Giulia Pellegri, architetto, è professore associato di Disegno presso il Dipartimento Architettura e Design DAD, della Scuola Politecnica dell'Università degli Studi di Genova.

La Giornata di Studi, nata in occasione di Expo 2015, si pone come occasione di confronto e dibattito multidisciplinare nell'ambito di ricerche e pensieri che dalla Rappresentazione si apre a tutte le discipline che coinvolgono l'analisi, lo studio, la valutazione, il progetto, il design, il colore, dell'"Ambiente uomo".
Il tema della Rappresentazione e delle ricadute scientifiche di tutti quei settori disciplinari che coinvolgono l'ambiente che viviamo, guardiamo, immaginiamo, progettiamo viene affrontata con una giornata di Studi dedicata, presentando le seguenti tematiche: 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 Quarta Giornata di Studi, interviene l'architetto Massimiliano Fuksas a testimonianza del valore e del ruolo del "disegno" più specificamente progettuale, con la Lectio Magistralis "Love will save the world _number 4" .

ISBN 978-88-94943-32-0

ATTI

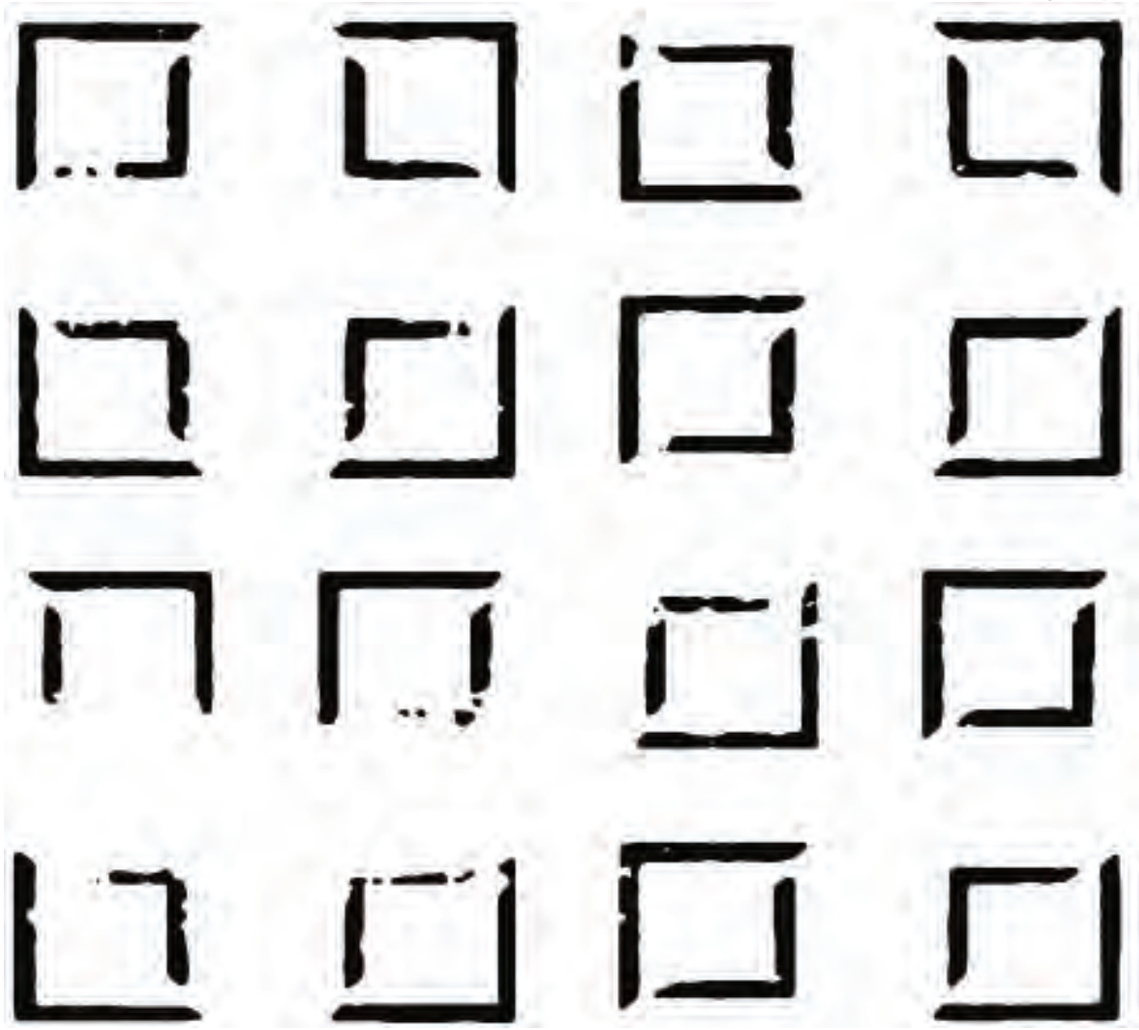
UNIVERSITÀ DEGLI STUDI DI GENOVA

De_*Sign*
Environment Landscape City

a cura di Giulia Pellegri

a cura di Giulia Pellegri

2018



De-Sign Environment Landscape City 2018
Atti _IV Giornata Internazionale di Studi sul Disegno

GENOVA UNIVERSITY PRESS

RICERCA

GENOVA UNIVERSITY PRESS

De-*Sign* Environment Landscape City/Di-*Segnare* Ambiente Paesaggio Città
International Drawing Study Day/Giornata Internazionale di Studi
Genoa May 08- 09, 2018/Genova, 08- 09 maggio 2018
Department Architecture and Design DAD/Dipartimento Architettura e Design DAD
Polytecnich School of Genoa/Scuola Politecnica dell'Università degli Studi di Genova

