for optimizing the survey of the historical boating sector through the use of digital survey technologies such as laser scanner and photogrammetric survey.

Methodology
From laser scanner to photogrammetry

The term R.E. or "Reverse Engineering" refers to a set of techniques aimed at acquiring the physical forms of an object for its evaluation and subsequent modifications. In practice, E.R. can be defined as the "design of a product through a digital model obtained from a point cloud obtained with the help of three-dimensional scanning tools of a physical object".
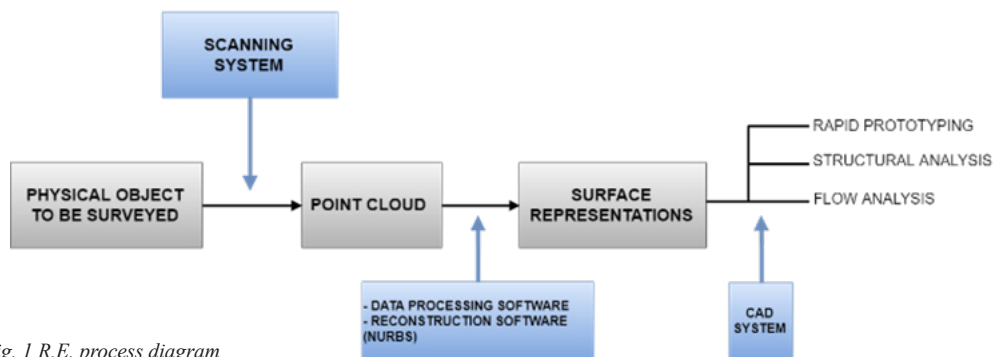
Fig. 1 R.E. process diagram

In many fields, 3d model implementations, which have heterogeneous characteristics, are becoming increasingly important. In the industrial and cultural heritage sector, the accuracy of the measure is crucial for their dissemination.

Among the surveying techniques used to produce digital models of surfaces, the traditional photogrammetry has been flanked by the laser scanning technique for some years now.

Photogrammetry is a technique now verified for the precise survey of three-dimensional structures, because the instrumentation, time and costs are variables verifiable and manageable also according to the specific requirements[4].

The use of photogrammetry for the generation of dense surface models is instead a little less widespread in the terrestrial sector, where tools such as the laser scanner are generally preferred because of their versatility and speed of acquisition, which allows to generate dense point clouds in a very short time. In many disciplines that require an in-depth knowledge of the object of study, such as recovery (both architectural/functional and structural), monitoring of cultural heritage and in-depth historical documentation, the survey represents the preliminary operation aimed at understanding and deep knowledge of the element.

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[4] (Gunn et al., 1988), (Ingram et al., 1989)

It is through this discipline, in fact, that one can identify, analyze and highlight the form, structure, individual elements, composition, the relationships between the parts and the whole, the material and chromatic characteristics, the state of conservation and any critical situations, historical evidence, temporal and spatial evolution.

The methodological operation of the survey, traditionally understood, consists of a series of actions whose final purpose is that of reproduction, through the graphic representation of the object studied. The phase of knowledge of the physicality of the object under investigation is characterized by two moments, that of the actual survey and that of restitution: the first, metric, to know its physicality and its morphological and material characteristics; the second to document, through the sign, its formal lines. The graphic restitution on the sheet of paper, which historically occurs with the identification of main reference planes on which to make a projection, is conditioned by an operation of abstraction with respect to the real perception of an object. In particular, the architectural structure consists of a three-dimensional volume and all the characteristic elements (metric, formal and chromatic information) that are detected and highlighted by the actions of relief, are distributed in three spatial dimensions. Therefore, it follows that the exclusive use of two-dimensional graphic supports inevitably leads to a loss of information on the three-dimensional components and relationships of the object under investigation.

The great difference introduced in the methodology of detection by the new high-resolution technologies consists precisely in continuously expanding, to the third dimension, the acquisition of the metric data and, above all, its representation, so as to allow a better and more intuitive understanding of the work in its three-dimensionality. Another difference introduced by these new technologies, compared to the traditional survey, consists in having the possibility to postpone to a second time (to the post-processing of data) the interpretation phase of the artefact, reserving to the campaign phase the acquisition of a large amount of data.

BIGRIN
Y.C.I

The case study: Bigrin

The boat chosen for the optimization of survey methodologies is Bigrin. Launched in Genoa in 1960 at the Beltrami Shipyards in Varazze, Bigrin is a sloop about 17 meters long and almost 4 meters wide. In 2018 it was donated by its last owner to the Yacht Club Italiano where it is currently located. The same year, following an unfortunate outing at sea that saw the boat take on water, it was put into dry dock to investigate the incident and to begin the procedure of investigation, design and restoration of the same.

The phase of survey[5] by photogrammetry was performed by the authors of this paper[6].

Attention has been paid to the potential of these methodologies, both in terms of their ability to characterize the object studied, and from the logistical/managerial point of view of the survey and return process, such as the ease (or difficulty) in acquiring, interpreting and managing data, as well as in assessing the consistency of the operator's intervention in process management and the possibility of integration with other techniques and scales of investigation.

An operation, therefore, that through the acquisition of data produces a digital model and then also a physical reproduction of the object detected and allows to manage a posteriori also a consistency control and therefore quality control for production or design purposes.

Acquisition methods can therefore be divided into:

- Methods for contact, further distinguishable in digital detection tools but with manual application, and traditional manuals with surveying tools (teams, plumb line, etc.).

- Non-contact methods such as laser scanners or photogrammetry.

As part of the Bigrin survey project, (fig. 1) two high-definition survey methods were analysed:

- Photogrammetry (image-based techniques), is part of passive optical systems (image-based techniques) in which the reconstruction of the geometric properties of the object under investigation takes place through a sensor that detects the radiation emitted or reflected by the object in a natural way, without the use of external artificial sources, and transforms it into an image.

- 3D laser scanning (range - based techniques) which is part of active optical systems, also called range-based techniques. This type of instrumentation is characterized by the presence of a source-sensor pair, in which the source emits some form of illuminating pattern and the sensor acquires the return signal reflected from the surface of the object.

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[5] See note 2.
[6] The survey was carried out as part of the agreement signed between the Italian Yacht Club and the Architecture and Design Department of the University of Genoa in April 2018.

Fig. 2 Bigrin boat located at YCI of Genova

Various indirect and photogrammetric survey techniques were compared: structure from motion and laser scanner.

The first phase of the photogrammetric survey made it possible to acquire a good amount of data in a reasonably short time. In order to acquire the necessary images, a detection campaign was carried out, using an SLR camera and taking the photos by holding the sensor parallel to the front to be detected, overlapping the shots by about one third.

The second phase of the survey campaign involved the use of the FARO laser scanner (Fig.3) for the acquisition of additional data to represent the model of the boat.
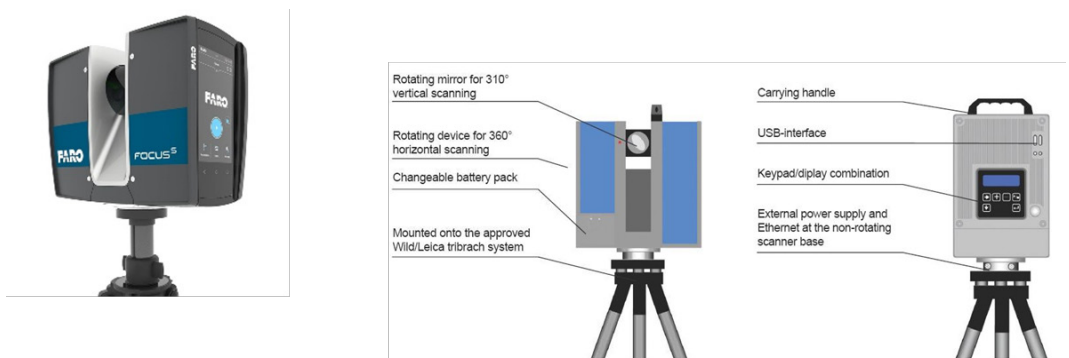
Fig.3 FARO Focus S high definition laser scanner for short range applications. https://www.microgeo.it/it/prodotti-e-soluzioni/20151-laser-scanner/laser-scanner-terrestri-modelli/faro-focus-m-70.aspx

Once the data was acquired, the images were processed with the 3df Zephyr software. The creation of the 3D model goes through five phases: photo alignment, point cloud creation, dense point cloud processing, mesh and texture creation.

The first phase concerns the alignment of the photographs taken during the survey campaign; the second phase, that is the realization of the sparse cloud, serves to identify the fundamental points to recreate the geometry of the artefact.

In the third phase with the creation of the dense cloud, the software closes the spaces between the points of the sparse cloud. In this phase, moreover, a color is associated to each point, simulating a texture in a discontinuous pattern. In the fourth phase from the dense cloud the program processes the mesh, a surface composed of triangular faces created by joining the points of the cloud. The number of faces of the mesh is in order of magnitude lower than those of the dense cloud. The mesh follows the geometry of the dense cloud, so the more accurate the cloud, the more precise the mesh. The last step is the creation of the texture. (Fig. 4)

Following the three-dimensional graphic rendering consistent with the actual dimensions, deductions of the water lines and deck shapes of the boat are allowed.

Once the three-dimensional survey and data processing phase was completed, a model navigable in space was obtained (Fig. 5) with appropriate modelling software and from which the two-dimensional drawings representative of the vessel in the two dimensions can be deduced.

Nuvola Sparsa

Nuvola Densa

Mesh

Mesh con Texture
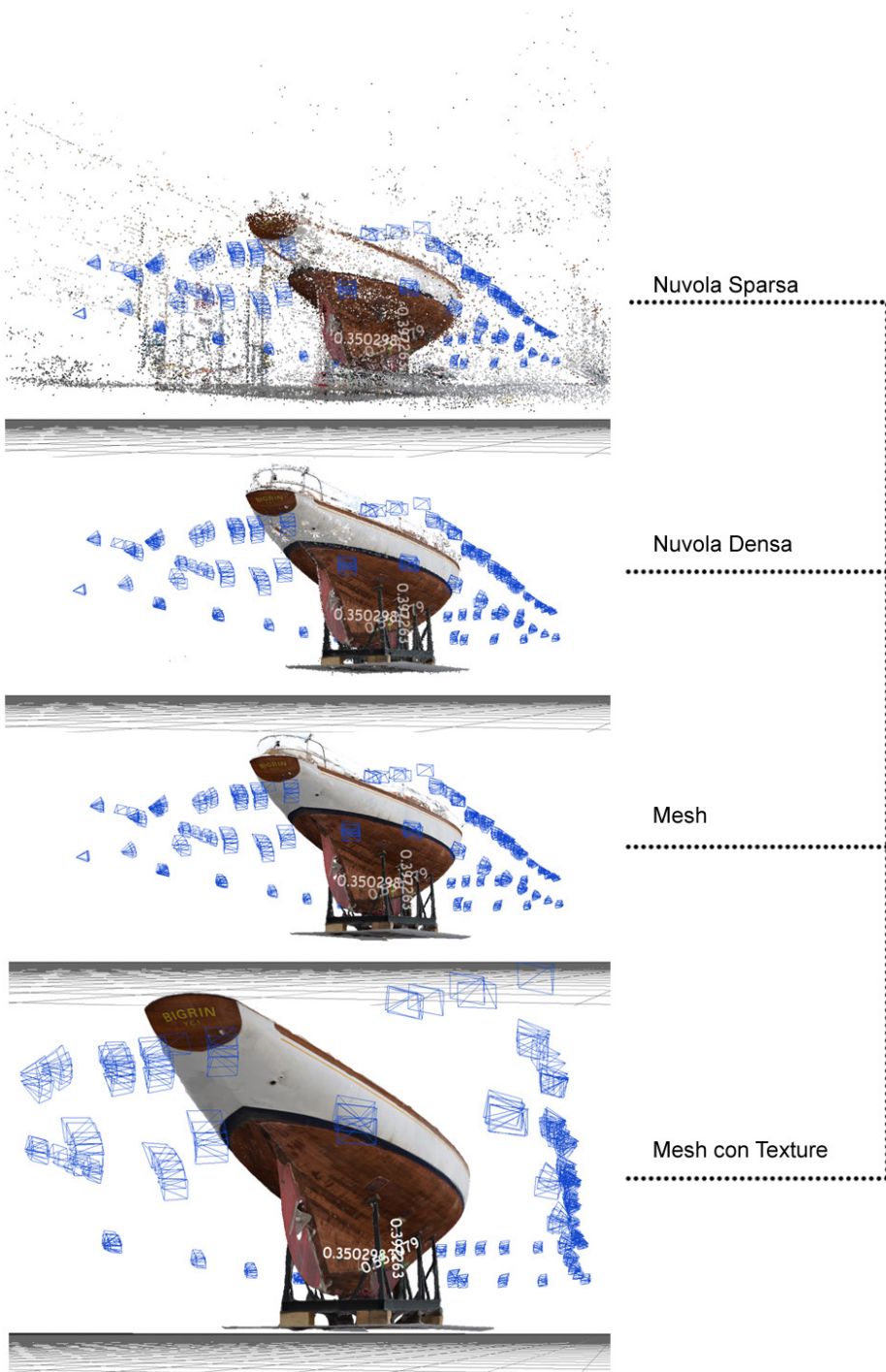
Fig. 4 Working pipeline for photogrammetric survey tructure from Motion
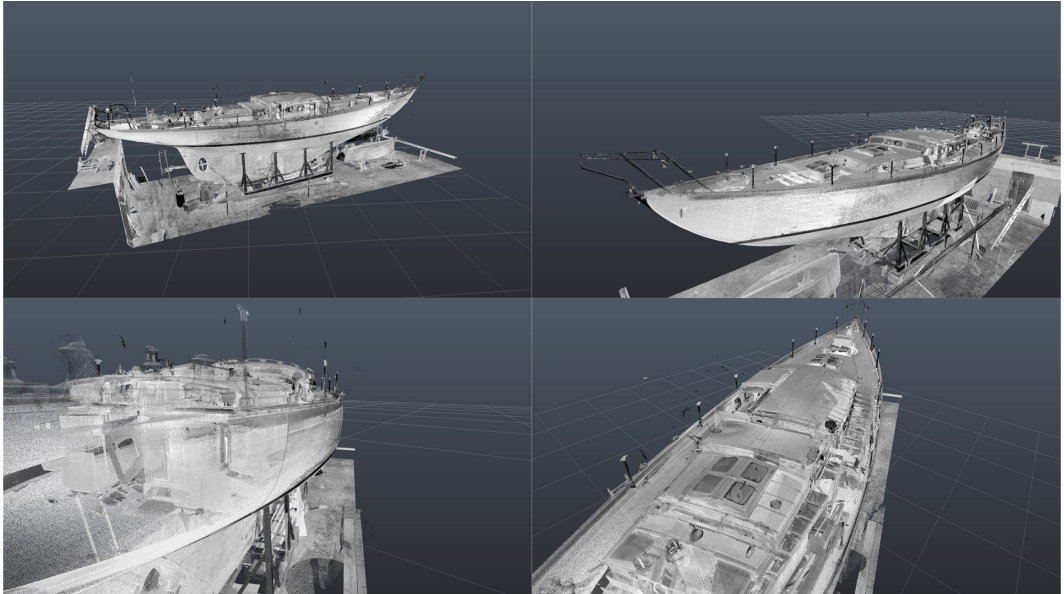
Fig. 5 Restitution survey with laser scanner for optimal data acquisition for returning the deck plan

Conclusions

The challenges that a designer must sustain in order to express his own thought are various, some of which are translating shapes into lines to be drawn on a sheet of paper, creating a synthesis, idealizing forms… The difficulties involved in redesigning an object that have not the regularity of the orthogonal planes and that is characterised by curved lines and complex geometries are even more evident.

Vessels, typified by curved lines, have no constant landmarks to be used for surveying. Normal deformations of the hull (especially the ones made of wood) due to the inevitable movement over time can imply a lack of cohesion which can lead mistakes. These just mentioned are part of the reasons why traditional survey is often very hard.

In this context, 3D laser scanner and Photogrammetry represent a first attempt for implementing and complete men's abilities especially when we cannot reach high levels of accuracy and rigor.

Completing the analysis of the experiments on Bigrin, we should judge the very added value of new technologies in relation to the objectives of the survey.

Starting from Photogrammetry, time of acquisition of an adequate number of photographs of good quality has been three days. Beyond making photographs, other factors to be taken into consideration are the weather that causes difference of brightness and the consequence calibration of the white colour of the camera, the space planning in order to obtain photographs at a constant distance from the boat. The cost of this operation can be evaluated considering a camera (even non-professional) and the time of the staff dedicated to planning and photographing the boat. Time for obtaining data decreases drastically when we consider the 3D laser scanner: about 2-3 hours for a total amount of 18 scanners (interiors and exteriors) in black and white. Nevertheless, costs, mainly due to the price of the scanner and of the software and the cost of the very specialised professionals, highly grow.

The comparison between timing of technological techniques and traditional technique show that photogrammetry and traditional survey are very similar. On the other way, 3D laser scanner needs lower time. For what concerns the following phases of realization of the nurbs 3D model and technical drawings that are the basis for making a project, technological methods and the traditional method follow opposite ways.

After making point cloud with Photogrammetry and 3D laser scanner, designers continue with the following phases: sectioning the point cloud; 3D modelling; drawing the bidimensional plan.

After acquiring the dimensional data with traditional survey, designers continue with the following phases: drawing the bidimensional plan; 3D modelling; drawing sections and details.

In conclusion, when the goal of the survey is to obtain technical bidimensional drawings for projecting, traditional survey is currently competitive. Depending on the accuracy that we need, traditional method appears quicker and more effective. In this context, high prices (3D laser scanner), similar timing (photogrammetry) and complex data processing which needs specific knowledges that overpass the usual vector drawing, play against the use of technological methods instead of traditional survey. The use of technological methods is successful when the final objective of the survey is to obtain texturized point cloud for 3D visualization of the boat that can be shown for example in a museum with the aim of enhancing and promoting the cultural good.

Finally, the aim of the paper is not to deny the great value that the use of 3D laser scanner and photogrammetry can add to naval and nautical design. Quite the opposite our aim is to push the scientific community to new experimentations and researches with the final goal of optimising the use of new technologies, making them suitable for the nautical context.

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Signs present of a lost past.
Medieval bridges in the territory of Garfagnana, Lucca.
Memory of a heritage to be recovered.

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Abstract

The project stems from the desire to promote and safeguard the medieval heritage of Tuscany, starting from the ancient itineraries and bridges that characterize a large part of the Luccan landscape. In order to do so, it is necessary to analyze and study these paths, something which is essential for their valorization and consequent recovery.

The territory involved in the research project is located between the Serchio river and its tributaries, precisely in the Municipalities of Fabbriche di Vergemoli, Gallicano, Molazzana and Castelnuovo di Garfagnana. It is a homogeneous system of internal areas characterized by a weak rural economy, located in a landscape, an environmental and archaeological-historical context, of considerable value. The first stage of the research that we carried out consisted of a surveying project, using 3D laser scanner digital technologies, for the realization of digital models in architectural scale and detail, tools which are necessary for subsequent critical analysis. The study has highlighted a widespread precariousness of the conditions of the medieval and sixteenth-century bridges and has allowed us to deepen our knowledge regarding those of San Michele, Castel Nuovo in Garfagnana, Pontecosi and several others.

The aim of the research is to set valid premises so that the territory, with its monumental heritage, can obtain a renewed visibility, and to start a recovery of the numerous bridges along the route, allowing residents and tourists to use the ancient roads of communication once again.

Abstract

Il progetto nasce dalla volontà di promuovere e salvaguardare il patrimonio medievale presente in Toscana, a partire dagli antichi itinerari e dai ponti che caratterizzano ampia parte del paesaggio lucchese. Per far questo si rende primariamente necessaria l'analisi e lo studio di tali percorsi, basi imprescindibili per la loro valorizzazione e il conseguente recupero.

Il territorio interessato è quello compreso tra il letto del fiume Serchio e dei suoi affluenti, precisamente nei Comuni di Fabbriche di Vergemoli, Gallicano, Molazzana e Castelnuovo di Garfagnana. Si tratta di un sistema omogeneo di aree interne ad economia debole di carattere rurale, che insistono però su un contesto ambientale, paesaggistico e storico-archeologico di rilevante pregio.

La prima fase lavorativa del progetto di rilievo ha visto l'impiego della tecnologia laser scanner 3D, per la realizzazione di modelli digitali in scala architettonica e di dettaglio, strumenti necessari alla successiva analisi critica. Lo studio ha evidenziato una diffusa precarietà delle condizioni dei ponti medioevali e cinquecenteschi e ha permesso di approfondire la conoscenza su quelli di San Michele, Castel Nuovo in Garfagnana, Pontecosi e diversi altri.

Obiettivo della ricerca è porre valide premesse perché il territorio con il suo patrimonio monumentale possa ottenere rinnovata visibilità e che sia altresì avviato il recupero dei numerosi ponti presenti lungo l'itinerario, permettendo agli abitanti e ai turisti di tornare ad usufruire delle antiche vie di comunicazione.

Introduction

Tuscany is a veritable open-air museum: art cities alternate with ancient villages and mountains to a harmonious landscape, shaped by man, among plowed hills and rows of cypress trees. These are the reasons why UNESCO recognized seven wonders in the region as World Heritage Sites. Among the places listed, the most famous are certainly the historical center of Florence, that of Siena and Piazza dei Miracoli in Pisa, on which stands the famous Leaning Tower. And yet, with its gentle hills, even the Val d'Orcia is a World Heritage Site, along with two of the richest villages in the Terre di Siena: Pienza, built according to Renaissance principles and San Gimignano, the city of towers. A total of 12 Villas and 2 Medicean Gardens[1] complete the list. Among spectacular panoramas, buildings and architectures of great harmony, in the territory there are also smaller villages, perched on mountains and for this reason gradually abandoned with the passing of time. The marvel of Tuscany seems to reveal itself little by little, through testimonies of history, art and literature spread over the territory and largely preserved and maintained, enhancing the cultural heritage, the products of the land and more generally the landscape. But beyond the Terre di Siena, Val d'Orcia and Valdichiana the paths of the Garfagnana must also be remembered, home to less famous villages, set in splendid mountain vegetation. Starting from this macro-analysis, it is interesting to promote and protect the medieval heritage present in the region, also paying attention to the ancient routes and bridges that largely characterize the landscape. Studying and analyzing these paths is therefore necessary for their promotion and subsequent recovery.

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[1] The data were obtained from the Tuscany Region. Consult the website www.regionetoscana.it for further information.

Squeezed between the Apuane Alps and the Tuscan Emilian Apennines, the Garfagnana is an interesting historical and geographical area with numerous itineraries articulated between ancient villages and medieval castles. The valley of the Serchio river which runs through it is rich in parks and caves,and is also the only flat area in the context of the Apennines and the Apuane that surround it. The variety of environments and natural sites ensure that the Garfagnana represents an area of rare scenic beauty, and of particular importance for the variety of flora and fauna of the Apennines.

Fig.1 Representation of the territory of Garfagnana (image take from the website. Http://www.mulinoisola.it/garfagnana.html?lg=it*)*

Among these mountains there is an ancient variant of the famous Via Francigena[2], the Via del Volto Santo, which from Pontremoli through the internal Lunigiana and then through the Garfagnana, touching villages and places of undeniable beauty allows you to reach Lucca in nine stages, on ancient muletracks. Il Volto Santo is the wooden reliquary statue which has been venerated in Lucca since 742: according to legend it was carved by Nicodemus who, with the help of Giuseppe D'Arimatea, deposited Christ in the sepulcher. Nicodemus sculpted just the body and fell asleep, but when he woke up he found that also the face had been carved. The story of how the Volto Santo reached its final location[3], the cathedral of Lucca, allows us to understand why it has become an object of worship and above all the reason for the splitting of the Via Francigena in the Lunigiana Garfagnana stretch.

[2] The Via Francigena, also known as Franchigena, Francisca or Romea, is part of a set of roads, called Romee routes, which from France led pilgrims, crusaders and men of faith in general towards, Rome. From here they continued onwards to Puglia and embarked for the Holy Land, their final destination.

[3] The Volto Santo is a wooden crucifix, which has been the object, of widespread veneration throughout Europe since the Middle Ages. It is currently preserved in San Martino's cathedral in Lucca; the great veneration for this relic has in fact eclipsed the patron saints of the city, San Martino and San Paolino and even given its name to the pilgrimage route that leads from Pontremoli to Lucca. Legend has it that the wooden face of the Messiah, carved in a miraculous way, had been embarked on a ship without a crew, free to sail at all winds, which finally arrived in the Tyrrhenian Sea, in front of the port of Luni. Here, the bishop of Lucca, Giovanni I, arrived after being warned by a dream of the presence of the Volto Santo on the ship, contended it against thepeople of Luni, and finally obtained it thanks to the appearance of some divine signs. (Guidi Nino, Verrini Oreste, La Via del Volto Santo. A piedi in Lunigiana e Garfagnana, Firenze, Le Lettere, 2015).

Following this new itinerary, in fact, the pilgrims departed from the usual seafront route, where the marshes abounded with the consequent risk of contracting diseases and moreover protected themselves from the brigands, who did not go as far as the Apennine trails. Studying the history of this pilgrimage makes it possible to know, step by step, the places that travelers used to visit and also it allows to identify the shelters, or more often the remains of these, where the devotees rested.

Fig.2 Map identifying the path of the Via Francigena and the way of the Volto Santo. At the top right the relic of the Volto Santo placed inside the Duomo of Lucca. (image taken from the website. http://blog.zingarate.com/luccadascoprire/cosa-vedere-a-lucca/)

The digital survey project

The territory involved in the project lies between the Serchio river and its tributaries, precisely in the Municipalities of Fabbriche di Vergemoli, Gallicano, Molazzana and Castelnuovo di Garfagnana. It is a homogeneous system of internal areas with a weak economy of a rural nature, which is however located in an environmental, landscape and archaeological-historical context of considerable value.

Fig.3 To the left a view of Fabbriche di Vergemoli. Water plays a leading role in the territory of Fabbriche di Vergemoli. It feeds the flow of rivers and since the beginning of the 20th century it produces the necessary energy for ironworks, mills and paper mills. Here some crafts survive, elsewhere forgotten, like the blacksmith of Gragliana, who uses an ancient hammer powered by the water or the cooper of Focchia, who continues skilfully building chestnut vats and barrels. Of considerable archaeological importance are also the caves present in the territory: the Grotta del Vento, a system of tunnels that owes its name to the currents that blow through its limestone corridors, or the Grotta di Castelvenere. To the right a view of Gallicano. It is said that Gallicano, a small village on the Volto Santo road, was named after the legionnaire Cornelio Gallicano, who received this land by the Romans as a reward for his feats. A rivalry started between Lucca and the dukes of Modena, the Este, to obtain control over Gallicano. for commercial reasons: the importance of hemp crops and weaving, as well as the fishing activities along the river "Turrite".

Applications and scientific results, perfected over years of experience by the LandscapeSurvey & Design Joint Laboratory of the University of Florence and the LRA Laboratory of Survey of the Department of Architecture of the same university, have refined a system of advanced technologies in the survey field for the digital documentation of the architectural and archaeological heritage. The project, concerning the digital survey of the medieval bridges of: Fabbriche di Vergemoli, Molazzana, Fiattone, Pontecosi, Castelnuovo, Castiglioni, Verrucole, Poggi and San Michele, as well as of the church of Rocca Soraggio and the ruins of the ancient hospice of San Nicolao di Tea, was conducted by the research group of the Department of Architecture of the University of Florence and has been ogoing since 2018. The digital survey campaigns, held from June to September, have been developed through on site workshops carried out for teaching and research purposes. During the campaign's students were able to experiment, together with professors and researchers, the digital survey technologies applied to archaeological surveying, in particular working with 3D laser scanner tools and with photogrammetric survey techniques.

The data of point clouds, with high metric reliability, coming from the processing of laser scans, together with the photographic shots, have allowed the start of a second phase of computerized post-production, still to be completed. In this phase, through two-dimensional representation (elevations, plans and sections in architectural scale and detail), a critical analysis of the studied elements was made possible and a widespread precariousness of the conditions of the evaluated medieval and sixteenth-century bridges was highlighted.

The data produced so far will constitute the documentary basis for the conservation and preservation of these architectures, as well as for their future enhancement: the digital documentation of the heritage allows the acquisition of further and more precise knowledge of the structures and materials used in their construction, as well as allowing a better understanding through the creation of three-dimensional models. At the end of the work it will also be possible to use information to enhance the routes from the point of view of tourism, thus achieving one of the objectives set at the beginning of the project, in other words to establish valid premises so that the territory with its monumental heritage can obtain renewed visibility. The documentary corpus that will be available will include digital, photographic, photogrammetric and direct graphical material (live sketches) useful for the start of a possible recovery of the numerous bridges present along the itinerary. In consideration of what has been said in the introduction, this recovery would be interesting not only from the point of view of the monuments, but also from that of the routes, in the perspective of a renewed use of the old communication routes, for the benefit of the inhabitants and the tourism economy of these places.

The analysis of San Michele's bridge

San Michele is a small district in the municipality of Piazza al Serchio, in Garfagnana (Lucca), perched on a knoll between Piazza al Serchio and Nicciano. The Acqua Bianca creek divides the village into two parts, which communicate through the fourteenth-century stone pedestrian single-arch bridge, whose dating is not certain, even if oral sources attribute the construction to the nobles of the Spinetta family, the castle's feudal lords. The castle imposes itself with its walls, anchored to volcanic rocks, on the medieval village of which ancient palaces, remains today, as well as ruined fortifications, paved paths and the ancient bridge of considerable importance and architectural beauty. During the survey campaign, students and researchers took part in the analysis of the bridge, one of the few still well preserved, working with non-invasive instruments (3D laser scanner and photogrammetric technique) to obtain a precise reconstruction.
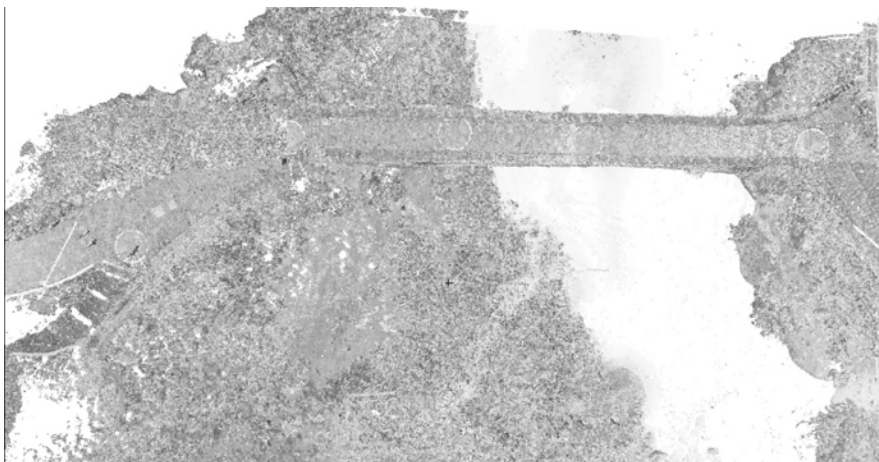
Fig.4 Map representation of the Bridge of San Michele obtained from the Union of the point cloud

Fig.5 Prospectus of the Bridge of San Michele obtained from the Union of the point cloud

Fig.6 View of the San Michele Bridge

The analysis of the church of Rocca Soraggio

The medieval town of Soraggio was originally composed of six small towns, Rocca, Brica, Villa, Metello, Camporanda and Vicaglia, located along the two banks of the river Serchio and often disputed by armed clashes between Lucca and the Dukes D'Este. The first church whose presence is attested to is the Ecclesia de Soragio, dedicated to San Rocco and documented over the years 1296 - 1299[4]. A decree of the Bishop of Sarzana moved the place of worship from Rocca to Villa Soraggio, joining the two religious communities and taking away the title at the church in 1758; this provision did not find favor with the faithful, so much so that in 1768 the two parishes had to be separated again through the intervention of the Vatican. Only recently has the church of Soraggio been known as Natività di Maria: it is perfectly integrated in the context being made of stone and natural materials and, it dominates, from the modest open space that surrounds it, over several valleys. Given its position in recent years it is rarely visited and there is little historical information concerning it, but despite this, maintenance work is currently under way. Students and researchers of the Department of Architecture carried out the survey using the technique of photogrammetry and laser scanner instrumentation, allowing an accurate metric reconstruction, to be rendered in two-dimensional and three-dimensional documents.
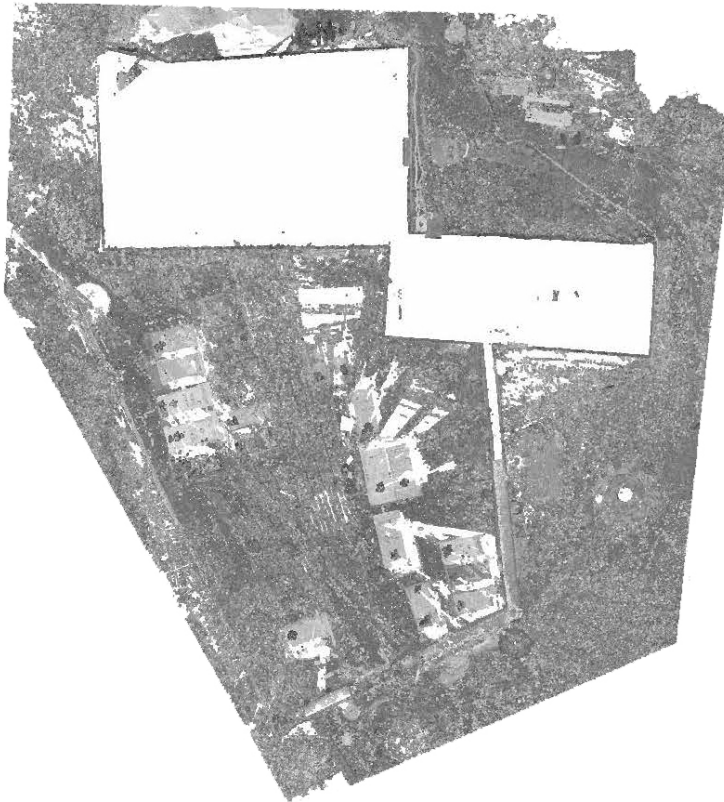
Fig.7 Plan of the Rocca di Soraggio

[4] The reference documents are kept in the Diocesan Decima of Luni-Sarzana.

Fig.8 Panoramic view from the Rocca di Soraggio
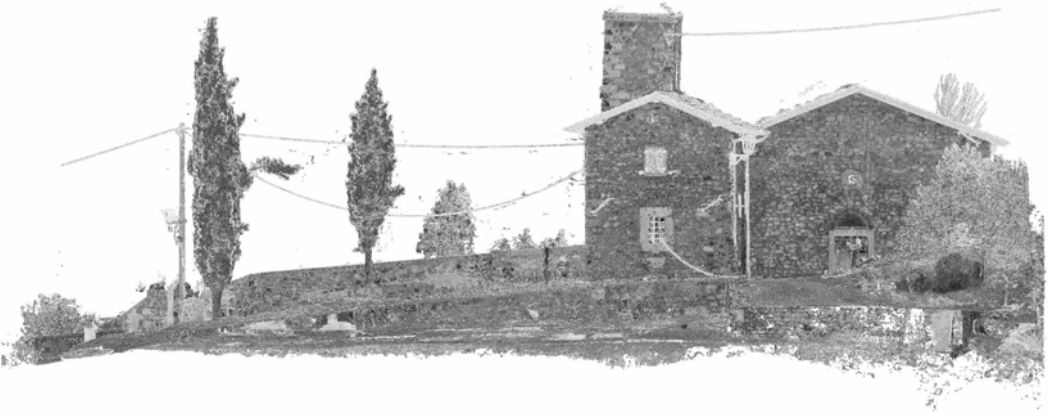
Fig. 9 Environmental section of the Rocca di Soraggio

Fig. 10 View of the Rocca di Soraggio

The analysis of the ruins of Hostel of San Nicolao di Tea

"Se, d'inverno, un pellegrino diretto a Roma o a Santiago de Compostela od un mercante lucchese diretto al porto di Genova o alle città padane avessero voluto valicare il passo di Tea avrebbero avuto poche possibilità di riuscirci se non vi fosse stato l'Ospitale di San Nicolao – che la leggenda vuole fondato da Matilde di Canossa – ove poter trovare riparo nella notte o nella bufera. E, di notte, non lo avrebbero raggiunto se non avessero sentito la campana che suonava per richiamare i viandanti smarriti. Tuttavia, in origine, fu solo una piccola chiesa ad un'abside con una stanza annessa. Era un altro mondo: il tempo di Matilde, quando si costruirono, dall'XI° secolo ponti, ospedali, strade lungo le quali nacquero culti e tante storie leggendarie destinate ad animare lo spirito degli europei. Lungo quelle vie – ebbe, infatti, a dire Goethe – si formò l'Europa."[5] (Fabio Baroni)

Of the Hospital of San Nicolao di Tea, located on the Apennine watershed between the Serchio valley and the upper Aulella valley, in the municipality of Minucciano (Lucca), only a few ruins remain today, but the building once included even a small church. The small complex stood in fact along an important Roman and medieval road, the Via del Volto Santo, which crossed the Lunigiana and the Garfagnana, representing a variation to the more famous Via Francigena. The hostel was located on a plateau above the village of Regnano, on a pass that for centuries was the only viable crossing place to make the journey from Lucca to Parma. Only a few signs are visible of the building, which is surrounded today by a wooden walkway, yet they are sufficient for the understanding of the area's visitability in the early medieval period. Over the years, excavations and studies of archaeological finds have been carried out, in order to identify the hostel' spaces and, the functions and activities that took place within it. In the same perspective of in-depth knowledge of the site, the Department of Architecture has carried out the detection of the area with the aid of 3D laser scanner equipment and appropriate cameras.

Fig. 11 Plan of the remains of the Hostel of San Nicolao di Tea.

[5] Fabio Baroni, born in Casola in Lunigiana in 1954, is a historian and a profound connoisseur of his land, on which he has published numerous books and essays. He worked on the lands of the Apennines, Lunigiana and Garfagnana, with particular attention to popular behavior in the different historical phases. The aforementioned text can be found in the informative posters on the site of the Hostel of San Nicolao di Tea.

Fig. 12 View of the Hostel of San Nicolao di Tea.
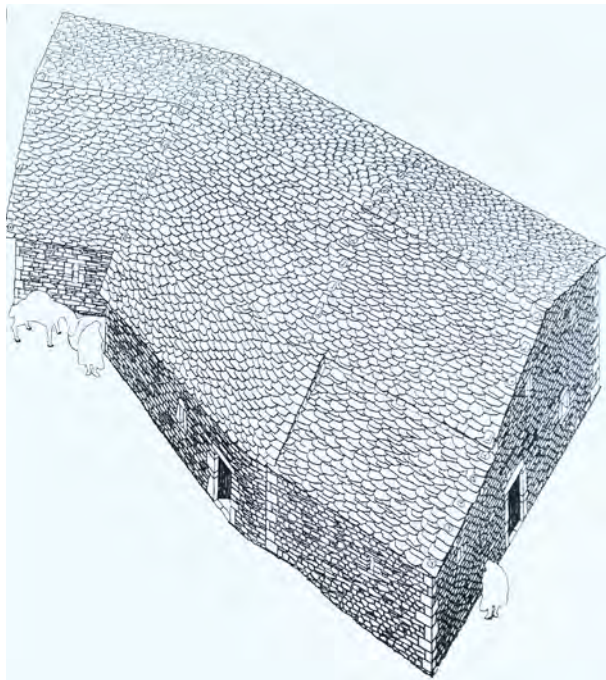
Fig. 13 Isometric view of the Hostel of San Nicolao di Tea

Conclusion

In Italy, the idea is that the short, medium or long-distance cycle paths will be able to better promote the territory, as they respond correctly to current environmental needs. This way of thinking, with mainly tourist-recreational and sportive-health purposes is undoubtedly useful for the cause of the bicycle, as well as possessing a marketing potential of great importance. The project of analysis, study and proposals for the recovery and enhancement of ancient routes and medieval and sixteenth-century bridges located in the territory, can certainly be considered essential broader perspective of the promotion of cultural tourism in the region of the Garfagnana. In fact, it is possible to bring out an impressive amount of structures of architectural importance to cross and visit along the way, these would make it historical as well as morphologically interesting, activating the conditions favorable to the sustainable development of the territory, to its economic and entrepreneurial growth and, to employment in the sectors of cultural tourism and related services.

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Interdisciplinary skills in the field of architectural surveying

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Abstract

Survey and general surveying, measurement and analysis, a system of transverse competences able to deepen the relationship between the historicaliconographic, typological, bibliographic and archival research and the metricspatial correspondences through Photogrammetric Survey and 3d modelling which provides a Reverse Modeling process.

The phases of the process of knowledge related to the survey do not end with the only graphic representation of the metric-geometric data, but a real complex design act is carried out which involves historical-iconographic, compositional, structural, technological, simple or complex decorative, perceptive chromatic and visual phases, not only at a punctual architectural level but above all at the urban level.

The technical competences that are supported during the metric-geometrical analytical phases are fundamental of the current line of this research. The photogrammetric phase of survey elaborated with the 3DF Zephyr Aerial program with which it is possible to create the 3D model. In fact, this software uses the "Structure from Motion" (SfM) technology that allows you to reconstruct the shape of objects by automatically collimating points from a set of photos.

For the roofs , photographs are made through the use of the drone DJI Spark. The model is then scaled using a 3D laser scanner with millimetric precisions and georeferenced through ground points obtained with GPS Geomax, finally from the three-dimensional are then extracted the orthodphotos of the exterior facades and the plant of the architectural system.

Abstract

Rilievo e Rilevamento, misura e analisi, un processo che mette a sistema competenze trasversali in grado di approfondire il rapporto tra la ricerca storico-iconografica, tipologica, bibliografica e archivistica e le corrispondenze metrico spaziali tramite il rilievo avanzato e la modellazione 3d che prevede un processo di Reverse Modeling. Le fasi del processo di conoscenza legate al Rilievo non si esauriscono nella sola restituzione grafica dei dati metrico-geometrici ma si attua un vero e proprio atto progettuale complesso che comporta fasi analitiche storico-iconografiche, compositive, strutturali, tecnologiche, decorative semplici o complesse, cromatiche e visivo percettive, non solo a livello puntuale architettonico ma soprattutto a livello urbano. Fondamentali le competenze tecniche che si affiancano durante le fasi analitiche metrico- geometriche dell'attuale filone di ricerca di chi scrive. Il rilievo fotogrammetrico elaborato con il programma 3DF Zephyr Aerial con il quale è possibile creare il modello 3D. Questo software utilizza infatti la tecnologia "Structure from Motion"(SfM) che permette di ricostruire la forma di oggetti attraverso la collimazione automatica di punti da un insieme di foto. Per le coperture vengono effettuate fotografie tramite l'utilizzo del drone DJI Spark. Il modello viene poi scalato utilizzando un laser scanner 3D con precisioni millimetriche e georeferito tramite punti a terra battuti con GPS Geomax, infine dal tridimensionale vengono poi estratte le ortofoto delle facciate esterne e la piante del sistema architettonico.

Survey Interdisciplinary methodological principles

Surveying architecture is an act of analysis historically recognized as an investigation of knowledge aimed at different stages of the architectural process: the measure for the ability to store data, the measure for typological knowledge, the measure for the knowledge of materials and techniques construction, the measure for the conservation of cultural heritage, the measure for the recovery of decorative façade data and the measure for the design of the new.

In the Renaissance the great tradition of surveying begins, which continued in the Baroque period and which sees the clarification of theoretical concepts and graphic standards and in the eighteenth century with the expansion of the field of investigation, was inherited and developed throughout the nineteenth and early decades of the twentieth century in academies and university faculties.

The conception of the architectural survey, however, had remained until our century, essentially in the nineteenth-century academic formulation with a rhetorical schematization and an excessive observance of intellectualistic rules, which led to consider the monument almost exclusively in the stylistic characteristics, while the structural, technological aspects and constructive were not taken into consideration. Even the environmental context, the spatial characteristics of the urban sectors were placed in the background compared to the beautiful drawing of the Academies[1].

For these reasons, the survey was often considered an end in itself research, far from the current conception of the survey intended as a measurement aimed at the critical analysis of the built and philological reconstruction, also environmental. The drawings were therefore linked to that aesthetic conception of the academic drawing.

The twentieth century finally develops interest in the morphological and environmental characteristics

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[1] M. Docci Maestri, D.Maestri, *Storia del rilevamento architettonico e urbano*, Ed. Laterza, Roma, 1993.

of urban aggregates, the city is recognized as a cultural, artistic and conceptual environment starting from the conjectural theories of the German school. Numerous European studies are developed focusing on the historical-urban development of cities. In Italy the main exponents of these studies are G. Giovannoni L.Piccinato and L. Quaroni[2].

Writings and research that in exploring the new discipline also attempted to provide a scientific structure, in the lesson of the past, thanks to the historical-structural analysis of the cities.

L. Mumford with the text The culture of Cities, New York, 1938 (Italian translation. The culture of the cities, Milan 1954) highlights the need for an approach on the cognitive value linked to the critical analysis of the historical city. But also the essays by authors such as S. Giedion, Space, *Time and Architecture*, Cambridge (USA) 1941, G. Giovannoni, G. Lugli, V. Mariani, R. Paribeni, C. Pietrucci, L. Piccinato, A. Solmi, *L'Urbanistica dall'Antichità ad oggi,* Florence 1943, by E. Saarinen, The City. Its Growt, its Decay, its Future, New York 1943 and S. Muratori carried more and more the theme for the conservation of ancient cities and the study of research methodology of the sector at national and international level[3].

In this process, the survey is an essential cognitive practice also thanks to the many historical and topographical essays aimed at identifying indications for any hypothetical interventions.

This methodological position definitely denies any validity to empirical procedures based on the artistic culture of Romanticism; instead, it affirms the fundamental objectivity of the systematic investigation practice, at a convincing methodological level because it does not want to be a pedantic philological analysis applied to the urban fabric, but its objective critical evaluation based on real documents, which are the building artifacts that make up the ancient environment.

Therefore, the comprehensive approach to the values of the environment is indispensable, developed through the analysis of all the factors that contribute to its formation and therefore, firstly, through the systematic recognition and objective documentation of all the building structures. pre-existing, which constitute the most conspicuous and metric more consistent aspect of the environment itself.

This process does not end with the simple measurement and graphic representation, but it constitutes only the first and indispensable phase of a wider and more demanding work of critical evaluation of the documented artefacts, during which analyzes must also be conducted on the authenticity of the structures and on the probable transformations undergone over time.

Furthermore, this researches aimed at identifying the recurring building typologies, at recognizing their probable evolution over time, at specifying the significant role they play in the characterized qualification of the urban framework to which they belong, up to the critical evaluation of their irreplaceable value in the context under consideration. .

This is to clarify the reasons why the problem of the systematic survey of the building structures of ancient urban centers spread among not only Italian scholars but also in Germany, where around 1952 studies were carried out on the ancient urban structure and on the evaluation of relationships. between the metric values of the building units and textures of the urban subdivision meshes, but the investigation is still maintained on dimensional and figurative levels, without addressing the

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[2] G. Giovannoni , *Vecchie città ed edilizia nuova, Torino 1931;Il quartiere romano del Rinascimento, Roma 1945; Roma dal Rinascimento al 1870,* in: Topografia e Urbanistica di Roma, Bologna 1958;L. Piccinato, Per una tipologia delle città medioevali italiane, Roma 1939; L. Quaroni, L'architettura delle città, Roma 1941.
[3] Saverio Muratori, *Vita e Storia della Città*, in: Rassegna critica di Architettura, n. 11-12 /1950, pp. 3-52

relationships with the structural and typological problems[4].

A need that arose almost simultaneously, and independently both in Italy and in Germany in the same years, that is, in two countries that more than others had suffered from the damage of the conflicts and that, at the beginning of the 1950s, continued to suffer from the serious environmental damage caused by the intense and disordered rhythm with which the building reconstruction took place.

From the Praetorian Tablet to the Digital Cartography

On the basis of the cited historical notions, which have led to consider increasingly detection as a cognitive science that shares interests, research methods and in an increasingly transdisciplinary way, not only as regards the conceptual and theoretical aspects, but also and above all as regards it concerns the historical development and current trends of the science of representation in the territorial, urban and architectural survey.

In the 19th century most of the European States had equipped themselves with specific bodies in charge of carrying out the geometrical classification systematic and regular cartographic survey of the relevant territory, in 1870 Italy formulated a Unified Cartographic Project and two years later the Military Topographical Institute carried out the project of general survey of the Italian territory in scale 1: 100.000. (Topographical Map of Italy).

The survey of the Gran Sasso, carried out by Michele Manzi in 1876 sees the first photogrammetric experiences, but above all the first approach to the use of different instruments - direct and indirect - the Praetorian tablet and terrestrial photographic panoramas with restitution thanks to the perspective rules and geometric proportions, in scale 1: 10,000. (Essay of phototopographicsurvey of the Bart Glacier)

In 1878 the geographic engineer Pio Paganini continued this research activity by creating more and more perfected models of phototopographic instruments for the ground sockets and tools to pass from the measurement of the frame coordinates to the spatial determination of the corresponding point on the ground, the self-restorers were still grounding devices and therefore bound to the frames taken with a horizontal optical axis camera.

In 1924, thanks to Major E. Santoni, a decisive impulse took place and significant developments for the photogrammetric method took place with the study and production of instruments including the photogoniometer and the researcher-triangulator (1925-29); the first phototeodolite (1930) experienced during an expedition in a mountain range in Asia; the ballistic phototeodolites-restitutors (1932) for the Navy and used until 1943; the solar periscope ((1925-26); the stereocartograph model I (1925-26); the stereocartograph model II (1928-29); the stereocartograph Galileo-Santoni model III (1933) and the stereosimplex Galileo-Santoni (1934).

802/5000 In 1938 he presented his experiments in air-triangulation in Rome at the 5th Congress of the International Photogrammetry Society. After a few years of experimentation, in 1929 the production application of the photogrammetric method began, over large areas of the territory, which gave an increasing contribution until the complete replacement of the graphic-numerical practice with the aerial photogrammetric procedure. In 1940, following the developments in the geodetic field, Hayford's international ellipsoid oriented to Rome-Monte Mario was adopted to replace the Bessel

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[4] K. Gruber, Die Gestalt der deutschen Stadt, Monaco, 1952.

ellipsoid oriented to Genoa. Furthermore, in 1948, the cartographic projection was also changed: the conformal representation of Gauss-Boaga replaced the polycentric projection of Samson-Flamsteed adopted in 1875[5].

The decisive acceleration of the technological progress of the last thirty years has made available to topographers and cartographers new and powerful means: satellite surveying techniques, methodologies and IT applications, digital procedures for acquiring and processing spatial data.

The national territorial survey system

The Military Geographical Institute (IGM) develops numerical cartography with research-experimentation-production activities aimed at acquiring topographical data by digitizing the stereoscopic model and interactive processing of the same data with consequent automatic drawing of the topographic map through the satellite positioning system global (GNSS), among which the best known is GPS, consisting of a constellation of satellites emitting electromagnetic signals and special receivers positioned on Earth, which detect the three-dimensional positioning of objects.

Satellite topography is a combination of classic topographical techniques, relative measurements of angles and distances made to fixed or moving points that are not invisible on the territory, and satellite navigation systems that directly determine the coordinates, in an absolute reference system. The aerial photogrammetry products can be processed digital maps of immediate usability, rectified images (orthophotos) and maps derived from them (orthophotos-cards) and databases that constitute the basic structure of Territorial Information Systems (SIT).

Direct photogrammetry, in which no aerial triangulation is necessary, is the latest important development in this field, thanks to the joint use of GPS in determining the position of the camera and inertial sensors (IMU) in identifying the attitude angles .

LiDAR (Light Detection and Ranging) is an aerial detection technique that has the ability to measure the spatial coordinates and the altitude of the points on the ground, by scanning the territory with a laser rangefinder. This allows, in very large areas, the identification, characterization and mapping of the morphologies present, both natural and anthropic, in rapid times and of the highest quality.

The survey by UAV (Unmanned aerial vehicle), commonly known as drone, represents the latest natural evolution, with regard to data processing methodologies and results, of detection techniques carried out with airplanes and helicopters, since it allows to acquire remarkable visual information and geometric in less time and at low cost.

The use of the GPS system that led to the creation of a new national three-dimensional geometric framing network called IGM95.

The national survey system provides for the creation of descriptive images of the earth's surface (Spaziocarta 50S), from satellite digital panchromatic data, which represent a valid supplementary tool of traditional cartography and a solution without alternatives to meet the need to dispose of in a short time. and low cost, of informative representations of the territory; in the construction of territorial information aimed at the formation of a geographic database organized and structured in the logic of an information system (called DB25) whose content, in terms of accuracy and consistency of information, is comparable to that of the topographic map at a scale of 1: 25000 and

[5] https://www.igmi.org/

which, at the same time, allows you to draw up, by extracting the information from the database itself, the associated cartography at the scale 1: 25000 and 1: 50000 which, for uniformity with the reference system WGS84 (World Geodetic System 1984) adopted with the establishment of the IGM95 network is based on the UTM-ETRS89 representation (with the meaning for the second acronym of European Terrestrial Reference System 1989 or the European realization of the WGS84 reference system.

The interdisciplinary system of territory management and tangible cultural heritage.

In the 1980s, at the University of Laval in Canada, the term Geomatics was coined which basically deals with studying, through the interaction of different disciplines, the territory, the environment on a mainly computer and infographics basis.

It presupposes an integrated multidisciplinary approach that selects tools and techniques in the acquisition of mainly metric and thematic data in order to search and archive georeferenced data in digital format.

This method of instrumental interaction is fundamental in the multiscalar approach of the survey. In fact, Geomatics puts in the system all the most up-to-date IT tools of indirect survey and representation, of the analysis of georeferenced data through satellite positioning, digital photogrammetry, remote sensing, SIT also linked to geostatistics and geoservices.

This new discipline defines an advanced multiscale approach for the survey precisely for all the components that determine its effectiveness.

Computer science: science of representation and processing of information applicable through the development of technological tools, hardware, and methods, models and systems, software.

Geodesy: science for determining the shape and size of the Earth, i.e. defining the reference surface in its complete form: the geoid, and in its simplified form: the ellipsoid, and its external gravitational field as a function of time.

Topography: born with Geodesy and inserted in it, it is the set of procedures for the direct survey of the territory. It is entrusted with the studies of the methods and tools to measure and represent in detail the details of terrestrial surface areas in its aspects of: planimetry (to determine the relative positions of the representations of the different points of the ground on the same reference surface); altimetry (determination of the elevation of the points of the earth's surface with respect to the geoid surface); speed-measurement: for the planimetric and altimetric survey of terrestrial surface areas.

Surveying: for the computation of areas, displacement and rectification of boundaries, leveling of areas of the earth's physical surface.

Cartography: provides a possible description of the shape and size of the Earth, of its natural and artificial details, by means of graphic or numerical representation of more or less large areas of the earth's surface according to predetermined rules.

Photogrammetry: science to determine the position and shapes of objects starting from measurements performed on photographic images of the objects themselves.

Remote sensing: remote acquisition of data concerning the territory and the environment as well as the set of methods and techniques for subsequent processing and interpretation (this definition is also suitable for digital photogrammetry).

Satellite positioning systems: allow the three-dimensional positioning of objects even in movement in space and time, on the entire terrestrial globe, in all weather conditions and continuously.

Laser scanning systems: for the identification of objects and the measurement of their distance by using light radiation in a range of the electromagnetic spectrum characteristic of optical frequencies (0.3-15 μm).

Territorial Information Systems (SIT) or Geographical Information System (GIS): powerful set of tools capable of receiving, storing, recalling, transforming, representing and processing spatially referred data. Decision Support Systems (DSS): made up of very sophisticated information systems, capable of creating possible scenarios through the modeling of reality and offering a choice of solutions to the decision maker.

Expert Systems: tools capable of imitating the cognitive processes performed by the experts and their ability to manage the complexity of the real through interdependent processes of abstraction, generalization and approximation.

WEBGIS: for the dissemination of geographic data stored on machines dedicated to the storage of databases, according to very complex network architectures.

Ontology: it is the specification of a conceptuality, that is, the description of the concepts and relationships that may exist for an element or between elements of a group, or entity, or class; conceptualization is an abstract simplified view of the world that you want to represent for a certain purpose[6].

Integrated digital survey systems

The complexity of the acquired data, of the architecture in the environment and therefore in the territory must necessarily be organized, processed, managed, represented in digital cartographies and digital representations and in systems that can be implemented for the control of changes and used in short times for a correct representation and knowledge of the situation not only territorial, but also architectural-urban one.

For these reasons, the new digital survey and representation methods are linked to this complex system: SFM System; laser scanner; drone and GPS.

By "Structure from Motion" we mean a calculation technique that allows you to reconstruct the shape of objects through the automatic collimation of points from a set of photos.

Based on computer vision algorithms, the SfM extracts the remarkable points from the single photos, takes the photographic parameters and crosses the recognizable points on multiple photos, finding the coordinates in the space of the points themselves.

The first calculation process in the SFM software determines the position and orientation of each camera used for the reconstruction of the model, generating a Sparse Cloud that constitutes the set of points useful for aligning the photographs.

This is the first and most important processing in an SFM software, if this step succeeds all the rest will be successful. The second processing consists in the generation of the Dense Cloud, being able to parameterize the creation of a cloud with the highest number of points.

[6] Gomarasca, Mario A.*, Elementi di geomatica*, Firenze, Associazione Italiana di Telerilevamento, 2004.

The third elaboration, is a generation of a triangulated mesh, with a mesh density relative to the number of points calculated in the dense cloud.

The coloring of the Mesh will be carried out using the average RGB value of the three coordinates that form the triangle.

The fourth processing is the generation of a high resolution texture.

The coloring of the Mesh will be carried out by applying the entire photographic texture of the images useful to the object of interest. Laser scanners are instruments capable of measuring the position of hundreds of thousands of points that define the surface of surrounding objects at very high speed. The result of the acquisition is a very dense set of points commonly called "point cloud". We can define laser scanners as direct measurement systems allowing to obtain measurements related to an instrumental precision defined by a calibration certificate.

There are several useful parameters for defining and evaluating the characteristics of a laser scanner instrumentation: range (maximum distance that the scanner is able to measure); speed (number of points acquired in each second); precision (ability of the instrument to return the same value in subsequent measurements); laser class (the danger of the laser beam emitted by the instrument), from class 1 (completely harmless) to class IV (very dangerous) and integrated devices (possibility of integrating other software or devices).

Basically there are 3 measurement principles with laser scanner: TOF (time of flight) laser scanner, phase difference laser scanner and triangulation laser scanner.

In TOF (Time Of Flight) laser scanners, the distance is calculated by measuring the round trip time of the laser pulse sent. In phase difference laser scanners, the distance is calculated by comparing the phase difference between the emitted and received waves.

Triangulation laser scanners have a technology that is based on the acquisition by an IP sensor of a pattern of infrared points in a given space.

At the application level, integrated surveys have been developed on the San Silvestro complex, currently the headquarters of the Architecture and Design Department of Genoa.

The tools used were:

- 3D EYE TELESCOPIC POLE with SONY A5100 24 Mpx camera for taking photos up to 10 meters high;
- DRONE DJI SPARK < 300 g for roofing and bell tower ;
- GPS GEOMAX to scale and georefer the model;
- LASER SCANNER FARO S70 to achieve sub-centimeter accuracy
- REFLEX CAMERA for photos from the ground.

All the photos were imported into the 3DF Zephyr Aerial photogrammetric software which generated the 3D model of the Pieve in a completely automatic way through four steps: Sparse reconstruction- Dense reconstruction- Mesh generation- Texture application.

The model was scaled and georeferenced within 3DF Zephyr by loading the x, y, z coordinates of the targets hit the ground with a GPS instrument.

The precision of the points was subsequently improved by aligning the photogrammetric point cloud with the laser scanner scans, reaching accuracy levels below the centimeter.

This system allows, from the 3D model, to extract 2D floor plans of the entire complex and high resolution orthophoto.

Images referring to 3d eye telescopic pole, drone dji spark Microgeo; gps laser scanner faro s70 Geomax.

Conclusions

Reading comprehension of such dispersive phenomenon, the research is linked to the old problem of urban planning responsibilities, one wonders what the agents to identify, analyze and represent in order to carry out qualitative and therefore "resilient" interventions.

The design of the city is also a philological interpretation of narrative that provides new methodological approaches, not least thanks to innovative information networks and processing of sources that the digital revolution has introduced into operation the analysis of complex systems that require interdisciplinary connections.

Management of graphic data, the purposes of computer graphics digital systems in the representation of environment (relational reality), landscape (perceived reality) and architecture (objective reality). The construction of a three-dimensional virtual model offers the possibility, through visual characterizations such as shadows and sunshine, to get closer and closer to the human perceptual system, making it possible to immediately communicate complex information concerning the territory and architectural volumes in an urban space.

The representation system thus becomes capable of illustrating the relationships between form and measurement in the scales of a territory or in an urban space, restoring an ease of understanding and interpretation of even very complex technical maps.

In this context, the simplification made to the system of representation of the territory offers the possibility of adding analytical information, without interfering with the ease of reading the geographical context.

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The fifth landscape
"The elephants would have inhabited the city"[1]

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Abstract

Through the ongoing experience of the Land Lighting Vesuvius project , in collaboration with the Vesuvius National Park Authority, the "Mauro Felli" Interuniversity Research Center on Physical Agents Pollution (CIRIAF) and the International Landscape Research Laboratory (CIRIAF-SSTAM) of the University of Perugia, and the analysis of Land Art works by artists, such as Walter De Maria and Christo, the concept of the centrality of the image and its media impact as a creation of virtuous valorisation processes is deepened/ revitalization of the landscape.

As the French art critic René Huyghe suggests: «Thanks to the creative act, art introduces into reality a new, virgin contribution, a type of extra wealth for which nothing seems to have paved the way. [...] Ultimately, art exists only when it introduces into reality the search, and the attainment, of a quality that is totally unmeasurable but inevitably lived in the active reaction provoked in the viewer by the creator »[2].

The stimulus to experience the landscape in a new way and in a short period of time is favoring the growth of temporary installations of great emotional impact on the collective memory, with the aim of transmitting, in addition to the true meaning of the work, even a sense of uniqueness of the moment one is experiencing.

Marc Augé writes in *Nuovi Argomenti, Lessons of truth*, that there is a double diversity of landscapes projected in space and time: "a geographical and climatic diversity evident for all and, beyond this,

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[1] Paolo Martore (edited by), *Walter De Maria. L'invisibile è reale*, Castelvecchi, Lit Edizioni Srl, Roma, 2015, p. 97
[2] *Estratto dal dialogo tra René Huyge e Daisaku Ikeda*, Buddismo e Società n. 190, Bimestrale dell'Istituto Buddista Italiano Soka Gakkai, Roma, Settembre-Ottobre 2018, p. 17

a diversity made of particular looks, experiences and individual stories "[3].

Gilles Clément, with the expression "Third landscape"[4] identifies all those places in a state of abandonment at the hands of man.

Finally the project "Fourth landscape. The urban experience of beauty"[5], promoted and funded by the Fondazione CR Firenze under the artistic direction of Virgilio Sieni / National production center, in collaboration with Fondazione Teatro del Maggio Musicale Fiorentino, Fondazione Scuola di Musica di Fiesole, Tempo Reale Music Production and Education Research Center, indicates a further landscape in which art is used to counter urban degradation and solitude.

Land Lighting's operations in the territory, in which light transforms the environment and the perception of the same and art interacts closely with scientific research, generate a further landscape: the "Fifth landscape" or Landscape 5.0.

Thanks to the creative act a new renewal of the landscapes is brought to light, which acquire new values, able to transmit to the observers the desire to investigate themselves and their environment past, present and future, interpreting the existing and building new narrations[6].

Abstract

Tramite l'esperienza in divenire del progetto di Land Lighting Vesuvius, in collaborazione con l'Ente Parco Nazionale del Vesuvio, il Centro Interuniversitario di Ricerca sull'Inquinamento da Agenti Fisici "Mauro Felli" (CIRIAF) e il Laboratorio Internazionale di Ricerca sul Paesaggio (CIRIAF-SSTAM) dell'Università di Perugia, e le analisi di opere di Land Art di artisti, come Walter De Maria e Christo, viene approfondito il concetto della centralità dell'immagine e del suo impatto mediatico come creazione di processi virtuosi di valorizzazione/rivitalizzazione del paesaggio.

Come suggerisce il critico d'arte francese René Huyghe: «Grazie all'atto creativo l'arte introduce nella realtà un contributo nuovo, vergine, un tipo di ricchezza supplementare per la quale nulla sembra abbia preparato la strada. [...] In definitiva, l'arte esiste solo quando introduce nella realtà la ricerca, e il raggiungimento, di una qualità che è totalmente non-misurabile ma inevitabilmente vissuta nella reazione attiva provocata nello spettatore dal creatore»[2].

Lo stimolo a vivere il paesaggio in maniera inedita e in un breve periodo di tempo sta favorendo la crescita di installazioni temporanee di grande impatto emotivo sulla memoria collettiva, con l'obiettivo di trasmettere, oltre al significato vero e proprio dell'opera, anche un senso di unicità del momento che si sta vivendo.

Marc Augé scrive in Nuovi Argomenti, Lezioni di vero, che esiste una doppia diversità di paesaggi proiettati nello spazio e nel tempo: "una diversità geografica e climatica evidente per tutti e, al di là di questa, una diversità fatta di sguardi particolari, esperienze e storie individuali"[3].

Gilles Clément, con l'espressione "Terzo paesaggio"[4] identifica tutti quei luoghi in stato di abbandono per mano dell'uomo.

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[3] Marc Augé, *Inediti. I paesaggi sono fatti culturali*, translation from French by Enrica Costantino, edited by Mauro Francesco Minervino, https://www.che-fare.com/marc-auge-i-paesaggi-sono-fatti-culali/, 2017
[4] https://www.quodlibet.it/libro/9788874620487
[5] http://www.artribune.com/mostre-evento-arte/quarto-paesaggio/
[6] Fabio Bianconi, Marco Filippucci (ed.), *Il Prossimo Paesaggio*, Gangemi Editore spa, Roma, 2018, p. 191

Infine il progetto "Quarto paesaggio. L'esperienza urbana della bellezza"[5], promosso e finanziato da Fondazione CR Firenze con la direzione artistica di Virgilio Sieni / Centro nazionale di produzione, in collaborazione con Fondazione Teatro del Maggio Musicale Fiorentino, Fondazione Scuola di Musica di Fiesole, Tempo Reale Centro di Ricerca Produzione e Didattica Musicale, indica un'ulteriore paesaggio in cui l'arte viene utilizzata per contrastare il degrado e la solitudine urbana. Le operazioni sul territorio di Land Lighting, in cui la luce trasforma l'ambiente e la percezione dello stesso e l'arte interagisce strettamente con la ricerca scientifica, generano un ulteriore paesaggio: il "Quinto paesaggio" o Paesaggio 5.0.

Grazie all'atto creativo si mette in luce un rinnovo inedito dei paesaggi, i quali acquisiscono nuovi valori, in grado di trasmettere agli osservatori il desiderio di indagare se stessi e il proprio ambiente passato, presente e futuro, interpretando l'esistente e costruendo nuove narrazioni[6].

Vesuvius work in progress

The *Vesuvius* project (fig. 1) comes from a path by the architect Diego Repetto in collaboration with the lighting designer Emilio Ferro, through innovative studies on the development of tourist sites of architectural and archaeological value and landscaping, involving university research institutions.

Fig.1 Photo-insertion of the land lighting project seen from the gulf

Following experiences in architecture, art and design, the need arose to identify a new artistic current operating on a physical territory and, specifically, capable of generating new landscapes: Land Lighting.

This new artistic trend is strongly characterized by scenographic projects of architectural lighting, capable of restoring new nocturnal landscapes, in which art, landscape, architecture and design are confronted with the themes of environmental sustainability and landscape.

On May 10th 2017 in Genoa on the occasion of the International Study Day De-Sign Environment Landscape City, organized by the Department of Architecture and Design of the University of Genoa, the concept of the Land Lighting Vesuvius project is officially published : 79 AD - 2019

AD , which describes the temporary artistic installation, in which viewers will be able to enjoy a unique and suggestive view of the eruption of "light" by sea from the Gulf of Naples, from the archaeological site of Pompeii, from the Vesuvius National Park itself and in those places considered strategic at touristic level[7].

During the second week of July 2017 a belt of fire besieges the cone of Vesuvius, a series of arsons involving an area of about 18 square kilometers, of which the wooded areas of the National Park are devastated.

All this has resulted in the temporary loss of a historical and important reference point for the local population; in fact, the tragedy, consuming itself for about ten days non-stop under the impotent eyes of the citizens, caused a real collective shock.

Following the tragic event, the Land Lighting project takes a new path: if at the beginning the artistic installation was to be linked to the celebration of the events of 79 AD, referring to the devastating eruption of Vesuvius described by Pliny the Younger, now it becomes the redemption of the community as a demonstration of the commitment of the population and institutions to restore new splendor to the friendly mountain, dramatically mutilated by a criminal act.

The work, designed in collaboration with the Interuniversity Center for Research on Pollution and the Environment "Mauro Felli" (CIRIAF), the International Landscape Research Laboratory (CIRIAF-SSTAM) of the University of Perugia and the Spacecannon SNe company, consists in the installation of 140 Ireos Pro 7KW IP43 equipment with very high xenon white light brightness and 15 spare, of which it was assumed the location on the "Path of the Great Cone" (about 3.00 meters wide).

The system has already been applied in various past events, including: the Tribute in Light in New York, in memory of the attacks of 11 September 2001 (since 2003 it is regularly lit on the night of 11 September each year), and the Imagine Peace Tower in Reykjavik, designed by Yoko Ono and inaugurated in October 2007.

The peculiarity of the Land Lighting Vesuvius project , in addition to an eruption of "light" never made on a volcano, is the environmental-landscape context (area of great geological, biological and historical interest and National Park established by Decree of the President of the Republic of June 5, 1995) and the choice to proceed with an unpublished environmental study for an event of this magnitude, in order to guarantee the protection of the flora and fauna species.

The work has been considered by lecturers in Italian and foreign universities, internationally renowned artists and ordinary people as a global event, able to show the world the desire for redemption and enhancement of the territorial area of Vesuvius and of Italy in general: through this great gesture of Land Lighting, the geographical area of intervention would benefit from various benefits, including the creation of new economic opportunities both for the local population and for tourism (fig. 2).

Like Walter De Maria, when he talked about his projects conceived in Germany (the elephant sculpture and the Olympic Mountain, two works of great scope and with mileage dimensions), he was aware of the immense political and bureaucratic obstacles he was facing, even in the case of

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[7] *Ibidem*

the ambitious and colossal project Vesuvius (new visual, artistic, emotional and landscape frontier) a great effort is required from all interested parties, from the Vesuvio National Park Authority to the staff of researchers for the feasibility analysis.

It took Christo himself years to see his latest current work, London Mastaba , taking into account that one of his projects dates back to 1973. The work in question is composed of 7,506 colored oil barrels arranged on a platform of plastic cubes floating on the Serpentine lake inside Hyde Park, in the heart of London; in reality the aim of the Bulgarian artist is of a future similar but even more impressive project to be carried out in the desert of Abu Dhabi (a structure composed of 410 thousand multicolored aluminum barrels).

Fig.2 Photo-insertion of the land lighting project seen from the archaeological park of Pompei

Proceeding towards a Memorandum of Understanding, between the Vesuvius National Park Authority and the Inter-University Research Center on Pollution and the Environment "Mauro Felli" (CIRIAF), of which the territorial structure consists of over 10 Italian universities, for the feasibility study aimed at the realization of the Vesuvius project , an itinerant artistic-experiential installation developed to narrate the a work by Land Lighting, with the collaboration of the International Landscape Research Laboratory (CIRIAF-SSTAM) of the University of Perugia, the European Cultural Center, the Ideal Spaces Group and the Italian-Chinese New Generation Association (ANGI).

The installation between art and science Resized Volcano represents the magma chamber: an area inside a volcano where magmas are stationed before being erupted on the surface (a reservoir area,

defined by encasing rocks injected abundantly and thickly by magma).

The visitor (adult and child) is projected into an immersive reality full of emotion: an adventurous journey inside the volcano, which begins with the external vision of the monolithic installation.

Bruno Munari in 1977 wrote in the book "Fantasia"[8]:

«The imagination is the faculty à pi ù free of other [ed invention, creativity and imagination à], it in fact can also not take into account the ò à realizzabit or the ò us that he thought operation. It is free to think anything, even the most ù absurd, incredible, impossible.»

Thus a black cloth covering an octagonal truncated cone structure becomes an obsidian monolith emerging from the earth (figs. 3 and 4, "a volcano covered with obsidian that emerges from the earth", Padiglione Olona, MUST Milano, photo by Enzo Cimino and Diego Repetto), which conceals an environment characterized by exciting special effects produced by the union of sound, lights and an evanescent mist (figs. 5 and 6, visited the work at the Olona Pavilion of the MUST in Milan about 4,500 people in four days, photo by Diego Repetto).

Fig.3 "Resized Volcano", Kids Sound Fest, Padiglione Olona, MUST di Milano, photo by Enzo Cimino

Thanks to the sound of the sound designer Enzo Cimino, an imaginary place was designed and created, a context capable of opening the door of emotions.

It doesn't matter if the sound is real or generated (synthesized) on the computer, what matters is the resonance with the inner world, very personal and intimate.

At the center of the magma chamber, the sound and stage perception is enriched by elements that make the experience rich in visual, sound and tactile suggestions.

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[8] Bruno Munari, *Fantasia. Invenzione, creatività e immaginazione nelle comunicazioni visive*, Laterza, 2017, p. 21

Fig.4 "Resized Volcano", Kids Sound Fest, Padiglione Olona, MUST di Milano, photo by Diego Repetto
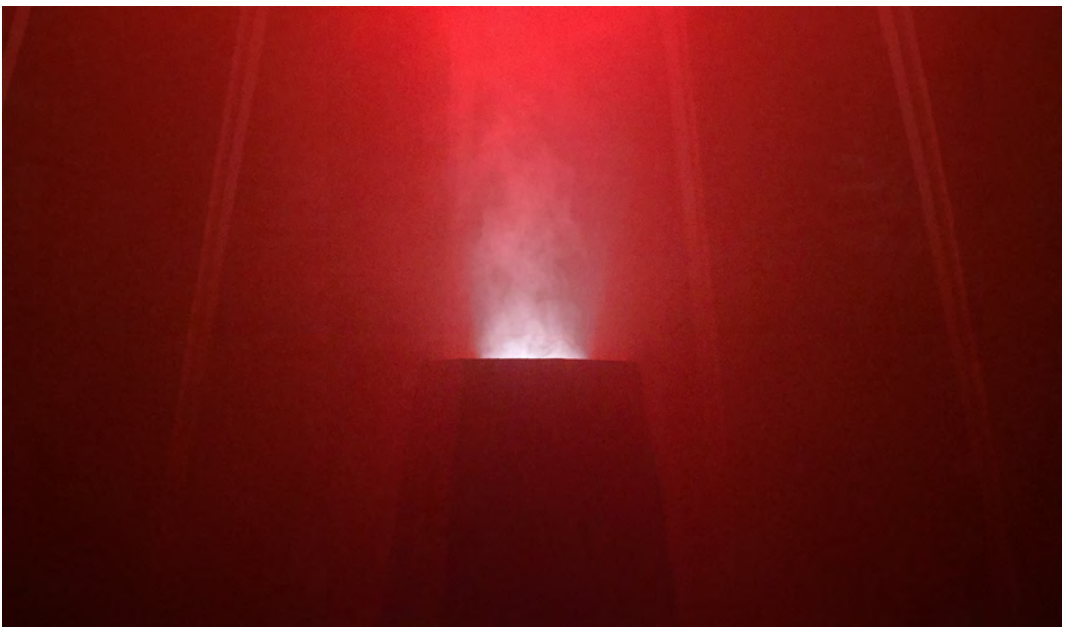
Fig.5 "Resized Volcano", Kids Sound Fest, Padiglione Olona, MUST di Milano, photo by Diego Repetto

The intention of the installation presented in world preview March 24, 2019 in conjunction with the Kids Sound Fest at the National Museum of Science and Technology Leonardo da Vinci (MUST) in Milan was to stimulate the desire for discovery and wonder.

One of the goals of the artistic-scientific installation is to educate to listen and to understand how sound enriches / creates a context, returns meanings and emotions and how the world of sounds is an inseparable part of our deepest being.

Fig.6 "Resized Volcano", Kids Sound Fest, Padiglione Olona, MUST di Milano, photo by Diego Repetto

Educating in listening to one's emotions, generated within the magma chamber, means first of all undertaking a journey with oneself, in the emotional "volcano" that is in each of us.

Elephants in the city: Art and Nature

In Germany, in Hannover, Walter De Maria, an American sculptor (1935-2013), one of the main exponents of the Land Art artistic movement, conceived an ambitious project with one hundred elephants; in response to a call for street art competition, he planned the division of the German city into vast areas by identifying paths for elephants as real tracks through parks and roads.

The intent was to make these huge animals of concrete presence in the city, but at the same time dreamlike due to the absurdity of decontextualization itself: "the elephants would have inhabited the city"[9]. The violent slaughter of African elephants in 1970 inspired this never concretized project: "the elephants were decimated because the herds were too numerous and they had to be reduced from eight to ten thousand to four or six thousand. In Africa, the expansion of farms was shrinking wild areas and consequently had planned the suppression, the extermination of half of the elephants"[10].

The spirit that led De Maria was the desire to save at least a hundred elephants, transporting them

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[9] Paolo Martore (edited by), *Walter De Maria. L'invisibile è reale*, Castelvecchi, Lit Edizioni Srl, Roma, 2015, pp. 97-98

[10] *Ibidem*

to the city and making them public sculptures (fig. 7).

Fig.7 "The elephants would have inhabited the city", photo insertion of a herd of elephants in the streets of Hannover, tribute by the architect Diego Repetto to Walter De Maria

Walter De Maria imagined an organization of the city such as to be able to integrate large animals into the urban environment; in this regard he maintained that "we see the city as something very complicated, but it is not so"[11]. His most famous work is The Lightning Field in 1977: a monumental installation consisting of 400 sharp metal poles, acting as lightning rods, driven into an area of about 3 square kilometers in the desert of New Mexico.

De Maria creates an extraordinary work of Land Art in synergy with Nature, in fact during thunderstorms the lightning rods collect and multiply the power of lightning at the service of a great light show. The work, usable directly from May to October or indirectly through photographs and videos, represents the union between artificial and natural, in which the work of art is obtained through the conditioning of a frequent climatic event in the installation area.

The art critic Germano Celant in a May 1980 article published in the number 606 of the Domus gazine writes[12]: «The temporal dimension is given by the expanded condition of the execution and by the permanence: to be executed the Lightning Field took over five years, from 1973 to 1979, and is foreseen as a permanent work. This expansion, while making the analogy explicit, in land art, between quantity of space and amount of time, makes possible the equivalence between the age

[11] *Ibidem*
[12] https://www.domusweb.it/it/dall-archivio/2011/06/21/the-lightning-field-walter-de-maria.html

of work and the age of the Earth. He then criticizes the interventions, spectacular and ephemeral, on the territory and refuses the information of the mass media in favor of a continuous existence and direct experience. No longer illuminating and pyrotechnic moment, but expanded tension and relaxation, where the whole lives on the presence and not on the memory and on the recorded illustration. The reception process becomes primary, because the request for intense participation implies the maximum degree of magic and isolation: the Lightning Field can be visited, every week, by a small number of people, not more than six, and every inspection must last at least 24 hours, so as to participate, from dawn to dusk, in all accidents and natural incidents. The setting is musical. A prolonged listening of the matter is solicited, in order to identify its modulations and to cling sensorially to them. [...] The indications for listening lead to another observation: the Lightning Field overturns the museum logic, and to an enormous amount of space corresponds a single work of art and a reduced number of visitors. Like the sound experience that spreads through space and isolates its listeners individually, it transfers this condition to art and makes the personal intangible reality. The consequence could be to dispose of a museum or a skyscraper individually for a whole day, so as to walk it without interference from others. One wonders then if the characteristics, which are shown during the visit, change and how much time, in terms of days, seasons and years, is necessary to observe them. The score is in fact the same, but the execution of the environment changes continuously. In the work of Walter De Maria the accompaniment of natural phenomena is part of the work, it is constructive and sensorial support. It is therefore impossible to identify the factors that contribute to forming the work, any description, such as photography, is partial, however some elements of the score may be given, leaving to each one the imaginary execution and arrangement».

Walter De Maria began his career as a drummer in the past (he also played with the Velvet Underground), up to understanding his true vocation: visual research.

All his artistic experiences, both in the field of music and art, have led De Maria to deepen in his Land Art works a search for the relationship of "constant and living participation of the visitor/spectator"[13].

The temporary metamorphosis of the landscape

Among the major representatives of Land Art and developers of large-scale installations, the same age as Walter De Maria, is the living artist Christo, who worked until 2009 together with his wife Jeanne-Claude Denat de Guillebon (1935-2009).

Characteristic of Christo and Jeanne-Claude is the creation of projects of imposing dimensions, which produce a temporary metamorphosis of the sites of intervention, visually transforming them into unrepeatable places.

Their works have contributed to generating "new visual standards", in which "a part or the whole of a rural landscape [...] become archetypal images right in the middle of their real context"[14], transforming architectures into new visions and existing natural environments.

Marion Taube, author of the text "Expanding Horizons" in "Christo and Jeanne-Claude. Recent

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[13] *Ibidem*
[14] Marion Taube, *Orizzonti in espansione* in *Christo e Jeanne-Claude. Progetti recenti, progetti futuri*, Fondazione Ambrosetti Arte Contemporanea, Skira editore, Milano, 2001, p. 66

projects, future projects "published by Skira publisher, writes[15]:

«A suddenly familiar image disappears, re-proposing itself in a new, changing and richer in colors, creating a new space for fantasy and reflection, enriched in its own imaginary, playful, seductive and above all difficult to forget.

The real prodigy that is in the works of Christo and Jeanne-Claude is revealed when the artists leave and their short-lived works are dismantled: nothing appears as it was before!

[...] What we have seen there is no longer forgotten and is stored in the depth of the observer's associative memory". An example of the temporary metamorphosis of the landscape is the installation The Floating Piers , conceived as a walkway that crosses the shores of Lake Iseo (figs. 8 and 9). In addition to having generated in visitors a global curiosity in experiencing it in person, attracting more and more tourists every day, the work of Land Art has generated a considerable economic benefit for the territory. The work, open to the public between June 18 and July 3, 2016, brought about a million and two hundred thousand visitors to the Sebino territory and a turnover of around 4.2 million euros per day.

Massimo Feruzzi, sole director of the Jfc company in Faenza (a company specialized in consultancy and tourism marketing), in an article in L'Eco di Bergamo, stated that "the economic benefits were [...] higher than expected. The Floating Piers was and will remain an irreproducible event that was able to bring 808,900 people to Lake Iseo who had never been there before. Overall, in the sixteen days the companies in the area have cashed in 88 million and 111 thousand euros: of these, exactly 76.5%, equal to 67 million 426 thousand euros, were invoiced thanks to the event. In essence, the total daily turnover, generated by The Floating Piers, was around 4.2 million euros »[16].

Fig.8 Walking on Lake Iseo, photo by Diego Repetto

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[15] *Ibidem*
[16] https://www.ecodibergamo.it/stories/Cronaca/leffetto-passerella-si-fa-sentire-sul-lagoincassi-per-88-milioni-di-euro_1193969_11/

Fig.9 Walking on Lake Iseo, photo by Diego Repetto

To confirm the success of the event also for economic purposes, as well as the image of the local territory in the world, was a survey conducted by the University of Bergamo, which shows that the percentage number of those who visited for the first time Lake Iseo, thanks to the call of The Floating Piers, is equivalent to 42% of total visitors[17].

Landscape 5.0

The experiences analyzed are for one thing connected to each other by the sense of grandeur and wonder that they transmit and by the interaction between the visitor / spectator and the work of art; in reality the concept underlying the project of Land Lighting Vesuvius is the conscious and intentional correlation between art and scientific research in which one supports the other generating a new landscape called the Fifth Landscape or Landscape 5.0.

In the Land Art works (a term conceived by the artist Walter De Maria author of the installation "Lightning Field") "the accompaniment of natural phenomena is part of the work, it is constructive and sensorial support", it becomes "impossible to identify the factors that concur to form the work [...] "," some elements of the score can be given, leaving to each one the execution and the imaginary arrangement "[18].

With the passage of time, temporary Land Art works have always become more frequent, the lasting is left for the provisional; as in communication and in the industrial sector, even in the artistic field there is an exponential evolution, in which technological factors contaminate living art, collaborating with the latter to amplify the message that the artist wants to convey with a given work. Communication is fast. The ephemeral prevails. The contemporary prefers the moment of the artistic gesture / message that will be remembered, but not relived in everyday life.

Therefore, a search by the tourist flow becomes more and more frequent, and not only of events that create temporary landscapes (of short duration), able to transmit a sense of uniqueness of the moment that is being lived, with respect to visiting historical landscapes and , in some ways, "static". Temporary installations in urban centers and open spaces become the opportunity to generate moments of different use of the environments, living them in a completely new way and creating new perspectives. Non-invasive interventions with respect to the environmental context, in which the fading of the work, given by its temporary nature, leaves no trace in the landscape.

The unpublished prevails and the Fifth Landscape is born.

If the first landscape is the managed forest, the second the cultivated field, the third the places in a state of neglect at the hands of man according to Gilles Clément and the fourth in which art is used to counteract degradation and urban solitude, the fifth landscape is that generated by large temporary installations that with catalyst force on the territory, stimulate to live the environment in a new way, generating new future perspectives.

The great emotional impact on the collective memory transmits, in addition to the true meaning of the work, also a sense of uniqueness of the moment one is experiencing.

New visions of landscapes are provided to the community, in which art, landscape, architecture and design are confronted with the themes of environmental sustainability and landscape.

In Landscape 5.0 the creative act becomes the expedient to generate new searches for territorial and social identity.

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[18] Germano Celant, *The Lightning Field, Walter De Maria*, https://www.domusweb.it/it/dall-archivio/2011/06/21/the-lightning-field-walter-de-maria.html

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Crosslands: resilience and new metropolitan polarities in the periurban river spaces of the mediterranean coast. The case of val polcevera

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Abstract

The Latin arch of the Mediterranean coast is characterized by a succession of torrential river areas, which have originally defined the distribution and morphology of the settlements along the coast. Many of them are located in not central areas and are part of those peri-urban territories that, not having a polar role in the development of the urban fabric, they have remained a marginal back of the city, an ideal place for infrastructural and industrial development.

The case of Val Polcevera, located in the west side of Genoa, has been studied for years by the research group GicLab, which identifies in it the need of a profound reconsideration of the current situation in the direction of both a resilient, environmental attention and also an innovative vocation. The territorial study focuses not only on urban infrastructural mobility, but also it focuses on the interconnection between geographic and social realities that are now interrupted: the complex territories that today are fragmented (such as Val Polcevera) have the necessity and the opportunity to be reactivated and re-interlaced in a new geo-urban fabric, in which connections and interconnections play a fundamental role. The strategic analysis of these case studies aims to show a new contemporary approach to a more multi-systemic (and multilevel) planning, that leads to the exploration of new types of cartography, mapping, graphic analysis (diagrams, ideograms, schemes) associated with a more expressive, communicative, plastic and conceptually explicit representation of the Urban De-sign.

Abstract

L'arco latino della costa mediterranea, è caratterizzato da un susseguirsi di spazi fluviali e corsi d'acqua, perlopiù a carattere torrentizio, che hanno originariamente definito distribuzione e morfologia degli insediamenti lungo la costa. Molti di questi, in una situazione non sempre centrale, fanno parte di quei territori periurbani che, non rivestendo un ruolo polare nello sviluppo del tessuto urbano, sono rimasti paesaggi di margine, talvolta retro della città, luogo ideale per lo sviluppo infrastrutturale ed industriale.

Il caso genovese della val Polcevera, limite a ponente della città di Genova, è da anni oggetto di studio da parte del gruppo di ricerca GicLab, che vi individua la necessità di un ripensamento in chiave non solo resiliente ed ambientale ma anche innovativa.

Lo studio territoriale si focalizza non unicamente sulla mobilità urbana infrastrutturale, ma anche, sull'interconnessione fra realtà geografiche e sociali oggi interrotte: territori oggi frammentati e complessi (come quello della val Polcevera) hanno la necessità e l'opportunità di essere riattivati e rintrecciati in nuove trame geo-urbane, in cui connessioni ed interconnessioni assumono un ruolo fondamentale. L'analisi strategica di questi casi di studio vuole illustrare un nuovo approccio contemporaneo ad una pianificazione più multi-sistemica (e multilivello) che invita all' esplorazione di nuovi tipi di cartografia, mappatura, analisi grafica (diagrammi, ideogrammi, schemi, masterizzazioni) associati ad una rappresentazione più espressiva, comunicativa, plastica e concettualmente esplicita del   Di-segno Urbano.

Introduction

Rivers, and water in general, have always had a crucial part in the emergence of human society and the process of human settlement (Silva, 2006). The Latin arch of the Mediterranean coast is characterized by a succession of rivers, mostly short and torrential that create some pauses and interruptions in a dense urban development. Originally, the presence of these river areas had influenced and defined the distribution and morphology of the settlements along the coast. Due to their small dimensions (bot in length and in flowrate of water) and the characteristics of stream, many of these rivers were originally located on the side of urban areas.

The relation between the rivers and the cities, as dynamic systems, have changed and evolved over time. The morphology of many cities has grown developing a dialectical relationship between the city functions, the infrastructural structures and the river system flowing inside (Abshirini, Koch, 2016). The Latin arch of the Mediterranean coast is characterized by the presence of a dense fluvial system that connect, and divide at the same time, the complex urban fabrics. Several cities in this area have one or more river inside or beside them, but none of them is considered to be a river-city. Rivers not only are usually located in marginal areas, but also have no identity role in the definition of these cities, which are strongly influenced by the presence of the sea and the ports. Peripheral streams were incorporated inside the urban fabrics when the cities grown in dimension and became part of those peri-urban territories that, not having a polar role in the development of the urban fabric,

remained a marginal back of the city, an ideal place for infrastructural and industrial development. Since the crisis of the industrial sector and the disposal of many factories, the conversion, reuse, and reactivation of industrial dismissed areas have been an important topic for architects and urban planners from the late nineties. Peripheral rivers areas, (as the Val Polcereva territory) now incorporated in the city development, have the chance to reinvent themselves as a new polarity in the grown metropolitan area, focusing not only on the essential re-naturalization and natural recovery of the stream system, but also on the urban values of the riverfront, as civic and human infrastructure. At the same time, more and more people are talking about new territorial processes of resilience and how new technologies enter into land use planning. Resilience is a term derived from the materials science and indicates the property that some materials have to maintain their structure or to regain its original shape after being subjected to crushing or deformation. In psychology connotes precisely the ability of people to cope with stressful or traumatic events and positively reorganize their lives face of difficulties. The resilient city, resilient cities, is an urban system that is not limited to adapt to climate change (especially global warming) that in recent decades make it increasingly vulnerable cities with ever more dramatic consequences and rocketing costs. The resilient city is changed by building social responses, economic and environmental new enabling it to withstand in the long run to the stresses of the environment and history. Resilience is therefore now a necessary component for sustainable development, by acting first and foremost on organizational and management models of urban systems. A sustainable city is therefore a resilient city.

Technology, of course, part of a new "open" design method, has become pillar of resilient cities: resilience is another fundamental characteristic of the smart city. In physical resilience is defined as the ability of materials to withstand external stresses. Transferred on the development plan, but also social, is the ability of a city to adapt and grow even when affected by traumatic events, such as floods and earthquakes, or if afflicted by "unnatural disasters" such as chronic unemployment, mobility problems and lack of green spaces, for example.

Resiliency does not imply only develop strategies of response and adaptation to external stress, but also put in paths field transformative acts to improve the city also in terms of prevention. Resilient cities are those who have knowledge of exposure to certain risks and thus establish a pro-active and integrated plan to prevent them. In this context, the data play a central role.

Methodology

Peripheral rivers areas have today the opportunity and a duty to rethink themselves as complex systems integrated in the metropolitan context and in the territorial system. We have to take a profound reconsideration of the current situation in the direction of both a resilient, environmental attention and also an innovative vocation, re-thinking it with a strategic redefinition, as a new urban-landscape pole with the development of new active and interactive key-operations.

In the introduction of the book *Landscape as urbanism* Charles Waldheim writes:

"Most often the sites associated with rethinking the urban through landscape are found at the limit to a more strictly architectonic order for the shape of the city. Most often these are sites where a traditional understanding of the city as an extrapolation of architectural models and metaphors is

no longer viable given the prevalence of larger forces or flows."

This territories, located at the limit between the urban fabric, the infrastructures networks and the nature cannot be understood and reinvented with the canonic architectural model, but need to take in consideration the landscape, as well as the complex systems of flows of goods, energy and people that cross it and create it. A more open and multidisciplinary approach is needed: an approach that is not afraid to confront with different realities, integrating the project in a complex process of strategic analysis, prevision and programming.

Analyzing and designing a complex territory as an urban river area means to speak about the city-river system (on a regional and territorial scale) and not about the city and the river as different interacting entities, defining the city-river system as overlaying of the river system with the urban system, focusing on the nodes that intersect both layers (Silva, 2006).

This strategic view aims to show a new contemporary approach to a more multi-systemic (and multilevel) planning, that leads to the exploration of new types of cartography, mapping, graphic analysis (diagrams, ideograms, schemes). As today cities have the ability to collect, process and produce information, they are defined not only by their physical architecture, but also by their architecture of information (Berardi, 2015). It becomes essential to question the consequences that this produces and the definition of urban strategies and their representation. The Datatown, extreme view produced by MVRDV in 1999, shows clearly how diagrams, information flows and collective behaviors, also influence the constitution of the physical city. In this context, the representation of complex and multiple information takes on a fundamental point: the diagram, by selecting specific data, already represents a design choice in itself. We can't therefore speak anymore of masterplans but instead we speak of «battle maps» (Gausa, 2003) able to guide dynamic and open processes, guided by qualitative variables that strengthen the territorial potential, working in networks of interaction between systems, and mitigate the critical points and areas of strategic-tactical priority intervention.

Two cities, two approaches

Two of the metropolitan areas that developed their fabric incorporating their side rivers are Barcellona with the Besòs and Genova with the Polcevera and the Bisagno streams. In both cases the impact of the human activity on the watercourses have been strong: all of the three rivers (Besòs, Polcevera and Bisagno) have been heavy canalized in artificial banks and the fluvial valleys have been progressively reduced and occupied by the city structures. Both the city of Genova and Barcellona suffered in the past from hydrogeological risk and heavy flooding problems, due to strong and sometimes wild urbanization of the river valleys, together with the fact that the morphology of the Mediterranean basin itself, with numerous small and steep river catchments, can turn the intense precipitation into severe devastating flash floods and floods (Rebora, Molini et al., 2012).

1. Barcellona and the recovery of the city-river system

The Besòs river, located on the east side of the metropolitan area of Barcellona, at the beginning of the 1990 was one of the most polluted rivers of Europe. The process of recovery of the city-river system concretely started in 1997 and the last phase of the project was opened to the public in 2004 (Vide, 2015). With the beginning of the '900 the growing industry expanded along the southern banks of the river, resulting in a great environmental impact. From fifties the metropolitan area of Barcelona grew and expanded rapidly, reaching the river territory of the Besòs. After the tragic flood of the 25 September 1962 that caused enormous damage and loss of life, in 1975 the canalization was inaugurated, limited by concrete walls, which restricted the alluvial plain from 300 to 130 meters wide. In the early 1980s, local associations began to deal with the problem of water quality, which was heavily polluted, raising the awareness of the municipal authorities. Thus was born the "Consorcio para la defensa de la cuenca del río Besòs". In December 1996 the environmental recovery project was approved by the European Union, for a value of 20 million euros. (paid for 80% by the EU and 20% by the municipalities involved in the project). On April 1999, phase I of the project ended with a major inauguration of the urban park and wetlands area. In February 2000, BarcelonaRegional began the project to extend the urban park to the sea (phase II), and finally in 2004 the last stretch was inaugurated, for a total of 26 hectares of urban park (Alarcón, Montlleó, 2011). The project, that have started focusing on the restoration of the river natural qualities, strongly reflects the local and social needs from which it took his origin, and this is probably reflected in a partial lack of continuity and uniformity in the solutions adopted, as well as the lack of a strong program for the neighboring areas. The process however had the capacity to recover one of the most polluted waterways in Europe to restore it to urban use as a public park frequented by over 300,000 people a year (Alarcón, Montlleó, 2011).
Even if the recovery of the Besòs river in Barcelona was mainly focused on environmental issues it created a social legacy on the metropolitan area and the birth and consolidation of a social consciousness in a particularly delicate context; it shows the close connection between regeneration of the environmental, urban and social system.

2. Re - informing the Val Polcevera system

The city of Genoa is accustomed to negotiate with its complex geography in sometimes unlikely situations, always taking advantage of its strong resilient component. The Val Polcevera has been studied for years by the research group GicLab, which identifies in it the need of a profound reconsideration of the current situation in the direction of both a resilient, environmental attention and also an innovative vocation. Since the tragic collapse of the Morandi bridge in August, the Polcevera area is the center of discussions at national and international level.
The challenge now is not only the construction of the new bridge (and its possible combination with the consolidation of the remains of the old one) but the treatment of the entire Val Polcevera, a fluvial valley with a diversity of urban, landscape, industrial structures and patrimonial, during years of "back to the city" and that today can (re) signify - treated with ambition and urban quality - as a new fundamental pole of the city. (Fig. 1)

Fig.1 Aerial view showing the complexity of the territory of ValPolcevera

The Integrated Architecture and Urbanism and Landscape Laboratories led by Carmen Andriani and Manuel Gausa together with Adriana Ghersi, as well as the Winter Workshop of synthesis and the Exhibition presented these days (4-11 January 2019) have been dedicated to this urgent topic. In this case, the theme was not "to build the bridge" but "to create bridges".

Between territories, cities, landscapes and citizens, today scarcely interconnected because of the fragmented reality that is at stake today.

The objective of both laboratories ranges from the analysis, reading and interpretation of the complex reality of Val Polcevera itself to its future projection, in an holistic vision of global definition that lies beyond the great viaduct: creation and development connections and interconnections, intersections and crossings, actions and interactions in a territory that presents an accumulation of unresolved tensions; in which the coexistence of infrastructure, residence and geography has always been characterized by the addition of parallel fronts, sometimes mutually indifferent, sometimes (often) dialectically conflicting. (Fig.2)

A territory, the one of the Val Polcevera, that attends to the continuous flow of goods and people: a passing landscape; a landscape formed by the sum of all these transits and lived, often, by those who cross it only as a place of fast crossing.

In this sense, the voice "Passage to the West"(Andriani) translates that territorial gaze further while the voice "Crossland" (Gausa) translates the desire to "weave" the Val Polcevera by making emerge a latent, infrastructural and landscape geometry, linked to its condition of (multi) fluvial flow:

- knitting the Polcevera Valley
- strengthing and highlighting a dormant structural (infra)geomorphology. (Fig.3)
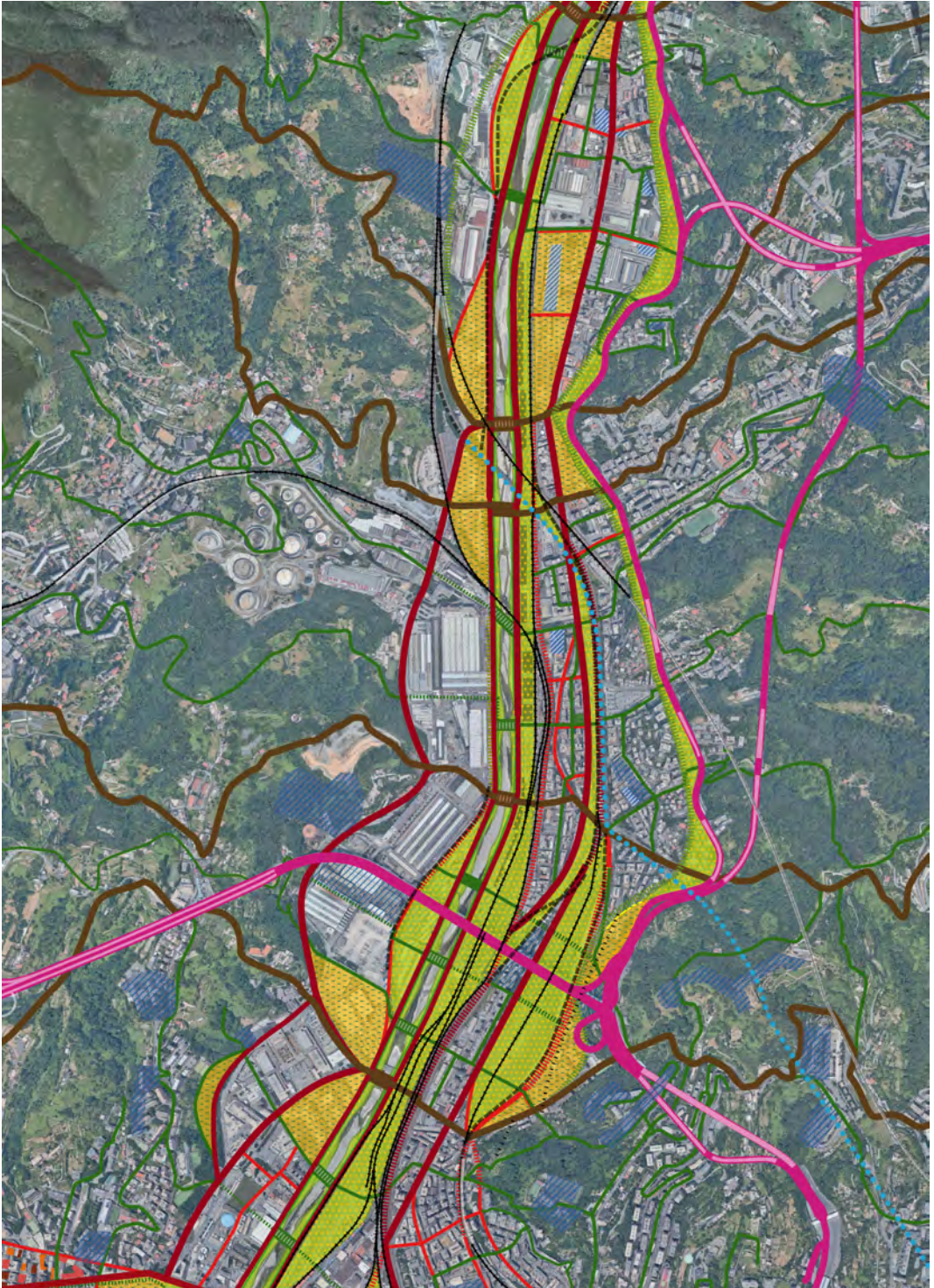
Fig.2 Crossland strategic points: weaving Val Polcevera, strengthening the latent (infra)structural geomorphology
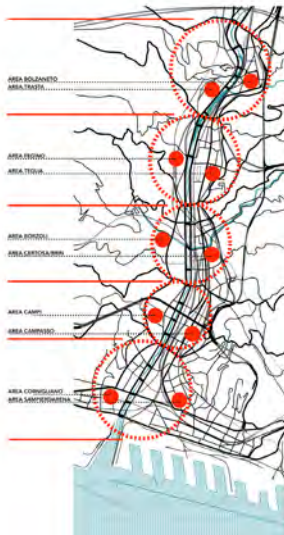
Fig.3 Weaving Val Polcevera: connecting the existing poles and knots on both sides of the river

Conclusion

The project and the presented proposals (Fig.4) could be synthesized in:

- to move from a cumulative structure of longitudinal road lines, along the river to a mesh geometry interleaced

- to go from a set of periurban fragments disintegrated and frayed today, on either side of the river (large factories, warehouses, dispersed urban fabrics, disused spaces, low density aureoles) to a system of well-profiled and inter-related spaces (fuses of urban bags) – to rediscover the fluctuating geometry of a series of local, urban and landscape identities, intertwined in a new network geourbanity.

– to Provide a sequence of 6 transversal cross-bridges (reinforced or designed ex-novo) and 12 bridges/platforms for pedestrian or slow connections, associated with urban and landscape paths to the nature of the nearby hills.

Based on the previous strategic decisions, the challenge is also about:

- to consolidate, to extend and to expand the future park-walk along the river (to design and project) through a strategic sequences of surfaces "in fuse" conceived as new operative landscapes (active greens) where to combine green spaces, architecture and functional programs of social exchange and

cultural public areas.

- to mean a whole series of sectors (indicated with different frames) connected to the main bridges, and called to be rethought in terms of mixed programming (housing, production, open spaces towards the river, etc.)

- to recover and/or recycle disused structures, with new production and/or living activities.

- to expand the leisure, trade and innovative production sector, in mixed structures where the recovery of old industrial facilities can be integrated and combined with the respect for the identity and domestic life of existing neighborhoods, the resilient landscape approach to the environment and an important commitment to qualitative planning, both methodologically and expressively and formally.

All this to reinform Val Polcevera as a new reference pole of Genoa in which to combine innovative development and social and urban self-esteem.
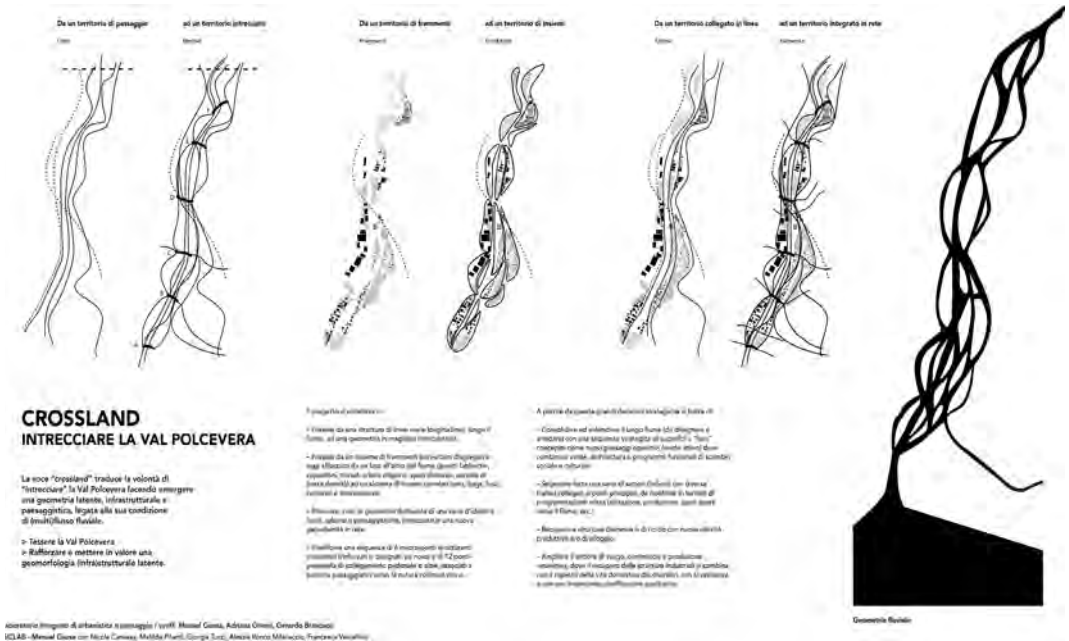
Fig.4 Strategic operational view of the valley

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On art and landscape: connections and meanings
between the representation and the project of the green

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Abstract

"A garden is a complex of aesthetic and plastic intentions; and the plant is, to a landscape artist, not only a plant - rare, unusual, ordinary or doomed to disappearance - but it is also a colour, a shape, a volume or an arabesque in itself." (Roberto Burle Marx)

The objective of this article is to develop a temporal path through the different meanings of landscape and its representations over time up to the languages of contemporary landscape architecture.

The term landscape architecture, in fact, originates from the title of a book by Meason in 1828, ON THE LANDSCAPE ARCHITECTURE OF THE GREAT PAINTERS OF ITALY, deeply linking the architecture of the landscape with its pictorial representations.

This article aims to determine the relationship between landscape design and art not only from a graphic-representative but also from a design point of view: through a series of case studies the temporal context, the techniques used and their meanings will be analyzed.

Drawing, as a universal language, is the key to understanding the evolution of the concept of the landscape itself. The article will conclude with a selection of examples of contemporary landscape projects to understand if and how art still influences design thinking and what are the future development possibilities for research on the subject. "Drawing is what we actually make." (Laurie Olin)

Abstract

"A garden is a complex of aesthetic and plastic intentions; and the plant is, to a landscape artist, not only a plant - rare, unusual, ordinary or doomed to disappearance - but it is also a colour, a shape, a volume or an arabesque in itself." (Roberto Burle Marx)

L'obiettivo di questo articolo è sviluppare un percorso temporale attraverso i diversi significati di paesaggio e le sue rappresentazioni nel tempo fino a giungere ai linguaggi dell'architettura del paesaggio contemporanea.

Il termine architettura del paesaggio, infatti, trae origine dal titolo di un libro di Meason nel 1828, ON THE LANDSCAPE ARCHITECTURE OF THE GREAT PAINTERS OF ITALY, legando profondamente l'architettura del paesaggio con le sue rappresentazioni pittoriche.

Questo articolo vuole determinare il rapporto tra il progetto del paesaggio e l'arte non solo dal punto di vista grafico- rappresentativo ma anche progettuale: attraverso una serie di casi studio si analizzerà il contesto temporale, le tecniche utilizzate ed i loro significati. Il disegno, come linguaggio universale, è la chiave di lettura dell'evoluzione del concetto stesso di paesaggio.

L'articolo si concluderà con una selezione di esempi di progetti del paesaggio contemporanei per comprendere se e come l'arte influisca ancora sul pensiero progettuale e quale siano le possibilità di sviluppo future per la ricerca in materia. "Drawing is what we actually make." (Laurie Olin)

Introduction

The design/project relationship about the landscape project owes a great deal to the languages of the figurative arts: the relationship between art and landscape is close relationship where the influences not only concern the expressive forms of the design but also touch the design in the composition of the spaces.

However, the relationship between art and landscape that we have identified is not univocal and constant in all the authors: the historical period in which the author lived, the cultural experiences, the history and personal sensitivity have a lot of influence.

The obvious intertwining of art, nature and landscape emerge from the analysis of the projects and drawings of the authors proposed below (Gertrude Jenkins, Roberto Burle Marx, Luis Barrgàn, Yves Brunier, Pietro Porcinai) chosen for the importance they still have in the field landscape architecture and for the variety of their expressive forms.

For the Oxford English Dictionary, art is "the expression or application of human beings' creative skills and imagination, generally in visual forms such as painting or sculpture, in the production of works mainly appreciated for their beauty and emotional strength. ".

This is not, obviously, the only meaning of art: we will refer here mainly to the visual arts and painting with its main theories.

Art is a powerful tool capable of passing on the past thanks to its narrative and expressive ability but art is also able to represent hypothetical future and dream scenarios, images capable of arousing profound reflections on the present.

Gertrude Jekyll[1]

"I am strong of the opinion that possession of plants, however good, does not make a garden; it only makes a collection[2]." or for Gertrude Jekyll, it is importing how and what to combine for the creation of a garden.

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[1] Gertrude Jekyll (29 11 1843 – 8 12 1932) was a British garden designer, writer, and artist.
[2] Colour in the Garden, Country Life Library, George Newnes Ltd, London, 1908

Its gardens have been strongly influenced by the principles of the Art and Crafts of John Ruskin and William Morris: a movement that sought a design reform based on simplicity and usefulness, referring to pre-industrial, rural and romantic England, with its architecture traditional its typical landscapes.

His gardens were deliberately designed of intimate dimensions, with delicate colours, using local materials from the region in harmony with the house and the context.

The illustrations in the Happy England book created by Helen Allingham[3] perfectly represent the idea of the ideal garden inspired by the theories of Art and Crafts: images of houses inserted in the English countryside immersed in lush flowery landscapes that much resemble the hallmark flower borders of Gertrude Jekyll.

The study of colours is a fundamental part of the approach to the design/construction of the Jekyll garden: the choices of the essences were also based on the combinations of colours.

Gertrude Jekyll was a garden designer but also an indefatigable writer, she wrote in several sector magazines and made numerous manuals: among them "Color Schemes for the flower garden" (1919) where she deepens the concepts and techniques used in her work.

Fig.1 Gertrude Jekyll' sketching from Algier, Norham Castle by William Turner (1835-1850).

Fig.2 Gertrude Jekyll's Munstead Wood flowerbed and Helen Allingham "A Herbaceous Border"

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[3] Helen Allingham (26 September 1848 – 28 September 1926) was an English watercolourist and illustrator of the Victorian era.

Roberto Burle Marx[4]

Roberto Burle Marx's relationship with painting is evident in his work and widely documented in his writings "The art of garden design is a very and perhaps the most complex art, demanding an understanding of the other arts and a willingness to learn from nature[5].

Universally recognized inventor of the modern garden, Roberto Burle Marx is still a source of inspiration for designers from all over the world and his influence is still recognizable in many contemporary projects. The artistic experiences of his youth subsequently influenced all his way of composing and designing gardens: evident references to Wassily Kandinsky, Henri Matisse and the works of George Braque and cubism in general.

His approach was that of a painter with canvas: "I decided to use natural topography as a surface for composition and the elements of nature, mineral and vegetable, as materials to the plastic organization, the very thing that other artists try to do on canvas with paint and brush[6]" .

The influence that Henri Matisse had not only in the representation of the project but in its planimetric composition is evident in the design for the Minister's Rooftop Garden and the project for the Mineral roof garden.

Wassily Kandinsky claimed "The artist must try to change the situation by recognizing the duties he has towards art and himself, considering himself not the master, but the servant of precise ideals, great and sacred. He must educate himself and gather himself in his soul, taking care of it and enriching it so that it becomes the cloak of his external talent, and is not like the lost glove of an unknown hand, an empty and useless appearance. The artist must have something to say because his task is not to dominate the shape, but to adapt the shape to the content[7].": these ideas and several of his works can be found in Roberto Burle Marx projects such as, for example, the project for the Fazenda Marambaia.

Fig.3 Roberto Burle Marx Ministrer's Rooftop Garden Rio de Janerio 1938, drawing from Mineral roof garden Sao Paolo 1983, Henri Matisse drawing

Fig.4 Roberto Burle Marx Fazenda Marambaia (1945), Movement 1 by Wassily Kandinsky (1935)

Luis Barragàn[8]

Luis Barragàn claimed "I don't divide architecture, landscape and gardening; to me, they are one "and has demonstrated this concept in all his works: the relationship between masonry walls, vegetation, solids, voids and colour present in his creations always demonstrate a profound symbiosis between the elements thus creating architecture in close relationship with its garden and the landscape in which it is inserted.

Luis Barragàn's work was influenced by his artistic education and in particular, his interest in painting is clear: his friendship with the Mexican painter Chuco Reies[9] and the influence of Mexican culture has certainly been a source of inspiration for the use of colour in his works.

Luis Barragàn got to know and understand the theories of colour developed within the Bauhaus: this relationship is particularly evident in two works, Casa Gilardi (1947) and Casa Eduardo Pietro Lopez (1948).

In the composition of pure volumes and chromatic combinations, the swimming pool of Casa Giraldi refers to "De Stijl 1" by Peter Keler, a pupil of Johannes Itten and Wassily Kandinsky at the Bauhaus in Weimar. Joseph Albers, a professor at the Bauhaus in Dessau, inspired more than one work by the architect with his series of studies on chromatic combinations.

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[8] Luis Ramiro Barragán Morfín (Guadalajara, 9 March1902 – Città del Messico, 22 November 1988) he was a Mexican architect and engineer. He is considered among the protagonists of his time, and the most important Mexican architect of the twentieth century.
[9] Jesús Reyes Ferreira, (1880-1977) also known as Chucho Reyes, was a self-taught artist and antiques/art collector and vendor.

Fig.5 Casa Gilardi (1947), De Stijl 1 di Peter Keler (1922).

Fig.6 Joseph Albers Colours study (1921-1932), Casa Eduardo Pietro Lopez (1948), Chucho Reyes Tèlon (1940).

Pietro Porcinai[10]

"Porcinai's work defies neat summary. Each garden reflects the individuality of the site and client, but it is possible to recognize consistent themes; three of the most important are: the relationship between garden and wider landscapes, the use of natural plant associations and the integration of the swimming pool into the garden[11]."

Pietro Porcinai is recognized as one of the most outstanding Italian landscape architect of the Twentieth Century: his works are still today a reference point and example to be inspired by.

"Our survival is tied to the landscape. We must make sure that the new landscapes return to being formed as they were in ancient Florence, ancient Venice, ancient Siena, etc. The landscape always reflects the quality of social order and in fact, a society that has no respect for earthly nature does not even have respect for human nature[12]."

[10] Pietro Porcinai (Fiesole, 20 dicembre 1910 – Firenze, 9 giugno 1986) è stato un architetto del paesaggio italiano. Ha progettato sistemazioni paesaggistiche nelle scale più diverse: dal giardino al parco urbano, dall'area industriale al villaggio turistico, dall'autostrada all'area agricola. Tra i suoi oltre 1.100 progetti, realizzati in vari paesi del mondo, vi sono anche giardini-paesaggio, cioè giardini nei quali l'uomo sembra non aver fatto nulla.

[11] Ian J. W. Firth-"Porcinai's renaissance of the Italian garden", Landscape Architecture no. 4 . 1984.

[12] Pietro Porcinai "Proposta per la creazione di un Istituto internazionale di studi universitari per l'architettura del Giardino e del Paesaggio inedito", 1968

This statement by Porcinai is topical: his inspiration from the landscapes of antiquity is also reflected in his way of designing his projects.

The references to some elements of the Renaissance representation of the landscape, in particular, the Tuscan villas of the Sixteenth Century, are always recognizable in his drawings and the study of perspective, an invention of that historical period, recalls the ideal cities, a theme of the developed around the XV century as a representation of the Renaissance theoretical concept of the perfect city.
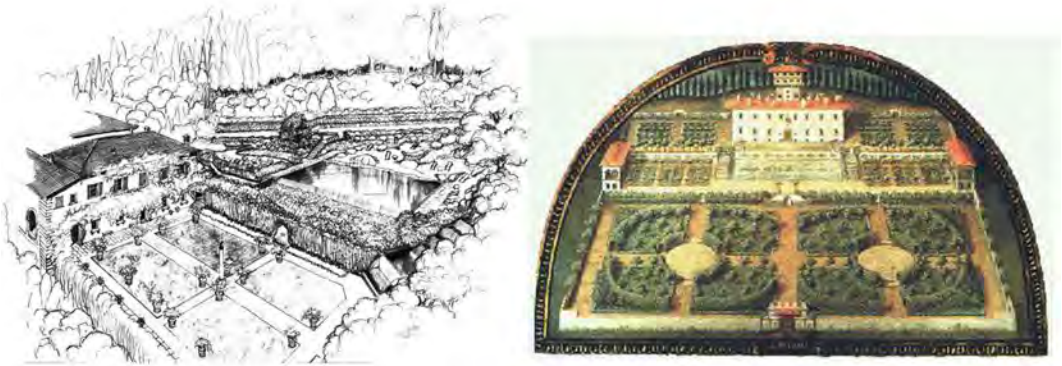
Fig.7 Pietro Porcinai, drawing for garden with swimming pool and Villa medicea della Petraia, Giusto Utens, 1599-1602
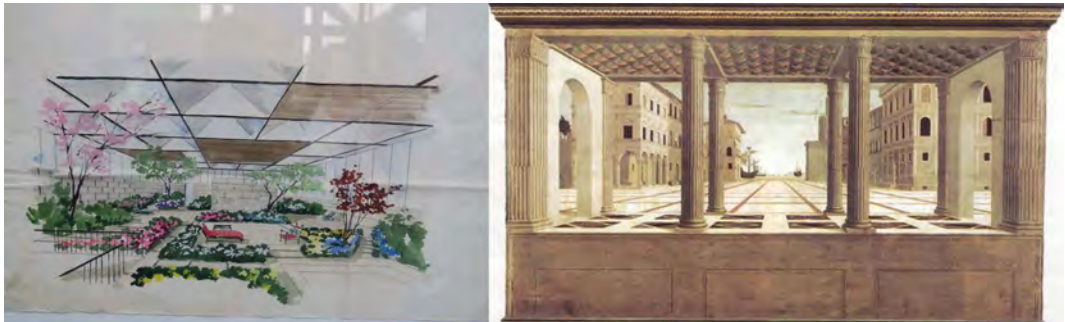
Fig.8 Pietro Porcinai, drawing for Zegna Foundation winter garden (1970 circa), La Città Ideale Tavola di Berlino (1447).

Yves Brunier [13]

Despite the few years of activity before his untimely death, Yves Brunier managed to carry out some important projects with important collaborations such as Jean Nuovelle and Bernard Tschumi.

Rem Koolhaas, with whom he collaborated as an architect than as a landscape architect, said of him: "Yves was a man of few words. He expressed his ideas in the form of drawings and collage tossed of wordlessly.[14]"

The characteristic of his work was the great originality with which he approached the design drawing: in addition to his models, which he made with recycled materials, he used to make collages with a strong critical and emotional impact.
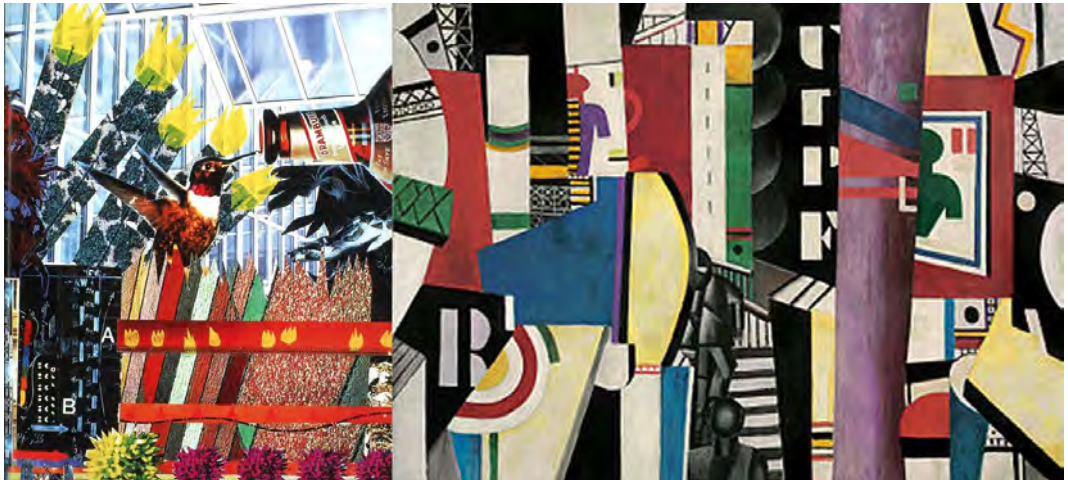
Fig.9 Yves Brunier, Diverse Design Documents (1990) and The City painting by Fernand Léger, 1919 (Philadelphia Museum of Art)

Collage is a technique invented by Cubist painters Pablo Picasso and Georges Braque in the early twentieth century as a break with traditional painting and an innovative form of artistic experimentation.

Yves Brunier recovers this technique and uses it to express his ideas by using their evocative skills, thus creating collages with sometimes dramatic atmospheres, exasperating the image with the use of black and red colours.

Conclusion

Drawing is an important tool for "knowledge" of the landscape, according to Le Corbusier: "The key is this: Look, observe, see, imagine, invent, create."

Design, therefore, is necessary for the design process for its vision and synthesis ability but above all for its contribution to the creation and invention of the idea.

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[13] Yves Brunier (1962 - 1991) was a French landscape architect best known for his collage illustrations and projects done in France and Belgium.

[14] Rem Koolhaas interview on the occasion of the Yves Brunier Exhibition presented from May 30 to October 27 1996 at Arc en Rêve Centre d'Architecture in Bordeaux

Representing the landscape is an operation that starts from a vast knowledge base, deals with a complex system of factors that interact with each other and contribute to the final formation of the object of study.

According to Eugenio Turri: "The landscape is the visual projection of that territory, recognizable through the visual perception of its physical forms and also through the works that the individual or the society of which it is a part, inserted in the physical space that constitutes as scenery, the theatre of their living and acting… ".

The landscape, therefore, a visual projection of the territory, requires a reading of the signs visible in it. This reading must be based on visual perception and analysis on the drawing since the "Landscape designates a certain part of the territory, as it is perceived by the populations, whose character derives from the action of natural and / or human factors and their "interrelationships[15].

Thirty years ago, in Design on the Land, the historian Norman Newton defined landscape architecture as "art - or science if he preferred - to arrange the earth, together with the spaces and objects on it, for safety, efficiency, health, pleasant human use. " This definition is too precise for the complexities of today's practice, that is, a complex discipline that connects science and art, mediating between nature and culture. Contemporary landscape architecture is advancing towards an independent language, drawing on the languages of art and architecture, thus giving the relationship between man and nature new graphic expressions.

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[15] Convenzione Europea del Paesaggio, Firenze 2000

The drawing and the dimension of protected agriculture into the Mediterranean landscape

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Abstract

The Mediterranean represents an almost closed basin within which numerous streams flow. The coastal territories that are part of it, constitute a well-defined ecoregion, characterized by a remarkable diversity of landscapes, geology and climate. The Mediterranean landscape is presented as the result of the interaction between the geo-environmental characteristics and the anthropic activities (Marzi, Tedone, 2009). The birth of agriculture occurred following the improvement of the climatic conditions due to the end of the last glacial period (Würm) and to the beginning of the Holocene (around 10,000 years ago) that still continues. Where there were the ideal characteristics to cultivate, the villages first arose, then the towns became cities and some of them in the present metropolis. It was agriculture that shaped the landscapes in its favor during the history, even today the rural territory draws a pattern of full and empty spaces, fields and greenhouses, variegated but easily recognizable. However, the need to adapt the climatic conditions to specific crops to meet the strong demand of the global market, led from the middle of the last century to a disproportionate and unconditional spread of agricultural structures with a serious environmental impact. This brief discussion highlights the dynamics that exist between the drawing of the agricultural landscape, the dimension of the rural sector, the Mediterranean landscape, European policies and future development prospects.

Abstract

Il Mediterraneo rappresenta un bacino quasi chiuso nel quale sfociano numerosi corsi d'acqua. I territori costieri che ne fanno parte costituiscono un'ecoregione ben definita, caratterizzata da una notevole diversità di paesaggi, geologia, clima. Il paesaggio Mediterraneo si presenta come il risultato dell'interazione tra le caratteristiche geo-ambientali e le attività antropiche (Marzi, Tedone, 2009). La nascita dell'agricoltura si è verificata in seguito al miglioramento delle condizioni climatiche dovute alla fine dell'ultimo periodo glaciale (Würm) e all'inizio dell'Olocene (intorno ai 10.000

anni fa) che perdura tuttora. Ove vi erano le caratteristiche ideali per coltivare sono sorti dapprima i villaggi, poi i paesi si sono trasformati in città ed alcuni di essi nelle attuali metropoli. È stata l'agricoltura a plasmare nella storia i paesaggi a suo favore, ancora oggi il territorio rurale disegna un pattern di pieni e vuoti, campi e serre, variegato ma ben riconoscibile. Tuttavia la necessità di adattare le condizioni climatiche a specifiche colture per far fronte alla forte richiesta del mercato globale, ha portato dalla metà del secolo scorso ad una diffusione smisurata ed incondizionata delle strutture agricole dal grave impatto ambientale. In questa breve trattazione vengono messe in luce quali sono le dinamiche che intercorrono fra il disegno del paesaggio agricolo, la dimensione del settore rurale, il paesaggio Mediterraneo, le politiche Europee e le prospettive di sviluppo futuro.

Introduction

Agriculture has always been much more than human practices to sustain the livelihood of man. Up to now, agriculture has taken on numerous cultural, symbolic and religious meanings. From being synonymous with organized society and the foundation of the development of every economy, to being the cause of praise and honour, as well as a symbol of power for the owners of the earth. In the course of history, land has been cultivated as a way of giving thanks to the God(s), Sacred areas were ploughed in the hope of a fruitful harvest and precise agricultural lines were organized on the basis of the lines defined by communities and cities, shapes and patterns of gardens were carefully designed symbolizing man's domination of nature. In the 18th century, agriculture added an aesthetic aspect to its functional character; the beauty and sublime of the landscape. The term "landscape" became increasingly associated with the words of art. A sublime landscape experience occurs when we can no longer define the boundaries of what we see. Places where this may happen could be in the vast spaces of the Grand Canyon, Niagara Falls, deserts, or even in acres of ice and snow. Today, we find the endless lavender expanses of Provence immensely fascinating, we organize trips through the fields of Dutch tulips and set up romantic photo shoots framed by vast, seemingly boundless grain fields.

Over the centuries, populations have practically "engraved" the history of their economic-productive and socio-cultural system into the ground. The land has been marked with different degrees of awareness, forms and structures in the territory, composing organized sculptures that blend with the landscape, resulting in a complex - yet organized – pattern. These patterns are witnesses of the geographic and cultural identity of a community. We can consider an agricultural field as a natural level of the Earth's surface, which is overlapped by a cultural dimension that affects and modifies the pre-existing one, giving it a definite and functional conformation, aimed at achieving a precise purpose: the evolution of society.

An agricultural landscape is an organized landscape, meaning an anthropic intervention where man regulates the functionality of the land and somehow also aesthetics. The evolution of the man-made agricultural landscape goes hand in hand with that of society. Habits and technologies mutate together while always leaving an environmental footprint: The "engraved" marks on the ground stand as a memory of the organized society. These marks are not immediately perceptible on a small scale, but they manifest themselves only when there is a much wider view of the landscape.

An aerial perspective for instance, will reveal how all the parts of each single agricultural pattern alternate with spaces of settlements in a recognizable, geometric logic, which is repeated and extended on the territorial scale.

Methodology

Analysing one of the landscapes closer to us, such as that of the Mediterranean, the agricultural pattern that composes it is marked by cultivated fields, but above all agricultural greenhouses. In fact, the agricultural and rural dimension of the Mediterranean has been determinant and essential – and still continues to be – for the economies and societies of this landscape. In 2005, a third of the Mediterranean population resided in rural areas and even today, despite (although) a tangible decline, agriculture is a strong and current component. In order to realize the dimension of this sector, it's important to quote that agriculture in the world occupies about 35% of the earth's surface and a further 35% is occupied by forest area. In the European union, rural areas account for over 90% of the territory, but actually about 75% of the soil is occupied by agriculture and forestry activities (De Castro 2010).

More specifically, the protected agriculture, for example, holds about one million hectares worldwide, of which nearly half (400,000 ha) are concentrated in the Mediterranean area (Campiotti et al. 2009; Waaijenberg 2006) (including greenhouses and plastic tunnels), mainly in: Netherlands (70%), Spain (60%), Italy (50%), France (46%) and Great Britain (15%) (Hubner, 2014).

Today this sector has relations and is compared to an international framework that can strongly compete with energy-environmental fields and agribusiness.

New demands for food guarantees and higher food safety levels and the need to reduce energy cost of agricultural facilities by producers, should be aligned with the new international goals. The Mediterranean agriculture should impose to become globally competitive, aiming to promote environmental sustainability, energy efficiency and the promotion of environmentally friendly production processes.

The agricultural production processes of the Mediterranean coast include both the nursery that the horticultural field since the beginning of the nineteenth century, when Alphonse Karr[1] started the trade and the export of French flowers throughout Europe (both in Italy, more precisely in the province of Imperia, carnations were cultivated more than today in the whole world). Today, the estimated areas used only to nursery in the world reaches nearly one million hectares (ENEA 2011) for an indicative equivalent of about 50 billion of euro.

Italy, for example, is in first place among producer countries in this field, with 12.700 hectares of agricultural area, and among the major exporting countries, whose most interesting market is Europe itself, such as France, Germany, Netherlands, Switzerland and the United Kingdom (ITA/ ICE, 2014).

Due to the significant extent of these processes it is therefore necessary to focus on different cross-cutting issues (logistics, supply chains, technology, management, etc.) in order that Europe will be

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[1] Alphonse Karr, French journalist and writer, became a famous entrepreneur horticultural in Saint-Raphael, he was the first man to start exporting flowers throughout Europe. Filippi, 1998 and Puccini, 1971.

able to align themselves in a competitive way to the rest of the world towards an ever-increasing demand for food and floral products, pursuing sustainable development models that do not affect the environmental balance. The wealth of natural resources and the diversity of landscapes make the Mediterranean an unique eco-region, however, industrial development, the incessant building, unfair social and pollution habits continue to compromise this fragile eco-system, worsened even more by the impact of climate change that adds drought and desertification processes in rural areas. Therefore it's necessary to understand the consequences triggered by the occupation and the intensive use of coastal rural areas of Latin arc, united by similar urban, rural and morphological conformations, as well as issues related to production cycles such as:

- the very high energy consumption due to the maintenance, heating and functioning of facilities and systems both in the warm months that especially in the cold months. The European energy consumption used for agriculture amounted to 5% of total European energy consumption, of which 350 million litres of diesel annually is used only for heating of the structures;

- the environmental impact, in fact, agriculture in Europe is due to over 9% of total greenhouse gas emissions (6.3 million tons), mainly nitrogen, methane and carbon dioxide (derived mainly from the use fertilizer) and numerous negative effects on the land (deforestation, erosion, salinization, etc.) (ISPRA 2010);

- water consumption for the European agricultural sector is over 24% (62 million m3 annual used in the agricultural and livestock sector), of which only one third is recovered and reused, the rest is dispersed for irrigation (ENEA 2011);

- the use of plastic materials for the protected agriculture exceeds 450,000 tons of plastic films, including mainly: polyethylene LDPE, more commercialized, ethyl vinyl acetate EVS and PVC polyvinyl chloride;

- but also the enormous amount of agricultural waste, called "green gap" needs of new recovery and recycling strategies, being biomass as a huge energetic potential.

Recently Europe is moving in the direction of efficiency and safeguard of environmental resources, with goals and strategies about the sustainable development (as well as uphold and promote the World Council for sustainable Development[2]).

The primary objectives that the world is preparing to pursue during the next few decades, will be related to sustainable development of rural areas, through the promotion of innovative technologies, the organization of food chain, the processing and marketing of agricultural products, the protection, restoration and enhancement of ecosystems related to agriculture and forestry activities, the efficient use of resources and promoting the transition to a low carbon economy in the agri-food and forestry sectors, but also the social inclusion, poverty reduction and economic development in suburban areas[3].

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[2] WBCSD – World Council for Sustainable Development, vision 2050
[3] ICAS VI 2013, International Conference on Agricultural Statistics VI, Rio de Janeiro, Brazil. Improving statistics for food security, sustainable agriculture and rural development. Linking statistics with decision-making.

Conclusion

Faced with this complex context, which is the present-day architect's position towards the planning of this "new Mediterranean countryside farmland in terms of production and environmental development?

Since the Seventies[4] the research, about the growth and decline processes of the cities, were not limited to an only urban perspective, but have investigated all the economic globalization phenomena that incorporate and act on urban spaces, identified "... not only such as object of study, but also as a strategic reference for the theory of a wide range of social, economic and political processes in the current era" (Sassen 1997).

Nowadays the functionalist planning is unable to handle these dynamic and fragmented situations, that are incubators of complex relationships (city-countryside, space-infrastructure, agricultural economy, sustainable development etc.), but that are rich of potentiality.

It will need to integrate traditional instruments with more global reorganization systems of urban and peri-urban space, able to support the farmland in this time of great change, helping it to achieve goals of sustainable development required from Europe, through awareness of the potential of the place and of the relationship that could weave with the cities themselves.

Who wants to face these issues, will understand the morphological-territorial and socio-cultural question of this Mediterranean agricultural landscape, in order to explore new prospects for these spaces through design strategies to reorganize rural sub-peripheral spaces, inquiring about future developments and providing a forecast of the concept of agriculture in the future scenario. So, I consider interesting to reflect on the dynamics of this multi-Mediterranean city understanding local realities and setting them in an international context in order to identify a method-model that allows to: integrate the existing with the new requirements, define some guidelines for limit new employment and recover the spaces «residues» (Clément 2004) – residual territories, delaissé – and to propose new design strategies that consider the problems and opportunities of the territory, providing an innovative and advanced method applicable to the local scale but transferable to the global scale.

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[7] Castells since the seventies highlights the importance of studying the city beyond its borders.
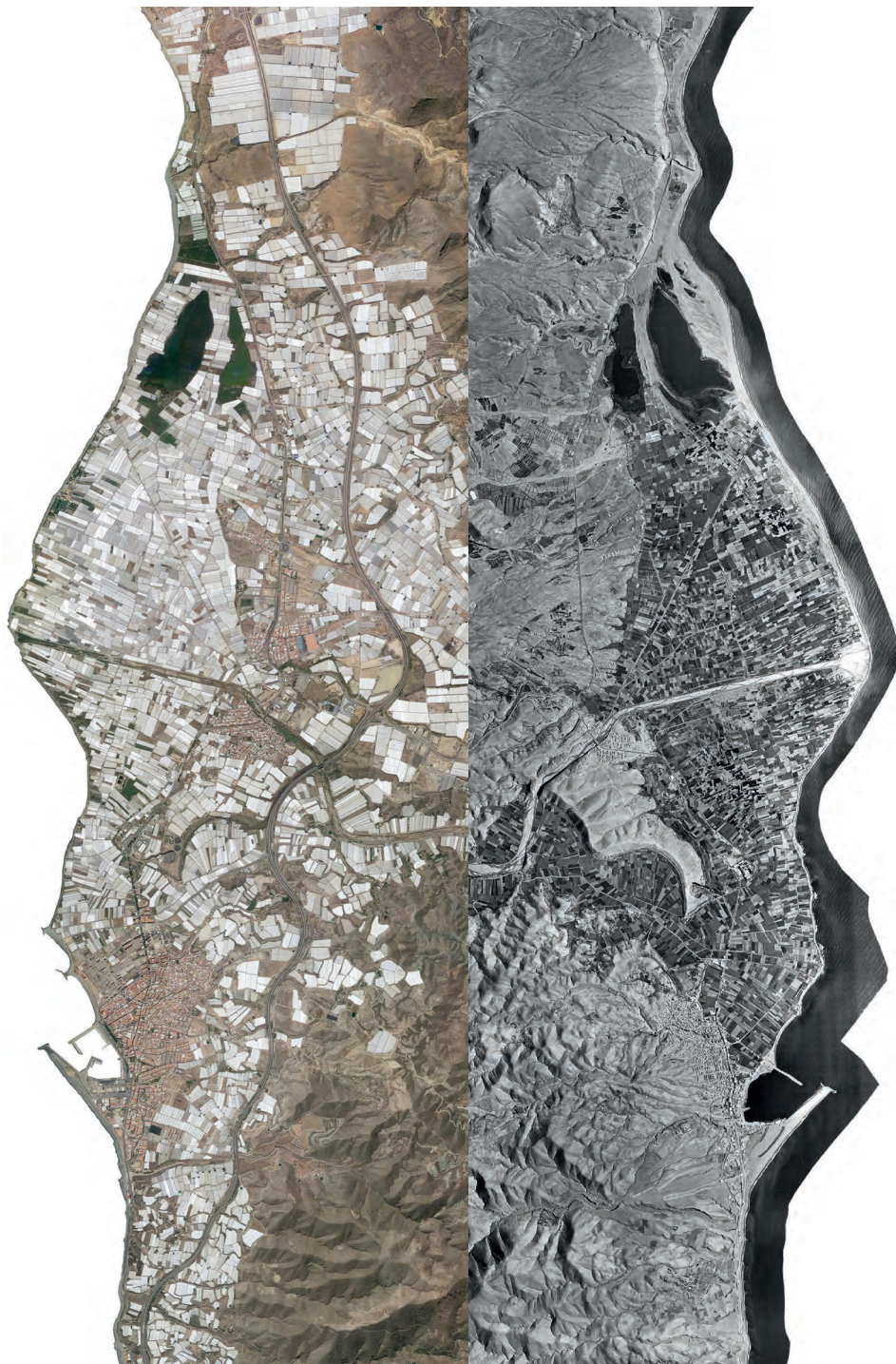
Fig.1 – Left: aerial photo of Adra, 2016, right: aerial photo of Adra, 1956. Source: Instituto de Estadistica y Cartografia de Andalucia <www.juntadeandalucia.es/institutodeestadisticaycartografia>

Fig.2 – Protected agriculture on the Spanish Mediterranean coast aerial photos, from the top: Motril, Gava, Roquetas de Mar and Castelldefels. Source: <eblancooliva.com>

Fig.3 – Coast of Motril, from 1956 (on top) cultivation of sugar cane open air, 1977 (middle) new industrial uses and cultivation of vegetables into the greenhouses, 2010 (down) only greenhouses for fruit and vegetable cultivation. Source: Instituto de Estadistica y Cartografia de Andalucia www.juntadeandalucia.es/institutodeestadisticaycartografia/didactica/ eltiempovuela/entregas/motril/index.htm

Fig.4 – Aerial view of Albenga's greenshouses, Italy. Ph. Luciano Rosso

Fig.5 - Calenzano (Firenze), industrial area in 1954 (GAI) and in 2010 (ARTEA/Regione Toscana). Monacci F., De Silva M.; Del Chiappa G., Nardini F., Nostrato C.; Gallegher G., Maulella F.; Lucchesi F. - LCart Laboratorio di Cartografia, UniFi DiDa - Dipartimento di Architettura, Regione Toscana, 2008.

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Considerazioni incomplete e marginali su aspetti attuali del disegno nell'architettura

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L'architettura è un'attività tra le più importanti, antica quanto la storia dell'umanità, che si configura come un impegno duplice, comprendente l'arte e la scienza, non in percentuali uguali ma con una forte prevalenza del primo termine. E' intrinseca in essa l'esistenza della funzione, che non deve essere considerata come un fatto esclusivamente tecnico ma come un luogo teorico e creativo nello stesso tempo stabile e metamorfico, da pensare in un ambito tipologico molto prossimo a quello delle relazioni strutturali e morfologiche alla quali le componenti di un edificio danno vita. L'energia intellettuale e creativa che governa il processo generativo di un territorio naturale di una città, dei suoi edifici, è per me, in accordo con le idee cinquecentesche di Giorgio Vasari e di Federico Zuccari, ma anche con le concezioni moderne del costruire di Le Corbusier e Ludwig Mies Van der Rohe, il disegno come sorgente primaria delle tre arti, la pittura, la scultura e l'architettura. C'è anche da dire che non sono mai stato convinto che l'architettura sia una disciplina, per di più composta di saperi specialistici autonomi, ovvero dotati di un proprio campo specifico. Credo invece che l'architettura sia unitaria, come lo sono tutti gli organismi ma, come questi, articolata in più parti o aree definite ma non indipendenti che si stratificano, interagiscono, e si integrano al fine di produrre un'identità concettuale e operante definita da precisi confini tematici, coerente nell'insieme delle sue componenti. In sintesi l'architettura non è formata da saperi diversi, dotati di una loro identità statutaria, ma il suo è un paesaggio conoscitivo e creativo il quale, come tutti i paesaggi, è caratterizzato da zone individuali, al contempo costituenti, come ho già detto, una struttura nel senso che il linguista Louis Trolle Hjelmslev dà a questa parola.

L'area della rappresentazione ha dato negli ultimi decenni un contributo, che non è esagerato ritenere straordinario, all'evoluzione dell'architettura verso dimensioni più ampie e complesse. Tale contributo ha riguardato due ambiti centrali della conoscenza e della creazione dell'architettura, il rilievo e la progettazione, che in questo testo preferisco, per inciso, da qui in poi, chiamare composizione per sottolineare la sua essenza formalizzatrice. In entrambi i casi le elaborazioni teoriche e le

relative nuove direzioni operative hanno riguardato le potenzialità offerte dalla rivoluzione digitale. L'introduzione degli strumenti elettronici nel rilevo ha prodotto senza dubbio un avanzamento improvviso e rapido della conoscenza dell'architettura su più piani, rendendo più agevole lo studio di un insediamento urbano e quello degli edifici che esso comprende. Anche l'archeologia, sebbene l'argomento non rientri in queste note, si è avvalsa con significativi risultati di queste risorse digitali. I mezzi messi a disposizione dall'architetto hanno inoltre consentito all'architetto di dotarsi di un nuovo senso, una vista capace di entrare più rapidamente, con maggiore esattezza e con una completezza prima difficile da ottenere, nel dispositivo tettonico di un'architettura, nei materiali di cui questa è composta, nei suoi dettagli costruttivi. In breve la scrittura architettonica di un'opera risulta più evidente e precisa se questa è rilevata con gli strumenti digitali, tenendo comunque conto che decifrare i contenuti di tale scrittura è un esercizio critico che il rilievo, da solo, non può compiere, data la vastità tematica della ricognizione ermeneutica alla quale, però, un rilevamento più avanzato può dare un contributo essenziale.

Al contempo, per quanto riguarda edifici antichi, anche il sistema delle stratificazioni temporali che li caratterizza si rende più comprensibile tramite i nuovi strumenti elettronici a disposizione della ricerca. Ovviamente il digitale non è uno strumento neutrale, ma produce, per così dire, un suo linguaggio figurativo ormai del tutto strutturato. Un linguaggio il quale reca in sé alcuni valori che entrano indirettamente, modificandone l'interpretazione, nell'architettura che esso consente di conoscere, contribuendo così all'idea che noi possiamo elaborarne. Da questo punto di vista al disegno di rilievo digitale va sottratto tutto ciò che non è la restituzione oggettiva di alcuni dati strutturali e formali del manufatto studiato.

Il secondo ambito nel quale negli ultimi decenni l'informatica ha agito sull'architettura riguarda il progetto. Tale spazio concettuale e pratico riguarda tre piani. Il primo è quello grafico, che ha modificato in modo sostanziale le procedure previsionali riguardanti le scelte progettuali. Procedure che hanno trovato nel BIM (Building Information Modelling) uno statuto ormai consolidato. Il digitale ha prodotto alcune modificazioni genetiche nell'attività progettuale, nel senso che esso tende a separare le fasi di definizione di un manufatto rinunciando a quella necessaria presenza in ognuna di queste della concezione generale di ciò che si sta cercando di organizzare in una progressione logica di decisioni. Il secondo piano nel quale si articola il ruolo del digitale nel progetto è l'accesso a un numero incalcolabile di riferimenti figurativi e formali. In effetti la presenza nell'architettura globale di immaginari fitomorfici, zoomorfici, minerali, astronomici, orografici, oltre allo sterminato repertorio di elementi architettonici che si possono trovare nella rete si deve proprio alla sua natura di wunderkammer, più che di enciclopedia, della rete stessa, che propone un universo iconico che mi fa pensare all'ossessione classificatoria di Athanasius Kircher. Il terzo aspetto che il digitale ha assunto nella progettazione architettonica è la dimensione parametrica, che dalle pioneristiche ricerche di Luigi Moretti è arrivato alle note sperimentazioni di Zaha Hadid. Una constatazione che mi preme proporre consiste nel fatto che non sono stati i docenti di composizione architettonica, tranne Antonino Saggio, a introdurre, teorizzare, illustrare l'operatività e infine diffondere il disegno digitale nell'attività progettuale, come sarebbe stato ovvio aspettarsi, ma tale lavoro esplorativo e

sperimentale è stato svolto in prima istanza da ricercatori e professori dell'area della rappresentazione, tra i quali vorrei ricordare Livio Sacchi per le sue illuminanti analisi sulle risorse ma anche sui limiti dell'era informatica. Se lo spazio di queste note lo consentisse avrei affrontato volentieri la forte incidenza del pixel nel disegno digitale, un'incidenza dovuta in gran parte dall'assenza, in questa cellula genetica della rappresentazione elettronica, dello spazio e del tempo. Il tutto in una istantaneità tanto suggestiva quanto, ancora oggi, densa di enigmi.

L'avvento del digitale nell'architettura non è stato, però, solo positivo. Nelle Facoltà di Architettura mi sembra che la diffusione dell'informatica- per inciso all'interno della stagione che vede nascere le arti elettroniche, indagate in modo esteso e criticamente profondo, nel contesto italiano, da Lorenzo Taiuti- abbia fatto scomparire, almeno ufficialmente, la pratica del disegno manuale. Con questa estinzione o, se si vuole, questa eclisse ormai trentennale, si è perduto uno spazio di ricerca che doveva a mio avviso permanere. Lo studio dal vero di forme, di ambienti naturali e urbani o di architetture; la traduzione di soluzioni possibili a un problema architettonico tramite schemi, diagrammi e configurazioni primarie di elementi espresse in schizzi; le prime stesure degli elaborati progettuali come piante, sezioni, prospetti in una simultaneità operante tra mente e mano sono entità quasi del tutto assenti oggi, nell'architettura attuale. Si tratta di una mancanza fortemente negativa, perché recide quel legame mentale tra l'idea e la sua rivelazione attraverso il segno, che è tra l'altro, assieme alla scrittura, l'espressione di sé più riconoscibile che un individuo possieda. Voglio anche ricordare che in prima istanza disegno manuale, ma anche quello digitale, come avviene nella ricerca di alcuni architetti delle giovani generazioni, se pensato oltre gli stereotipi ormai consolidati, può essere ancora uno spazio privilegiato di ricerca teorica. In effetti esiste un'esplorazione concettuale che solo nel disegno, tra utopia e visionarietà, concretezza e idealizzazione, semplicità e complessità, si esprime compiutamente. Non è certo una scelta lungimirante quella di avere escluso o lasciato in una condizione indeterminata o del tutto individuale questo spazio, da sempre ricco di intuizioni teoriche e formali necessarie all'architetto per la loro vocazione anticipatrice, dal processo formativo in atto nelle nostre scuole oppure lasciato in una condizione indeterminata o del tutto individuale.

Alla luce di queste considerazioni, sono convinto che occorra procedere al più presto dare vita fin dall'inizio degli studi a una simbiosi teorica e operativa tra il disegno manuale, da riscoprire nelle sue numerose valenze ancora presenti, e il disegno digitale. Tutto ciò cercando di superare un fattore strutturale del sistema universitario attuale che secondo me non è stato una buona scelta, ovvero la frammentazione degli insegnamenti in settori scientifico-disciplinari. Questi si sono configurati come binari, paralleli o divergenti, che non consentono incontri e interazioni tra aree diverse di un medesimo sapere. Fino a quando dagli specialismi, oggi dominanti, non si risalirà a una visione generale, ritengo che non sia possibile far sì che l'architettura riacquisti la sua sostanziale unità. Il Novecento ha visto un fenomeno particolare per quanto concerne la concezione del nostro mestiere, vale a dire il suo continuo ampliamento tematico. Un'estensione sempre più vasta che ha prodotto di fatto la dissoluzione dell'architettura in una miriade di competenze diverse, spesso molto lontane le une dalle altre. Questa dilatazione ha tolto molte delle possibilità di riconoscere e di valutare le finalità e la sostanza complessiva dell'architettura alla maggior parte dei suoi utenti, essendo

essa divenuta non solo un ibrido labirintico tra atopia, mediaticità, moda, gusto dell'effimero e del relativo ma anche un ambito essenzialmente neofunzionale, che ha reso anche la forma e la sua bellezza non più una realtà estetica di matrice intellettuale spirituale, ma una semplice e gratificante oggettivazione. Il tutto espresso non più da linguaggi architettonici diversi, prodotti dalle tante culture del mondo, culture la cui molteplicità è un inestimabile valore umanistico, ma da un artificioso e ingannevole esperanto nel quale tutto si mescola in una casualità incomprensibile e insignificante che deprime ogni singolo luogo rendendolo anonimo e muto. Questa situazione non è frutto di un progresso, ma l'effetto di un arretramento del nostro sapere, caratterizzato attualmente da una molteplicità inestricabile che occorre contrastare al più presto. A cominciare dal considerare di nuovo l'architettura come un'arte dell'abitare che deve consentire a tutti gli esseri umani di vivere, per quanto è possibile, in modo sempre più libero, aperto e felice.

Incomplete and marginal considerations on current aspects of drawing in architecture

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Architecture is one of the most important activities, as old as the history of humanity, which is a dual commitment, including art and science, not in equal percentages but with a strong prevalence of the first term. It is intrinsic in it the existence of function, which should not be considered as a purely technical fact but as a theoretical and creative place at the same time stable and metamorphic, to be thought in a typological field very close to that of the structural and morphological relationships to which the components of a building give life. The intellectual and creative energy that governs the generative process of a natural territory of a city, of its buildings, is for me, in accordance with the sixteenth-century ideas of Giorgio Vasari and Federico Zuccari, but also with the modern conceptions of the construction by Le Corbusier and Ludwig Mies Van der Rohe, drawing as the primary source of the three arts, painting, sculpture and architecture. It must also be said that I have never been convinced that architecture is a discipline,moreover composed of autonomous specialist know-how, that is, equipped with its own specific field. I believe that architecture is unitary,as are all organisms but, like these, articulated in several parts or defined but not independent areas that are stratifying, interacting, and integrating in order to produce a conceptual and operating identity defined by precise thematic boundaries, consistent with in the whole of its components. In short, architecture is not formed by different knowledge, endowed with their statutory identity, but its is a cognitive and creative landscape that, like all landscapes, is characterized by individual areas, at the same time constituting, as I have already said, a structure in the sense that the linguist Louis Trolle Hjelmslev gives to this word.

The area of representation has in recent decades made a contribution, which is not an exaggeration to consider extraordinary, to the evolution of architecture towards broader and more complex dimensions. Such   contribution concerned two central areas of the knowledge and creation of architecture, survey and design, which in this text I prefer, incidentally, from here on, to call composition to emphasize its formalizing essence.

In both cases, theoretical elaborations and related new operational directions have concerned the potential of the digital revolution. The introduction of electronic instruments in the survey has undoubtedly led to a sudden and rapid advance in the understanding of architecture   on several levels, making it easier tostudy an urban settlement and that of the buildings it includes. Archaeology, although the topic does not fit into these notes, has also used significant results of these digital resources. The means made available by the architect have also allowed the architect to equip himself with a new sense,a view capable of entering more quickly, with greater accuracy and with a completeness before difficult to obtain, in the tectonic device of an architecture, in the materials of which it is composed, in its construction details.

In short, the architectural writing of a work is more evident and precise if it is detected with digital instruments, taking into account that deciphering the contents of such writing is a critical exercise that just survey cannot accomplish, due to the thematic vastness of hermeneutic reconnaissance to which, however, a more advanced detection can make an essential contribution.

At the same time, with regard to ancient buildings, the system of temporal stratifications that characterizes them is also made more understandable through the new electronic tools available to research. Of course, digital is not a neutral tool, but produces, as it were, its own figurative language that is now completely structured. A language that carries in itself some values that enter indirectly, changing its interpretation, in the architecture that it allows to know, thus contributing to the idea that we can process. From this point of view, all that is not the objective return of some structural and formal data of the manufactured artifact should be subtracted from the digital survey drawing.

The second area in which computer science has acted on architecture in recent decades concerns the project. This conceptual and practical space covers three levels. The first is the graphic one, which has substantially changed the forward-looking procedures regarding design choices. Procedures that have found in BIM (Building Information Modelling) a well-established statute. Digital has produced some genetic modifications in the design activity, in the sense that it tends to separate the defining stages of an artifact by renouncing the necessary presence in each of these of the general conception of what is being tried to organize in a logical progression of decisions. The second level in which the role of digital is articulated in the project is access to an incalculable number of figurative and formal references. In fact, the presence in the global architecture of phytomorphic imaginations, zoomorphics, minerals, astronomical, orographic, in addition to the endless repertoire of architectural elements that can be found in the network is due to its nature of wunderkammer, more than encyclopedia, of the network itself, which proposes an iconic universe that makes me think of the classifier obsession of Athanasius Kircher . The third aspect that digital has taken on in architectural design is the parametric dimension, which from the pioneering research of Luigi Moretti has come to the well-known experiments of Zaha Hadid. One observation that I would like to propose is that it was not the teachers of architectural composition, except Antonino Saggio, who introduced, theorized, illuminated the operation and finally disseminated the digital drawing in the design activity, as would have been obvious to expect, but this exploratory and experimental work was carried out in the first instance by researchers and professors in the area of the I would like to

mention Livio Sacchi for his enlightening analyses of resources but also on the limits of information technology. If the space of these notes allowed it I would have gladly addressed the strong incidence of the pixel in digital drawing, an incidence due in large part to the absence, in this genetic cell of electronic representation, of space and time. All in an instant as evocative as, even today, full of enigmas.

The advent of digital in architecture, however, has not been only positive. In the Faculty of Architecture it seems to me that the spread of computer science - incidentally within the season that sees the birth of the electronic arts, investigated extensively and critically deep, in the Italian context, by Lorenzo Taiuti- has made the practice of manual design disappear, at least officially. With this extinction or, if you will, this eclipse now thirty years old, a space of research has been lost that, in my opinion, was to remain. The study from the true of forms, of natural and urban environments or of architectures; the translation of possible solutions to an architettonic problem through schemes, diagrammes and primary configurations of elements expressed in sketches; the first drafts of the elaborate projects such as plants, sections, elevations in a simultaneity operating between mind and hand are entities almost entirely absent today, in the current architecture. It is a strongly negative lack, because it portrays that mental link between the idea and its revelation through the sign, which is, among other things, along with writing, the most recognizable self-expression that an individual possesses. I would also like to remind you that in the first instance manual drawing, but also the digital one, as is the case in the search for some architects of the younger generations, if thought beyond the stereotypes now established, can still be a privileged space of theoretical research. In fact, there is a conceptual exploration that only in drawing, between utopia and visionaryness, concreteness and idealization, simplicity and complexity, is fully expressed. It is certainly not a far-sighted choice to have excluded or left in an indeterminate or completely individual condition this space, always rich in theoretical and formal intuitions necessary to the architect for their anticipation vocation, from the training process in place in our schools or left in an indeterminate or entirely individual condition.

In the light of these considerations, I am convinced that it is necessary to proceed as soon as possible to give life to a theoretical and operational symbiosis between manual drawing, to be rediscovered in its many values still present, and digital drawing. All this by trying to overcome a structural factor in the current university system which, in my opinion, was not a good choice, namely the fragmentation of teachings in scientific and disciplinary fields. These are configured as binary, parallel or divergent, which do not allow encounters and interactions between different areas of the same know. Until the major specialisms come to a general view, I believe that it is not possible to ensure that architecture regains its substantial unity. The twentieth century has seen a particular phenomenon with regard to the conception of our craft, namely its continuous thematic enlargement. An ever-widening extension that has effectively resulted in the dissolution of architecture in a myriad of different skills, often very far from each other. This dilation has taken away many of the possibilities of recognizing and assessing the overall purpose and substance of the architecture to most of its users, having become not only a labyrinthine hybrid between atopia,

mediation, fashion, taste of the ephemeral and of the relative but also an essentially neofunctional field, which has also made form and its beauty no longer an aesthetic reality of spiritual intellectual matrix, but a simple and rewarding objectification. All this is expressed no longer by different architectural languages, produced by the many cultures of the world, cultures whose multiplicity is an invaluable humanistic value, but by an artificial and deceptive Esperanto in which everything mixes in an incomprehensible and insignificant randomness that depresses every single place making it anonymous and mute. This situation is not the result of progress, but the effect of a retreat in our knowledge,   which is currently characterized by an inextricable   multiplicity that must be countered as soon as possible. Starting from reconsidering   architecture as an art of living that must allow all human beings to live, as far as possible, in an increasingly free, open and happy way.

Twenty4You® computational lab:
Dall'idea al progetto - From idea to project

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Abstract

The common sense tells us that innovation go through the Genius of people who mature unexpected ideas. The experience completes the statement introducing the necessities for these ideas to be sustainable and doable, nor the market will sustain them nor people pay for them. On these two statements, we decide to build a sustainable experimental lab, innovative in the technological experience and accessible in costs, trasversal and transdisciplinary for the researches, but concrete and ergonomic in the realizations, available for the pure big data archives but aligned with the market necessities. Starting from the actual researches, the lab exploit the potentialities of the parametric algorithms and the full immersion experiences, to recreate connection, virtual location and innovative format, creating concrete project developing new kind of activities. From the idea to the metaproject (built on real data tracking), to the project itself correctly managed thanks to digital instruments and training activities, to the concrete output for the market, the right balance between research and business: "twenty4you® computational lab".

Abstract

Il buon senso ci dice che l'innovazione passa attraverso il genio di persone che maturano idee inaspettate. L'esperienza completa questa dichiarazione introducendo la necessità per queste idee di essere sostenibili e fattibili, diversamente né il mercato né gli utenti saranno disponibili ad investire su di esse.

Su queste due affermazioni, abbiamo deciso di condividere il progetto della costruzione di un laboratorio sperimentale sostenibile, innovativo nell'esperienza tecnologica e accessibile nei costi, trasversale e transdisciplinare per le ricerche, ma concreto ed ergonomico nelle realizzazioni, disponibile per la raccolta di big data ma in linea con le necessità del mercato. Partendo dalle ricerche attuali, il laboratorio sfrutta le potenzialità degli algoritmi parametrici e le esperienze di "full immersion reality", per ricreare connessioni, location virtuali e format innovativi, creando progetti concreti. Dall'idea al "metaprogetto" (costruito sul rilevamento dei dati reali), al progetto stesso gestito correttamente grazie agli strumenti digitali e alle attività di formazione, alla produzione concreta per il mercato, al giusto equilibrio tra ricerca e business: nasce il "twenty4you® computational lab".

Introduction

The common sense tells us that innovation
The collaboration between research and market, in particular between universities and SMEs, has always been a centre for development strategies challenging an evolving market, where the real challenge is certainly connected to the ability to innovate.
The touch point between these two realities is a strategy of adaptation, a way to answer to the rhythms of a time of the contemporary that foresees a rethinking and a re-projecting activity under new strategies.In this premise we can find the strategy that in the national context is called Industry / company 4.0, linked to what is called the "fourth industrial revolution".
Technological innovation is inherent in a new value of data, understood as the coin of the future, and of the tools of production: 3d printers (Additive Manufacturing), Augmented Reality, Experimental simulations and virtual tests (Simulation), Nanotechnologies and intelligent, Electronic integration of data and information along the different production phases of the company (Horizontal integration), Electronic sharing with customers / suppliers of information on the status of the distribution chain (inventory, tracking, etc.) (Vertical integration), Security Detection and analysis of large amounts of data, IT security during operations in network and open systems, electronic communication between machinery and products (industrial Internet of Things).
The plan includes measures for operations in a technological neutrality logic, to act on enabling factors. The use of tools is the basis of public policies aimed at companies' renewal efforts, including the measurement of over-amortization and hyper-depreciation, the Tax Credit for R & D expenses, the New Sabatini for innovation credit, and guarantee funds.
Particularly in the relationship with the University it is interesting to underline the value of the Tax Credit, which for a company reaches 50% of incremental expenses in Research and Development, recognized up to an annual maximum of 20 million € / year per beneficiary (with a minimum of 30,000 euros) and calculated on a fixed basis given by the average of the expenses in Research and Development in the years 2012-2014. The tax credit can be used, even in the event of losses, to cover a wide range of taxes and contributions. All expenses related to fundamental research, industrial research and experimental development can be facilitated: costs for highly qualified and technical personnel, depreciation charges on laboratory instruments and equipment, technical and industrial

skills, but also research contracts with universities in particular, research institutions, companies, start-ups and innovative SMEs. This is a benefit that can be accumulated (with other measures such as Super-amortization and Hyper-amortization, Nuova Sabatini, Patent Box, Incentives for the capitalization of companies (ACE), Incentives for investments in Start-ups and innovative SMEs) but also with specific calls for proposals such as those inherent direct (certainly more complex) or indirect European funds, inherent in regional policies.

Thanks to the Economic Ministry we can underline that 302,700 limited companies used the tax credit in 2015, totalling €18.9 bn (claimable ACE); by

Individual Saving Plans, +530%, daily average grew from €1.2 to €7.9m; 728 registered innovative SMEs at present. The group is steadily and rapidly growing; about patent box, 435 agreements, of which 431 in 2017; tax incentive applied on €320m, for 620 firms; through Minibonds and crowdfunding, around €850m are collected in 2017. But one of the most important data is that in 2017, the number of companies that benefited from the R&D&I Tax Credit increased by +104% compared to 2016.

Umanìa's "Twenty4You®"

In this context, thanks to the long experience of the founding partner Angelo Rondi in ergonomics applied to the study of interaction between individuals-technologies-design, and to the consolidated experience of Silvia Bernardini in the management of human resources and transfer of skills the activity of the last years of Umanìa Srl fits in, with a new service called Twenty4You® which aim is supporting companies in the digital transformation process. It has increasingly happened, In the last twenty years of supporting companies, to receive challenges from customers to carry out consulting projects or interventions where usual approach couldn't be useful. Umanìa created a brand (Twenty4You® - www.twenty4you.com) under which all experimental projects approached with different methods and tools were developed, putting team and customers outside the comfort areas of the team. While doing the Twenty4You® projects, we fortunately had the opportunity to experiment models, skills, tools, design approaches, management approaches, and absolutely unusual working methods. Project after project, we realized that actually the Twenty4You® was becoming more and more an area of research and experimentation, where every time, in addition to being focused on achieving the result requested by the customer, it was necessary to try and test new ideas and new and always different solutions (often at our economic risk), which have allowed us to develop increasingly transversal skills, managerial and managerial skills of an increasingly meta-planning nature and identify areas of research and development even far from the main competences. In these years of experimentation on the field, perhaps a bit visionary, perhaps a bit pioneers, Umanìa had the pleasure of working with people and professionals always different, in various company contexts (from micro to big), in very different sectors (from industry, to crafts, to fashion, to retail, to food, etc.). In this context, each project has become an opportunity to learn, transfer and co-develop new skills and new ways of working.

Despite the beauty of it all, someone has envied the possibility, someone has struggled to grasp the meaning of work, someone has absolutely misunderstood the "reason why", and even the Umanìa

staff sometimes found difficult to explain what was going on, in the logic of developing potential project. Therefore, the need to think over on "what" the Twenty4You® "was, was becoming, could become". In this space-time parenthesis, Umanìa has attracted to itself eclectic and diverging personalities who have increasingly requested and promoted to continue in this activity of continuous research and experimentation (with not a few problems often linked to the sustainability of the projects that they required to investigate issues related to calls for tenders and financing, which is always welcome on a business level).

But Umanìa's staff also realized that it was not enough to collect challenges and carry out original projects, there was something more to be done. Therefore, was necessary began to leave some concrete traces, so we decided to analyze all the works done, project by project, to understand if there was a minimum common denominator on which think over a replicable, scalable and above all transferable model. The results of this work of self-analysis and self-diagnosis allowed us to understand that there were recursive elements in the projects followed, in particular:

• the Human factor approach;
• the User Centered Design approach;
• the Design Thinking Oriented approach
• the learning by doing and learning by thinking approach;
• the Business Oriented approach;
• the Marketing Oriented approach;
• the Digital oriented approach;
• the sustainable approach to project.
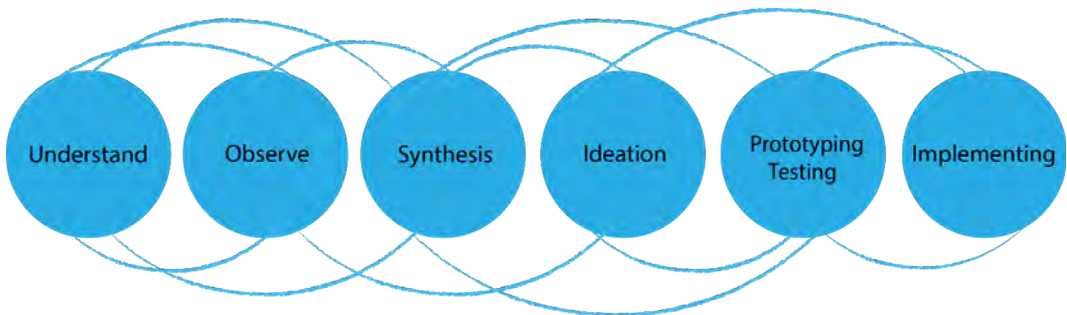
At this point Umanìa's staff understood that Twenty4You® is the set of many very different approaches, all based on a common element: People. Where "People" means those who seek, those who develop, those who manage, those who collaborate in development, those who communicate, those who sell, those who assist, those who benefit from the result in a long chain of creation, collection and value distribution. This perspective has made all the work of the last few years completely different and new. What we believe was as innovative solutions, transferring new knowledge, analysis for new needs, developing new technologies, creating new business models, producing products that are easy to use, creating new easy services to enjoy with weren't the focus, but the activities or the results that we were looking for, thinking only of the single project, the single goal, the single problem to be solved.

The distinctive action of a real Twenty4You® is the "boost" that lead each time to change the approach, the process, the tools, the teams. It is the attention to the whole Person that leads to focus in a central way.

From this point of view, Umanìa approach to the Department of Civil and Environmental Engineering of the University of Perugia and its interesting researches about people's perception of landscapes, places and architecture, developing a wide technological know-how linked to the use of technologies for the study and development of interpretative models of human perception. From this fortuitous encounter a strong synergy was immediately born based on similar values and therefore the idea of bringing together existing activities and projects.

The nowadays project: use existing technologies (increasingly widespread and accessible) and develop new ones, to analyze and understand the dynamics of people in carrying out their business activities (emotional, behavioral, cognitive and learning dynamics). So on the one hand the Twenty4You® know-how on the other the concrete and implemented technological knowledge of DICA, therefore, together, the "Twenty4You® Computational lab".

The Twenty4You® Team now has tools to monitor, track, study people experiences in the business context (relational, management, creation, learning, development). The DICA team now has the possibility to apply a deep technological ability in a specific context that is no longer only that of spaces and places but also that of business processes and industrial sectors.

Innovation in digital representation

Research and Development projects is based in the advanced digital technology in the field of representation and computational design, in term of approaches and instruments.

Smart Factory, Virtual Prototyping and Mass-Customization are elements those drives the business in the building industry, providing IT technology and expertise. The implementation of new methods of collaboration and process development—i.e., Computational Design, Parametric Design and Building Information Modeling (BIM) — support modern construction company in embracing with the new technology enabled by the fourth industrial revolution. Virtual prototyping strategies based on multi-objective optimization (MOO) algorithms, Artificial Intelligence, and Big Data Analysis are used within an integrated design process to optimize both the design and manufacturing process with regard to a heterogeneous and significant amount of information influencing Building Performances. Web-based user interfaces are developed to provide mass-customization services for customers as well as advanced data analysis for the company. In particular, with respect to the canonical approaches to representation, parametric modeling allows configuring solutions with variable parameters that, following certain logics, can vary in conformations. This process is projected towards the optimization of solutions, taking advantage of the digital calculation capacity in comparing the various possible combinations in order to find the most performing, a strategy called the form-finding. The innovation at the base of this project idea is the use of genetic algorithms to design architectural organisms able to adapt to a specific context. These tools, developed primarily in the field of Artificial Intelligence, have been used since the early 1970s in the aerospace and mechanical engineering field for the development of virtual prototyping models.

However, it is only in recent years that their use in structural and energy optimization has demonstrated their versatility and effectiveness in the construction field, confirming the successes already obtained in such diverse fields as: Engineering, Art, Biology, Economics, Market, Genetics, Robotics, Social Sciences, Physics and Chemistry.