Scientific Director/Direttore Scientifico
Giulia Pellegri, Scuola Politecnica di Genova, Dipartimento DAD

Organizing Committee/Comitato Organizzatore
Sara Eriche, Scuola Politecnica di Genova, Dipartimento DAD
Marina Jiménez Jiménez, Universidad de Valladolid, ETS Arquitectura
Michela Mazzucchelli, Scuola Politecnica di Genova, Dipartimento DAD
Giulia Pellegri, Scuola Politecnica di Genova, Dipartimento DAD
Francesca Salvetti, Scuola Politecnica di Genova, Dipartimento DAD
Michela Scaglione, Scuola Politecnica di Genova, Dipartimento DAD

Scientific Committee/ Comitato Scientifico
Marta Alonso, Universidad de Valladolid, ETS Arquitectura
Gianandrea Barreca, Architetto Studio professionale Barreca & La Varra
Enrica Bistagnino, Scuola Politecnica di Genova, Dipartimento DAD
Paolo Clini, Università Politecnica delle Marche, Dipartimento di Ingegneria Civile, Edile e Architettura, DICEA
Raffaella Fagnoni, Scuola Politecnica di Genova, Dipartimento DAD
Maria Linda Falcidieno, Scuola Politecnica di Genova, Dipartimento DAD
Patrizia Falzone, Scuola Politecnica di Genova, Dipartimento DAD
Massimiliano Fuksas
Marco Gaiani, Alma Master Studiorum Università di Bologna, Dipartimento di Architettura
Noelia Galván Desvaux, Universidad de Valladolid, ETS Arquitectura
Manuel Gausa, Scuola Politecnica di Genova, Dipartimento DAD
Adriana Ghersi, Scuola Politecnica di Genova, Dipartimento DAD
Marco Giovine, Università di Genova, Dipartimento di Scienze della terra, dell'ambiente e della vita DISTAV
Marina Jiménez Jiménez, Universidad de Valladolid, ETS Arquitectura
Adriano Magliocco, Scuola Politecnica di Genova, Dipartimento DAD
Michela Mazzucchelli, Scuola Politecnica di Genova, Dipartimento DAD
Giampiero Mele, Università degli Studi eCampus
Giulia Pellegri, Scuola Politecnica di Genova, Dipartimento DAD
Franco Purini, Professore Emerito, Università degli Studi di Roma "La Sapienza"
Maria Elisabetta Ruggiero,Scuola Politecnica di Genova, Dipartimento DAD
Francesca Salvetti, Scuola Politecnica di Genova, Dipartimento DAD
Michela Scaglione, Scuola Politecnica di Genova, Dipartimento DAD
Antonio Tordesillas, Universidad de Valladolid, ETS Arquitectura

Segreteria organizzativa/Local organizing office
Sara Eriche, Scuola Politecnica di Genova, Dipartimento DAD
tel. 010.2095570 Email. giornatadistudi@arch.unige.it

Patronage/Patrocinio
Università degli Studi di Genova, Scuola Politecnica di Genova, Dipartimento Architettura e Design; ADDgenova Dottorato in Architettura e Design; Universidad de Valladolid, ETS Arquitectura; Comune di Genova; Ordine degli Architetti Paesaggisti Conservatori e Pianificatori della Provincia di Genova, OAPPC, Fondazione dell'Ordine degli Architetti; Comune di Strevi; Associazione Italiana Architettura del Paesaggio, AIAPP, Valle d'Aosta and Piemonte; Boero; A.I.T.I.V.A Associazione Italiana Tecnici Industrie Vernici ed Affini; Umania_ Knowledge Sharing Improvement, Cts_colorLabCts_culture technology science_Laboratory of Colour

De- Sign

Environment Landscape City_ 2018

a cura di

Giulia Pellegri

GENOVA UNIVERSITY PRESS

è il marchio editoriale dell'Università degli Studi di Genova

De-*Sign* Environment Landscape City
International Drawing Study Day
Genova, 08- 09 maggio 2018
Dipartimento Architettura e Design DAD, Scuola Politecnica dell'Università degli Studi di Genova

Questo volume contiene contributi sottoposti a blind peer review per la Giornata Internazionale di Studi De-Sign Environment Landscape City, tenuta presso il Dipartimento Architettura e Design dell'Università di Genova, 08- 09 maggio 2018.

Patrocinio:

Impaginazione grafica a cura di: Sara Eriche

In copertina:
Elaborazione digitale del disegno analogico di Maria Carratino
Corso di Fondamenti e Pratiche di Rappresentazione 2 a.a. 2017 - 2018

Realizzazione Editoriale
GENOVA UNIVERSITY PRESS
Piazza della Nunziata, 6 - 16124 Genova
Tel. 010 20951558
Fax 010 20951552
e-mail: ce-press@liste.unige.it
e-mail: labgup@arch.unige.it
http://gup.unige.it

ISBN 978-88-94943-32-0 (versione eBook)

Finito di stampare dicembre 2018

Stampato presso il
Centro Stampa
Università degli Studi di Genova - Via Balbi 5, 16126 Genova
e-mail: centrostampa@unige.it

CONTENTS/CONTENUTI

Signs and Drawings for Design
Segni e disegni per il design

Advanced Representation
Rappresentazione avanzata

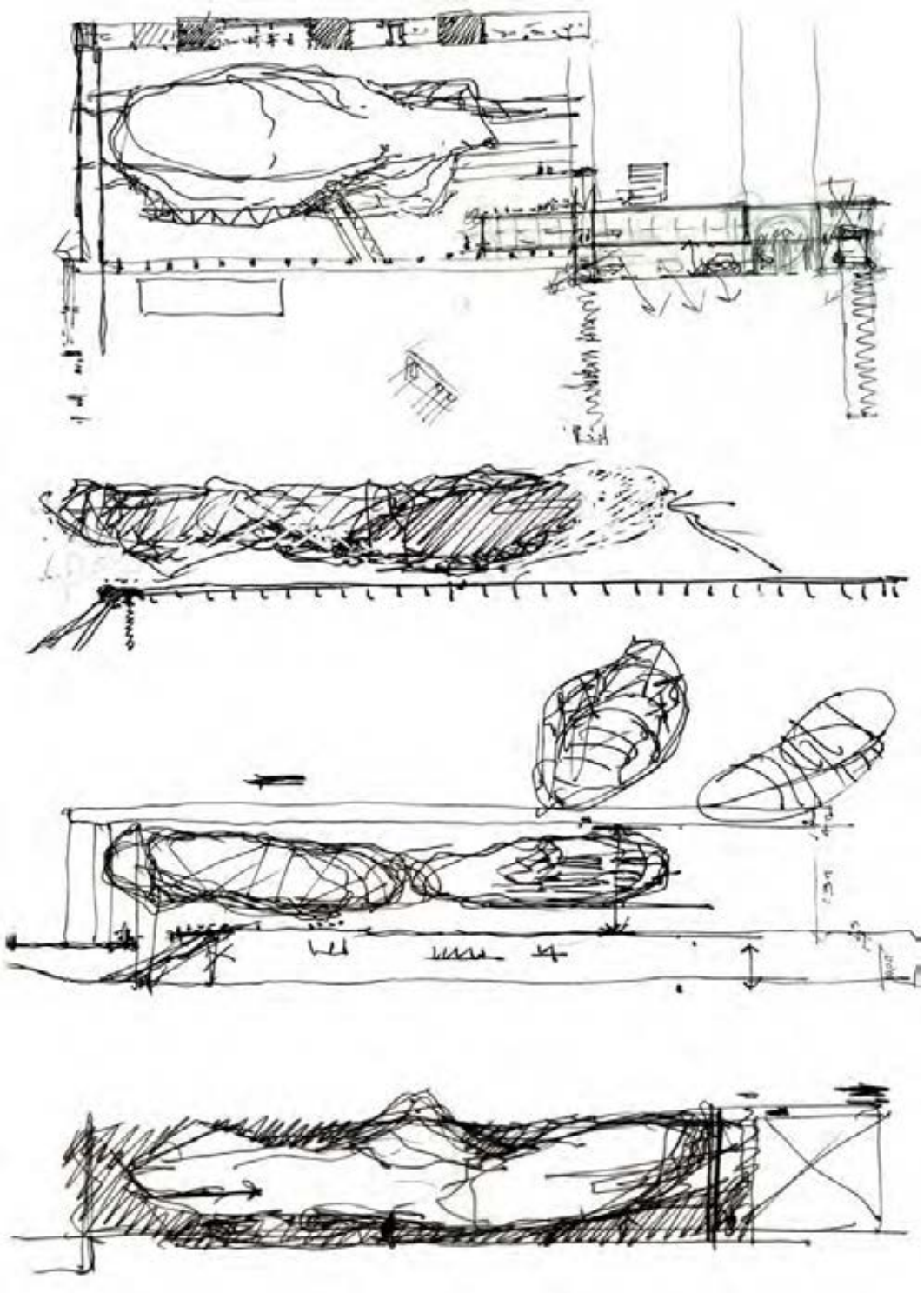
Preface

The International Study Day, born during Milan Expo 2015, is a multidisciplinary debate in the field of research that open up to the disciplines that involve analysis, study, evaluation, project, design, colour, of the "Human Been Environment".
The Drawing, universal language and communication of planning intentions is at the center also of this Fourth International Meeting organized on two days 8 and 9 May 2018.
The architect Massimiliano Fuksas opened the Conference with the Lectio Magistralis *Love will the World N. 4.* I thank the architect Fuksas who highlighted his expressive capacity and the founding role in the design vision of his drawings and paintings.

Massimiliano Fuksas of Lithuanian descent, was born in Rome in 1944. He graduated in Architecture from the University of Rome "La Sapienza" in 1969. Since the Eighties he has been one of the main protagonists of the contemporary architectural scene.
From 1994 to 1997 he was a member of the Planning Commissions in Berlin and Salzburg. In 1998 he was awarded for his professional career with "Vitruvio International a la Trayectoria" in Buenos Aires. From 1998 to 2000 he directed the "VII Mostra Internazionale di Architettura di Venezia", Less Aesthetics, More Ethics. In 1999 he received the Grand Prix National d'Architecture Française, the following year he was named National Academic of San Luca and was decorated Commandeur de l'Ordre des Arts et des Lettres de la République Française. In 2002 the Honorary Fellowship of the AIA – American Institute of Architects , Washington D.C. Three years later member of the Académie d'Architecture in Paris. In 2006 the Honorary Fellowship of the RIBA – Royal Institute of British Architects, London UK and was named Cavaliere di Gran Croce della Repubblica Italiana. In 2010 he was decorated with Légion d'Honneur by the French President. In 2012 the Medal of the Presidency of the Council of Ministers in Italy, and the Global Lithuanian Award, Art and Culture category in Vilnius, Lithuania. The following year the Idea-Tops Awards, Shenzhen Bao'an International Airport-T3, awarded Best Transportation Space in Shenzhen, China. In 2014 Architizer A + Award and Architizer A + Popular Choice Award, Transportation-Airports category in New York. From 2000 to 2015 he was author of the architecture column – founded by Bruno Zevi – in the Italian news magazine "L'Espresso" and from 2014 to 2015 he was, with his wife, the author of the Design column in the Italian newspaper "La Repubblica".
He has been Visiting Professor at a number of Universities such as Columbia University in New York, the École Spéciale d'Architecture in Paris, the Akademie der Bildenden Künste in Wien, the Staatliche Akademie der Bildenden Künste in Stuttgart.