The new industrial model based on modern Computer Aided Manufacturing techniques opens up the possibilities for process optimization that can substantiate the design process. Effectively, while the parametric and virtual prototyping models allow the designer to visualize and evaluate hundreds of design solutions, a new assembly line allows the creation of different versions of the same product without a substantial price increase. In order to optimize production processes and parameterize production costs, the use of BIM interchange models is proposed. Through the Building Information Modeling it is in fact possible to structure the data in a "smart" way, with the variability of the parameterization and the possibility provided by the different digital libraries. The digital instrument, in addition to be a means for representation, becomes the pivot of the management of production and realization. The research is then combined with the opportunities and needs of innovation, because the BIM models improve interchange with the actors of the building process (architects, structural engineers, installers) and guarantee the management of the construction phases, as well as the subsequent management of the building. On the other hand, innovation in the field of representation is also favored by instruments. In addition to the more advanced processors and the more piercing screens, in this context it is useful to point out the use of instruments already tested in other projects, making reference to the research interest on the themes of perception that is the basis of the "Twenty4You® Computational lab" .

First of all we can point out the use of biosensors and in particular of eye-track, an instrument aimed at measuring the ocular fixation point or the movement of an eye with respect to the head. The use of this tool is central to marketing choices due to its objectivity in identifying which areas of the surrounding environment are attracted to the eye. The study environment can be as heterogeneous as possible and is generally used for the study of monitor advertising, but in the approach of the Twenty4You® Computational lab you want to test by enhancing its flexibility also for larger scale analysis as may be the study of an artifact or even an urban / architectural one. In recent years, eye-tracking technology has become part of education science to help understand learning behaviors. The analysis of the visual attention of students during classroom teaching, for example, provides valuable information on which elements capture the interest and which distract them. Eye tracking is used extensively to study a wide range of neurological and psychiatric conditions. Combined with conventional research methods or other biometric sensors it can help assess and potentially diagnose neurological diseases such as attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), obsessive compulsive disorder (OCD), schizophrenia, Parkinson's and Alzheimer's disease. Eye-tracking has recently been introduced in the video game industry and has since become an increasingly important tool as designers are now able to evaluate and quantify measures such as visual attention and reactions. In the "Twenty4You® Computational lab" eyetrackers are often used in parallel with EEG neuronal helmets. These are instruments capable of measuring which parts of the cerebral cortex are activated in certain experiences.

They are used for example for neuromarketing studies, for direct and non-intrusive monitoring during

shopping, or to evaluate the effect of advertising, trailers and media testing, because analyzing data based on their frequency can provide an unfiltered view and impartial cognitive-affective states of the public.

Frequency-based EEG metrics are then widely used in commercial research on brand effectiveness in packaging and product design, including websites and software interfaces, in order to improve workflows based on cognitive-afficent processes. Moreover with these tools it is possible to structure projects based on Brain-Computer Interfaces, monitoring the alpha activity on the motor regions for example to allow patients to guide robotic arms or legs according to the brain activity. Another element, much more common, is the use of viewers for augmented or immersive reality. If these tools have a clear playful and communicative application, their great value is in simulating the analyzed reality.

It is then a question of being able to immerse the user in a simulated world or to enrich the perceptive experience with more information. If this added value guarantees a new way of living, reading and interpreting disparate areas that pass from architecture to medicine, using the logic of the game, these tools can be used simultaneously, creating new scenarios of very interesting research and development. Combined with the previously mentioned tools, with the analysis of perception, vision and emotions, it is possible to simulate the impacts of multiple and variable solutions, in order to find tools capable of more accurately estimating their fitness capacity in the selection process of the market.

Final considerations

Once the drawing was intended for most as a communication and illustration tool. Those who worked in this field, like the "perspectivists", were concerned with recounting and evoking environments and forms. The representation has actually always been the place of the definition of the idea, the instrument capable of transforming images into a model. But beyond the divisions inherent in the various documents, the great digital revolution today is bringing the representative process to be the pivot of research. The digital model in the form increasingly manages to integrate the various issues inherent in the theme of experimentation and simulation, which in a more performing way every day exploit the computational capacity of digital. The future lies in design, in models that, in a transdisciplinary manner, beyond the specificity of language, are able to describe even the immaterial relations underlying the signs. Putting the person at the center also means being able to find new ways to enrich the models of the complexity inherent in the necessary projection of their needs. Innovation comes out from this spirit of research and service, from the research that finds in the tools an aid to investigate the needs of the person and develop innovation itself.

Community design.
The case of "polo unico ospedaliero" in Perugia

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Abstract

The present research work is related to the study made by the University of Perugia of a masterplan that includes the Hospital Center in Perugia; in particular, the focus is on the project for the construction of a new building that will result in the extension of the current Special Residences for patients in outpatient therapy. This project is part of the organic plan that involves the spaces of the "Comitato per la Vita Daniele Chianelli", a non-profit organization that was created by a group of parents who felt the need to intervene more directly in carrying out activities to support the public structure and to be alongside those who suffer and struggle for life. The functional requirement is to increase the reception capacity of Chianelli Residence and at the same time to extend the services offered in the area of the hospital pole by integrating commercial and nursery spaces with a dedicated and protected green area, in order to provide global assistance to families who care for children and adults throughout their illness.

Abstract

Il presente lavoro di ricerca è relativo allo studio di un masterplan che ingloba il Polo Unico Ospedaliero di Perugia, in particolare l'attenzione è posta al progetto per la realizzazione di un nuovo edificio ad ampliamento delle attuali Residenze per accogliere i malati adulti e bambini in cura presso i reparti di Oncoematologia Pediatrica ed Ematologia.
Tale progetto si inserisce all'interno di una proposta di piano organico per l'area del Polo Unico Ospedaliero (Azienda ospedaliera ed Università di Perugia) quale iniziativa del Comitato per la Vita

"Daniele Chianelli", un'associazione senza fini di lucro che nasce per opera di un gruppo di genitori che ha sentito l'esigenza d'intervenire in maniera più diretta nel realizzare attività di supporto alla struttura pubblica e di dover essere al fianco di chi soffre e lotta per la vita.

L'esigenza funzionale è quella di incrementare la capacità di accoglienza del Residence Chianelli e al contempo ampliare i servizi offerti nell'area del polo ospedaliero integrando spazi commerciali ed asilo nido con area verde dedicata e protetta, in modo da fornire un'assistenza globale alle famiglie che assistono i pazienti bambini ed adulti per tutto il decorrere della loro malattia.

Introduction

The Hospital Pole has been operating in San Sisto area since 2008[1]. It is the result of a transfer lasted almost a decade, which saw the moving of all the activities historically carried out in the former Polyclinic of Monteluce. The hospital already named after the illustrious clinical of School of Medicine of Perugia Prof. Silvestrini, inaugurated in 1985[2], following the 1967 project, written by the group of Signorini, Casciotti, Capocchia, Bolli[3]. The structure, named after Santa Maria della Misericordia in continuity with the ancient hospital founded in 1305[4], is located between Sant'Andrea delle Fratte and the district of S. Sisto, in what was considered to all intents and purposes a few decades ago the outskirts of the city of Perugia[5]. San Sisto, only 4 km away from Perugia, known in historical chronicles[6] for being the seat of the encampment of Frederick II in 1235[7], and qualified as a castrum in 1495, 1491, and 1501[8].

In the first Regulatory Plan of Perugia, drawn up with Bruno Zevi, Giuseppe Grossi, Mario Coppa and Francesco Zannetti and approved in 1958[9], the production vocation of the area is highlighted[10], which from 1961[11] will host the new Perugina plant, present in the neighborhood of Fontivegge since 1913-15[12]. However, in the city as early as 1907[13], space of one million square meters of occupied

[1] *Santa Maria della Misericordia da Monteluce al Polo Unico Ospedaliero Universitario di Perugia*, Regione Umbria, Azienda Ospedaliera Perugia, Quattroemme Editore, Perugia, 2009

[2] M. Pitzurra, *L'Ospedale di Santa Maria della Misericordia a Perugia dalle origini ad oggi*, Università degli Studi, Perugia, 1992.

[3] *"Domus Misericordie" Settecento anni di storia dell'Ospedale di Perugia*, C. Cutini (a cura di), Perugia, Deputazione di storia patria per l'Umbria, 2006.

[4] L. Tittarelli, *Gli esposti all'Ospedale di S. Maria della Misericordia in Perugia nei secoli XVIII e XIX*, in "Bollettino della Deputazione di storia patria per l'Umbria", n. 82, 1985; *Istituti di assistenza e servizi sociali a Perugia dal medioevo ai nostri giorni: ciclo di conferenze sulla città*, F. Bozzi (a cura di), Perugia, Provincia di Perugia, 1999; L. Tittarelli, *Le balie di campagna dell'ospedale di S. Maria della Misericordia di Perugia a metà dell'Ottocento*, in "Bollettino della Deputazione di storia patria per l'Umbria", vol. 88, 1991, pp. 131–183; *Domus misericordiae: settecento anni di storia dell'ospedale di Perugia*. Atti del convegno, Perugia 16 e 17 dicembre 2005, C. Cutini (a cura di), Perugia, Azienda ospedaliera, 2006; L. Tittarelli, L. Calzola, D. Lanari, *Gli esposti all'Ospedale di S. Maria della Misericordia di Perugia dal XIV al XIX secolo*, Selci-Lama, Pliniana, 2003; N. Ramacciati, *Infermieri nello Spedale Grande di Perugia: contesti generali e profili locali dall'Unita d'Italia all'epoca fascista*, Morlacchi, Perugia, 2003; *Le pergamene dell'Ospedale di S. Maria della Misericordia di Perugia. Dalle origini al 1400*, A. M. Sartore (a cura di), Archivio di Stato di Perugia, Ministero per i Beni e le Attività Culturali. Dipartimento per i Beni Archivistici e Librari, Direzione Generale per gli Archi, Perugia, 2005

[5] S. Siepi, *Descrizione topologico-istorica della città di Perugia*, Perugia, 1822

[6] A. Grohmann, *Città e territorio tra Medioevo ed età moderna*, v. II, Perugia, Volumnia, 1981, p. 999

[7] P. Pellini, *Dell'historia di Perugia*, I, Venetia, appresso Gio. Giacomo Hertz, 1664, p. 251

[8] A. Fabretti, *Documenti di Storia* Perugina, II, Torino, coi tipi privati dell'editore, 1892, p. 86, digitalizzato in cdwdoc.demo.alchimedia.it [2011]

[9] Il Piano Regolatore di Perugia entra in vigore con l'atto normativo del Decreto Presidente della Repubblica, siglato il 12/11/1958, anche se è già approvato dal G.P.A. il 01/08/56.

[10] Perugia, Piano Regolatore Generale. Relazione, p. 32, in www.rapu.it [2019]; Ivi, p. 43.

[11] F. Cavallucci, *San Sisto. Da territorio a quartiere*, Protagon, Perugia, 1990, p. 49

[12] S. Massimo, L. D'Amico, R. Di Pietra, *Accounting and Food: Some Italian Experiences.* Routledge, Londra, 2016, p. 404

[13] Perugia, Piano Regolatore Generale. Relazione, p. 32, in www.rapu.it [2011]; Ivi, p. 43.

and, of which 70,000 occupied only by the establishment[14]. The productive space faces the interest and the need to form "urban districts" that emerged "already implemented without thinking"[15]. These addresses of the Plan favor and induce the transfer of the Perugina factory right to this area[16], a condition that is realized in determining the real birth of the same district of San Sisto. Until then, the district was just composed of a few houses leaning against the Pievaiola, a small aggregate urban that "explodes" following the construction of the new industrial plant, increasing its population from 700 to 7000 units in a few years[17]. The attraction of the work center in fact creates a residential pressure, exercised mainly by low-income families[18], whose planning tries to keep up with the construction of subsidized housing[19]. The advent of the "Cittadella Sanitaria" led to the centralization of the Medicine Center and two important services for the citizen, the Hemato-Oncology Research Center (CREO), inaugurated in 2015, and the Chianelli Special Residences, in the hospital area, present since 2006. Infrastructural interventions concerning fast mobility redesigned the area, which already has its own railway line stop, although little frequented, with overloaded car parks that reach peaks of 18,000 visitors per day[20]. Despite its orographic conformation, the area sees a strong presence of green: in the southern slope are developed a series of cultivated areas with urban gardens for the elderly owned by the Province of Perugia[21], and in the east, a wooded area acts as a caesura with the nearby residential district of via Settevalli.

Fig.1 San Sisto, the evolution of the place in technical papers (1940; 1960; 1990)

[14] F. Cavallucci, *San Sisto. Da territorio a quartiere*, p. 47
[15] Perugia, Piano Regolatore Generale. Relazione, p. 23.
[16] Perugia, Piano Regolatore Generale. Relazione, pp. 19-20
[17] F. Cavallucci, *San Sisto. Da territorio a quartiere*, p. 87
[18] L. Quaroni, *L'abitazione per le famiglie a basso reddito*, in "Urbanistica", 31, 1960, pp. 106-113
[19] A. Quartulli, *I protagonisti dell'edilizia popolare*, in "Edilizia Popolare", 79, 1967, pp. 3-6; E. Capodaglio, *Realtà e prospettive della GESCAL*, in "Edilizia Popolare", 81, 1968, pp. 49-50
[20] http://www.umbria24.it/attualita/ospedale-perugia-picchi-18-mila-auto-al-giorno-dati-cinque-telecamere-sorvegliare-varchi [2019]
[21] F. Tei, P. Benincasa, M. Farneselli, M. Caprai, *Allotment Gardens for Senior Citizens in Italy: Current Status and Technical Proposals*, 2nd International Conference on Landscape and Urban Horticulture, Bologna, 2009

The Committee for Life "Daniele Chianelli" finds here the seat of its residence, correlated to the interests of the association that was born in Perugia, on 26 October 1990, by a group of parents who, lived the painful experience of the disease of their own children, felt the need to intervene more directly in carrying out activities to support the public structure and to be at the side of those who suffer and fight for life. In close collaboration with Perugia Hospital, the committee promoted the creation of a special residence for patients in outpatient therapy (Residence "Daniele Chianelli"), an architecture designed in particular by Fabio Bianconi.

The space aims at supporting in the best possible way the patients admitted to the same departments, guaranteeing housing for the patient family members during the hospitalization period and making available at the time of discharge, after careful evaluation with the chiefs of the various structures, an apartment in the structure that guarantees the best situation for the patient.

The present research is in continuity with this relation of professional collaboration, but it develops within the agreement stipulated between Onlus and the Department of Civil and Environmental Engineering of the Engineering Department of Perugia, whose goal is "design studies of architecture for multifunctional urban spaces". It is therefore an "ethical" collaboration, developed in support of the Foundation by virtue of its particular mission, aimed at promoting innovation paths and testing multiple solutions.

Fig.2 The Hospital Pole of the city of Perugia

Methodology

The present research was born as an architectural design application[22], with the aim of hypothesizing a master plan for the area and estimating and simulating an enlargement project capable of having continuity with the existing structure, guaranteeing in any case the recognizability of the evolution[23]. The image is set at the center, also due to the spatial correlation and the value of perception, linked above all to the health of patients. Image and design are closely connected. Vittorio Ugo, in a volume about urban design perhaps too forgotten, emphasizes that in Greek there is one word, eidos, "to draw both the form and the idea, quality and beauty; and it is no coincidence that it has its root –fid – in common with the Greek verb orao (to see) and with the term istoria"[24]. In the centrality of the event, the "perceptive principle of intelligibility" focuses on geometry and thus recalls the concept of "topology"[25], literally "study of places", a subject that is fully inserted into the representation of architecture, which is founded precisely on a synchrase between space and time. "The cognitive process in the study of an object (architectural, urban, territorial) has as its purpose the construction of an ideological-mental image of the same, obtained through critical reading and interpretation of its historical genesis and its contingent physical reality"[26]. The images are therefore the starting point and the main tool that engages the process of knowledge based on the "constructive" capacity of the drawing, which finds the concretization and the verification of what has been analyzed in the graphic act. The current Residence, inaugurated in 2006, was classified according to the idea of a "Roman villa" closed to the outside and organized with internal courtyards; it is bounded by a system of walls that generate two courtyards destined to host collective functions (children's play, small-equipped park, outdoor music and physical activities). The building develops on five levels, one of which is underground, and it intends to be primarily the accommodation of the 27 residential units of approximately 35sqm each. The complex includes some specialist clinics, a gym for therapeutic activities, a space for educational activities, a multipurpose room for meetings and shows, a playroom, a small library and a media library, a kitchen, a laundry room and an open court looking at the entrance hall and a recreation area. There are also some commercial activities, such as a health center, a bar/restaurant and a hairdresser: all services designed for a greater comfort for the parents of the patients, who no longer need to move away from the hospital.

At the present state, the functional need is to expand the reception capacity of Chianelli Residence and at the same time to increase the services offered in the area of the Hospital Center: in fact, the existing commercial spaces are to be increased and a nursery with a dedicated and protected green area is to be inserted.

The proposal foresees the construction of a new isolated building, with an L-shaped area, consisting of two buildings, one of four floors and one of two floors, where one floor is a basement. On the ground floor, there is the raised pedestrian connection to the existing residences.

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22 F. Purini, *Comporre l'architettura*, Edizioni Laterza, Bari, 2009

23 F. Purini, *Luogo e progetto*, Edizioni Kappa, Roma, 1981

24 V. Ugo, *Contributi alla problematica del disegno urbano*, Eliotecnica, Palermo 1973, p.128

25 A. Sgrosso, *Topologia e architettura*, in "Op. Cit.", n. 45, Edizioni "Il centro", Napoli, 1979

26 D. Coppo, G. Ceiner, *Specificità delle immagini nella cartografia storica e nel rilievo per la costruzione dell'immagine formale*, in "L'immagine nel rilievo"*, C. Cundari (a cura di), Atti del Seminario di Studio, Gangemi, Roma, 1992, p.260.
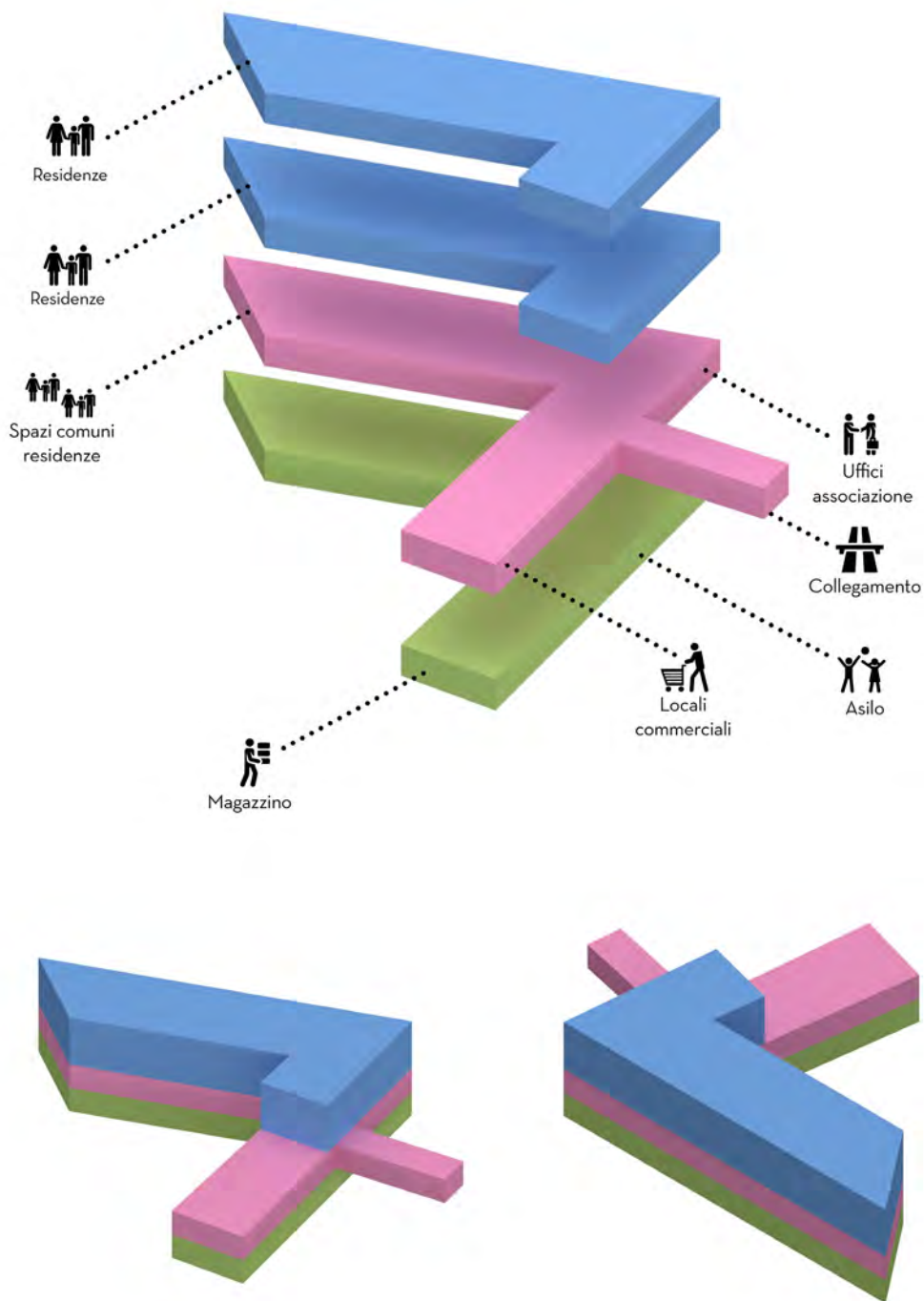
Fig.3 Concept of the expansion of the Chianelli Residence

Fig.4 The actual Residence Chianelli

The project sees on the first and second floor no. 10 special residences for patients in outpatient therapy, five residences of about 37.50 square meters on each floor, overlooking the "Parco Del Sorriso" (Smile Park).

Each residence has an entrance hall, utility room, service bathroom, living room with kitchenette, double room with bathroom also accessible with a wheelchair and a terrace, accessible from both the bedroom and from the living room. Each residence will have an electromagnetic induction cooktop. The concept of the design of each accommodation is based on the assumption that all surfaces must be easily accessible and cleanable, avoiding situations that could compromise full health for the guests in therapy. In this sense the room for the hospitalization, including the bathroom of relevance, will have a set of fixed and mobile furnishings reduced to the bare minimum.

From the first floor, it will be possible to access the flat roof of the ground floor of the lower building. This coverage was intended, partly as a terrace and partly as a green cover. The guests of the residences can use both spaces for recreational activities.

On the ground floor, in correspondence with the floors of the residences, there is a connection with the current residences and spaces have been identified for offices, storage rooms and common aggregative spaces to be used for the residences. The service distribution corridor is flanked, on the southwest, by a bioclimatic solar greenhouse.

On the ground floor, in correspondence with the lower part of the building, a commercial activity was set up consisting of a sales area, open towards the internal courtyard and the "Menghini" parking lot, an office, a storage/changing room and a toilet. The commercial space is connected to a local warehouse, located in the basement, by means of a double ramp staircase.

The nursery takes place in the basement, in correspondence with the building that runs parallel to Via Martiri 28 March, the public road on which the driveway and pedestrian access is located. The main entrance is located on the northwest elevation and it opens onto a report space intended for welcoming guests. On the opposite side, compared to the entrance, there are some classrooms for ordered activities, for free activities and for rest. Along the corridor connecting the entrance to the spaces for children, there are a meeting room for the educators and toilets.

Still along the corridor, on the southwest side, there are large glazed French windows that overlook a porch space and an internal courtyard, destined for private greenery. Particular attention is given to architectural barriers: starting from the nursery, the project foresees the respect of the accessibility requirement, for both the internal spaces and the external spaces reserved for educational activities (porch and private green space). As far as the internal spaces are concerned, all spaces of relationship and educations and the children's toilets are accessible. In addition, for employees and visitors, in addition to the minimum equipment of toilets (a toilet for men and a toilet for women), there is a toilet that can be used by people with reduced or impaired motor or sensory capabilities to the requirements.

On the ground floor, in the space dedicated to the commercial activity, the requisite of visitability of the sales area is respected, while in the part dedicated to services relating to special residences the accessibility requirement is guaranteed to all the report spaces open to the public.

Fig.5 Rendered view of the expansion of the Chianelli Residence
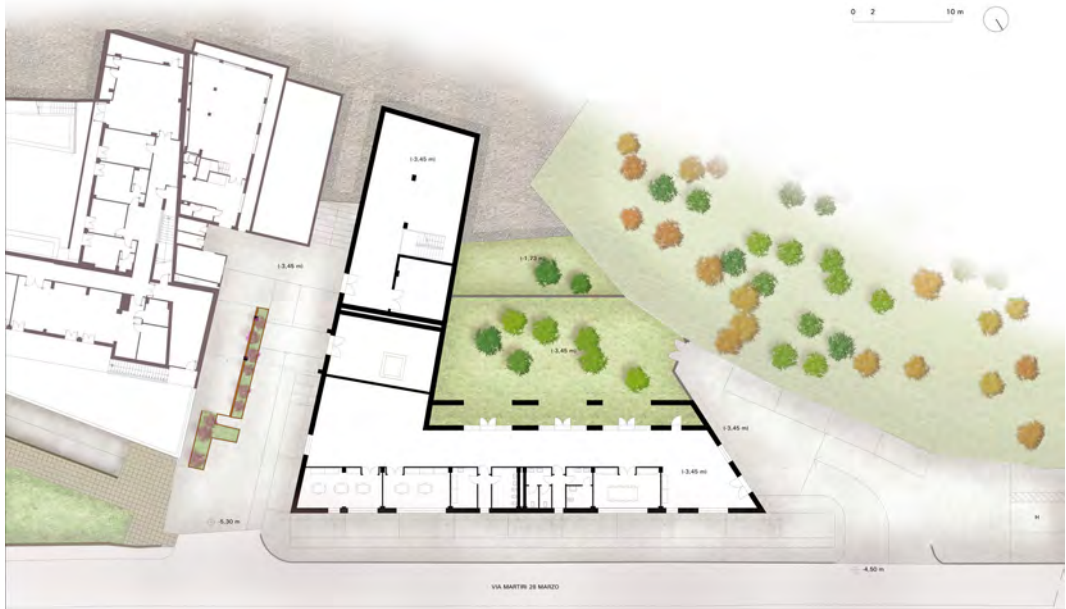
Fig.6 Ground floor plan

The access is via the covered connection, placed at a height with the ground floor, with the residences already completed. The covered connection is reachable via a path, accessible also by people with reduced or impeded motor or sensory capabilities, from the "Menghini" car park. In the toilets of the floor, there is a toilet usable also by people with reduced or impaired motor or sensory capabilities to the requirements. Finally, on the first and second floors, dedicated to special residences, the project envisages the requirement of accessibility to all the relationship spaces and residences. The access to the relationship spaces takes place through the covered connection, placed at a height with the ground floor, and an elevator which, placed in a central position between the new residences and the existing ones, vertically distributes the new building. Each residence respects the accessibility requirements and it is equipped with a room, with a bathroom, accessible by people with reduced or impaired motor or sensory capabilities.

Fig.7 Standard apartment plan

Conclusion

The proposal is defined as the natural continuation, even conceptual, of the existing structure and is directed towards the "Parco Del Sorriso": the physical connection between these two environments, between these two worlds, expresses the need to create a social cohesion and support for those who come to live these spaces. The relation with landscape, with the green, with the horizon of the city, the search for tranquility and well-being, is combined with the services offered to a city in the city as the hospital is. The presence of a nursery, the enlargement of the commercial spaces, remain congruent to the needs of the person who cannot always afford to move from the hospital. In the proposal, man is placed in the center, and inserted in a context that is not just only a hospital room, but also a place to feel at home, to live and discover the value of the community. The study of perception, architecture, vision, the rewriting of classical design themes such as building typology, shows the need for a marriage between ethics and aesthetics, where one serves the other, and the research, the specific experimentation of the project, of the designs, become a community design, a path of education to hope.

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Prolegomena of a discipline that will become science: the design of a ship in the Modern age

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Abstract

In the fifteenth century thanks to the farsighted pre-visions and initiatives of Henry the Navigator (1394 - 1460) and Christopher Columbus (1451 - 1506), to cite only the best known among the many, new horizons opened up for exploration, navigation and maritime trade thanks to the new routes in the Atlantic, which led to the discovery of new lands and new riches. The necessity and the desire to cross the ocean in the shortest possible time and with the maximum chance of success required a renewal of the European fleets because galleys, cogs and carracks could no longer be considered reliable vessels for the great ocean sea as they were for the Mediterranean or for coastal navigation along the European coasts.

This need for renewal required a change of paradigm in shipbuilding that involved a major study and a deepening of the construction techniques for the building of ever larger, strong and reliable vessels in navigation in the high sea.

This need was answered in the sixteenth century, when they start to realize the construction plans of ships; these scale drawings of boats became a fundamental tool for shipbuilding and a new winning way to have a reliable idea of what would have been the new ship, thanks also to the integration of the project with the new disciplines that were developing more and more in those years: arithmetic, geometry and technical drawing. Beyond the knowledge of the master carpenters, this new way of designing began with scholars such as the Portuguese Fernando Oliveira (1507 - c. 1581), who wrote one of the first shipbuilding treatises in 1580, the *Livro da Fabrica das Naus,* the English Matthew Baker (c. 1530 - 1613), with particular reference to his manuscript *Fragment of Early English Shipwrighty* of 1586, and the Italian Bartolomeo Crescenzio (second half of the 16th - 15th centuries), who beckoned of this new way of understanding the design of the boat in its *Nautica Mediterranea* treatise of 1607, to arrive a few years later to the fundamental treatise *Architectural Navalis* (1629) by Joseph Furttenbach (1591 - 1667).

In this short note, we want to trace a brief history of this change of paradigm in the naval construction that has anticipated the linguistic revolution, which will see its maximum expression in the seventeenth and nineteenth centuries in Europe.

Abstract

Nel XV secolo grazie alle lungimiranti pre-visioni e iniziative di Enrico il Navigatore (1394 - 1460) e di Cristoforo Colombo (1451 - 1506), per citare solo i più noti tra i tanti, si aprirono nuovi orizzonti all'esplorazione, alla navigazione e al commercio marittimo grazie alle nuove rotte in Atlantico, che portarono alla scoperta di nuove terre e nuove ricchezze. La necessità e il desiderio di attraversare l'oceano in minor tempo possibile e con la massima possibilità di successo, resero necessario un rinnovamento delle flotte europee in quanto galee, cocche e caracche non potevano più essere considerate imbarcazioni affidabili per il grande mare oceano come invece lo erano per il Mediterraneo o per la navigazione di cabotaggio lungo le coste europee.

Questo bisogno di rinnovamento richiese un cambio di paradigma nella costruzione navale che implicò un maggiore studio e un approfondimento delle tecniche costruttive per la realizzazione di imbarcazioni sempre più grandi, robuste e affidabili nella navigazione in mare aperto.

Questo bisogno trovò una risposta a partire dal XVI sec., quando si iniziarono a realizzare i piani di costruzione di una nave; questi disegni in scala delle imbarcazioni divennero uno strumento fondamentale per la costruzione navale, un nuovo e vincente modo per avere una idea affidabile di quella che sarebbe stata la nuova imbarcazione, grazie anche all'integrazione del progetto con le nuove discipline che si andavano vieppiù sviluppando in quegli anni: l'aritmetica, la geometria e il disegno tecnico. Questo nuovo modo di progettare, al di là dei saperi propri dei maestri d'ascia, prese l'avvio da studiosi come il portoghese Fernando Oliveira (1507 – c. 1581), che scrisse il Livro da Fabrica das Naus nel 1580, uno dei primi trattati di costruzioni navali, l'inglese Matthew Baker (c. 1530 – 1613), e in particolare al suo manoscritto Fragment of Early English Shipwrightry del 1586, e l'italiano Bartolomeo Crescenzio (seconda metà XVI - XV sec.), che fece cenno di questo nuovo modo di intendere il progetto dell'imbarcazione nel suo trattato Nautica Mediterranea del 1607, per arrivare alcuni anni dopo al fondamentale trattato l'Architectura Navalis (1629) di Joseph Furttenbach (1591 – 1667).

In questa breve nota si vuole allora tracciare una breve storia di questo cambio di paradigma nella costruzione navale che ha anticipato di alcuni secoli la rivoluzione linguistica che vedrà la sua massima espressione nei secoli XVII e XIX in Europa.

Naval art and architecture

The science we call "naval architecture"[1] did not exist in ancient times, nor in the Middle Ages and nor until the modern age. The shipwrights were grouped in guilds that jealously guarded the secret of their knowledge and their rules of construction. These rules, ignored by many members of the

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[1] As is well known, [Miranda, Salvatore. *Architettura navale. Elementi di dinamica della nave*. Napoli: Liguori, 2015] naval architecture is the science of naval engineering that studies the design of boat hull shapes, through the study of the ship's hydrostatic, hydrodynamic, stability and manoeuvrability characteristics.

guild itself, were often known only to families of carpenters, blacksmiths, caulkers, rope-makers, sailmakers and shipwrights which transmitted from father to son, from teacher to student, that set of practices and construction techniques proper to the art of building, as the rules for cutting timber and the use of materials, the rules for proportioning and dimensioning the structural elements and the individual parts, according to the type and size of the boat.

The ancient builders ignored the art of tracing the construction plans of a boat and they proceeded by rules consolidated by centuries of experience which included the choice of the type of hull and keel, the model of the section of the ship, the construction of the successive ordinates and currents that form the backbone of the sides and ribs connected to the keel, the strengthening slats, the floorboard, the bilge, and so on. After having built the supporting skeleton of the hull, they proceeded to realize the deck beams and the plating and its subsequent waterproofing (caulking); finally, they dealt with the laying of the trees and the completion of the decks. A set of techniques and procedures handed down orally, but without leaving anything written, no drawing or document that could allow to spread this knowledge to others.

Aware of the growing importance of the naval weapon in the policy of expanding the kingdom, Henry VIII (1491 - 1547) starts building a powerful fleet, the foundation of what will be the Royal Navy, even if his successors Edward VI (1537 - 1553) and Mary I Tudor (1516 - 1558) they did not implement the fleet, considering it was little more than a coastal defence system. It will take an important event such as the defeat of the Spanish 'Armada Invencible' (Grande y Felicísima Armada) in 1588 by Sir Francis Drake (1540 - 1596), under the reign of Elizabeth I (1533 - 1603), to make the rulers understand the need for a powerful naval fleet definitely reigns. After the end of the civil war, with the restoration of King Charles II (1630 - 1685) to the throne (1660), the United Kingdom of England, Scotland and Ireland had inherited a large fleet of 154 ships. They were no longer "King's ships", but a set of ships designed and built to show the rising power of the kingdom and the British Commonwealth, the "Royal Navy". Charles II departed from Scheveningen, the Netherlands, on 8 May 1660 on the flagship of what will be his new fleet, named in his honour "Royal Charles"[2], which was a liner with 80 cannons of 1,229 tons, built by Peter Pett (1610 - 1672), in the construction sites on the Thames at Woolwich, in 1655. In 1707, after the union between England and Scotland, the two navies that already worked together since 1603 under the reign of James Stuart (1566 - 1625), merge into a single naval power that, after the unsuccessful expeditions against the Algerian pirates in 1620/1, against the Spanish fleet in Cadiz in 1625 and in aid of the Huguenots in La Rochelle in 1627 (Anglo-French war: 1627-1629), it will be such until the Second War World. The creation of the Royal Navy in the United Kingdom, which took place in 1660, is therefore a time of concern and a spur to the development of shipbuilding in the Kingdom of France. Under the leadership of Jean-Baptiste Colbert (1619 - 1683), France made a grandiose effort to build an important fleet to oppose the nascent English naval power and be the first naval power in Europe[3]. On this occasion a process of shipbuilding is set in motion, which in a few years sees the launch of twenty ships of 600 gross tonnage, 120 1,000-ton ships, of which several exceptional ships, armed with more than 100 guns, and then again ships of up to 2,000 tons. In these years of great development of French shipbuilding,

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[2] Kishlansky, Mark. *L'età degli Stuart*. Bologna: il Mulino, 1999; p. 285.
[3] Metais, Emmanuel and Pierre-Xavier Meschi and Jacques Colin. *The 'Marine Royale' or the extraordinary revival of the French Navy under Louis XIV*, Réf: G1499(GB), Centrale de Cas et de Médias Pédagogiques (2007).

the success and ability of master builders, carpenters, etc., is appreciated, as well as architects and naval engineers who carefully follow the construction and development of ever more impressive ships. Around 1670 the will to establish a series of rules for shipbuilding and in particular warships[4] and the need to have a regulation that establishes the guidelines for the design of the main boats[5] is manifested in the Ministry of the Navy. In March 1671, with *Régiment pour la garde & conservation des ports, arsenaux & vaisseaux de guerre, du 23 Octobre 167*1, it was created in the three main French ports of Brest, Toulon, Rochefort, a "Conseil de construction". It had the task of supervising the construction of the ships and the work of the shipwrights, in particular, forcing them to draw up "quotas" of work before the construction of a ship through an estimate of the cost of the construction based on a simple sheet that it contained about twenty dimensions of the most important elements of the construction. In September 1673, a more detailed regulation was issued than that of 1671, which will be followed in 1673 and 1674 by new rules concerning the management of naval arsenals and shipyards.

Fig. 1. School of Naval Constructions of Brest (1680), drawing made in 1752, by Nicolas Ozanne (1728 - 1811), for the first edition of the Éléments de l'architecture navale ou Traité pratique de la construction des vaisseaux by Henri Louis Duhamel du Monceau (Paris: Charles Antoine Jombert, 1752).

In the decree of Colbert of October 31, 1678, we read: «*L'intention du roi est qu'il soit fait, en chaque arsenal, des modèles en petit d'un vaisseau […] et il faudra que ces modèles soient faits avec autant d'exactitude et de justesse qu'ils servent perpétuellement pour les mesures et les proportions à tous les vaisseaux qui seront construits dans l'avenir*» [Décret de Colbert, 31 octobre 1678]. The French

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[4] Règlement. Que le Roi veut & ordonne être observé dans la construction des vaisseaux de Sa Majesté. (b). Du 4 Juillet 1670 à S. Germain en Laye.
[5] An exhaustive list of *Règlements*, *Ordonnances*, etc., of the French Navy published from 1647 to 1689 is located in *Historie Generale de la Marine*, Tome Troisieme. Amsterdam: Antoine Boudet 1758. Cfr. *Code des Armées Navales*, pp. 343-347.

shipbuilding industry thus entered modernity[6]. In the years 1680-1690, the admirals Abraham Duquesne, Marquis du Bouchet (c. 1610 - 1688), commander of the French fleet on the occasion of the naval bombardment of Genoa in 1684, and Anne Hilarion de Cotentin, Comte de Tourville (1642 - 1701), asked for scientific advice, to consciously address work in shipyards, to the knight of Bernard Renau Eliçagaray (1652 – 1719), a famous mathematician who is also urged to draw up a shipbuilding manual. In 1679, he prepared a manuscript on the theory and technique of building ships and he also added a method for their conduct at sea. This work was much appreciated by the French admiralty who invited Renau Eliçagaray to carry out lessons in the various shipyards to improve the vessels under construction. Subsequently, starting from 1680, the school of shipbuilding became an institution active in the construction sites for the education of officers and shipyard inspectors. The inspector will thus become the person destined to the education of the carpenters (and of the shipwrights) and who will teach to make plans and profiles of the ships before starting the construction, in order to correct the defects, found in the shipbuilding until then realized, even if the shipwrights of more ancient formation will always have the tendency to jealously preserve the secrets of their science and to transmit them in the workshop. The only discipline that had led to the construction of impressive ships was the know-how, which in the future would have been destined to disappear. In fact, the new technical literature represented by the writings of scholars and scientists would soon have clashed with the shipyard practice and the experience of know-how, and it would have been more and more often at odds with the empirical rules that provided for the construction of ships up until then: the *Hydrographie* by Georges Fournier[7] (1595 – 1652), the *Architecture navale* by François Dassié[8] (XVII century), the *Théorie de la manœuvre des vaisseaux* by Renau Eliçagaray[9] and *La théorie de la construction des vaisseaux* by Paul Hoste[10] (1652 – 1700) are the first reference texts that will revolutionize naval knowledge and shipbuilding in the following centuries, even if the path for the formulation of science and naval architecture will still be long and complex.

Another cause of the delay in the transmission of knowledge regarding the construction of ships and naval architecture is linked to the lack of drawings and construction plans. This deficiency did not escape Colbert, who imposed, in 1678 that the construction plans for all the ships being built in Toulon be drawn up. In 1683, an ordinance required master carpenters "to make a model and a profile for each ship" before shipbuilding. Only in the years 1690-1695 the construction plan became an official document and a common practice in France, although later began a long period of stagnation in the construction of ships (1695-1720), linked to a moment of peace in Europe, limiting the activity on construction sites to the maintenance of the factories of the shipyard (the arsenals) or to the construction of small naval units. At the end of this period of stagnation, however, the new generation of builders that was about to enter service was more accustomed to the formation of shipbuilding plans which became a systematic activity in French shipyards. The use of these construction plans makes it possible to correct the defects found in the construction of the ship,

[6] Frasca, Francesco. Jean-Baptiste Colbert and the birth of the *Marine Royale*, in *Rivista Marittima*, August - September 2012, pp. 77-93.

[7] Fournier, Georges. *Hydrographie contenant La theorie et la practique de toute les parties de la Navigation.* Paris: Michel Soly, 1643.

[8] Dassié, le S[r]. *L'architecture navale contenant la maniere de construire les Navires, Galeres & Chaloupes, & la Définition de plusieurs autres especes de Vaisseaux*. Paris. Jean de la Caille, 1677.

[9] Renau d'Eliçagaray, Bernard. *Théorie de la manoeuvre des vaisseaux*. Paris: Estienne Michallet, 1689.

[10] [11]oste, Paul. *Théorie de la construction des vaisseaux, qui contient plusieurs traitez de ... sur des matières nouvelles et curieuses.* Lyon: Chez Anisson, & Posuel, 1697.

in the organization of work and in the management of the site, significantly reducing construction times and costs. Unlike their English counterparts who designed ships using graphical methods and elementary yet rigorous mathematics, French manufacturers claim their freedom in the design of the hulls, seeking the elegance of the forms, to the detriment of physical and mechanical considerations on the behaviour of the boat itself, operated which obviously was not without drawbacks.
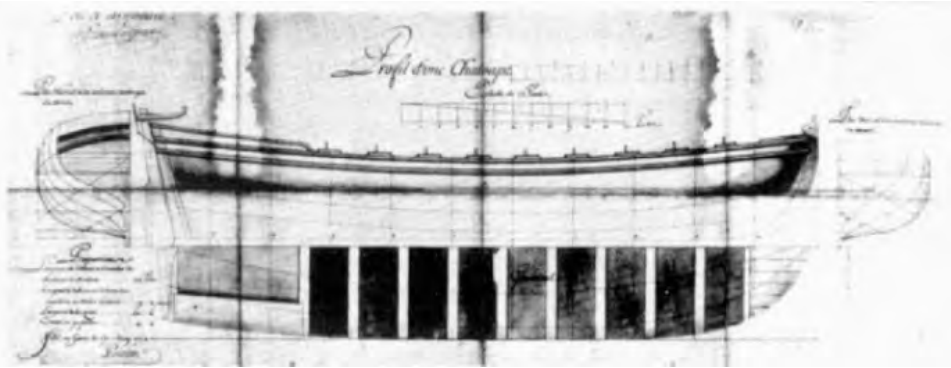
Fig. 2. Profile of a 'sloop' signed by Poirier, 1734, master carpenter, then shipwright and finally shipbuilder. Jacques Poirier (- 1740) builds the flûte La Baleine on behalf of the king [Alain Demerliac. La Marine de Louis XV: nomenclature des navires français de 1715 à 1774. Nice: Omega, 1995] which roams a ship of III ranks with 28 guns with a tonnage of 600 tons. (length 40.27 m., width 10.39 m., draft 4.28 m.), in the shipyard of Havre 1725 [Mercure de France, dédié au Roy, Octobre 1725. Paris: Guillaume Cavelier, Noel Pissot, 1725; p. 2528].

Only after 1720 with the resumption of shipbuilding the empirical technique is questioned; later the first calculations began to be made regarding the gross capacity, the study of stability and the first drawings were drawn up which modified consolidated constructive traditions. The section of the buoyancy was designed, reducing the weight of the upper parts of the dead work, reducing the height of the superstructures, the size and weight of the artillery, playing on the ballast and on the ship's supplies and accessories. In this sense, Bouguer's work[11] - by Pierre Bouguer (1698 - 1758), a French mathematician - becomes fundamental, which will become a reference point for calculations concerning the stability of the ship.

At the origin of the project design

Starting from the sixteenth century, the need to renew the fleets of the main European naval and maritime powers required a paradigm shift in shipbuilding which led to a greater study and in-depth study of construction techniques for the construction of larger and stronger boats in offshore sailing. It was a scientific-technical revolution, but above all linguistic in the broad sense of the term, because they perceived the need to abandon, even if not entirely, the method of oral transmission of knowledge in order to pass to an innovative language that involved the use of design for the transmission of technical-constructive knowledge. Ship building plans began to be implemented; these drawings drawn up to scale, albeit conditioned by a heterogeneity of measurement systems, a fundamental tool for shipbuilding, a new and winning way to have a reliable idea of what the new boat would have been, also thanks to the integration of the project with the new disciplines that were

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[11] Bouguer, Pierre. *Traité du Navire, de sa construction et de ses mouvemens.* Paris: Jombert, 1746.

developing more and more in those years: arithmetic, geometry and technical design. Beyond the knowledge of the shipwrights, this new way of designing began as scholars such as the Portuguese Fernando Oliveira (1507 – c. 1581), who wrote the *Livro da Fabrica das Nau*s in the 1580[12], one of the first shipbuilding treaties, the Englishman Matthew or Mathew Baker (c. 1530 - 1613), and in particular his 1586 manuscript *Fragment of Early English Shipwrightry*, and the Italian Bartolomeo Crescenzio (second half of the 16th - 15th centuries), who mentioned this new way of understanding the project of the boat in his *Nautica Mediterranea* treaty of 1607[13], to arrive a few years later at the fundamental treatise the *Architectura Navalis* (1629) by Joseph Furttenbach (1591 - 1667)[14]. The text of Crescenzio is perhaps the first text that attempts to codify a set of concepts useful for shipbuilding, in particular the galleys, archetype of the treatises that will be published in the following centuries by Robert Dudley (1574 - 1649)[15], the aforementioned Paul Hoste and Fredrik Henrik af Chapman (Frédéric Henry de Chapman, 1721 - 1808)[16]. Likewise the contemporary treatise remains anchored to the description rather than the technical illustration: this is witnessed by Thomé Cano (c. 1580 - post 1618)[17], Ithier Hobier (15 .. - 1644)[18], Joseph Furttenbach[19], Georges Fournier[20], Isaac Voss (Isaak Vossius, 1618 - 1689)[21].

In the seventeenth century the foundations of these disciplines had not yet been laid and the first treatises on naval architecture were still influenced by that empirical and descriptive knowledge typical of an oral rather than a scientific tradition, and in the first manuscripts that dealt with this theme one felt the intention to transpose the corpus of empirical knowledge in written documents enriched with drawings and descriptive tables of the components of these complex machines that were the vessels[22]. *La Construction des Vaisseaux du Roy, et le nom de toutes les pièces qui y entrent, marquées en la Table par numero. Avec toutes les proportions des rangs, leur explication, & l'exercice du Canon* [Havre de Grace: Imprimeur du Roy & de la Ville (J. Hubault), 1691[23]] of 1691,

[12] A dissertation on the text of Fernando Oliveira is in: Montalvão de Sousa, Carlos Manuel. *O Livro da Fábrica das Naus de Fernando Oliveira. Princípios e Procedimentos de Construção Naval*. Mestrado em História Marítima. Lisboa, 2009.

[13] Crescenzio, Bartolomeo. *Nautica Mediterranea*. Roma: Bartolomeo Bonfadino, 1607

[14] See: Corradi, Massimo and Claudia Tacchella. At the origins of Shipbuilding Treatises: Joseph Furttenbach and the *Architectura Navalis*, in *Historic Ships*. London: The Royal Institution of Naval Architects, 2018; pp. 1-9.

[15] Dudley, Robert. *Dell'Arcano del mare*. Volume II, Book IV. Florence: Francesco Onofri, 1646.

[16] Chapman, Friderico Henr. *Architectura Navalis Mercatoria, Navium varii generis Mercatoriarum, Capulicarum, Cursoriarum, aliamrumque, cujuscunque conditionis vel molis, Formas et rationes exhibens exemplis æri incisis, Demonstrationibus denique, Dimensionibus, calculisque accuratissimus illustrata*. Holmiæ (Stockholm): [s.n.], 1768. Chapman, Fredrik Hindre af. *Tractat om Skepps-byggeriet tillika med förklaring och bevis öfҫfr Architectura Navalis Mercatoria &c*. Stockholm: Johan Pfeiffer 1775 [Chapman, Frédéric de. *Traité de la construction des vaisseaux, avec une Où l'on démontre les principes de l'Architecture Navale Marchande, & des Navires armés en course ... Traduit du Suédois, sur l'Édition publiée & imprimée chez Jean Pfeiffer en 1775*. Paris: Sayllant & Nyon; Veuve Desaint, 1779. Translated into English in 1820 (*A Treatise on ship-building, with explanations and demonstrations respecting the Architectura Navalis Mercatoria by Frederick Henry de Chapman, ... Translated into English ... by the Rev. James Inman*. Cambridge: J. Smith, 1820)]. Chapman also wrote: *Afhandling om rätta sättet at finna segel-arean til linie-skepp och däraf rundhultens längder*. Kongl. Am:ts Boktryckeriet, Carlskrona, 1793; *Försök till en Theoretisk afhandling att gifwa åt linie-skepp deras Rätta Storlek och Form, likaledes för Fregatter och Bevärade fartyg*. Kongl. Am: ts Boktryckeriet, Carlskrona, 1804.

[17] Cano, Thomé. *Arte para fabricar, fortificar y aparejar naos de guerra y merchante...* Sevilla: Estupiñan, 1611.

[18] Hobier, Ithier. *De la construction d'une gallaire et de son équipage*. Paris: Langloys, 1622.

[19] Furttenbach, Joseph: *Architectura navalis*. Ulm: Jonam Saurn, 1629.

[20] Fournier, Georges. *Hydrographie contenant La theorie et la practique de toute les parties de la Navigation*. Paris: Michel Soly, 1643.

[21] Vossius, Isaac. 'De Trirerium & Liburnicarum constructione' in *Variarum Observationum Liber*. Londini: Scott, 1685.

[22] A first English manuscript on shipbuilding was published in 1625 with the title *A Treatise on Shipbuilding and a Treatise on Rigging, Written about 1620-1625*, then published by W. Salisbury & R.C. Anderson and also published by the Society for Nautical Research, Occasional publications / the Society for Nautical Research, No 6 London: The Society for Nautical Research, 1958. In 1670 the important text *Deane's Doctrine of Naval Architecture* is published, subsequently reissued by Brian Lavery for the types of the Conway Maritime Press (London, 1991), which anticipates the important essay by W. Sutherland *The ship-builders assistant* ... (London, 1711), reprinted by Jean Boudriot in 1989 (Rotherfield, 1989) [Cfr. Sexton, R.T. Building their Majesties' Ship Roebuck in *The Great Circle* in Vol. 37, No. 1, Special Issue: William Dampier (2015), pp. 16-35; Note 2, p. 34].

[23] There is an edition published in Brest and dated 1688 [Brest: R. Malassis, 1688] without drawings.

the *Description du vaisseau le Royal Louis* (Marseille: Charles Brebion, 1677) of the Commissioner of the Port of Toulon Laurent Hayet (XVII century) or the *Proporciones de las medidas mas essempciales ... para la Fabrica de Navios, y Fragatas de Guerra* by José Antonio de Gaztañeta e Iturribalzaga (1656 - 1728)[24] are texts still aimed at the practical knowledge of shipbuilding, what Giovanni Santi Mazzini (1941 - 2014) calls "the knowledge of naval anatomy". In this context we find the treaty of naval architecture by Joseph Furttenbach that will lead the way to a renewal of the treatises in the naval field which will find his followers in the ship carpenter William Keltridge (XVII sec.)[25], the illustrator Edward Battine (XVII sec.)[26], le Sr. Dassié (François Dassié)[27], Nicolaes Witsen (1641 - 1717)[28], Johannes Van Keulen (1654 – 1715)[29], Carel Allard (1648 - 1709)[30], Cornelis van Yk (XVI-XVII sec.)[31], the Viceproto of Marangoni at the Venice Arsenal Stefano de Zuanne de Michel (XVII sec.)[32], and then again Henri Sbonski de Passebon (1637 - 1705)[33], "Lieutenant d'une des Galeres du Roy", as he himself defined himself in the title page of his work, and then Paul Hoste, the Jesuit and mathematician who gave a great impulse to a renewal of the science and techniques

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[24] Gastañeta e Iturribalzaga, Antonio de. *Proporciones de las medidas mas essempciales dadas por el theniente general de la Armada Real del Mar Occeano Don Antonio de Gastañeta ... ; para la Fabrica de Navios, y Fragatas de Guerra, que pueden montar desde ochenta Cañones hasta diez, cuyas Proporciones tiene resuelto su Magestad se observen pro regla general en todos sus Astilleros de España, como en las de America. Con las explicaciones de la construcción de la varenga maestra, plano, y perfil particular de un Navio de setenta Cañones, con los largos, gruessos, y anchos de los Materiales con que se debe executar.* Madrid: Phelipe Alonso, 1720.

[25] Keltridge, William. *Notebook*, c. 1675 [National Maritime Museum]; Keltridge, William: Original drawings of seven hulls of ships. Manuscript, 1684. See: Davies, J. D. *Pepys's Navy: Ships, Men and Warfare 1649-89.* Barnsley: Seaforth Publishing, 2008; p. 67.

[26] Battine, Edward. *Method of building, rigging, &c. Ships of warr.* Manoscritto, datato Dec. 23, 1684. Cfr. Cochran, John. *A Second Catalogue of Manuscripts, in Different Languages ...* London: Ibotson & Palmer, 1837; p. 138 e a *Catalogue of the Harleian Manuscripts in the British Museum.* Vol. IV. (London): The House of Commons of Great Britain, 1812: p. 266. See also: McBride, P. The Dartmouth, a British frigate wrecked off Mull, 1690 - 3. The guns in *The International Journal of Nautical Archaeology and Underwater Exploration* (1976), 5.3, pp.189-200. There is also a manuscript dated 3 August 1689 entitled *The Method of building, rigging, apparelling and furnishing his Majesty's Ships of War, according to their rates* ´British Museum, n. 9957] quoted in *List of Additions Made to the Collections in the British Museum in the Year MDCCCXXXI.* London: printed by Order of the Trustees, 1839; p. 8.

[27] Dassié, le Sr. *L'architecture navale contenant la maniere de construire les Navires, Galeres & Chaloupes, & la Definition de plusieurs autres especes de Vaisseaux.* Paris. Jean de la Caille, 1677.

[28] Witsen, Nicolaes. *Architectura Navalis et Regimen Nauticum ofte Aaloude en Hedendaegsche Scheeps-bouw en Bestier.* Amsterdam: Casparus Commelijn, Broer en Jan Appelaer, Boeck, 1671; Amsterdam: Pieter en Joan Blaeu,1690².

[29] Van Keulen, Johannes. *De nieuwe hollandsche scheepsbouw.* Amsterdam: J. van Keulen, 1680; quoted in Hoogendoorn, Klaas. *Bibliography of the Exact Sciences in the Low Countries from ca. 1470 to the Golden Age (1700).* Leiden: Brill, 2018; p. 1080.

[30] Allard, Carel. *Nieuwe Hollandse Scheeps-bouw, Waar in vertoond word een Volmaakt schip, Met alle des zelfs uitterlyke deelen, Met een verklaaring der naamen van dien ; als mede van alle ae Touwen, Zÿlen, &c: Benevens de Afbeeldingen Van alle de voornaamste Vlaggen, Die men in zee outmoet; ... Carel Allard.* Amsteldam: Carel Allard, 1695; 1705.

[31] van Ik, Cornelis. *De Nederlandsche Scheeps-bouw-konst Open Gestelt; Vertoonende Naar wat Regel, of Evenredenheyd, in Nederland meest alle Scheepen werden gebouw; mitgaders Masten, Zeylen, Ankers en Touwen, enz. daar aan gepast.* Delft: Andries Voorstad; Amsterdam: Ian ten Hoorn, 1697.

[32] *L'architettura Navale di Stefano (Steffano) de Zuanne de Michel Viceproto de' Marangoni; nella quale vi sono descritte le raggioni, e regole per fabricare ogni sorte de' (di) Navi, Galere, Galeazze, Galeote, Caicchi, Feluche, & ogni altro bastimento solito a fabricarsi tanto nella Casa, che fuori. Con li disegni, e dichiarazioni per formare li Sesti, e Partizioni per fabricare, & un discorso sull'uso delle altre Nazioni tanto per le Navi, che per le Galere, con una descrizione delle misure degli Alberi, & Antenne, come pure sulla differenza del governo dei Timoni alla Ponentina da quelli alla Faustina. Si descrive anco le qualità, e grossezza de' Legnami, che si adropano in ciaschedun Bastimento con li avvertimenti alli Mastri delle cose essenzialli. S'avverte aversi lo Scrittore acostato al Decretto dell'Eccellentissimo Senato, & all'uso sin quì praticato, e che tuttavia si pratica. Opera d'applicazione, e fattica. Descritta e designata di sua mano in Venezia l'Anno 1686.* Venice: Manuscript, 1686 [Manuscript preserved in the British Library in London, Add Ms, n. 38655]. The work of Stefano de Zuanne also contains much other information on the Bombers to throw Bombs, on the Marcilians, the merchandise galleys and then on how to build the boats of the Flemings, the Englishmen, the Frenchmen and the Genoese. The work of the Venetian Viceprotector is accompanied by very refined illustrations and the model of a Frigate built in 1667 at the Arsenal Regiment when, he writes, "the Ships began to be built in the aforementioned House" [See: Tentori, Cristoforo. *Saggio sulla Storia civile, politica, ecclesiastica e sulla Corografia e Topografia degli Stati della Repubblica di Venezia.* Tome I. Venice: Giacomo Storti, 1785. See: Digressione non inopportuna sull'Architettura Navale Veneziana de nostri tempi, e degli antichi (pp. 326-357).; pp. 346-347]. In 1719 the naval architect Stefano de Zuanne de Michel starts the construction of a new Bucintoro, a "*lusoria*" or fun and representation ship (doge ship), sumptuous to be used in big parties such as the Marriage of the Sea and Ascension, finished in 1729 under the doge of Alvise III Sebastiano Mocenigo (1662 - 1732) [See: Secco, Alberto. Stefano De Zuanne de Michiel e il bucintoro del settecento, in Marzari, Mario (edited by). *Navis. Rassegna di studi di etnologia e archeologia del mare.* Vol. 1. Sottomarina (Chioggia): Il Leggio Editrice, 1999; pp. 87-102].

[33] Sbonski de Passebon, Henri. *Plan de plusieurs bâtimens de mer avec leur proportions et les pavillons et les enseignes, que chaque nation porte à la mer.* Without place and dates; probably Marseille: Laurent Brémond, c.1690 or Amsterdam: Pierre Mortier, c. 1690.

of shipbuilding, dealing with indicating and theorising the way for the development of a discipline founded on scientific bases: naval architecture with his treatise *Thèorie de la construction des vaisseaux, qui contient plusieurs traitez de Mathématique sur des matiéres nouvelles & curieuses* (Lyon: Anisson & Posuel, 1697) and *L'art des armées navales ou Traité des evolutions navales* (Lyon: Anisson & Posuel, 1697).

The theme of the project and the construction of a boat was therefore a complex problem that required knowledge that went beyond the simple practice of manufacturing. In this regard, Vettor Fausto wrote in 1530: «*(...) if knowledge of architectural constructions on earth is so difficult, what should I say about that on the sea, where everything is the result not of straight lines (which is a relatively simple method), but from repeatedly made curves and variations?*[34]»

As we have seen in the 15th and 16th centuries there was a renewal of shipbuilding linked to new geographical discoveries, but also to the need to have a fleet capable of managing the large trade routes that gradually became political and military they were also opening because the oceanic crossings required a ship that was very different from that used in the Mediterranean area or in the North Sea for coastal navigation or for limited sea crossings. The evolution of the fleets also involved a change in the type of boats that began to be built. In fact, the modest caravels and *naos* used by the first explorers were soon replaced by larger boats such as the galleons and subsequently the vessels armed with 3 and even 4 trees, in addition to a smaller ship to complete a military ship as well as merchant that had to guarantee the possibility to carry out long-range trades, but above all to arm powerful and versatile naval teams. Thus, there were also constructive innovations, such as the construction method for side-by-side tables called *carvel*, which were spreading mainly in navies that operated on long ocean trade routes. Likewise, the increasing size of the boats allowed a widening of the firepower that resulted in an expansion of the bridges armed with an artillery of greater calibres, but above all of greater weight which significantly influenced the dimensions and the stability of the boats[35].

In this period of innovation and naval development, it is not surprising to discover that even in the field of design, a paradigm shift occurs. The central figure in the construction of a boat had been the shipwright until then. This professional figure should have skills in different fields that include the design and knowledge of materials, construction technologies and shipyard management; for this reason, these professional figures were important in shipyards, received good wages and were at the top of the shipyard's management hierarchy. These important figures were therefore not "rude mechanics", or otherwise humble artisans in a sphere of activity relatively limited to the construction of boats[36], but rather versatile figures who over the years had to learn to manage resources and workers, leading to directing both the construction of the new ship both the repair of a boat, effectively creating a professional figure that translated, as in the case of the Pett family, into

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[34] Letter from Vettor Fausto to Giovanni Battista Ramusio in *Epistolae Clarorum Virorum* (Venezia, 1556), f. 93. About Fausto see: Lane, Frederic Chapin, Venetian Ships and Shipbuilders of the Renaissance. Baltimore: Johns Hopkins University Press, 1934, pp. 64-71 and P.L. Rose e S. Drake, Lo pseudo-Aristotelico "Quesiti di Meccanica" nella Cultura Rinascimentale *Studi nel Rinascimento*, 18 (1971), 65-104, pp. 77-8.

[35] For a review of these late medieval and Renaissance developments, Richard W. Unger, *The Ship in the Medieval Economy 600-1600*. London: Croom Helm, 1980.

[36] For a comparison with the Venetian example, P. Burke, *Tradition and Innovation in Renaissance Italy* (Londra, 1974), p. 291, where attempts are made to classify the various Italian occupations by income. Out of a total of 26 occupations, the Venetian naval master reaches seventh place.

a genealogy of naval architects.

It is precisely due to one of these figures that what would later become the paradigm shift that we mentioned in a veritable revolution in the shipwright's way of working is starting. Former shipwright during the reign of Elizabeth I (1533 - 1603), Mathew Baker was an important figure in the world of shipbuilding, not only because he was responsible for the construction or reconstruction of many of the boats that faced the *Invencible Armada* in 1588, but also because he started a scientific-linguistic revolution in the construction field.

The great albeit subtle transformation Baker made was to introduce the "paper" at the centre of the design of a boat. In his manuscript treatise, *Fragments of Ancient English Shipwrightry*, probably written in the second half of the sixteenth century, we can see this change in the way a ship is designed. As we have previously mentioned, other manuscripts already existed that illustrated naval design, but they were drawn up with a more descriptive than design intent. The work of Baker is therefore not in the temporal primacy but in the primacy of the contents that will be proper to the linguistic revolution of the 18th century, by scholars such as Charles Bossut (1730 - 1814), Pierre Bouguer and Henri Louis Duhamel du Monceau (1700 - 1782)[37], to name only some of the major ones. The importance of Baker's work lies in the completely different approach given to naval design. In the technical literature of the time there already existed a series of treatises realized starting from the 15th century on shipbuilding, for example the already mentioned texts by Oliveira and Crescenzio, and the already manuscript of Stefano de Zuanne de Michel. However, these treatises were cryptic in that they used a language and terminology that was difficult to understand even for the erudite reader who had to work in this field. Although it was undoubtedly a step forward for the dissemination of technical and constructive knowledge that was previously entrusted solely to oral and practical transmission, the dissemination of these texts was actually very useful to modern scholars to understand how the boats of the time were realized, not nevertheless presenting no progress regarding the technique of shipbuilding. Without wishing to diminish in any way the great value that these works have contributed to the birth of a discipline, naval architecture, it must however be emphasized that they were compendia made by translating the work of the shipwright observed in the construction site into written form. The paper was therefore only a means of support for a literature that limited itself to describing how a boat was made and how the various operations took place for its construction within the shipyard. However, this model of technical-scientific treatise will find epigones in the following century, even after Baker's work; for example, let us consider the famous text by Furttenbach published in Germany, following a long Italian stay by the author, in 1629, on the method of construction of Italian construction sites.

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[37] For more information on this topic see: Corradi, Massimo. Epitome della scienza navale, in *Atti del 2° convegno nazionale. Cultura navale e marittima transire mare 22-23 settembre 2016*, by Maria Carola Morozzo della Rocca e Francesco Tiboni. Florence: goWare, 2018; pp. 136-149.

From wood to paper: from practical empiricism to reasoned design

The central element in shipbuilding has always been wood: this was the material with which the boats were built, and it also became the element with which the scale models were made to have a reference through which the ship building process could be started for similarity. However, the entire design process was purely practical and empirical, no study was carried out prior to the beginning of the work, but on the contrary the entire design phase was based on the experience and know-how of the shipwrights, who operated with simple technical rules based on the proportions of the individual constructive elements in relation to the dimensions of the boats and on the realization of prototypes in 1:1 scale, made of wood, for the definition of particularly complex elements such as construction elements with simple or double curvature.

Baker operates a linguistic-technical-constructive revolution because he did not limit himself to transcribing the construction processes that followed one another on paper, but with a critical spirit towards the work of his colleagues, he argued that it was no longer enough to rely on their own experiences for the construction of a boat, but on the contrary a previous mathematical study of the hull and all the constructive elements that contributed to the construction of the ship was necessary. Thus, we are witnessing a decisive step forward in the field of ship design, which is no longer just art, but it becomes a science, a compendium of disciplines related to mathematics (algebra and geometry) and to drawing. The main building material in the construction of the boat, wood then becomes a material corollary of geometric shapes drawn on paper which become the incipit of naval design in the modern sense. The approach to the project therefore makes use of new mathematical tools, algebra and geometry, and descriptive, drawing. In this way we witness a transposition of the materiality of the construction to the representation, that is, to a graphic form where through the use of algebra, of numerical calculation formulas and through the use of symbols and the study of figures and the treatment of curves, the mathematical aspect and the geometric aspect see in paper the only suitable support, thus importing new tools into the world of the master-builder which have now become necessary for one's work, such as the ruler, the squaring and the compass, to paraphrase the mathematical revolution that will take place at the end of the eighteenth century, in the field of technical design, for example by Lorenzo Mascheroni (1750 - 1800) with the treatise on "geometry of the compass"[38]. In Baker's manuscript, the drawing therefore assumes the same importance as the word, and here along with the technical drawings, appear also representations of boats complete with decorations, sketches of historical or mythological images, maps, but above all drawings with elevations and sections of ships; and even mathematical tools useful for scaling measurements and defining proportions. Between this profusion of different representations there are therefore various approaches to the project, supplemented by explanations and descriptions, but above all algebraic calculations and geometrical drawings.

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[38] Mascheroni, Lorenzo. *La geometria del compasso*. Pavia: Presso gli Eredi di Pietro Galeazzi, 1797.

Fig. 3 Matthew Baker, Fragment of Early English Shipwrightry (1586), Magdalene College, Pepys Library, Cambridge (Ms 2820, sheet 21).

Considering that this type of approach not only did not follow tradition but that on the contrary it was fully contrasted with it, how is it possible that in a world so tied to it, as it is that of boating, this new art of the project has managed to prevail, although obviously not necessary? It should be considered that the paper support became the key element of Baker's work as it correlated it to a series of other useful aspects to be recognized as such even by the contemporary shipwrights. The pages of Baker's manuscript became a place where technique, control of the construction elements correctness, teaching, administration and management of the boat were combined and put into a system through a juxtaposition of information and technical-scientific knowledge. Paper therefore functioned as a means of recording and transmitting information, but it was also a means of designing and experimenting at a relatively low cost; in fact, in several pages we can see how Baker's research on geometric shapes was declined in different ways. Consequently, the paper was also the means to test new dimensional relationships, varying different parameters in mathematical formulas, even if elementary, being able to instantly evaluate their influence on the hull and boat shapes, offering the possibility of systematically performing various changes since they demonstrate the numbered sequences, for example, of as many as 16 models of the central sections of a boat, present between the pages of this manuscript and each slightly different from the others. The same operation performed on wooden models would have been excessively expensive from an economic point of view if not impossible due to the great effort that would have required.

The new design supports also required a new working environment: enclosed spaces where calm and peaceful thinking and tables on which many design drawings were made were necessary.

It is clear that the noisy and laborious outdoor shipyard where the shipwright had always operated was no longer the only suitable place to do his job. Therefore, this marked contradiction of tradition has also distorted the practice of the construction site, giving life to what could be defined as workshops, rather than offices, breaking away from the practical world of construction on the shipyard and moving into the world of reasoned thought and transferred to paper. Therefore, for Baker, the shipwright becomes something else; a unique figure able to draw up a project without almost ever coming into contact with the busy world of the shipyard. The project's medium changes: the master works with the compass on boards where the sections of a ship are represented and drawn, translating the complex geometries of the shapes into drawings through the technique of scaling.

Following the changes made by Baker, the image of the designer being created is placed in a new work space, very different from the traditional work on site, with new materials and different tools, also suggesting a change in the social position of this new professional.

The *Fragments* manuscript shows how the author not only carried out this work for his personal interest in study and research through the use of drawing, work and design on paper, but also it reveals how he involved the interest of other figures that still revolved around the shipbuilding.

Despite the reputation of the shipwright as jealous guardians of their knowledge, Baker's manuscript is not just a work written for personal interest of the author, but takes on the role of document destined for a very particular public: his students. The didactic nature of the text is suggested by the language used in many passages such as: « *(...) in this division observe all the rules before taught (...)* »; « *Now that I have showed how to know the tonnage of a ship (...)* »[39], thus also highlighting the didactic side of the work aimed precisely at teaching the reader how to design a boat.

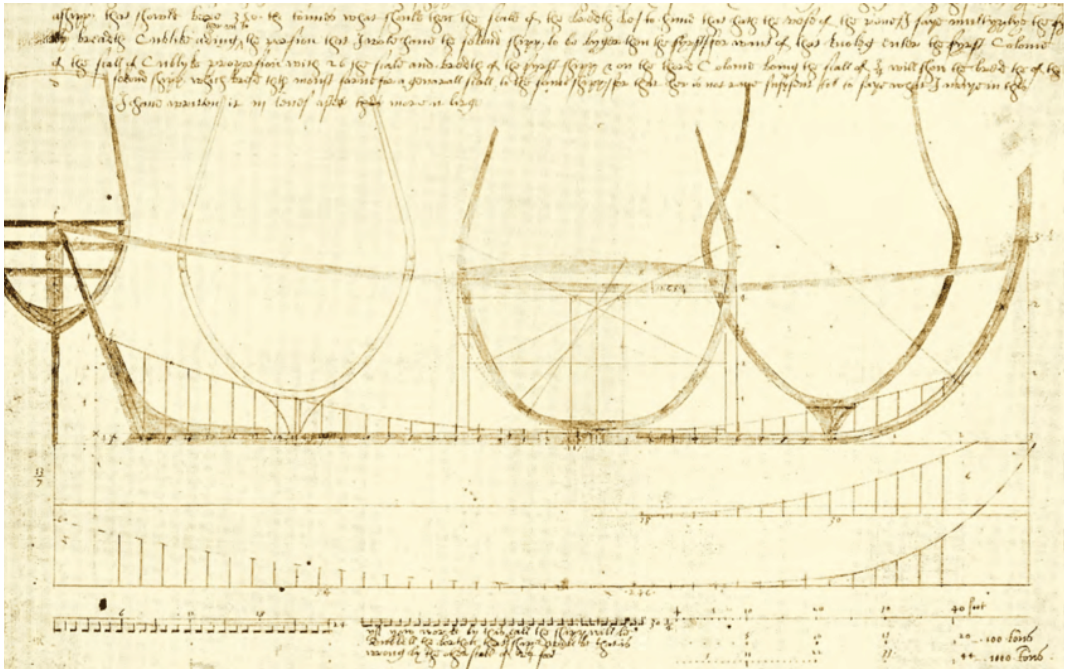Fig. 4 *The hull of a vessel inspired by the shape of a cod head and a mackerel tail. Matthew Baker, Fragment of Early English Shipwrightry (1586), Magdalene College, Pepys Library, Cambridge (Ms 2820, sheet n.d.).*

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[39] Baker, Matthew. *Fragment of Early English Shipwrightry.* Manuscript of 1586; pp. 40 and 154.

According to tradition, apprentices learned the craft by observing and imitating the various operations carried out wisely by the shipwrights on site. Therefore, there was not a real teaching method, but otherwise a profusion of practical advice and a transmission of knowledge that took place during the daily work. The art of building was therefore handed down during the daily hours of work, and moreover this process did not include literacy or knowledge of algebraic, geometric or even drawing tools.

Instead Baker promoted a form of exercise separate from the activity of craftsmanship in the workplace. Again, therefore, we find in Baker a radical change with respect to common use, a new approach to teaching, which took place no longer during the working day, but at the end of it, thus providing a time specifically dedicated to the education of the students, and consequently increasing the value of this step for the training of future shipbuilders and designers. The inevitable consequence of this change of paradigm was the change in the place of education: as with the design on paper, the open space of the site was no longer suitable for this type of transmission of knowledge, even the relationship between teacher and student found a place more suitable in a naval workshop. Considering also that, based on the use of algebra - with Arabic and non-Roman numbers - and geometry, the design action proposed by the English master has made it almost necessary to develop new calculation tools, new design and representation techniques and then necessarily literacy of learners. In our opinion, this detail is not trivial, given that a higher level of training certainly contributed to creating more brilliant and cultured minds; the figure of the shipwright was thus transforming himself from being a craftsman to a designer, leading then, in the eighteenth century, to the figure of the naval architect and engineer who would have been entrusted with the design of the boat after a complex and demanding work of learning entrusted to mathematicians and scientists.

In this way, not only the design action, but also the teaching of the trade was removed from the world dominated by the materiality of wood and transferred to a new work space like that of the drawing workshop. This is not to say that Baker considered drawing and mathematical calculation the only tools necessary to manage the design act, only that he treated them as distinct and necessary elements to become a exhaustive and complete project[40].

Among the many figures that gravitated around the world of shipbuilding, some of them were not really accustomed to the world of the construction site, they appreciated Baker's text: among the *Navy Board* and formerly known as the *Council of the Marine* and even the *Her Majesty's Most Honourable Privy Council*.

In addition to its educational function, in fact, the *Fragments* manuscript also had an administrative purpose, which was noticed by the English Admiralty, which made the project "on paper" become part of the naval decision-making process. The large expenses that had to be incurred for the construction, procurement and management of the fleet made this sector of great interest to those responsible for military security and the solvency of the realm, as the economic commitment had a strong impact on the finances of the state. Necessarily the complex questions relating to the management and construction of a fleet had to be made known directly to the Admiralty and to the Lords of the Council. Given the large amount of money required to start the construction of a new boat, the negotiations and negotiations prior to the approval of a project were always complex

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[40] Johnston, Stephen. *Making mathematical practice gentlemen, practitioners and artisans in Elizabethan England*. Ph.D. Cambridge, 1994; note 33, p. 134.

issues to manage, especially given that the Lords of the Council, which ultimately established its feasibility, could not have the final result of the project in mind. In this relatively complex situation, Baker introduced a significant change: presenting the miniaturized drawings in scale of the boat whose project was to be approved, he extended the financial and technical control available to both the naval and civil authorities, making the materials, the construction procedures and finally the finished work visible in every detail.

Nevertheless, the realization of the construction plans of a boat meant that a new professional figure was introduced, an indispensable servant of the crown, who was the naval architect, thus ensuring a secure economic and prestige position on the social scale. In general, it can be said that the design "on paper" has therefore contributed to reinforce the role of shipwrights in a rather troubled historical period that goes from the end of the sixteenth century to the entire seventeenth century.

Conclusions

The role of what could now be defined as a naval designer was thus configured thanks to Baker's contribution, starting from not only practical, but also theoretical and rational teaching, to a working method, no longer empirical, but also scientific, distorting in fact, a group of professionals who moved from the construction site to the shipyards. This therefore entailed a detachment of the figure of the shipwright from that of the artisan to whom he was in any case associated, and finally raising this role to that of naval architect-designer, not only in the internal hierarchy of the shipyard, but in general of the social world and administrative resulting indispensable figure for the functioning of the management of the Navy and therefore of great utility to the Crown, witnessing the new identity of the elite of designers who went from there onwards to outline.

Moving the design focus from wood to paper, Baker went on to revolutionize the world of shipbuilding in a vertical manner with respect to the hierarchical scale, thus changing everyone's work, from the apprentice, to the craftsman, to the shipwright, reaching up to the authorities' government that administered shipbuilding. The result was therefore that of a new "technical, social and administrative" practice.

It is curious to note that this profound revolution begun in the sixteenth century in the English world, finds a similar diffusion in the continental context only much later, starting with the 18th century France. In reality, this fact may not be surprising if we consider that, at the time, the English Crown and the kingdom of France were in a radical antagonism, which did not fail to influence the birth of a navy. It is perhaps for this reason that, having found an effective method to manage shipbuilding, the world of English shipwrights did not make it known to other countries. This design-construction process took place in the French area at the end of the seventeenth century promoted by Jean-Baptiste Colbert and started and developed Henri Louis Duhamel du Monceau with the birth of the naval engineering schools.
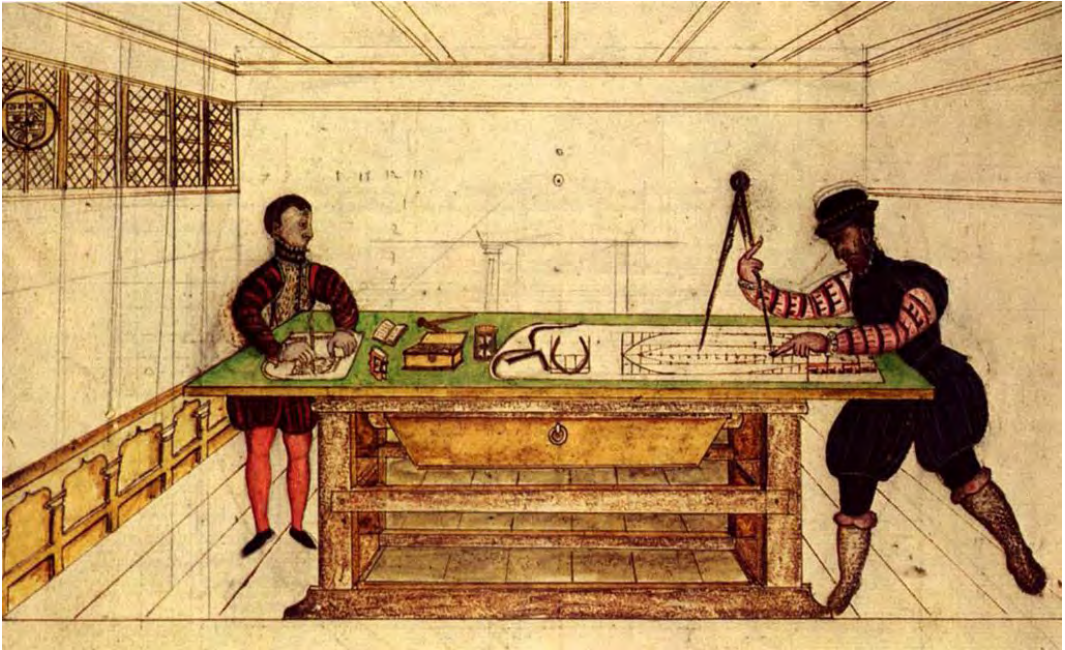
Fig. 5 Matthew Baker, Fragment of Early English Shipwrightry (1586). One of the first drawings in which the act of designing a ship appears: drawing (c. 1580) by Matthew or Mathew Baker (c. 1530 - 1613), preserved at Magdalene College, Pepys Library, Cambridge (Ms 2820, sheet 8), probably in Fragment of Ancient English Shipwrighty by Matthew Baker (c. 1586). See also: Johnston, Stephen 'Making mathematical practice: gentlemen, practitioners and artisans in Elizabethan England' (Ph.D. Cambridge, 1994); Chapter 3: 'Mathew Baker and the Art of the Shipwright', pp. 107-165.

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An abandoned ropeway in the urban landscape

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Abstract

Urban transformations are linked to networks that develop in several half-spaces, from aerial half-spaces to underground half-spaces. Ropeways belong to the former group; they enhance the perceptive element and an unusual, bird's-eye view of the city.

This contribution reinterprets the functional and perceptive features of a ropeway built in Naples in 1937 and abandoned in 1961. It used to connect the hill of Posillipo – the natural border of the old city to the west – to the new twentieth-century neighbourhoods, especially the exhibition centre called Mostra d'Otremare built during the fascist period by some of the most important protagonists of twentieth-century architecture, including Luigi Piccinato and Carlo Cocchia.

This study carefully reinterpreted available documentation, especially drawings and photographs, and compared past and present maps of the urban context to analyse the contemporary importance of the ropeway, bearing in mind that current international thinking considers this infrastructure type as a valid support to the accessibility and enhancement of the landscape features of urban space.

Abstract

Le trasformazioni urbane sono legate ad una rete di collegamenti che si sviluppano in vari semispazi, da quello aereo a quello in sottosuolo. Tra i primi possono essere annoverate le funivie, che esaltano la componente percettiva ed una visione inusuale, dall'alto, della città.

Il contributo proposto vuole rileggere le connotazioni funzionali e percettive che assumerebbe oggi una funivia realizzata a Napoli a partire dal 1937, e dismessa dal 1961. Essa collegava la collina di Posillipo, che rappresentava un naturale limite della città antica verso occidente, ai nuovi quartieri di espansione novecentesca e, in particolare, al polo espositivo della Mostra d'Oltremare, realizzato nel periodo fascista, e nel quale operarono alcuni tra i maggiori protagonisti della cultura architettonica del Novecento, tra cui Luigi Piccinato e Carlo Cocchia.

Attraverso una attenta rilettura della documentazione reperita, soprattutto grafica e fotografica, e dal confronto cartografico tra il contesto urbano dell'epoca con quello attuale, si è voluto analizzare il significato contemporaneo della funivia, guardando ad uno scenario internazionale che vede in tale tipologia di infrastrutture di collegamento, un valido supporto all'accessibilità e alla valorizzazione delle qualità paesaggistiche dello spazio urbano.

Introduction

Contemporary cities frequently contain the remains of old works and infrastructures that have become an integral part of the contemporary urban built; they include not only ancient artefacts, but also complex nineteenth-century works that influenced and inputted into the construction of the city. Ropeways are just one example[1]. In the past urban ropeways were a strong iconic element in many cities, especially the ones built on hills; they were a valid additional means of transportation when surface accessibility between urban areas was limited.

In the early decades of the twentieth century even the city of Naples, with its unique morphology, had several structures which, thanks to the use of different building techniques, made it possible to connect its hillside areas with the plains next to the sea shore.

One of these structures was designed to provide a direct link between the urban area that had developed on the Posillipo hill, the natural border of the old city to the west, and the new twentieth-century neighbourhoods in the westernmost part of the urban plain.

Very little remains of this complex system built in the late thirties and deeply embedded between the close-knit buildings in the city, however the imposing pylons of the ropeway are still present and tower perceptively above the urban fabric (Fig. 1).
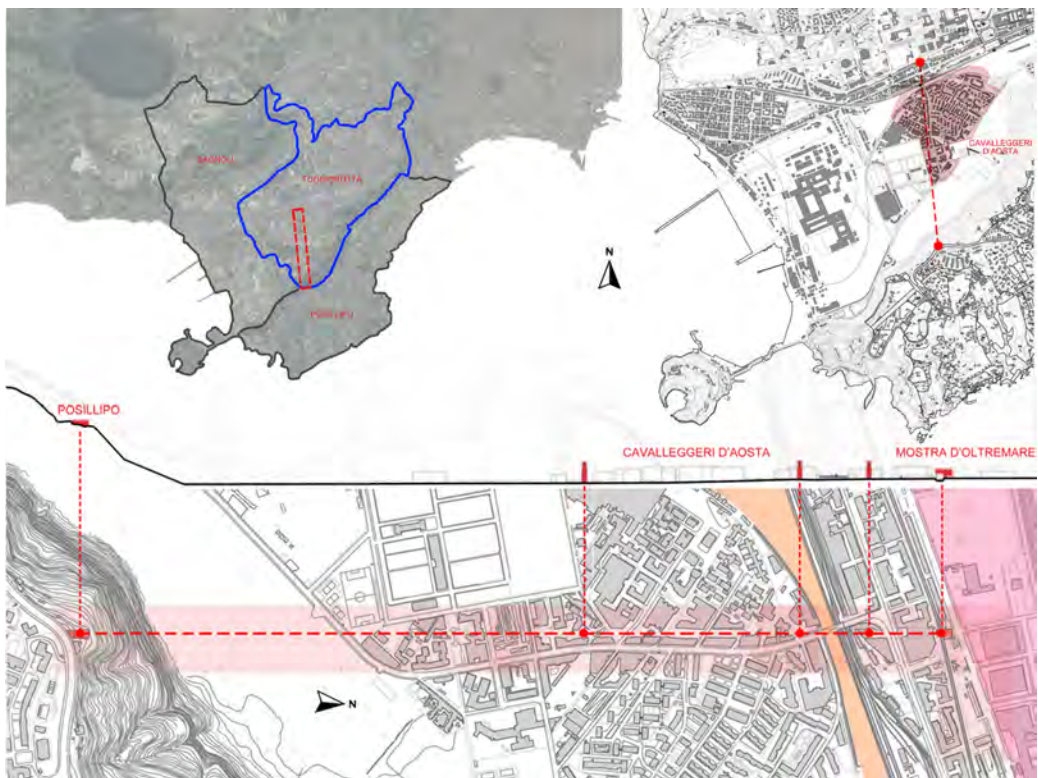
Fig.1 The ropeway between the Fuorigrotta neighbourhood and the hill of Posillipo.