Giulia Pellegri


75.00



Love will save the world n.4

Massimiliano Fuksas

Lecture 08 Maggio_ Aula San Salvatore

Dipartimento Architettura e Design, Scuola Politecnica di Genova

Aula San Salvatore, Dipartimento Architettura e Design, Scuola Politecnica di Genova

Grazie a tutti voi, io sono qui oggi per merito vostro. Ciò che è stato detto è tutto vero: probabilmente se ci fosse stato qualche impegno davvero improrogabile non sarei qui adesso, ma quando sono gli studenti, i giovani, a chiamarmi, corro immediatamente.
L'unica cosa che posso dirvi con certezza è che non è vero che il mestiere dell'architetto è impossibile, che porta solo frustrazioni, che è meglio non provarci, che bisogna essere ricchi, (certo male non fa). Anche quando vi dicono che non costruirete mai non credetegli, lo dicono sempre, lo hanno detto per anni, lo dicevano a me, e sicuramente lo diranno anche a voi. Non è vero neppure che ci sono troppi architetti ne servirebbero molti molti di più, perché l'architetto è colui che deve occuparsi di questo mondo, dell'universo, il nostro universo, capire meglio quello che bisogna fare, aiutare. E questa è una parola importante.
Non ricordo se ho fornito un titolo a questa nostra conversazione, a questa lectio, ma se ci dovesse essere un nome a questa lectio potrebbe essere "The love will save the world and the creation will save the art". L'amore salverà il mondo e la creazione salverà l'arte.
Perché il mondo è dei sognatori, di tutti quelli che sognano, di tutti quelli che hanno sognato.
Diceva un mio vecchio amico, per il quale ho costruito a Jaffa il Centro per la Pace, diceva, guarda, e che è scomparso tre mesi fa all'età di 90anni, "Dobbiamo avere più sogni da realizzare nel futuro di quelli che abbiamo già realizzato". I sogni che abbiamo realizzato sono sempre meno di quelli che vogliamo o dobbiamo realizzare, e questo lo dobbiamo sempre avere in mente.
Mai sentirsi né stanchi, né soddisfatti, mai completamente pieni di questo nostro sapere o fare.
Il giorno in cui ci sentiremo soddisfatti, in quel momento la nostra vita risulterebbe finita, finita anche la nostra esistenza. Dunque il mondo è dei sognatori, non di chi non sogna.
Tutti i sognatori pagano un prezzo, molto alto, spesso però possono ottenere enormi, enormi piaceri e soddisfazioni. Io vi dirò poche cose, nulla di scientifico, facendovi vedere alcune immagini. Non so neppure di preciso cosa dirò, voi però ricordatevi sempre che i sogni che avrete nel futuro devono essere superiori a quelli che avete già realizzato.

Video Admirant Entrance Building, GLOW Festival,05.01.2017

Mentre stavo restaurando e recuperando il centro di Eindhoven in Olanda (fig.1), un giorno mi sono imbattuto in alcune immagini, lì ho scoperto (e non avrei mai potuto immaginarlo prima perché quello che io avevo fatto era semplicemente progettare un edificio), ho capito, che l'architettura è anche il supporto per l'arte. Io avevo progettato solo un edificio, anzi una serie di edifici, anzi una piazza, anzi uno spazio pubblico, e ora vi racconterò la storia di questi spazi, così come delle bolle

di Nardini… L'architettura può diventare supporto per l'arte, può essere una cosa molto modesta, permette agli artisti di raccontare le proprie storie e questo è quello che succede nello spazio urbano, dove abbiamo costruito delle colonne di acciaio corten che sono come delle sculture, il blob, che ha fatto diventare lo spazio una piazza, chiamata 18 Septemberplein, il giorno della liberazione di Eindhoven, città invasa e distrutta durante la Seconda Guerra Mondiale.
Lì abbiamo fatto anche un altro progetto, oltre a tutto quello che c'è intorno, il Comune ci aveva chiesto di fare un parcheggio, e abbiamo realizzato un parcheggio per 3600 biciclette, non c'è neppure un'automobile, si sta benissimo, anche perché l'Olanda è pianeggiante, e c'è questo parcheggio con tapis roulant che facilita l'accesso.
L'architettura può essere utile agli altri non solo a noi stessi.

Fig.1 Admirant Entrance Building, Eindhoven, Holland, 2003-2010.

Andiamo avanti.

Vi faccio vedere e vi racconto alcuni progetti.
Chi un po' conosce quello che facciamo Doriana ed io, sa che noi partiamo sempre da un disegno, anzi io parto sempre da un quadro, un disegno, una pittura, non so come chiamarli.
Non sono così pazzo da considerarmi un artista, ma neanche così folle da non considerare questi lavori importanti per quello che poi andiamo a fare.
Questo è il primo disegno (fig.2) che è servito per costruire la fiera di Milano, iniziata nel 2003, tantissimi anni fa, e in ventisei mesi l'abbiamo completata.

L'Italia può anche essere ottimista perché a ciò che che non si costruisce mai, ci sono progetti che si realizzano velocemente, anche se non se ne parla.
Noi non siamo più abituati a parlare delle cose che vanno bene, siamo abituati a parlare solo di quello che va male. Questo è un vizio storico del nostro paese.
Questo quadro che ho regalato a mia figlia, che fa la regista, è il disegno, l'idea, dell'invenzione della natura che produce l'architettura, è il contrario esattamente di quello che si dice.

Fig.2 Un Paesaggio per Milano, 2002.

Questo è il primo 3D, (fig.3) già nel 2003 si cominciavano ad usare le forme digitali, certo non erano raffinate come quelle di oggi, però questi disegni sono stati i primi disegni digitali con cui poi abbiamo costruito l'intero progetto.
L'asse centrale della Fiera (fig.4) è lungo 1,6 km, è completamente di vetro, e vicino abbiamo costruito il resto. Poi l'abbiamo anche finita questa scultura di 1,6 km, un miglio; e vicino c'è tutta l'altra parte della fiera e l'asse centrale per collegare i padiglioni, per rendere più logico il percorso.

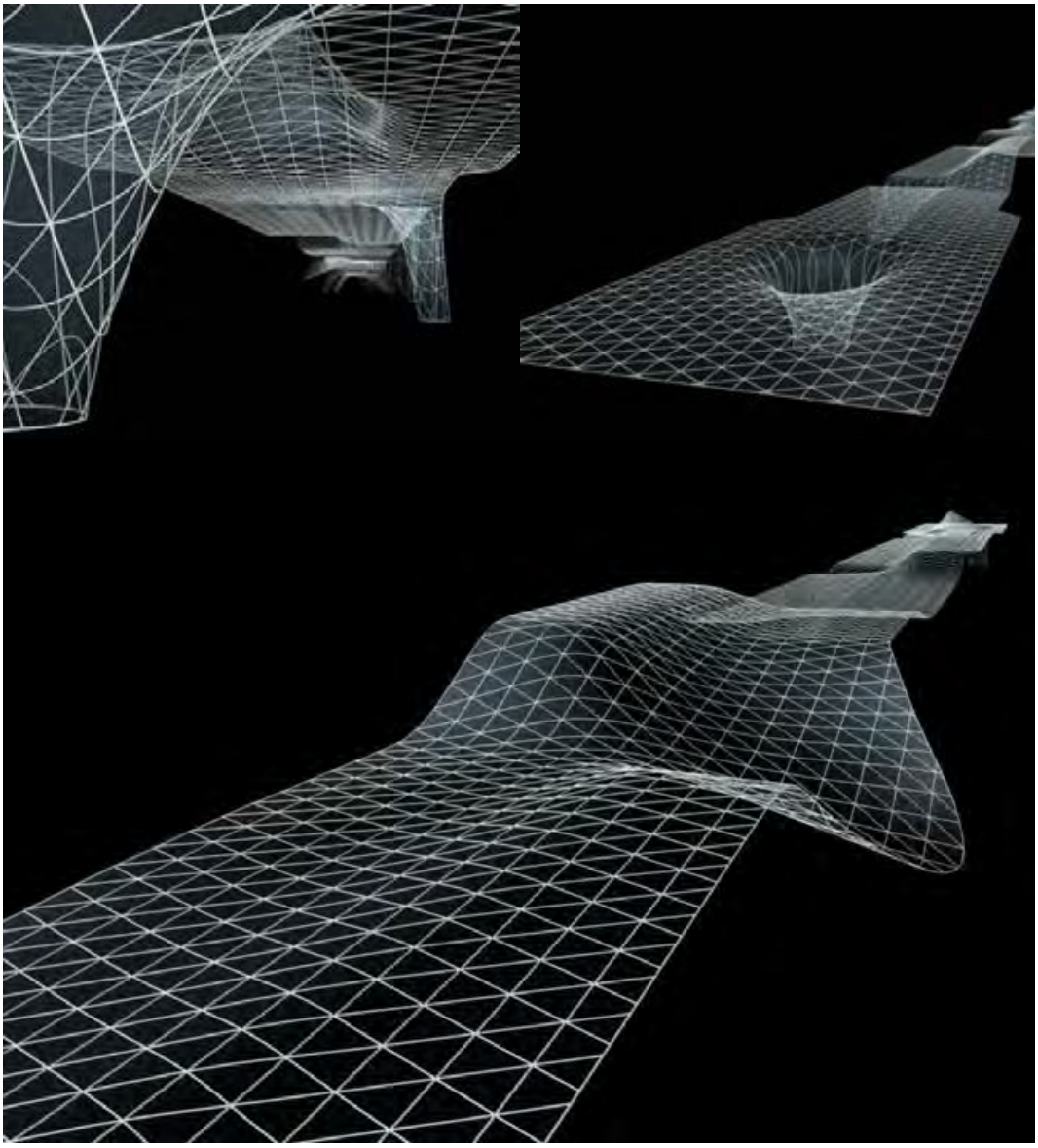


Fig.3 New Milan Trade Fair, Rho-Pero, Milan Studi tridimensionali digitali 2002-2005

Noi abbiamo chiesto di fare immediatamente la stazione della metropolitana. Infrastrutture! Volevamo che la gente arrivasse lì a piedi, alla fine di questa lunga passeggiata, ma arrivasse con un mezzo rapido, senza dover sempre cercare un parcheggio.
L'infrastruttura base è stata la metropolitana e il collegamento con la metropolitana.
L'uso dell'acqua che sarà presente quasi in tutti i nostri progetti, è un uso non del tutto innocente, perché l'acqua partecipa a salvare l'energia e a darti un grosso contributo, raffredda d'estate e riscalda d'inverno. I grandi bacini d'acqua che ci sono alla fiera hanno questa profonda voglia.
Questo era il sogno di tutti noi, io volevo vedere come la gente un giorno si sarebbe appropriata degli spazi, e quando uno vede che le persone si siedono, si distendono, si danno un bacio, e dopo di questo c'è l'alternanza tra uno specchio inox e dall'altra parte un colore arancio denso, e queste due cose che si alternano determinano l'illusione, si vede un riflesso e per noi il riflesso è sempre la parte più importante della realtà. E' più reale il riflesso di quanto l'oggetto che l'ha prodotto.