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[1] Ropeways are collective transport systems; the cabins are suspended on one or more high resistance iron ropes running between two stations and resting on intermediate pylons. They differ from funicular railways which are transport systems on a fixed rope; energy is supplied by an electric engine located in a station on the ground and transmitted through the high resistance cable to which the cabins are attached.

This study carefully reinterpreted available documentation, especially drawings and photographs, and compared maps of the urban context, then and now, to analyse the contemporary importance of the ropeway, bearing in mind that current international thinking considers this infrastructure type as a valid support to the accessibility and enhancement of the landscape features of urban space.

The ropeway in Posillipo: origins and evolution

In the early decades of the twentieth century extensive urban expansion was undertaken in the western part of the Neapolitan city; this included housing, a new road network and a public transport system, all part of an ambitious modernisation and construction project aimed at turning Naples into a "city of the future".

The plan was part of the policies and strategies of the fascist regime that had chosen the Phlegraean valley as the ideal site for the Mostra triennale delle terre italiane d'Oltremare, a new, innovative, and functional exposition centre where it wished to celebrate its colonial expansion in Africa.

Naples, in the centre of the Mediterranean, was not a random choice: in fact, it was the perfect place to display artefacts of the various ethnic groups controlled by the regime.

A ropeway was designed to connect the exhibition area to Posillipo, the natural hilly border between the two parts of the city, i.e., between the old layout and the new expansion area. This transport mode was the most suitable option because it could cross the higher ground of the hill of Posillipo in just six minutes, thereby boosting the area as a tourist attraction and enhancing the city's charm, especially in the new exposition area.

The ropeway, designed in 1938 by the architect Giulio De Luca and built by the Ceretti and Tanafani company (Milan), was inaugurated in 1940.

It stretched for 1629 m between the lower station in Viale Kennedy and the upper station located in Via Manzoni close to the big park area known as Parco Virgiliano (Fig. 2-3). The almost horizontal layout of the rest of the Expo area then extended upwards towards the hillside (a 104 m difference in level). Each of the two cabins could carry 20 passengers.

Fig.2 The ropeway, seen from the hill towards the valley (left), and near Viale Kennedy, from the Cumana railway (right).
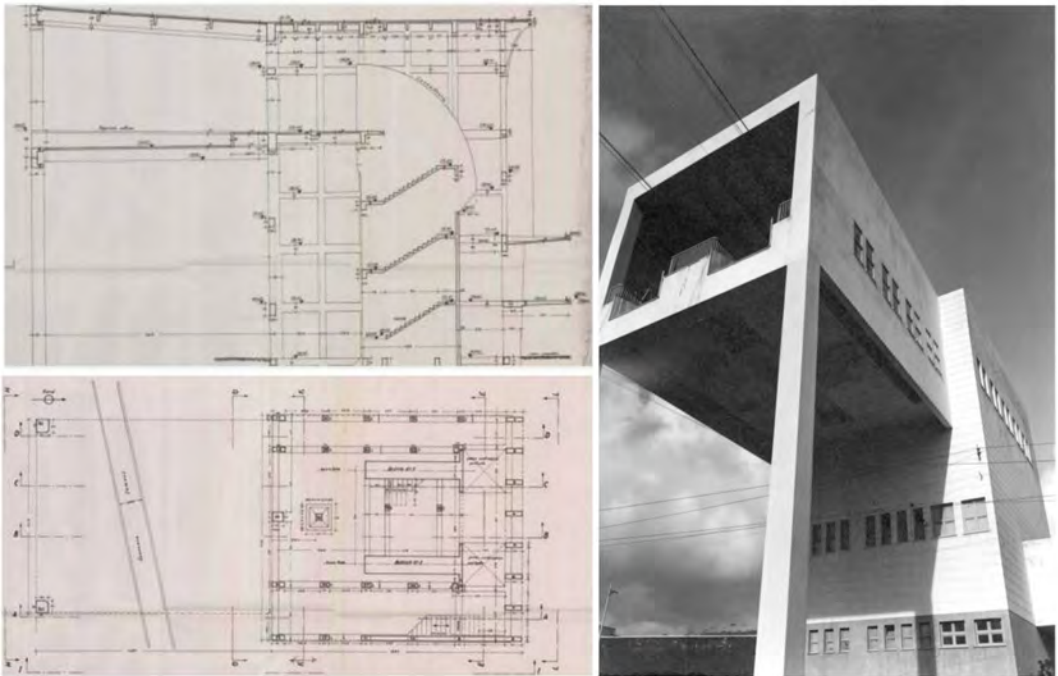
Fig.3 Left, plan of the ground floor and section of the lower station along Viale Kennedy (Source: Archive of the Mostra D'Oltremare di Napoli, 195); right, the lower station in an old photo.

Newspapers enthusiastically announced the launch of the ropeway: "The cabins of the ropeway are similar to an aerial belvedere: as they rise the panorama opens up in all its wondrous breadth and reveals horizons undetectable from any other location".

The war broke out approximately one month after the ropeway opened; as a result, it was prudently deactivated. In 1943 German bombs destroyed most of the ropeway. Restructured in the fifties, it was permanently closed in 1961 after the concerns of local inhabitants regarding the three-dimensional space occupied by the ropeway.

Today the characteristic shape of two of the three reinforced concrete pylons supporting the aerial cables and cabins still stand like a reinforced concrete giants with open, outstretched arms; they tower over the urban fabric which has gradually witnessed an increase in its densification.

The albeit deteriorated lower station is now used as a garden centre while the upper station has been completely abandoned (Fig. 4-5).

A different perception and fruition of urban space

Although the surviving elements are important material remains of the original ropeway, they certainly do not help to fully understand its design. Above all, the pylons are widely considered as invasive and foreign to the site and its history (Fig. 6).

Only a careful documentary study made it possible to retrace and understand the social and functional

importance of the ropeway during its construction and use, its relationship with the immediate natural and anthropic elements, and its overall strategic and functional design, especially the orientation and direction of the ropeway in light of the morphology of the hill.

The study has made it possible to not only substantiate and stimulate a cultural debate about the important role played by the abandoned parts, but also, bearing in mind the international scenario, evaluate the ropeway as a sustainable infrastructure that can be used to access and enhance the landscape features of this urban space.

In fact, ropeways provide a panoramic view of the urban landscape and its features, modernising the form of perception that was so widespread in eighteenth-century representations (Fig. 7-8).

Fig.4 Modern map compared to the 1942 map (Public Deeds of 21 April, XX. N. 11119 Vol. 521, Fol. 69) showing what remains of the original ropeway.

Fig. 5 A series of images of the abandoned ropeway. Top left, the two stations, lower and upper, with the equipment and an old cabin; below, exterior and interior of the upper station. Right, the upper part of one of the impressive pylons.
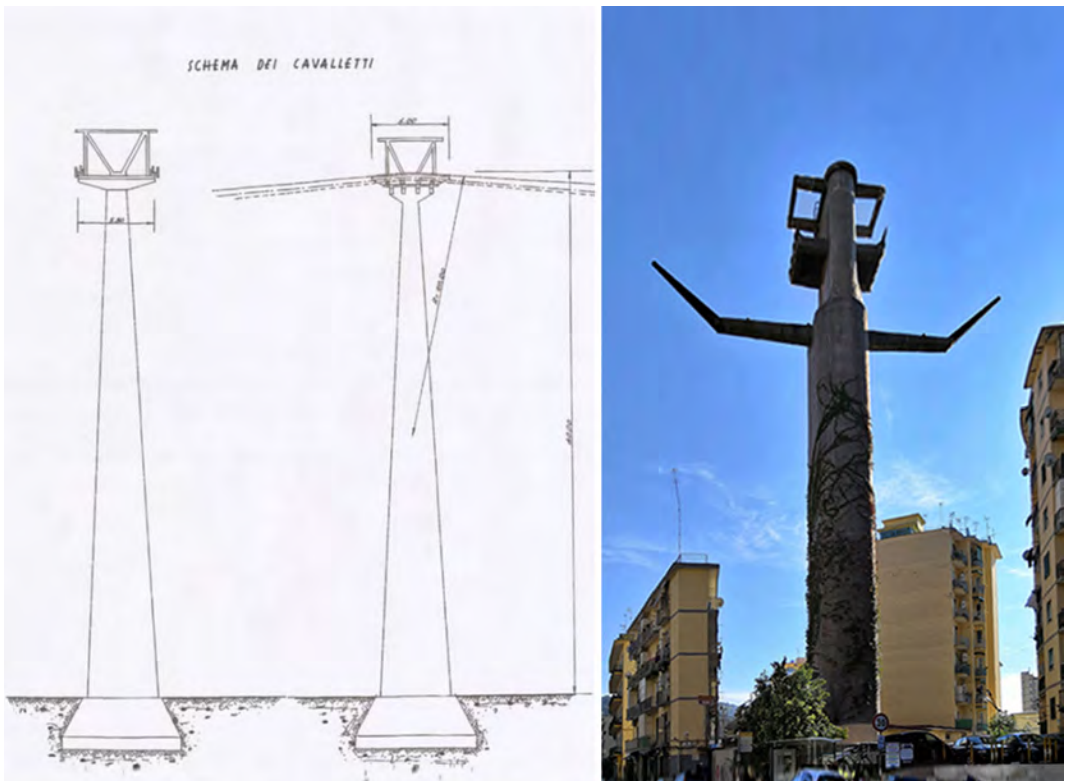
Fig. 6 Left, elevation of one of the pylons (Source: Archive of the Mostra D'Oltremare, 1940); right, view of the second pillar located inside the densely populated fabric and the Cavalleggeri d'Aosta district.
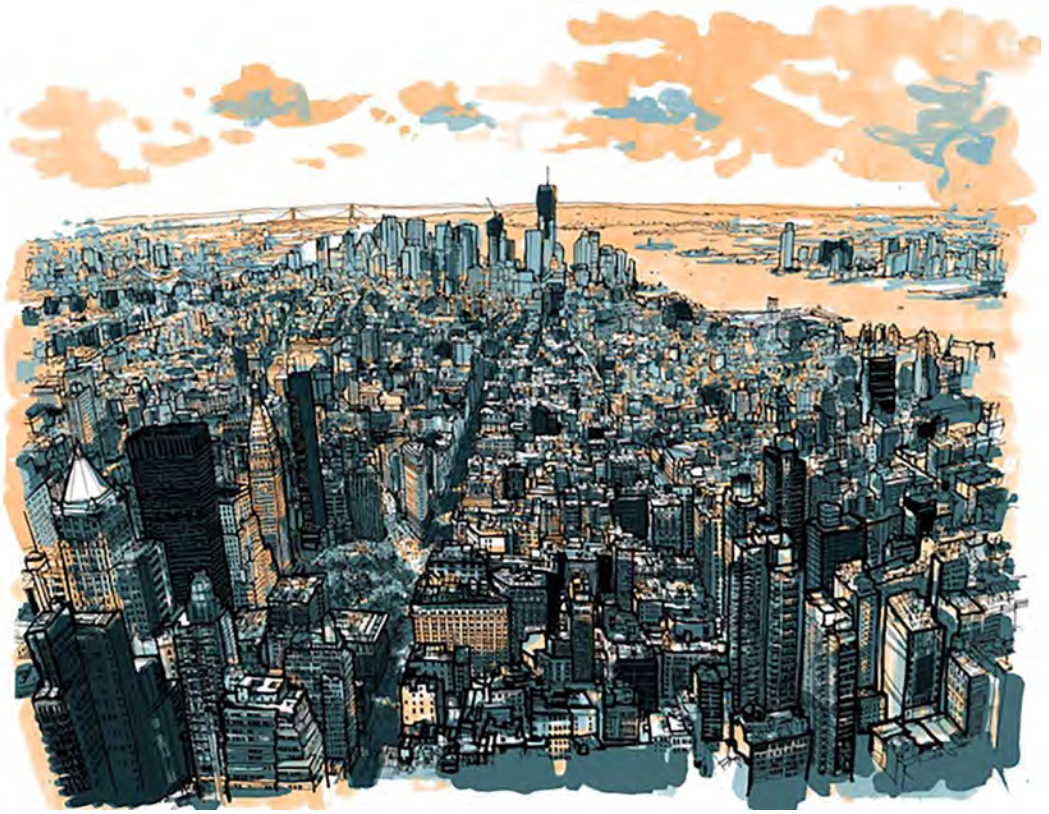
Fig.7 Patrick Vale is the author of this complex illustration entitled Empire State of Pen, using the Empire State Building as his viewpoint.

Fig.8 A View of the Bay of Naples, Looking Southwest from the Pizzofalcone towards Capo di Posillipo, Giovan Battista Lusieri, 1791, Paul Getty Museum.

Their descriptive goal was based on establishing viewpoints from which an observer could enjoy the broadest but static visual field in which to merge the natural and cultural elements of the landscape. Over the years several proposals to reactivate the ropeway have been launched; however they have come to nothing despite the fact it could be a tourist attraction if it was reactivated, and not to mention the significant contribution it could make to mobility between the hillside area and the Phlegraean neighbourhood[2] where rail links are currently elements of discontinuity in the urban fabric. In fact, although the surface infrastructure networks in the western plain of the city play an increasingly important role, they often appear severed from the inhabited areas and contexts; they appear to be more functional but have less formal and expressive importance (Fig. 9). The fact the city has grown up around these linear works has de facto created empty spaces between the networks and the more or less aligned façades of the buildings.

The morphogenesis of these marginal areas is therefore linked to the "non-project" while the concept behind their formation is based on separateness and the self-referentiality of the "infrastructure – corridors" that create them.

These considerations, backed by analyses and graphic prefigurations, can spark a process of revitalisation or workable proposals regarding an alternative route for the ropeway, in practice a project that would stimulate the degraded areas and enhance perception which, thanks to its height, would be considered as an interpretative category and imaginative tool for description and dissemination[3].

Fig.9 Graphic of the altimetric route of the ropeway (Source: Archive of the Mostra D'Oltremare, 1952) with images of today's "moving panorama".

[2] To mitigate concern that the route and pylons are too close to the buildings it is possible to use modern technologies and materials to protect the corridor under the tramway. A. Capasso (a cura di), Trasporto verticale e città. Gli impianti di risalita nella mobilità urbana. Dagli ascensori alle funivie, CLEAN Edizioni, Napoli, 2001.

[3] In an interesting essay Barbara Rocchetti focuses on the perception of the universe by citizens, associated with a search for dynamism, for a vivifying link between past and future which in the aerial perspective cited by the Russian writer Lermontov manages to reconcile the elements of the artificial and natural universe provided by the city-world. Cfr. B. Rocchetti., Uno sguardo dall'alto sulla città: Lermontov e la verticalità, da http://www.europaorientalis.it/uploads/files/ Ronchetti.pdf

Conclusion

More and more interest is being shown regarding ropeways as viable projects in the vast panorama of urban mobility interventions; they represent a sustainable mobility system and are cheaper compared to the much more expensive underground options, especially in stratified historical contexts.

One example is the ropeway in Berlin stretching between two neighbourhoods in former East Berlin. With an intermediate station at the top of the hill, it is linked to the city's subway system allowing passengers (in 65 cabins and with a capacity of 3000 people an hour) to reach the city centre. Another example is the Montjuïc ropeway in Barcelona, inaugurated in 1928 for the Universal Exposition; it connects the city to the Montjuïc hill and from the latter to the port area thanks to another ropeway. The one in Bogotà (Columbia) has a chiefly tourist vocation; it stretches between the city and the top of the Monserrate Hill, 3,152 m above sea level (Fig. 10).

In Italy, very few many similar systems are present in urban areas, and yet there are places where this alternative "aerial" transport system would be perfect[4].

Fig.10 Top left, the ropeways in Barcelona; top right, the ropeways in Berlin; below the ropeways in Bogotà.

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[4] After Giulio De Luca's project for the ropeway in Posillipo, another interesting proposal was submitted in the 1950s by the architect Luigi Mattioni, founder of the Società Italiana Metropolitane Aeree (S.I.M.A.).

One of the most unique aspects of aerial transportation is undoubtedly its tourist value, especially the possibility to visit an urban complex that may not be as accessible when using other transport modes or provide a "moving panorama". In fact, the multiple viewpoints offered by a ropeway, i.e., in one direction, presents a sequential panorama of roads, squares, buildings and monuments that can be enjoyed in a different way and with a diverse level of detail, depending on the distance and lighting conditions, when doubling back along the same route; this is even more visible when the ropeway – such as the one described here – connects a hilly area with a plain located close to the sea. Last but not least, ropeways enhance access to places that are not easy to reach using other means of transportation; they endorse the dual component inherent in the concept of urban accessibility: active accessibility[5] and passive accessibility. The term passive or spatial accessibility means the ability to allow all individuals full access to places and resources and free circulation; instead active accessibility involves enhancing the physical and psychological wellbeing of citizens and the possibility to enjoy material and immaterial assets. In the words of the philosopher George Santayana, it means enjoying beauty as a means to elicit pleasure, emotions and wellbeing, but above all knowledge created by signs, images, symbols and forms that everyone can use in their own way to find a reflection of something that belongs to them[6].

The contribution was developed, in equal measure, by the authors L.M.Papa and G. Antuono.

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[5] Cfr. R. De Rubertis, M.Clemente, Percezione e comunicazione visiva dell'architettura, Officina edizioni, Roma, 2001.
[6] Cfr. G. Santayana, Il senso della Bellezza, Italian edition by Giuseppe Patella, Aesthetica Edizioni, Palermo, 1997, pp. 208.

Maps of strategical, physical, social (and emotional) geographies

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Abstract

In the last fifteen years the concept of urban planning has been deeply changed, with a change in the geographies of living. On the one hand the recent development of the Territorial Data Infrastructures (SDI), on the other the phenomenon of Voluntary Geographical Information (VGI) and in particular of the geographical data deriving from Social Media (SMGI), whose diffusion allowed to overcome the physical / gnoseological concept of boundary generating fluid and versatile geometries.

Today urban planners, through the study of SMGI data, are able to quickly obtain qualitative and quantitative indications on the spatial dynamics of citizens. This practice will be increasingly exploited in the future, especially in conjunction with an environmental or culpable disaster, in which the redesign of orderly tight deadlines.

The question that arises is: will it be possible to rethink an urban context in which everyone, being able to access social networks, will have the power to represent their own future image of space? What consequences are immediate tests on the redesign of the plant? How Starting with Google Maps and Instagram would you see an overlap or a split between the maps and the maps of emotional geographies?

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Abstract

Negli ultimi quindici anni è stato profondamente stravolto il concetto di urbanistica, con un conseguente mutamento delle geografie dell'abitare.

Da una parte il recente sviluppo delle Infrastrutture di Dati Territoriali (SDI), dall' altro il fenomeno delle Informazioni Geografiche Volontarie (VGI) e in particolar modo dei dati geografici derivanti dai Social Media (SMGI), la cui diffusione ha permesso di superare il concetto fisico/gnoseologico di confine generando geometrie fluide e versatili.

Oggi gli urbanisti, attraverso lo studio dei data dei SMGI, sono in grado di ottenere in tempi rapidi indicazioni qualitative e quantitative sulle dinamiche spaziali dei cittadini.

Tale prassi sarà sempre più sfruttata in futuro, in particolar modo in concomitanza di un disastro ambientale o colposo, in cui la riprogettazione di un'area prevede serrate tempistiche.

La domanda che sorge spontanea è: sarà possibile ripensare un contesto urbano in cui ognuno, potendo accedere ai social network, avrà il potere di rappresentare la propria immagine futura dello spazio?

Quali sarebbero le conseguenze delle immediate risposte dell'utente sulla riprogettazione di un'area?

Come Partendo da Google Maps e Instagram si assisterebbe ad una sovrapposizione o ad una scissione tra le mappe degli spostamenti fisici e le mappe delle geografie emotive?

Introduction

"Queequeg was a native of Rokovoko, an island far away to the West and South. It is not down in any map; true places never are".[1]

The first decades of the twenty-first century are opening today to the exponential development of new technologies that have multiplied the interaction potentials between spaces, contexts, media and users, thus opening a new stage of increasingly ubiquitous, augmented and embedded capabilities) in a new material-virtual dimension called to define one's own "expanded" condition of contemporary reality.

The coexistence of a hyper-connected and a hypo-connected societies thus expresses a new reality to be managed and balanced with a new type of governance more sensitive to a new type of holistic, equitable and empathic logic (empathicities)

In this changing framework of action we could ask ourselves what has been the role of representation (that is, of analytical and projective expression) and its possible evolution over time.

The "hard" reaction of the late eighties (with the mean attention to the ambiguously peri-urban spaces of the new fragmented city) was going to be supported, rather than in the (re)layout in the (re)treatment (from the Latin, re-trahere, to bring back) of the new spaces; but also, in the minimalist abstraction (and the volumetric deconstruction), as new instruments of analysis and design called to break with the previous "Platonic" imaginary .

The dichotomy between "evocative landscapes" and "combative margins" was going to give way, however, at the beginning of the nineties, to a new dimension of the urban in which the super-structural and the fragmented would give way to the infrastructural and the definitely fractal.

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[1]Herman Melville, Moby Dick, Gli Adelphi, 1994

The scenario of this change of scale would appeal, already entering the new decade, to a new type of holistic, strategic and integrative recognition, in which representation would no longer be that of postmodern iconographic figuration or that of alternative photometry (and volumetry), neo-modern, but that of more advanced "synthetic capacity"; that of new systemic processes (and registers), multiple, increasingly complex.
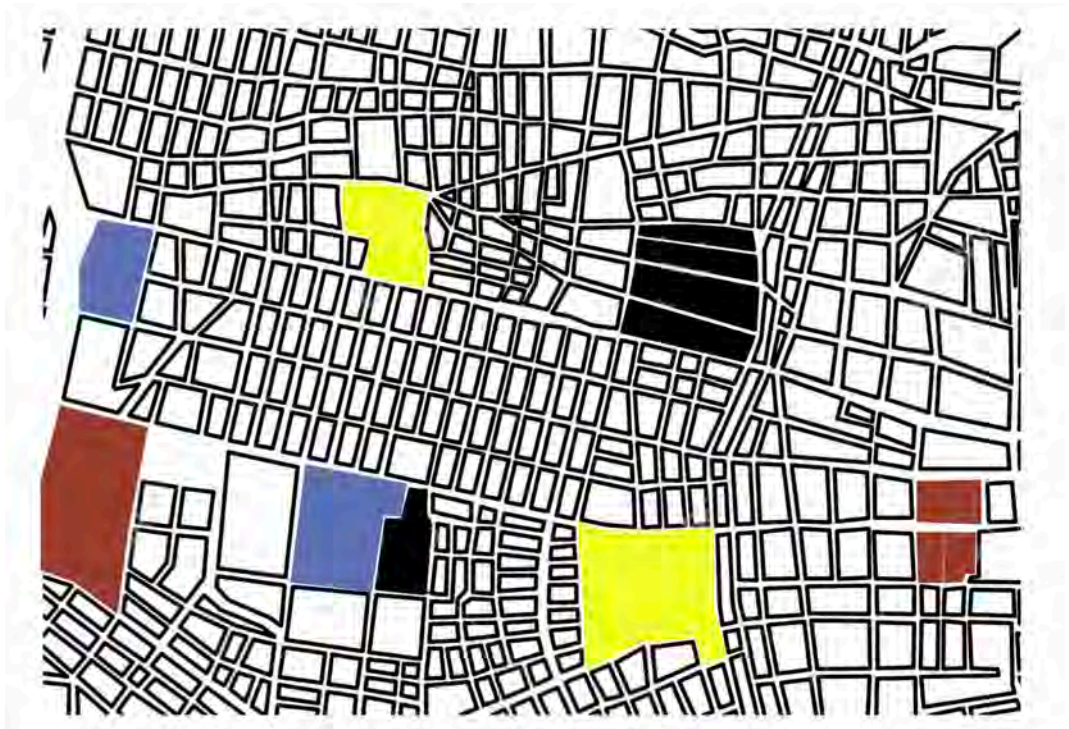
(Re) presentation and expanded realities

"Action maps", "open devices", "network systems" –info, eco, infra and intra-structural- would give way to a new instrumentation made of multilayer cartographies, evolutionary schemes, compressor diagrams and/or conceptual ideograms that would send , in turn, at a clear moment of transition –in the nineties– between the old analytical-analogical approaches and the new synthetic-digital logics (remember the appearance of the first laptops with the diffusion of windows systems, GIS and Scans, in that decade).

The increase of new technologies in the information age and a new expanded condition in which the co-participated processes will multiply, makes us think today of a new type of concerns in the analytical approaches to the city at the beginning of the century.

The generation of "open programs" (more than maps or registers) associated with the instrumentation of "open source" software such as Grasshopper or interactive devices such as Arduino, refers to a new type of approach where evolutionary spaces and dynamic processes would be combined in the projection of possible simulated scenarios, as multiple as varied and differentiated in their diverse

responses (responsive, reactive, interactive) to information, conditions and changing demands.

The digital age we live in is putting available a huge amount of data that we can use to improve the resilience of our cities and territories.

The Big Data are in fact becoming a dominant theme, not only in the business world, but at every level of social organization, and in particular in the pursuit of environmental sustainability of cities of the future.

In fact, over the last fifteen years the concept of urban space design has been deeply changed. On the one hand, the spread of social problems, with a consequent mutation of the geographies of living, on the other, the migration phenomenon has brought into play overall social practices responding to plural solicitations. By fragmenting the urban space into versatile and heterogeneous geometries, networking has largely succeeded in overcoming the physical and gnoseological concept of planned boundary / space, giving shape to a new border etymology. That boundary is found, however, in the fragile urban space, what Foucault calls heterotopia: "a place without a place, which lives for itself, which defines itself and which is abandoned at the same time".

The info-sphere is staged by WhatsApp, Facebook, Twitter, Instagram, places of social relationship in which new models of collective management are experimented, of dialogue between migrants, local communities, institutions and NGOs, of exchange of solutions to everyday problems. A hybridization process in which "the Internet has facilitated the development of global networks, but paradoxically its influence in local areas has been less recognized".

The heterotopia is, instead, represented by the refugee camp and the reception center, a synthesis of the "in transit" community of our century. These spaces, entering in already poor and marginal contexts, occupy a low position in the urban and social hierarchy, they become peripheries of the suburbs: "places of crisis and deviation of the individual-environment set-up".

The urbanism of the twenty-first century, in a continuous dialogue with discipline, thus manages a fluid and hybrid urban habitat, in its diaspora transience, attempts to define itself. There is a question whether the urban planning of the future will be conceived starting from Google Maps or Instagram, from the study of the United States, in the case of the first service, and of the emotional geographies that outline the collective spaces, in the case of the second. Do we live in the full heterotopy of hybrid space or in a digital jungle?

It is in this cultural horizon that an embryonic design of the future city is inserted, which sees its trace in a new form of urban planning, a link between Design, Psychology and Programming. Taking in analysis the daily practices of the contemporary citizen, the analysis of his experiences, expectations, needs and physical spaces of everyday life, some specific dynamics are reproduced that can be reproduced on a physical-urban map and a psycho-emotional map. In this scenario the role of the planner is inserted, a professional figure who, observing the context from different points of view, is able to respond in a temporary and versatile way to the needs of the city, which is increasingly experienced in a temporary way as to be considered a "city of passage".

"A planner that takes the planning tension and the attention to the local reality from the urban planner, while in the sociologist's tradition he finds the tools for a richer and more problematic interpretation of the local context and for a greater attention to the institutions within which the plan

develops; and finds in the contributions of the pedagogue and the social worker some stimuli for the clarification of an idea of an increasingly participatory project intervention, increasingly aimed at making people aware of what can be done"[2].

Aware of the social dynamics of the physical-emotional and virtual tissues of urban space, the urbanist-designer's gaze focuses on connections, discontinuities, relationships and urban syntax, promoting a continuous interaction between "temporary" inhabitants, communities " permanent ", psychologists and programmers. Acting on the strong bonds of the community and analyzing the weak ties of society that emerge from social media.

Hugo Zaragoza, at Smart City World Expo 2016, said that "social media is the best sensor network in your city". As part of everyday life, people share their social concerns on public platforms, from Facebook and Twitter to personal blogs. Studies from New York University and the University of Vermont now show that people can be more honest online than in person. This means that looking at unfiltered social media can tell us what citizens really think.

Social media, although often part of a weak bond within society, can become the object of analysis by urban planning in order to promote strong ties within the community.

For example, by sponsoring the growth of a conscious community that redesigns the territory according to its individual needs.

Let's think about FragneBenan, a social platform born in Vienna to promote the development of the neighborhood unit, promoting the exchange of favors and services among the citizens of the same neighborhood.

Will the observation of community relations and psychological reactions by studying social media increasingly be a marker for community participation? In the redesign of a space and an urban context?

The knowledge made available by big data processing, if properly used, will make us more responsive to changes in the complex space in which we orient ourselves.

Today we are faced with the need to seek new forms of development and enhancement of environmental resources. The digital revolution should visit more carefully the assessment of the effects and externalities produced by the spread, on a planetary scale, new products and behaviors.

Methodology

"Where language breaks up and opens up a silence, a space, a question, the further dimension of our language living begins to make its way."[3].

The purpose of the study is to understand the causes and effects of the transformative process that underlies the emergence of the space experienced by the citizen and to demonstrate that the future development of the city can be planned and / or planned starting from the overlapping of geographical maps and physical-emotional maps traced starting from the data extracted from the social networks.

[2] G. Attili, *Rappresentare la città dei migranti. Storie di vita e pianificazione urbana*, Jaca Book, 2008
[3] I. Chambers, *Paesaggi migratori: cultura e identità nell'epoca postcoloniale*, Meltemi Editore, 2003.

To trace urban-emotional geographies we can use the data and a qualitative survey on the territory carried out on a large sample of citizens through a semi-structured questionnaire. The aim is to analyze perceptions, opinions, behaviors that in part can be considered predictable but which, for the rest, may have been underestimated or ignored. In other words, the freedom that the semi-structured questionnaire allows to acquire information on known and unknown aspects.

The passing citizen thus traces an image of the city on an experiential-affective learning, where the space of everyday life translates into geography of appropriation and familiarity. By studying the relations between the inhabitant and the neighborhood it is possible to draw a fil-rouge and outline the dynamics that are generated by living a space according to one's mental and emotional geographies.

Let us think of the city experienced today by the migrant, in many cases "citizen of passage". For the migrant, feeling at home in a new physical and socio-cultural context is a processual, gradual and reversible experience, which goes beyond traditional boundaries to come into contact with the receiving society by negotiating over time, through successive "thresholds of domesticity"[4], spaces for recognition, independence, intimacy and well-being.

We find ourselves having to quickly build a familiar spatiality for survival instinct, going to recreate mobile and spatial dynamics in the urban context that reproduce rooted psychological mechanisms. The question is raised on several points.

What are the factors and the dynamics of living the city "in a temporary way" that are repeated?

What elements are repeated in the mental map of the migrant?

Which spatial and cultural logics are intertwined between permanent citizen and passing citizen?

From which religious and cultural phenomena depend?

How much do the reasons for expatriation and the geographies of your own country affect?

"These elements of the image, not tied to objects, are rather relationships between things within a dynamic and variable reciprocal structural link: something can be - depending on the case, the day and the scale - node or neighborhood, path for some and margin for others."[5]

From the study it derives a mental map that illustrating the dense network of socio-cultural relationships, is able to trace the elements that govern the life of the city of passage. We then examine a new topography that, apart from the topographical-Euclidean geography that has limited the cognitive process of an often transparent human geography, made up of small phenomenological details that, taking root, go to outline a physical geography "made and finished". The goal is therefore to understand the dynamics that tend to repeat themselves and the factors that regulate them in order to represent and predict future developments of what James Holston calls insurgent city.

*"The spaces taken from the modern and planned dominion of the city: the territory of the homeless, the networks of migrants (...) the spaces in which practices take place that disturb the consolidated stories of the contemporary cit*y".[6]

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[4] P. Boccagni, *Fare casa in migrazione. Una chiave di lettura dei processi di integrazione e di riproduzione sociale e quotidiana in contesti multietnici*, [PDF file], 2017

[5] K. Lynch, *The image of the city,* MIT Press, 1964

[6] J. Holston*, Insurgent Citizenship. Disjunctions of Democracy and Modernity in Brazil*, Princeton University Press, 2007
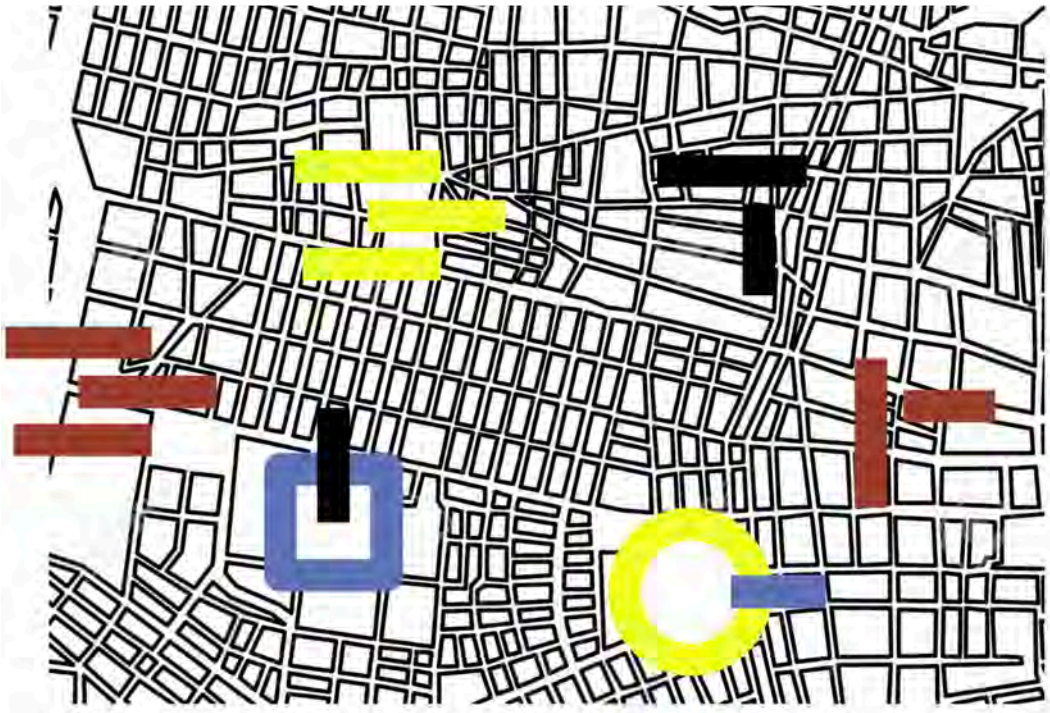
Conclusion

"To the foreigner not to ask for the place of birth, but the place of the future." [7].

What are the trends that regulate "feeling at home" within a space? The goal is to study the visible and non-integrative dynamics that govern the space, starting from the superimposition of psycho-emotional and geographic-spatial tendencies emerged from the mental maps of the sample under examination. A geography of the city emerges that is built up in the process of affection for places, in the acquisition of awareness of the meaning of some spaces in relation to the activities that take place in them. What trace remains of the passage of the temporary inhabitant within the urban space and its community? What spaces emerge most from the overlap of emotional geographies? What from the overlap of urban ones? Do they coincide? Taking in analysis the social and emotional heat-maps, how far in advance can the socio-spatial dynamics of the future city of passage be predicted? Will a future city of passage exist or will each city be lived temporarily so that it no longer even makes sense to complement the "passing"? Through the study of such geographies, will it be possible to foresee in advance the birth of future urban spaces or the change of existing ones?

If this were the case, the theory of psychologist J. C. R. Licklider, presented in an article from the 1960s entitled The symbiosis between man and computer, would be confirmed. The machine is presented as an extension of the human body on an emotional and spatial level.

[7] E. Jabès, *A Foreigner Carrying in the Crook of His Arm a Tiny Book*, Wesleyan University Press, 1993
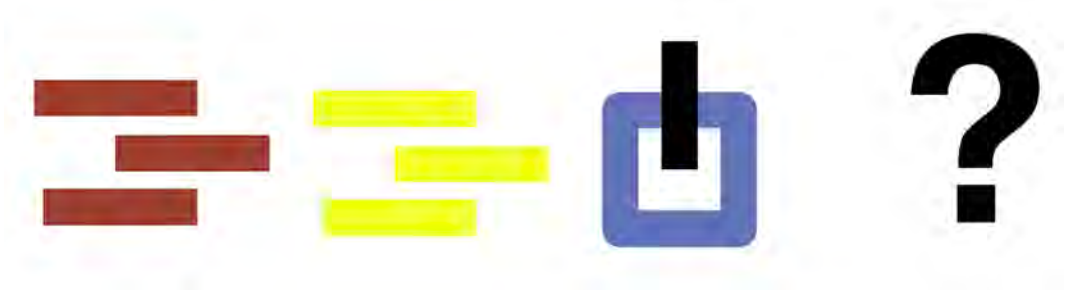
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Geo-graphica. The visual representation of urban identity evolution: maps and visual artifacts as his-torical knowledge machines.

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Abstract

The identity of urban space is built thanks to complex sedimentation of antithetic phenomena. On the one hand, the planned activities of politicians, planners and architects aimed to design both the spatial and the social structure of a community. On the other side, it is the results of a human appropriation that dynamically changes and overwrites the built images. At the same time in the historical evolution of a city is an intertwinement both public and private, collective and individual lives. Historical maps together with the official and spontaneous production of multimodal artifacts connected with space – such as paintings, sketches, photographs, and so on – are valuable tools to tell the story and the urban evolution of a place. Furthermore, digital technologies and the possibility of geo-referencing documents offer a common platform to share knowledge and historical insights. The paper proposes and discusses a critical review of the most recent approaches and best practices in the field of historical-visual representation of digit-ised documental sources contextualized in the evolution both historical and cartographic of a territory.

Abstract

La costruzione dell'identità urbana si gioca, da sempre, sull'intreccio di fenomeni antitetici e concorrenti. Da un lato il processo di pianificazione intenzionale e consapevole si gioca sui ta-voli dei decision-maker – come la politica, l'urbanistica e l'architettura – tesi alla costruzione non solo dello spazio abitato, ma anche di un'idea e di un modello sociale. Dall'altro, questi luoghi sono il risultato delle dinamiche umane di appropriazione che, come una forza carsica, cambiano e sovrascrivono l'immagine costruita e preordinata. Al contempo l'evoluzione storica di una città si genera dall'incontro tra la dimensione pubblica, ufficiale e collettiva da un lato e da quella privata, individuale ed intima dall'altro. Le mappe storiche, insieme con i materiali prodotti intenzionalmente o spontaneamente riferiti ad un determinato territorio – come quadri, schizzi, fotografie e così via – sono imprescindibili strumenti per raccontare la storia di quei luoghi e la loro evoluzione nel tempo. Inoltre, le tecnologie digitali e la possibilità di geo-referenziare le fonti documentali offrono un sostrato comune per condividere la conoscenza storica. Il paper propone e discute una mappatura critica dei più recenti approcci e best practice nel campo della rappresentazione storico-visiva delle fonti documentali digitalizzate contestualizzate nell'evoluzione storica e cartografica di un territorio.

Introduction

Maps are powerful tools both to represent and to understand the world. Nevertheless, they are not only a possible transposition in a two dimensional surface of a 3D space, but also a cognitive way to understand connections and relationships among date and a way to mentally prefigure concepts and models (see Ausubel, 1968; Sowa, 1983; Novak, 1998).

On the one hand, they have been used to document and witness morphology of an environment and its evolution along the time. Especially in the pre-geodectic phase, spatial representations have also been a way to bring out social and symbolic values through the visual manipulation of elements, specific orientations or stratified depiction of information. While maintain a certain formal rigor, instruments such as pilot books or partially projective views, typical also of the visualizations of the pre-prospective he phases and cultures, inscribe in the cartography further levels of data. This is the instance of the disproportion of the Castello Sforzesco in the map of Cartaro (see fig.1) that suggests the relationships of strength and political power of the family that governed Milan, even compared to others such as the ecclesiastical one identifiable with the cathedral, already consecrated (1577) although not yet completed in its current imposing marble decoration (Bollini & Begotti, 2017b).
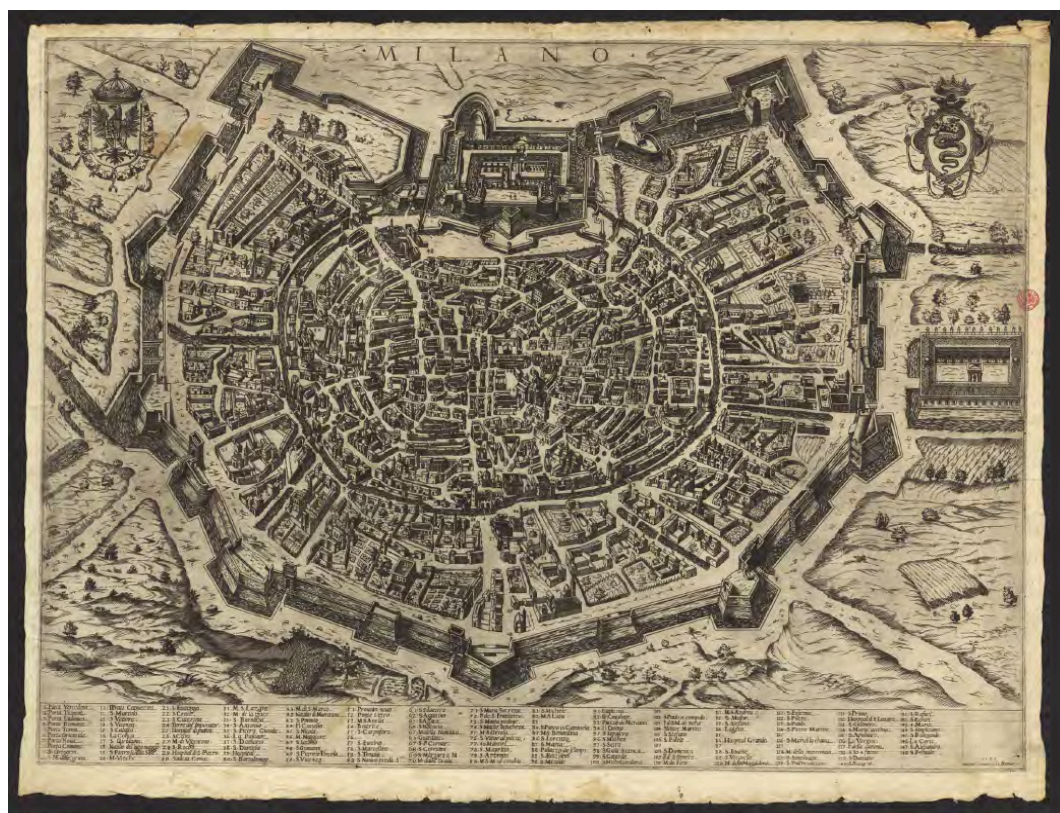
Fig.1 The map of Milano drawn by Mario Cartaro in 1581. The document is kept at the Biblioteca Nacional de Portugal in Lisbon.

Maps are storytellers: real spaces and visual metaphors

Part of this narrative may emerge from the encounter between the specific role of geographic data visualization and the possibility of using planar representation in metaphorical manner giv-ing rise to hybrid forms of data-visualization and infographic. A paradigmatic example in this sense is given by the work carried out on the map of the London metro by authors such as Re-ginald Percy Gossop (1926), Herry Beck (1931): the spatial data and its representation develop according to a conceptual path that makes abstract and qualitative, no longer realistic, the sys-tem of visualization (for more details see Degani, 2013; Down, 2015; Bollini, 2018c).

The map, then, does not tell so much about the world as it is, but how we understand and repre-sent it. Spatial architecture is translated into cognitive architecture, first, and then informative through semantic passages that increasingly enhance the sense, the bonds and the organization compared to the quantitative parameters of reproduction, rather than of interpretation of reality.

Massimo Vignelli says, about the design of the map of New York (1972): "Good design is vis-ually powerful, intellectually elegant and, above all, timeless" (Santi, 2017). The map is an ab-stract diagram of the metropolitan network without a precise relationship with geography such as the Beck's one, from which it draws inspiration. Yet, this infographic, ideally and visually essential and functional in its purpose, does not find a positive response from the public who must use it. People do not recognize themselves in the representation of a space that is familiar to them, experiential and that has already generated a personal and social image, as Lynch (1960) reminds us, all the more so as a strong structure and identity of a city like New York.

The transition between the figurative vocation of an atlas and its ability to convey other levels of information is also explored by Saul Wurman, the pioneer of information architecture within New Road Atlas U.S. Atlas project since 1991. The research continues in an increasingly ab-stract and diagrammatic perspective that leads him to one of the following representations of the Tokyo subway in 1984 (see fig. 2), where the complexity of the metropolitan system is reduced to the essential intersection of only two lines "It actually shows two lines of the JR East rapid transit network that very cleverly help to define Tokyo: the circular loop Yamanote Line, and the cross-town Chūō-Sōbu Line. The stations along the Yamanote Line all have points of interest listed, while the Imperial Palace complex is shown for reference within the circle." (Transitmap, 2012) Not a representation, then, but an abstraction in which the narrative becomes metaphori-cal, not in space, but in conceptual and symbolic intersections.

But the representation of space can become an opportunity to configure new worlds in which concepts, images, words and their form, become the landscape themselves.

The landscapes designed by Paula Scher and collected in the volume Maps (2011) further shift the potential of metaphorical narration of the maps. Maps of words, in which the word loses its dimension of transcription of the verbal to become a pure visual form, a sort of word clouds, with which the American designer anticipates the times between infographic and visual art. The paintings are at the same time worlds and meta-narratives of them, keywords that emerge from the visual texture of signs and colors and shapes that reproduce the real covering it with mean-ings and stratifying it in messages.

A process similar to and at the same time opposite to that carried out, in terms of poetics, by the British designer James Quail, part of the Dorothy collective.

His thematic maps reproduce the morphology of a place, which is, however, pure representa-tion, as is the case with The Film Map: "which is loosely based on the style of a vintage Los Angeles street map has its own Hollywood Boulevard and includes districts dedicated to Hitch-cock and Cult British Horror movies. Like most cities it also has its own Red Light area. There's an A-Z key at the base of the Map listing all the films featured with their release dates and names of the directors."
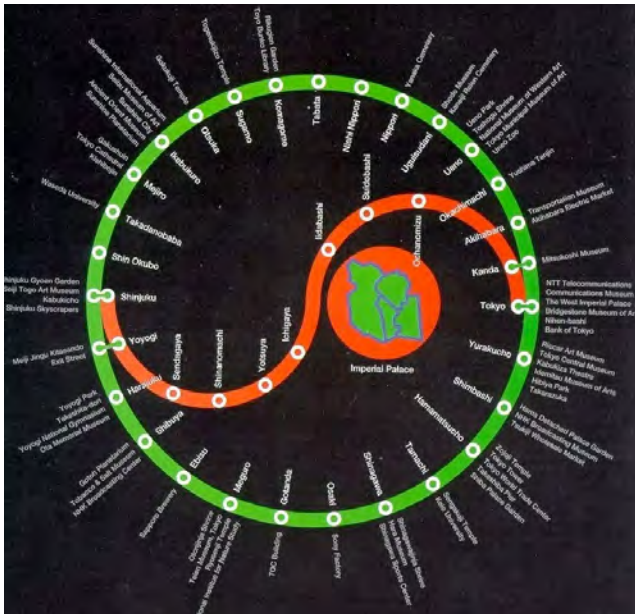
Fig.2 Historical Map: Tokyo by Richard Saul Wurman, 1984 (Source: Pintrest)

Maps are time-machines: Historical and Intangible Heritage

Although maps are spatial representations, their evolution testifies to the fourth dimension, i.e. they integrate the fourth dimension into a two-dimensional system. But the mere overlapping or evolutionary difference between the representations is not a sufficient tool to narrate both the histories and the context that took place in that space.Moreover, in recent years, in the world of the so-called digital humanities, a lot of work has been done for the virtualization of cultural and documentary heritage on several levels (Gnoli, Marino, & Rosati, 2006; Camurri, 2008). The digitization of primary sources for preservation and dissemination, the possibility to share knowledge in archives, museums and collections (Bollini, 2009; Bollini 2013) and the involvement of people, in a process that is increasingly participatory and collective, both at the level of co-design and enjoyment, active experience (Simon, 2010). Knowledge-bases represent a strategic resource to tell, through other descriptive and communicative modalities (Bollini, 2001; Bollini 2004), the data that can be represented punctually on the map or the only informative dimension provided by a text. The set of visual materials, such as images, paintings, sketches, plans or photographs, of audiovisual sources such as recordings, video testimonies or interviews provide an articulate and generous way (Whitelaw, 2015) to explore relationships and connections between places, time and people.

The mere transposition into a digital format is no longer sufficient to respond to that demand for participation and knowledge that comes from public not specialized, as may be a historian, researcher, curator or archivist, but at the same time more and more curious involved and partici-pants in the great revolution of accessibility that the network, mainly, has made possible.

The strategies to be implemented therefore follow different possible paths. On the one hand, the support of historical cartography becomes a way to contextualize temporally and spatially this information, be it primary sources and documents with a testimonial function or fragments of a social or individual discourse that are recomposed into a collective narrative (Bollini, Busdon & Mazzola, 2015). On the other hand, the possibility of finding the data and the opportunity for the user to reinsert it in a wider and more articulated context that brings out those significant re-lationships implicit for a specialist, but otherwise invisible.

Mapping the relationship between space an time: the research methodology

Starting from this perspective, a research-track focused on the analysis, mapping and critical organization of already existing resources and experiences published online aimed at the multi-modal presentation of historical and cultural data and intangible assets based on the use of his-torical maps has been developed. The activity is part of a wider research project entitled "Ki-netic and Multimodal interfaces: transmedia storytelling and situated interactions in the field of participatory Cultural Heritage and Exhibit Design" established in 2018.

The process has been focused on collecting, analyzing and organizing onto a Cartesian coordi-nate system – with opposite semantic-values along X and Y axis based on the Opsis identifier descriptive model (see Bollini & Palma, 2004 and Bollini & Palma, 2003) – a wide range of online resources in the field such as web-tools digitised archives and geo-based portals. Several analysis criteria were adopted to decide whether to include some items or not.

A first cluster gathers patterns on the spatial relationship between historical data and its repre-sentation on maps (Bollini, 2019; Bollini, 2018; Bollini, De Palma, Nota & Pietra, 2014; Bol-lini, De Palma & Nota, 2013; Bollini & Falcone, 2012), both antique and contemporary (mainly Google map):

• how the past and the modern map are connected or related
• if and how the data are geo-referenced
• how geo-referenced data can be explored or investigated
• how maps are presented and the role played inside the digital projects

A second conceptual criterion focuses on original documentation digitised and stored in digital archives (Bollini, De Santis, Radice & Zocchi, 2016; Bollini, 2016; Bollini 2013). In particular:

• the relationship between documents and where they historically took place
• how contextual or situated information are displayed
• if the comparison between historical data and present are made possible
• how non-textual information is presented and highlighted to users interest

Finally, according to previous studies on different research models (see Bollini & Borsotti, 2016; Bollini & Cerletti, 2009) findings have been classified in two different categories:

• Exploration and query search modality
• Filtering, tagging and cluster modality

According to these criteria, 10 case studies have been selected, namely:

1)Venice timemachine. Archivio di Santa Maria Gloriosa dei Frari (see fig. 7)

2) Georeferencer, David Rumsey (see fig. 6)

3) Kultursampo (see fig. 4b)

4) Vestige of New York (no longer online) (see fig. 4)

5) Locating London past

6) Digital atlas of History of Europe

7) Quauhquechollan, a chronicle of conquest (see fig. 4a)

8) Retro View of Mankind's Habitat (see fig. 5)

9) Dentro la Grande Guerra

10) Storie Milanesi

Besides the chosen digital tolls have been carded and analyzed according to two semantic oppo-sites aimed to investigate in particular:

a) the use of the map as a tool for contextualizing historical-narrative data (geo-localized data vs. contextualized data)

b) representation of the historical threshold of the data through historical cartography or contemporary cartography (Google maps vs. historical maps)

In addition, two further pairs of criteria have been identified that respectively take into account the interaction with the spatial data (maps) and the historical knowledge acquisition (archive).
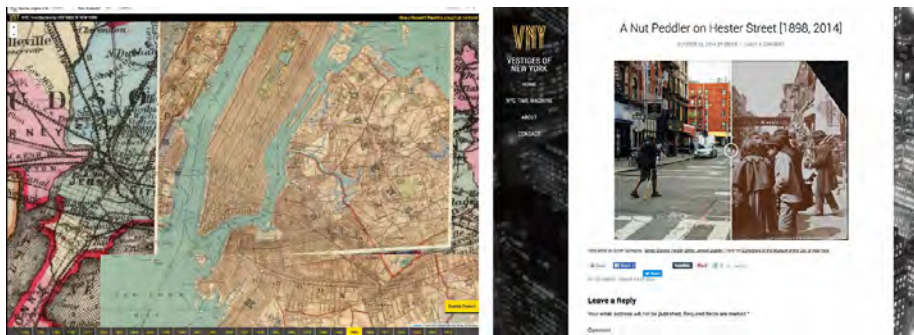
Fig.3 Vestige of New York (no longer online)
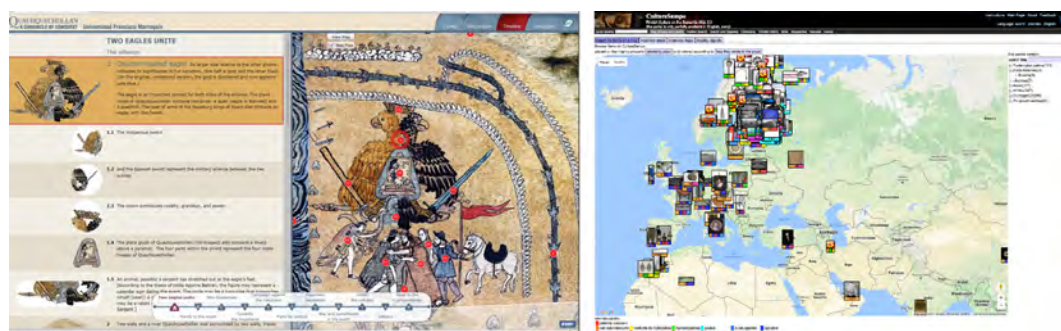
Fig.4 a) Quauhquechollan, a chronicle of conquest (Source: http://webmaplienzo.ufm.edu/lienzo/); b) Kultursampo (Source: http://www.kulttuurisampo.fi/explore.shtml)

Fig.5 Retro View of Mankind's Habitat (Source: https://pastvu.com/)

The case studies, among the many materials found in the network, have been selected as para-digms of a series of possible types of use of geo-localized historical data. Beyond the single site or tool, in fact, we wanted to investigate and catalog the solutions already implemented. But each of them represents a kind of archetype.

In the case of Kultursampo (see fig. 4b), for instance, we are faced with a system that offers classic temporal visualizations, such as a timeline, which are more articulated from a spatial point of view. The database is based on semantic relations between the data and the classifica-tion that emerges is extremely articulated from the point of view of information architecture and transversal relations (Morville, 2014). Vestige of New York (see fig. 3), unfortunately no longer online, instead of superimposing contemporary views of the streets of the metropolis with his-torical photos and definitely focuses on the participation of people through social media for sharing and virality of the cultural project. Retro View of Mankind's Habitat (see fig. 5), alt-hough rather difficult to consult from a cartographic point of view, offers a contextual tool for referencing image galleries that is very easy to use and at the same time extremely technical to understand from which point historical photos were taken and superimpose them with the con-temporary landscape.
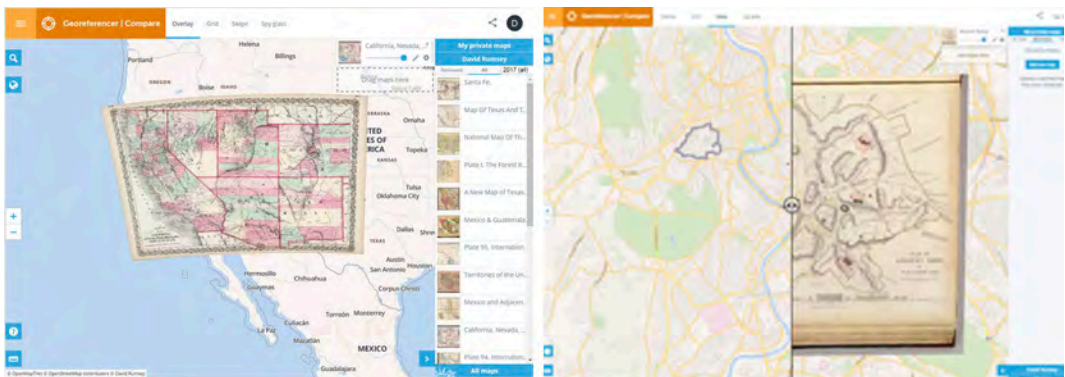
Fig.6 Georeferencer, David Rumsey (Source: https://www.davidrumsey.com/view/georefereencer)

Fig.7 Venice Time Machine (Source: https://www.youtube.com/watch?v=uQQGgYPRWfs)

The most promising ever looks like it is The Venice Time Machine (see fig. 7 above). The pro-ject includes three different aspects of restituting the priceless heritage of the State Archives of Venice, the Archive of Santa Maria Glorious of the Frari and the Giorgio Cini Foundation, which brings together more than a thousand years of history of the city of Venice and the daily life of its citizens. The work is the result of the collaboration between the University of Ca' Foscari and the Polytechnic of Lausanne. Digitization involves not only the virtualization of documents, but also the automated interpretation and subsequent transcription into text (rather than just an unsearchable image) from historical manuscripts. The visualization also proposes a dynamic three-dimensional modeling of the morphology of the Venetian territory and its trans-formation of time, as well as the availability of historical maps. Calligraphic recognition is cer-tainly one of the most interesting hypotheses, as well as the return through three-dimensional models, but the project announced for October 2017, at the moment does not seem to be com-pletely solved. However, the hypothesis of using a machine learning algorithm to match images and documents related to the a subject – the connection person, place, event according to a "so-cial network" logic – and the possibility of working on big data in a field such as the historical documentation (it has been estimated the acquisition of one million documents) suggest a highly innovative model in the field of digital humanities.

The output: a possible taxonomy of maps as knowledge machines
The first result of the research that can already be shared is a mapping that, by adopting the four reading criteria mentioned above, organizes and presents in a structured space a possible taxon-omy of the study cases considered. In addition to the ten case studies, some specific experiences have also been identified in the metropolitan area of Milan, which already exploit spatial con-textualization to narrate specific stories through archive sources.

In particular, we can see the relationship between the use that is made of the spatial relationship as an activator of knowledge with respect to the simple transmission of information. In the top right quadrant, in fact, where geo-referential data are not only given on cartography, but are also contextualized through specific information or the presence of a multimodal communication that draws on multiple sources, the exploration of historical data becomes a real experience of un-derstanding. The documentary source, whether it is a historical image, a manuscript text, a heirloom or an audiovisual testimony, is presented simultaneously in its relationship with the territory and in its temporal position thanks to the presence of a cartography relative and coherent to the period it-self.

Fig.8 A geo-based archive taxonomy

In the lower right area of the graph, on the other hand, the correlation between the primary tes-timony of the archive document and its location in real space emerges more strongly.

Along another axis, the primary interest is instead for the correlation and reading of the environmental aspect. The use of historical maps and the mere spatial location of information allows us to focus on the evolution of the territory, as in the case of the project, the software and the cartographic archive of Ramsey. The possibility of transparently superimposing a map on the current morphology of the experienced space allows us to see and understand its evolution: the growth and transformation of urban areas, the erosion of the unbuilt landscape. The spatial rep-resentation, therefore, becomes a machine to tell stories that involve the social and environmen-tal dimension of a territory, indirectly of its migrations – both internal and external– its values and its organizational and productive processes. Finally, in the lower right quadrant, we find instead the possibility to explore the physical-spatial dimension, starting from our contemporary experience. The presence of historical docu-ments in relation to the contemporary map of a space allows us to understand its past that we implicitly know, but that we are often unable to imagine. As in the case of Vestige of New York: the use of a simple slider that superimposes the contemporary perspective on the urban land-scape and the historical pictures referring to the same point of view that allow us to discover the mutations and persistences.

Photography, in this case, plays a double documentary role: on the one hand, the historical testimony that photographs the existing in that given moment, an instant extrapolated from the flow, as Berger would define it (1967), on the other hand the narration of urban, political and social evolution.

Conclusion

Although it is a planar spatial representation, the maps contain in themselves a large multidimensionality of information. However, in their twofold interpretation key: as historical teachers in themselves and as a support for the visualization of historical archive sources, they allow us to narrate the temporal dimension or the fourth dimension. They also offer an interpretative and metaphorical perspective on the world that they visualize, both physical and relational, as well as cultural and social.

The use of digital technologies has made it possible to transform them into platforms of knowledge in which historical data and documents from the archive find a diachronic and chronological location depending on the points of view and filters used to interpret them. Be-sides, the mobile revolution allows to exploit this potential of knowledge and experience of the built environment also in mobility, thanks to situated interactions, making accessible, in fact, archives and niches of specialized knowledge in contexts of use and everyday explorations.

Recent developments offered by mass platforms – such as Google Maps – seem to further drive the practices of historical and cultural dissemination towards an increasingly pervasive use of geo-referenced maps and data. the augmented reality system integrated in Google Street View could be a future possibility of development in the world of geo-referenced historical and cul-tural heritage. In addition to being helpful in following directions in real time, the use of the AR and the camera could suggest with personalized recommendations to help you discover places in your neighborhood. The geo-referenced archival data would be indexable as point of interests and would give access to a fruition of the spatial narration of historical traces according to a natural and spontaneous experience.

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A Designer in Disney

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Abstract

Everyone has encountered in his/her life a Disney product. Once adult we still enjoy the movies, the creations, the toys and the objects somehow. There is anyhow, appreciated and uttered or not, a deep symbolism and a variety of good values behind and besides the scenes.

Disney is a synonym of magic, and this magical power has to be sustained, not only with the movies or the comics, basically outstanding within the idea we have of it, but with the whole production that goes along and around this world.

Far from being invented by Walt Disney, in Design History, it is uncomplicated to find material declaration about the importance of merchandising, the construction of relations with users in the branding and the pivotal role of communicational activities: all this is aimed to lead the users to feel the brand in their lives.

What is behind? Who designs for Disney and how? Are the projects and the products magical by their inner nature, exactly as they are perceived, or there is indeed a long process to embed all the Disney magic inside them?

The essay takes the chance to present how a Disney product - largely intended - is built, from the initial sketches to the final production, opening a debate that involves the designer about the inspiration and the following of ideas, the concept of creativity in the boundaries of a so well-known brand, the eventual dyscrasia in production's phases and finally the answer of the public.

Abstract

Ognuno di noi si è imbattuto nel corso della sua vita in un prodotto Disney. Una volta adulti godiamo ancora in qualche modo dei film, delle progettazioni, dei gadget e degli oggetti. È comunque presente, apprezzato ed esposto o no, un profondo simbolismo e una quantità di valori positivi dietro e al di là delle scene.

Disney è sinonimo di magia, e questo potere magico va sostenuto, non soltanto con i film o i fumetti, fondamentalmente esemplari nell'idea che abbiamo di esso, ma con tutta la produzione che va accanto e intorno a questo mondo.

Lontano dall'essere inventato da Walt Disney, nella Storia del Design non è artificioso trovare dichiarazioni materiali circa l'importanza del merchandising, la costruzione di relazioni con gli utenti attraverso il branding e il ruolo chiave delle attività di comunicazione: tutto ciò è finalizzato a guidare gli utenti a percepire il brand nella loro vita.

Cosa c'è dietro? Chi disegna per Disney e come? I progetti e i prodotti sono magici per loro innata natura, esattamente per come vengono percepiti, o c'è invece un lungo processo per incorporare in loro tutta la magia Disney?

Il saggio coglie l'opportunità di presentare come un prodotto Disney – largamente inteso – venga costruito, dagli schizzi iniziali alla produzione finale, aprendo un dibattito che coinvolge il designer circa l'ispirazione e il seguire delle idee, il concetto di creatività all'interno dei vincoli di un brand così noto, l'eventuale discrasia nelle fasi produttive e infine la risposta del pubblico.

D is for drawing the magical Magic
Maria Elisabetta Ruggiero

The eye sees what the mind knows [J.W. Goethe]

magìa s. f. [from latin magīa, gr. μαγεία]. In general, practice and form of esoteric and initiatory knowledge that presents itself as capable of controlling the forces of nature[1].

Images, suggestions, and sometimes 'extra-ordinary' experiences, can contribute in their whole to the idea that everyone has of what owns this special 'aura', but certainly. in relation to the definition of 'magic', much is due to a production of visual artefacts that blend real elements and fantasy products: there is no doubt that the concept of 'magic' owes much to the imaginative contribution of Walt Disney who, in 1922, when very young, began producing animated short films inspired by popular fairy tales. In his film production the relationship between 'magic' and 'nature' is evident in the images: it is a question of observing something that is naturally familiar to us, but which unexpectedly assumes an accent out of the ordinary, 'extra-ordinary', 'magical' - precisely - and precisely in this consists the strength and the identifying potential of certain suggestions. Walt Disney has been able to capture and enhance this accent with the use of simple images. The conception of his characters, of the world that they inhabit and of what characterizes this world, in fact, has an evident link with what is natural / normal, but thanks to the contribution of the imagination this combination turns into natural / magical,

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[1] See Treccani online dictionary.

leaving only a subtle borderline... between what can be and what could not be... unless...

The identification with unusual and clearly 'magical' forms, characters, places and visual languages thus becomes more accessible precisely by virtue of this bond: this is how the perception of a usual reality, but narrated with an accent of 'magical' extraordinariness, makes it more easily memorized and similar.

The thin line between reality and fantasy is blurred by this permeability of different worlds by virtue of the 'magic' itself. Figuratively speaking, this narrative register can be traced back to two actions: on the one hand the lifelike action and on the other the introduction of some signs that herald or denounce what we are witnessing is 'magical'.

Let's take, for example, one of the first Disney feature films, namely *Snow White and the Seven Dwarfs* (1937), bearing in mind that equally valid examples will be *Cinderella* (1950) and many others, up to *Zootropolis* (2016) where real elements and 'magical' (or surreal) elements coexist in a very natural way. In *Snow White* the characters are surrounded by woodland animals that interact actively, although without speaking, with the protagonists; the house of the dwarves and the figurative repertoire that connotes their world can be traced back to a Nordic folk architecture and, finally, the same 'magic' made by the witch, basically, occurs by means of a natural element such as an apple.

Undoubtedly these choices, that is to say on the border with the known and the usual, are proper of many fables or popular legends, but what distinguishes Disney's work has been to have translated them and to continue to translate them into an extremely detailed visual language that emphasizes precisely this closeness with reality, underlining everything with a captivating musical accompaniment that becomes the sound connotation of images and some recurring and iconic signs. The actions, the characters and the dialogues are coherently concerted to underline this dreamlike aspect.

Landscapes, architecture, characters and objects are taken from reality: the characters, animals and even the elements of the landscape come alive naturally according to the needs of history, and they never seem completely unreal or impossible. If what our mind produces exists as an 'idea', even more so, if the product has the characteristics of something tangible, it will seem even more plausible and liable to be identified.

But still, always figuratively speaking, very often the magical dimension of Disneyan situations or events very often draws emphasis precisely in a narrative semantics that distinguishes the Disneyan world and, also in this case, Nature offers the starting point for the definition of these signs.

Let's take a typical example: the flicker of infinite small points of light, a diffused sparkle that preludes and identifies the 'magic' of a specific moment, finds an experiential correspondence in the vision of the fireflies of a summer night or the reflection of the light on the water ... and precisely for this reason it affects the sensitivity of the spectator even more.

Whether it is the thousand reflections of the cave of the Seven Dwarfs, the sparks of the magic wand of the Fairy Godmother of Cinderella or, again, the 'luminescences' on the ocean of Moana, there is a repertoire of signs that makes us foresee, or rather that suggests to us, in an extraordinarily and probably almost natural way, that what we are seeing, however, happens in a world clothed in 'magic'. We could therefore say that some signs contribute, like the soundtrack, to connoting a topical moment.

This suggestion is so strong that, in a sense, it has become a sort of visual convention: let's think of the atmospheres of Hogwarts in the Harry Potter films, with candles suspended in the refectory or the magic wands of the young magicians, but also, in a certain meaning, to the concretization of this narrative form in many other realities, with the proliferation of installations in which precisely the

micro lights become the protagonists of an evocative atmosphere of something unexpectedly magical. If conceptually this is the modus with which the kaleidoscope of images produced by Walt Disney's imagination has conditioned and conditions our concept of 'magic', which is, operationally speaking, the process that leads to the creation of visual artefacts and, now, also of products who condition us with their vision or their presence? Drawing, that is to say the graphic representation in a broader sense and even with the help of extraordinary technologies, seems to be the method with which the ideas, languages and stories of the vast Disneyan world have taken and take shape, in which naturalistic inspirations and creative interpretation find a concrete and increasingly suggestive form, we would dare to say as the age of the viewer grows!

Fig.1 *From left above: house of the '7 dwarfs' from the film Snow White and the 7 dwarfs, Walt Disney Production, 1937; cottages in the Cotswalds region; Madam Mim's house from the film The Sword in the Stone, Walt Disney Production, 1963; bories or griottes in the Perigord region; Riqewhir in Alsace; Belle village from Beauty and the Beast Walt Disney Production (1991). The relationships between real architectural language and the figurative language of animations are evident.*

Fig.2 *From left above: swarm of fireflies in the Ligurian hinterland; light trail from the magic wand of the Fairy Godmother (Cinderella, Disney Production 1950); light installation - Tokyo Christmas 2018; Hogwarts Refectory (Harry Potter and the Philosopher's Stone - Warner Bros. - 2001); 'luminescences' on water (Moana - Disney production 2016).*

D is for designing the magical Magic
Luisa Chimenz

Everyone knows Disney, unless of being in very remote parts of the world. Nevertheless, like everything in our (iper-designed) world, Disney products, however we would evaluate them, are to be intended under the realm of design.

Everything starts - of course - with comics and movies, even if in the company evolution theme parks have had a pivotal role, as in the fertile and productive imagination of their creator.

As said, in fact, by Newson, Sugget and Sudjic « While Disney (1901 – 66) has had an enormous influence on popular culture, Disney's first theme in California in 1955 […] was initially met with critical disdain, despite its popular success. Only more recently has there been a realization that Disneyland was in fact an expression of urban life that touched an emotional chord for many people. […] When Euro Disney (later Disneyland Paris) opened in 1992 the distinction between 'entertainment' architecture designed by set builders and high culture architecture had vanished»[2]

Whatever this state and important words mean, within the amazement and the experience of the parks, the public - the people - enjoy *any* kind of entertainment and wants to live again and again the feelings after the experience itself.

It is interesting to observe how deep this concept might be and the wider sense that comes along if we think instead of big designed architectural park to little everyday objects. In this sense, merchandising and branding are a connection of the company, we could list with little incertitude within the lovemarks, and the public itself. Everything is promotion, indeed, but not only. It might be seen as a specific and target oriented decoration, as a witness, as a statement, with the only difference that everyone is the target, because there is the 'right' product for everyone. Thus, this power has profoundly to be considered as for its strength to affirm and to orient, through design, realistically, but not only.

In fact, as Heskett observes: «The significance of objects, the precise value imputed to them, however, will often vary considerably between different cultures. [...] Meanwhile is not necessarily permanently fixed, however, since the significance of the product can vary over time and space. A classic example was the Volkswagen Beetle, developed in 1930s Germany […] successfully exported to the United States in the 1950s and became a cult object. The design was virtually identical across this period of time, but the significance of the product underwent a remarkable transformation: from an icon of fascism in the 1930s […] to the lovable 'Bug' and hero of Walt Disney's Herbie films in 1960s America.»[3]

We are not treating here the whys of the reason for preferring a product despite of another, this would much better be a psychological or an anthropological discourse, but we are seeking to understand, assumed that these kinds of product generate affection and are - we might say – needed, what is behind them and how much they might influence popular culture.

The essays took the chance of its existence thanks to a fortuitous conversation with a senior creative designer in Disney Italia, Davide Zannetti, about design, drawing and the importance of quality in them both and goes to the product itself and its realization. Shortly, it became likely an occasion

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[2] See A. Newson, E. Sugget and D. Sudjic, *Designer Maker User,* Phaidon Press Limited, London, 2016, p. 228.
[3] See J. Heskett, *Design. A Very Short Introduction,* Oxford University Press, Oxford, 2002, p.31.

to think about merchandising, branding and quality in their connection with design, assuming that, unfortunately, often the naturally embedded additional values give a reason not to indulge in the latter. Aiming to better understand Davide's work is essential to quote Bryman saying: «A further area which tends to be given minimal attention in many accounts of the Studio in the early and later years is merchandising. It was nearly always mentioned in the Disney biographies, but was invariably depicted as a simple adjunct to the making of animated cartoons. Some articles dwelt on the Disney merchandise […], but these were largely descriptive and rarely analysed their significance in depth. Mickey Mouse arrived on the scene at a time when interest in movie-related merchandise was growing and Felix the Cat had spawned a sizeable range of such items. The Disneys moved very quickly to sign up merchandising and licensing deals […] and were keen to improve the quality and range of the products of such agreements. […] Such deals were central to the Studio in the 1930s and about half of the profits came from these areas […]. Cartoon shorts were not very profitable, due to the small and frequently late advances that were often forthcoming. It is possible that the development of merchandise was therefore much more central to the Disneys' business strategy than is commonly suggested.»[4]

In Disney Italia they don't work on movies, they still do work on comics, though it is not anymore the major occupation; thus, a lot of job is performed on the merchandising and licensing that goes along the whole Disney world. Davide himself, accordingly to what stated so far, has worked for almost ten years in the publishing area but later on has been assigned to trade marketing, appointed as senior creative designer: the choice is evident in Disney's logic since his founder was alive.

Thinking to Disney's magical appearance, I was wondering to remain grounded on earth, aiming to understand if it is possible to deliver (popular) culture through very little everyday objects and, in the case, if the process is already on its proper way.

Fig.3 Sketch and render of the Box Game, realized for Mickey Mouse 90th Anniversary (courtesy of The Walt Disney Company Italia and Davide Zannetti)

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[4] See A. Bryman, *Disney and His Worlds*, Routledge, London, 2005, p.25

_ *First of all what are we talking about when we relate Design to Disney? What does it mean?*

DZ: The question is brief and concise but the answer is complex, because complex are the definitions of the terms inserted in the sentence. In mathematics, a relationship is a bond, a rapport, a function that links two mutually commensurate quantities. For understanding what this link is, we first need to realize what the two referenced quantities are. With the term 'design' we intend the conception and the project activities of objects of use to be produced industrially and in series, according to aesthetically valid forms in relation to the functionality of the object itself. The word 'Disney' obviously means The Walt Disney Company, a multinational US based whose sectors of interest are Media and Entertainment. It is pretty hard to synthetically define the main Disney sales artefacts. In the everyday life, when talking about my work, I enjoy to ask what are the main products made by other multinationals such as Coca Cola or Apple. Average answers instantly provide the correct one, i.e. most of the interviewed immediately identify the well-known beverage in the first case and the technological jewels of the Cupertino's company within the latter. But, as soon as I ask the same question with reference to The Walt Disney Company, the result is surprisingly doubtful. The most frequent answers are "cartoons", "comics" or "theme parks", but nobody realizes that the real exceptional Disney product is something much less tangible and concrete as the *fairy tale,* fantasy, friendship, affections or love: all dreadfully immaterial concepts that we love to define in one word, *Disney Magic.*

These are feelings we cannot do without, we all 'desire' at all costs, indeed. For revolving these concepts into marketable practical material, Disney has to 'convey' its very personal *Fantastical World* in an endless series of commercial articles, such as films, books, comics, video games, websites, theme cruises, amusement parks, fashion products, food, toys, and so on.

Disney has, therefore, to deal with the realization of the contents in this vast market, attaining to sell its *products*, which have naturally to recall the characters and stories so beloved by the public. Buying a movie ticket for a Pixar animation does not only imply buying the movie, but as well it means buying a piece of Disney Magic, that will be confidently found in those 90 minutes of the show. The same pertains to the entrance to the park, which denotes the wish to really experience that 'magic', so skilfully created by Disney. Obviously, the alike converse is relevant to all other types of products. This is precisely the link between Design and Disney, the bilateral convergence to the product's realization. Disney, meaning as stated above The Walt Disney Company, manufactures (or assigns to be externally manufactured) and sells its product but the design discipline is needed to find ways for conceiving and designing it. And it is definitely not easy.

Let's go back to the example in which we were mentioning Coca Cola and Apple: whilst it is almost univocal the answer for an ideal visual campaign for the both the brands, embodying a red background for Coca Cola and a white one for Apple with an 'essential' and 'clean' graphic composition, it looks much more articulated for Disney. Though, which graphics would represent the world of *The Walt Disney Compan*y, broadly and equally effectively, considering the new acquisitions of Marvel and Star Wars, without considering the brand new Fox? Things get here pretty complicated, due to the embedded Disney style, perfectly recognizable by the consumer as 'Disney official', but with parameters that would require a much longer dissertation.

I believe this is the main role of my work as a designer in Disney: the *(proper, Ed)* graphic representation of the brand. For achieving the realization of a 'Disney product' - and for Disney product we are considering both product design and visual design as totems or trade marketing material to support sales – it is needed to go through specific and hierarchical functions that bond the creative process:

Franchise → Deadline → Budget → Function → Material → Shape

_ *Which are the challenges in dealing with such restrictions? Do you feel them like a constraint or more as an opportunity?*

DZ: The restraints, as we mentioned above, could be both a challenge and an enablement. Often, the lack of pickets does not facilitate creativity. In fact, too many possibilities could be an extensive waste of time in respect of the focus dictated by corporate constraints. At the same time, it is daring to be capable to create impactful graphics, projects or products with the limited 'room for manoeuver' allowed.

_ *How much is important in your opinion a good drawing for design, in the meaning of performing a further correct production?*

DZ: I realized that the many restrictions imposed by Disney are a cause of concern for all Disney collaborators, as they are more troubled about achieving Disney approval than performing projects creatively. That is because they would bump into many changes and rejects on the part of the Disney 'censorship'. For this reason, the agencies that collaborate with Disney are more than happy to rely on already approved guidelines. Consequently, when I do a project, my idea is to create a first suggestion, we might say a draft, a graphic concretization of the design idea, encompassing all the points listed above. All this process requires considerable energy and time, this latter never gifted for a second revision, or - we might say - for 'producing a fair copy' of the project. Once seen, and shared, and approved, the work is considered completed. Here lies the problem, because the project so sketched is dispatched at the agency, which does not consider it - as I would expect - as a starting point of a creative re-elaboration. Nevertheless, this latter one, awed by the Disney limitations, tends to consider my work as the rod that marks the point of arrival instead of the springboard. This is the basis of the final dissatisfaction with the final realization. When something is done at the maximum level, the goal is to reach it, thus (the position, *Ed)* is to remain under the lower limit, without thinking about exceeding it and much.

_ *Which are the references and from where do they reach you for using while designing, I mean how much do you relate your work to the historical matter of Design and how much to the Disney heritage?*

DZ: *The references to artistic culture are definitely strong in Disney. Suffice it to say that Walt Disney has derived all the inspirations for his fantastic creations after some journeys through Germany and all Europe, the most important one in the 1930s. Here, he was strongly influenced by the Architecture, the vernacular and popular culture but either Liberty style, with its natural roundness and sinuosity. This is still the basis of the Disney style and I always keep it in mind when creating any Disney graphics. The lines always have soft connections, with bows, and never with sharp angles that might break the softness of the trait. I could use for drawing Disney bends mathematical functions or Bézier curves. On the contrary, Marvel graphics, which must convey strength and movement, is featured*

with images inclined at 45 degrees, much closer to Futurism or the architecture of the 1930s by the Chrysler skyscraper – in fact, Marvel Comics begins in 1939.

_ How do you think you fulfil the advancement of the design discipline through your work, if you do? What are you searching for? Here I mean, for instance, Dieter Rams was searching for the fulfilment of his "ten principles for good design", functionality, aesthetic, innovation, and in his opinion the things would go along naturally. The same concept was expressed in Architecture by Louis Khan, thus I am guessing how much do style and design trends mean in your work. It is still true, in your opinion, that design is better if it embodies an outstanding aesthetic value, like in the thought - and in the work - of Raymond Loewy?

DZ: Design at Disney has to be extremely aesthetic, due to its recognition by the consumer as 'official'. The customer has been used since the days of *Snow White and the Seven Dwarfs* to be amazed by the quality, colours, music and beauty of the drawing and of the shapes, always considerably superior to the competitor[5]s; in this sense, the final outcome in Disney must really differentiate itself by finding other competitive styles (such as the exaggerate elongated figures of the characters of *Despicable me* with very thin ankles and pronounced big nose).

_ Would you say the public is ready for a more 'aesthetical' idea of design, encircling style, beauty and functionality? What is the public searching for, indeed? I mean, in Design History we have seen that often trends and so-called styles were not completely understood by the public even if maybe followed as for following a natural force and their strength has been later on confirmed with the passing of time, whilst others have been completely rejected revealing their potential only many years later or still having to.

"Disney - Davide seriously argues - is not only functionality", and this concept evidently and naturally recalls Norman's idea of the emotional design, in particular where he states that pleasurable objects better fulfil their function. In addition, it seems proper to go back on the first question and observe that anyhow, despite of taking place - realistically - after budget and deadline, function comes much earlier than *shape*.

_ Do you see a linkage between culture and realisation, and in addition do you think the 'public' would expect more from you, meaning of course your design, the production the giving body actions and the final outcome?

DZ: The public always expects the best from Disney, which is synonymous of quality. At least, it is for me. In my work I end up for presenting a project only when I managed to actualize all the proposals that my creativity can give birth to.

Only when I consider myself satisfied and do like them, I do feel myself confident in proposing my designs to the client or to internal references. I always show all the proposals, in such a way as to show the development and the route I achieved that solution. This also allows the customer in operating a choice and realizing that all pathways have already been travelled and explored. Moreover, this kind of method allows the most capable to select different elements in such a way as to provide more

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[5]As a proof of what Davide is saying, is here appropriate to quote Bryman: «However, the constant need for ploughing money back into the company in order to enhance quality was not based entirely on the grounds of quality. The decision to apply the expensive innovations of sound and then colour to the early cartoons can be viewed as a strategy of product differentiation - a strategy to steal a march on competitors […] by making cartoons distinctively different from the efforts of these studios.» See A. Bryman, *Disney and His Worlds,* Routledge, London, 2005, p. 24

precise feedback for the improvement of the project or the product. Feedbacks are more accurate when presenting a variety of ideas instead of a single work.

Fig. 4 Save the date, Product Showcase Invitation, 2019 (courtesy of The Walt Disney Company Italia and Davide Zannetti

D is for delivering the magical Magic
Luisa Chimenz

Anyhow, and however it is, when dreams finally become substantial and have basically given matter and shape they maybe loose a little of their magic. Either, they acquire something that intangible and unsubstantial like a blink in the eye make children and adults part of the same family, gathered and got from the same sense of amazement.

Affection, when related to something so material and so perishable as a product or a design, largely intended is definitely double meant. On one hand, of course, everything depends on the end-users sight and this is a concept and a lesson that is now more than largely understood and exploited in the marketing realm. On the other side, it is a long way the one that lead us to live in a material world, in which we state not only and not completely our stauts but our feelings, our dreams, our missions and visions by possessing things.

Moore interestingly relates Disney's entertainment park - and his art himself - to religion, suggesting in his thought that: «Substantively both traditional pilgrimage centers, especially Mecca, and Walt Disney World are analyzed in terms of shared activities, symbols displayed, myths evoked, partite time-space processes of rites of passage.

The Magic Kingdom is shown to be ritual threshold, which symbolically replicates the baroque capital. To go there is transcendent make-believe, play which is intended with deadly seriousness. The pilgrimage has re-emerged as a place for grand play»[6].

He continues, «Main Street, the focal monumental avenue in the Magic Kingdom, is lined with Victoria shops of uniform height leading from Town Square to a circular plaza in the front of the dominant building, Cinderella's Castle. Town Square and Main Street are a deliberate evocation of the commercial railroad towns of Walt Disney's rural childhood in the Midwest […].»[7]

So far, we might imagine that the company, within which the original vision is clearly exposed by Bryman, will continue to pursue its own research of quality, embedding every single product of its magical Magic.

As the scholar says, in fact: «The idea of merchandise having a role in the creation of characters, while speculative, is not entirely fanciful. In 1934, Churchill interviewed Walt for the New York Times Magazine and wrote on his notepad: 'Fifteen people work in the New York office handling royalties on articles manufactured in Mickey's name. That's where the big profit is' (1934:13). Forgacs (1992) has noted that in the 1930s there was a growing emphasis at the Studio in the importance of characters possessing the attribute of 'cuteness' and suggests that this may have been motivated by the greater merchandising and licensing potential of such characters. In an interview, a Disney animator, Bill Dover, ventured the view that one of the main reasons why Walt was keen on doing The Jungle Book in spite of difficulties of bringing it off was 'it has a little boy in it, Mowgli, and a lot of animals and both are great for merchandising' (in Fessier, 1967:19). A Wall Street Journal article in 1958 was unusual in its attention to merchandising and used for its title Walt's summary of his business philosophy, which fits well with much of the present discussion: 'dream, diversify - and never miss an angle' (Gordon, 1958). A detailed account of the significance of merchandising at Disney needs to be written, but in the meantime it is being suggested here that accounts of Walt and the Studio tended to play down the importance of merchandising and licensing and that they were much more central to their business strategy than is often recognized.»[8]

If it is unbelievable the latter concept above exposed, the real matter is, how and when will Disney begin - here intended as the wider company - to save our life, in consequence of its already stated enormous power on the popular and material culture?

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[6] See A. Moore, "Walt Disney World: Bounded Ritual Space and the Playful Pilgrimage Center" *Anthropological Quarterly*. 53.4 (1980): 207 - 218, p. 207.
[7] *Ivi*, p. 211
[8] See A. Bryman, *Disney and His Worlds,* Routledge, London, 2005, p. 25-6. The quotation is here reported with references due to its importance and thanks to the wider scenario opened.

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Drawing the Function.
Organicism vs Rationalism in quest for objectivity

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Abstract

According to linguistics, dichotomies are the means by which language signifies and, consequently, the means by which we give sense to the world around us. Rational / Organic is a fundamental dichotomy of architectural vocabulary: during the "heroic" years of Modern Movement, between the 20s and 30s of the twentieth century, the two terms fought for a primacy in the field of architectural theory, declining the central idea of "functionalism" with different and apparently antithetical outcomes: the simple and orthogonal geometries of Rationalism, on the one hand, and - on the other - the complex, oblique and curvilinear geometries of Organicism. A dogma, however, united the two contenders: in both cases, in the architects' opinions, the formal aspect of the buildings was a by-product, a variable dependent on factors much more important and decisive, completely extraneous to aesthetic feeling: the structural and economic ones of building (Rationalism) and the practical ones of living (Organicism). Starting from a comparative analysis of two dwelling houses, two well-known masterworks of the Modern such as Ludwig Mies van der Rohe's Farnsworth House and Hugo Häring's Wohnhaus, this paper will try to demonstrate how in reality the competition between the two contenders took place exclusively, and beyond the statements of the authors, within the realm of form, the internal rules of its design and configuration.

Abstract

Le dicotomie, secondo Ferdinand de Saussure, sono il mezzo per il quale il linguaggio significa e, di conseguenza, il mezzo per il quale diamo significato al mondo che ci circonda. Razionale/Organico è una dicotomia fondamentale del lessico architettonico: negli anni "eroici" del Movimento Moderno, tra gli anni '20 e '30 del Novecento, i due termini si sono contesi il primato nell'ambito della teoria dell'architettura, declinando l'idea centrale di "funzionalismo" con esiti diversi e apparentemente

antitetici: le geometrie semplici e ortogonali del Razionalismo, da un lato, e - dall'altro - quelle complesse, oblique e curvilinee dell'Organicismo. Un dogma, tuttavia, accomunò i due contendenti: in entrambi i casi, nelle opinioni degli artefici, l'aspetto formale dei fabbricati è un sottoprodotto, una variabile dipendente di fattori ben più importanti e decisivi, del tutto estranei al sentire estetico: quelli strutturali ed economici del costruire (Razionalismo) e quelli pratici dell'abitare (Organicismo). A partire da un'analisi comparata di due case d'abitazione, due note opere del Moderno come la Fansworth House di Ludwig Mies van der Rohe e la Wohnhaus di Hugo Häring, questo paper cercherà di dimostrare come in realtà l'agone tra i due contendenti si svolse in modo esclusivo, e al di là delle dichiarazioni degli autori, nell'ambito della forma, delle regole interne del suo disegno e configurazione.

Introduction

We shall be looking here at two masterpieces of the XXth Century's architecture. Two villas, conceived in the same historical time: 1946, immediately after World War II. Time of conception is the only thing they have in common because anything about the rest couldn't be more different. We are talking about Ludwig Mies van der Rohe's Farnsworth House [Fig. 1] and Hugo Häring's so-called "Wohnhaus" [Fig. 2][1].

According to linguistics, difference resides at the bottom of any meaning: meanings are not immanent to signs, but the result of a differential relationship: we associate a meaning to a sign by comparing it with the meaning of all other signs of the system[2]. All this is very clear cut in the case polar oppositions: radical dichotomies opposing two terms in accordance with binary logic, like Beautiful/Ugly, Man/Woman, Nature/Culture. The capital letters stand for the fact that, with dichotomies, what we are dealing with is not just a question of word's meaning, but of world's meaning: an anthropological way by which we give meaning to the world around us[3]. The particular and in a way the paradoxical quality of dichotomies is that, as opposed as they are, each of the two terms "needs" the other to mean: it is impossible to reach a definition of beauty without a simultaneous delimitation of the concept of ugliness, and vice versa[4]. Seen in plan, Farnsworth House and Wohnhaus appear like an actual "dichotomia in figuris", and actually we will try here to exploit all the hermeneutical power of dichotomies to try to give them a sense (as in "meaning", "direction towards" and "perceptibility"[5]).

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[1] The house was the product of a theoretical project and never meant to be built. "Wohnhaus", in German, literally means "House". The project consists of a plan and a façade drawn in the same sheet of paper. The drawing is conserved at the Akademie der Künste in Berlin. It is catalogued as "Obj. Nr. 96" in Sabine Kremer, *Hugo Häring (1882-1958): Wohnungsbau: Theorie und Praxis*, Karl Krämer Verlag, Stuttgart 1985, p. 237; and is reproduced in full-page in Jürgen Joedicke and Heinrich Lauterbach, *Hugo Häring. Schriften, Entwurfe, Bauten*, Karl Krämer Verlag, Stuttgart 1965, p. 133.

[2] "... in language there are only differences. Even more important: a difference generally implies positive terms between which the difference is set up; but in language there are only differences *without positive terms*.", Ferdinand de Saussure, *Course in General Linguistics* (1922), Columbia University Press, New York 2011, p. 120 (emphasis in original).

[3] "Just think about the cosmogonic opposition heavens/earth, or the one between life and death, good and evil, at the centre of the whole world's theologies and moral codes": Gerardo Milani, "Da Saussure a Jakobson. La teoria della lingua e della poesia*"*, in *Essais*, s.d., p. 10 (my translation).

[4] See: Jacques Derrida, *Positions* (1972), The University of Chicago Press, Chicago 1981, p. 41.

[5] About the three possible meanings of the word "sense", see: François Cheng, *Cinq meditations sur la beauté*, Albin Michel, Paris 2006, p. 35.

Sharing a Studio

Actually, beyond the birth's date, the two villas have another thing in common: the spaces of the studio that their authors, Mies and Häring, physically shared between the years 1923 and 1926[6]. Which is strange, because we couldn't think of two more different characters working together. Indeed, they never worked on a common project, but what happened anyway is that the place itself became the common ground for a chivalrous conflict, the hotbed where two opposite weltanschauungs were forging themselves[7]. In those years, both Mies' project for a Brick House [Fig. 3a] and Häring's project for a Country House [Fig. 3b] came to light, already proposing, both in plan and in elevation, the kind of contrast that will achieve its full maturity thirty years later in the two villas we are considering here. While everyone is familiar with the linearity and orthogonality that the former epitomizes in itself, the irregularity and curvilinearity of the latter can still strike us with the strangeness of its configuration: certainly not something normally associated to the idea of modernity. Indeed, this is why these first seeds of the contrast have an interest going beyond the personality of their authors: because they are the evidence, in the very years of modernity's birth, of two distinct ideas of modernity destined to meet with a different fortune.
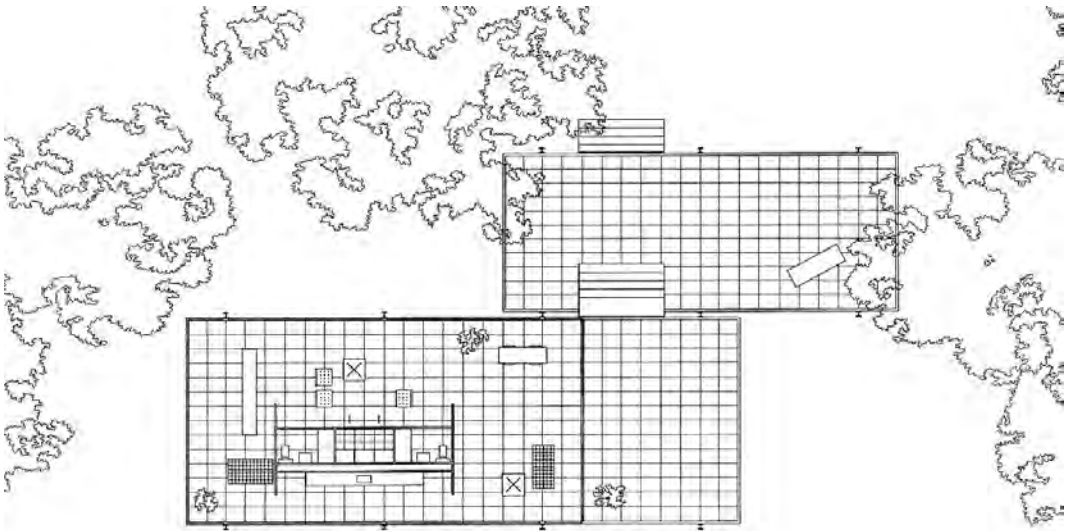
Fig.1 *Ludwig Mies van der Rohe, Farnsworth House*

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[6] According to Piergiacomo Bucciarelli, the time span covers only two years: 1923-24 (*Hugo Häring. Impegno nella ricerca organica*, Dedalo Libri, Bari 1980, p. 95). Peter Blundell Jones extends the period until 1926 (*Hugo Häring. The Organic versus the Geometric*, Edition Axel Menges, Stuttgart-London 1999, p. 36 and p. 204, n. 3).

[7] "We spent more time debating questions of the time than on making designs", Häring, in a letter to Heinrich Lauterbach of 31 March 1952, Lauterbach Archive (cited in Blundell Jones, cit., p. 204, n. 2).
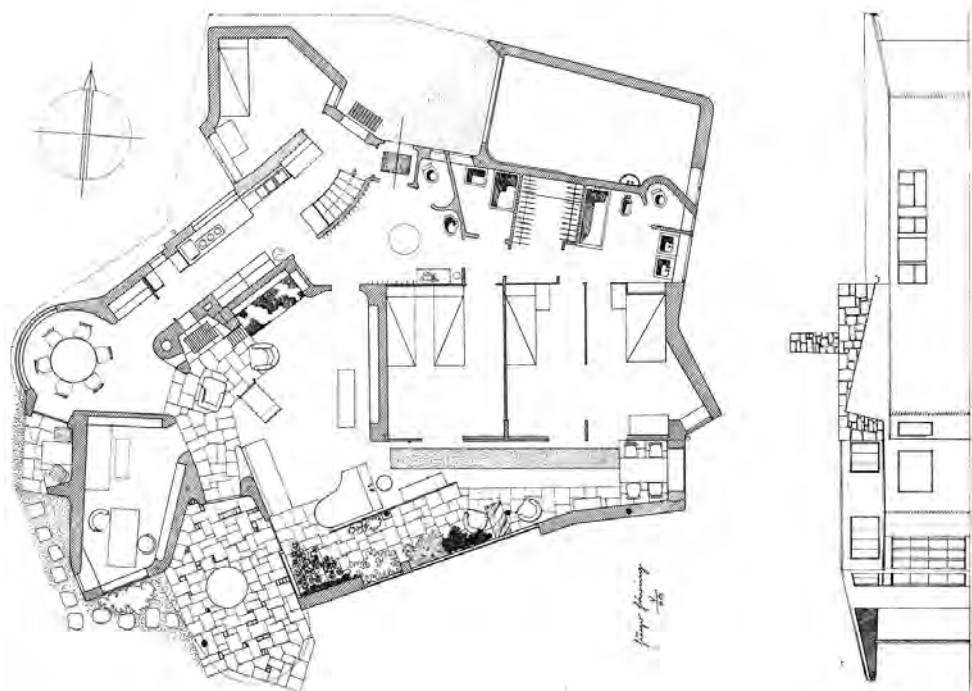
Fig.2 Hugo Häring, Wohnhaus
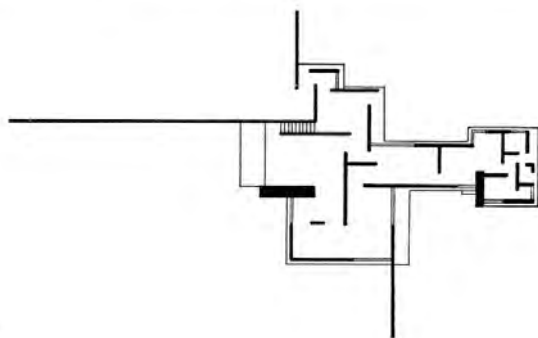
a)
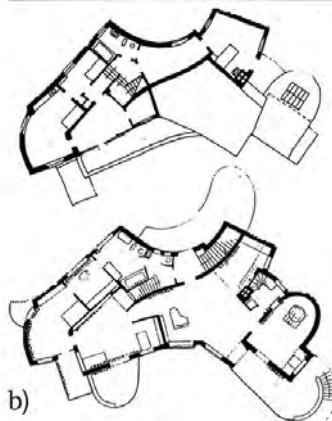
b)

Fig.3 Ludwig Mies van der Rohe, Brick House; Hugo Häring, Country House
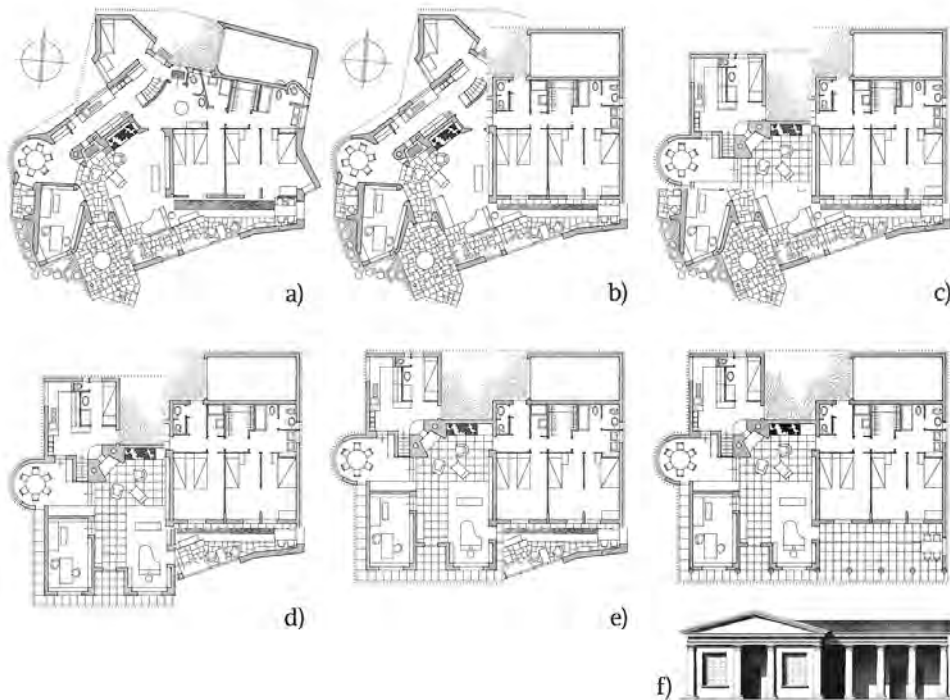
Fig.4 Wohnhaus Morphing

The reason why Farnsworth House, together with its author, are extremely famous and the object of countless monographs, while Hugo Häring and his work are almost unknown, does not issue from a difference of quality: the Wohnhaus is not the minor work of a minor architect, but the masterpiece of an immensely talented architect who found himself on the wrong side of the barricade during the intense ideological, political and cultural debate within the architectural avant-gardes in the period between the two world wars.

It is an historical fact that Häring personally confronted the two unofficial leaders of CIAM, Giedion and Le Corbusier, during the first Congress held in La Sarraz in 1927, opposing his catchwords of "organicism" and "building" (bauen) to the ones of "standardization" and "architecture" sustained by his contenders. The outcome is known: he soon became unbearable to Le Corbusier (who privately called him "herring"), was excluded from the guests of the second Congress and, in a certain sense, from the official history of the so-called Modern Movement[8]. Ignored by its official chroniclers (Hitchcock, Giedion, Pevsner)[9], the monographs dedicated to him can be counted on one hand[10].

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8 Hugo Häring, *Il segreto della forma. Storia e teoria del Neue Bauen*, Jaca Book, Milano 1983, pp. XXIV-XXVI.
9 See: Piergiacomo Bucciarelli, *cit.*, p. 6; and Fernando Quesada Lopez, "Hugo Häring, espacios coreográficos del devenir", in *Proyecto, progreso, arquitectura*, 3, 2010, p. 81.
10 There are only four monographs dedicated to Häring sufficiently complete to be worthy of the name: Jürgen Joedicke and Heinrich Lauterbach, *cit.*; Sabine Kremer, *cit.*; Matthias Schirren, *Hugo Häring, Architekt des Neuen Bauens*, Ostfildern-Ruit, Hatje Cantz 2001; and Peter Blundell Jones, *cit.* Of the four, only the last is written in English and therefore has a real international dimension. In a way, it has some significance the fact that the publishing house of Blundell Jones' book is also German.

Back to our villas. Should we ask a layman what difference stands out comparing the two plans, he would respond without hesitation that one is "all straight" while the other is "all crooked". Should we address the same question to an architect, he would suspect a trick question and would hesitate to give an answer: surely there must be something more profound beyond the surface of forms? Sure thing, both Mies and Häring have repeatedly stated their total disdain for form as an architectural principle[11]. Certainly the argument of the endless debates staged in the rooms of the studio they shared wasn't about form, or only in the measure of its being the consequence of a new, more objective, functional (modern!) way of making architecture: the "rationalist way" proposed by Mies or the "organicist way" opposed by Häring. For the time being, we will bracket the layman's answer. We shall come back to it later.

Of all the slogans of modernity about function, the one that most stuck - ironically enough, thanks to its euphony - is the triple capital F of Form Follows Function[12]. A powerful motto, subtracting architectural form from the arbitrariness of the artistic realm by securing it as a dependent variable of a scientifically assessable function: where "functionality" and "objectivity" become one. Yet, given the abundant variety of forms produced by modernity, as compared to the relatively fewer of classicism, we must admit that the sacred transubstantiation from function to form must be all but automatic. Actually, the nature of this passage is exactly the bone of contention of the whole Häring versus Mies question (and versus Corbusier & Giedion).

The Function of Living

In an article pointedly entitled "Working on the Floor Plan"[13], Häring maintains that "the organic work [begins] with objects to which corresponds a clear functional need"[14], and states his functional creed by stating that "it is a matter of laying out the house from the inside outwards, starting with the life-processes of dwelling, and proceeding according to this principle"[15]. To illustrate his words he chooses, of all the possible options, the plan of our Wohnhaus. He does not describe the plan: in a way, it is the drawing that explains the text, not the other way round. Actually, to analyze this plan is to attend to a flawless figural lecture on how to translate function to form.

Following his hint, we shall analyze it proceeding from within to without, starting from the centre of the house. Not the geometrical one, obviously, but the symbolic centre: the heart of the house, that, as it happens, is the hearth of the house. The hearth opens on the living room, that is the hub of the pulsating life of the family, where to make conversation by the fire, sit on three different armchairs (no standardization allowed), or to listen to piano music by the conservatory lit by the sun on the south side, or else to read a book chosen from the built-in bookshelf in the wall. We arrive in the living room via two possible entrances: whether the principal one on the south side or the service

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[11] "We refuse to recognize the problems of form… Form is not the aim of our work, but only the result. Form by itself does not exist. Form as an aim is formalism", Ludwig Mies van der Rohe, "Aphorisms on Architecture and Form", in *G*, n. 2, 1923. Häring, for his part, repeatedly talks about form, but solely and exclusively as an adaptation to use (see, for example, Hugo Häring, "wege zur form", in *Die Form* n.1, 1925, n. 1, pp. 3-5.

[12] This is how the formula has known its success, even if the original formulation, made by Frank Lloyd Wright's *Lieber Meister* Louis Henri Sullivan, was "form ever follows function", in "The Tall Office Building Artistically Considered", in *The Lippincott's Magazine*, March the 23rd 1896, p. 408.

[13] "arbeit am grundriss. Zugleich eine fortsetzung des aufsatzes « geometrie und organik", in *Baukunst und Werkform* n. 5, 1952, pp. 15-22.

[14] My translation.

[15] The translation is taken from a quotation of Peter Blundell Jones, *cit*., p. 150. The emphasis is mine.

entrance on the north side. This last is reserved for the family, or for the live-in maid (it was that kind of society). We probably arrived by car, got out, cleaned our boots on the doormat in the still external cabinet preceding the lobby, entered the lobby, took off our Loden and Tiroler-Hut, hung them to the clothes hook drawn on the curving wall on our right, took off our gloves and put them on the table in front of us (they are actually drawn in the plan), washed our hands in the wash-basin on our left, eventually relieve ourselves in the W.C. on the side, and at last be ready to enter the living room and perhaps sit down on the built-in couch lined with calfskin (it was a skewbald calf).

Had we been guests, we would have entered through the main entrance on the south side, after passing through a paved area (an opus incertum in stone interspersed with smaller tiles, probably bricks) "carved in" the building as a niche and sheltered by a projecting roof. We wouldn't have to clean our boots (such a request would be impolite from the part of our hosts), nor to hang our coats (they would be fetched to the north-side lobby by the hosts themselves), and we would be directly inlet in the living room, ready to join the party. The external opus incertum prolongs itself inside the house (but without the bricks, to mark nonetheless a difference) until it reaches the fireplace, then it gives away to a smooth, seamless surface: to mark off, within the living room, a rustic area in front of the fire (dedicated to manly discussions?) from a more mundane area between the grand piano and the bookshelves. Another "rustic area" would be the planted conservatory, directly accessible from the sheltered paving outside.

The owners and the guests: what about the maid? After entering the cum-doormat cabinet on the north side of the house, she would come in through the door on her right. There she could choose between a) depositing the soon-to-be-eaten groceries in the scullery in front of her; b) descending the stairway on her left leading to the basement (to deposit the not-so-soon-to-be-eaten groceries); c) going straight ahead to her room, a room that is more adjacent to the house than within the house (four out of five of its walls are external walls), as to reflect the social condition of its occupant: both within and without the family she lives with. Had she chosen the first option, she could have seamlessly proceeded, after storing the groceries, to the kitchen, where to prepare the lunch she will serve, in due time, in the directly accessible round dining room. Perhaps after putting, during the cooking, the cold meal on the various shelves at the dining room's entrance, and warming some of it in the small hole opened in the back of the fireplace. Whether serving at the table, cooking at the stove, washing at the sink, chopping meat, heating food, storing or pulling out ingredients, she would move rectilinearly back and forth like a spindle through the large gallery joining the service entrance at one top to the dining room at the other.

Meanwhile, the family would have joined at the round table in the middle of the round dining room. The landlord would be leading the thanksgiving prayers, lest he is late, busy in the adjacent, quiet and isolated studio (three out of four external walls), consulting books taken from the built-in shelves lining the walls, or writing at his desk. Perhaps he was exhausted, and he fell asleep on the couch facing the south window. And the maid would have to be sent to wake him up. At the end of the dinner, the landlord, together with his guest, might smoke a cigar outside, enjoying the last rays of the sun coming from the south, in a "cosy nook" sheltered between the external walls and the overhanging roof, directly accessible from the dining room, or via a picturesque garden path coming from the north porch.

At the end of the day, after more conversations and music (no tv-sets in those days), everybody would go to his bedroom, the father and the mother in two adjoining rooms, one with a slightly larger bed (you don't just sleep at night), the two children in another room. The rooms are accessible via an equipped (with bathrooms and cloakroom) corridor progressively tapering according to the progressively fewer people needing to use it. Another "cosy nook" is found in the veranda in front of the bedroom at the bottom of the house, equipped with a table with four chairs: the father, the mother, and the two children having breakfast in the morning, kissed by the first rays of the sun coming through the facing east window.

All the walls bend, yield and taper to invite to the movements of a life entirely planned by the architect. Any need, any menial task has been taken care of: there's even a manhole grill outside the kitchen window to throw away the dirty water, and a chopper with its block is ready alongside the fridge. Any drawn line in the plan has a scope and describes it. Only the beds lack the usual iconic quality of all the other objects and are represented by the conventional symbolic rectangle crossed by a diagonal: perhaps to convey the idea that the intensely functional morning life arrests itself on the threshold of the stillness of slumber, a stillness reiterated by the "static" right angles of the bedrooms, the only right angles of the whole house (the maid's bedroom is not right-angled: perhaps there are some additional chores to be done occasionally during the night).

All in all, Hugo Häring accomplishes a real feat in his Form-Follows-Function tour de force: after the analysis, the plan actually appears as a solidification of functions; and the façade, drawn at the bottom of the plan, as a by-product of the plan. Yet, there are some known objections to such a deterministic stance. Adolf Behne once argued that Häring's tapering corridors, shrinking on the example of arteries when blood flow is less abundant (Häring's metaphor), work only as long as users act exactly according to the architect's predictions. However, a simple change of function, or a new owner moving the doors and reversing the distribution flow, would be sufficient to make the "arteries" become "varicose veins"[16]. And Häring's flatmate Mies, in the course of one of their countless arguments, famously stated a similar objection by saying "make your spaces big enough, man, that you can walk around in them freely, and not just in a predetermined direction! Or are you all sure of how they will be used? We don't know at all whether people will do with them what we expect to. Functions are not so clear or so constant; they change faster than the building"[17]. Human life, alas, is shorter than the life of a building.

Yet, for all its reasonableness, the argument does not strike like a conclusive attack to Häring's theories. We could keep thinking that they hold true at least for some buildings: after all, it easy to think that, if built in 1946, the Wohnhas would still be a dwelling house, a sound and functional home, and a very comfortable one for that matter. Sure enough, the maid would probably have gone, but we can think of some other suitable function for her room. Perhaps a studio for the landlady, conceptually symmetrical to the one of the landlord and as much isolated. It would be apt, in an epoch when women's emancipation is an accomplished fact.

Moreover, Behne's and Mies' argument does not go to the core of the real question: is there really

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[16] Adolf Behne, "The Modern Functional Building" (1926), The Getty Center For The History Of Art, Los Angeles, 1996, p. 129.

[17] Franz Schulze, *Mies Van Der Rohe: A Critical Biography*, University of Chicago Press, Chicago and London 1985, p. 109.

a necessary relation between those functions and those forms? Are those forms the only possible outcome? This is what we will try to verify, by tampering a little bit with Häring's forms [Fig. 4a]. Suppose we straighten the whole a little bit while leaving untouched the floor areas of the rooms and the topological relations between them: we could begin with the eastern part, that, what with the bedrooms' orthogonality, seems to be the apter to undergo the whole operation. After all, it is just a question of rendering uniform the width of the corridor (Behne would be happy) [Fig. 4b]. Then, emboldened by the success of the first step, we could use the dining room as a pivot and rotate the north-western part of 45 degrees clockwise. We should have to move the maid's room a little bit to the left, but the functional connections would be unaffected [Fig. 4c]. After having straightened the south-western part [Fig. 4d], we can shift the entire western part, to align the posterior walls and adjust the connections [Fig. 4e]. One last finishing touch to the veranda and voila, the morphing is completed. Now we would just have to apply a colonnade to the front to obtain a perfect neo-classical villa presenting the same functionality and comfort together with an entirely different vibe [Fig. 4f]. Form, it would seem, exhibits a certain insouciance towards Function. There is no solidification, no translation: actually, what's on stage is just Hugo Häring's own Kunstwollen.

Conclusion

What about Mies' rationalistic way to FFF? We could begin by saying that Mies' reasonable criticism to Häring's determinism actually hides a total lack of interest for the very concept of commodity (in the Wottonian sense of the term). While Farnsworth House has two bathrooms, its open space allows a decent living to just a single person or, at best, to a very intimate couple. The furniture, rigorously arranged in orthogonal fashion along the floor grid, is just a "hint of habitation"[18]. Reportedly, to a distressed Mrs Farnsworth asking for a closet space for her clothes, he suggested to hang them "on the hook on the back of the bathroom door"[19]. But naturally, speaking of function, Mies had in mind an altogether different idea. To him, architecture is the "art of building" [Baukunst], where form follows the structural and economic functions of building. "The art of building is the will of an epoch translated into space"[20], he said, and here again we find the idea of architectural form as a translation from something other. Standardization, typification, economy, machine logic: these were modern Zeitgeist's essential requirements advocated by Mies. "Our steel beams, they have been born straight haven't they? It takes a great deal of effort to bend them"[21], he once said to Häring during one of their ideologic clashes (and Häring must surely have retorted something on the lines of "Why do you wish to design Man with the ruler and the set square?").

But, even if bending beams was not his wish, Mies' working on structures hides under his apparently simple, essential forms, an incredible amount of time-consuming workmanship: "Mies used conventional bolted connections in the less visible parts of his structures, but in exposed positions he wished his elegant steel members to be displayed cleanly, uncluttered by bolts, rivets or plates; and here he defied normal practice by using more expensive welded joints, preferably concealed and

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[18] Blundell Jones, *cit.*, p. 156.
[19] William Norwich, "STYLE; Sex and Real Estate", *New York Times Magazine* (June 1, 2003), pp. 70-75.
[20] Ludwig Mies van der Rohe, manuscript, August 2 1923, MoMA, Mies Manuscripts, Folder 3. In Vittorio Pizzigoni [ed.], Ludwig Mies van der Rohe, *Gli scritti e le parole*, Einaudi, Torino 2010, p. 7.
[21] Ludwig Mies van der Rohe "Mies Speaks: I Do Not Design Buildings." *Architectural Review*, No. 862, December 1968, p. 452.

invisible. If the weld could not be totally hidden he would have the steel sections temporarily joined by means of Nelson stud bolts and cleats, apply permanent welding, and then burn off the holding bolts and plug the holes. The steel surfaces would then be ground smooth to give the appearance of being formed of a single continuous material without breaks or joints. Finally, to ensure a smooth and elegant appearance he had the steel sections grit-blasted to a smooth matt surface, and the entire assembly primed and given three coats of paint"[22]. As Robin Evans brilliantly explains, the real core of Mies' idea of a rationalist structure are geometry and logic, certainly not building[23]. And he is ready to fight for his idea at any cost, literally so. His most famous dictum, "Less Is More" should be implemented in "Less Is More Expensive", as probably thought Mrs Farnsworth when she filed a lawsuit against Mies for additional and unforeseen costs of construction doubling the initial estimates[24].

In the end, there seem to be no deep reasons for the formal choices of our two contenders, and we seem to be left with the "superficial" answer our fictional layman gave us at the beginning: the two villas are different because one is "straight" and the other is "crooked". So that's it? Is it just a question of arbitrary, superficial forms? Yes and no. Yes, it is just a question of forms. No, because to stop at the surface of forms does not necessarily mean to be superficial. Because, in architecture, the truth lies on the surface. Both for Mies and for Häring form in itself is an enemy, it diverts from the real, substantial questions behind, but only by focusing our attention on the formal quality of their forms we will be able to really understand their work. Only through form architecture really have meaning, a meaning that does not stop at its first, external referent, but is forever caught in the unlimited semiosis of association of ideas. It is a question of how much forms are able to lie about their functions and, in doing so, are able to tell some truth about our human condition of mortal inhabitants of the world. Form, in this sense, Follows (Narrative) Function. Could they talk, Farnsworth House and Wohnhaus would tell us something about their being. Something like this:

Farnsworth: "I am pure as a geometric solid, true as a theorem, eternal as an archetype"

Wohnhaus: "I am pure as simplicity, true as real life, eternal like nature"

Any architecture, in order to be truly that, aspires to eternity, not just in the sense of building something that will last forever, but also by giving form to ideas living above time. So to resume the sentiments the villas just "voiced", we could say that Farnsworth House is the daughter of an Idea, and Wohnhaus the daughter of Tradition. And, with this, we are brought to the greatest dichotomy of them all, perhaps the one from which all the others dialectically descend: the one masterly represented by Raphael in the School of Athens, where Plato points his finger towards the sky and Aristotle holds his hand horizontally, inviting us to come back to earth.

And this is what renders the villas two eternal masterworks, notwithstanding Farnsworth House's functional shortcomings, its impossible cost, and Mrs Farnsworth lawsuit. And the fact that the Wohnhaus is just a drawing lost in the papers of an architect almost forgotten by history.

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[22] Lord Peter Palumbo, in Maritz Vandenberg, *Farnsworth House. Ludwig Mies van der Rohe*, Phaidon Press, London 2003, pp. 18-19.

[23] Robin Evans, "Mies van der Rohe's Paradoxical Symmetries", in *Translations from Drawing to Building and Other Essays*, Architectural Association, London 1997, pp. 233-276. See in particular: "[his] structures have nothing to do with material or weight. They refer to organizing formats which may be imposed upon, or discovered in, material objects, but which remain conceptual, like the structure of a sentence", p. 245.

[24] See: Jean Robert, "Autonomy and Heteronomy in Architecture Theory: Part I", in *The International Journal of Illich Studies*, vol. 6, n. 1, 2018, p. 11.

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Stone Genoese and Renaissance gates: colours and textures.
A proposal for interdisciplinary researches

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Abstract

During the XII-XVI centuries Slate, Promontorio stone and Carrara marbles were the most used building materials in Genoa. A new approach to this historical topic is possible, connecting architectural surveys, metric investigations and scientific analyses. This study point out deep and natural connection between texture, colour and stone in the realization of a congruent urban landscape".

Abstract

Durante i secoli XII-XVI l'Ardesia, la Pietra di Promontorio e il marmo di Carrara erano i materiali da costruzione più utilizzati a Genova. Un nuovo approccio a questo argomento storico è possibile, collegando rilievi architettonici, indagini metriche e analisi scientifiche. Questo studio evidenzia una connessione profonda e naturale tra tessitura, colore e pietra nella realizzazione di un paesaggio urbano congruente.

Introduction

In 1518 Raphael entrusted to Perin del Vaga and Giovanni da Udine the decorations of Logge Vaticane in Rome; then in 1527 Andrea Doria invited the painter in Genoa to decorate his palace of Fassolo. Perin spread in the city roman fashion in garnishing the façades of aristocratic and bourgeois palaces with polychrome frescoes. This trend developed in Genoa from the half of XVIth century to the end of XVIIIth century and changed radically the chromatic appearance of urban spaces. However in XIXth and XXth centuries the extensive restorations made by débadigeonnages and to rescue of Medieval and Renaissance building components (windows, gates, decorations), altered this state.

The present appearance of ancient buildings doesn't allow a virtual recreation of the colours of Genoese urban spaces between the XIIIth and XVth century. It's only possible to suppose a ruling role for some varieties of stones in architecture: this is unquestionable in decorative parts, but it is not so clear in structural parts because of protective plasters over layered. Monumental stone gates instead are an important evidence of the employment of a great variety of building stones. Genoa was the most important Italian harbor in import-export of rough and wrought stones; in the city there were a lot of workshops and the artisans were both local and foreigner: they came from Versilia, Lunigiana and from the Lakes' District in Milanese duchy. These stonemasons produced artistical, technological ad entrepreneurial knowledge that reached an international value. The Andalusian castles of La Calahorra (1491-1515) and of Vélez-Blanco (1504-1516) were enriched by luxurious marbles that were produced in Genoa (thanks to an avant-garde standardization of the pieces) and then sailed and assembled by Genoese workers in situ.

A good number of monumental stone gates - from 1475 to 1520 approximately - constitutes a homogenous group for artistic and technological investigations. They were built with slate, Promontorio stone and many varieties of Carrara marbles. Art historians have produced meticulous researches about this study case, but they need also in-depth analyses focused on architectural design, metrology, materials, standardization in technology and assembly techniques in situ. The gates belong to the aesthetic taste that Enea Silvio Piccolomini expressed describing Genoa (epistle to Andreozzo Petrucci, march 1432): he insisted on a predilection for valuable ornaments, as much in gown as in construction. Monumental stone gates could be consider as shining jewels - a status symbol - pin on a plain dress. The stone gave a bright chromatism to a simple building.

This project seeks a well-organized methodology in which metrological surveys and scientific investigations are in dialectical and scientific agreement. This methodology leads to a full knowledge of an architectural work and to its "ethical" conservation: looking at a work of art it's impossible to divide technological components from aesthetic and historical values. Hanna Jedrzejewska theorized the full conservation of heritage as a cultural action in which historical and scientific surveys must join in a balanced agreement.

The application of diagnostic methods to historical-artistic assets is particularly useful for the study, the classification and the conservation of architectural and cultural heritage.

In this preliminary study it was applied a non-invasive and non-destructive method for chemical components analyses in four gates located in: P.zza di S. Donato (slate lithotype) n° 21, P.zza G. Cattaneo (marble lithotype) n° 2 and via delle Grazie n° 25 and n° 50r (slate lithotypes). In addition to the study of the building stone materials, it was decided to investigate the chemical composition of any alterations and degradation revealed, such as fading, discolouration, patinas, disintegration. In addition, construction elements extraneous to the lithotypes (spikes) were also analyzed.

A portable XRF spectrophotometer (FP-EDXRF, Field Portable Energy Dispersive X-ray Fluorescence - XMET7500 Oxford Instruments) was used to analyze chemical elements present in the matrices and, therefore, determine qualitatively the matrix compositions and point out, if revealed, extraneous elements. This is possible thanks to the adaptability of the instrument and the internal software, which is able to modify the acquisition methods according to the matrix under investigation.

With this approach we wanted to set about a possible diagnostic study based on historical, cultural

researches and scientific investigations. Furthermore, because of the analytical limitations of the instrumentation used, these monumental stone gates should be investigated also with micro-destructive analytical techniques, which are able to give quantitative measurements and important information to draw complete analytical conclusions.
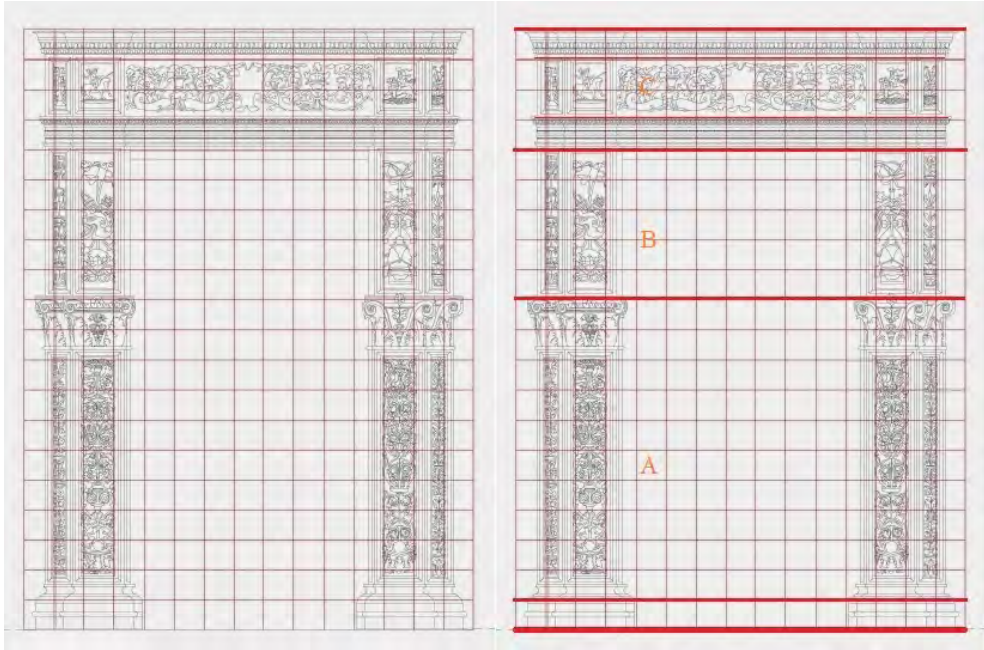
Fig. 1 – Metrological survey of marble gate in Grillo Cattaneo palace. Architectonic order (A), pilasters (B) and trabeation (C) are modulated on the basis of genoese span (0,248083 m.). Metrical survey and drawing by Veronica Falappi

Methodology

In the field of cultural heritage, X-ray fluorescence (FP-EDXRF) is a widespread technique, thanks to the use of a non-destructive analysis method. The analyses can be carried out directly in situ with the aid of portable instruments, which are suitable for compositional analysis of the materials constituting an artwork. With this approach it is possible to obtain numerous information regarding to the chemical composition of the matrix under investigation.

The radiation from the artefact is detected, as a function of its energy, by the solid-state detector SDD (Silicon Drift Detector) of the spectrophotometer, which allows to identify in a single measure all the elements constituting the artefact. The instrument is able to detect any chemical element with atomic number greater or equal to 12 (corresponding to magnesium); this analytical limit has not to be underestimated, since it does not allow the analysis of organic component, such as the concentration of carbon or oxygen.

However, despite some limitations, XRF spectrophotometry applied with portable instrumentation is a fast and versatile method to obtain very important preliminary information in every field of application. The instrumental characteristics are shown in figure 2:

X-ray tube	45 kV, Rh target
Detector	**NEW** Large area Silicon drift (SDD)
Primary beam filters	5 position filter changer
Element range	Mg – U
Battery life	10-12 hours
Computer	Integrated
Weight	< 1.8 kg

Fig. 2 - Instrumental characteristics of the XMET-7500 Oxford Instruments spectrophotometer

The instrumental detection limits are shown in table 1:

Elemento	Mg	Al	Si	P	S	Cl	K	Ca	Ti	V	Cr	Mn	Co
LOD (ppm)	3500	694	1	38	78	10	36	24	12	13	8	9	4
Elemento	Ni	Cu	Zn	As	Se	Sr	Zr	Nb	Mo	Rh	Ag	Cd	Sn
LOD (ppm)	2	2	3	1	1	2	2	4	3	10	8	9	14
Elemento	Sb	Ba	Ta	W	Au	Pt	Hg	Tl	Pb	Bi	Th	U	
LOD (ppm)	15	74	6	6	3	3	3	2	3	2	4	3	

Tab. 1 - Detection limits (LOD) for the analyzed elements (expressed in ppm)

The lithotypes considered in the study in question are:

- Slate: dark gray-coloured shale, of low metamorphic grade composed by various clay mineralogical phases such as calcite, illite, chlorite, muscovite and quartz. It has the peculiarity of separating into thin slabs with a flat surface.
- Marble: limestone ($CaCO_3 > 95\%$), which, due to dynamic or contact metamorphism, has assumed a uniform grain crystal structure; its accessory mineral components are quartz, graphite, iron hydroxide, etc.

The carrying out of the analysis involved the positioning of the instrumentation directly in contact with the materials (figure 3); the time required for the acquisition strongly depends on the matrix under investigation. As far as slate and marble are concerned, each revelation required acquisition times of 120 sec: acquisition times are necessary for obtaining statistically reproducible results. The concerning both the chemical composition of the matrix itself and the chemical composition of the alterations found. Instead, for the analysis of construction materials such as metallic spikes, an acquisition time of 30 sec was sufficient.

The instrumentation integrated camera was used for the correct positioning of the instrumentation at each survey point: the camesa is also equipped with a "cross" pointer directly viewable on the spectrophotometer screen (shown as an example in figure 4). Each point subjected to investigation is reported in the Fig. 5, 6, 7, 8.

The gates photos were modified with RDF, a straightening photogrammetry program: thanks to metrological surveys (fig.1) it was possibile to scale properly the photos and to define where every survey point were placed geometrically.

Fig. 3 - *Positioning of the instrumentation directly in contact with the matrix*

Fig. 4 - *Example of acquisition using a camera with a "cross" pointer*

Fig. 5 - *Piazza di San Donato n° 21*
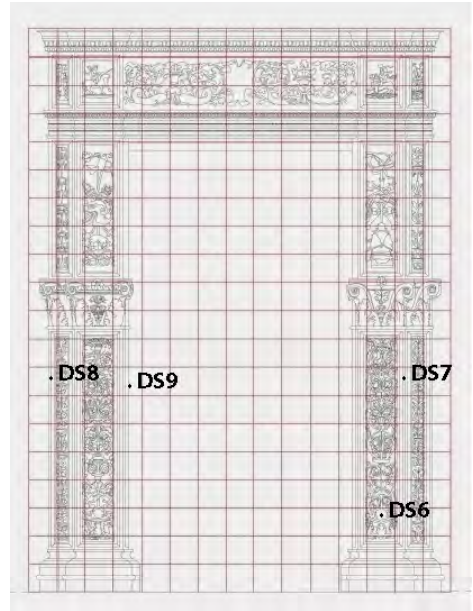
Fig. 6 - *Piazza G. Cattaneo n°2*

Fig. 7 - Via delle Grazie n° 25

Fig. 8 - Via delle Grazie n° 50R
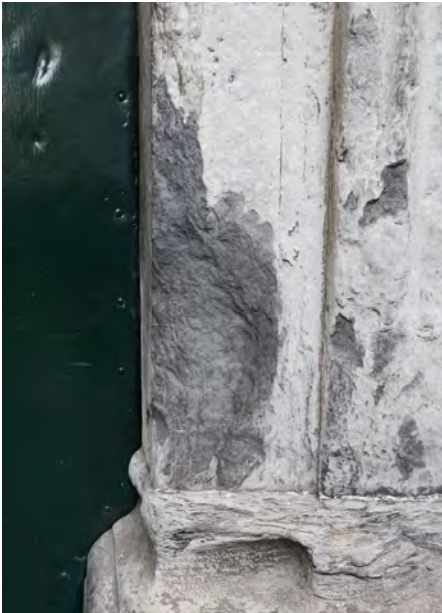
Fig.9 - Loss of components due to mechanical damage

Fig.10 - Dissolution of calcareous stone surfaces exposed to water run-off

Fig.11 - Discolouration

Fig.12 - Exfoliation: detachment of multiple thin stone layers (cm scale) that are sub-parallel to the stone surface.

Fig.13 - Fracture

Fig.14 - Dissolution of calcareous stone surfaces exposed to water run-off

Results

The results obtained are shown in Table 2 and 3; Table 2 shows the results of the analyses carried out on the two different lithotypes (Marble and Slate), obtained by an analytical method specific for the recognition of the elementary components in stone materials.

Table 3, on the other hand, shows the results obtained using a specific analytical method for the analysis of metal alloys.

From the interpretation of the data reported in table 2, in addition to the elements characterizing the two lithotypes (Si, Al, Ca, K, Fe, Ti, etc.), there are chemical elements representative of probable alterations developing, for example, from the interaction with atmospheric pollutants or deriving from the application of protective / varnish layers.

In both the lithotypes the more or less high concentrations of sulfur (S) stand out, because it is not an element naturally involved in the chemical-mineralogical composition of slate and marble.

The presence of this element is probably due to chemical reactions generated by the interaction of the carbonates present in the lithotypes and the compounds present, for example, in atmospheric pollutants. Pollutants such as sulfur dioxide (SO2) and carbon dioxide (CO2) are among the main causes of acid rain that can lead to sulphation and dissolution reactions.

Specifically, sulfur dioxide will lead to the formation of sulfuric acid (H2SO4) by reaction with the water vapour present in the atmosphere, causing sulphation phenomena:

$$CaCO3 + H2SO4 + H2O \longrightarrow CaSO4*2H2O + CO2$$
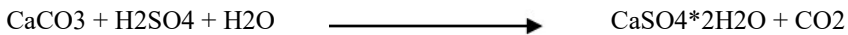
Carbon dioxide, on the other hand, if present in suitable quantities can cause dissolving acidic phenomena of carbonates, naturally insoluble in water under "normal" conditions, turning them into water-soluble calcium bicarbonate and, therefore, leachable until acidic conditions persist in the reaction:

$$CaCO3 + CO2 + H2O \longrightarrow Ca(HCO3)2$$
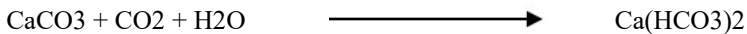
The leaching is well present in all the survey gates, especially in those made of slate where it is possible to notice a marked exfoliation (fig. 11); however, the gaps found are also certainly due to the impacts suffered over time by the gates (fig. 9 and 13).

In the P.zza G. Cattaneo gate, the presence of sulfur should be thoroughly investigated as a symptom of degradation still present, despite the cleaning intervention carried out not many years ago. This could mean that the cleaning intervention was not followed by any conservation maintenance plan, aimed to avoid a new formation of deteriorating agents.

Another foreign element to the natural composition of the lithotypes is lead (Pb); its nature could be variable. On one hand, lead-based paints may have been applied during the ages (as in the case of the gate located in P.zza di S. Donato), probably to make the colour of the portal homogeneous; discolouration (fig. 11) could be caused by the interaction of the paint with the surrounding environment or through the further application of protective products. Another derivation of lead could be due to the deposition of atmospheric particulate, which was, until a few decades ago, heavily present in the vehicles exhaust fumes of and, even today, present in the fumes released by industrial activities.

At points DS15 and DS16, attributable to the gate under investigation in via delle Grazie, 25, chlorine (Cl) was revealed; this element, extraneous to the natural composition of the slate, could be due to the application of a microcrystalline wax applied in the past decades for protective purposes, following a cleaning for conservative purpose carried out on the portal. This possibility can be assessed by the fact that, the analysis carried out at point DS17, corresponding to a portion of lithotype in which this protection is not present (following an impact suffered by the material), the chlorine element was not detected.

Points DS12, DS13 and DS16, regarding the nails present in the two portals of Via delle Grazie, showed the use of ferrolega, that is a similar alloy to the cast iron (Fe-C), in which silicon (Si) was used in binds with iron instead of carbon. For this reason the material, especially in the gate of via

delle Grazie 50r, is rustier, since naturally more attachable if not adequately protected as in the case of the portal of via delle Grazie, 25 (Fig. 7 and Fig. 8).

Name	DS1	DS2	DS3	DS4	DS5	DS6	DS7	DS8	DS9	DS10	DS11	DS14	DS15	DS17	DS18
Material	Slate			Slate			Marble			Slate			Slate		
Position			P.zza di S. Donato			P.zza G. Cattaneo			Via delle Grazie, 50r			Via delle Grazie 25			
wt% (major elements)															
SiO_2	32,72	34,69	32,77	36,21	34,82	9,64	5,69	8,75	11,88	32,22	39,02	40,15	27,39	21,16	23,85
TiO_2	0,64	0,59	0,54	0,70	0,62	0,07	0,07	0,28	0,08	4,66	0,81	0,63	0,82	0,70	0,65
Al_2O_3	5,14	5,77	5,07	6,10	7,31	1,80	1,37	2,15	2,13	4,71	7,30	6,83	4,55	3,20	4,28
Fe_2O_3 t	4,02	4,17	3,90	4,40	3,21	0,40	0,31	1,65	2,07	22,89	5,82	6,39	4,21	4,46	4,01
MnOt	0,07	B.D.L	B.D.L	0,05	0,05	B.D.L	B.D.L	B.D.L	B.D.L	0,09	0,15	0,13	B.D.L	B.D.L	B.D.L
MgO	B.D.L	B.D.L	B.D.L	B.D.L	2,17	B.D.L	B.D.L	B.D.L	7,03	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L
CaO	49,97	47,64	48,43	44,78	44,48	82,57	87,17	80,98	69,70	23,32	38,88	38,45	51,47	59,14	59,10
K2O	1,64	1,77	1,68	1,99	1,68	B.D.L	B.D.L	1,00	B.D.L	1,24	2,46	2,48	1,96	2,00	1,65
P_2O_5	B.D.L	0,11	B.D.L	0,23	0,10	0,15	0,07	0,19	3,71	0,73	0,49	0,20	0,54	0,15	B.D.L
TOT	94,20	94,75	92,39	94,46	94,43	94,63	94,68	94,99	96,60	89,86	94,92	95,25	90,94	90,81	93,54
mg/kg (trace elements)															
Name	DS1	DS2	DS3	DS4	DS5	DS6	DS7	DS8	DS9	DS10	DS11	DS14	DS15	DS17	DS18
S	8815	4421	18727	8178	8502	7258	7490	7847	12841	53061	8362	5375	18058	15896	12529
Cl	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	20900	17378	B.D.L
V	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	5041	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L
Cu	B.D.L	B.D.L	B.D.L	108	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	2404	132	110	B.D.L	B.D.L	B.D.L
Zn	856	810	1012	216	131	325	121	174	82	749	267	200	116	195	B.D.L
Sn	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	B.D.L	512	660	B.D.L
Pb	1619	947	3003	2587	122	1049	686	B.D.L	497	3988	167	108	2687	3849	3490

Tab.

Name	Material	Position	Al	Si	P	Ti	Mn	Fe	Cu	Zn	Sn	Pb
DS12	Alloy	Via delle Grazie, 50r	1,98	4,99	0,58	B.D.L.	0,04	92,26	B.D.L.	B.D.L.	0,06	0,09
DS13	Alloy	Via delle Grazie, 50r	2,99	9,30	1,02	B.D.L.	B.D.L.	86,28	0,12	0,13	B.D.L	0,16
DS16	Alloy	Via delle Grazie, 25	B.D.L.	2,69	B.D.L.	0,11	B.D.L.	95,83	0,16	0,09	0,12	1,00

Tab. 3 - results of the analyzes carried out on the metallic components expressed in % p / p (B.D.L. – Boundary Detction Limits).

Conclusions

As mentioned above, this type of approach must be seen as a first analytical step for the study, survey and conservation of the lithotypes used for the realization of historical portals.

Because of the characteristics of the instrumentation used, the advantages and disadvantages listed, and in order to define better materials and alterations (patinas, crusts, gaps), it is necessary to carry out more detailed investigations to determine complete analytical conclusions and possible conservative interventions to be applied.

To reach a set of scientifically representative data aimed at drawing up the compositional characteristics of the materials and the presence of elements foreign to them, due to the possible previously described alterations, in addition to the in situ XRF technique, it would be necessary to use more and different diagnostic techniques such as: optical microscopy, scanning electron microscopy combined with X-ray spectrometer (SEM-EDS - Scanning Electron Microscopy-Energy Dispersive Spectrometry) and XRD spectrometry (X-ray Diffraction). The drawback of these methods is the need to take samples, even if in minimal quantities (micro-destructive).

Optical microscopy would allow, through the study of a thin section (maximum thickness 30μm), to determine the mineralogy of a lithotype, studying the optical characteristics of the minerals that make up the matrix. In the case of the P.zza G. Cattaneo gate, this technique would allow us to accurately determine the type of marble that was used, but also to specify the origin of which could, through the mineral-petrographic characteristics, study the degree of metamorphism suffered by the parent rock. The type of metamorphism undergone is in fact specific to a given geological area of extraction.

Scanning electron microscopy would characterize the morphology of the lithotypes; combined with the EDS probe (or EDX), it allows the qualitative and semi-quantitative identification of the constituent materials, through elementary microanalysis also of the chemical elements present in traces. In this case, unlike the XRF technique, organic compounds could also be determined. Moreover, through the use of this instrumentation, images with a high degree of resolution and high magnification (up to 100,000x) would be obtained, thus being able to observe in detail the phenomena of chemical, physical and biological degradation of materials.

X-ray diffractometry (powder method) would make possible to perform semi-quantitative or quantitative analyzes by taking a minimum quantity of sample (about 0.5 g). This technique would lead to the determination of the crystal lattice of the stone matrix, being able to distinguish also very similar lithotypes (for example the Ligurian slate from a slate coming from other areas). It would also be very useful for the study and determination of salt efflorescence, crusts and patinas due to the presence of alterations, such as the black crusts or oxalates that covered the stone surfaces.

Even degradation phenomena would require specific studies: the first approach to this study could be reveal any alteration/degradation phenomena and record them in a "degradation map" studying the relationship between the phenomena and the context, the atmosphere conditions and the building materials. These maps are made using atlases recognized nationally and internationally (UNI 11182; ICOMOS-ISCS, Illustrated glossary on stone deterioration patterns) to accurately describe the type of alteration and / or degradation.

These analytical techniques are just a few application examples. The scientific techniques applicable

in the field of diagnostics of historical-architectural heritage are innumerable. Furthermore, the scientific approach cannot be exempt from the historical study, the documentation (when available) and the cultural context.

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Procedural applications of chromatic values in mormative matters: the village of Zuccarello

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Abstract

The gradual and widespread interest in the elements that characterize the historical identity of the city has led to new stimuli for the municipal administrations, which have profoundly renewed the urban planning instruments by launching programs for the restauration and enhancement of historic centres. The Color Project, aimed at restoreing the chromatic values of a specific urban nucleus, through understanding, and the enhancement of architectural and typological characteristics, is one of the urban planning tools that have most affected scientific research and has undergone important changes over time.

Paradoxically, one of the most obvious consequences of many "restorations" in historic centres is the trivialisation of the original image of the building's characteristic elements, such as plaster, colors and other "chromatic ensembles" and of street furniture, effectively escaping the specification legislation designed to regulate the interventions or to not complete integration with other urban planning regulations. In particular, the importance of the management of the overall image that is formed by the overlapping and coexistence of several procedural applications in the normative field is more evident in the smaller urban centres. Specifically, the article investigates, through the case study of the Color Project of Zuccarello (SV), the perceptive chromatic re-reading of the building fabric, not only through two-dimensional representation, but also with the aid of photogrammetry and modeling, a three-dimensional representation, for a complete definition and connection with all the elements involved.

Abstract

Il graduale e diffuso interesse per gli elementi che caratterizzano l'identità storica della città ha comportato nuovi stimoli per le amministrazioni comunali che, hanno rinnovato profondamente gli strumenti urbanistici avviando programmi di recupero e valorizzazione dei centri storici. Il Progetto Colore, finalizzato al recupero dei valori cromatici di un determinato nucleo urbano, attraverso la comprensione, e la valorizzazione delle caratteristiche architettoniche e tipologiche, è uno degli strumenti urbanistici che maggiormente ha interessato la ricerca scientifica e che ha subito importanti modifiche nel tempo. Paradossalmente una delle conseguenze più evidenti di molti «recuperi» nei centri storici è la banalizzazione dell'immagine originaria degli elementi caratterizzanti l'edilizia, come gli intonaci, i colori ed altri «cromatici» e di arredo urbano, sfuggendo di fatto agli insiemi specifica normativa atta a disciplinarne gli interventi o alla non completa integrazione con le altre normative urbanistiche. In particolare, l'importanza della gestione dell'immagine complessiva che si viene a formare dalla sovrapposizione e compresenza di più applicazioni procedurali in materia normativa, si evidenzia maggiormente nei nuclei urbani minori.

Nello specifico l'articolo indaga, attraverso il caso studio del Progetto Colore di Zuccarello (SV), la rilettura percettiva cromatica del tessuto edilizio, non solo tramite la rappresentazione bidimensionale, ma anche con l'ausilio della fotogrammetria e la modellazione, una rappresentazione tridimensionale, per una completa definizione e connessione con tutti gli elementi coinvolti.

New representative methodologies in the management of color projects

The normative management of the color projects and of the graphic-design elaborations linked to the identification of the peculiar characters of the places is investigated in this article, bringing for example a case study result of the Research Agreement stipulated between the Cts_ColorLab, for which the writer is responsible, and the Municipality of Zuccarello[1].

The research activities carried out within the Color Laboratory are aimed at the integrated survey of buildings, using advanced instrumentation (drone- three-dimensional elaborations- holographic visualizations- realistic simulations) in relation to the chromatic values of historical and modern buildings.

The age-old problem for the protection of buildings, also under the visual-perceptual chromatic aspect of the places and the recovery of the design and chromatic characteristics, is treated here in the awareness that the management of the works should allow the continuous updating of the data in the congruence of the changing building materials. Due to its change, subject to continuous transformations in the urban environment, it still remains an evolving field for studies and evolutions on possible approaches that not only fill what may be discrepancies or alignments with current legislation, but which allows an even more evident connection with the perception of the urban landscape in its entirety.

In Italy, not all Regions have adopted laws referring to the theme of color, among those already

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[1] The chromatic values of the Historic Center of the Municipality of Zuccarello (SV): identification of the optimal tools for the acquisition of color data in construction; geometric metric relief; graphic restoration and chromatic design hypothesis. Scientific responsible : G.Pellegri, Operative responsible F. Salvetti.

consolidated we can include Liguria, the Color Plan of Turin city of 1997 extending, at the methodological level, now to all the municipalities of Piedmont, Region Campania Public building Regulations for the implementation of regional law 18 October 2002, no. 26: "Rules and incentives for the enhancement of the historic centers of Campania and the cataloging of environmental heritage and of landscape quality", amendments to the Regional Law of 19 February 1996 n. 3, and the Sicilian Region Law with the" Plan of the Color of the Urban Decor and of the Landscape for the Cities, Seas and Mountains of the Regional Territory". In the absence of regional laws specific for the Color Projects, guidelines according to the government and protection territorial use, or the laws of protection by the Ministry of Cultural Heritage are being implemented. The Liguria Region with the law n. 26/2003 entitled "Color Cities", which modifies lr 25/1987, considers as a fundamental value for the community, the decoration of buildings and of public spaces and it provides for the granting of contributions to the Municipal administrations that will use a "Color Project". The project must identify both the materials, the colors and the pictorial techniques that are part of the local historical-architectural tradition, and the colors best suited to lighten the visual impact of large buildings[2].

The international conditions defined in 2000 by the European Landscape Convention and by the Reform of the Code of Cultural Heritage, respectively from 2000 and 2004, still today have not significantly influenced the specific management of data processing linked to representation and perception for the continuous implementation in the evolution and transformation of objective data on the conservation of chromatic values.

The three-dimensional modeling of objects in the urban environment is a rapidly growing field of research. The evolution of acquisition techniques and processing methods allows to adopt a simplified methodology, not only at the field work level, but also during the subsequent processing and post-production phase.

The current development of photogrammetry techniques, thanks to the evolution in the field of computer vision and in particular of the strategies from Structure from motion (SfM), are presented as a new generation of highly versatile tools accessible to the professional of documentation or protection. of heritage.

It also provides immediacy during documentation tasks, as it requires limited planning when it comes to placing photographic shots, as opposed to the laborious planning of shooting for traditional photogrammetry or the lack of operability of some equipment in certain working conditions.

The methodology addressed in this specific case gives rise to dense point clouds, it is very easy to connect with other workflows based on the virtualization of objects or scenes, regenerating mesh surfaces and photorealistic textures, as well as creating error-free orthophotos or orthoimages. of perspective.

As part of the Zuccarello Color Project, the in-depth analysis of the relief of the built heritage has highlighted how digital representation, for the knowledge of all the constituent elements of the building material, is a fertile basis for experimenting with new forms of visualization of places. represented.

The experience was aimed at deepening, through direct experimentation, some photogrammetric survey techniques compared to current image-based applications in the field of Cultural Heritage,

[2] G.Pellegri, Drawing the Color: Project - Rules – Suggestions, De-Sign Environmet Landscape City, Genova, David and Matthaus collana Athaeneum, 2017.

to obtain high-definition three-dimensional reconstructions and models of the area under study. The experimented photogrammetry project had an essentially methodological purpose, which underlines the new potential of fruition and dissemination of scientifically collected data during the survey phase. One of the most interesting aspects of the application of relevant techniques, as a critical restitutor of the characters that make up the construction reality, with the instrumental potential offered the opportunity to return three-dimensional virtual models of the entire area with very high levels of detail.

SfM techniques are proposed as an important heritage documentation tool, not only for their important levels of geometric precision, but also for the accessibility and immediacy of this technique, whose levels of detail are conditioned exclusively by the resolution and the number of images used.

The figure of the professional in data management for the protection of color values related to perception is linked to the Gestalt principles applied to places. In this sense, K. Lynch's theory of figurability is perfectly linked to the three-dimensional visual modality of the city in the search for readability of the urban form also given by the comparison of the elements of the urban image identified in general in the systematization of the differences that can be listed as follows : routes, margins, neighborhoods, nodes and references.

The representation of the elements contributes to determining a systematic approach to the identification and determination of the urban image also linked to the chromatic aspect.

Plans and Projects Colour: Reference standards

The interest in the last fifty years for the protection of the visible and perceived aspect of the building, in its volumetric, design and chromatic characteristics, has been a topic widely dealt with both in the theoretical scientific and regulatory fields

The definitions and provisions on landscape introduced by the European Landscape Convention on 20 October 2000 and subsequently confirmed by the reform of the Code of Cultural Heritage Legislative Decree 42 of 22 January 2004, which introduced the importance of protection and the enhancement of the landscape as an identity of the entire community, including within it, from an anthropic point of view, the transformations that man has produced in the area with the built-up area, led to the evolution of the theme of color, defining it as an element of strong characterization of inhabited centers. It was in those years that the first regional laws were issued aimed at defining guidelines for the conservation, enhancement and maintenance of buildings and common parts of the existing heritage, in order to restore and guarantee the building fabric a recognizable identity and high urban quality.

In the twentieth century in particular, the role of color in construction and its study as a qualifying and identifying aspect of our environment led to the creation of multiple fields of investigation on historical documentary bases, technical/objective analysis and theoretical / sociological observations. The control of geometries and colors on an urban scale, in particular for the historical one, where the signs left by the past are present and evident, becomes an element where the scientific debate has outlined different approaches and experiments in the design choices. Specifically in Italy, starting from the 70s of the last century, the impetus was given to planning and designing the urban landscape through the birth of the Color Plans. The intent was to enhance and codify, through specific legislation,

the interventions on buildings and on the colors of urban centers as a whole.

The Regions that have adopted laws regarding the specific color theme to date are, in temporal sequence of implementation, the Campania Region L.r. 26/2002[3], the Liguria Region L.r. 26/2003[4] and the Sicily Region that with the bill has prepared the "Plan of the color of urban decoration and landscape for cities, seas and mountains of the regional territory" drawn up in 2003[5]. The list can be integrated by the Piedmont Region which, despite not having a specific law, in 2010 resolved a legislative[6] address on the subject of "Urban recovery, architectural quality and landscape insertion", in which Municipalities are suggested to adopt Color Plans, to be drawn up according to the now consolidated methodology of the Color Plan of the Municipality of Turin.

In the absence of specific regional laws, which guide not only the drafting of the project by the designers but also the implementation by the municipal administrators, the plans and color projects are left to the sensitivity of the Municipality itself, unless interventions are carried out punctual on constrained construction in which there is an obligation to follow the provisions on the protection of cultural and environmental assets of Legislative Decree 42/2004.

Within the regional laws, it is unequivocally highlighted how these projects must be received as an implementing regulatory tool with which local administrations integrate and complete the other urban planning tools already in force and as if in contrast the regulations of the Plan prevail of Color.

The regional laws differ in particular on the implementation of the legislation only within a chosen area or which may also include the extension of the built out of scope even if not involved in fact-finding investigations and design choices; and on the flexibility or not of prescriptive use of the technical standards. In some cases, in fact, general rules are dictated which, while orienting the design choices to the recovery of the typological, constructive and chromatic characteristics of the historical building, respect the possible variability of the choices within an abacus provided by the legislation itself.

The most evident consequence of many recoveries is given precisely by this wide decision-making freedom on materials and colors, because it refers to a system of rules and chromatic combinations of the single prospectus not considering the aspects related to the visual perception of the chromatic values of the single building inserted in a context in particular the neighboring one.

Another element that leads to the trivialization and repetition of the chromatic sets of the original image is the use of the color chart, drawn up according to specific direct and indirect surveys on the buildings falling within the scope, even in neighboring areas or in small neighboring construction realities .

In particular, the importance of managing the overall image that is formed by the overlap and co-presence of multiple procedural applications in regulatory matters, is more evident in the smaller urban areas.

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[3] Regional law n. 26 of 18 October 2002: "Rules and incentives for the enhancement of the historical centers of Campania and for the cataloging of environmental quality landscape goods", amendments to the regional law of 19 February 1996 n. 3

[4] Regional law n. 26 of 27 October 2003 "Città a Colori", amendments to regional law 25 of August 5, 1987 "Regional contributions for housing recovery and other planned interventions.

[5] The Regional Landscape Territorial Plan (PTPR), drawn up in 1996 by the Department, is also a useful reference and comparison tool to BB CC.

[6] The municipality as part of its organizational autonomy, according to the resolution of the Regional Council n.247-45856 on urban recovery, architectural quality and landscape insertion, art.106 can refer to the indications contained in the D.G.R. n.30-13616 of 22 March 2010 art.106 "Tools for the protection and enhancement of the landscape: approval of the guidelines for the landscape quality of the settlements Good practices for building and address planning; Good practices for local planning and art. 109 in reference to a summary definition of the Color Plan.

A case study: the Borgo di Zuccarello

In the specific case of the Zuccarello Color Project[7], in order to develop a design culture for the management of the existing building heritage in the interventions of ordinary and extraordinary maintenance, restoration and conservative restoration of the walls, the foundations of the reference methodological matrix are laid for a reading and a recovery of the surface treatments of the facades, of the construction techniques, of the materials and for a correct chromatic reading of the building units facing the via Tornatore.

Pursuant to art. 7bis of the L.R. 25/1987 and subsequent mm. and ii., the Color Project will entail effects of integration of the current "Recovery Plan of the Historic Center[8]" and of prevalence over what is in contrast, as regards the scope of application as defined in the planning stage.

During the analysis and design phase, the case study highlighted several orders of problems from which reflections and proposals for possible changes are generated, including in the regulatory framework.

First of all, the inconsistency of management in the control of the transformations implemented with the Recovery Plan of the historic center, in which the fronts and in particular their material and chromatic surface treatment were not protected in their original expressive integrity. There are many cases of fronts treated with painted decorations, re-proposed with different decorations and of a plastic nature. Secondly, the recent recovery of the portico has entailed the plastering not only of the porticoed surface but also of some parts of the elevation, going to cover traces of valuable historical painted decorations still preserved.

In this sense, in order to guarantee the effectiveness and management of the interventions, according to the existing town planning guidelines, the competences that have the task of guaranteeing their compliance with the Project and providing it with a control system should be identified within the administrative structure. display of the project itself more usable and immediate.

The primary objective is therefore to protect the original historical image in its volumetric/constructive design / chromatic characters and identities of the place, including inside the possibility of transformations that take into account the natural evolution of the building, avoiding to fix and freeze the in the current state but assessing the possible guidelines as a starting point for the application by technicians and administrators of the reference legislation.

In this the regional law of Liguria is the one that, with respect to the other Regions mentioned above, has issued more prescriptions and restrictions on the definition of Color Projects, in particular by inserting in the implementation regulation, in a timely manner, all the documents required in the drafting phase, including which the representation of the "spatial relationship between the volumes and the chromatic perception as a whole".

To date, this type of investigation has resulted specifically in a detailed photographic campaign through approaches to the area, for a visualization of the building as a whole, according to the main route for a visualization of the spatial relationships of the fronts and detail of the single fronts for

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[7] Indicatively, the Plan or Color Project is included within the landscape discipline at a precise level when the Municipal Urban Plan (P.U.C.) is formed, or drawn up within the Recovery Project of the historic center, or constitute the design element of an Urban Planning Implementation Tool, or as an Operational Urban Planning Project (P.U.O.) or drawn up within the Historic Center Recovery Project.

[8] The Municipality of Zuccarello adopted the Historic Center Recovery Plan in 1985.

punctual visualization; combined with the restitution of the survey of the road scenes, in the current and projected state, through the classic representation of orthogonal axes of the elevations that will be superimposed or mirrored on a reference plan, therefore with a two-dimensional view of the fronts.

The Color Project provides, according to a precise scientific methodological approach, the reading of the elements constituting reality, through the deconstruction of the same from the unitary image, as a fundamental decoding process for a detailed and detailed study of the individual issues. But it is also important for a better understanding and usability by all the actors involved in the process, to restore that image according to a natural and therefore three-dimensional visualization. The idea is to create three-dimensional models of the building in which its current state is represented, the project and the changes that the urban fabric will have over time with the application of the Color Project. Consequently, the current state model must be implementable and modifiable by the municipal administration, which will highlight its transformations, in the immediacy of the practical realization of the single front, in order to explain its renewed image on the model itself.

The complete three-dimensional model of the representation of our entire area, described in all its volumetric/material and drawn/chromatic parts, in the three different versions, appears to be observable as a whole and in the individual details with a rapid change of scale through multiple displays.

This type of reading would not only facilitate the professional in the drafting of the project and the administrative manager in the control of the same in the implementation, but through digital means of communication could allow the involvement of the entire community in all phases of the Color Project. Furthermore, the participation of the community in the implementation process could lead to a renewed sensitivity towards the matter, including its cultural value in maintaining that decorum and cleanliness of public spaces and buildings.

If, on the one hand, the design methodology has consolidated and applied the theories developed in fifty years of scientific research, on the other hand, it would be necessary to rethink at a regulatory level the inclusion of a reading of greater immediacy and understanding of future transformations of the building, in particular as regards a ten-year urban plan.

The three-dimensional application as a reading phase

The representation of the three dimensions is almost as old as its own artistic manifestations, and although it was studied from the classical period to the Renaissance, it was in 1840 when Charles Wheatstone[9] invented the stereoscope, capable of recreating with apparent simplicity the feeling of depth of pairs of drawings or figures in which slight differences between both would have triggered the feeling of depth if elaborated by our system of perception. Around 1858, years after the invention of the daguerreotype, this photographic process began to present itself as an ideal means of recreating stereoscopic scenes, which would have acquired importance as a tool for the study of different disciplines. In these same years, the German architect Albrecht Meydenbauer[10] began to develop the

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[9] During the first half of the nineteenth century the studies of Sir Charles Wheatstone led to the realization of the first stereoscopic experiments. In particular, he understood that the brain processes two two-dimensional images, coming from the eyes and unites them into a single three-dimensional image, allowing us to perceive depth. http://www.tuttovideo360.it/evoluzione/larrivo-della-fotografia-lo-stereoscopio-porta-panorama-casa/

[10] In 1858 the architect Albrecht Meydenbauer (1834 - 1921) used some frames to obtain measurements during the survey operations of the cathedral of Wetzlar, in the region of Hesse in Germany, thus creating architectural photogrammetry.

concept and techniques of photogrammetry as a tool for studying the geometric properties of objects and photographic scenes. Meydenbauer's achievements should not remain only in the development of photogrammetry, but we could also consider him one of the pioneers in the graphic documentation of the heritage for its conservation, since among his objectives was the use of photographic images to preserve the geometry of the buildings or monuments and to proceed with their reconstruction in the event of a disaster.

Today the photogrammetry, both of the distant object - such as aerial photogrammetry - and of the near object - oriented to the study of scenes or objects close to the observer - has gone from complex mechanical devices to functional IT tools.

Currently, advances in artificial visualization have brought new 3D modeling proposals to the market, such as structure from motion (SfM)[11]. In this line, software such as Agisoft's Photoscan or 3DF Zephyr allow to elaborate a three-dimensional model starting from digital photographs or videos. The result of a photogrammetric or SfM process is primarily a discrete point cloud; these discrete, or low-density, clouds are the result of what is known as the Bundler adjustment. This concept is closely related to photogrammetry and allows you to move a series of points in space that coincide between the images and the positions of the cameras that took them with respect to the scene. These points can be established manually, or in the case of SfM they are automatically detected by means of the so-called SIFT[12] process, with which homologous points are detected between pairs of images, which allows us to compare hundreds of images in order to extract common points. Although these scattered clouds may provide geometry information, they are insufficient to evaluate an object or scene in detail, so the final step in these SfM processes is usually a dense point cloud with points that describe the surfaces and geometry of the objects in a way more detailed.

When we talk about clouds of dense points, both obtained with SfM and with photogrammetry, we refer to a set of vertices described in a three-dimensional coordinate system of the XYZ type. Where in addition to spatial information, in the case of SfM and some LIDAR[13], each vertex or point is accompanied by a colorimetric description in the RGB model. This combination of geometric or spatial information with colorimetric data is particularly useful when it comes to acquiring descriptive information about a work or scene. During the SfM process, this color information is extracted from the image pixels used in the process, so if we have chromatic reliability in these images, they will be transferred to our dense point cloud. This phenomenon transversal to 3D modeling therefore requires particular attention to color management in the images used, in order to guarantee maximum chromatic fidelity.

Once we have obtained our dense cloud of points, we already have a document on which we can make both geometric and colorimetric estimates and where we can also connect our workflow with virtualization tasks for purely informational purposes, where photorealistic textures and synthetic lighting prevail over the loyalty of the models.

Each 3D model can be assigned a scale from a known distance between two points which allows measurements to be made in a particular system of measurement units. But we can also contextualize

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[11] SfM, based on the phenomenon whereby human or animal vision systems can reconstruct three-dimensional structures starting from 2D images projected on the retina thanks to the movement of these same structures with respect to the observer or of the latter with respect to said structures.

[12] Scale Invariant Feature Transform

[13] (Light Detection and Ranging) laser-scanning technology that allows you to determine the distance of an object or surface using a laser pulse and then reconstruct the morphology and obtain the shares of the territories flown over.

it in a coordinate system by assigning ground control points (GCP), allowing to elaborate scenarios with different models and to connect them to geographic information systems, to create layer-based models. SfM techniques are proposed as an important heritage documentation tool, not only for their important levels of geometric precision, but also for the accessibility and immediacy of this technique, whose levels of detail are conditioned exclusively by the resolution and the number of images used.

Conclusions

This methodological approach investigates the possible perceptual reading of the volumetric, design and in particular chromatic elements of the building fabric, not only through the two-dimensional representation but also, with the help of photogrammetry and modeling, three-dimensional for a complete definition and connection with all the elements involved.

The simultaneous visualization of the three-dimensional models for an immediate conversation between reality in fact, transformations in continuous updating and final project, would allow to frame the entire scientific and critical process, making explicit the different spatial relationships in a unitary image. The Plans and Color Projects, in fact, are planning tools that allow you to prefigure the future image of a place in a very long period of time, not taking into account what are the transformations and the new design and color perceptions that are coming to create; here this new view would allow, in the case of the Color Plans, in which the modification margin is left in the implementation phase, to be able to highlight inconsistencies in advance. On a regulatory level this could be a methodological implementation of reading that would fill that absence found to date, of a shared awareness of the constructive landscape features in the process of transformation, by the end user by opening to participatory procedure processes in the specific case of restricted areas.

The legislation thus implemented by updating and implementing three-dimensional digital visualization tools would become a form that places a new centrality in the interpretative process of the Plan, laying the foundations for an acceleration momentum of the recovery process which is currently very slow.

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Convenzione Europea del Paesaggio del 2000

Aerial view of Zuccarello. Digital processing of the images by F. Salvetti, taken from a three-dimensional digital model of Microgeoand Geomax and supplied by Instrumentrix. I.Cappelletti.

Territory and environment of the genoese before the development of Genoa outside the historical walls, in the paintings, in the watercolours, in the drawings, in the prints and in the drawings

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Abstract

The Genoese territory, which insists on the historic harbour arch, is a natural amphitheatre, formed by a wreath of fan-shaped hills, overlooking the sea and the historic city, on whose continuous ridge the medieval convents and the forts spired. But, this natural environment, more than the compact historical center of Genoa, has been so strongly transformed as to be almost totally unrecognizable today, because the vegetated covering was all built up and the historical buildings– churches-convents, Villas – Agricultural properties – absorbed in nineteenthcentury building matters.

All the free spaces – gardens, coltive zones, parks and gardens – were in fact occupied, up to high altitudes, by the massive building expansion, and by the even heavier, industrial in the nineteenth century, especially in the West Genoese.

This particular environment was characterized by a relationship between buildingnature and particularly scenographic characters, both for the shape of the territory, almost always in slope, and for the presence of the colors, vivid and brilliant of the built, counterpointed by the equally lively ones of the natural environment, in the various forms of plant covering, giving rise to overall environmental characteristics, both to the perception from close up, and to the perception from afar, absolutely original and peculiar.

Because today all this has been almost cancelled: structuring of the territory, paths, buildings, parks and gardens, it is possible to rediscover that configuration and those environmental characteristics, maintained intact until the end of the nineteenth century, in the paintings, watercolors , prints, drawings, and especially in the rsurveys of the seven-nineteenth century, which show attention to these characters in the wide axomometrics of the villas with gardens, parks and land pertaining.

This study allows to re-read this historical/environmental heritage, and to replenish this part of the image and perception of the city in its territory, which has been a strongly identity and decisive element of the Genoese environment from the landscape point of view.

Abstract

Il territorio genovese, che insiste sull'arco portuale storico, è un anfiteatro naturale, formato da una corona di colline a ventaglio, affacciato sul mare e sulla città storica, sul cui crinale continuo svettavano i conventi medioevali ed i forti. Ma, questo ambiente naturale, più del compatto centro storico di Genova, è stato così fortemente trasformato da essere oggi quasi totalmente irriconoscibile, perchè il ricoprimento vegetato è stato tutto edificato e gli edifici storici presenti – chiese - conventi, ville – proprietà agricole – assorbiti nella materia edilizia ottocentesca.

Tutti gli spazi liberi – orti, zone coltive, parchi e giardini – sono stati infatti occupati, sino ad alte quote, dalla massiccia espansione edilizia, e da quella ancor più pesante, industriale, dell'Ottocento, soprattutto nel ponente genovese.

Questo ambiente così particolare era contraddistinto da un rapporto edificionatura dai caratteri particolarmente scenografici, sia per la forma del territorio, quasi sempre in pendio, sia per la presenza dei colori, vividi e brillanti del costruito, opera dell'uomo, contrappuntati da quelli altrettanto vivaci dell'ambiente naturale, nelle varie forme del ricoprimento vegetale, dando vita a caratteri ambientali complessivi, sia alla percezione da vicino, sia alla percezione da lontano, assolutamente originali e particolari. Poiché oggi tutto questo è stato pressoché cancellato: strutturazione del territorio, percorsi, edifici, parchi e giardini, è possibile ritrovare quella configurazione e quei caratteri ambientali, mantenutisi intatti sino a fine Ottocento, nei dipinti, acquerelli, stampe, disegni, e soprattutto nei rilievi del Sette-Ottocento, che mostrano attenzione a questi caratteri nelle ampie assonometrie delle ville con i giardini, parchi e terreni di pertinenza.

Questo studio consente di rileggere questo patrimonio storico/ambientale, e ricostituire questa parte di immagine e percezione della città nel suo territorio, che è stato un elemento fortemente identitario e determinante dell'ambiente genovese dal punto di vista paesaggistico.

Introduction

The Genoese territory, that insists on the historical harbour arc, is a natural amphitheater, formed by a crown of hills to fan, overlooking the sea and the historical city, on whose continuous ridge the medieval convents and forts stood out.

But, this natural environment has been so strongly transformed to be almost totally unrecognizable today, because the vegetated covering has been all built up and the historical buildings present–churches - Convents, villas– agricultural properties– absorbed in the building material of the nineteenth century. All the free spaces– vegetable gardens, cultivated areas, parks and gardens– have been occupied, up to high altitudes, by the massive building expansion, and by the even heavier, industrial, of the nineteenth century, especially in the West of Genoa. Thus the territory, once the seat of the agricultural properties of the major Genoese families, from east to west has modified its image and characters. In the genoese east the villas with the agricultural properties of the suburban territory of Albaro have been absorbed in the building development of the twentieth century of the new residential quarters; to the west, beyond the Genoese arch, to the sides of the Polcevera, the territory of the villas of San Pier d'Arena and Cornigliano was even more mortified for the heavy industrial development, besides that

eight-building of the 20th century, which has completely distorted this coastline.

An absolutely original and distinctive environment characterized by a relationship between building and nature with particularly scenic characters, both for the shape of the territory, almost always on the slope, and for the presence of colors, vivid and brilliant of the built, the work of man, contrasted with those just as lively of the natural environment.

Fig.1 The great transformations: from 1300 to 2000

Methodology

The methodology to reconstruct what has been cancelled: agricultural structure of the territory, routes, buildings, villas, parks and gardens, is to find, through documents, those environmental characteristics, kept intact until the end of the 19th century, reconfigurating them through the cartographies, the views, the paintings, the watercolors, the prints, the drawings, and especially the surveys of the Seven-Nineteenth century, which show attention to these characters especially in the large assonometers of the complex villas – gardens - parks and land of relevance.

This re-reading of the territory and its transformations follows a precise investigation and a precise comparison of the numerous types of documents:

- the classic bird's-eye views of Genoa, its gulf, and its territory, starting from the XIII century, which document its characteristics from the origins of the structure of the soil;

- classical views, at man's height: prints, paintings, watercolours, drawings;

- historical maps, for cadastral purposes, starting from the Sixth and Eighteenth centuries;

- the architectural and architectural surveys of the eighteenth and nineteenth centuries, as in the case of Liguria, the most important ones, made by M. P. Gauthier and R. Reinhardt in the nineteenth century.

Moreover, in the Genoese case, the very important informations already existing require to be integrated with those of identification of the chromatic valences of this environment: oil paintings and watercolor from the sixteenth to the eighteenth-century Nineteenth century, until the Twentieth century, that still document this pristine environment in the colors of buildings and nature, and their close relationship.

Phases of the investigation method

1.   Genoese territory and urban form. Morphological characters. Development and transformations.

1.1. Origins, characteristics and development of the historic city and the structure of the territory of the Genoese area

1.2. Genoese territory and historic city in historical views: the landscape.

1.3. Genoese territory and historic city in the cartography of the eighteenth and nineteenth centuries.

1.4. Genoese territory and historical city in the current cartography and in the current image.

1.5. Genoese territory and historic city in the postcards and photographs of the nineteenth / twentieth century.

1.6. Genoese territory and historic city in the eighteenth and nineteenth century surveys.

2.   Landscape and Color

2.1 The survey of the chromatic component of the villa fabric.

2.2 The landscape of the villa and the color in painting, from the eighteenth to the twentieth century.

2.3 Catalog of colors for knowledge, documentation and enhancement

1.1 Character and development of the historical city and of the Genoese territory

Fig. 2 Genoa in the 11th century, the 13th century, and the 15th century

1.2 Genoese territory and historic city in the views from the sixteenth to the nineteenth Century

Fig. 3 The compact city of Genoa and the Genovese territory. Left: M. Wolgemut, Genua, 1493. Right: C. de Grassi, View of Genoa in 1481, painting from 1597. Bottom: F. Hogenberg, View Genoa, 1572-76; right: Anonymous, 1845 ca., Plan de la ville de Genes et de ses environs, stairs 1:10.000

Fig. 4 *View of Genoa, G. Bordoni, 1616. Territories of San Pier d'Arena and Cornigliano to the west; Albaro to the east.*

Fig. 5 *A. Baratta, The famous and noble city of Genoa with its new fortifications, 1637. To the west, beyond the Lantern, San Pier d'Arena and Cornigliano, the villages on either side o f the Polcevera stream; at east, beyond the Bisagno stream, the territory of Albaro.*

Fig. 6 Above: Mr. P. Gauthier, General View of the Port of genes,; 1818-32. Acquaforte. Below: Mr. P. Gauthier, View of the city of Genes taken from the heights of the Madonna del Monte, 1818-32

Fig. 7   Giolfi -Torricelli, View of Ripa Maris, (approaching from the sea), 18th century. Print.