Fig.4 Asse centrale della Fiera di Milano

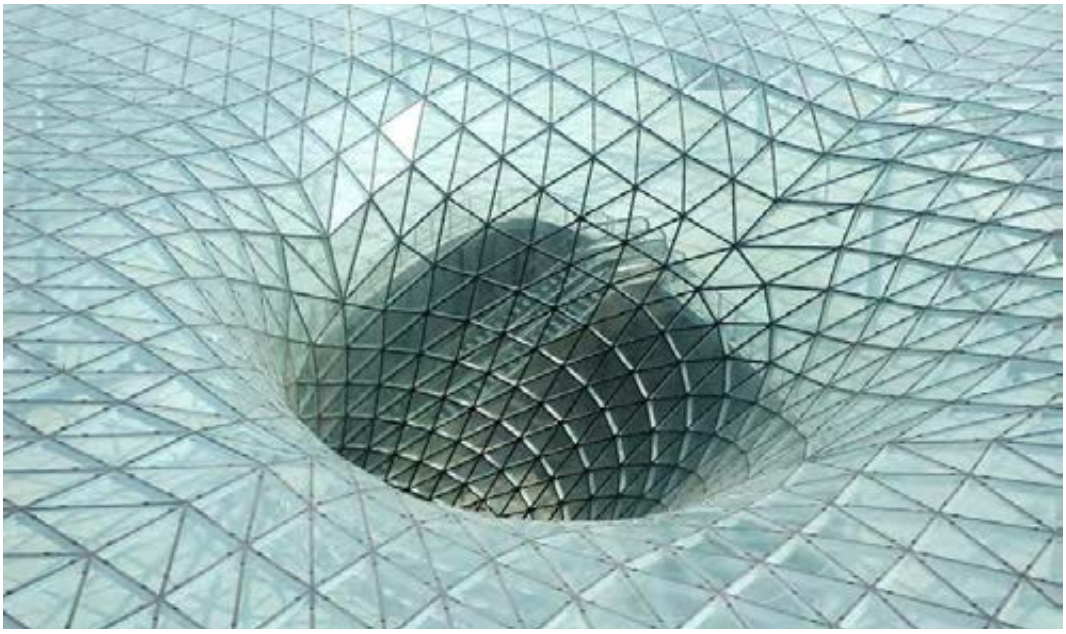


Fig.5

E poi c'è sempre l'acqua, un sistema di riflessi, di presa di luce.

Questo è uno degli ingressi… poi la storia la conosciamo tutti, uno skyline che ricorda le Alpi e questa specie di pizzo alto 60 metri con uno spazio interno che è anche una piazza.

A metà di questo spazio lunghissimo, ci sono i luoghi degli incontri.

Alla fine c'è il tramonto e poi c'è il luogo dove la gente si incontra, oppure usa diversamente questo spazio, questo supporto che è composto da due ellissi ruotate che diventano una struttura geometricamente complicata. All'inaugurazione c'era la (compagnia teatrale) La Fura dels Baus (fig.6) che ha fatto una performance straordinaria, usando l'architettura come supporto per le altre arti. (figg. 7-21)