1.1 Genoese territory and historic city in the cartography of the eighteenth and nineteenth centuries.
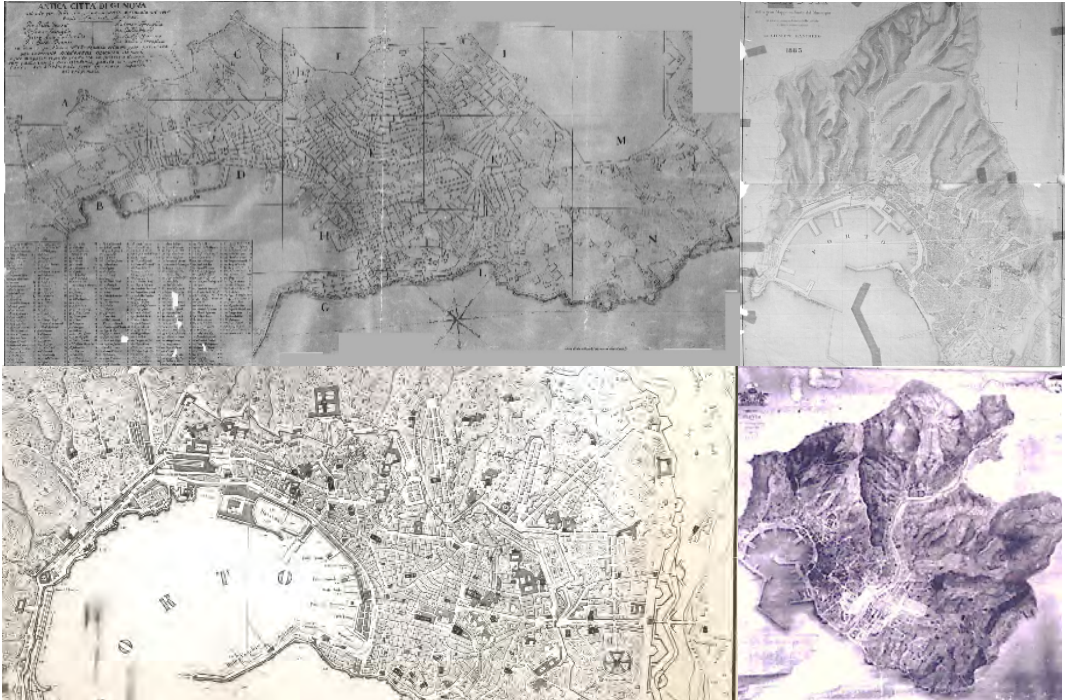
Fig. 8 These cartography highlight both the 17th-century walls and urban development, which are still very small in them, as well as the paths and settlement modes of the territory. In particular, from the Genoa Poggi Plan, still in 1898 we read the orderly and continuous plot on the hills, of villas, rustic houses, religious and fort buildings. Above: G. Brusco, Ancient City of Genoa within its old walls, 1656. G. Banchero, Genoa, 1885. Below: C. Foppiani, Topographical Map of the City of Genoa, 1855. Scale 1:5000. M. Poggi, Plan of the City of Genoa in 1898, Scale 1:2000.

1.1. Genoese territory and historical city in the current cartography and in the current image

The current cartography shows the saturation of the area around the historic city, both towards the hilly areas and towards the valleys of Polcevera and Bisagno, forming the Genoese conurbation.

Fig. 9 Left:, Photograph by A. Merlo, The Port of Genoa from Above. To follow, Zenithal view of the Genoese area, from Bing Maps. On the right, Liguria Region Cartography, scale 1: 25.000. The two valleys Polcevera and Bisagno and the development of the modern city are clearly identifiable.
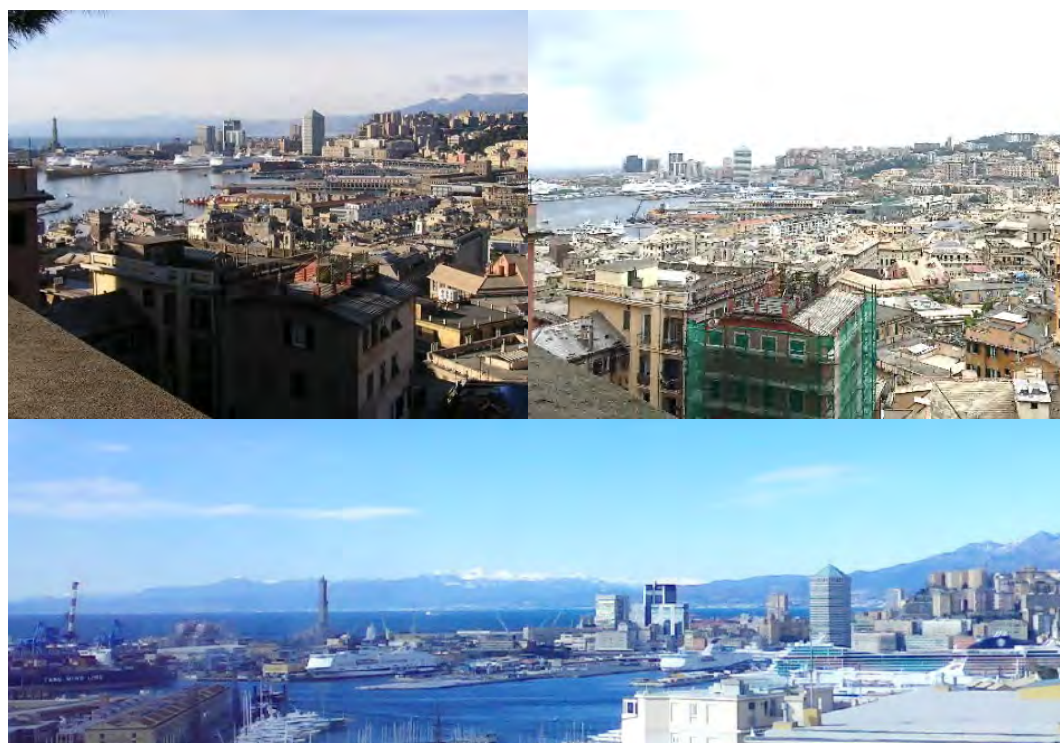
Fig. 10 The Genoa Territory and the historic city in photographs from the late 1900s to early 2000s.

The case studies of San Pier d'Arena, to the west, and of Albaro, to the east.
Documents for Knowledge and Enhancement.
1. The Structure of Villa di Albaro
1.1 The territory of Albaro in views of the sixteenth century: the landscape of the villa structure

Fig. 11 The current state of the Albaro district, in the zenithal view of Google Maps, in comparison with the Detail of the View of Genoa in 1481 by De Grassi1, painted in 1597.

1.2 The Genoese territory of Albaro in the views of the eighteenth century: the landscape of the villas

Fig. 12. Above: A. Magnasco. Entertainment in a garden of Albaro. Second half of the eighteenth century. Oil painting. The structure of the cultivated landscape, and the colors of the buildings still appear intact, in an incredible homogeneity of environmental and landscape values, throughout the nineteenth and early twentieth centuries. Below: Giolfi-Torricelli. The Albaro hills beyond the Bisagno. Second half of the eighteenth century. Print.

1. 3 The Genoese territory of Albaro in nineteenth-century views: the drawings
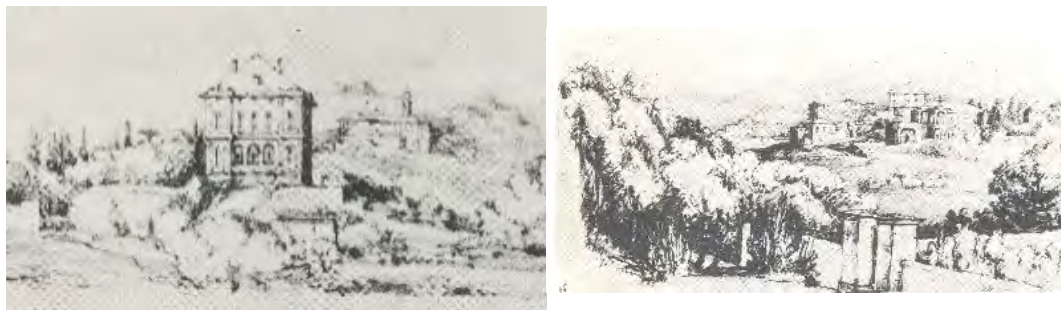
Fig. 13 D. Cambiaso, Views of villas and gardens. Drawings.

1.4 The survey of the territory and the historic villas of Albaro in the nineteenth century.
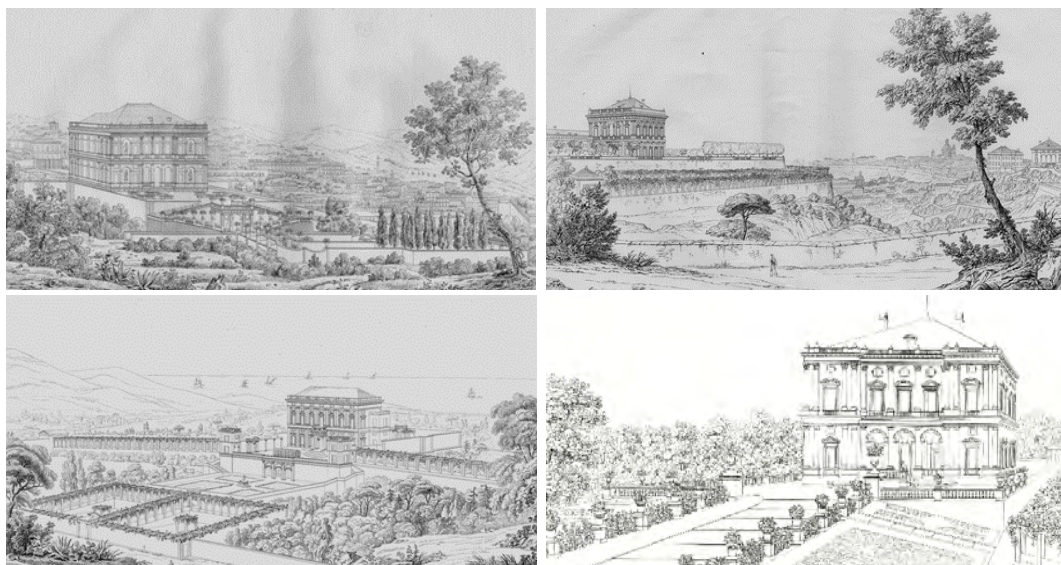
Fig. 14. Environmental survey. The surveys of M. P. Gauthier, 1818 - 1832. Villa Pallavicino «delle Peschiere» - Villa Franzone - Villa Durazzo - Villa Cambiaso.

1.5 The territory of Albaro in the cartography of the eighteenth, nineteenth and twentieth centuries.

Fig. 15. Top left, M. Vinzoni, Genoa to the east, Genoa 1758. On the right: Detail of the Planimetry of Genoa by M. Poggi, 1889, with the structure of Villa di Albaro still intact. Scale 1: 2000. This plant, compared with the current one (elaborated by prof. P. Falzone), below, shows the saturation of the Albaro green areas and spaces.

1.6 The Genoese territory and the Albaro villas in the current photographic images

Fig. 16. Current photographic images of some villas with their green spaces, often reduced and besieged by the development of the modern city.

1.7 The villas of Albaro in the environmental survey of the twentieth century

Fig. 17 Left: the structure of Albaro's villa in the zenithal view of Google Maps. Right: Urban environmental survey of the structure of the villa of Albaro Planimetry. Below: Detail, Scale 1: 500. Course of Architectural Survey, University of Genoa, Prof. P. Falzone, AA: 2006/2007.

2. San Pier d'Arena Villa Structure

1.2 The Genoese territory of San Pier d'Arena in the bird's-eye view of the 16th century: the landscape of the villa structure

Fig. 18 - 19 The current state of the San Pier d'Arena district, in the zenithal view of Google Maps, compared to the Detail of the View of Genoa in 1481, by C. de Grassi, painted in 1597. A. Baratta, the very famous and noble city of Genoa in the circle of its new fortifications, 1637. Detail of San Pier d'Arena and at the end, beyond Polcevera, of Cornigliano. In the foreground the Lanterna, also the pivot of the Genoese gulf and the end of the city. Print.

Fig. 20 J. Volckammer, Territory of the villas of San Pier d'Arena; Eighteenth century. Print.

1.3 Transformation of the territory and landscape of the villas of San Pier d'Arena in the eighteenth and nineteenth centuries.

Fig. 21 Prints with the landscape of San Pier d'Arena seen from Ponente, beyond Polcevera, in the XVIII century, with the presence of the railway built in front of the coastal villas.

1.2 The Genoese territory of San Pier d'Arena in nineteenth-century views: the villa structure
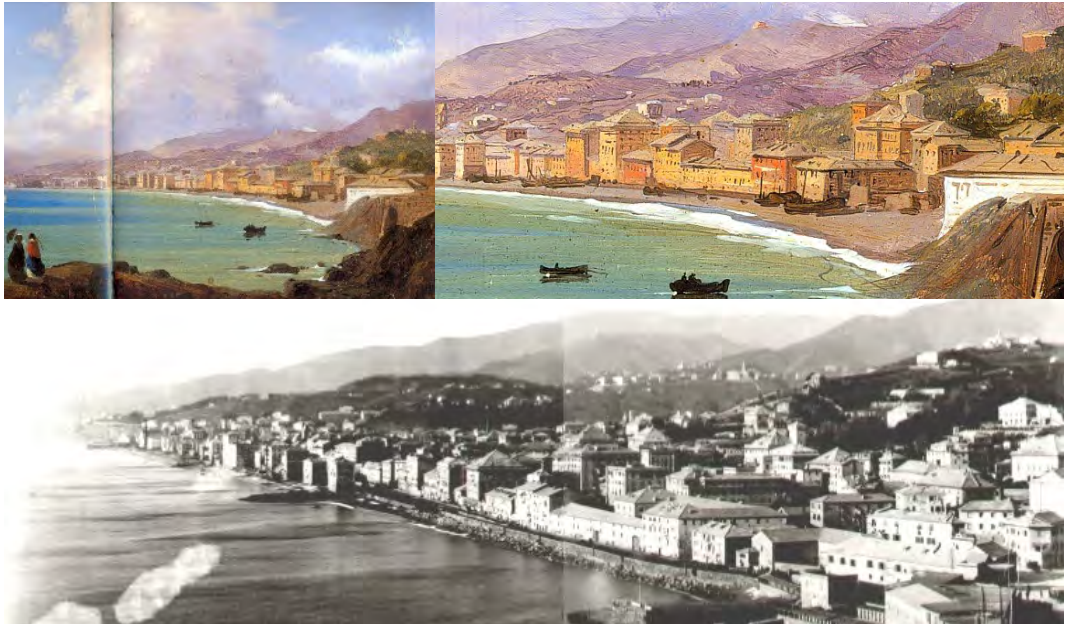
Fig. 22 Above: I. Caffi, View of San Pier d'Arena from the Lantern. Mid-nineteenth century. Below: nineteenth-century photography from the same point of view.

1.3 Territory and villas of San Pier d'Arena in the cartography of the eighteenth and twentieth centuries

Fig. 23 The path of the villas of San Pier d'Arena: comparison of the Plan of San Pier d'Arena, of 1773, by M. Vinzoni, with the current cartography, where the structure of the villa now appears drowned in modern building, as an exhibition the planimetry taken from: P. Falzone, The villas of San Pier d'Arena and Cornigliano, in AA. VV, Il Ponente, 1986, Volume of the Series "Le ville del Genovesato".

1.4 The historical villas of San Pier d'Arena in the reliefs and photographs of the 19th century, and postcards between the 19th and 20th centuries
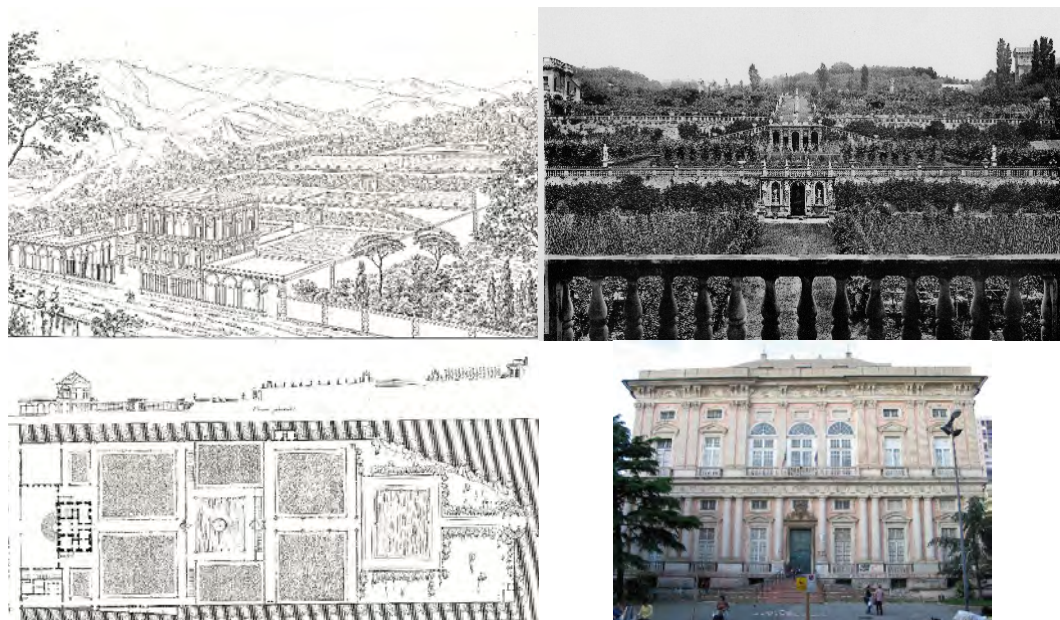
Fig. 24 Villa Imperiale Scassi "The Beauty", 1560. On the left, the survey by M. P. Gauthier. 1818-32. Right, photograph by R. Reinhardt from: The Palaces of Northern Italy, up to Tuscany, 1886. Below: current photograph of the villa and garden.

Fig. 25 San Pier d'Arena: nineteenth-century development, buildings, industries, and modern infrastructures.

1.5 The villas of San Pier d'Arena in current photographs, with reference to the ancient internal route parallel to the coast

Fig. 26 The ancient internal path of the villas of San Pier d´Arena in the present state, upset by the heavy modern urbanization.

2. Landscape and Color in the fabric of Genoese villas
2.1 The color of the Albaro villas in the reliefs of the twentieth century.

Fig. 27 Urban environmental survey of the villa structure of Albaro. Color.
Plan and get up. Scale 1:50. Course of Architectural Survey, University of Genoa, Prof. P. Falzone, AA: 2006/2007

2.2. The landscape of a villa in painting.
2.2.1 The villas of San Pier d'Arena in seventeenth-century paintings
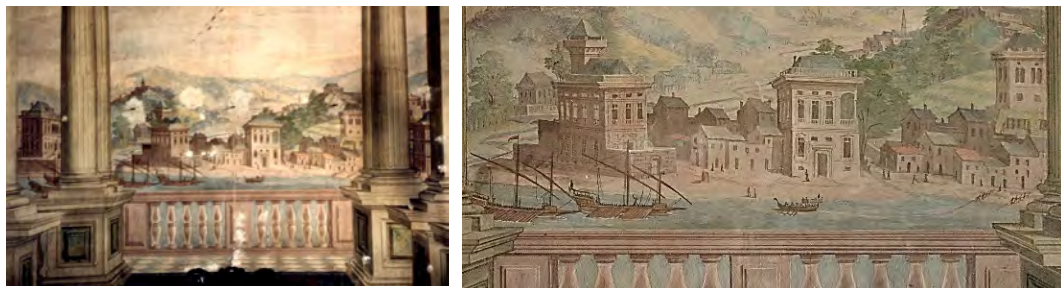
Fig. 28 In the villa Borsotto di Albaro, the frescoes of a room clearly represent the coast of San Pier d'Arena and its immediate hillside, handing down a unique landscape, now lost.

Structure of the cultivated landscape and colors of the building still appear intact, in an incredible homogeneity of environmental values from east to west, starting from the Garden of Albaro, and the surrounding landscape, all cultivated, of Magnasco, and from the View of the coastal strip of San Pier d'Arena with the villas all still overlooking the sea and the internal crossing path, to the detail of the picture of the Imperial family with a view of the vast garden of the villa, up to the painting of Cornigliano, seen from the beach, by Gustavo Dufour.

2.2.2 The villas of San Pier d'Arena in paintings from the eighteenth to the twentieth century

Fig 29 A. Magnasco. 2nd half 1700. Entertainment in a garden of Albaro. Oil on canvas.

Figure 30. San Pier d'Arena. I. Caffi, View of San Pier d'Arena from the Lanterna (mid-nineteenth century). The family of G. V. Imperiale with, in the background, the Garden of the Imperial Villa Scassi "The Beauty" in San Pier d'Arena. "Oil. Below: G. Dufour, "Cornigliano in 1870". Oil on panel from the early twentieth century.

2.2.3 Landscape of villa and color in the paintings of Luigi Garibbo of the nineteenth century

From the extensive work of the Genoese painter Luigi Garibbo, of the first half of the nineteenth century, the strongly distinctive chromatic component of the described environments, linked to both vegetation and houses, palaces, and religious buildings, seen in their contexts

Fig. 31 Watercolors by Luigi Garibbo, 1827. From the top, Sampierdarena, seen from San Benigno. View of Genoa from San Bartolomeo degli Armeni. View of the harbor from the top of the Lanterna, with the ramparts and the church of San Teodoro. Genoa, Villa of the Prince Doria. Below: View of Palazzo Cambiaso al Garbo, and of villa cultivates. Topographical Collection of the Municipality
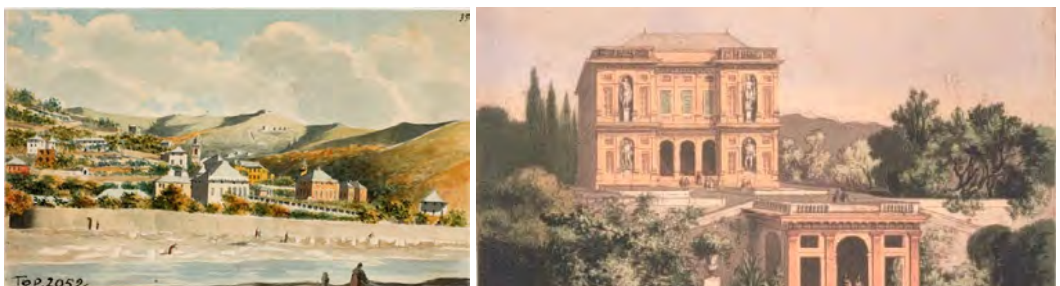
Fig. 32 Luigi Garibbo. Marassi. The banks of the Bisagno with the villa structure behind it. On the right is Villa Pallavicini, called delle Peschiere. Topographical Collection of the Municipality of Genoa.

2.3. From watercolors and oil paintings a Color Catalog for knowledge, documentation and enhancement

The following documentation has extracted from the previous one the details of the prevailing colors of the built: of the facade bottoms, and of the architectural decorations, starting from the cold colors, the blue, less frequent, but also present everywhere in Genoa and Liguria, to get to the many warm colors.

Cold colors / gray - bluish

Warm colors / Tones of Genoese red and dark and light shade earth
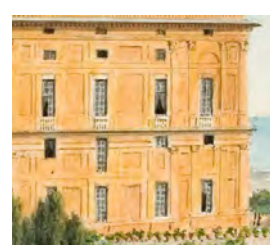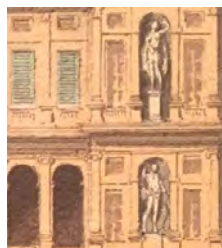
Warm colors / Light and ochre shadow

Shades of rose from Genoa Warm colors
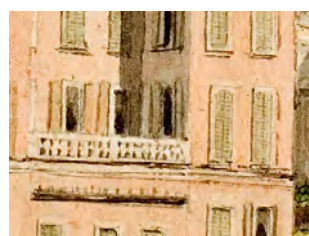
Warm colors / Genovese red

2.2.4 The recurrence of the prevailing colors in the paths of the villas of Ponente

Fig. 33 Recurrence of the colors prevalent in the paths of the villas of San Pier d'Arena.

Fig. 34 Recurrence of the colors prevalent in the paths of the villas of Cornigliano.

Conclusions

This complex type of knowledge is very important, and it constitutes a specific key of reading through which to be able to decipher villas and historic buildings, to re-ample, thus identifying it, an environmental heritage, and a planting model. It is now a rare building with its green spaces, which absolutely needs, in a way that is indifferible, for the state of emergency in which it is located, a similar attention to that reserved for the historic center of Genoa, even if the irretrievably lost important country and environmental characters, still documented only in historical map, prints and paintings.

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The "Chromatic Garden" in the Park de Gerland, in Lyon (FR)

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Abstract

The Park de Garland in Lyon is the rehabilitation of a former industrial site, turned into an innovative urban space (80 ha), open to different interpretation of nature, along a gradient from the built environment towards the river Rhône. The Atelier Corajoud realized the park (after winning a competition) from 1999 to 2006.

The most interesting element of the design is the "Megaphorb" Garden, a sequence of cultivated stripe-shaped lots (referring to agriculture as a mediation from town to nature), located along the main axis of the park, characterized by a community of tall herbs and flowering plants, with a wide bio-diversity and variety of colourful vegetation.

The composition of this garden is based on the choice of plants (400 different species) that like a damp, nutrient-rich soil, associated for their particular height, pigmentation, form and texture of the flowers and leaves.

At night, the lighting (by Laurent Fachard) changes the perception of the garden, creating a magic atmosphere: the park becomes a place where people can walk at night, plunging into a symphony of coloured lights. The "Megaphorb Garden" is transformed into a "chromatic garden", the main luminous event of the park, in which nature is shown under a new aspect and a new perspective. Coloured lights underline any activities and exceptional events, revealing the landscape characters and emphasizing shades, vivacity and morphologies of the vegetation.

Abstract

Il Parco Gerland a Lione costituisce la trasformazione di un sito industriale dismesso in un parco urbano (80 ettari) aperto a diverse interpretazioni di natura, lungo un gradiente che va dalla città costruita al fiume Rodano. L'Atelier Corajoud ha realizzato il parco (dopo aver vinto un concorso) tra il 1999 e il 2006. L'elemento più interessante del progetto è il "Giardino delle Megaforbie", una sequenza di lotto coltivati di forma allungata (che si riferiscono all'agricoltura come mediazione tra ambiente costruito e natura del fiume), posti lungo l'asse prnicipale del parco, caratterizzati da una comunità di alte erbe e piante fiorite, con una grande diversità e varietà di vegetazione colorata. La composizione del giardino è basata sulla scelta di piante che amano suoli umidi e ricchi di nutrienti, associate per le loro peculiari altezze, colori, forme e tessiture dei fiori e delle foglie.

Di notte, l'illuminazione (progettata da Laurent Fachard) cambia la percezione del giardino, creando una magica atmosfera: il parco diventa un luogo per una passeggiata notturna, in una sinfonia di luci colorate. Il "Giardino delle Megaforbie" è trasformato in un "giardino cromatico", il principale evento luminoso del parco, in cui la natura è mostrata sotto nuova prospettiva. La luce colorata sottolinea le diverse attività e gli eventi, rivelando i caratteri del paesaggio e enfatizzando tonalità, vivacità e morfologie della vegetazione.

The design approach

Michel Corajoud[1] is one of the most meaningful protagonist of the French School of Landscape Architecture. As professor in Versailles, he interprets the transformation of the National School of Landscape Architecture (ENSP), teaching the students his sensitive and dynamic approach, inviting them to listening and curiosity ("*to be in an effervescent mood, to explore boundaries and exceed them, to browse everywhere, to go through the scales, to look ahead*"[2], to question a site's potential and identity). In his projects he solves the contemporary social needs, revitalizing a relationship between nature and built environment, using earth movements and vegetation to realize urban parks which represent real cultural references, in which the composition and the richness of experiential spaces offer new areas of quality for the neighborhoods of urban suburbs. His realizations are a fundamental 1980s manifesto of the disciplinarian autonomy of Landscape Architecture, always searching the right design for the right place[3]. The main tool to design is the use of vegetation as a priority material. After dealing with the issue of urban infrastructures[4], his work for the riverfronts in Lyon and Bordeaux points out the possibility to re-draw the urban margin towards the water through the mediation of a true "cultivated garden", inspired by the rural landscape.

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[1] Michel Corajoud (1937-2014) received many prizes, among them: Grand prix du paysage (1992); Médaille de l'Académie d'architecture (2000); Gran prix for Urban Planning (2003 e 2011), Prix André Le Notre (2013). His office, together with Claire Corajoud, realized many important designs.

[2] See his "letter to the students" (2000)

[3] Such as the Parc des Coudrays in Elancourt-Maurepas, Parc de Sausset in Aulnay-sous-Bois (northwest to Paris),..

[4] Like the linear park above the sunken highway in Paris.

Fig.1 The striped garden along the river Garonne in Bordeaux, near the "water mirror" in front of the historic Place de la Bourse, realised by M. Corajoud in 2006.

The Park de Gerland in Lyon (FR)

Inaugurated in 2000 (Phase 1), located along the river Rhone, on the brownfiled of an ex-industrial district (partially already reconverted into sports area), it is a leisure urban park, designed with a special attention to offer the possibility to discover nature inside the town.

The Park de Gerland is connected to the Park of the Golden Head (a wide traditional park of the XIX century[5]) by the Berges of the Rhone (a walkable promenade of six kilometers, realized by In-Situ in 2005-2008[6]), thus creating a continuity of high quality urban green spaces, on the riverbank.

The main part of the Park is a large triangular free lawn (10 ha), with the longest site facing the Rhone, enriched by trees, especially along the riverfront, creating a shady border.

It is an appreciated lively associative place to run, to play, to make a pic-nic, to simply stay with the family, to reconcile the city with the river.

This main lawn is delimited by the special sequence of parallel walkways, crossing the park from north to south (the "Iris Lane" and the "Flower Lane"), and shallow channels, with aquatic plants, embracing a large band of cultivated garden planted in rows, with tall herbs and plants: the "Megaphorb Garden".

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[5] Inaugurated in 1857, this urban park is inspired to the English Gardens. With a surface of 105 hectares, it is the main park in Lyon, with a 17 ha wide lake, deriving water from the river Rhone.
[6] Emmanuel Jalbert and Annie Tardivon designed a fluid linear public promenade (5 Km), passing through a sequence of different spaces, along the river Rhone.

This sequence characterizes the park, creating a relationship from the open and more natural space of the lawn (facing the river) and the urban contest, tied with a system of tree-lined avenues, using a citation of the cultivated agricultural landscape.

A residual industrial pavilion has become the House of Flowers, where the visitors can find a narration of the history of the site, information, gardening classes and temporary exhibitions.

Fig,. 2 Park de Gerland in Lyon: the "Megaphorb Garden".

In the park there are some particular attractive elements, such as a wide "Fog System", that creates a fine mist, sport fields, indoor and outdoor skate-parks and different playgrounds, a secondary free lawn, a dense wooden area and a series of allotments and Community gardens.

Other interesting elements deal with animals, such as some insect hotels, filled with different materials, to help the preservation of urban bees[7], or many nesting boxes placed in the orchard, hosting numerous species of birds, to ease a contact with nature.

[7] Urban Bees (www.urbanbees.eu) is a programme with European funding for the preservation of wild bees in urban environments.

Fig. 3 The cycle-pedestrian "Flowers Lane" at the border of the larger lawn, that reaches a lower level, finding a wooden deck and a low wall of ramned earth as mediation (on the left) and that marks the beginning of the "Megaphorb Garden" (on the right).

Fig. 4 The pedestrian "Iris Lane", ending the sequence of the "Megaphorb Garden", with a double row of trees and a channel with aquatic plants.

The "Megaphorb Garden"

At the border of the main prairie, the cultivated garden is the heart of the project: a promenade that is full of dense vegetation, along an axe that let people interact with a rich, complex and changing vegetal universe. From the botanic concept of "Megaphorbs" (hydrophilous tall herb fringe communities of plains: a group of luxuriant erbaceous plants, needing a deep fine soil), the realization is a disposition of stripes, for a total length of 600 metres and a total wideness of 50 metres, showing the relationship with the cultivated landscape, talking about the rural tradition. This Megaphorb garden show the natural seasonal vegetative power: every year the plants are cutted, the soil is worked, landscape staging follows the rythm of the seasons.

The maintenance is totally mechanized (like in a rural extensive area). The garden is extremely dynamic: the gardeners mantain the Megaphorbiae and change the disposition of the different species; this continuous changement encourages the dialogue with the public, and even the exchange of seeds.

Different parcels are composed mixing plants with particular colour effects, different heights and tactile/morphological habits. The constant motion of nature is shown, exhibiting a wide variety of colourful vegetation Near the flowering hedges some panels detail the plants to look at.

For example in Parcel n. 2 there are flowering plants with pale colours (in september 2018- first stripe: *Indingofera gerardiana, Nepeta fasseni* "Six Hills Giants", *Nepeta sibirica* "Andrè Chaudron", *Centaurea dealbata*, *Agapanthus* Headbourne Hybrid Bleu; second stripe: *Dicentra spectabilis* "Gold heart", *Hosta* "T-rex", *Geranium macrorrhizum, Geranium sanguineum* "Vision rose clair", *Pennisetum japonicum, Spirea japonica* "Little princess"; third stripe: *Astilbe arendsii* "Snow star", *Perowskia abrotanoides*; fourth stripe: *Succisella inflexa, Panicum virgatum* "Rehbraun", *Heuchera villosa*"caramel", *Heucheria sanguinea* "ruby bells"; fifth stripe: *Panicum virgatum, Panicum virgatus* "Heavy metal"/"Cloud nine", *Ceanothus delilianus* "Marie Simon"/"Gloire de Versaillles", *Lagerstroemia indica*); in parcel n. 4 there are stripes of tufty gray-blue plants (in september 2018- *Salix gracilistyla, Andropogon garardi, Sorghastrum nutans* "Indian steel", *Aster novae-angliae* "Andeken an alma", "Constance", "Rosanna", "Andeken an Paul Gerber" / *Salix irrorata, Salix aurita, Salvia chamaelygoides* "Silver leaves", *Glaucium flavum, Verbena venosa* "Polaris", *Stipa gigantea, Lychnis coronaria, Delosperma cooperi / Iris pallida, Salvia nemorosa, Perowskia abrotanoides. Miscanthus sinensis* "Fernster Oster", e "Yaku Jima", *Salix acutifolia* "Pendulifolia", *Salix fragilis / Eupatoriom purpureum, Salix alba* "vitellina" e "sericea", *Sasa tsubo*iana).

Repeating a similar formal composition is the striped garden along the river Garonne in Bordeaux, near the "water mirror" in front of the historic *Place de la Bourse*, realised by M. Corajoud in 2006. The realization along the riverbank has changed this site into a successfully revitalized part of the city, where different activities can take place, at different times of the day, answering different social needs. The cultivated garden in this case is no more inside a protected park, but in an open urban area, always available for different user.

Fig. 5 View of the "Megaphorb Garden" in September 2018: different heights of two species of Rudbeckia, with their yellow flowers.

Fig. 6 Tufty and blue gray plants: Perowskia and Miscanthus.

Fig. 7 *The metal plate inserted in the paved path: "Parcel n. 1: Little slight flowers mixed with grass plants"*

Fig. 8 *The square resting area in the middle of the "Megaphorb Garden".*

The "Chromatic Garden"

The Megaphorb Garden becomes a "Colour Garden" when the day turns into night. The realization by Laurent Fachard is a particular work of landscape illumination, with lighting of the vegetation, to be perceived fron sunset until the closing of the Park, at 10,30 pm., changing the Park into a nocturnal stage-set, where people can walk. The lighting project responds to functional needs for visual information, related to the activities in the park, but unlike a common anaesthetising sodium lighting of the city, trying to reproduce a daytime appearance, this artistic project permits other perceptions.

In the special moment of sunset, with boldly refractions and low-angled lights, the human eye can perceive chromatic distortions from selected colours of natural light, like the brilliant yellows, the orangey shades and the reds of the sun.

The lighting concept transposes the landscape through the use of colour, changing perpectives and creating some new spatial interpretation, moving from daytime reality to something unreal and imaginary, towards the suggestion of an extraordinary nocturnal experience, playing a metaphore of nature, turning the park into a magic place, where the diversity of plants is celebrated, plunging the park into a symphony of colours.

The Park at night can a be a place for entertainment and culture, contemplation and discovery. Coloured light makes the pursuit of exceptional events and reveals landscape characteristics and the peculiarities of the park, painting varied and dynamic lighting environments

The lights underline 3 different types of hierarchical spaces: the promenade avenues (20-30 lux), the large and small meadows (1-5 lux) and the "Megaphorb Garden" (3-300 lux), where light and colour create different atmospheres, emphasing the vegetation, with shaded areas and visual rest. Colours are obtained by colored metal halide lamps or filters.

The coloured lights activate and increase the difference between simultaneous chromatic contrasts, they elicit emotions, ranging from euphoria or marvelling at polychromy to the deep calm of a bluish half-light. Colours like mauve and red can enhance and sharpen visual acuity in low light.

The entrances to the park are conceived as a gate, signed by a threshold of light.

The avenues have indirect lighting, distributed in staggered rows, with different colours for each different way.

The Megaphorb Garden becomes the main luminous event of the park, by three-color accent lighting (red/green/blue), in which nature is transfigured and shown under a new aspect. At night, the flowers take on other colours and their leaves shine with their own coloured shady light, creating an impressionist scenery. "Red poppies are darked with blue, the green of the Miscanthus turns red before Autumn, the wild geranium pales in the violet, the gilly flowers become orange". "The lavander and grains are refreshed by green light and the carpet of forget-me-not are super-satured in the blue" (Fachard, 2004).

The square rest area in the middle of the garden becomes an island of light, lit by strings of coloured light. Dynamic lights illuminate the outdoor skate park, by the use of coloured beams of light and masks, playing in a synchronised movement.

The light gives chromatic volume to the mist of the fog system, that can be seen from the opposite

bank of the river, as the entrances and the north-south crossing walkways, becoming new nocturnal landmarks. Some big trees are accented in blue and green, through a wise gradation to pass from the colourful Megaphorb Garden to the bluish deep meadows.

A sound installation inside the "Chromatic Garden"

The "Animots" sound installation adds a sonic and musical dimension to the visual and olfactory perceptions of the park, which aims and arouses the playful interest of the walk with surprising effects.

The installation enhances and amplifies the plant composition of the *Megaforbiae* through a virtual game that is based on the evocation of the sounds of small animals living in the garden: like myriads of small sounding touches reminiscent of amphibians, insects or birds, sometimes indefinable because electronically mixed. The musical composition uses the laws that describe the behaviour of chance: its distribution on the 16 sound speakers are programmed so random from a computer, which handles more than 600 numbered sounds.

The resulting unpredictable sounds are natural or interpreted by a synthesizer, to reproduce a series of sounds between realism and abstraction. The installation, designed by the composer Pierre-Alain Jaffrenou, runs throughout the opening of the park, also when the lights of the "Chromatic Garden" are playing.

Fig. 09 The loudspeakers of the "Animots" installion.

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Food in Landscape design

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Abstract

The present research has as object the activities promoted within the Multinet project (PSR Umbria 2014/2020, Mis.16.1) and in particular, the different approaches adopted to innovate business models of Umbrian farms, by enhancing the multifunctionality of agriculture. The use of agricultural spaces, agro-food production and food consumption are traditions and experiences deeply linked to the identity of the territory, a cultural heritage that increasingly becomes an instrument of connotation of the landscape. These new guidelines contribute to the affirmation of the concept of food that belongs to the territory, as a vehicle of tradition and memory but also as landscapes of food, Foodscape, which represents the complexity of production and consumption of food. The proposed operational paths activate social and spatial relations, and focus on perception through the multifunctionality of agriculture, in order to promote the development of Umbrian territory.

Abstract

La presente ricerca ha come oggetto le attività promosse nell'ambito del progetto Multinet (PSR Umbria 2014/2020, Mis.16.1) e in particolare i diversi approcci adottati per innovare i business model delle imprese agricole umbre valorizzando la multifunzionalità dell'agricoltura. L'uso degli spazi agricoli, la produzione agroalimentare e il consumo di cibo costituiscono tradizioni ed esperienze legate profondamente all'identità del territorio, un patrimonio culturale che sempre più diviene strumento di connotazione del paesaggio. Questi nuovi orientamenti contribuiscono all'affermazione del concetto di cibo del territorio, come veicolo di tradizione e di memoria ma anche di paesaggi del cibo, che rappresentano la complessità della produzione e del consumo agroalimentare. Si attivano così percorsi operativi per la riattivazione di relazioni sociali e spaziali, ponendo al centro la percezione attraverso la multifunzionalità dell'agricoltura, al fine di promuovere lo sviluppo del territorio umbro.

Introduction

The research faces the theme of possible tools for the enhancement and real protection of landscape. Beyond the various proclamations, it is possible to affirm that it is agriculture, and food, the great protagonists that draw the landscape. Man transforms the territory, but this action finds a balance with nature being a tool to protect man. Transforming places becomes an aesthetic and cultural founding action, to create places where a community identifies itself and develops a sense of belonging[1], but not only, the work that is at the center, with a consequent correspondence between the aesthetic landscape and reduction of the risk of disasters, in shaping beautiful but also stable and safe landscapes[2]. It is man's work[3] to build our landscapes[4], according to Article 1 of the Italian Constitution, it is the basis of the Republic, with a relation revealed as the central axis for the development of the territory. Agriculture in landscape is the "face" that "re-veils" its history, the experiences that have shaped its character, its essence, culture and identity that reflect here.

The enhancement of the quality agricultural production[5] of a territory, taking as example the lentil form Castelluccio or the ham from Norcia, anticipates the images of physical spaces, the Plain of Castelluccio or Norcia's main square, arriving to convey them. Food is linked to its tourist attractiveness[6], to exports[7], to culture[8], to traditions[9], being to all effects goods of ethno-anthropological value, as shown for example by the recognition as a World Heritage Site of the Mediterranean Diet in Cilento and the agricultural practice of sapling vine on Pantelleria.

This opens up the concept of multi-functionality of agriculture, which emerged in the 1990s[10] and refers to all those positive externalities that are associated with agricultural products and activities. This is not about diversification, as when the company simultaneously provides different services such as production, processing, catering, sales and farm holidays. It is more the multi-functionality[11] developed in parallel and simultaneously with normal activities, adding positive effects[12] that engrave on the collective well-being, on man[13], on the environment[14], creating indirectly a better quality of life, on the economy of a territory, on the impact that the vision of the landscape produces[15], on the health[16] that is physically transmitted in foods through a proper nutrition.

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[16] Aldo; Bertazzoli et al., «Gli alimenti salutari per i consumatori a rischio povertà», *Agriregionieuropa* 10, n. 36 (2014); Hanna Konttinen et al., «Socio-economic disparities in the consumption of vegetables, fruit and energy-dense foods: the role of motive priorities», *Public Health Nutrition* 16, n. 05 (3 maggio 2013): 873–82.

The multi-functionality of agriculture finds its strength in the relations between proximity and sustainability[17], in the reactivation of relations[18] between city and countryside weakened by globalization. It is therefore a matter of making visible a factor that has a crucial role in the government of the territory[19], affecting our lives, perhaps only "too big to see"[20] especially because it does not show it. "The emphasis on the theme of production, the traditional urban-rural dualism and an increasingly global and de-territorialized agro-industrial system have meant that food - after shaping and mould the shape and substance of cities for centuries - has gradually disappeared since reflections on urban development"[21]. If the city, by its definition, is not autonomous and cannot provide to produce food in its spaces, a relation with peri-urban space is inevitably triggered[22]. The sectoralisation of space, necessary to order and govern the territory, emerges today in the contradiction of an urban-centered logic aimed at the design of the territory. The need for naturalness[23], expressed by gardens in the city, and the design of the territory of agricultural areas, which reflects the same geometric logics of the built spaces, reveal an indeterminacy of the limits that is substantial in the government of the territory. The territorial planning increasingly emerges in the contradiction of its results and in the failure of the hypothetical government: almost as Antipolis, the scattered city shows the dominance of the built, while the compact city, without nature, shows the unsustainable environmental and landscape of the same places. Both conditions can be read as the result of a separating programm that does not enter into the integration value that city and country must necessarily have. The dictates of this integration are representatively theorized in the cycle of frescoes "The Allegory and Effects of the Good and the Bad Government" by Ambrogio Lorenzetti, preserved in the Public Palace of Siena, datable to 1338-1339 (Fig.1).

Fig. 1 Section of "The Allegory and Effects of the Good and the Bad Government", Ambrogio Lorenzetti, Public Palace of Siena (1338-1339)

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[17] Clara Cicatiello e Franco Rossi-Doria, «Filiere corte e sostenibilità: una rassegna degli impatti ambientali, sociali ed economici», *QA Rivista dell'Associazione Rossi-Doria* 3 (2012): 47–65.

18 Roberta Sonnino e Terry Marsden, «Beyond the divide: rethinking relationships between alternative and conventional food networks in Europe», *Journal of economic geography* 6 (2006): 181–99.

[19] Kameshwari Pothukuchi e Jerome L. Kaufman, «Placing the food system on the urban agenda: The role of municipal institutions in food systems planning», *Agriculture and human values* 16 (1999): 213–24.

[20] Carolyn Steel, *Hungry city : how food shapes our lives* (London: Vintage Publishing, 2015).

[21] E; Dansero e C; Peano, «Pianificazione urbana alimentare e sistemi territoriali del cibo», in *Verso la Food Policy di Torino: processi e buone pratiche*, a c. di M; Bottiglieri, G; Pettinati, e A; Toldo (Milano: FrancoAngeli, 2017), 8–13.

[22] Rossano Pazzagli, «Il rapporto città-campagna tra agricoltura e paesaggio», in *Il territorio bene comune*, a c. di A; Magnaghi (Firenze: Firenze University Press, 2014).

[23] Richard C. Smardon, «Perception and aesthetics of the urban environment: Review of the role of vegetation», *Landscape and Urban Planning* 15, n. 1–2 (1 giugno 1988): 85–106, https://doi.org/10.1016/0169-2046(88)90018-7.

The re-localization of food, through basic initiatives aimed at reshaping an interpersonal world of production and consumption, presents itself as a strategy aimed not only at responding to food and social needs, but also to strengthening local communities, in the profound relation between cultural and economic aspects that have implications in work and innovation on resource management. All this cannot happen without a deep transformation of the current models, and of the cultural approach in the relation established through food between society, territory and environment, for the definition of a "next landscape"[24] where food becomes one of the testimonials and examples elements of the values of the territory that generated it.

Thus, the right to food can be introduced into a close link between aesthetics and ethics, starting with the first definitions of the Universal Declaration on Human Rights (1948)[25] and the International Covenant on Economic, Social and Cultural Rights (1966)[26] of the United Nations and that the 2030 Agenda for sustainable development translates into "eliminating hunger, achieving food security, improving nutrition and promoting sustainable agriculture"[27]. These assumptions correlate with the concept of food sovereignty, defined by the Nyeleni Forum (Mali) in 2007[28] as the right of peoples for a healthy food, culturally appropriate, produced through sustainable and ecological methods, by virtue of their own right to define their own agricultural and food systems.

Facing the new possibilities offered by the enhancement of a new market, the commitment required to the producers involved is to cultivate well, to promote models of sustainable agriculture, for the 9% of total greenhouse gas emissions in Europe are generated from the agricultural sector[29]. There is a responsibility in the care of the land, the environment and the landscape. Moreover, there is a parallel possibility of participating in such protection on the part of consumers, including the public sphere, which can favor certain behaviors with their purchase choices. From the point of view of zero soil consumption, the development of the territory does not start from infrastructures, buildings and production poles, but from an enhancement of the uses of the land, of local productions, of work. The services of multifunctional agriculture reactivate a concrete relation between those who produce and those who consume. The cooperation in a network of businesses, administrations and citizens takes the form of a participatory strategy, aimed at promoting an integration of the offer of multifunctional services, simplifying relations and services in new networks focused on the territory (e.g. GAS, canteens ...), in the enhancement of territorial resources (e.g. foodscape, abandoned lands, urban gardens ...). The aim is to trigger innovative urban processes based on rooting, authenticity, quality and nature to bring out "a new food economy"[30]. It is a solidarity economy of relation, which wants to be placed before the market economy because it allows establishing forms of concrete cooperation between consumers and producers, consequential to a critical thought made operational and united by the pursuit of common objectives, such as health, the environment and the dignity of work, global justice, and rights. The process of strengthening identity relations and the sense of

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[24] Fabio Bianconi e Marco Filippucci, *Il prossimo paesaggio. Realtà, rappresentazione, progetto*, a c. di Fabio Bianconi e Marco Filippucci (Roma: Gangemi, 2018).

[25] ONU, *Dichiarazione universale dei diritti dell'uomo*, approvata dall'assemblea delle Nazioni Unite il 10 dicembre del 1948.

26 ONU, *Patto internazionale relativo ai diritti economici, sociali e culturali*, adottato dall'Assemblea Generale il 16 dicembre 1966, entrato in vigore il 3 gennaio 1976.

[27] ONU, *Trasformare il nostro mondo: l'Agenda 2030 per lo sviluppo sostenibile*, sottoscritto il 27 settembre 2015.

[28] https://nyeleni.org/spip.php?article328 [2019].

[29] Carlo A. Campiotti et al., «Le filiere del sistema agricolo per l'energia e l'efficienza energetica», *RT ENEA*, vol. 11 (Roma, 2011).

[30] Michael M. Mertens, «Implications of Local and Regional Food Systems: Toward a New Food Economy in Portland» (Portland State University-Oregon, 2014).

community therefore transposes the theme of immediate and private interest in a well-being and a sobriety of the physical and social environment.

This gives rise to the idea of a "food contract", a participatory path and a bottom-up strategy[31] that takes place in parallel, integration or declination of a social contract. Agriculture "is" multifunctional because its activity already protects and enhances the landscape in terms of its naturalistic and environmental importance, and as an artificial landscape, a work of man, an approach to sustainable local development that must be read as the concrete opportunity for new economies[32] and markets. "The co-governance theme – public/private – is becoming a crucial aspect to face the change. This has to do with the need to involve civil society, and individuals in general, to deal with the emerging problems in a phase of evident crisis of public resources. Consequently, the need to rethink the traditional separation between State and Market in favor of more hybrid forms, in which responsibility, active participation, exchange, reciprocity, acquire new weight and attention. The organizational and logical shift towards co-governance is not trivial and, from the point of view of the forms of representation and decision-making, it implies the rethinking of the tools of representative democracy and the juxtaposition of these with forms of deliberative democracy. The perspective is to involve public and private local actors in a more intense way, in the shared co-production of services and activities, in order to make them more effective and efficient, but also to be able to find new solutions to support the creation of public and private goods"[33]. The vertical vision of the strategy that invests public administrations is strengthened through the horizontal involvement of the different stakeholders who can be involved to make it effective and operational, finding convergences of objectives. From here, it unravels an innovation path, with the purpose of building and testing a multifunctional strategy connected to a citizenship pact, to innovate relations and thus reduce territorial fragmentation by redefining communities through food.

Methodology

The research is born around the interdisciplinary value of landscape and it is inserted in the intersection with the inherent policies of the Rural Development Plan of Umbria Region. The research interest led to the development of the Multinet proposal, financed in Measure 16, Sub-measure 16.1 "Cooperation and Innovation". The project involves four university departments: Department of Civil and Environmental Engineering, Department of Political Science, Department of Agriculture and Department of Medicine; twenty-eight farms scattered throughout the Umbrian territory that represent an heterogeneous sample by type and core business, which pass from the production of cereals to the breeding of horses for pet therapy (fig.2).

The central theme of this project is to innovate the business models of the companies involved by finding new strategies and new tools to recognize to the agriculture its multifunctional value. This is a vector for the development of society and the economy of the territory and its effect is inextricably linked to landscape's quality.

[31] Emanuele Polizzi e Matteo. Bassoli, *La governance del territorio : partecipazione e rappresentanza della società civile nelle politiche locali* (Roma: FrancoAngeli, 2011).
[32] Claudia Pahl-Wostl e Matt Hare, «Processes of social learning in integrated resources management», *Journal of Community & Applied Social Psychology* 14, n. 3 (maggio 2004): 193–206.
[33] FP; Di Iacovo, G; Brunori, e S; Innocenti, «Le strategie urbane: il piano del cibo», *Agriregioneuropa* 9, n. 32 (2013).
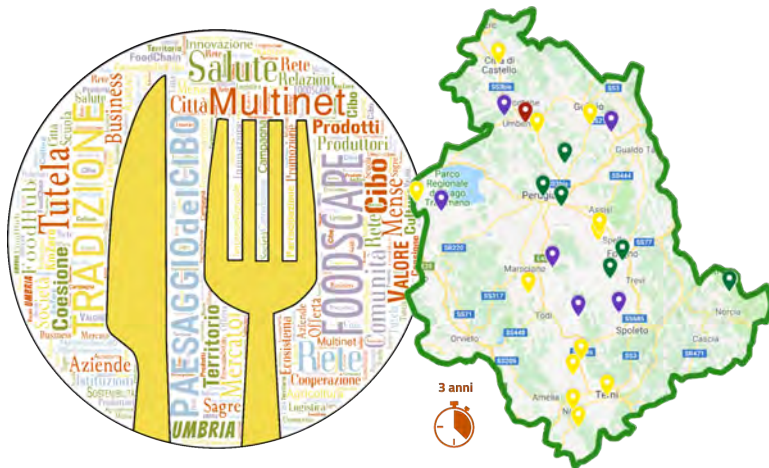
Fig.2 Infographic related to the Multinet project.

Food is the pivot on which design strategies revolve, since the interests of those who produce and consume converge in it and it is the element to convey best the concept of multi-functionality.

The design strategy stands out in 4 work packages divided as follows: WP1 _ TERRITORIAL PROGRAMMING. Focused on the territorial approach, and above all on the idea of foodscape as an innovative strategy to enhance the historical-cultural-environmental context and the landscape through. WP2 _ PROGRAMMING OF THE MULTIFUNCTIONAL SERVICES OFFER. It concerns the activity of guiding the transformation of business models in function of multifunctional services to be enhanced through the market, and lays the organizational foundations of the Business Network. WP3 _ DIGITAL ECOSYSTEM. Focused on developing digital assets useful to companies to strengthen the entrepreneurial network and identify a virtual place where supply and demand can meet. WP4 _ COMMUNITY INVOLVEMENT. Focused on developing community involvement activities towards responsible consumption issues, new market forms that are more connected to the area of origin of the products, which are more environmentally friendly and agricultural production methods that also involve disadvantaged people with a view to social inclusion, respect for diversity and building an inclusive society.

The innovation of the farm, final goal of the Multinet project, is accompanied by an innovation of the context. The theme of the multi-functionality of agriculture finds its strength in proximity relations, in the reactivation of relations between city and countryside weakened by globalization. The objective is to support territorial government policies to find structuring conditions in recognition of the multifunctional value of agriculture in norms, programs, and green public procurement.

In this context, the research developed within the representative aspects is part of the topic of territorial planning (WP1) and the construction of the digital ecosystem (WP3). As far as the relations between food and territorial government is concerned, developed by focusing on landscape, the study is based on an extremely complex and developed line of research, which perhaps in Italy has only recently been achieved, having begun to achieve, more positive results in

others territorial contexts. This is a very hot topic not only for developing countries, but also for the most developed cities where an urban food planning it is being developing for years. Among the urban strategies, the Plans of London[34], Bristol[35], Vancouver[36], Melbourne[37], Malmo[38], Amsterdam[39], New York[40], Portland[41] can be cited as international references. In recent years, even at national level research groups are developing interesting experiences, among which are to highlight and analyze the proposals and experiences gained and in place in the Provinces of Pisa[42], Turin[43], Rome[44], Bologna[45] and Milan[46].

Food strategies represent for the Administrations the possibility of materializing policies for rebalancing economic, social and cultural inequalities, with new regulatory models aimed at promoting health of the citizens and the environment. The active involvement in the "regulation of urban metabolism implies the construction of new knowledge with respect to the theme and the problems connected to it, but also the identification of appropriate working methods and logic, up to the definition of integrated policies (environmental, energy, food, territorial and transport, prevention, education) aimed at ensuring, at the same time, an efficient use of resources and environment, full democracy in access to basic goods for the populations, greater stability in future supplies"[47]. The role of municipal administrations develops in their ability to plan the territory and the infrastructures, physical and immaterial, drawing in parallel the government of the territory according to the urban logics. The same administrations are involved as big consumers, for canteens as for other types of purchases, for their ability also to determine certain market conditions (e.g. purchases of festivals).

In the Multinet project, in addition to the structured regulatory instruments governing the territory, there are a whole series of projects that have a substantial and essential impact at a social, economic, territorial, landscape and environmental level. It is possible to find an integration between food supply, the enhancement of local products and the care of the territory. Assuming the advantage derived from the collaboration between the public bodies, the associations of citizens, understood as a community, and those who produce. The strategy places the theme of food and production at the center of the development of a proximity market, in order to give strength and value to the multi-functionality of agriculture and the link between local products and the landscape. Regional laws, as evident in the regulation of agritourism centers and festivals in progress support this tendency.

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[34] David Barling, Tim Lang, e Rosalind Sharpe, «The Re-emergence of National Food Security on the United Kingdom's Strategic Policy Agenda: Sustainability Challenges and the Politics of Food Supply», in *Food Security, Nutrition and Sustainability*, a c. di Kristen; Lawrence, Geoffrey; Lyons e Tabatha; Wallington (Earthscan, 2010), 61–68.

[35] Joy Carey, «Urban and Community Food Strategies. The Case of Bristol», *International Planning Studies* 18, n. 1 (febbraio 2013): 111–28, https://doi.org/10.1080/13563475.2013.750938.

[36] vancouver.ca/files/cov/vancouver-food-strategy-final.PDF [2018].

[37] http://www.melbourne.vic.gov.au/community/health-support-services/Pages/health-support-services.aspx [2018].

[38] http://malmo.se/Nice-to-know-about-Malmo/Sustainable-Malmo-/Sustainable-Lifestyle/Sustainable-food-in-Malmo.html [2018].

[39] ec.europa.eu/regional policy/.../6a_iclei_amsterdam.pdf [2018].

[40] http://www.nycfoodpolicy.org/ [2018].

[41] http://www.portlandonline.com/portlandplan/index.cfm?c=51427 [2018].

[42] Elisa Butelli, «Pianificazione ambientale autosostenibile e alimentazione: il Piano del cibo della Provincia di Pisa», *Scienze del Territorio* 3, n. 0 (2015): 125–30, https://doi.org/10.13128/SCIENZE_TERRITORIO-16258.

[43] Dansero e Peano, «Pianificazione urbana alimentare e sistemi territoriali del cibo».

[44] Aurora Cavallo e Davide Marino, «Assessing the connections between farming, food, and landscape planning in the development of sustainable urban policies: the case of Rome», in *Proceedings of international conference on "Changing Cities": Spatial, morphological, formal & socio-economic dimensions*, a c. di A; Gospodini (Thessaloniki: Grafima Publ., 2013).

[45] http://www.cityoffood.it/it/ [2018].

[46] http://www.milanurbanfoodpolicypact.org/ [2018].

[47] Di Iacovo, Brunori, e Innocenti, «Le strategie urbane: il piano del cibo».

In fact here it is required that 80% of the food supply must derive from the territory, these instruments are only coercive and do not offer nor a real possibility, as the networks of local businesses guarantee, nor an instrument of control, as the municipal scale can guarantee, nor an instrument of social cohesion. It is not in fact secondary to show how the community, in the course of the last century, has found in the phenomenon "festival" a point of recognition and centrality. Although based on the food supply, only now regulated as territorial, this element has its interest for the correlation it creates with the places where civil associations promote such events, green spaces managed and cared by virtue of such opportunities for community meetings. The public represents a potential buying vector that, paradoxically, today acquires in the global market and fails to address the economic and territorial development of the place it has to exploit. The proposal then wants to work in the territorial strategy, in connection with the Landscape Plan, putting in parallel the involvement of the community in co-planning paths. It is a question of rethinking the spaces of food, the next city and the next landscape, in order to rethink the relations between city and countryside, valuing the logics of proximity.

The other action that falls within the representative studies is the WP3, which deals with including the communicative potential linked to digital in the innovation strategy. The central theme of the research in this area is concerned with analyzing not only the digital tools useful to the project objective of innovating business models, but above all to develop a digital environment in which the activities of the other WPs of the project converge. This acts as sounding board for the dissemination of the value to the economy and the multifunctionality society of agriculture and finally to act as a real virtual square for the meeting between producers, service providers, consumers and administrations of the rural context of Umbria region. Given this context, the importance of the analysis on the themes of image and digital marketing is evident; Umbria region presents large rural areas not well known despite the quality of the environment and the historical-cultural heritage with territories, often in competition, each of which proposes its own recipe of development. Therefore, we highlight the need to develop integrated territorial marketing actions that involve all the actors of the regional scene and aim to enhance the entire regional heritage made of art, history, beauty. It is necessary that these actions succeed in combining traditions and knowledge with the quality of the products of each production area as well as with natural and historical-cultural attractions. The role of WP3 is to optimize these promotion actions by exploiting in particular the innovation of communication and on-line marketing promo based on the enhancement of the value elements of landscape, transmitted through its products. The goal is to build a digital environment in which all the activities seen up to here converge in a communicative and functional point of view. A platform that can perform different functions; that connects producers/products/consumers through geo-localized search functions and e-commerce functions, which can also be a sounding board for the project, communicating the good practices initiated and their replicability giving the possibility to analyze and collect data in reference to transactions on the platform.

In the logic of Digital Ecosystems applied to territory and landscape (Landscape understood in the broad sense of the term as a product of human action), the adoption of strategies of Interconnection and Cooperation between the public and private sectors will be the key to seize digital development and increase the competitiveness and efficiency of the agricultural sector that can be the driving force for the territory.

It is emphasized that what this research wants to study is not so much the digital instrumentation available but rather a different model of digital innovation, not so much technological as methodological, optimized from the point of view of communication. This is an innovative way of conceiving and structuring institutional, operational and economic relations using digital technology and evaluating its application in the case of the Multinet project.

Conclusion

Landscape, agriculture and food are the three elements on which the Multinet project is concentrated. Food becomes the element on which the interests of those who produce and those who consume are concentrated, and it is the real tool for transmitting the multi-functionality of agriculture and the production process. Food, understood as a product of the territory conveys the image of the landscape; it is easy to associate the landscape that produced it to a product, think of the lentil of Castelluccio di Norcia, which recalls the flowered plateau of the Sibillini (Fig.3), or the Sagrantino that recalls the hills of Montefalco.

Fig.3 The Pian Grande of Castelluccio di Norcia linked to the production of Lentils.

Agricultural activity, when done with professionalism, competence and strategic vision, combines safety objectives, environmental quality and enhancement of landscape, essential requirements and a true measure of the actual conditions of well-being and quality of life and sustainability. This is the multi-functionality of agriculture. In the context of "doing" landscape, understood as the set of projects and policies that involve it and that affect agriculture and food, taking into account the perceptive value is fundamental, even in the European Landscape Convention[48] the theme is central and linked to the "population" that lives it. Through the landscape, it is possible to not only "look" at a territory, but also "see it"[49] and read "the making of a society in a territory"[50]. Interpreting and recognizing the actions that transform the landscape is the key to understanding its evolution. According to Franco Purini, "reading a landscape involves the intelligence of a diachrony between a primary form, an ahistorical form, outside the categories of completeness and organicity, and a derived form, resulting constitutionally unfinished"[51].

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[48] European Landscape Convention, European Treaty Series - No. 176, 01/03/2004

[49] G; Nigro, «L'Umbria e il paesaggio oltre il terremoto», in *I paesaggi dell'Umbria del terremoto*, a c. di F; Fazzio e B; Bondensan (Perugia: Quattroemme, 2007), 7.

[50] Emilio. Sereni, *Storia del paesaggio agrario italiano* (Roma-Bari: Laterza, 1986).

[51] Franco Purini, «Un paese senza paesaggio», *Casabella* 575–576 (1991): 44.

From what has been said so far in the study of the landscape and its being perceptible, its representation becomes central.

The variable that most influences the dynamics of landscape today is time. Not only the speed with which landscape can be transformed increased, but also the speed with which it is lived and therefore with which it is perceived. "We moved from a dozen kilometers per hour to a hundred, adding an order of magnitude that leads us to distract attention and the spirit of communion with what surrounds us. Time, and therefore speed, have made the relation between man and environment almost impossible". While at a lower speed one was led to immerse oneself in the landscape, to take an active part in it, today speed distracts us and perceiving a landscape is an act increasingly complicated and filtered. The filter can be "the windshield of a car, the window of a train or an aircraft, the screen of a telephone or a computer"[52]. Therefore, in this short time it is much more difficult to understand and know what surrounds us both for those who use the landscape and for the designer.

Given these difficulties, very often it is the ideal image of the landscape that we know, not the landscape itself. Moreover, this knowledge does not necessarily bind to our direct experience, but more often, what touches us is an iconic image, more or less consciously through the media, and often this image is conveyed through the products of the landscape[53].

To know the landscape in its overall reality it becomes crucial to succeed in representing, re-presenting and telling. Vittorio Ugo asserts, "For our culture, representation is the condition and place of the formation of knowledge and of the project. The representation is not only an instrument of communication; it is above all a process of construction of the form, and not of the simple visible image. It is, to paraphrase Klee, a making visible (in the eyes of the mind, reason and memory and not only in the eyes of sight) rather than making the visible, according to the procedures of banal mimesis"[54]. For Franco Purini, only "the reconstruction of the landscape allows us to identify those primary settlement elements whose immovability causes them to be recognized as a whole system of inertia, as a resistant device, as something that, since it tends to reconfirm itself, is configured as a true and own memory"[55]. As for telling the landscape, reference is made to Krueger's researches where space is understood as the place that communication builds or destroys. In fact, Krueger's research starts from the awareness that our concept of place is based on communication skills and is defined by the information available simultaneously to the people who communicate[56]. Therefore, it becomes a necessity to resort to new representative techniques and data collection that make new interpretations of the landscape programming possible. These new ways of representing must be able to make visible those features of the landscape that remain less perceptible but still characterize it. New technologies, new information management software, make it possible to create interactive models that can manage data coming from different areas of landscape analysis. This help us study the genesis of landscapes and its indicators, and give the possibility to perform simulations that allow us to access useful information to understand its evolutionary dynamics: "Reading a place means coming to understand what happens in it, what it happened and what it could happen"[57].

[52] Fabio Bianconi, *Nuovi Paesaggi. Operazioni semplici su seconde nature*, vol. 1 (Perugia: Morlacchi Editore, 2008).

[53] Gyorgy Kepes, *Language of vision* (Chicago: Paul Theobald, 1944).

[54] V; Ugo, «Una forma del tempo», in *Architettura e rappresentazione del paesaggio*, a c. di R Salerno (Milano: Guerini Associati, 1995), 17.

[55] Franco Purini, «Forma Urbis e città», *Spaziotest* 3 (1989) rip. in Dal Progetto, cit., p.211.

[56] Myron W. Krueger, *Artificial reality* (Boston: Addison-Wesley, 1983).

[57] Kevin Lynch, *Good city form* (Cambridge: Harvard-MIT, 1984), 321.

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The green protagonist of the contemporary city

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Abstract

After having "defuturized" the future, it is necessary that projects, programs and actions return to talk about the future starting from the reconstruction of an idea of "public city" based on a strong social protagonism (...). Capable of opposing that exclusive hegemony of the present that (...) is imposed as an accomplished fact, overwhelming. (Augé – 2010)

The green spaces represent the contemporary society in its many nuances and take on new appearance not only with respect to the public park created with the industrial revolution, but also with respect to the most recent narrative parks of the late 1900s.

The transformation of ex-infrastructure or ex-industrial areas has overturned the fate of entire neighborhoods, from Hafen City in Hamburg to the classic High Line, where the regeneration process has now reached excessive levels, transforming the identity of a cheap place into a chic one. In other cases it has changed the face of entire cities with the regeneration process initiated by the reconversion of the waterfront, which involved everything else, as for Toronto and Sydney. In other cases, however, the intent to solve social problems has been the engine of change, giving a new face to the public city and enhancing the theme of ethnic multiculturalism as a characteristic element of the contemporary world (Superkilen Park). The park can sometimes be not only a space for the city but also a sustainable tool to solve rainwater drainage problems, such as The Soul of Nørrebro in Denmark. In Italy, where historical cities are characterized by open, extraordinary and polymorphic public spaces, even if the contemporary design process is slow, excellent examples can be glimpsed (Milan, Turin and Bologna).

Abstract

Dopo aver "defuturizzato" l'avvenire, occorre che progetti, programmi e azioni tornino a parlare di futuro a partire dalla ricostruzione di un'idea di "città pubblica" basata su un forte protagonismo sociale (...). Capaci di contrastare cioè quell'egemonia esclusiva del presente che (...) si impone come un fatto compiuto, schiacciante. (Augé – 2010)

Il verde rappresenta la società contemporanea nelle sue numerose sfumature ed assume nuove sembianze non solo rispetto al parco pubblico nato con la rivoluzione industriale, ma anche rispetto ai più recenti parchi narrativi della fine del 1900.

La trasformazione di ex infrastrutture o di ex aree industriali ha ribaltato il destino di interi quartieri, da Hafen City di Amburgo dalla classica High Line, dove il processo di rigenerazione ha raggiunto ormai livelli eccessivi, trasformando l'identità di un luogo cheap in uno chic.

In altri casi ha cambiato il volto di intere città con il processo di rigenerazione avviato dalla riconversione dei waterfront, che ha coinvolto tutto il resto, come per Toronto e Sidney. In altri casi, invece, l'intento di risolvere problemi sociali è stato il motore del cambiamento, conferendo un nuovo volto alla città pubblica ed esaltando il tema del multiculturalismo etnico come elemento caratteristico del mondo contemporaneo (Superkilen Park). Il parco può talvolta essere oltre che uno spazio per la città anche uno strumento sostenibile per risolvere problemi climatici di drenaggio delle acque piovane, ad esempio il The Soul of Nørrebro in Danimarca. In Italia, dove le città storiche sono caratterizzate da spazi pubblici aperti, straordinari e polimorfi, anche se il processo progettuale contemporaneo va a rilento, si intravedono degli esempi eccellenti (Milano, Torino e Bologna).

Introduction
Historical evolution of the idea of urban green

Within the cities the need to have parks, avenues, tree-lined squares or some natural place between the buildings was born only in the modern age, prior to this period in the habits of the population leisure, physical activity and leisure were not foreseen.

A brief excursus into the past starting from the Middle Ages is the demonstration: the urban voids of the villages are open spaces, widenings obtained in the morphology of the site, which in some cases assume the appearance of irregular squares, on which at least one public building overlooks, sometimes the town hall or the church or the building of the stock exchange, often used as a public market. Inside the perimeter of the medieval walls the green area is present above all inside the religious complexes, in the cloisters or in the open spaces of the land belonging to the convents or monasteries, mostly for productive purposes. In the Renaissance the arcaded squares represent the new open spaces of the city; they are designed with stairs, important ramps and porches of buildings according to the classical canons. Each of them is never defined by trees, shrubs or other green elements, such as the parterres, which instead characterize the formal gardens of the contemporary villas and palaces overlooking the landscape with arcades and stairways. In Renaissance treaties the green is not present in the ideal city square; Palladium, for example, arises in a different way to use the green in cities and suburban areas. In his prestigious country villas open space is closely

connected with the built and plays both an ornamental and productive role. In the Quattro Libri dell'Architettura, Palladio asserts: "As in the cities beauty is added to the streets with beautiful factories; so outside it grows ornament to those with the trees, which being planted by one, and on the other side of them, with vegetables they cheer our souls and with the shadow they make it a great commode ".[1]

Starting in the seventeenth century, the process of transforming defense masonry began in the cities. Initially the ramparts along the perimeter of the walls (Lucca, Antwerp, ...) are only lined with trees, then with the evolution of the city and with the disposal of the defensive use of the walls, these will in some cases become boulevards, in others public parks or even the major urban boulevards. These host access to the most important public buildings, such as very representative nineteenth-Ring Vienna, with buildings designed specifically for the new tree-lined street. At the end of the XVIII century the tradition of public green spreads progressively in all the big European cities. Different concomitant factors are responsible: a new interest in the urban environment studies, dissemination of related costumes, previously the exclusive world of the courts, the social situation evolving with the need for new areas to spend free time.

In the writings the need for greenery in the city begins to manifest itself, Diderot asserts: "If it had been up to me to design the Piazza Luigi XV where it is located, I would have been careful not to cut down the forest. I would have liked to have seen the dark depth between the columns of a great peristyle. Our architects have no imagination, they do not know what accessory ideas are awakened from the environment and from the surrounding objects. "[2]

The first public parks created as places to fulfill recreational, cultural and physical needs are designed in Paris by Jean Charles Adolphe Alphand. According to the latter the public park must be: a place of education, entertainment and cultural invention.[3] The idea of a public park is intimately connected with that of the city and is the innovative element within its evolutionary process; these are places of public entertainment, open to the whole population, supplied and maintained by public spending and enjoyed daily by all the popular classes.[4] The forms are not yet defined, as in all experimental phases various attempts are put in place before reaching a consolidated model. With the philosopher Rousseau, compositional narrativity is introduced as a design tool in the conception of a park. "There is nothing aligned, leveled; here the line has never entered, nor the team, things unknown to nature; the apparently irregular sinuosities are carefully understood to prolong the walk, hide the island's borders and widen its apparent width (...). The man of taste (...) will combine water, greenery, shade and coolness; because nature also brings these things together. He will not concede anything to the symmetry, which is the enemy of nature and variety (...) the two sides of its avenues will never be exactly parallel (...) it will not bother to open beautiful distant perspectives."[5] These words take shape in the park of Ermenonville designed in 1766 by Rousseau's disciple and friend, René-Louis Girardin. In this place the philosopher will spend the last years of his life and here he will be buried. The theory becomes practical and the narrativity is manifested through a story built on movement to cross places and to discover surprising and often wonderful elements along the way.

[1] A. Palladio, *I quattro libri dell'architettura*, Venezia, 1570, p.5
[2] F. Venezia, *Scritti Brevi 1975-1989*, Napoli, 1990, p.11
[3] Cfr. J-C-A. Alphand, *Le Promenades de Paris, 1867-1873*
[4] Cfr. A. J. Downing, *Treatise on the Theory and Practise of Landscape Gardening*, New York, 1841
[5] J.-J. Rousseau, *La Nouvelle Héloïse,* Paris, 1761, p.75

Time becomes a relevant component of the project, the work is revealed during the narration. The narrative connection between architecture and nature becomes the theoretical foundation of several new city planning interventions. The park represents the ideal model to express this projectual story, in particular the one in Romantic Style is taken as a reference to contemporary fashion and in line with philosophical thought. Among the theorists of the time Laugier uses the metaphor between city and forest and as a foundation in urban renewal he suggests the use of the geometric rule at the base of the design of seventeenth-century gardens, while criticizing the artifice underlying the parks of Le Nôtre. The abbot's words of 1753 highlight the similarity between a great city and a park, so the design of green area for the public enters in the city becoming the key element in urban planning. The city park is not only the idealization of the campaign in a built environment for the new working class moved recently from a purely rural environment, but also has a cultural value, "where the narrative of the project, its poetry, the unveiling through episodes that are part of a story, are the elements that, especially today, differ from the public park area equipped to green."[6]

In Paris during the Empire of Napoleon III, Alphand designed a metropolitan system of parks following the fashion of the landscape park, so-called English. Each of these parks assumes a central importance in their own neighborhood, to the point that this complex is structured as functional today as part of the contemporary city. The same guidelines adopted by Olmsted in Boston mean that the so-called necklace of parks makes this city very efficient and adequate for the needs of the present. Another ancient example, still functional today, is Amsterdam Bosch Park; in this case the agricultural landscape of the polders and the former Zuider See was transformed into a public park The transformation process of this area was started around 1936 with the planting of many Nordic plant species and a forest was built within which numerous areas for leisure time and sport were planned. Such intervention introduces another innovative principle in the conception of a public park: landscape ecology, which joins functional and natural those of the nineteenth-century parks.

Starting from the Enlightenment, the landscape aesthetic component is supported more and more by the scientific and ecological. The geometric rules introduced for the construction of military fortifications, embankments, hydraulic regulating works and landscape ecology are also used for large public green works The dichotomy between aesthetic and scientific landscape leads to the Modern Movement, where alongside the contemplative vision of the green there is the quantitative vision of urban standards. In contemporary degeneration, green often corresponds only to an economic value, which translates into the realization of urbanization works. These equipped areas have no ecological value and often do not observe any functional program.

The gardens of history are being replaced by sites of time[7]: Smithson's words underline the fundamental role of the time dimension in any landscape architecture project. This element manifests itself in different versions: the temporal movement necessary to cross a park with the perception of the continuous change of places, the period corresponding to the life cycle of the vegetation and finally the interval of the changing seasons. After the rationalist period at the end of the last century the public park is transformed again into a narrative project, with natural, ecological and recreational components. The park is the centerpiece of the transformation of residential areas (Citroen, Bercy,

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[6] I. Cortesi, *Il parco pubblico, Paesaggi 1985-2000*, Milano, 2000, p.45

[7] R. Smithson, *A Sedimentation of the Mind: Earth Projects*, 1968, p.18

the Villette) emphasizing the connection between the park and the city.

Methodology
Green in the contemporary city from concept to realization

Below we have tried to classify the public green in the contemporary, what may seem to be a simple park actually covers a wider meaning and in any case includes various levels of reading.

Green as a tool for social cohesion: Superkilen, Copenhagen

Superkilen was created in 2012 in Copenhagen and is the result of the collaboration between the BIG studio, the Topotek1 landscape designers and the Superflex artists.

The district in question, in a central city location and with a very high population density, is characterized by 57 communities of different cultures and often involved, in the past, by very tense situations. The area of the project, of 30,000 square meters, was monofunctional and dangerous so a competition was drawn up to enhance the area.

The response of this project was very strong and revolutionary as it contrasts with Western customs and seeks a meeting point between various places and cultures.

It was very easy to create a neutral project that tried not to generate conflicts but the designers' idea is the opposite: to make all the communities participate to create an alternative space.

The Topoteck 1 study explains how in past centuries parks have represented a reproduction of a distant place, the transmission of ideals or the glory of the past, in the same way Superkilen wants to be a contemporary interpretation of 'universal garden' in which objects are present from all over the world and also numerous surprise elements like posters from various countries, writings and drawings on the walls and on the flooring.

The garden consists of three areas: a red one dedicated to sport, a green one that is a large playground and finally the black area where food is carried out.

What makes this project very interesting is certainly its collection of international objects, the designers explain that the various communities have been asked to propose elements of their own culture, the objects have been selected based on their functionality according to a strong utilitarian vision: the most comfortable bench, the most beautiful fountain and so on.

Superkilen is therefore formed by the elements of all cultures and communicates a strong social integration that is being reflected in the reality of the neighborhood.

The park contains objects of completely different shape, function and color, gradients, signs and vegetation that the project was able to associate and create a harmony that is reflected in the inhabitants.

Fig.1 Superkilen, Copenhagen (image sources: www.archdaily.com/286223/superkilen-topotek-1-big-architects-superflex)

New green design strategies: Bosco Verticale, Milan

The innovative Bosco Verticale project designed by Boeristudio, G. Barreca and G. La Varra, was born with the need to redevelop Porta Nuova in the heart of Milan, with the aim of achieving high urban quality and creating a series of related areas, the result was a topic of discussion at international level for its character of a pilot project of a sustainable design.

The intervention has a very strong and important idea for contemporary times that has led the whole sector to reflect on these issues. Contemporary architecture is mainly based on form, but this project focuses attention on the needs of urban reality.

The project proposes a new way of thinking about the green and of living, a solution to regenerate the environment and urban biodiversity: the vegetation helps to create a microclimate, humidity, absorbs CO_2 and fine dust and produces oxygen. The presence of different species of vegetation increases biodiversity and becomes a strong attraction for birds and insects in order to stimulate a process that should be natural but that, due to the lack of vegetation in the metropolis, no longer occurs. The architects have a larger program than the two towers that are the manifesto of this idea; the creation of a network of Bosco Verticale as a strategy to restore green spaces and the possibility of spontaneous growth to the metropolis, a new model for thinking about the city.

The aspect that characterizes the project are the facades, these are covered with a dark gray porcelain stoneware and marked by a sequence of balconies where there are over the plant species center. The composition of the façade has been studied to favor the growth of each species based on the best possible exposure and to favor an adequate irradiation inside the property units. The plants are placed inside cement containers, the trees and shrubs are planted in a layer of soil of 1 m and 50 cm. As regards water drainage, a layer of polyethylene fabric and geotextile was inserted between the containers and the ground. The inclusion of such a large number of plants has obliged the designers to pay attention to the structural problem, indeed many simulations and security solutions have been necessary both as regards the static of the building and as regards the insertion of anchors and safety cables to avoid the fall of the vegetation.

The sustainable aspect of the project is not limited to using the vegetation but proposes solutions capable of having a sustainable vision in all aspects. An example is the centralized irrigation system which, through the use of filters, uses gray water and exploits the underground water of the geothermal system.

Fig.2 Bosco Verticale, Milan (image sources: www.inexhibit.com/case-studies/the-vertical-forest-towers-in-milan-by-boeri-phenomenon-or-archetype/)

Green as an educational tool: Biblioteca degli Alberi, Milan

The project Biblioteca degli Alberi of the Inside Outside I Petra Blaisse studio in Amsterdam is part of the restoration and redevelopment of the area of the city of Milan mentioned above (Garibaldi area and Piazza della Repubblica). The park covers 9.5 hectares, includes 450 trees of 21 different species and 90,000 plants including hedges, creepers, aquatic plants and bamboo.

The proposed themes are those of the Bosco Verticale: redevelopment of the territory, creation of a new biodiversity, but the presence of an urban botanical library is added where the species are marked in such a way that everyone can recognize them.

The trees were chosen to have an interesting image during all seasons: cornelian, magnolias, deciduous, pear and apple trees in spring, Magnolia grandiflora in summer; birch maples, poplars, cornelians, Liriodendron, Liquidambar, ornamental apple trees and rowan trees in autumn; pines, cedars and birches in winter.

The project uses eco-sustainable materials, architectural concrete has been used for the pedestrian paths, for the other walkable surfaces a concrete with high drainage capacity that allows the groundwater to recharge.

The most innovative aspect of the project is the involvement of citizenship that is involved in the process of building the park and actively in the use of the garden in such a way as to create a sense of belonging and responsibility.

La mappa del parco e gli alberi

Fig.3 Biblioteca degli Alberi, Milan (image sources: Lombardi M. A. 2017 n° 403 pp 76-83. - La biblioteca degli Alberi, Gardenia)

Green as a tool for climate change
The BIG U, Manhattan

The topic of climate change is certainly at the center of global discussions, planning and new projects have the possibility to intervene in this issue.

There are many projects with "sustainable" solutions, but the BIG Team's proposal for Manhattan is truly revolutionary. The BIG U is a protection system that runs around the city to protect it and meet the needs of the community. The project stems from a real need to protect the vulnerable territory from floods and rainwater but develops into an intervention for the community with new infrastructures and public spaces.

The waterfront has been divided into three areas, compartmentalised by the others as far as floods are concerned but co-operating and communicating with regards to the integration of the communities. One of the starting points of this project was to constantly interact with the community in order to have a project that reflects who lives in the city and that is not a simple physical barrier of ten miles but an opportunity to give a new social infrastructure to the city.

The area of intervention contains dwellings, the most important economic district of the country and which affects the world economy every day, and the city is visited every year by about fifty-two million visitors; Storm Sandy devastated the city, bringing New York City and the world economy to its knees and making the problem of climate change clear. The Big U is a large-scale infrastructure but does not want to be a dividing wall between the sea and the city but a project that works at different scales to create social spaces for the community.

In the first design phase, the Big Team organized meetings with local organizations and workshops using a scale model in order to discuss the various design approaches and develop solution schemes. The project consists of three areas that have different uses and therefore each of them has a project that reflects its needs but green spaces characterize the entire project, green is used as an active tool: as a protection element and water drainage, to improve air conditions, city temperature and to improve the quality of life within the city.

The project proposes interventions such as bridges, pedestrian walkways, new public parks, new areas of enjoyment of the sea, museums, green corridors and new resilient strategies to intervene on the existing and make the population aware of what is happening to the planet. The designers used studies on raising the sea level available to them and based on these future simulations they defined the areas and their interventions.

From a technological point of view, the project envisages three types of physical protection: earth barrier (embankment), T-wall in reinforced concrete and temporary barriers for exceptional events. The solution of the earth bank is the most used within the project and allows creating spaces for play and relaxation, it is low cost and easily modifiable.

Fig.4 The BIG U, Manhattan (www.rebuildbydesign.org/our-work/all-proposals/winning-projects/big-u)

The soul of Nørrebro

Nørrebro is a central district of Copenhagen where different cultures and realities live together and, like the whole city, is driven by a strong creative force that fosters change. The SLA study has realized a project for the adaptation of Hans Tavsens Park & Korsgade to climate change, returning a park that raises the quality of life of residents and creates a new biodiversity. The concept on which the project is based is the cycle, as can be seen in nature, with the advantage of being able to adapt to external influences and create perfectly functioning ecosystems.

The designers therefore focused on three fundamental aspects: the hydrological cycle, the biological cycle and the social cycle. The hydrological cycle focuses on the value of rainwater, rainwater can be seen as a resource for the entire city and can be collected, purified and reused. The biological cycle is the natural process of fauna and flora in constant flux, this cycle is very fragile and decisively characterizes the green space, the park aims to be an environment of birth of a biological diversity that will improve the healthiness of the neighborhood and of the 'environment.

The proposal of the social cycle increases the cohesion between the cultures that already coexist in the neighborhood, in fact the diversity already characterizes this neighborhood but the new communities often have difficulty to integrate, the objective of the social cycle is to increase the quality of life and the happiness through the elements of the project. The ability to adapt to climate change thanks to the use of nature is certainly one of the most innovative aspects of the project.

Natural elements are used to collect rainwater but also to increase water quality, the creation of an ideal micro-climate, the reduction of noise and CO2 emissions, increasing the quality of the air and therefore of the life of the residents.

In Denmark, as in the rest of the world, the problem of intensification of atmospheric phenomena is very serious, violent storms and floods for the city are increasingly frequent, the project proposes to address the problem in a sustainable perspective, making the water cycle the main theme. The tanks will be installed in the entire area to collect rainwater underground, it is purified thanks to the stratigraphy of the soil and can be reused for public irrigation or for proven uses. The violence of the water of the storms will be slowed down through the drainage of the soil and conveyed to the lakes provided by the project to be purified and subsequently returned to the sewer, so as not to have a blockage of the latter. A further design solution that has been used is a purification system for the lake, rainwater is conveyed towards the lake with pipes and purified with the combination of bio-organisms, phyto-purification and pumps.

The combination of these strategic elements makes it possible to give the city a new public space with features that improve air quality, make it possible to reuse rainwater and purify it of pollutants.

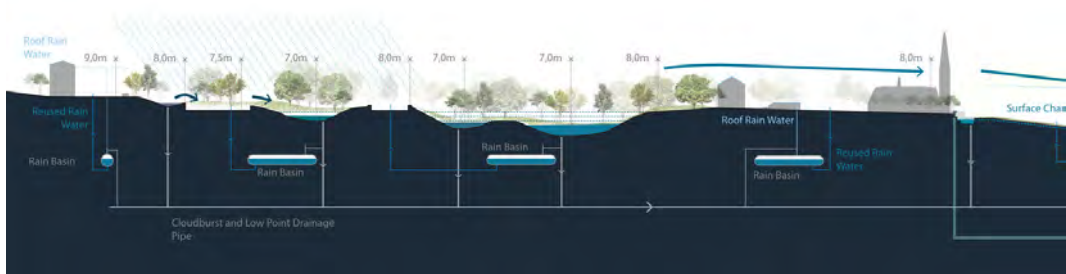*Fig.5 The soul of Nørrebro, Copenaghen (http://nordicinnovation.org/Documents/Nordic%20Built%20Cities dokumenter/ Soul%20of%20Norrebro_booklet.pdf)*

Fig.6 The soul of Nørrebro, Copenaghen (www.landezine.com/index.php/2016/11/nature-based-climate-adaptation-wins-scandinavias-biggest-architecture-award/)

Conclusion

"After having "defuturized" the future, it is necessary that projects, programs and actions return to talk about the future starting from the reconstruction of an idea of "public city" based on a strong social protagonism (...). Capable of opposing that exclusive hegemony of the present that (...) is imposed as an accomplished fact, overwhelming."[8]

If Marc Augé supports the need to found a new citizenship starting from actions and projects that are no longer individual, but for the community, today public green really plays a central role in the change. The park in the city today, preserving the character of cultural innovation and social education of its original meaning, takes on a wider meaning. The park becomes the sustainable tool for solving the problems of the contemporary city: climate, pollution, traffic, ethnic multiculturalism, ...In conclusion, the contemporary transformation of disused infrastructures, former industrial areas and waterfronts has changed the destiny of entire neighborhoods, from Hamburg's Hafen City to the now classic High Line. In some cases like New York, today the regeneration process has now reached excessive levels, transforming the identity of a cheap place into a chic one.

In Italy, where historical cities are characterized by open, extraordinary and polymorphic public spaces, even if the contemporary design process is slow, except in Milan, excellent examples can be glimpsed (Turin and Bologna).

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Wayfinding in territorial communication: applications for Ciociaria

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Abstract

One of the greatest difficulties that a person finds in an environment is to receive sufficient information to relate to it, through an effective system of "environmental communication", also known as "wayfinding". Wayfinding is the science that deals with the planning and design of signal systems and traditional and technological orientation. It means choosing and following a path that leads to a defined destination, effectively; it is the set of signals we use to understand where we are and where we are going. The ever-increasing programs, at European level, for the realization of tourist itineraries for different purposes (for example: of religious matrix such as the San Benedetto Way or the Via Francigena, of mountain hiking nature such as the Italy trail), also requires the realization of an effective wayfinding system, which must include: a) on an architectural level - the "directional signs" on panel, which must be consistent with the identity of the place and must include its character, design, visual identity in general, and is the most effective way to transfer environmental information to people; b) at the level of technological devices – "digital wayfinding", as an innovation in guidance systems, capable of increasing user involvement through the use of mobile devices, websites and geolocation. In the present paper is indicated a wayfinding system, for Ciociaria, which integrates the study and use of "directional signage" and that of "digital wayfinding", such us "FrancigenAR+" and "IsIPU" for iOS devices.

Abstract

Una delle maggiori difficoltà che un individuo trova in un'ambiente è ricevere sufficienti informazioni per relazionarsi con esso, mediante un efficace sistema di "comunicazione ambientale", anche noto con il termine di "wayfinding".

Il "wayfinding" è la scienza che si occupa della pianificazione e progettazione di sistemi segnaletici di orientamento tradizionali e tecnologici che aiutino gli utenti a scegliere e seguire un percorso che porti ad una destinazione definita; è l'insieme dei segnali che utilizziamo per capire dove siamo e dove stiamo andando.

I sempre maggiori programmi, a livello europeo, di realizzazione di itinerari turistici con diverse finalità, richiede anche la realizzazione di un efficace sistema di wayfinding, che deve prevedere:

a) a livello architettonico - la "segnaletica direzionale" su pannello, che deve essere coerente con l'identità del luogo e ne deve comprendere il carattere, il disegno, l'identità visiva in generale, ed è la modalità più efficace per trasferire informazioni ambientali agli individui;

b) a livello di dispositivi tecnologici - il "digital wayfinding", quale innovazione in fatto di sistemi orientativi, capace di aumentare il coinvolgimento dell'utente attraverso l'utilizzo di dispositivi mobili, siti web e geolocalizzazione.

Nel presente contributo viene indicato un sistema di wayfinding, per la Ciociaria, in cui è integrato lo studio e l'uso della "segnaletica direzionale" e quello del "digital wayfinding", come "FrancigenAR+" e "IsIPU" per dispositivi iOS.

Introduction

The forms of representation of the city that include the sequential perceptions typical of urban exploration make use of wayfinding, which indicates the field of research that identifies the ways in which people orient themselves within the physical space, in relation to the sensory perception mechanisms of the environment and the qualitative conditions of the environment that surrounds them. Wayfinding (environmental communication) and universal design (understood in the broadest sense of design for improving accessibility), are two fields of research closely connected and have a common and relevant social impact.

Wayfinding opens up new fields of application for graphics, design and visual and extra visual perception of space. Graphics for the visually impaired constitute a valid example: it leads to the selection of signs that must be examples of a reality that is not perceived visually. Graphics for the deaf, focuses on the communicative effectiveness of the signs to make understand even very complex concepts.

Universal design and its principles fit perfectly into this framework, where the two forms of communication described above are extended to all observers. The two lines combined allow to develop research on new production possibilities offered by objects that can satisfy the needs of sensory disabled people: tactile maps, graphics and web design and other specific objects.

Wayfinding and cognitive maps are closely related elements. People, whenever they find themselves

in a new or different environmental situation, prepare in their mind, to orient themselves and move, one or more cognitive maps that are spatial representations, made up of elements acquired through experience and memorized in different ways.

New areas of research and development in wayfinding are linked to the use of recent digital technologies and present complementary methods of use and applications (notebooks, smartphones, tablets, touch screen devices).

Access to Google Maps service has multiplied our possibilities of visualizing the city, providing "virtual perceptions" based on a zenithal or axonometric photographic and immersive type: axonometric and perspective "bird's eye" views, given from the two possibilities of visualization, today return the full recognizability of urban components through texturing processes; Street View mode has made possible a "simulation" of the perception of places close to human vision through a sequence of 360-degree panoramic views linked together. The immediate recognizability of the places allowed by Street View has given life to an urban "avatar" with which, using the characteristics and principles of wayfinding, we can plan in advance the experience of urban exploration, storing landmarks and possible routes.

With Google Earth urban mapping has been implemented with new information and data accessible at the same time (3D models, historical maps, weather conditions, tourist accommodation and transport services, photos, etc.).

All this data and information, nowadays implement in mobile devices also the immersive dimension allowed by Street View through applications that use Augmented Reality. Information directly related to the real environment become accessible and viewable: each level of information contains data that can be superimposed on the physical reality, to provide detailed and additional digital information on particular points of interest in the city. Users can insert the contents categorizing them on the different web channels such as social networks, personalize the information through filters, share them, exchange information and build a "collective" knowledge.

Methodology

A cognitive map is therefore a mental representation of a specific spatial context, which one person creates unconsciously to orient himself and move, applying previously acquired information. The formation of cognitive maps is fundamental both for people with cognitive disabilities and for those with little memory or who can easily be confused in places and spaces new for them. Another aspect to consider is that being able to form an efficient cognitive map of a space, is useful also in the case of escape in an emergency situation.

At the center of a good wayfinding system, is fundamental a "strategy" where are defined the objectives and is taken into consideration the behaviors of the users, the principles with which people move through space and points where they take decisions. The strategy also defines the communication system, starting from the ideation of the brand and a coordinated image, analyzing how this is perceived, designing every single aspect and taking care of every detail up to pictograms and colors, without neglecting the aspects related to new technologies.

The information provided can be architectural, ie concerning the morphology of the open space or of the building, or graphic and sensorial. An effective wayfinding system must include:

a) on an architectural level - the "directional signs" on panel, which must be consistent with the identity of the place and must include its character, design, visual identity in general, and is the most effective way to transfer environmental information to people (fig.1);

b) at the level of technological devices – "digital wayfinding", as an innovation in guidance systems, capable of increasing user involvement through the use of mobile devices, websites and geolocation (fig.2).
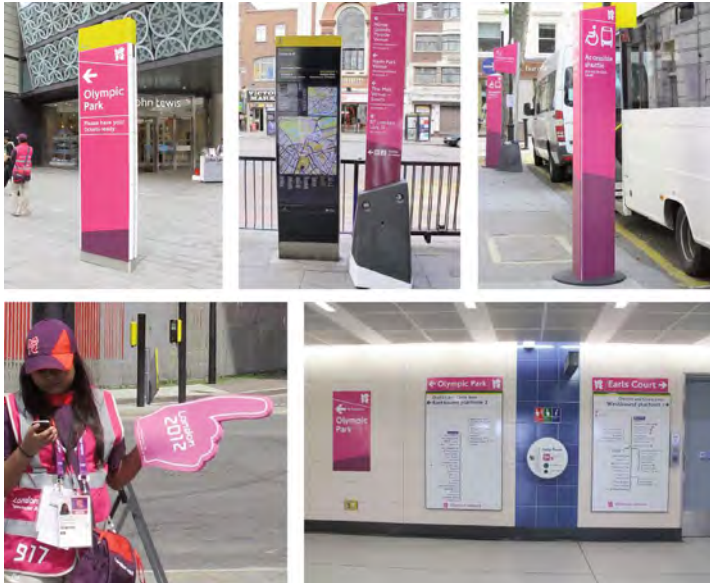
Fig.1. Wayfinding system for the London Olympics, 2012, designed for both indoor and outdoor spaces. The proposal combines historical vectors and iconic influences in a highly distinctive design, inspired by the colors of the London logo.

Fig.2. Digital Wayfinding realized through an APP (Wikitude) that exploits augmented reality. Places and points of interest and other AR content are displayed in the camera's field of view through an effective iconic system.

Directional signage

A good "panel orientation signage system" helps to communicate useful information, such as the most important destinations in a place or emergency exits. The main features of a correct sign system are summarized in:

- position of the signs: the signs are positioned perpendicular to the direction of travel; placed above eye level; well lit to avoid annoying glare. It is important to position the signals at regular intervals, especially at the points where decisions must be take on a path to be followed;

- readability of the information: all signs must be easily readable in many environmental conditions, including the most disadvantageous ones. The text of the signal must be large and with a good contrast with background, accompanied by an easily understandable pictogram, even by those who cannot read the language of the text. In addition, must be prepared a sign placed at a height that can be perceived even by a person in a wheelchair, and must have symbols and text in relief and in Braille for the visually impaired;

- color: in a signage system color must be used only as an element to reinforce the message and be related to the environment.

General information panels or "directories" are used to assist visitor in identifying his destination and are generally combined with maps. "Directories" must have the following characteristics:

- collect information in small groups of no more than 5 elements;
- accompany the text with graphic information (pictograms);
- use a simple color coding system, coordinated with the map, if this is present;
- be positioned at strategic points in the space they represent (for example, one for each floor in multilevel buildings);
- be realized also with reliefs and symbols in braille for the visually impaired.

Project and location of the orientation maps play an important role. Information panels, and in particular the maps associated with them, frequently require the ability to decipher or read them, and can be a problem for people with intellectual disabilities or for many other groups of people who have difficulty translating two-dimensional information into three-dimensional information.

Therefore, maps must be made easier to understand taking into account the following criteria:

- be located at key points in the space;
- must be inserted "you are here" sign;
- if you are in a multi-storey building, the level you are in must be indicated;
- relevant maps must be prepared for each space represented (for example concerning each floor in multi-level spaces);
- must be created a legend where "key" information (such as toilets, refreshment points, escape routes, first aid points and information points) are indicated by means of a large graphic enough to be understood.

Both color and lighting play a fundamental role in the design of a wayfinding system. Color must be considered as an element of information reinforcement, but it must not be used as a primary element, because there is a high number of people with color blindness problems. A good lighting system (both artificial and natural) must be well prepared to illuminate some architectural emergencies and illuminate maps, signs and landmarks and to avoid glare.

Digital wayfinding

Digital wayfinding should include fixed multimedia stations (touch screen panels) and/or solutions for mobile devices (smartphones and tablets), through the implementation of specific cross-platform APPs (iOS, Android, Windows). This type of wayfinding must be designed in addition to or in support of a traditional system on fixed panels and must be able to increase the visitor's involvement in particularly complex environmental situations, or where we want to provide personalized information addressed to few persons (for example a conference of a trade association that wants to reach the spaces designated for the event only by its own members). The particular nature of the "digital wayfinding" system allows great flexibility and continuous updating of the technological system used, allowing variations of the information and, therefore, of the general wayfinding system (change of the conference room or additional services not originally planned).

Applications for Ciociaria

The research has set the goal of creating an innovative wayfinding system where "directional signage" and "digital wayfinding" are complementary in an open space, with the aim of implementing tourist flows and increasing accessibility and the usability of places. Reference areas are located in southern Lazio, Ciociaria region. "Directional signage" system incorporates the devices necessary for the functioning of "digital wayfinding" and signs for visually impaired people. In particular, Digital Wayfinding systems foresee the realization of two Augmented Reality (AR) APPs, which therefore allow an enrichment of human sensory perception through information, manipulated and conveyed electronically.

FrancigenAR+

"FrancigenAR +"[1] APP is designed to facilitate wayfinding in tourist itinerary of a part of the southern Francigena. It is adressed to contemporary tourists for whom smartphonse or tablets replace the traditional information sources, such as maps, brochures and tourist guides, to become an instrument for exploring the territory. It is an application aimed at experienced and non-experienced users, as it is based on a simple and direct system of icons that allows to organize the visit route in a practical and fast way, directly and at any time mobile devices, to allow people to get useful information about the points of cultural-historical-naturalistic interest etc. Device Application[2] presents a geo-referenced cartography of the routes, which is automatically recognized by smartphones and tablets thanks to the GPS system incorporated in the devices. This allows to be geo-localized and to visualize on the map services and/or points of interest in cultural field, which are located close to the user. The AR system, which can be viewed on the device's display (by the use of the camera), allows to view in real time the distance of different sites and additional information can be obtained by clicking on

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[1] The project is financed by Lazio Land Authority, Department of Culture and Youth Policies, the Province of Frosinone and the Municipality of Acuto, the Municipality of Alatri and the Municipality of Frosinone. Scientific Coordinator for the Department of History, Representation and Restoration of Architecture - Sapienza University of Rome is Tommaso Empler; Head of the Cultural Association "La Terra di Mezz"o is Patrizia Rotondi; software developer is Giovanni Murru; graphics by Francesco Madonna and Giacomo Zilocchi; texts and photographs by Patrizia Rotondi and Katia Osvaldi, who also dealt with the translation into English.

[2] The APP for iPhone and iPad (iOS operating system) is free and you can download it from the iTunes store at: https://itunes.apple.com/it/app/francigenar+/id828960385?mt=8

icons that appear on the display from time to time.

The described system is already widespread and does not require specific knowledge, because it is easy to use; it is developed in Italian and English, and the icons allow immediate recognition even by users who do not know the two languages. At the start, on the first screen, users can get general information both on the Francigena's northern route (from Canterbury to Rome) and on the southern one (from Rome to Jerusalem). A circle highlights the route from Acuto to Ripi and by clicking on it you enter the application's Home page. On the "Home page" there is a map showing the structure of the route from Acuto to Ripi. On the top bar there are three buttons that allow to return to the Home page, or to enter AR mode or to get information on the selected stage. On the right side of the screen there is a drop-down menu divided into two parts: at the top you can select a stage to view the points of interest nearby; at the bottom you can select the points of interest you want to display, organized by filters: Religious buildings; Historical centres; Cultural heritage; Artwork; Archaeological sites; Museums; Parks and Nature; trails; Free time; Offices (fig.3).

Fig.3. FrancigenAR. From left to right: first screen with information on the entire route of the Via Francigena; Home page with map display and selection buttons; filters for displaying points of interest.

"Augmented Reality" function activates the camera of the smart device, and allows to view the points of interest on the display: after selecting a specific stage, the screen focuses attention on the portion of the area where there are emergencies, which are marked with icons, distinct by color and graphics depending on the category to which they belong. The information on the selected stage contains the history of the locality and a series of significant photos. Photos have a dual display mode: more recent and historical photos, referring to the same point of view. In the lower right corner you can activate the reading of text with speech synthesis, a system accessible to the visually impaired, blind or those with reading difficulties in general.

By selecting the points of interest you will get more information about the individual sites.

Clicking on a single icon activates multiple interaction/display possibilities:

- car navigation to the selected point of interest, starting from the position in which you are at that moment (thus activating the navigation mode of the smart device);

- data sheet of the site with photos and descriptive text, audible thanks to the voice synthesis system present in the smart device;

- 360° panorama of the selected emergency (fig.4).
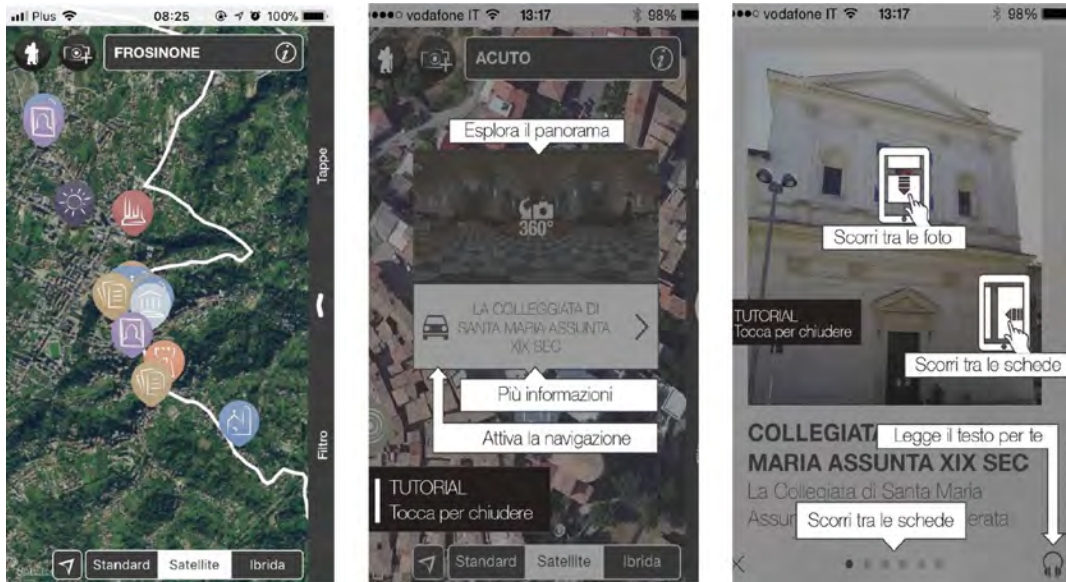
Fig.4. FrancigenAR+. From left to right: screen with display of the points of interest present in a specific stage (in this case Frosinone); interaction/exploration mode to access information about a point of interest; activation of data sheet for each element.

The possibility of providing information on the sites is a way to increase their value, specifically the application intends to apply the ITC to the enhancement of a section of the Via Francigena, developing a digital means of communication capable of promoting accessibility, interaction and communication of an environmental context so that it can become a tool for exploring the territory.

IsIPU

IsIPU[3] is an APP created to disseminate some prehistoric deposits excavated by the Italian Institute of Human Palaeontology (IsIPU). The APP considers some prehistoric deposits where there are no visually recognizable and visitable excavations (except when there are seasonal guided tours) in the basin of Anagni, in the south of Lazio.

It is a museum throughout territory, where, unlike archaeological sites, there are no obvious signs of the presence of man or animals who lived there two million years ago.

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[3] IsIPU is an APP realized with the contribution of the funding of the Project MIUR "Diffusione Cultura" (Legge 6/2000) D.D. 369/Ric. del 26/06/2012, with the patronage of the Department of Culture of the Lazio Land Authority.
Project title: "Physical" and "Virtual" enhancement of the prehistoric deposits of the Anagni basin.

The APP allows visitors to be guided through several prehistoric sites and, for each of them, allows viewing a general data sheet, which contains a scientific/descriptive text and a significant iconographic support. The disciplinary areas involved are:

1. Visual Communication, with semiological and semiotic implications;

2. Representation, for the realization, management and exploration of 3D models and two-dimensional representations (raster or vectorial);

3. Multimedia, for the possibility of direct interaction by the user, who can decide where to channel or focus their attention.

Data sheet is supported by additional functions that give an integrated knowledge of the area and its existences:

- by an "Augmented Reality" (AR) visualization of the site, based on GPS position, with geolocalized icons referring to paleontological findings found during excavations. You can also call up additional views and data sheets for each of them;

- by a "time bubble" with a 360° panoramic view of the current state of the place and its morphology referring to two million years ago; you can switch from one mode to another in real time, by means of a special time control bar, where on one of the two ends is reported "today" and on the other "prehistory";

- by a list/abacus of large animals, the remains of which were found in the area in a recent excavation campaign.

For each animal found there is a specific information sheet referring to its cataloguing, with the ability to view and manage a 3D model of reconstruction of the same animal (this possibility can also be extended to the presence of fossil plants), supplemented with a textual description and a gallery of reconstructive drawings developed by paleontologists.

Selecting "Explore the sites" in the "Splash Screen", a map opens showing the two sites of paleontological interest, named "Coste San Giacomo" and "Fontana Ranuccio". Clicking on one of them, you can view the path to get to the site, or, alternatively, access the data sheet. From the top bar of this screen, you have three different possibilities that allow to switch to "Augmented Reality", open the mode "Time Bubble" or allow to go to the finds of each individual animal whose remains were found on the site. You can see their localization thanks to an icon on themselves. If you select it, the reference animal's information opens (fig.5).

"Time Bubble" function provides a link between the past and the present, allowing you to compare, in real time, the view of the current landscape with that of its conditions dating back to 2 million years ago, obtained through graphic reconstruction. Operation is made possible thanks to the scientific support of paleontologists and paleobotanists, while the definition of the morphology of the place is supported by paleogeologists (fig.6).

Photorealistic reconstruction (using digital graphic images integrated with photographic images), in this case, represents an innovative operation in a sector where reconstructions are mainly entrusted to the communicative effectiveness of traditional drawings made with strokes.

To visualize site's current state at 360°, after photo campaign, some applications allow assembly of spherical panoramas. On these panoramas, there is a graphic transformation, through photo editing to reconstruct past conditions.

Graphic operation becomes complex because it has to support the development of the image at 360°. For realization of prehistoric animals are created 3D models (fig.6) (supervised by the paleontologists) with a limited number of meshes, in order to satisfy, at the same time, the need to obtain a reliable and realistic animal's reconstruction and to obtain a fast computing power of smart instruments.
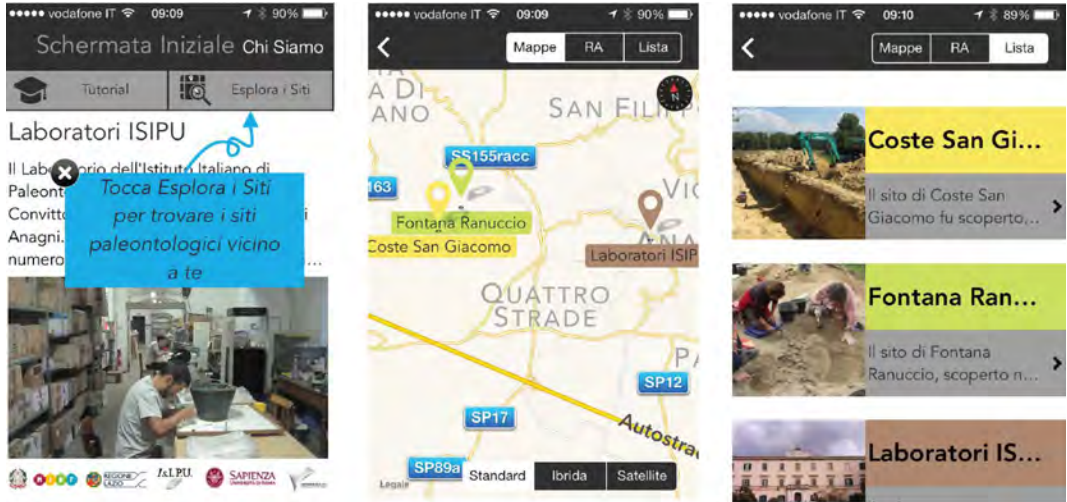
Fig.5. IsIPU. From left to right: splash screen with tutorial that guides users to the exploration of the APP; location of places of interest in map mode; places of interest in list mode.
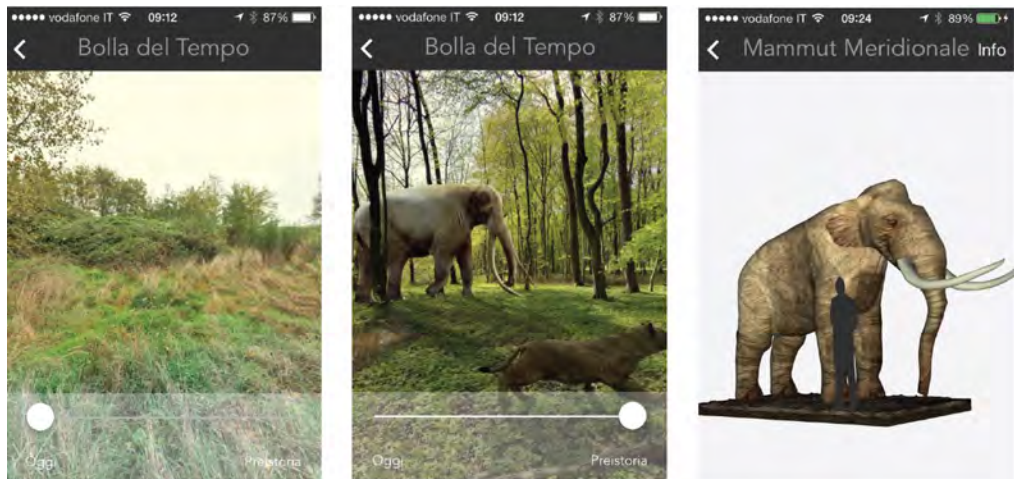
Fig.6. IsIPU. From left to right: Fontana Ranuccio fossil site in "today" mode, you can view a 360° panorama ; "Time Bubble" in Fontana Ranuccio fossil site in "prehistoric" mode, panorama has been previously modified with photo editing; navigable 3D model of the "southern mammoth".

IsIPU APP is one of the first applications of its kind designed for paleontology sector. The collection, processing and integration of information in the APP is very well received by the scientific community of paleontologists, a community not so far accustomed to the use of technologies related to smart instruments. Subsequent developments include the inclusion of other sites and museums that can be visited all year round, extending the contents of the APP to the entire Lazio Region.

It is planned to include some important museums, such as:
  - National Prehistoric Ethnographic Museum "Luigi Pigorini", in Rome;
  - Museum of Paleontology of the Sapienza University of Rome, in Rome;
  - Prehistoric Museum of Pofi, in Pofi, province of Frosinone;
  - Palaeontological Museum of the Polledrara of Cecanibbio, in Rome;
  - Pleistocene fossil site of the Museum of Casal de' Pazzi, in Rome.

The application is designed to increase the knowledge and understanding of paleontology among a non-specialist audience through the communication of landscape and its ecosystems.

Conclusion

Both applications aim to apply digital wayfinding systems to the enhancement of cultural heritage, developing a digital means of communication capable of promoting the accessibility, interaction and communication of a rich context such as that of Ciociaria. Site's character (historical/naturalistic route and paleontological site) causes the visitors/users to be unable to see almost anything (finds or reconstructions). In this case, AR together with traditional wayfinding system, is able to outline new communication paradigms and new forms of interactive digital content that favour experimental ways of accessing territorial resources. Clearly, this technology is not the exclusive solution to increasing place's use, but it can be seen as an additional option. For these reasons, research focuses on how to integrate and improve territorial area's perception, its historical, landscape and cultural identity, creating new instruments that become wayfinding tools to explore the territory.

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A logo for La Pigna

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Abstract

Centers of resources and innovation for artistic crafts" (with the DAD part of the partnership, leader the Chambre des Métiers et de l'Artisanat Provence Alpes-Maritimes Cote d'Azur) aims to promote artistic craft activities, with the final goal to combine contemporary tools and processes with the creative abilities and the manual skills of artisans of the territories involved - Liguria, Sardegna, Corsica, Région PACA -.

This article is focused on one particular activity that is intended to use artistic craft to redevelop the ancient Sanremo neighborhood called La Pigna, currently considered an unsafe neighborhood by its residents.

This activity consists in a competition, launched in spring 2018 among the students of the Architecture and Design courses in Genoa, aiming to identify a "logo" for the future activities of the district La Pigna. This logo should recall the neighborhood morphological (from which the name derives) and a significant and recognizable graphic element.

Abstract

Oggetto del presente articolo è la relazione su una delle attività svolte nell'ambito del progetto INTERREG Marittimo Italia Francia denominato "ART LAB NET Centri di risorse e di innovazione per i mestieri d'arte" che ha come obiettivo la valorizzazione dell'artigianato artistico. Il progetto (con il DAD parte del partenariato, capofila la Chambre des Métiers et de l'Artisanat Provence Alpes-Maritimes Cote d'Azur) vede nell'artigianato artistico una esplicitazione delle tipicità dei territori di cooperazione del programma coinvolti - Liguria, Sardegna, Corsica, Région PACA - con volontà di sposare le capacità creative e le abilità manuali degli artigiani d'arte con strumenti e processi di crescita contemporanei.

Una parte del progetto vede l'artigianato d'arte come forma di riqualificazione urbana e sociale dell'antico quartiere di Sanremo denominato La Pigna che ha vissuto un progressivo abbandono, ed oggi è un insediamento con molti problemi ma dal grande fascino. Si intende quindi contribuire ad una ridefinizione identitaria del luogo, oggi visto dagli abitanti del centro unicamente come luogo di attività illecite. Nella primavera del 2018 è stato lanciato un bando di concorso tra gli studenti dei corsi di studio di Architettura e Design di Genova con lo scopo di individuare un "logo" per le attività future del quartiere, che possa in qualche modo richiamare la sua singolarità morfologica (de un elemento grafico significativo e riconoscibile.

Introduction

The ART LAB NET Project - Centres de Ressources et d'innovation pour les Métiers d'Arts

ART LAB NET project has been funded by the Interreg Maritime Italy-France Program with the aim to help and support the craftsmanship – with a focus on artistic artisanship –, an economical sector that suffers from the globalized and globalizing context in which it is located. The artistic craft is a direct expression of the traditional culture of the territory and, in most of the regions included in the Interreg Marittime IT-FR program, it represents a component of the local economy that struggles to survive. As a consequence of this, many artisans are disappearing or are unable to transfer their know-how to next generations. This is happening even in areas where artistic craft maintains a strong role, with close ties to tradition, despite the appreciation of the public - as in Sardinia -.

The ART LAB NET project partnership consists of: Chambre des Métiers et de l'artisanat de la Région PACA (Provence and Côte d'Azur, VAR Department) as lead partner; Chambre des Métiers et de l'artisanat de la Corse; Sassari (Sardinia) Fine Arts Academy "Mario Sironi"; ARTIMANOS artistic crafts association (Sardinia); Insight Human Resources (consultancy – Sardinia and Liguria); Department Architecture and Design University of Genoa (Liguria); Pigna Mon Amour association (Sanremo, Liguria).

The project wants to combine craftsmen's creativity and manual skills with contemporary instruments and processes, and improve their communication and marketing skills. Based on a survey of the needs carried out on the project's territories, training activities and tutorials were offered and workshops organized. One point was to allow a better understanding of the digital tools useful for the communication and for selling products. In order to innovate and stimulate production capacities and to attract the new generations in a little known work, four Resource Centres were funded. These Centres are laboratories able to host advanced machinery, like a sort of Fab Lab, with 3D printers, laser cutter, allowing old and new artisans to experiment and hybridize traditional production technologies. These Resource Centres are very different from each other, related to different management organizations. The two Chambre des Métiers are organisms created for the training and support of artisan companies, with public funds and offices. In Sardinia, the Resource Centre is divided in two seats, one is a big Laboratory managed by the Fine Arts Academy in Sassari, a place where to experiment and to prototype objects. The other one is in Cagliari and it is a place where artisans can attend seminars and sell, collectively, some of their products in the city centre (most of Sardinian craftmans have labs located near their home and out of the city centres of the main

touristic cities, due to the high rent costs). The fourth Resource Canter is in the old part of Sanremo city, named La Pigna (that means The Pine Cone), and is managed by Pigna Mon Amour (PMA), an Association for the cultural promotion of the old historic centre of Sanremo called "Pigna". The activities conducted by ARTIMANOS and PMA need project funds to be numerous and effective because usually they are self-financed and people work for them as volunteers.

Methodology
Craftmanship and city requalification

Cities have always been the place for economic and cultural opportunities. The artisanal objects are direct expression of their history and traditional expertise. We are facing a generalized crisis in the redevelopment of historic centres, but we can hypothesize that today craft can be an instrument for their redevelopment. In the cities where the historical centres have survived with limited levels of gentrification, rent prices have remained affordable. In these spaces, on the ground floor, we can still often find small shops. Some experiences in Italy seem to support this hypothesis.

The Association Free Artist Craftsmen Balarm of Palermo (Alab) is an example of symbiotic relationship between territory and craft activities, with about eighty laboratories and three hundred members involved. Their manifesto states: "We create a diffused network of microeconomics for the urban redevelopment of the territory". "We spread creative craftsmanship as economic and cultural innovation in squares, in schools, training both the youngest and those trying to make a real alternative." The Association aims to create a space of cultural initiatives that would lead to cultural development by encouraging art and crafts. According to the members of Alab, artistic craftsmanship is a fundamental economic and productive resource, which led the association to conceive a path of rebirth within the historic centre of Palermo that is at risk of abandonment. An itinerary has been defined for citizens and tourists to discover the artistic and craft work and to distinguish it from industrial product, enhancing a profession in which handcraft and intellect meet and where the artisan manage the entire production process.

Another example is the Perugia historic centre, where in 2009 the cultural association "Artisan shops of the historic centre" was set up by promoting artistic craft activities both traditional and innovative. The historic centre is an ideal place for its artistic importance, wanting to disseminate, protect and communicate the culture, the craftsmanship and its product.

Another initiative comes from Finale Ligure: in order to promote and enhance art and craftsmanship, a few years ago, the "Fatto a Mano" Finalborgo association (that means: made by hand) was established. Finalborgo is the medieval historical centre (but the foundation date back several centuries earlier) of the coastal town of Finale Ligure. In 2014, the "Fatto a mano" head office was conceived to promote manual work and ancient crafts through the products created by artisans and guest artists, creating opportunities to show their skills and their creativity, demonstrating and exposing their creations rigorously made by hand and involving the public with courses or workshops. These initiatives – others could be mentioned - often arises during public projects aimed at recovering the most degraded portions of the urban territory, favouring the establishment of new economic activities or supporting the existing ones. These projects are not always able to activate self-

generating mechanisms and it is necessary that the new entrepreneurs are able to maintain competitiveness. *ART LAB NET aims to establish a lasting collaboration between Resources Centres and artistic artisans involved even after the project will be over. In fact, in the case of artistic craftsmanship, the difficulty in sustaining all the costs that a small-scale production and commercial activity requires bring this activity more and more towards seasonal work. A solution is to provide services to artisans at reasonable costs. A temporary activity, linked solely to the festive days "markets", induces artisans to begin "operators of their own talent" that is a category that can sell works in a limited number of public events a year. This "temporariness", as well as being difficult to control from the fiscal point of view, has the consequent difficulty for the artisan to grow, to form himself, and subsequently transfer his artistic skills to new generations. A consequence is that historical centres are going to be empty of craft and commercial activities, exposing themselves to degradation or, at best, to an intense gentrification.*

La Pigna district

A specific part of the project sees the art and craft as a form of social redevelopment - and, consequently, of building recovery - of the old Sanremo district, called La Pigna. This strange name comes from the form of its planimetry, where the paths form the scales of a pine cone. The district was founded around 1000s and consolidated until the 1500s. After the boom of flowers cultivation and in Sanremo, it has seen a progressive abandonment that left it almost without human and economic resources, but allowed a substantial crystallization, so that today we are witnesses of a historic settlement of great charm, still almost inviolate. The district continued to expand and strengthen until 1500 to defend itself from pirate attacks. One of the entrances of La Pigna is the door of Santo Stefano, a stone arch in Gothic style that represents a point of connection between the old city and the new one. The residential area develops on the hill, on concentric circles, with covered passages, courtyards, arches and stairways. The district is located above sea level; at the top of the hill stands the sanctuary of the Madonna della Costa, a reference point for navigators from 1630, when it was finished, on an original small oratory from 1200. The evocative late-medieval Piazza della Cisterna (literally "tank-square"), which once was a district of artisans, it is an example of urban wisdom, since the lack of water was solved with a complex system of collection and sorting of rainwater in subterranean tank. Not inferior in importance is Piazza dei Dolori (fig.1), where the oratory of San Sebastiano (1502) and the palace of the Genoese family Gentile-Spinola are located. Another peculiar characteristic of the neighbourhood are the Rivolte (fig.2), wonderful porticoed passages made up of medieval walls that connect Piazza dei Dolori to the door of Santo Stefano (Vulpio, 2016).

Despite the great historical and cultural values, the buildings of La Pigna have been gradually abandoned. Most of the ground floors are closed and remain unused, with few activities, mainly commercial, like bar, restaurant, brocanterie, and almost none of craft-shops. Art Lab Net project tries to face this problem opening the "Textile and digital fabrication" Resource Centre, developed by the Pigna Mon Amour association, looking for or training new artisans. This could be an opportunity for bringing back new small commercial businesses to the district, essential for the survival of La Pigna. In addition, due to the desire to keep intact the historical memory of the district, from which

its charm derives, a short workshop on the restoration of the plaster was organized for the students from the School of Specialization in architectural and landscape heritage. The activities are filmed to witness the development of the project that will end this spring. The Resource Centre focuses on tailoring mainly, profiting by the presence in La Pigna of many unemployed women, some from North Africa countries, already used to sewing. For this reason the association members and sympathizers considered more profitable and simple to implement, as a first activity of the resource centre, some sewing and tailoring courses. Particular attention was given to the concept of "ethical fashion", organizing a seminar day "Fashion, style and lifestyle". To support the promotion of the Resource Centre, the Department of Architecture and Design (DAD), together with the Association Pigna Mon Amour, announced a competition for students to define the logo of La Pigna, to be used to promote products sewn in the district.

Fig.1 Piazza dei Dolori

Fig.2 Le Rivolte

La Pigna's logo competition

In February 2018 the Department of Architecture and Design (dAD), together with the Association Pigna Mon Amour, published a call for student "La Pigna's logo competition", with the aim to find a logo that can promote La Pigna district. The participation in the competition was numerous, thirty different logo proposals arrived, evaluated by a selected jury. The jury was formed by the authors (Magliocco, Canepa), directly involved in the project, by a representative of the Association Pigna Mon Amour Carlo Terzi, restorer, and by the Professor Ruggiero Torti, graphic and communication expert.

In order to find appropriate evaluation criteria, the jury referred to the characteristics that a logo must have. The word logo comes from the Greek word lógos, which in turn comes from léghein, "choose,

tell, enumerate, talk". Because of that a logo should represent a product, a service or a company. It is the readable and pronounceable part of a brand, in another words is the visual signature of a brand. The logo can be formed exclusively from the logotype and therefore can be represented by a lettering that reproduces a phonetics expression (such as Coca Cola, IBM, Zara or ASUS), or can be composed of a pictogram, an ideogram, a monogram, an acronym or a combination of these with the logotype. (Budelmann et. al., 2013). Another element to consider when creating a logo is the colour. Colour is a fundamental element of the visual code that helps in understanding reality, it is part of the DNA of all living beings and conveys mood by providing information that acts on the nervous system, influencing perceptions, judgments and sensations. Red is the most used colour in graphics because it transmits vitality, passion and a large amount of positive sensations such as love. It is the colour that most of all stimulates excitement and impulsiveness and is in fact used in many sales signs in shop windows to tempt to purchase. Black, as well as white, can be combined (almost) with any colour. The most elegant combination is the one between black and white. The black colour, however, must be used with great care because it is very heavy and conveys a high-risk range of emotions. In any case it remains a symbol of elegance and therefore suitable for products and brands related to fashion, perfumes, art or design (Healey, 2012).

The evaluation criteria selected concerned different characteristics which must have an effective logo, even in relation to the activities of the Resources Centre. First of all, the effectiveness: the logo had to be functional and attractive; many proposals have tried to start from the suggestion of the pine cone, referring to the shape of the neighbourhood, trying to synthesize its geometric characteristics, or on the contrary, emphasizing its urban characteristics. The second aspect is the consistency of the logo with the aim of the project: it was important that the logo was focused on tailoring as well as on promoting the neighbourhood. The third aspect was the originality: the logo had to offer a different point of view than the logos previously used by the association. The fourth aspect was the reproducibility: the logo had to be used in different formats and be applied to various products, like dresses, hats, t-shirts, posters, stamps, without losing its definition and quality. The last aspect was the versatility: the logo had to be suitable for the various activities of the centre. Each criterion could reach a maximum score between 15 and 25, for a total of 100 points. The winning project, elected with 90 points, was created by Elena Geria and Alessandro Chilosi, both students in architecture of the Department of Architecture and Design. Their design, starting from the shape of the pine cone, consists of triangular geometric elements, and thanks to its simplicity it allows the reproduction of the logo in different scales and colours. They proposed the logo in two versions: a red one and a black one initially without lettering and name study, added later after the association request.
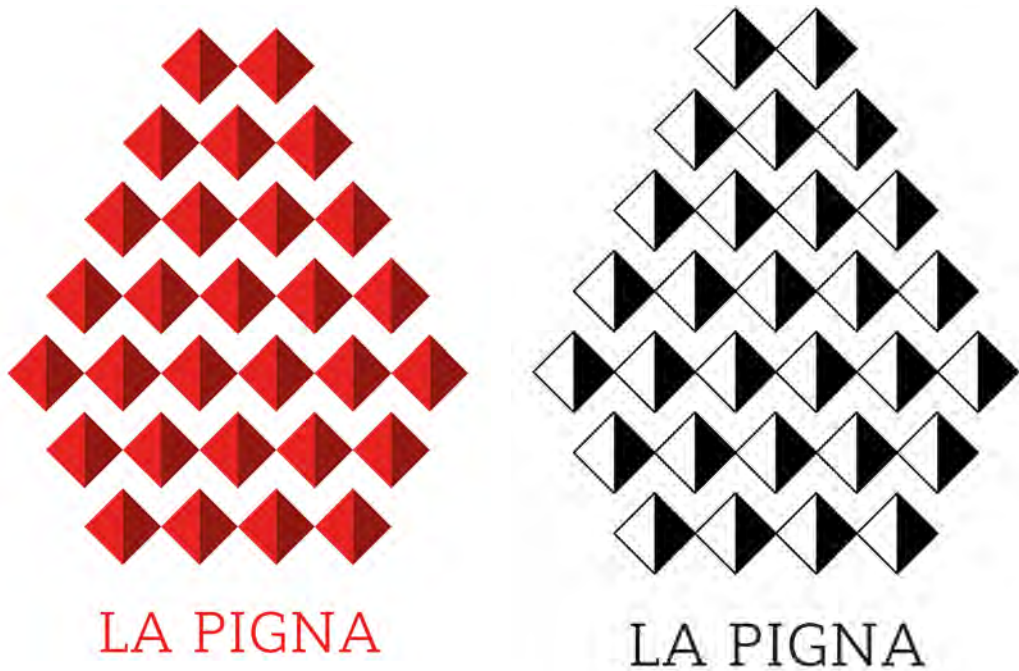
Fig.3 The Pigna's Logo by Elena Geria and Alessandro Chilosi

Conclusion

The *Homo faber* (Sennett, 2008) is a maker, a creator, a judge of labour and material arts. He is the worker with the obsession for quality, that is the craftsman. Many men with the obsession for quality would therefore be able to face the re-establishment of a neighbourhood like La Pigna understanding its meaning. The challenge is to promote the neighbourhood without exceeding with the territorial marketing strategies that could transfigure it. The new logo La Pigna is not yet a brand, but it could be an evocative image of the activity of a group of people who want to focus on the neighbourhood without commercialise it. The first use of the logo will be to distinguish home sartorial products, made by the participants in the tailoring courses organized by the association Pigna Mon Amour within the project ART LAB NET. The goal is to bring some of the course participants to a level of ability that allows them to open a craft business based in the neighbourhood.

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Conservation and Enhancement of Monumental and Local and Heritage, matter and design

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Abstract

The didactic/professional experiences here presented have a dual objective. 1) To compare, on the construction site, the professional figures that most affect the planning and execution of conservation intervention: professors and expert restorers, young architects attending a specialized training course (Post-Graduate programme in Architectural Heritage and Landscape), architects in charge of safeguarding heritage. 2) To sensitize the local community to the conservation and enhancement of its cultural heritage. The two experiences have been held within the post-Graduate programme, one in the Monumental complex of the Staglieno Cemetery in Genoa (Spring 2019) and the second on the facades of Sanremo's historical town centre (within an INTERREG project, Spring 2018). These ideas have matured around different purposes, including the priority to preserve cultural and architectural heritage, as well as training and sensitizing the community in general. The result was a fruitful collaboration between Local authorities, Superintendence, restorers, teachers and students of the post-Graduate school. From virtual reality (surveys, maps showing the state of conservation) to the material world: the specialists were invited, under the guidance of restorers and teachers, not only to refine their manual skills, but also to reflect on the meaning that an operation, necessarily limited to a small portion, can acquire in the most complete and complex conservation project (a part to a whole).

Abstract

Le esperienze di tipo didattico e professionale presentate nel testo hanno un duplice obiettivo.
1) Confrontare, sul cantiere, le figure professionali che maggiormente influenzano la programmazione, progettazione ed esecuzione di interventi di conservazione: docenti e restauratori esperti e giovani architetti che frequentano un corso di formazione specializzato (Scuola di Specializzazione in Beni Architettonici e del Paesaggio), in dialogo con funzionari di Soprintendenza responsabili della tutela. 2) Sensibilizzare la comunità locale alla conservazione e alla valorizzazione del proprio patrimonio culturale. Le due esperienze si sono svolte all'interno del programma post-laurea, una localizzata all'interno del Complesso Monumentale del Cimitero di Staglieno a Genova (primavera 2019) e l'altra sulle facciate del centro storico di Sanremo (nell'ambito di un progetto INTERREG, primavera 2018). Le sperimentazioni didattiche sono maturate con diverse finalità, la conservazione del patrimonio culturale e architettonico, la formazione specialistica, la sensibilizzazione della comunità alla tutela e valorizzazione del proprio patrimonio. Ne è risultata una proficua collaborazione tra autorità locali, soprintendenza, docenti, restauratori e studenti della scuola di specializzazione. Dalla realtà virtuale (rappresentazioni, mappe dello stato di conservazione) alla materialità: gli specialisti sono stati invitati a perfezionare le loro abilità manuali, ma soprattutto a riflettere sul significato che un'operazione, necessariamente limitata a un piccola porzione, può acquisire nel più completo e complesso progetto di conservazione (dal parziale al totale).

Introduction

Flemish depictions of the Tower of Babel, an allegory of the proliferation of languages, were often used in technical literature throughout the late Twentieth Century as a symbol representing the complexity of construction work and site. This artistic reference clearly seeks to evoke a historical turning point in the world of building, from a wealth of knowledge that was 'conventional' (even artisanal) to one that was 'predetermined', meaning it is based on practices and rules that are codified and standardized. The same if not greater complexity of information, skills and situations is typical of construction carried out on what already exists, characterized by a multitude of figures and languages, methods of expression and representation, along with a merely apparent simplicity in materials and building solutions.

Virtual/material and total/partial are the terms around which the third-level learning experiences herein presented are developed, where the students at the Specialist School of Architectural Heritage and Landscape (Post-Graduate Programme), benefitting from first-hand experience with materials and how they are preserved, were given the chance to reflect on the meaning behind their work. These experiences, of an applicative nature, derive from the aim to compare, in situ, the most influential professionals in planning and executing conservation interventions, progressing from the virtual representation stage to the manual phase. These experiences took on the form of two intensive workshops, one of which ended recently inside Genoa's Monumental Staglieno Cemetery (April 2019) while the other took place in La Pigna, Sanremo's historical town centre (April 2018). In the first case, the initiative was carried out jointly alongside Genoa's Local Administration, Civil

Services Department, and saw the active collaboration of the Archaeology, Fine Arts and Landscape Superintendence, teachers from the Post-graduate school and expert restorers specialized in stone materials. In the second, the idea came into being during the ART LAB NET project – Resource centres for innovation in artistic professions, INTERREG ITA-FR Maritime Programme 2014-20, which saw the involvement of a number of bodies including Genoa University's Department of Architecture and Design (headed by Adriano Magliocco) and the Pigna Mon Amour Association (Franco et al. 2018).

Fig.1 Tower of Babel, Abel Grimmer, Antwerp 1595 (Louvre Abu Dhabi)

The Monumental Staglieno Cemetery, among Europe's most important cemeteries (inaugurated in 1851 following an initial design by Carlo Barabino, later perfected by Giovanni Battista Resasco), today acts as not only the city's main place of burial, but an exceptional open-air museum where marble, the most present material, gives form to memory, to a true 'city of the dead', following an initially 'fenced' layout of strong neoclassical influence, to which surrounding hillsides of great landscaping importance have been added (Sborgi 2000, Mastrorilli and Pigafetta 2007, Falcidieno and Malagugini 2014). The considerable extension to the complex and the exceptional number of significant works of sculpture make the area an attraction worth visiting. The site's main problem is undoubtedly its continuous maintenance, due to the aggressive environmental effects suffered by the works of sculpture along with the architectural elements and the green areas, which grew spontaneously and randomly compared to the original layout. A maintenance where at times private owners (of chapels and sculptures) enter into conflict with the ambitions of the public sphere when it comes to arriving at an effective conservation plan.

La Pigna, on the other hand, is Sanremo's oldest section, a fortified town built before the year 1000 around a garrison owned by the Counts of Ventimiglia, which today faces outward with primarily Sixteenth-century shapes, presenting later additions of a Baroque style in the churches, elevations and extensions within the key families' buildings, in the form of arcades, cornices and decorated entrances. It is no easy task to identify within the lines making up the urban fabric the nuclei of the originally closed medieval quarters from the Thirteenth Century; the lack of linear street lines, the saturation of spaces and the vicinity of buildings, linked by typical arches, forced the decision to use covered vaulted passages. The most prominent architectural element is the complex of supporting arches, built to reinforce the homes during the frequent earthquakes that would hit Liguria's Riviera di Ponente. The intensive project was focused on the facade's plaster, a fragile element that risks being lost even during everyday maintenance.

Planned conservation and the dialogue with the owners: an ever-open issue for the Staglieno Cemetery

Planned conservation is an innovative procedure, conceived as a shift from 'restoring as a one-off event' to 'conservation as a long-term process' (Musso 2009). It is more than maintenance and monitoring: it is a complex strategy that brings together large-scale risk mitigation and an accurate organization of daily activities. This form of conservation is therefore something greater than simply carrying out maintenance: it means implanting a new scenario, posing questions regarding strategies and connections between conservation activities and local development processes. Planned conservation is a global strategy (Della Torre 2010). Compared to the traditional mentality behind restoration, planned conservation accentuates the focus on the long term (maintenance and care-related interventions take place in different timeframes) and on the perception of potential risks (which the object can be subject to, and which can mature over time), and it requires a process of innovation which implies a profound change of mentality. Restoration is thus interpreted in a process-related logic, in which responsibilities are accentuated in terms of compatibility, durability, minimal intervention and information management (Della Torre 2010).

Of particular interest, beyond small cases of experimentation on works of marble, could be the creation of a planned conservation programme, where the environmental situation (an environment submerged in greenery) and the lack of maintenance, in some cases, have brought about a state of evident decay. In some cases, vegetation (on paths and in the 'woodland of memories') was expected, planned and wanted since the cemetery's first layout was designed. Over time, however, it has undergone changes and lacked care and attention; it has therefore become, in a number of places, a threat and a source of decay for the cemetery's smaller architectural elements.

During the workshop that took place with the Post-graduate school, one item that was discussed was the difficulties in carrying out delicate operations such as cleaning the marble surfaces with details and, often, delicate etchings or even gilding or layers of colouring; another subject of discussion was the need to carry out surface consolidation interventions in areas characterized by a high and constant degree of humidity.

The workshop compared the most recent products and treatments provided by leading research

bodies (Matteini et al. 2006, 2011; Pittaluga et al. 2012). In such a particular context, another need to be underlined was that of the complexity of necessary conservation interventions for implementation strategies that are more suitable than the ones currently available in this field. The idea of planned conservation and therefore of a programme of maintenance and restoration interventions within the cemetery could have a 'proactive' effect on conservation; projects could be developed that are in line with territorial systems (the Staglieno Cemetery itself can be seen as a set of territorial systems, at times with considerably varying characteristics), with initiatives being planned and optimized accordingly; this could also bring about development objectives in which the growth of human capital (younger generations of agents and architects that are specialised in restoration) and of its skillset could represent a strategic turning point. The synergy among the various Institutions (Universities, Superintendence, Local Authorities...) implemented in this workshop aims to be a first step in this direction.

From virtual reality to the material world

The conservation project follows methods consolidated in schools and practical experience, expressed through specific maps for the constituting materials, state of conservation and relative interventions, according to a gradual recognition of the constructive aspects, the agents and causes of decay and consequential phenomena.

The historical town centre La Pigna, which, following the destiny of many old town centres in the region, was progressively abandoned by its residents, preserves a great quantity of ancient plaster that has deteriorated, and has been touched up over the years, re-coloured and tampered with in one way or another, which gives expert eyes extraordinary timelines. The post-graduate students were given the opportunity to work on these surfaces, which at times were decorated (albeit simply), getting to grips with applying their ability to observe and process in a logical manner the information obtained, their own tactile perception and their ability to use 'fragments' and to reconnect the parts to the whole (Mannoni 1982, Casarino and Pittaluga 2001). This did not simply mean 'picking up a tool' to practice on one or more simple interventions (learning the 'how') but deciding what to preserve (reflecting on the 'why').

The experimental contexts were chosen on the basis of their representativeness within the constructed environment:

- the entrance wall to the Palazzo Manuel Gismondi on Via Morardo, of Eighteenth-century construction, with a curved shape that embraces the stairway and the gate that fences off the relevant open-air space, characterized by a coloured decoration in relief;
- the main facade of an elevated construction incorporating medieval walls within its own base, with hints of decorations surrounding the openings, beside the Santa Brigida church;
- a portion of outer wall of a building without any notable architectural aspects except for relatively old painted writings;
- a decorated shrine in Piazza del Capitolo.

The chosen interventions, agreed upon by the Archaeology, Fine Arts and Landscape Superintendence

and the experts from Sanremo's Local Authorities and authorised by the owners, are those of the greatest simplicity and smallest impact:

- cleaning (removing biological patina, layers painted on later which do not match, vandalism and atmospheric pollution)
- pre-consolidation
- integration of missing portions.

In all cases and for every kind of intervention, the post-graduate students were given the chance, under the guidance of restorers and professors, not only to refine their own manual skills but also to reflect on the meaning an intervention, necessarily limited to a small portion of the concerned wall, can acquire within the complete, complex conservation project as a whole.

Cleaning to unveil: an intervention on the exedra at the entrance of the Palazzo Manuel Gismondi

Through practicing with simple cleaning interventions, restorers and post-graduates were able to shed new light on the decoration at the base of the exedra at the entrance of the Palazzo Manuel Gismondi, in the background with plaster in relief and white colouration, surrounding bands in pink and white and outlines on the encasing pillars. A simple work but of great quality, as is the case in other buildings of La Pigna; by cleaning a limited sample the aim was to sensitize the local community to the value of their heritage and its identity, to the need for its recovery, which must be in line with the preservation of its materials.

The following are the interventions carried out.

1. Cleaning away biological patina by applying benzalkonium chloride diluted from 3% to 10% and mechanical brushing with a synthetic brush; washing with demineralized water.

2. Applying a "Nevek" compress on graffiti emerging from beneath the biological patina, along with an acetone solution, and the removal through brush work and scalpel of sections of synthetic paint.

3. The removal of the incoherent layer of paint with the use of a scalpel, focusing on a yellow colouration on the white backgrounds as well as on the pink backgrounds, which is entirely incoherent with the original colours, followed by washing the portion with demineralized water and a sponge.

4. Stucco work on the gaps found in the surrounding smooth bands and in the corner reinforcement. The integration of the decorated band (deep gap) is carried out in two stages (on different days) placing an initial arriccio layer of a seasoned lime mortar with a larger granulometry and a finishing layer with a finer granulometry. In order to seek out a tone that is similar to the finishing layer, a mortar was prepared with aggregate/bonding proportions (lime putty) of 3:1, varying the composition of the aggregate (in one case, 2 parts of yellow sand to 1 part of grey while, in the other, 2 parts of grey sand and 1 of yellow sand). The integration is refined by the use of a trowel and a sponge, in order to help the mortar aggregate come to the surface, giving the mortar a particular colouration.

5. A final correcting glaze with lime and colouring powders to even out the plaster used to smooth out the surface. Colours are obtained by adding earth-based pigments to the lime putty diluted in water to obtain more or less diluted tones to be laid during later applications on limited superficial integrations, as to reconnect localized uses of colour. When dealing with larger areas in need of

smoothing over, sharper colours are added in the base while the required tone is obtained by using a limewash glaze; over time the colour emerges from beneath the glaze in a selective fashion, creating a "living" facade.

Fig. ... (caption partially obscured)

Selecting and preserving: the adjacent facade to the Santa Brigida Church

The facade overlooking the small town square delineated by a side of the Santa Brigida Church shows fleeting signs of a decorative pattern, which can still be glimpsed at the base along briefly etched sections and, higher up, in the difference in colours between the earthy plaster and the frame surrounding the apertures, painted white and decorated at the top. The finishing shows clear signs of stratification (layers of plaster and painting), gaps, detachments, which make the oldest layer scarcely legible at a first glance. The existence of this oldest layer, which probably did not cover the entirety of the medieval walls, was confirmed through the removal of sections of the other layers using a scalpel and a small hammer. The effort to read, interpret and select information was thus focused on the uncovering of the decorative theme around the arched aperture, still present albeit partially concealed by layers of paint and finishing plaster applied later. The following are the interventions carried out.

1. Layer removal, in order to shed light on the frame's etchings surrounding the aperture, similar to the more noticeable one around the window of the upper floor. Following the pre-consolidation of a portion of detached plaster, the older layer was uncovered with a small hammer and a scalpel, in phase with the surrounding decoration.

2. Gap integration in the concerned portion for this workshop (both in the decorated band and in the plaster base) with a mortar made up of lime and 2 parts of coloured sand and 1 part of grey sand, along with natural umber in order to bring the colouration as close as possible to that of the plaster. The gaps are not completely sealed, instead the broken edges are accompanied towards the lower layer with plaster. Due to the fact that the finishing layer is particularly varied, during the experimentation phase one tends to minimize the idea of incompleteness and decay without however

hiding traces of the layers themselves which can be useful for future studies.

3. Glazing. In order to smooth over the integrations applied on the plaster and frame, two glazes are applied: one obtained by mixing natural umber and seasoned lime putty and the other with marble dust and watered-down lime putty, in order to achieve a similar colour to that of the frame. The work therefore focuses exclusively on earth-tone pigments in order to bring out contrasts between the colours, thus emphasizing the decorative phase, considered to be of greater value.

Restoring and integrating: the shrine on the Piazza del Capitolo

The small shrine has been subjected to many re-paintings and the cleaning samples carried out are aimed at allowing the post-graduate students the chance to identify the stratifications and to select the most valuable finishing (presumably the first constructive and decorative phase). Through pre-consolidation, layer removal, cleaning, consolidation, paint integrations and glazing, under the guidance of the restorers, the students were able to gain experience in manual work, while also having the opportunity to evaluate how long they should extend each operation as to not compromise any other traces still hidden, waiting to be uncovered.

The following are the interventions carried out.

1. Layer removal aimed at detaching the layers covering that which is considered of greater value by using a fixed and mobile blade, small hammer, sponge and water. When it comes to layers that are difficult to detach, ammonium carbonate in paper pulp can be used to remove the superficial layer without compromising those beneath.

2. Pre-consolidation of detached layers (corresponding to a side of the shrine), the edges of which are preventively cleaned with ethanol injections diluted in equal parts with water. The alcohol reduces the superficial tension and allows the water to penetrate inside the detached sections' pockets and evaporate quickly, paving the road for injected mortar. Before the consolidating material is injected, the detachment's edges are sealed with a mortar made up of 3 parts of marble dust and 1 of seasoned lime putty.

The injected mortar, on the other hand, is more fluid and made of a premixed hydraulic lime for

restoration. Next one must proceed layer-by-layer, making sure to work from the bottom up, injecting the mortar until it overflows in the case of structural or bedding mortar detachments, while creating small connecting 'bridges' for superficial detachments, in order to avoid the risk of varying the localized mechanical and transpiring aspects.

3. Glazing of limited decorated surfaces. Having reached the layer to be preserved, the next step is to use watercolour glazing lowering the tone of the gaps of colour. In order to establish which colours to use, from a perceptive standpoint one must carry out a chromatic analysis of the colour that needs reproducing, assessing the relationships between primary and secondary colours. On the smaller portions of stucco work and on the stucco work on the fractures the process to follow is one of chromatic selection, once again using pure colours that cancel each other out, in order to achieve the right tone.

Conclusions

Both initiatives proved to be excellent learning experiences in which to refine the knowledge and awareness of techniques that are adopted solely in projects regarding conservation, maintenance and restoration of stone elements and plastered surfaces. Furthermore, especially in the case of Sanremo, the chance to meet with the residents, tourists and 'city users' was enough to open up a social community to the respect and care (Torsello 2006) needed for their own historical heritage, emphasizing the importance of enhancing one's own culture (Musso 2015) in order to give rise to 'heritage communities' and to solve the problems of decay or underuse (Pittaluga and Nanni 2016; Pittaluga 2017).

The approach applied during the various case studies and the sensitivity demonstrated by the post-graduate students, assisted by the restorers and pofessors from the School, in identifying and preserving historical stratified traces presented a clear sign of respect, which in the future could evolve into the definition of guidelines for interventions which often, in day-to-day situations, tend to be carried out in an invasive, if not entirely substitutive, manner. The intervention in the monumental cemetery and that carried out in Sanremo's La Pigna aim to underline once again the need to safeguard the beauty of historical heritage of more or less value and the absolute necessity of conservation, which cannot exclude a bottom-up process.

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The city inside the ship: new formal configurations in the organization of space on board

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Abstract

The evolution of the design of the cruise ship, in its meaning of inhabited system, goes beyond the formal limits defined by the traditional proportion between hull and superstructure: the external casing, in its characterization, has in fact always defined the connection between the closed and the external parts.

In the past, the compositional system and the scenographic apparatus of interiors within the on-board layout (defined as a complex of public and private areas, in the variety of representative spaces and their respective connections) was the only communication tool able to recall the complexity of the urban environment. Now this task is entrusted to the study of the external parts, through new volumetric configurations of the superstructure, and in the redefinition of the deck with respect to the traditional perceptive relationship between interiors and open spaces. According to the most recent design trends, the deckhouse leaves the original monolithic aspect - more or less solid - to form an articulated and complex, sometimes irregular, element. The new spatial arrangements, expressed in the splitting of the superstructure volume and in its recomposition in autonomous and isolated parts, are able to recall, in visual perception, the complex aspect of an urban *scenario*. The outdoor areas are no longer confined to the perimeter of the superstructure, but rather are connection paths between volumes, capable of generating new compositional and scenic outcomes. This promises an innovative combination in the design of on-board spaces: the implications of these go beyond the simple functional planning to join the study of the built landscape. Where the theme of perception, of a new urban configuration built on a regular surface, bordered by liquid boundaries, it becomes pre-eminent.

Abstract

L'evoluzione compositiva della nave da crociera, nella sua particolarità di organismo abitativo, oltrepassa i limiti formali tradizionalmente delineati nel rapporto tra lo scafo e la sovrastruttura, il cui involucro, di fatto, definisce i rapporti tra parti concluse ed aree esterne. Se in precedenza l'impianto compositivo e l'apparato scenografico degli spazi interni dell'allestimento di bordo -quale complesso di aree pubbliche, private e delle rispettive connessioni- era l'unica articolazione espressiva capace di richiamare la complessità dell'ambiente urbano, ora questa prerogativa si proietta all'esterno, attraverso una nuova configurazione volumetrica della coperta, che pare ridefinire le relazioni proporzionali tra gli interni e le zone all'aperto: secondo le più recenti tendenze progettuali l'incastellatura abbandona l'originaria conformazione monolitica per smaterializzarsi in un elemento articolato e complesso -più "permeabile"- talvolta irregolare. Le nuove configurazioni spaziali, espresse nella frammentazione dei volumi della sovrastruttura e nella sua ricomposizione in parti autonome ed isolate, richiamano, nella percezione visiva, le tipicità di uno scenario urbano. Le superfici esterne, non più relegate ai perimetri laterali, divengono piuttosto dei percorsi di connessione tra i volumi, in grado di generare nuove combinazioni compositive e scenografiche. Si prospetta così un innovativo connubio nella progettazione degli spazi di bordo: le cui implicazioni vanno al di là della semplice pianificazione funzionale per accomunarsi allo studio del paesaggio costruito, per il quale, il tema della percezione -ivi riferito ad un'inedita "forma urbana" delimitata dai confini liquidi- diviene preminente.

Introduction
The inhabited space and the hull, between tradition and research of new typological configurations.

The ship, since its initial historical configuration of means of transport conceived expressly for the use of passengers, becomes a habitable place, a structure of hospitality divided into several specialized spaces for functions, thus assuming the characteristics of architectural structure, first in the its purely utilitarian conception of a liner, therefore in the pleasure boating of a cruise ship.
The need to solve - under this aspect - the articulation of habitable environments, albeit through an still uncertain distribution of the spaces on board, underlies the immediate reference to the spatial organization of the large reception facilities, to create a nautical equivalent of the hotel architecture. Thus it was that the eclecticism of the great hotels of the beginning of the century soon became the reference point for the steamers that have now become objects of considerable size with ever greater and regularized volumes on board.
Therefore the formal apparatus could not ignore the architectural reference: the naval specialization in the transport of passengers on intercontinental routes, has progressively identified an orderly determination of the parts: a formal codified evolution for which they could be seen - starting from the primeval formations - precise formal, proportional and volumetric relations between the complex of the "sailing machine", common to all merchant ships, and that - more specialized - of the residential complex.

These relationships concurred to the definition of a typological apparatus specialized in hosting a community of people united by the same objective, that is: to reach a destination as soon as possible - in the case of the liner - and to visit new locations in a relaxing atmosphere and in a comfortable environment, in the case of the cruise ship.

Since its conception, the typological corpus of the passenger ship has a series of distinctive elements, as regards the formal relations among the various components of the overall body, with respect to the other types: first, the volumetric relationship between the hull and the superstructure; secondly, the extension and characterization of the latter, with reference to the aesthetic canons in their respective chronological terms.

Historically, the aesthetic configuration of the ship has always been defined by the synthesis of the needs of the "habitable machine", with those of the "navigating machine", that since the first design expressions contained compromise solutions sometimes antithetical and discordant with respect to the housing needs properly.
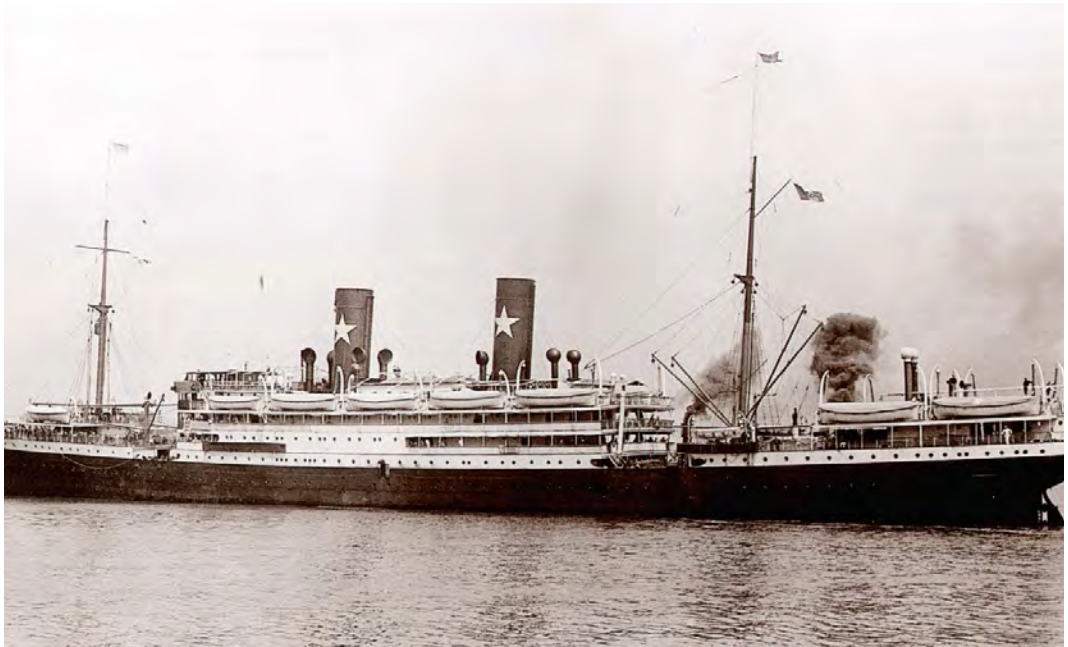
Fig1 S.S. Dante Alighieri, 1913.

From the moment in which the typology assumes an autonomous definition with respect to the merchant ship, the continuous search for a balance between the technical element and the housing apparatus - determined by the set of functional and recreational elements - produces, in the identification of spaces suitable to contain a growing number of passengers, a sequence of varied volumetric configurations, both in the composition of the superstructure and in its extension - longitudinal and transversal - with respect to the hull. In the history of the passenger ship we can see how the specimens of the origins had a rather articulated and fragmented superstructure in a sequence of detached volumes (eg the first decades of the twentieth century).

The general layout of decks was characterized by an evident compositional disorder in the housing system, specifically from the proximity of the countless technical parts and the private and common residential areas. According to still random distribution schemes that was subordinated to the technical compartments of the huge-sized locomotion system, of the holds and the relative ventilation systems, of the navigation equipment, of the loading facilities, capstans and other bulky armaments. It was a invasive equipment that overspreaded vertically and longitudinally throughout the body of the ship. Therefore, the external areas of the ship were practically inaccessible to life on board, since they were at the exclusive use of the crew, except for the side decks, on which overlooked the common areas and the few cabins with windows, where they were not occupied by lifeboats.

It took decades for the superstructure to acquire a formal completeness from a volumetric and compositional point of view, with respect to its original conformation through small separate volumes. The stern castle and the front quarter were then connected in a single unifying body, the sides were thus equipped with gangways, initially open and later protected by canopies supported by slender props. Already from the second decade of the twentieth century the superstructures were composed of overlapping decks, progressively reduced in length with reference to the level considered, according to a formal and functional hierarchy in composition that ended with the lifeboats-deck, in the most elevated position with respect to the freeboard.[1]

The superstructure began to acquire an architectural conclusion, in the lateral development and in the front facades: the command bridge became an aesthetically distinctive part, defined by a protected wheelhouse delimited by a parapet, jutting transversely beyond the boundaries of the bulwarks, in order to guarantee the full visibility in surveys and in the berths.

If the aesthetic conformation had acquired an outlined appearance, on the other hand the habitability of the external areas was just partial with respect to the total expansion of the walkable areas of the superstructure. The parts dedicated to socialization and conviviality took place in the interior spaces, while the superstructure so it stood as a closed envelope - designed to limit as much as possible the interactions of the passenger with the outside world - whose horizontal perimeter surfaces housed the technical equipment.

An urban space organized mainly in the interior

In relation to the psychological and social effects of the transoceanic crossing, most passengers in fact perceived the relationship with the sea as a foreign element to the usual daily experiences a bleak expanse devoid of physical limits and visible references, besides being a source of discomfort in the adverse weather conditions. It was an environmental element to be wary: by virtue of this, the layout of the "habitable machine" developed in an artfully "introspective" manner, aimed at creating self-referential spaces, which denied every visual and physical connection with the external context. That was a peculiar characteristic of the living space on board of liners, which completely differentiated it from the terrestrial architectural space. The set of private and social areas found its formal completeness and representativeness only in internal surfaces. The architectural space - individually and in the overall distribution system - lacked external intelligibility, based on which it is possible to

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[1] The housing of the lifeboats, equipped with special support structures, will become one of the main elements characterizing the aesthetics of the ship's profile.

read the object in its relationship between external forms and the surrounding environment.

The on-board distribution system, with the increase in the size of the transatlantic liners, increasingly assumed increasing proportions and complexity, becoming a functional complex divided into a multitude of functions. From private spaces for passenger accommodation, which reflected the social classes of reference in the different levels of finishing and comfort, restaurants, spaces for culture and entertainment, common routes of connection, representative spaces for events: socializing was celebrated in all its aspects related to appearance, fashion, vanity. Spaces in which the ritual of life has been perpetuating for a certain period, in relation to the social extraction of reference of passengers. The interior of the ship as a theatrical setting that acts as a backdrop for everyday life in its expressive complexity: from the private dimension to the social and urban dimension, a place for sharing the same destinies related to the momentary nature of the journey. In addition, because of these aspects the "habitable machine" apparatus becomes - like a theatrical installation - the place where the personal vicissitudes of travellers unfold. A place that has shortly lost the formal references of the terrestrial inhabited space and therefore needs to recreate a surrogate, through an illusory apparatus.

Throughout the first half of the twentieth century, the interior layout disregards the outside world to re-propose it entirely in-house, in the artifice of an urban setting, in a sequence of paths: meeting places, commercial activities, the theatre, recreational spaces and for physical activity, restaurants, dance halls, lobby.

The space becomes more and more closed in itself, and with an aesthetical characterization inspired by coeval architecture. Neoclassicism was the most common stylistic code of reference in the fitting out of liners for over half a century, with a wide range of formal quotations to architectural realizations of the main European capitals, in relation to the armament flag of the considered steamer. The theme of the *Hotel*, and of the *Palais* were declined in the scenic apparatus of the interior layouts, through reproductions of facades, colonnades, balustrades, pediments, arches, cornices, using refined optical expedients, such as vertical recesses, which developed in height for multiple decks. Interior fixtures - complete with frescoed surfaces and *trompe d'oeil* - expressive of the representativeness of buildings and the built environment. The on-board set-up was therefore an organism similar to a real urban agglomeration, due to the multitude of its functions and activities, but unlike this, it was a space designed only through internal surfaces rather than through closed architectural volumes.

Since the installation was a "closed system", the passenger did not therefore have an overall perception of the entire built space, as in reality it happens in an urban location. To remedy this limit, the "city told by its interior" adopted very clever design solutions (or scenic tricks!), consisting of spaces with double or triple height: real theatrical sets designed to recall the vestiges of the grandiose buildings of urban sociability. These environments, in addition to conveying the amplitude of the single representative space (the hall, the theatre, the ballroom) constituted valid design expedients for transmitting to the passenger the real proportions of the entire shipbuilding complex.

In fact, externally, this large-scale object could not be perceptible in its real size, since the external vision was partial, since it was limited to only lateral walkways and to a small portion of the deck of the sun-bridge, bounded by the technical compartments that limited the panoramic view.

The superstructure was in fact a "closed" shell organized on overlapping rings that precluded - beyond their specific functional use - the real and complete dimensional perception of the external

Fig2 S.S. Conte Verde, 1928: the access staircase to the salon.   *Fig.3 S.S. Aquitania, 1913: the first class saloon.*

It was a sequence of partial spaces devoid of physical references, which are not attributable to the actual size of the overall on board space.

The ship as a mainly closed "urban organism" was devoid of those identifying elements through which it aesthetically characterizes itself and relates to the surrounding environment. Therefore, the continuity of the connections between inside and outside and a progressive mediation between the two spatial configurations was missing.

The possibility of completing the perceptive experience of the on-board space as a whole thus becomes the dividing line between a self-referential habitable system in its interior layout (where the external parts take place as accessory offshoots) and a continuous system, where the same interior layout is oriented to communication with the exterior and becomes complementary with the perimeter areas. These are therefore the main parameters through which the evolution of the space on board and therefore its modernity could be definable, rather than in the stylistic-formal choices of the furniture components.

For decades life on board was conditioned by its taking place within the habitable shell and with it the totality of the perceptive experience, assumed as a dynamic complex that links the place to the multitude of actions and relationships of everyday life that are performed there.

It was thanks above all to the new leisure purpose, aggregated with the utilitarian one, that on board the ship we began to reconsider the importance of the environmental context, as a possible added-value to the levels of comfort, rather than as a source of danger.

The transatlantic rediscovers a new finality that rewrites its destiny: the exhaustion of its task as a *ferry* of human events perpetrated by the progress of air transport coincides with the birth of a new purpose of travel, for which the goal was no longer the "place of destiny" but an exotic tourist resort. The ship loses its rigorous demeanour to discover a playful, comfortable, airy, panoramic place:

spectacularly overwhelming!

It was therefore necessary first to convert the existing heritage into this perspective and to reconceive the organization of the parties "from scratch". Thus it was that over time there was a transformation of the floating city and its spaces, which were no longer only told from within but became double: internal and external, for a functional specialization of the respective areas. The perimeter of the superstructure becomes a usable area, interfacing with the outside world and the sea is no longer a danger but a mutable scenario, which can be the background for new enjoyable recreational activities. The outer decks that become a habitable place[2] therefore constitute the real innovation on the conception of life on-board, no longer a place of fleeting passage used in short times of the day, shared with the technical facilities. The surface of the superstructure, until then monolithic, becomes unexpectedly permeable. As for a side effect the internal bundles, which deny the existence of an external source of dangers, begin to fade away and the living space becomes communicating: internal and external become parts of a functional complementarity that invests the new era of passenger ships. The arrangement of the spaces, in the ratio of forces between inside and outside, sees the centripetal attraction in favour of the centrifugal attraction reduced for the first time. The lateral part of the superstructure becomes a windowed wall, the relationships between solids and voids change, and consequently the internal layout is oriented towards the natural light source, the perimeter becomes a "passing surface". Magically the innermost and closed city begins to dematerialize!

This transformation was not immediate, but came about because of decades of mediation in which the seeds of the new vision appeared almost timidly. The process of organization of the external parts, in fact, occurred in stages, similarly to what happened in previous times for the internal parts. Initially through an uncertain and promiscuous configuration, in which the layout of the habitable machine crept into the meanders of the marine machine, replicating - even outside - the "ordering process" of the housing function with respect to the still invasive and messy distribution of the technical parts. If the habitable part of the external decks initially coexisted - in a discontinuous and irregular surface - with the technical layout, this on the other hand marked the irrepressible need to equip the dwelling with its natural completion through the relative external reference spaces.

Throughout the first half of the twentieth century, the highest part of the superstructure was by election intended for outdoor socialization and recreational areas: including the equipped zone for play and the swimming pool[3]. However, this space as well as accommodating the chimneys contained the mouths of the ducts for the ventilation of the interior spaces, of the engine rooms, of the holds, as well as the pylons and the ship's mast supporting the antennas, flags and the navigation lights. The co-presence of these elements produced social spaces characterized by the promiscuity between collective space and technical area: it was difficult completely enjoying these environments besides characterizing them from the aesthetic point of view: in fact, their purpose was not enough highlighted under the aesthetical point of view.

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[2] In this regard, we recall the initiative adopted by the Italia Flotte Riunite shipping company, which, since 1932, has been promoting a summer cruise program aboard the Conte Verde ship, called "Estate sul Mare". It aimed at enhancing outdoor life during the crossing from Italy to America - in function of a recreational-recreational use: the solarium begins to make the first timid presence. At first, by cutting out the recreational areas, they are actually clippings in the technical spaces.

[3] In this regard, the MS Augustus - launched in 1926 for the Navigazione Generale Italiana Company - was the first steamer to introduce, in a small deck space still characterized by "technical presence", the outdoor pool and an outdoor play area.

Fig.4 S.S. Augustus, 1926: the sun deck and the swimming pool.

Under the perceptual appearance the mixing of the areas related to hospitality, socialization, collective spaces outdoors, and the technical parts produced uncommon formal syntheses in the architectural housing apparatus. This combination on the other hand produced a stylistic imprint with a strong iconic character. A varied scenario in which the repertoire of nautical parts made up of hatches, hatches, vents, windsocks, grills, "dog house" combined with the typical utilities of urban furnishing, creating an unusual formal combination, however capable of creating an evocative scenario and becoming a source of inspiration for a variety of future urban settings[4].

For a long period of three decades, these were the romantic motifs of the marine style strongly identifying the naval world, which combined the collective spaces typical of the terrestrial architecture with the properly nautical canons. The design of the common spaces of the outside deck referred to a formal traditional repertoire, respecting the naval typeface. This classic and neoromantic configuration will characterize the profile of the naval superstructure and will contribute to identifying in the collective imagination a typical scenario of the external areas on board, in a complex of shapes, colours, materials, aesthetic relationships between the walkable surfaces and the volumes that delimit them. The outer space seemed to be connoted as a whole still disconnected from the rest of the habitable plant, and defined through forms and proportions deeply conditioned by the pre-existing technical apparatus. Its forms, that is, aims not yet at an effective relationship with the neighbouring areas: the interiors and the environment.

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[4] The typical configuration of the deck areas through the technical apparatuses gave rise to a new aesthetic characterization through the technical elements of the on-board systems. It is interesting to underline in this regard that these elements have been assimilated into the collective imagination as typical of the marine scenario and are therefore reproduced in fittings designed to reproduce this formal identification repertoire. We are witnessing an inverse transposition: initially the urban setting and the architectural apparatus were the evocative end of naval installations. In this case, the technical apparatus of the naval tradition constitutes the expressive language of urban furniture, to recall the ancient mercantile remains of the converted place (see the urban redevelopment project of the Expo area of Genoa signed by the architect Renzo Piano).

Maximization of the habitable volume and transparency of the envelope

The traditional typology had thus reached a formal equilibrium in which, besides the aesthetic-proportional characteristics of the constructive complex, it delineated the distributive characters, in the relationship between the internal and external habitable areas and in the respective relations of continuity and complementarity.

The configuration of the general plant was still based on the dichotomy characterizing the original conception between a protected cell autonomous with respect to an external plant that, even if over time had acquired any articulation and wideness, was a living environment only on certain occasions. The liveable place, by definition remained the closed space within a protective shell.

At the end of the 1980s, the ship underwent a new general approach, abandoning the traditionalist configuration, which had characterized it for many decades. The superstructure increases in volume, its width extends to full hull, flush with the side, the gangways become excavated volumes taken away from the main one. Its shape takes more and more the appearance of a square volume tapered frontally: the volumetric differences between the various bridges disappear and the progressive degradation towards the top of the different orders of bridges. In the same way the overlapping sequence of external side walkways disappears, which constituted a physical interface between internal habitable areas and the reference environmental context. The internal areas become ever wider and more regular in the compartmentalization of the spaces, which specialize in functional types by virtue of the new residential standards and the comfort of modern cruising.