Fig.6

Fig.7

Fig.8

Fig.9

Fig.10

Fig.11

Fig.12

Fig.13

Fig.14

Fig.15

Fig.16

Fig.17

Fig.18

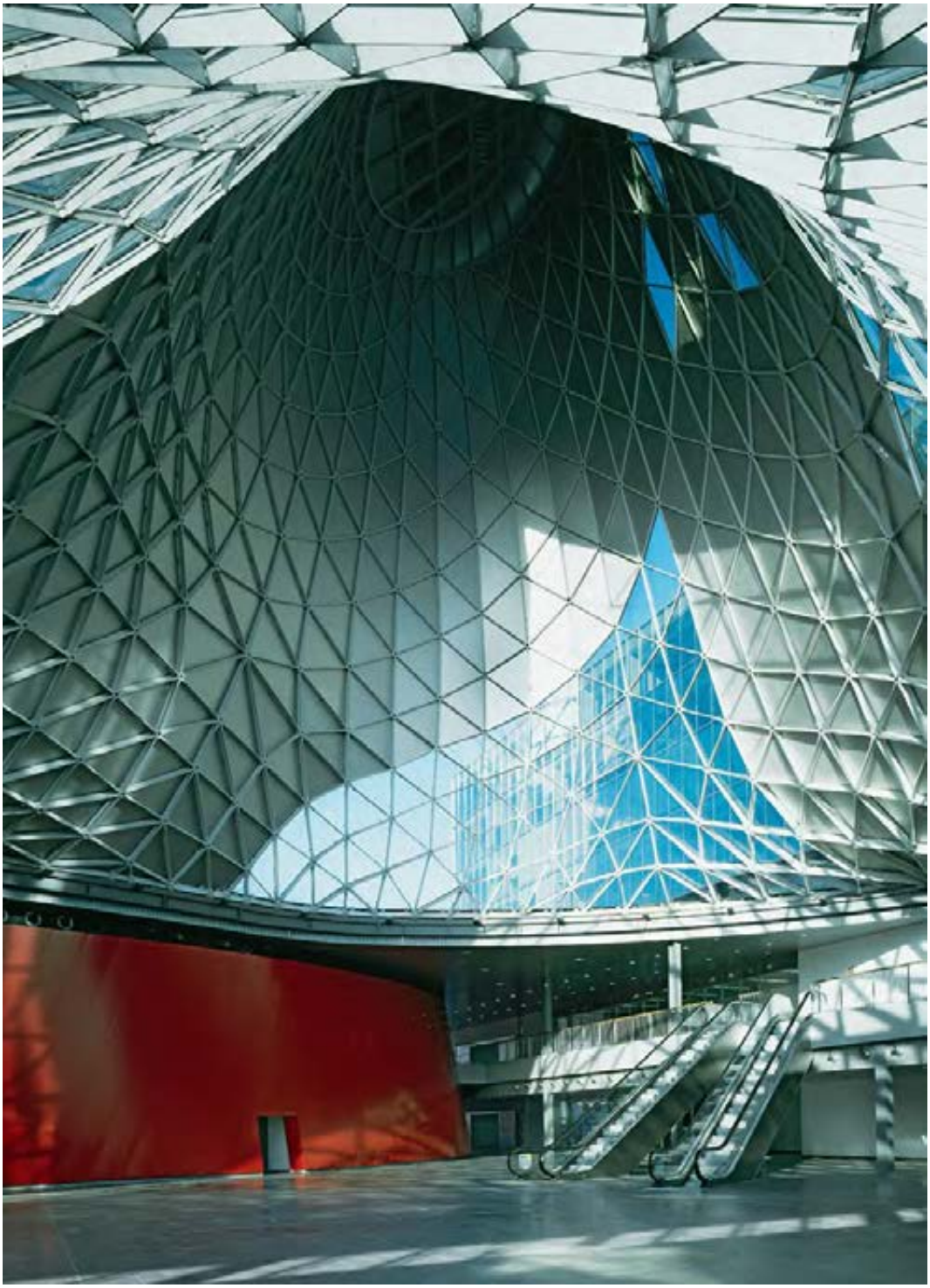


Fig.19

Fig.20

Fig.21

Questo è un francobollo, fatto in mia memoria, lo fece il governo dell'epoca. Il disegno è mio e l'hanno fatto in onore mio...(fig.22)

Fig22

Questo vi riguarda più direttamente, è un modello: noi come lavoriamo?
Noi facciamo modelli, quadri, pitture, disegni e questo è il progetto fatto per Giorgio Armani a New York, sulla Fifth Avenue.
Giorgio Armani è grande amico di Doriana, anche mio, ma più suo, e ci dice: "perché non mi progettate il negozio sulla Fifth Avenue?".
Il risultato è un edifico complesso, che oggi ci piace tanto. Abbiamo cambiato sezioni e piani, volevamo fare un grande spazio, poi ad un certo punto abbiamo deciso di mettere una scultura nel centro dello spazio. Una scultura che potesse essere un luogo: se facciamo una scala-scultura la gente non prende più l'ascensore, non ci credeva nessuno ma alla fine è stato così.
Questo era il modello.(fig.23)