Fig.5 Birka Princess, 1984.

The perimeter surfaces become continuous, thus redefining the action of the perimeter casing that transforms the relationship between interior and external space into a mainly perceptive experience primarily visual. The original physical structure of the superstructure configured for overlapping rings, now becomes a uniform block, whose lateral permeability is now characterized by a new relationship between solid and void parts. The invention of the windowed bridges allows transferring to the internal areas the perceptive experience of the surrounding environment mediated by the reassuring though transparent barrier of protection. This leads to a reconfiguration of the entire complex of living areas on board and, with it, the varied organization of the set-up space that presents a differentiated range of scenography sets that offer a wide range of configurations for the on-board fitting. The different conception of the fitted spaces mainly depends on the new way of conceiving the cruise of modern times: a place of escape tout court, in which the location to be reached fatally assumes a secondary value. The entire urban space in the set of public and private parts has become a scenic-representative complex in which the passenger is at the same time - besides inhabitant - spectator and actor. A wide range of mutable scenarios opens up, from the enclosed space to the panoramic area. In this way, the attention of the passenger-viewer moves, sometimes in a sudden way, from the spectacle of the sets of artefactual concluded spaces, to the opening of the enjoyable perspective view from the windows of panoramic rooms (show lounge). Sometimes this passage is mediated by a series of paths that vary in width and height. The internal space acquires in its continuous flow between one environment and another - between the different functional areas - a succession of scenery that amplifies the emotional tension of the path, in the use of the on board places. The indoor space thus becomes a multifunctional place that is able at the same time to guarantee the protection of the enclosed areas and provide the possibility of visually savouring the mutability of the scenarios of the surrounding landscape. In general, even in the cruise of the new millennium, the areas of strict relevance to the external environment appear reduced in relation to the overall development of the public areas on board. The living space is still the result of a scenographic artifice, for which the built environment, defined in the planning of the areas and in the installation plant, is an illusory system that disregards every connection point with the real environment. It is an autonomous system able to regulate environmental and temporal conditions, altering them with respect to those of the outside world. Brightness, temperature, colours, scenarios with changing images and background sound effects, mutate and alternate thanks to sophisticated control systems in which home automation is increasingly predominant and becomes an integral part of the on-board set-up complex. The environment set up on board, through an automated direction that regulates virtual and changeable scenarios in a temporal sequence, becomes changeable and stands as an alternative element with respect to the real world and sometimes in contrast to this. The experience of the journey in reference to the perception of the mutability of the actual moving scenario therefore seems a marginal factor. It is relegated only to certain areas of the ship's housing complex: mainly to private areas, for which the panoramic view still identifies an unavoidable quality standard[5].The cruiser of the new millennium is still deeply marked by the dichotomy between internal and external space.

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[5] In reference to the cabin space: the external view, on board of modern ships, acquires an ever-greater importance, in relation to the quality of the on-board services offered. If in the cruisers of the 70s and 80s the external cabin was simply equipped with a porthole, then from the window, which becomes wider and wider, we see that already in the mid-90s the balcony cabin is an acquired standard. The latest standards include internal balconies, double-height loggias with two tiers of bridges.

Fig.6 MSC Meraviglia,2017: the "indoor promenade" with the changing vault that reproduces the night scenery.

The shell of the superstructure is still a physical barrier that delimits two parts: the experiential fulcrum of life on board and the specifically seaside suburban area of the external bridges: two parts still lacking physical continuity. The general architecture of the superstructure is now deeply characterized by the monolithic consistency of the superstructure whose perimeter envelope differs from the past mainly in the relationship between transparent and solid surfaces. It appears as an alveolar surface, progressively rarefied. Its greater transparency assimilates this to a photographic diaphragm that filters the visual interaction of the internal spaces with the external world. While - from an aesthetic point of view - the windows of the common areas and the balcony loggias of the private areas are signs of discontinuity that increasingly tarnish the homogeneity of the superstructure of the modern ship. Under the functional point of view, the correlation between internal areas and the external environment is still rarefied, and limited to certain common spaces on board, mediated by panoramic windows; therefore the connection between the internal and external environments is still exclusively visual. The approach of continuity between the two parts fails to move from the two-dimensional area - of the different configurations of the sidewalls - to the three-dimensional one, of a new spatial and volumetric combination capable of reconfiguring the on-board distribution plant.

The trend reversal: the volumetric dematerialisation of the superstructure

According to the aesthetic criteria of the last decade, the superstructure of the ship acquires a decidedly more articulated configuration than the typical monolithic complex of the previous decades, this with implications from the functional point of view with regard to the definition of the boundaries between dwelling and outside decks.

From the point of view of housing, space is now a single organism in which interiors and exteriors blend seamlessly. In perception, the space on board is now a variegated continuum of closed spaces and panoramic areas where the environmental context is finally more involved in the experience of life on board. From a distributive point of view, the choice to configure the bridge as a diverse set of multiple functional and perceptual experiences appears strategic.

Thanks to a new volumetric configuration of the superstructure, the on-board layouts develop in an alternation between open and closed areas, generating new types of mediated spaces. The on-board urban layout is rethought through new formal experiments: the historical sectorialization is definitively abandoned to give rise to a multi-functional mixture, typical of the city.

Fig.7 Aida Diva, 2007: starboard sidewall.

The different collective areas open onto open-air routes that are overlooked - at higher levels - also by private areas6. The path loses its functional specificity to become generalist: a shared space formally inspired by the traditional urban organization of the *galleries passages* of nineteenth-

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[6] In this regard, it is significant the choice of various companies - including Royal Caribbean and MSC - to create in the aft quarter a space divided into two side-by-side longitudinal blocks. It houses a distribution path in the central part (with the typical functions of the common areas), overlooked by the balconies of the cabins, thus creating a functional and visual admixture, so far unthinkable, between public and private areas.

century. It is no longer an interior space, but for the first time it becomes an inlet between two different buildings. At the same time the superstructure is no longer an inseparable block but can in some way be composed and deconstructed. Its compactness is attacked in the projects of the latest generation cruisers[7] in which for the first time there is a transverse separation of the casing above the boundary line. A stern and amidships take place the internal courtyards, overlooked by the different functional areas of common life and, on the upper levels, the balcony facades of the internal cabins. This combination, enriched with elements of urban decor is a source of suggestive and reassuring visual glimpses. The central deck is a new space, emblematic of an epochal transformation: an open but protected environment, which can be enjoyed - during the day as well as at night - even during navigation because it is not affected by wind action. The decor loses the typical connotations of the external bridges in order to equip itself with decorative components that are clearly drawn from the repertoire of street furniture.

The upper decks are articulated in a lively varied course - even altimetrically - on which a multitude of activities alternate, in an alternation of visual openings: from the closed spaces, to the spaces delimited laterally, to the completely open spaces, creating a visual tension that it eludes the original dispersive effect of traditional lido decks. In the same way, the perimeter walls of the superstructure undergo a dematerialization action, more evident than in the past. A two-dimensional deconstruction: through an ever more prominence of transparent surfaces and through the introduction of loggia façade. Then a three-dimensional deconstruction through width variation of the continuous sequence of built blocks and their transversal retraction with respect to the overall size of the hull. The main deck is no longer the narrow perimeter ring of the past, but is now a wide external path, connected transversely with the central promenade. It becomes a part of network of paths, which develop along the entire length of the ship. A dynamic sequence in the interaction of the different types of spaces that follow one another: closed, partially closed, open spaces8.

This design trend, which involves obvious consequences in the way of experiencing the spaces on board and perceiving the inhabited space through the boundaries of the built, subtends a constant and increasingly marked reference to urban archetypes. This happens first in general terms, then with references, albeit in the abstraction of the decontextualized place, to a particular city: through sets, installations and compositional solutions that sometimes even become quotations of particular examples of modern architecture.

These formal solutions, however, subtend a different conception of life on board in the redefinition of the relationships between the various functional parts of the on board fitted space. Thus, new distribution concepts and fittings, call into question, as well as from the aesthetic point of view, the traditional partition between interior and outdoor. The internal layout - in its dual distributional and scenographic meaning - no longer appears to be the only theatre through which the on board space is expressed in its urban aspect. Thus, we are witnessing a trend reversal, from the design point of

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[7] A tal proposito si cita il cruiser Harmony of the Seas della compagnia Royal Caribbean costruito dai Chantiers de l'Atlantique, le cui dimensioni principali sono: L360mt, B 47 mt, D 49 mt; in grado di accogliere 5400 passeggeri, è stata varata nel 2016.

[8] The latest generation of MSC ships, Seaside and Seaview series built by Fincantieri, whose main dimensions are L340mt, B 41mt, D 74mt is a clear example of this trend. Capable of accommodating 5632 passengers, launched in 2017 and 2018 respectively. The same design and distribution principles will give rise to the evolution of the Seaside EVO whose launch is scheduled for 2021, and to a further evolution in the World Class, whose launch of the first exemplar is planned for 2022. In this model the design concept defined as Y Shape Design will further develop, which radically transforms the planimetric layout of the superstructure with respect to traditional canons. Its aft layout defines real squares surrounded by buildings, while laterally the recession of the central body with respect to the side defines a court space concluded on three sides.

view, the rarefaction of superstructure volumes, in relation to the surface of the hull platform, with respect to the logic of maximizing them.

Fig.8 Harmony the Seas, 2016: the central park.

The subdivision no longer provides a definitive but clear separation between inside and outside, defining rather a complex configuration in the respective rarefaction and re-composition of multiform spaces. The superstructure as a place of varied volumetric combinations that generate unusual formal, perceptive and functional expressions. The new compositional theory thus opens up to an innovative union in the design of on-board spaces: between organization of functionalities and territorial planning. A discipline whose implications go beyond the functional programming and the study of user flows, to involve the themes of the landscape study, in the relationship between the built complex and the changing environmental context to which it can refer from time to time. It thus finds expression in a variety of possible variations: the port, the open sea, the coastal landscape. The floating city and its spaces like a scenic machine that, thanks to its dynamic component, becomes the theatre of different scenarios and actors.

Fig.9 MSC Seaside & fi Seaview, 2017

Conclusions: possible developments, between new formal compositions and future scenarios

A significant example, in relation to the contributions made to the process of transforming the cruiser, in its functional conception that goes beyond the mere complex of playful activities, prefiguring the theme of the floating city tout-court, therefore untied from the ephemeral boundaries of the cruise, consists of the World City Phoenix project-study. Developed in 1983 by the Knud E. Hanse studio in Copenhagen, commissioned by the magnate Knut Kloster, characterized by extremely revolutionary elements - almost visionary - for the period. Starting from the size of the hull of 380 meters, made in itself singular, in an era in which the gigantism of the hulls was still a feature foreign to the cruise ship typology. The innovative elements also involved the use of the ship, the concept of liveability of the space on board intended as a series of features that went beyond the boundaries of the normal utilities of the contemporary cruise. The complex of on-board facilities by far implemented the traditional repertoire, in the multitude of daily activities that these spaces made possible, assimilating this ship more than a fun place to a real floating urban organism. It consisted of all the elements of civic life, even those not exclusively related to the strictly recreational sphere in which terms the cruise offer took place. : "*The project aimed anyway to carry out a product of superior characteristics than a conventional cruise ship. Kloster's dream was to create a veritable cosmopolitan floating city above the sea able to offer fun, culture and work*"[9]

[9] In: www.knudehansen.com/news/phoenix-world-city-the-unrealized-knut-klosters-dream

Fig.10 World Phoenix City, 1983 (first concept).

The public areas were articulated on three different levels with a spacious common area that developed along the entire surface of the deck. The private areas, essentially cabins with exterior views, were developed on three towers that rose from the main deck, home to the main activities of daily life. In the general plan-volumetric organization, the superstructure is no longer a volume-extension to almost the entire body-ship but is resized and reconfigured according to a relationship of interaction with the surface of the main deck, which takes on a strategic role and becomes a nerve centre for life on-board. The panoramic bridge is no longer an isolated and relegated place on the last level but rather becomes an airy articulated promenade, a place of social interrelation and of the perception that the new multi-faceted distribution configuration proposes. This effect is possible thanks to the visual openness that distinguishes the spaces and makes the different blocks that make up the deck superstructure visually identifiable. The environment is a place shaped in an alternating sequence of closed volumes and open spaces and of openings and closed visual, for a dynamic relationship between the passenger-inhabitant and his perceptive context, intended as a geometric combination and fusion between constructed elements and natural landscape. It is also a set of symbolic elements of urban functionality, social interactions, visual glimpses and the surrounding landscape i.e., in this case, is integrating into a changing background that envelops this vital microcosm.

The space on board thus acquires its completeness in the simultaneity and continuity through which a multitude of actions takes place in a space that is no longer sectorial, but communicating, that is to say without the functional barriers constituted by the original monolithic conformation of the superstructure. A common path along which there are several bars and cafes, dozens of restaurants, shops and boutiques, art galleries, the spa and wellness centre, several swimming pools, a large theatre, the casino, the place of worship, the library, the museum, a planetarium.

It is also a seat of a series of added activities, certainly not related to the cruise sector, such as studios

for artistic, television and musical productions, a university campus, a hospital, a path for physical activity, a heliport and a hall for conferences, lectures and exhibitions. Innovation was not limited to the wide range of on-board facilities, but rather to the urban organic structure of the complex and the choice to associate these elements with the typical configurations of urban space: the palace, the square, the avenue, the portico. In this way, the parts of the on-board set-up albeit on a reduced scale assume an evocative role. This factor, in turn, leads to the aesthetic recognisability of the various functional parts that make up the common space: each element is representative of its function: residential, social and commercial.

Le *Nouveau France* is another significant example among the innovative projects that revolutionize the image of the cruiser in its traditional canons. The project, defined by the architect Didier Spade starting from the idea of reviving the glories of the famous French liner10, formally reinterprets the strong iconic imprint, consisting of the two soaring aerodynamic funnels of the original model, to make them become the fulcrum of the new layout. At the same time, these become a stylistic reference to the dynamism of the journey and to the static nature of the tower buildings, respectively in the aerodynamic and tapered shape of the new volumes and in their definition of elements solidly based on an extended platform. In this case, the reinterpretation of the iconic character of the original model goes beyond the mere aesthetic operation, through the invention of a new functional definition: instead of mere technical elements for the discharge of the combustion fumes, they rise to the role of cardinal points in the general distribution of on-board spaces.

In the new configuration of the deck, the concept is oriented towards the denial of the traditional proportions between the hull and superstructure. In this case, the deck is transforming into a square protected laterally by a perimeter loggia, which is at the same time a connection path longitudinal between the two buildings and a multifunctional space, which houses a small urban park with tall trees. In this case, the deck becomes a place of projection of the typical components of urban architecture, here outlined by the soaring presence of the twin towers that become the centre of the housing activity and life in common.

*Getting lost in open spaces, The sea from a different angle, A unique deck layout, A breath of fresh air*11 these are the declared inspiring criteria of the project that, in the intentions of the funding body, should have been fulfilled in 2015, then only five years after the birth of the first idea concepts. The project called The Streets of Monaco12 is another example. This time much more oriented towards the extreme limit of the characterization through the transposition of real portions of the urban scene aboard a hull, which modifies its own geometric characteristics to better adapt to the "territorial" conformation of the housing organism aboard. The deck becomes a complex of dwellings, hotels, representative buildings, public places, meeting spaces, shops, squares and parks with fountains, sports facilities and even an electric-car racetrack.

This case represents the exemplification of how the extreme of a design vision can create excesses:

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[10] SS France was a Compagnie Générale Transatlantique ocean liner, constructed by the Chantiers de l'Atlantique shipyard at Saint-Nazaire, France, and put into service in February 1962. At the time of her construction in 1960, the 316 m (1,037 ft.) vessel was the longest passenger ship ever built.

[11] www.lenouveaufrance.com/fr/le-navire

[12] The project of the English design studio Island Yacht Design, proposes the theme of the pleasure boat dedicated in the likeness to a particular city; the project reproduces the most famous locations on self-propelled platforms in the different models. Similar to a floating island: 155 meters long reproduces a glimpse of the city of Montecarlo. On the highest of the four bridges, on which the superstructure develops, is the Piazza del Casinò, the Palazzo del Principe, where the owner's apartment is located (three floors for over 1,400 square meters), a waterfall, the heliport and a scale replica of the famous Formula 1 circuit.

in this case aim to replicate a portion of a city, through a selection of its most representative parts, to create an evocative layout with a specific reference to an urban location and, consequently, to a lifestyle in particular.

Fig.11 New France, 2010: partial view of the main deck.

The paradox of the cruise vehicle, which through the scenography of its set-up already replaces the final destination, appears here extremely evident. The journey thus becomes an independent variable with respect to the place of destination, since –somehow- the latter is already integrated into the ship. From the formal point of view, we are witnessing a progressive alienation of the stylistic- aesthetic motifs typical of the naval tradition, whose existence resided in certain constructive functional reasons selected by a secular evolution of the nautical discipline. Whose formal repertoire is diluted and moves back to the new aesthetic, functional and social concepts related to the living apparatus applied to the marine machine, in the different possible reference scales. Due to its specialization in passenger transport, the ship has undergone continuous hybridization over time. This process will inevitably lead to new progressive compromises, due to issues inherent in the aboard housing. And in relation to the progressive complexity reached by the latter to the extent that the number of users affects the size of the living space, as a place of social interrelations and functional interactions for the multiple activities related to everyday life. By its very dual nature, the cruiser embodies in itself the apparently insoluble dichotomy between the two antithetical instances - those of living and of sailing - respectively linked to the dynamism and static nature that the two worlds represent. Within this devious chessboard moves the design experimentation that has always been indomitably aimed at new forms of synthesis that apparently appease the two design sectors, involved as factions in contention. On the one hand, the ship as a technic whole of elements inherent to propulsion, the floating body, the hull and hydrodynamics, the set of technological and structural systems.

On the other hand, the complex theme of collective living in its multiple aspects linked to the different dimensions of the urban setting and its functions. In a progress in which, among extravagances, excesses, utopian visions and rational pioneering intuitions - represented from time to time by avant-garde solutions - lies the humus that feeds - now like a century ago - the evolution of this particular naval type.

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About drawing for design

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Abstract

Drawing and design have always subsisted a dual relationship, sometimes controversial. If it is true that design needs drawing to express itself, it is equally true that the two disciplines, however interconnected and perceived with the same sense - the view, dwell on distinct positions.

Drawing (and representation in general) can be fathomed for design as a language: knowing perfectly the vocabulary and rules does not necessarily means having something interesting to say, just as an interesting concept that is not well expressed looses its charm and becomes incomprehensible and not shareable.

In particular, in the relationship between drawing and design there is a shared moment of absolute creation, which sees them equated in commitment, the moment of the sketch prior to the project. Through the sketch, the designer leaves aside the technique for expressing himself freely, giving shape to the project on paper, studying the functionality, the dimensional relationships.

Deeply different from artistic drawing, the sketch is conceptual, graphic, not decorative, almost a private moment. The sketch is configured as a preliminary phase of knowledge and as an object of investigation and instrument of the design process, capable of making material the object, providing the design artefact, whatever its nature, those characteristics that allow it to be appreciated with all the senses, encompassing in some way the multiple and successive articulations. The sketch, expressive and exhaustive in terms of questions, is crucial because it shows the descent into the world of the project of what Bruno Munari calls "the idea".

Abstract

Il disegno e il design vivono da sempre una relazione duale, a tratti controversa. Se è vero che il design necessita del disegno per esprimersi, è parimenti vero che le due discipline per quanto interconnesse e percepite con lo stesso senso - la vista, albergano su posizioni distinte.

Il disegno (e la rappresentazione in genere) può essere inteso per il design come linguaggio: conoscere perfettamente il vocabolario e le regole non significa necessariamente avere qualcosa di interessante da dire, così come un concetto interessante mal espresso perde di fascino e diventa incomprensibile e non condivisibile.

In particolare, nella relazione tra disegno e design c'è un momento condiviso di assoluta creazione, che li vede equiparati in impegno, il momento dello schizzo precedente al progetto. Attraverso lo sketch, il progettista lascia da parte la tecnica per esprimersi liberamente, dando forma su carta al concetto che ha in mente, studia la funzionalità, le relazioni dimensionali.

Profondamente diverso dal disegno dal vero, lo sketch è concettuale, grafico, non decorativo, quasi un momento privato. Lo schizzo si configura come fase preliminare della conoscenza e come oggetto d'indagine e strumento del processo progettuale, atto a rendere materico l'oggetto, a conferire all'artefatto di design, qualsiasi natura esso abbia, quelle caratteristiche tali da permettere di apprezzarlo con tutti i sensi, analizzando del progetto in qualche modo le molteplici e successive articolazioni. Lo sketch, espressivo ed esaustivo in termini di domande, è nodale perché dimostra la discesa nel mondo del progetto di quella che Bruno Munari chiama 'l'idea'.

Introduction

This essay would be a reflection on some aspects of the practice of design, especially for what concerns its connection with drawing and representation, in a perspective that takes in account both the work at a professional level and the teaching and education of the younger generations of designers.

As already known, drawing and design have always subsisted a dual relationship, sometimes controversial: interconnected and perceived with the same sense – the view - the two disciplines, however, dwell on distinct layers.

Undoubtably, for a long time in the past, drawing, or however the analogical representation, has been the most eligible tool for design to express itself, as it allows of immediately foreseeing the project before its turning into reality, condensing in images the narrative of its main features.

Not willing here to refute the importance of developing the drawing process according to precise rules for design, and also considering the advancements of industrial machineries, it is clear that nowadays major changes occurred in both disciplines, making traditional procedures somehow outdated.

On one hand, as Marco Gaiani explains, «Thanks to digital design, it is possible to transfer the whole argument into digital form, working on a visualizable model with continuous accessibility in space

and time.*»*[1] Overriding, *de facto*, the separation between the several phases of the process, «digital design proposes, from different points of view, a redefinition of the very concept of representation as it has been defined through two millennia.*»*[2]

Among the latter, Rossi and Buratti note how the evolution of what is called 'digital fabrication' was born out of «a convergence towards digitization of production processes alongside with the software development, that supported the advancement of a new phase for computer-aided drawing, in which it is possible to incorporate material properties and technological requirements earlier as the starting moment of giving the shape.»[3]

Thus, with 'digital fabrication', a process without interruption from representation to production is outlined, and it can be read on two diverging levels: if it is true that the chance for a single operator - the designer - of managing every phase makes somehow simpler the whole procedure, indeed, the risk is to loose the sight of the theoretical instruments, by means of which evaluating and keeping the design coherence high enough[4].

Therefore, in this perspective, what at a first sight appeared as a simplification actually conforms itself as an aspect of the complexity that characterizes the contemporary era, where it is becoming more and more imperative for the design activity to coordinate its multiple facets into a strategic approach, in a 360-degrees vision embracing all the stages of the project.

According to Francesco Zurlo, «Strategic design operates in collective environments, supports its actions thanks to its capabilities and finalizes its action to produce a sense effect. The result of such operation is realized in "systems of offer" more than in punctual solutions, in a product-service rather than in a simple product, visible representation of the strategy.»[5]

Later, following on from what expressed at the beginning, it is interesting to notice that Zurlo himself continues his reasoning so observing: «[…] design is characterized by a set of skills that can be referable, mainly, to the realization of things with a visual and perceptive relevance. So, if the act of vision becomes classifying, we can make a first subdivision, not exhaustive but meaningful, of the capabilities that connote the design: ability to see, understood as a reading skill focused on contexts and systems; aptitude to foresee, seen as capability to critically forecast the future; ability to make visible, meant as the capacity to visualize future scenarios.»[6]

Then, definitely overcome the old patterns on which design and production have been organized for decades, it could be asked if the traditional instruments of the design activity such as representation still play a role and which, or if instead drawing, especially by hand, can be only considered an old-fashioned skill, having nothing to deal with the contemporary approach.

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[1] M. Gaiani, *Progettazione digitale*, In Treccani XXI Secolo, 2010, retrieved from http://www.treccani.it/enciclopedia/progettazione-digitale_%28XXI-Secolo%29/ , last consulted on 20/05/2019

[2] *Ibidem*.

[3] G. Buratti, M. Rossi, Disegno e complessità verso nuovi scenari di progetto, in A. Nebuloni, A. Rossi (a cura di), "Codice e Progetto, Il computational design tra architettura, design, territorio, rappresentazione, strumenti, materiali e nuove tecnologie", Ed. Mimesis, Milano – Udine, 2017, p. 86

[4] *Ibidem*.

[5] F. Zurlo, *Design strategico*, In Treccani XXI Secolo, 2010, retrieved from http://www.treccani.it/enciclopedia/design-strategico_%28XXI-Secolo%29/, last consulted on 19/05/2019

[6] *Ibidem*.

Methodology

Following what above stated, today drawing - and broadly speaking representation - can be considered unlike in the past an useful instrument in certain phases of the design process and not in others. By means of a quite overused metaphor, they appear instruments that can be fathomed just as one among the possible languages of design.

So far maintaining the analogy presented in the beginning, as well as there are several words or ways of expressions to state the same thought, as well the same concept can be depicted in more than a single way. Nonetheless, we all agree on how hard is communicating without having first learnt alphabet and grammar.

Besides perfectly knowing rules and dictionary, it is hard to build a discourse without having anything interesting to say, exactly, as something really fascinating can loose its attractiveness, if not properly communicated, becoming incomprehensible or even not shareable.

Similarly, one can be a very talented drawer, and yet not have considerable ideas to propose or, on the contrary, someone else could have remarkable design proposals not having the ability to represent them in order to share and discuss them with others.

As Francesco Trabucco remembers, the word "design" shares with "*disegnare*" ("to draw", in English) the same origin from the Latin "*designare*", which means "to mark out", "to delimit", as well as "to designate". Always according to Trabucco, «to draw is not only intended as for shaping things, but also unfolding horizons of meaning where objects spread, affecting the environment and the users' lives[7], whilst "design" has the general meaning of "project."»[8]

Nonetheless, as previously highlighted by John Heskett, «Not surprisingly, in the absence of widespread agreement about its significance and value, much confusion surrounds design practice»[9], confusion that depends largely on the «initial problem presented by the word itself, which covers several meanings, starting from "indicating a general concept of a field as a whole", getting to the one of "a finish product of some kind", by way of the ones of "action or process" and "concept or proposal".»[10]

While Trabucco thinks about drawing as an instrument of knowledge and investigation of the reality both "actual" and "possible", Heskett pragmatically points out how the plurality of interpretation of the word "design" underlies undoubtably a path, leading from abstract premises to actual outcomes. In these different perspectives, drawing and design can be considered like two wires that can alternately unravel independently from each other or intertwine and reveal common ground and interdependence.

The contact point in the relationship of these two disciplines can be considered the moment of the sketch, prior to the project, as an absolute, shared moment of creation, which sees in them an equal commitment and absorption.

Expressive and exhaustive in terms of questions, the sketch is crucial so far as it makes explicit the first phases of the creative process, through which it takes place the descent into the world of the

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7 F. Trabucco, *Design*, (I Sampietrini 13). Bollati Boringhieri, Torino, 2015, p. 34.

8 *Ibidem.*

9 J. Heskett, *Design. A very short introduction*, Oxford New York: University Press, 2005, p. 1

10 *Ibid.*, p. 3 et seq.

project of what Bruno Munari calls the idea[11]. More precisely, as Munari himself writes in his book *Da cosa nasce cosa*, «the designer shall not immediately start to search for a brilliant idea to quickly solve the problem, that is a romantic-artistic way to find a solution.»[12] According to Munari, the idea that needs to be found is rather the result of a creative process that starts from a rational method *remaining within the bounds of the initial problem*[13].

According to this view, the sketch becomes a unifying moment, through which the designer leaves aside the technique for freely express himself, exploring the data at his disposal, the already existing solutions, the potential areas for enhancement, and last but not least the study of new proposals that meet the demand of the issue. At this stage, what matters is not the 'quality' of the representation in its aesthetic meaning, but rather its expressive power, intended as ease to read. Furthermore, the sketch is an occasion for synthesis and analysis at one time, that allows to check the validity of the concept at the very stage of the process: while giving shape on paper, comes along studying its functionality, its dimensional relationships, thinking at the better choices in terms of material, colours, and textures.

Deeply different from artistic drawing, the sketch is conceptual, graphic, not decorative, nearly a private moment.

In this sense, it is of some importance to underline that the personal insight of the designer plays a pivotal role in determining the way how the project gradually takes place, starting from the earlier stages of the sketch, and it is not only, or not just a mere matter of style, but more deeply, the expression of mental processes translated into images to make them clearer and understandable.

In this regard, quoting Donald A. Schön, Giovanni Federle recalls that «In its basic, minimum constituents, the design process involves different ways of seeing, depending on visual intelligence: the construction of figures and configurations are determined by the designer's way of thinking, the assessment of quality, in terms of how intentions were formed, the problems arisen, and the solutions assessed, the identification of the desired or unexpected consequences of the design moves.*»[14]

In order to give better embodiment to what so far expressed, it could be helpful to refer to the work of some Italian masters of design. They are recognized for being highly illustrative in this sense: even if they worked in a context profoundly different from the contemporary one for what concern design and production, nevertheless their approach still offers food for thought regarding the significance credited, or not, to sketching and drawing.

The focus is on the object, it is represented with more or less details, with or without written records: common features that each designer, according to his/her own personal method, followed. In any case, however, the *charme* of these drawings only secondarily is fineness or accuracy; thus, the truer it is, the messy and more unpolished might this kind of works be, retaining a strong expressive immediateness.

About Angelo Mangiarotti, Beppe Finessi writes: «Drawing as a working tool, as a means to focus on problems and to find solutions, of course, but also as a kind of narration. Towards the drawing, Mangiarotti has an exemplary, unique relationship. Few designers have his ability of describing and,

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[11] B. Munari, *Da cosa nasce cosa*, Laterza Ed., Bari, 1981, p. 43 et seq.
[12] Ibid., p. 38
[13] Ibid., p. 50
[14] D. A. Schön, G. Wiggins, *Kinds of seeing and their functions* in "Designing. Design Studies", 13(2), pp. 135-156. In G. Federle, *Pencil and Mouse. Drawing in the digital era*, in "Italian Journal of Educational Technology", n. 18(3), p.15

at a same time, of moving this way […] Audacity and technical pleasure radiate from those traits, never complicated or unreadable. Signs that seem to merge the happy smoothness of the line and the evocative capacity of the studies of Erich Mendelsohn, with the punctual descriptive sketches of

Fig.1, Angelo Mangiarotti, sketches for Lesbo table lamp (1967) and Eros table (1971).

Truly, it is not hard to agree with him, if observing the poetry and freshness of the sketches for *Eros* table and *Lesbo* table lamp in which, nevertheless, are clearly depicted forms, proportions and texture suggestions. Achille and Pier Giacomo Castiglioni's work, wisely, denotes a different way of considering the activity of design, even featured by Achille's words: «Delete, delete, delete, and at the end find the 'core aspect of design'; while we were designing against the intrusion of design, we were looking for the slightest stretch that served the function. We wanted to say, less than that cannot be done.» According to this vision, the same attitude pervades many of their sketches and drawings: though not being technical drawings, they are full of information and through clean lines let the object's functionality and constitution be understood at once, highlighting the insights inspiring their projects. Maybe less poetical if compared to Mangiarotti's drawings, Achille Castiglioni's ones succeed in communicating technical details, still avoiding to turn into coldness or appearing aloof, also thanks to the ironic and playful component of a large part of their designs.

«The Italian design is made of conceptual designs. Look at the *Arco* lamp by Castiglioni: with a plumber and an electrician at your disposal, in words, without drawing a line, you make them build it. Need to draw? No!»

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[15] G. Finessi, *Nel segno di Angelo Mangiarotti*. In "Abitare", n.403/2001. Republished on 05/07/2012. Retrieved from http://www.abitare.it/it/architettura/2012/07/05/angelo-mangiarotti-1921-2012/, last consulted on 25/05/2019
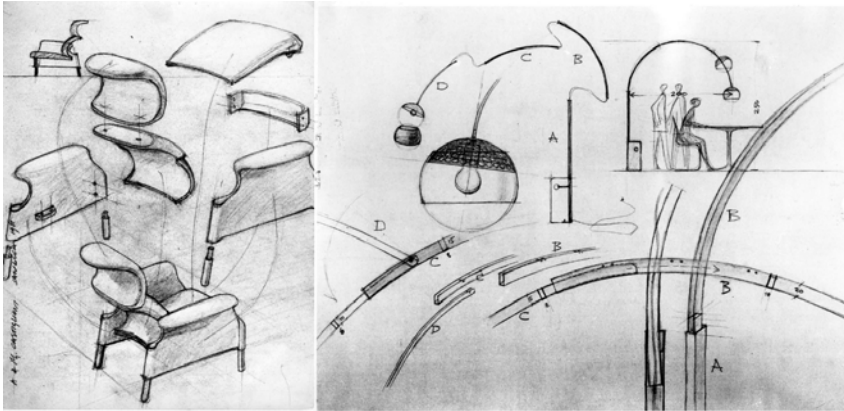
Fig.2, A. and P. G. Castiglioni, sketches for San Luca armchair (1960) and Arco floor lamp (1962).

These simple words by Vico Magistretti acquaint us with his highly original approach to design in respect of drawing; as well, we shall consider his position when he states: «I like concept design, which is so clear that you may not even draw it. Many of my projects have been transmitted over the phone.»

As he repeatedly remembered, he used to consider himself as a mediocre draftsman. Perhaps, on this acceptance he based his conviction, that there is no need for a designer of being able to draw *well*, always preferring concepts instead of technologies. In this sense, Maria Teresa Feraboli points out that: «This is why Magistretti has always communicated his plans through sketches, instead of technical drawings: the sketch, allowing to grasp immediately 'the deep sense of a project's use and image', best expresses the designer's role, which was not for Magistretti being an inventor of forms, but rather being an intellectual capable of defining the object's principles of use and its possible usage once produced.»[16]

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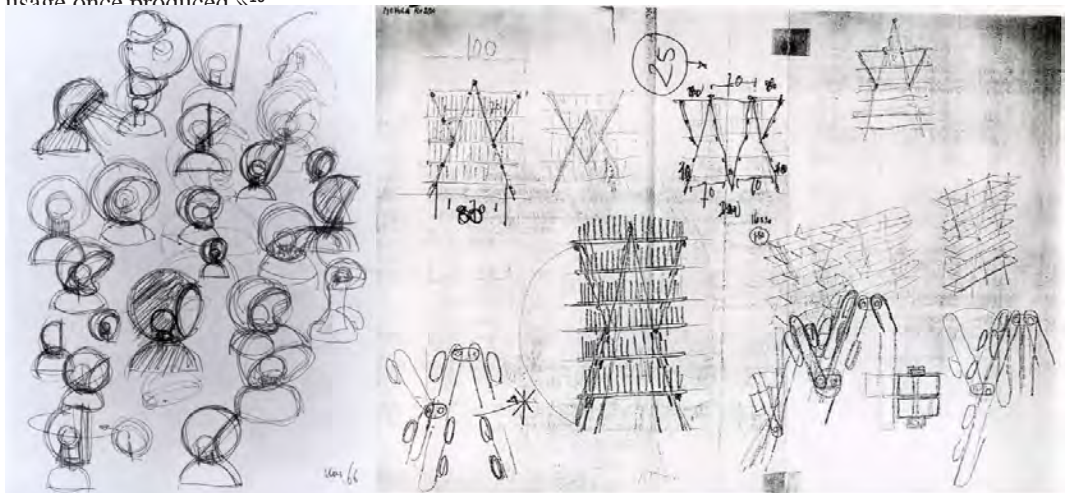
[16] M. T. Feraboli, *Vico Magistretti*. Ed. Il Sole 24 Ore, Milano, 2011, p. 109

Fig.3, Vico Magistretti, sketches for Eclisse table lamp (1967) and Nuvola Rossa bookshelf (1977)

Thus - actually depending on a less skilled hand or rather on the awareness that a solid idea is immediately distinguishable - in the sketches of his masterpieces such as *Nuvola Rossa* bookshelf or *Eclisse* table lamp, the repetition over and over of details, often from diverse points of view, or at different scales, alongside with the recurrence of the gesture look like a way to explore the innermost possibilities of forms, of relationships among them, and all potential functions of the object.

Conclusion

Without going into specific disciplinary issues, the premises discussed above inspire several reflections, and also suggest a number of questions.

First, based on what stated by Zurlo and Gaiani, if drawing traditionally intended still makes sense within the design process; moreover, if is a "good drawing" essential in order to get a good project. Finally, remembering the words of Vico Magistretti, if it is possible drawing without design, is it true also the opposite? Is it possible to design without drawing at all?

The considerations presented in the previous sections of this essay are at risk to be considered irrelevant, or at least too far from context we live in: indeed, what kind of value can it represent the study of the masters of the past, if as we seen, their way of working has been so far superseded? Do we believe it is still worth, in the era of digital design, spend time and energy to enable the new generations of designers to grasp "old" methodologies?

Despite looking idle questions, rather they are ill-formulated: in the opinion of the writer, the problem arises within the framework of the teaching activity, and it is not related with the greater or lesser proficiency in well drawing.

Where a large part of students today learn in a very short time to master modelling software and CAD programs, thanks to their confidence with the digital technologies, less and less they own the basic skills to translate their ideas in graphic forms, communicating efficiently the very essence of their projects.

Then, our priority as teachers should be to enhance these competences, aiming at increasing the awareness, on the part of the students, that being able to effactually communicate the concept since the beginning is as central as the concept idea itself.

So, it should be of main importance to focus on sketch as a preliminary phase of knowledge and as an object of investigation, an essential instrument of the design process. Capable of making material the objects, it provides the design artefact, whatever its nature, those characteristics that allow it to be appreciated with all the senses, encompassing in some way the multiple and successive articulations. A good confidence with the tool of sketch, in fact, will be not only the starting point for switching to the modern software of digital 3D sketching, but also, what is really significant nowadays for a designer, it will be the sign of a high capacity of using imagination and of quickly visualizing changes and transformation occurring in the project.

In this way, to return to the issue of "good drawing", even a sketch not so well-finished can be consider a beautiful drawing, depending on how much potently and immediately it can show the idea behind, making it present and easily comprehensible.

Given that drawing as autonomous activity will keep on existing, maintaining its own rules declined to meet specific purposes, it could be said that afterwards, it risks remaining a noble exercise in cognition, but end in itself if executed 'to perfection' only for the sake of it.

Otherwise, perhaps it is right to acknowledge its special role at the service of both conceptual and factual development, of the "product" – in the broader sense, from the rough sketch to the most detailed technical drawing.

Credits for iconographical references

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Redrawing Valpolcevera
The Morandi Bridge and the Valley as
a complex project of urban regeneration

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Abstract

After the collapse – August 14, 2018 – of the viaduct on the Polcevera, the *Coastal Design Lab*[1] (hereafter *CDL*) worked with the aim to redesign the entire system of the Valley taking into account architectural, industrial, environmental and infrastructural emergencies. As a prerequisite, *CDL* chose to preserve the east side of the Morandi Bridge as evidence of one of the most significant inventions of Italian ingenious in the field of structures during the Sixties. Following this purpose, the preserved segment – the one with stays – is returned to the city with a new public vocation.

During its six-monthly research activity, *CDL* confronted the authorities, interrogated scholars and residents and proposed its reasoning and projects to the public debate.

The goal of public exposure and dissemination has led to adopt a single graphic technique to communicate the different projects elaborated by the students as a harmonic product. To do that, a double representation register was set: for the initial survey – carried out collectively – color schemes and coordinated layouts were arranged, while for the in-depth analysis, groups were free to develop a personal code of representation. In the end, the 8 projects were illustrated together in two large tapestries which allowed a transversal and synchronic view of the interventions.

[1] Coastal Design Lab, active since 2014, is an Integrated Design Studio of the Master Architecture Program of the Polytechnic School of Genoa (IT), dAD Department Architecture and Design. CDL is coordinated by Full Professor Architect Carmen Andriani with researchers Arch. Davide Servente, Arch. Beatrice Moretti, Arch. Luigi Mandraccio, Arch. Stefano Passamonti and collaborators Martina Canepa, Andrea Cappelli, Alberto Gaglio and Tomaso Tedeschi. Parallel to the teaching activity, CDL develops autonomous projects, such as publications, conferences and exhibitions. In February 2019, CDL completed the six-month Design Studio with the inauguration of the exhibition 'Passaggio a ovest. Rigenerare la Valpolcevera'. Web site: costaldesignlab.wordpress.com

In parallel with the investigation approach and with the development of new strategies, the design topics addressed by the *CDL* were decisive for establishing the advanced degree of representation. Once again, the exercise of representation was structured as a form of governance of the great complexity: different levels of information were set whose interlacing provides valuable tools to understand and verify the substance of what is represented.

Abstract

Dopo il crollo – il 14 agosto 2018 – del viadotto sul Polcevera, il *Coastal Design Lab*[2] (in seguito *CDL*) ha lavorato al ridisegno dell'intero sistema vallivo, includendo emergenze architettoniche, industriali, ambientali e infrastrutturali. Del Ponte Morandi si è preservata la parte strallata di levante, quale testimonianza di una delle invenzioni più significative dell'ingegno italiano nel campo delle strutture durante gli anni Sessanta, restituendola alla città con una nuova vocazione pubblica.

Durante la sua attività di ricerca semestrale, il *CDL* si è confrontato con le autorità competenti, interrogando studiosi e residenti, proponendo i propri ragionamenti e progetti al dibattito pubblico. L'obiettivo dell'esposizione pubblica e della divulgazione ha comportato la scelta di adottare un progetto grafico unitario, utile all'osservatore nella lettura di un prodotto armonico composto dai diversi lavori proposti dagli studenti. Ricercando la comparazione tra i vari progetti si è utilizzato un doppio registro di rappresentazione: per l'indagine iniziale – svolta collettivamente – si sono utilizzati codici colore e layout coordinati, mentre per gli approfondimenti si è lasciata una maggiore autonomia agli studenti. Gli 8 progetti sviluppati sono stati sintetizzati e rappresentati insieme in due gradi arazzi che hanno consentito una lettura trasversale e sincronica di tutti gli interventi proposti lungo la Valpolcevera.

I temi progettuali affrontati dal *CDL*, ma anche la chiave di lettura utilizzata per leggere il contesto della valle e delineare nuove strategie di sviluppo, sono stati determinanti per stabilire il grado avanzato della rappresentazione. L'esercizio della rappresentazione è stato, una volta di più, una forma di governo della complessità, attraverso differenti livelli di trasmissione delle informazioni, il cui intreccio fornisce strumenti efficaci per comprendere e verificare la sostanza di ciò che è rappresentato.

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[2] Il Coastal Design Lab, attivo dal 2014, è un laboratorio integrato di architettura e progetto urbano all'interno dell'offerta formativa del Corso di Laurea Magistrale Architettura del dAD Dipartimento Architettura e Design della Scuola Politecnica di Genova. Il laboratorio è coordinato dalla Prof. Arch. Carmen Andriani con i ricercatori Arch. Davide Servente, Arch. Beatrice Moretti Arch. Luigi Mandraccio, Arch. Stefano Passamonti e i collaboratori Martina Canepa, Andrea Cappelli, Alberto Gaglio e Tomaso Tedeschi. Parallelamente all'attività didattica, il CDL sviluppa progetti autonomi, quali pubblicazioni, conferenze e mostre. A febbraio 2019 il CDL ha concluso il lavoro di laboratorio semestrale con l'inaugurazione della mostra dei progetti 'Passaggio a ovest. Rigenerare la Valpolcevera'.
Sito web: costaldesignlab.wordpress.com

Introduction

The big "A"

The decision to demolish the remaining parts of the viaduct over the River Polcevera, after the collapse of the section above the area on August 14th, 2018, led to the removal of one of the symbols of the Ligurian capital and of Italian ingenuity. It is the outcome of the dramatic event that caused the death of 43 people and the interruption of a fundamental infrastructure serving the port of Genoa and northern Italy. For the Genoese, the bridge was part of the city's heritage, a "silent giant" that watched over the city, the border between the coast and the hinterland. For those arriving in Genoa, it was the "gate" towards the sea, the product of Italian optimism and of the economic boom: at the time of its realization, it stood as a positive symbol linked to progress and expression of a country projected towards a future of growth. (Fig.1)

Fig.1 Valpolcevera, August 18th 2018. Photo by Gian Luca Porcile.

Between 1962-1967, Riccardo Morandi designed the elegant structure of the bridge, giving it a perfect balance between its parts and the context and creating a harmonious set of heterogeneous elements belonging to different scales. Longitudinally, the main supporting element of the bridge was a big "A" from which the tie-rods supported the cable-stayed elements of the bridge: a simple figure with a strong iconic charge, the symbol of the entire composition. Edoardo Benvenuto, writing about Morandi's methodological orientation, underlines how he sought the integration of structural verification with architectural design, avoiding any formalism. Moreover, how «Morandi was able to promote that fruitful relationship between language and words, between precompression and message that precisely highlights the design innovation because it manifests continuity through variation, the scientific foundation through artistic creation, the overall coherence through the loving attention to detail».[3] (Fig. 2-3)

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[3] E. Benvenuto, *L'arte del costruire*, in «L'arte del costruire in Riccardo Morandi ingegnere italiano», in Cetica, Pier Angelo (eds.), Alinea, Firenze, p. 32, 1985 (translation by the author).

Fig.2-3 Vivere sotto una cupa minaccia, 1980s. Photos by Michele Guyot Bourg.

For many Genoese, the Morandi Bridge was called the "Brooklyn Bridge". Apart from an apparent similarity of the stay cables, the two artifacts shared nothing in common (dimensions, materials, construction system), but the association with the bridge on the East River gave the viaduct on the Polcevera an "exotic" and monumental meaning – both in size and constructional qualities – worthy of a great metropolis. On social networks, in recent years, it has become customary to post specific phrases or logos in order to declare solidarity to a particular cause or to victims of natural disasters or criminal events. From the very early hours after the collapse and for several weeks, a *silhouette* of a completely different cable-stayed bridge from that of the Ponte Morandi was used and shared without anyone highlighting the error. These two apparently isolated facts are a sign of how the bridge was perceived by people and how its image, even if strongly characterized by its designer, was transfigured into memory. Architecture is meaningful, according to Christian Norberg-Schulz, and as a work of art it «materializes objects and higher "values" », giving «visual expression to ideas that mean something to man and "order reality" ». And through this order, «recognizing their mutual dependence, things come to have sense and meaning».[4] In the case of the Morandi Bridge, there was therefore an affection that went beyond the design and which found reason in the "values" it represented and in its "meaning".

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[4] C. Norberg-Schulz, *Il Significato in Architettura*, in «Il Significato in Architettura», in C. Jencks, G. Baird (eds.), Dedalo, Bari, p. 267, 1974 (translation by the author).

In the 1951 essay *Bauen Wohnem Denken*, Martin Heidegger takes the artefact of the bridge as an example to explore the meaning of building based on the intrinsic sense of living: it is a place as it connects spaces differently distant from it, something that is in one spot which can be occupied by something else.[5] The Morandi Bridge was a "place" in the city of Genoa and therefore susceptible to different interpretations of the people who lived there on the basis of their daily life. The big "A" was second compared to the experience of crossing the bridge or halting below it.

Since September 2018, the *Coastal Design Lab* – coordinated by Prof. Arch. Carmen Andriani within the Master's Degree Program of the dAD Department of Architecture and Design of the University of Genoa – has worked on the redesign of the entire Valpolcevera, opting for the choice of preserving the cable-stayed section in the East and returning it back to the city with a new public vocation[6]. This choice was based on the assumption that for the redevelopment of the valley it is essential to deal with the legacy of the Ponte Morandi: a synthesis, despite its fragmentation, of structural complexity and simplicity of sign, heritage, memory and urban place.

Methodology
Represent Complexity

From its initial stages, *CDL* has set up a survey on different levels and scales able to explore the context and support the development of programs and concepts for the project. During this process, the changing condition of the investigated territory introduced an indispensable presupposition: solutions had to be gradually elaborated as experiments in continuous formation, as options with a dynamic character that excludes preconceived configurations from a morphological and structural point of view. For this reason, the eight projects elaborated by *CDL* are tools to transform the physical environment but also to balance the relationships between political will, economic choices, social behaviour, different planes of territorial structures and equipment. The *CDL* design experience is a path that pursues goals that are neither obvious nor unmistakable but are continuously redefined. So, the exploration triggers a "process as a result in itself" that is inserted into the changing of the territory, helping to identify problems, reveal them and point out possible solutions.

During his teaching experience in several Architecture Schools, Giancarlo De Carlo described a similar methodology as a **«*piano processo*»** where «the objectives arrive at a fine-tuning during the process itself: they are defined through a continuous comparison, between pressures of real needs and images of spatial configurations, which refines the requirements and perfects the configurations until a satisfactory equilibrium condition is reached, even if unstable due to the further mobility of the process itself».[7] The projects of urban regeneration developed by *CDL* are a concatenation of hypotheses that test the ability of territories to change, especially in critical circumstances such as those following the collapse of Ponte Morandi in August 2018.

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[5] Cfr. E. Benvenuto, *L'arte del costruire*, op. cit., pp. 23-27; Cfr. A. G. Cassani (2014), *Figure del ponte. Simbolo e Architettura*, Pendragon, Bologna, p. 9, 1985.
[6] See C. Andriani, Visto da sotto: da qui parte la rinascita della Valpolcevera, 2019. http://inchieste.ilgiornaledellarchitettura.com/visto-da-sotto-da-qui-parte-la-rinascita-della-valpolcevera/
[last accessed: April 10th 2019]
[7] G. De Carlo, *Il pubblico dell'architettura*, in "Parametro", n. 5, pp. 4-12, 1970 (translation by the author).

So, the fragility of the context, from an infrastructural and environmental point of view, becomes a decisive fact: it gives rise to a spontaneous multiplication of possibilities inherent the organization of space and acts as a solicitation that manifests the tendency of the plan to be modifiable.

By establishing this research path – which is at the beginning of its multi-year program – the aim is to provide students with a design methodology and, at the same time, to produce a sense of territorial belonging by searching for a common code of expression. To reach this purpose, the graphic representation of the project has the task of making the information accessible and the processes recognizable, guiding towards what is still invisible, but which already potentially exists. To confirm this, De Carlo claims to believe «very much in the evocative and stimulating capacity of the architectural image. If you represent how a place *could be*, it is as if that place were already *as it could be*. People take over the representation promptly and mentally begin to experience it, to modify it, to contradict it, to enrich it».[8] The will of public exhibition of the results conditioned the *CDL* project from the beginning: the adoption of a unified graphic technique, in fact, was useful to communicate it as a collective work. Operationally, a double representation register was employed. In the initial survey – carried out collectively by all the members of the *CDL* – shared colour codes and layouts were used. The first result is a catalogue of Maps that shows the systems in which the context is articulated: morphology, buildings, abandoned heritage, infrastructures, historical and environmental emergencies, hydrography compose different levels whose interweaving conveys complexity territorial area. In parallel, *CDL* studied the context from an orographic point of view. The geography of a vast stretch of valley – about 2 km long – has been punctually analysed with transversal and longitudinal sections, useful for assessing the ground's steepness and the relationship between the building plot, the logistics and productive areas (especially the port) and the natural elements. (Fig. 4-5)
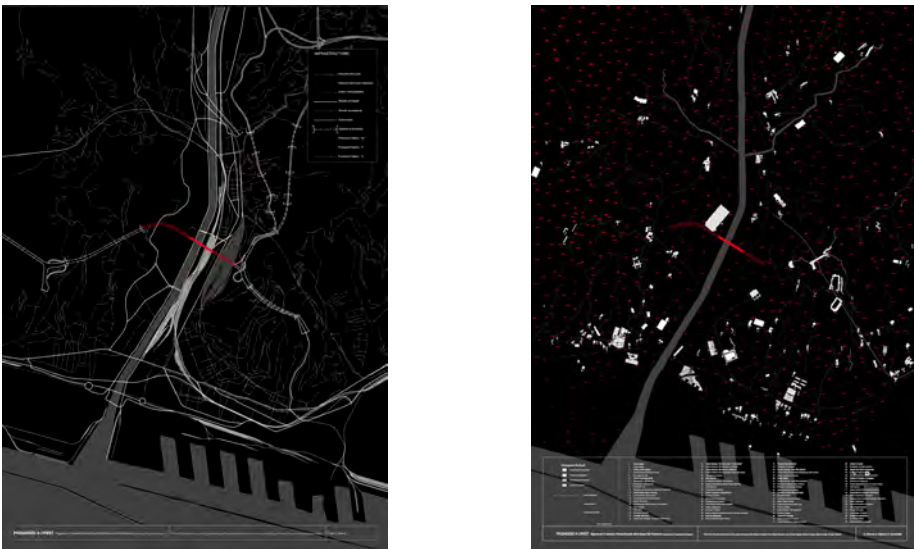

Fig. 4-5 Analysis Maps, 2019. Coastal Design Lab.

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[8] G. De Carlo, *Gli spiriti dell'architettura. Antologia degli scritti,* in L. Sichirollo (eds.), Editori Riuniti, Roma, 1992 (translation by the author).

Differently from the coordination pursued in the first phase, the graphic representation of the projects left more autonomy to the students. Each group, in fact, worked individually on the design and on the elaboration of four (max five) boards with plans, sections, elevations and views as well as the production of at least two models representing the urban and architectural scale.

Even in the design phase, though, *CDL* continued to work on a graphic synthesis in order to provide a transversal and synchronic reading of the projects along the Polcevera Valley. To do this, *CDL* developed two large *Arazzi* (Tapestries) – each 180 cm wide and 300 cm long – in which the eight proposals are unified and interpreted through a conceptual graphic language. The first *Arazzo* represents the interventions on the existing infrastructural system starting from the new adopted layout of the bridge to punctual mobility solutions concerning highway, railway, pedestrian or bike paths. The second *Arazzo*, on the other hand, systemizes the eight design solutions highlighting urban and architectural aspects through a common graphic. Both *Arazzi* are samples of advanced representation that aspire to create a strong visual impact, focusing specific consideration on the Polcevera system, a new environmental and mobility infrastructure capable of innervating all the regeneration actions. (Fig.6)
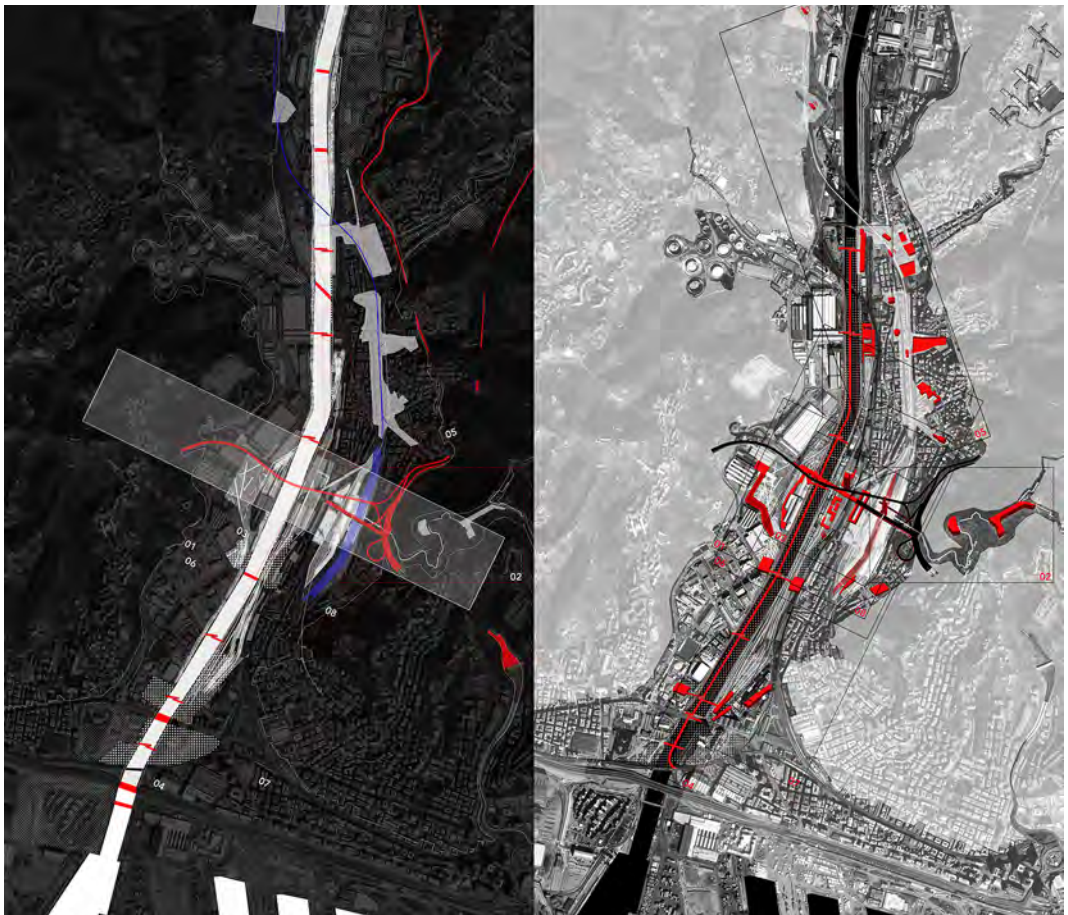

Fig. 6 Valpolcevera Arazzi, 2019. Coastal Design Lab. Graphic Elaboration by Alberto Gaglio and Tomaso Tedeschi.

Conclusion
Advanced Representation

The field of representation related to Architecture is changed a lot in the past years, following some trends that have affected the design more generally. The logic of representation sometimes takes over the whole project and gives rise itself to the choices. At the same time, drawings – as result of representation – are a sort of fuel for the design process: Pinterest is plundered of the ideas that it puts on display, just to feed the production of new images, which are then included in social media.

Architects and researchers develop constantly new ideas about representation. Sometimes it can be recognized as an advanced representation, but it is an uncertain definition. Any kind of representation that performs the core of the project in an innovative way can be considered "advanced". At the same time, one is justified in considering as "advanced" any form of representations that attempts to distinguish itself from present styles with respect to drawings, images and so on. Developing new styles or learning new techniques can be the "right" approach, in fact trying to be innovative is not only something quite interesting but probably it is necessary. However, as architects, we must strongly pay attention not to be overwhelmed by this research, and above all to maintain the substance of the project independent of this work on the communication of architecture.

Perhaps, the truly advanced representation is the one that works most intensely and closely with the project and its themes. Architecture is certainly more than a correct and/or incisive representation. At least the project is a complex whole in which each component has its specific part to play, even if the roles and levels of understanding are often mixed with unexpected results.

This certainty acquires greater strength if is related to really complex projects and to a scale that implies a great impact. The situation of the Valpolcevera is gotten into the line of this frame of discussion: it represents a remarkable case for measuring the terms of an advanced representation when linked to complex themes and methodologies.

The analysis phase – the first level of interaction with the object of the study after the preliminary awareness – always starts by setting the perimeter of the environments within the area of interest. This first step is fundamental in dealing with a complex project, as it allows the identification of the first selection of main themes to be faced up throughout the design strategy. The specific case of a complex project that concerns a vast territory makes this step even more necessary because the number of these themes and the intertwining that exists between them is greater. Identifying borders – of every kind and according to any type of parameter, physical or not – is not only a fundamental part of the analysis but it is a matter of representation.

The analysis' Maps must show the logic of the method applied, both in term of results and power express by the tools utilized. So, the representation cannot be uprooted with respect to the whole strategy that rules the entire process. Indeed the "strategy" is the logical structure that unifies any levels and steps of the project, bringing together all components of the reasoning.

After the analysis, it comes evident that the actions subsequent are characterized by a recursive leap between different scales of the intervention and of the reasoning. It is not an orderly sequence of events in direct and linear correlation to each other. The projects with a higher level of complexity – like at the territorial scale, as for the Valpolcevera – are managed by a contemporary multi-level of thoughts.

The decisions taken throughout the process are never the result of a single point of view. Rather, architects (in this case, the students) are called to be the directors among many different opinions. In the same way, the representation of the project is not a single sign but will necessarily be the expression of a broad logical structure, with methods and timing commensurate with the complexity of the project.

The *CDL* worked with big effort over both the project strategies and the most effective representations to communicate them. Once again, Giancarlo De Carlo's experience is an important reference: «The project is for the ILAUD, before being a resolutive proposal, a means of understanding the problem that is faced in architectural terms. In fact, the ILAUD believes that the project cannot lead to convincing solutions if it does not have in-depth knowledge of the situations in which it intervenes [...]. The project can therefore be called an "attempt": in the sense that it tries to reach the solution by proceeding to tests and verifications, but also in the sense that it tempts the situation with which it is confronted, to bring out its imbalances and to understand how and to what extent it can change, without distorting itself, and reach new balances»[9].

In dealing with a complex project it is not possible to renounce to the proactive contribution of an advanced representation strategy that can contribute to the attempts to deal the issues – even in extreme emergency situation, as in the case of the Valpolcevera. (Fig.7)[7]

Fig. 7 Coastal Design Lab Final Presentation, February 5th 2019.

[9] These words by Giancarlo De Carlo were published in "Reading and projecting the territory", Proceedings of the Conference on the occasion of the 20th anniversary of the founding of ILAUD, Ferrara April 1995, Maggioli Editore, Rimini 1996 (translation by the author). ILAUD – International Laboratory of Architecture and Urban Design – was founded in 1976 by Giancarlo De Carlo as a design studio focused on the problems of physical environment.

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Note to Text

The Chapter *Introduction. The big "A"* is by Davide Servente.

The Chapter *Methodology. Represent Complexity* is by Beatrice Moretti.

The Chapter *Conclusion. Advanced Representation* is by Luigi Mandraccio.

Strategies to visualize the change

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Abstract

The processes of designing and implementing of projects on the themes of environment, landscape and city are more and more carried out by multidisciplinary teams. Today the involvement of potential users or citizens, activates bottom up processes, where co-creation and co-design are essential and they require the identification of new strategies. The aim of this text is to tell how the user works in the co-design sessions, and the tools that he needs to see all the elements necessary for the project, for example how to identify the causes and effects of the problems that he wants to solve. These new social interactions, with the contribution of the user's participation, modify the spaces, the environments and the way of living the cities. As a result, will be analyzed critical issues of representing, through visualization, complex and ramified realities, such as social networks, infrastructures, transport, services, and will be analyzed the reason why representation tools are borrowed from other disciplines such as computer science, economy, storytelling. The need is to represent systems that change over time, with sequential and consequential characters, which contain invisible and intangible parts such as experience, emotions and interaction between people. Finally, within the design of services, strategies and systems, it will be explained how the visual communication, made up of meaning signs and symbols and related codes, is essential to have a common language and to make the process usable, from the idea to the project.

Abstract

Sempre più i processi di ideazione e realizzazione di progetti sui temi di ambiente, paesaggio e città sono determinati da team multidisciplinari. Oggi il coinvolgimento dei potenziali utenti o cittadini, attiva processi bottom up, dove la co-creazione e il co-design sono indispensabili e richiedono l'individuazione di nuove strategie.

Questo testo ha l'obbiettivo di raccontare come agisce l'utente nelle sessioni di co-progettazione, e gli strumenti di cui ha bisogno per visualizzare tutti gli elementi necessari al progetto, ad esempio come individuare le cause e gli effetti dei problemi che vuole risolvere. Queste nuove interazioni sociali con il contributo della partecipazione dell'utente, modificano gli spazi, gli ambienti e il modo di vivere le città. Verranno di conseguenza analizzate le criticità del rappresentare, attraverso la visualizzazione, realtà complesse e ramificate, come reti sociali, infrastrutture, trasporti, servizi, e la ragione per la quale si mutuano strumenti di rappresentazione da altre discipline come l'informatica, l'economia, lo *storytelling. L'esigenza è quella di rappresentare sistemi che si modificano nel tempo, con caratteri sequenziali e consequenziali, che contengono parti invisibili e intangibili come l'esperienza, le emozioni e le interazioni tra persone. Verrà infine esplicitato come all'interno della progettazione di servizi, strategie e sistemi, la comunicazione visuale, fatta di segni e simboli significati e relativi codici, sia indispensabile per avere un linguaggio comune e rendere fruibile il processo, dall'idea al progetto.*

Introduction

Contemporary reality is characterized by a strong complexity and very rapid processes of change that simultaneously involve cities, the environment, the landscape but above all relationships and social dynamics. Very often the changes that involve people concern the reconfiguration of the surrounding cities and territories, with the creation of infrastructures, industrial plants, the expansion of the peripheral districts, the redevelopment of historic centers, etc. These changes require the ability of citizens to adapt, but above all the ability to redefine their position within constantly changing scenarios, the ability to bring to attention the problems that transformations present, but above all the ability to ask oneself as active subjects, finding places and circumstances that allow participation in the design of change processes.

The user in the Co-Design session

Co-designing strategies have the function of activating bottom-up processes in which the role of the person, which becomes a user or object of transformation processes, can become that of "expert of his / her experience". "In a co-design process, on the other hand, the roles change: the person who will eventually be served through the design process is given the position of *expert of their experiences*, and plays a large role in knowledge development, idea generation and concept development. In generating insights, the researcher supports the *expert of his/her experience* by providing tools for ideation and expression. The designer and the researcher collaborate on the tools for ideation because design skills are very important in the development of the tools."[1]

The user experience is a fundamental starting point to begin to define the contours and characteristics of the problem that has emerged or that is attempted to emerge through the observation of phenomena, in which some form of discomfort appears.

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[1] L. Sanders, e P. J. Stappers, *Convivial Design Toolbox: Generative Research for the Front End of Design.* BIS, Amsterdam, 2012, pag. 23-24

In the first instance it is necessary that these observations and the experience of the citizens are represented and displayed in some form, so that they can be the basis of a common language, through which everyone can contribute to finding a solution: "*Active* and *collaborative involvement, social tie strength,* and *relational intensity* are therefore four characterizing dimentions of collaborative encounters. They provide not only the language for talking about these encounters but also criteria for designing them (or more precisely, for designing the conditions that make them more possible)."[2]

If we consider change as a process, visualization strategies must take into account, first of all, the relationships that exist between the subjects called upon to make the change, that is, to keep track of the communication processes that take place. As Roberta Tassi maintains, "it is the collaboration between designers, internal and external stakeholders, the users we involve in the design process and who benefit from the solutions once built, the true engine of change… adopting a choral and collective point of view."[3] The possibility of providing tools to activate and enhance what emerges from the communication processes, must take into account some fundamental aspects: the complexity of the relationships between the subjects, the complexity of the social realities from which the problems emerge and on which the interventions will fall, the complexity of the material factors that must be included in the process.

"Various initial barriers to participation – fear of saying the wrong thing, reluctance to disagree with a superior, unfamiliarity with co-creation principles – must be overcome, whilst the designer will often have to moderate the session in order to ensure that it generates the type of results that can be incorporated in the next stage of the process." [4]
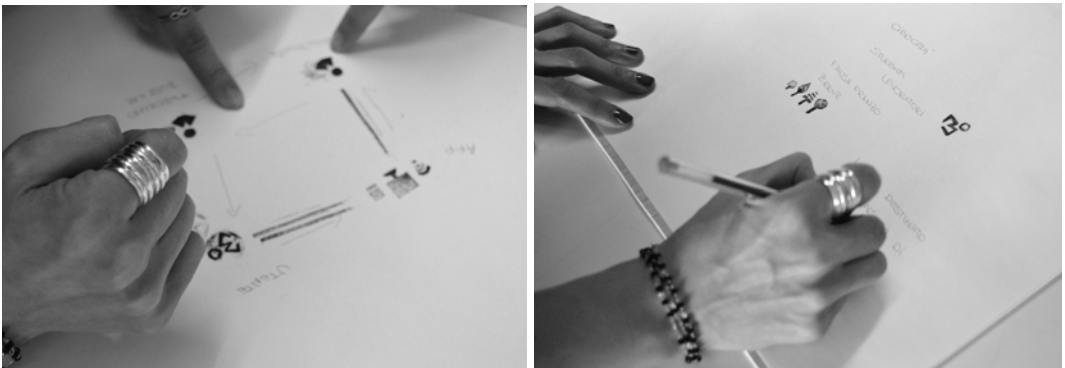

Fig.1(a-b) Co-design session.

The communicative dynamics activated within the co-designing sessions represent a first form of change in social dynamics in a certain context. This change, even before these dynamics are codified and formalized in some way, is visible as the creation of new aggregations, which are formed around new forms of knowledge, developed through collaboration.

Within an appropriate mapping, the aggregations and the new knowledge are visibly, modalities of production of value that strengthens the links created.

[2] E. Manzini, *Design, When Everybody Designs. An Introduction to Design for Social Innovation.* (Coad, R. trad.). The MIT Press, Cambridge, Massachusetts, 2015, pag. 105
[3] M. C. Lavazza, *Radical Collaboration. Coinvolgere le persone nella progettazione di esperienze e servizi,* I libri della UXUniversity Roma, 2018, pag. 10
[4] M. Stickdorn, *This Is Service Design Thinking: Basics, Tools, Cases,* Wiley, Hoboken, 2011, pag. 198

Individuals experiment their own ability to affect the processes through their own ability to express and recount their experiences and express their needs.

The representation of a co-design session is the representation of how a network of relationships evolves that transform a social and urban structure.

Problem setting and time

As a matter of fact citizens react in a positive way when they are asked to co-design, in reality they need tools that allow them to imagine new scenarios in which to frame problem solving. Above all, it is necessary to have tools that facilitate the definition and representation of the problem. Tim Brown (citing Peter Drucker) reiterates first of all the need to make people capable of "converting need into demand": "our real goal is not so much fulfilling manifest needs by creating a speedier printer or a more ergonomic keyboard… It is helping people to articulate the latent needs they may not even know they have, and this is the challenge of design thinkers."[5]

The first step, to convert the need into a demand, is precisely the identification of the problem, through causes and effects. The need is that in jargon we can define *problem setting*, the starting point, which must be well defined and clarified to give value to the entire system. The need, although it was made explicit by the subjects, is not sufficient to activate a process of seeking satisfaction. The need requires a phase of study that deepens the elements that are part of it, the roots from which it develops and the shortcomings it generates. A suitable tool to support people in the analysis of needs to be able to identify specific questions in relation to the causes and effects detected, is the graphic model of the tree of objectives.

As Manuel Lima[6] has amply demonstrated, the model represented by the tree has been used since the most ancient times: it is the system of representation to visualize, in an organized and rational way, various information through time. It is the forerunner of diagrams and an indispensable tool for interpreting the evolution of the complexity of human processes of understanding the world: from theological beliefs to the encounter with scientific subjects. In the process of identifying problems, this mode of representation is used by placing the problem in the trunk, in the roots the causes that are identified by comparison with people, in the branches the effects that the problem produces.[7] This model has the function of facilitating the analysis of need or discomfort, highlighting the various facets both in terms of causes and effects. Through this exercise the need can be converted into a series of specific request of potential solutions.

Another model of representation for the analysis of the problem setting is suggested by Ellen Lupton, which refers to the *mind maps* developed by Tony Buzen and Barry Buzen (1996): "Also called *radiant thinking,* mind mapping is a form of mental research that allows designers to quickly explore the scope of a given problem, topic or subject area. Starting with a central term or idea, the designer quickly plots out associated images and concepts."[8]

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[5] T. Brown, *Change by Design khow design thinking transforms organization and inspires innovations.* Harperbuisness, New York, 2009, pag. 40

[6] M. Lima, *Visual Complexity, Mapping Patterns of Information*, Princeton Architectural Press, New York, 2013

[7] This type of cause and effect diagrams was developed by Kaoru Ishikawa

[8] E. Lupton, *Graphic Design Thinking: Beyond Brainstorming, How to genarate ideas,* Princeton Architecturals Pres. Baltimore, Maryland Institute College of Art, New York, 2011, pag. 22
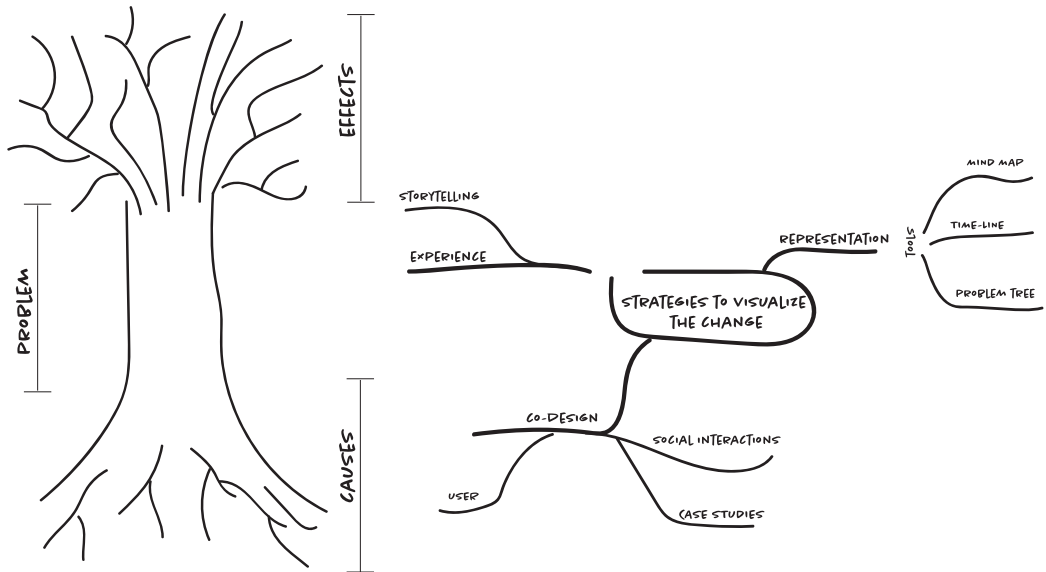
Fig. 2 Representation of the "problem tree" scheme. Ispired by Kaoru Ishikawa, 1969. Fig. 3 Representation of a mind map example. Ispired by Tony Buzen and Barry Buzen, 1996.

In the *mind map* model, which in some way imitates the representation of a neuron that activates radial connections, the problem is analyzed by renouncing the genealogical aspects, enhancing instead the relationships that the problem generates with a broader context, in which elements join together by association. Focusing on a significant element of the problem, people are asked to participate in creating a network of associations able to broaden the meaning of the central element. All the elements placed around will in turn be connected to each other to suggest new associations and ideas, developing knowledge.

Unlike the *mind map*, the tree model shows the causal links as it represents descent or ancestry indications, therefore it also implies a temporal dimension: the structure of the tree indicates the direction in which to read and interpret a phenomenon; the causal links displayed can describe the history of the origins of a problem and its spread. As emerges from the representation encoded in the tree model, time is a fundamental aspect to describe and visualize the experiences that people report in the co-design sessions to define problems. The difficulty is to represent the time outside the time lines used to visualize the historical development of an event.

"The passage of time creates fixed sequence. Time offers a simple organizational framework, because everyone knows how events unfold over the course of time. Time-lines are the classic guides for the writing of history; they show how things have developed."[9] The time of lived experience is sequential, above all consequential, it can also be considered with respect to phenomena that occur simultaneously. When co-design has generated solutions, time indicates the development, the realization of a service, its functionality, but at the same time indicates once again the unfolding of an experience.

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[9] S. Rendgen, J. Wiedemann, P. Ciuccarelli, R. Saul Wurman, S. Rogers, e N. Holmes, *Information Graphics, Taschen, Köln, 2012, pag. 210*

The experience as well as being carried out in the space in which the service arranged is articulated, necessarily takes place over time. Also in the realization of the service the foreseen actions follow one another in a relationship of cause and effect, or in a relation of sequential, or according to the simultaneity or contextuality. The structuring of time is necessary to identify the rules system that allows the use of the service effectively. It is interesting to note that the diagram of representation of the experience, achievable through a service, expresses the complex articulation of events over time. It can be seen in the frames of the interfaces of apps, websites, platforms that the user utilizes.
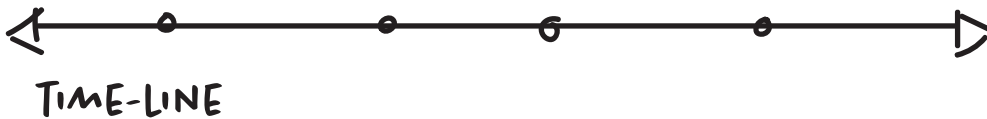

Fig. 4 Representation of a time-line.

Social interactions

The change produced by the social dynamics activated by co-design, but even more the dynamics activated by the production of Service Design solutions, has an impact on the transformation of the territory as it produces new social behaviors, new forms of consumption, new forms of living, new forms of socialization, which require forms of adaptation of urban and territorial structures. Visualize the entire process that starts with the definition of the needs up to the definition of the responses to the needs, itself represents the visualization of changes that are reflected on a new panorama: they build a new scenario of coexistence.

It is necessary, during the designing of services, which may involve the transformation of real life spaces, try to imagine or predict how these systems modify the area concerned, through the use of maps of various kinds. "Maps are somehow always an answer to a double need, that of orienting oneself in a world that pre-exists and that of being able to influence it." [10]

In this regard it is very interesting to give an example of how the co-design activity modifies the way of experiencing the city and in some way the city itself. This is the *Creative Citizens* project designed within the doctoral theses of Daniela Selloni. In this project the role of citizens who have collaborated to identify new ways to experience the city is significant. In the Manifesto we read: "The project aims to develop a new format of intervention and collaboration in our cities, a dedicated entity to support codesign activities, which can be defined as a "fab-lab of services".

In this place, citizens are veritable service-thinkers and service-makers, because they literally produce the services they need themselves, that are in a hybrid area in between public and private, market and society, amateur and professional, profit and no-profit." [11]

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[10] L. Pignatti, (cur.). *Mind the map. Mappe, diagrammi e dispositivi cartografici*. Postmediabook, Milano, 2011, pag. 71
[11] http://www.cittadinicreativi.it

The services designed by *Cittadini Creativi* are different: the enhanced *Time Bank* - a system for exchanging skills and small favors in the neighborhood; the *Library of Objects*, the *Citizen's Desk, Facecook* - a food local distribution network that unites restaurants, markets, local shops and citizens - the local Cicerones that act as guides. These are some of the actions to which others can be added such as: neighborhood concierge, collaborative quarters, community garden, elderly assistance, vigilant grandparents, fab-lab, solidarity buying groups, micro-crèche, time bank involving citizens, modification also the exploitation of some social spaces. Also interesting are the tools used to bring the citizen closer to design: papers, prototypes, process visualizations. It is relevant how, if a map of the realized services were produced, superimposable on the topographical map of the area concerned, it would be immediately visible the change of the urban dimension in relation to the change of social dynamics, through the proposed services. To quote Louis Marin: "a map of the city is the representation of a discourse on the city."[12] Citizens can see their own discourse about the city or their neighborhood, through the map of the services provided, exactly like the effect of the collaborative process.

Representation

If we manage to monitor and facilitate the communication processes that develop within the co-design groups and provide tools to represent the activities that facilitate communications and the activities that produce solutions, we are visualizing the genesis and the realization of the change. In first instance, the change is realized in posing a problem, according to the constitution of social aggregations around the discussion of the problem and finally in the realization of the project. The evaluation of what real transformations will produce on the environment in which the project will be implemented is the last stage.

Within the co-design sessions it is possible to design either with the possible users of the service or with future providers. Therefore in the project implementation process it is necessary to identify and represent two fundamental elements:

- The experience that the user will realize, the exchanges that will take place, the connections and the relationships that will be realized, and that will change over time.

- The entire backstage equipment, therefore the identification of all the steps that the user does not see, or sees in part, such as the productive apparatus that is made available, which allow the service to be realized.
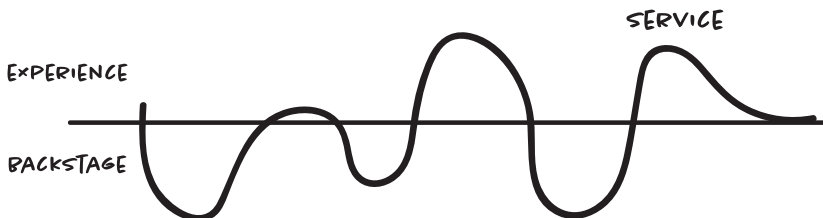

Fig. 5 Representation of the service between experience and backstage. Ispired by service blueprint (G. Lynn Shostack, 1984).

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[12] L. Marin, *Della rappresentazione.* (a cura di L. Corrain), Meltemi. Roma, 2001, pag. 76

Among the most useful tools for the design and representation of the project there are various types of maps such as the *stakeholder map*, the *system map* or the *journey map*. The mappings allow the identification of the various actors entering the system, what role they play, the connections that are created between the various touchpoints, and the graphic representation of how the user proceeds within the system. These tools refer to the wide world of maps well described by Franco La Cecla: "We talk about emotion maps, trying to focus attention on the psychological dimension of the lived space, and we talk about sense maps, cities that come described for odors, for noise, for tactile sensations and more generally for the sense of discomfort or well-being. Maps that respond to a somewhat sentimental vision of space and while they enhance the narrative dimension, reduce it a little too much to the easy consumption of the instant."[13] Even this typology of maps imagined by La Cecla could have an important function in the process of clarification of needs. These maps activate a communication that highlights the emotional and experiential aspects that are a fundamental part. It becomes necessary to represent the lived space of the cities in all aspects not only functional but also emotional, since the emotional dimension of the places is the dimension that more than others is at the base of the discomfort that produces needs, or at the base of a condition of well-being. The representation through maps, both of the tools of design and those for example of La Cecla, are fundamental representations to understand the process, but contain a limit that requires an integration with other forms of representation: they are static and with difficulty manage to tell the emotional and temporal evolution of the experience.

The *narrative visualization* helps to give life to the representation of the experience that evolves over time. Paolo Ciuccarelli argues that: "Information design and, more specifically, narrative visualizations, can play an important role. Narrative visualization uses communicative elements that are not limited to the purpose of conveying facts. These elements go beyond the mere visualization of data, they draw the bigger context of phenomena… in other fields of design research it is quite established that emotion is a cognitive force which contribute to sense making, facilitates interaction and enables a better user experience."[14] The possibility of urging people to communicate their emotions and experiences to focus on a problem, coincides with the possibility of having a role in the design process. *Storytelling* helps to represent the emotions and experiences that constitute a problematic phenomenon, a need, but also helps to prefigure the experiences and the emotional meaning of the solutions that are being built.

In narratology, many scholars have considered it essential to construct a graphic representation of the development of a story. Joseph Campbell had developed a graph, "The hero cycle", to identify structures that simplify the narrative process. In the graphic of Campbell, reworked by Vogler with the *journey of the hero*, each stage indicates a topical moment of the experience of the character who undertakes the adventure. He brings all the emotional load that this entails, to solve a hardship, a lack, a problem that has arisen before him, as happens to the people involved in a co-design process, to activate a change. In Gustav Freytag's diagram that represents the *narrative arc*, the dramatic trend of the story is instead underlined, in reference to the emotional involvement that causes the search and the realization of a change.

[13] L. Pignatti, (cur.). *Mind the map. Mappe, diagrammi e dispositivi cartografici,* Postmediabook, Milano, 2011, pag. 72

[14] S. Rendgen, J. Wiedemann, P. Ciuccarelli, R. Saul Wurman, S. Rogers, e N. Holmes, *Information Graphics, Taschen, Köln, 2012, pag. 80*

"Design is storytelling unfolds in three main acts. Act I, "Actions" explores the patterns that underlie nearly every story, from the narrative arc to the hero's journey. Designers can apply these patterns to users' relationship with products and services. The process of unboxing a gadget, opening a bank account, or visiting a library follows a dramatic arc with highs and lows, anticipation and suspense."[15]

In all the representations taken up to now, basic visual communication made up of signs and symbols is always present. The use of icons and typography is always indispensable, because whoever designs in co-design sessions, acquires a shared code in which to recognize and build analogies with what he already knows or has to tell. This common and simple language allows people of different backgrounds and with different roles, to be able to make their own contribution.

The most common tool, often used in co-design sessions, which uses icons and typography in a simple and immediate way, is the tool of the cards. The cards are used as guidelines for the project, through a series of rules that must be followed. IDEO (IDEO is a global design company. We create positive impact through design.)[16] has several types of cards to its credit. Among these, the *Nature cards*[17] are very interesting. These cards, created in collaboration with Biominmicry 3.8, aim to identify strategies for solving the proposed problems, investigating the animal world and seeking answers in the behavior of nature. The analogies that are created between the two worlds, the human and the nature, have the function to achieve new imaginaries that are based on the experiences compared.

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[15] E. Lupton, *Design is storytelling,* Cooper Hewitt, Smithsonian Design Museum, New York, 2017, pag.12

[16] https://www.ideo.com/eu

[17] https://www.ideo.com/post/nature-cards

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La V Giornata Internazionale di Studi sul Disegno, De-Sign Environment Landscape City, che si svolge presso il Dipartimento Architettura e Design della Scuola Politecnica di Ingegneria e Architettura dell'Università degli Studi di Genova, pone al centro del dibattito nazionale e internazionale il ruolo del disegno nelle diverse "anime" dei settori scientifico disciplinari che coinvolgono tutti gli aspetti progettuali dell'ambiente.

Al fine di coinvolgere studiosi, ricercatori, studenti e professionisti delle diverse aree di ricerca, le tematiche introducono le seguenti linee di ricerca: Rilievo e Rappresentazione dell'Architettura e dell'Ambiente; Il Disegno per il paesaggio; Disegni per il Progetto: tracce - visioni e pre-visioni; I margini i segni della memoria e la città in progress; Cultura visiva e comunicazione dall'idea al progetto; Le emergenze architettoniche; Il colore e l'ambiente; Percezione e identità territoriale; Patrimonio iconografico culturale paesaggistico: arte, letteratura e ricadute progettuali; Segni e Disegni per il Design e Rappresentazione avanzata.

Nell'ambito della V Giornata di Studi, interviene Chris Bangle, designer statunitense di fama mondiale con la Lectio Magistralis "Designer Notebook".