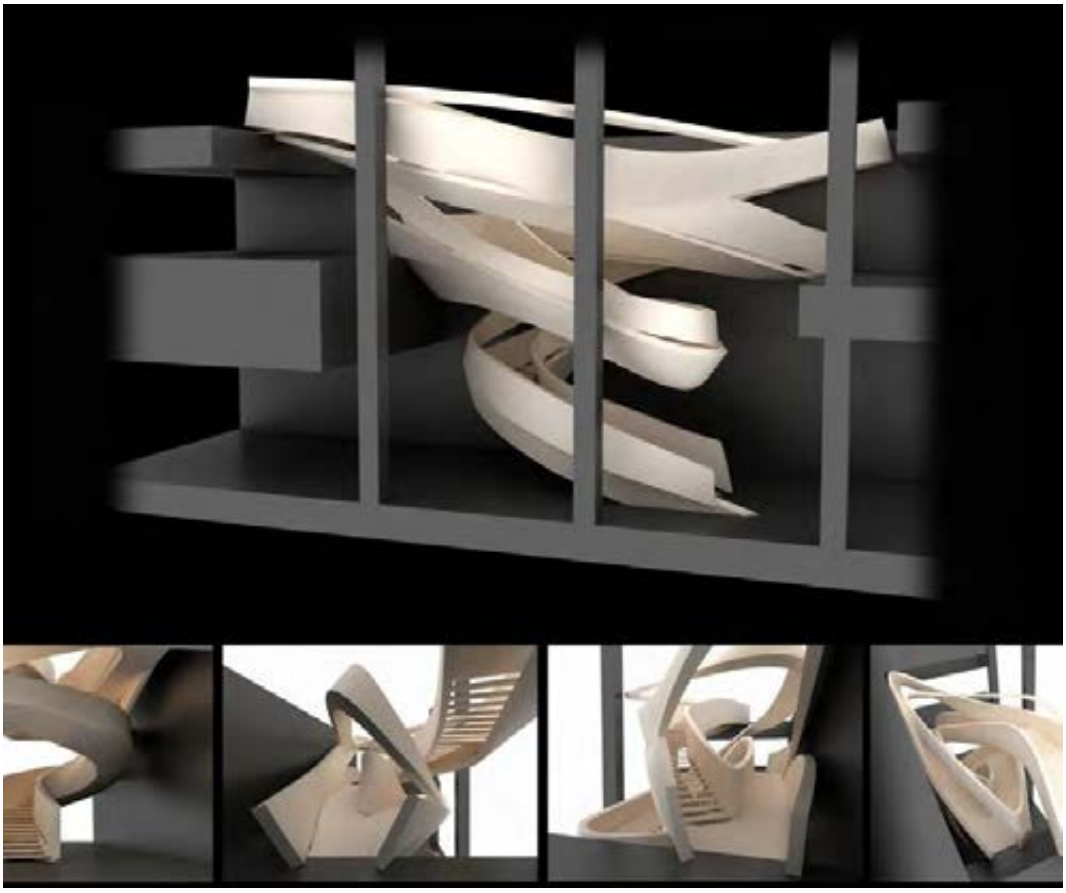


Fig.23 Armani 5th Avenue, New York City,2007-2009

Ad un certo punto gli americani, che dovevano realizzare l'opera, dicono a G. Armani: "Sì sì, tu vuoi costruirla in tre mesi, noi la costruiamo in tre anni; tu vuoi spendere 10, per noi costa 60.". Armani ci chiama e dice: "A noi piace moltissimo questo vostro progetto, però ha costi troppo elevati e tempi tanto lunghi..". Allora qui riscoprimmo l'Italia e ci ricordammo che una scultura simile l'avevamo fatta per Nardini (a Tbilisi), per le bolle di Nardini, con un'impresa di un piccolo fabbro della provincia di Forlì o Vicenza. Lo chiamammo, venne a Roma nel nostro studio e gli facemmo vedere i disegni, e lui non batté ciglio. Gli americani rimasero sconvolti, le grandi imprese americane sconvolte e lui invece disse soltanto: "Datemi dieci minuti, adesso guardo un po'…". Sfogliò le carte, tutti nell'attesa del responso di questo fabbro, che disse: "Sì, sì, lo posso fare", e noi: "Ma in quanto tempo?", e lui: "In tre mesi", e il costo? "Quello che proponete voi come costo mi sembra sufficiente". Lo dicemmo ad Armani. La conclusione è stata che lui ha costruita la 'scultura' in un laboratorio in Italia, poi l'ha fatta a pezzi e l'ha mandata via mare e l'ha fatta arrivare a New York, dove è stata rimontata.

Questo è il risultato. Non c'è nessun punto di appoggio nelle pareti laterali, la struttura si poggia soltanto alla base, un punto solo di appoggio.(figg. 24-30)

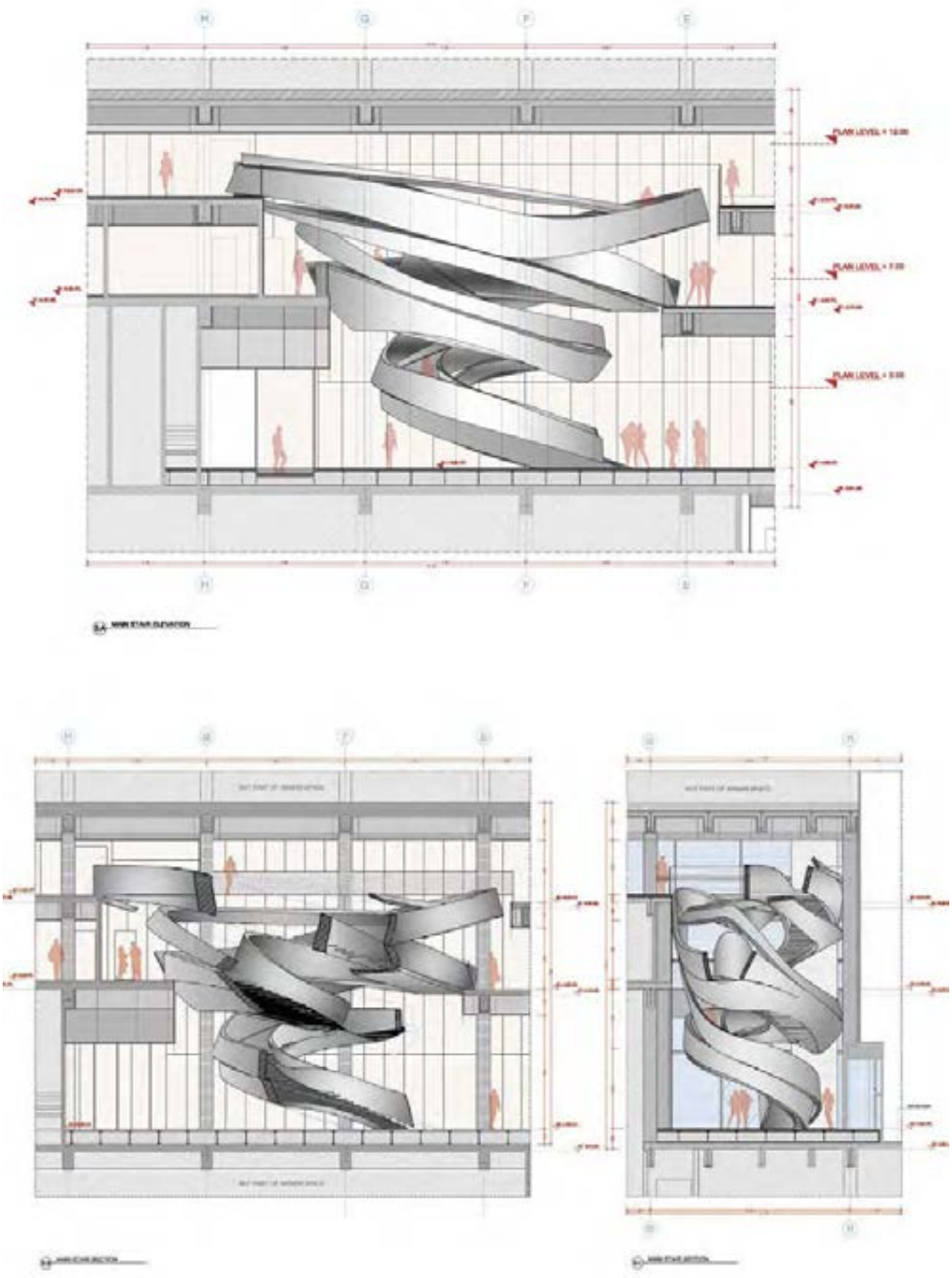


Fig.24

Questo per dire che l'Italia è anche questo, non c'è solo quello che vediamo oggi, di cui tutti vogliono parlare, c'è anche un'altra Italia, straordinaria, positiva. Voi, tanti altri come voi, come noi, come quel fabbro.

Fig.25

Fig.26

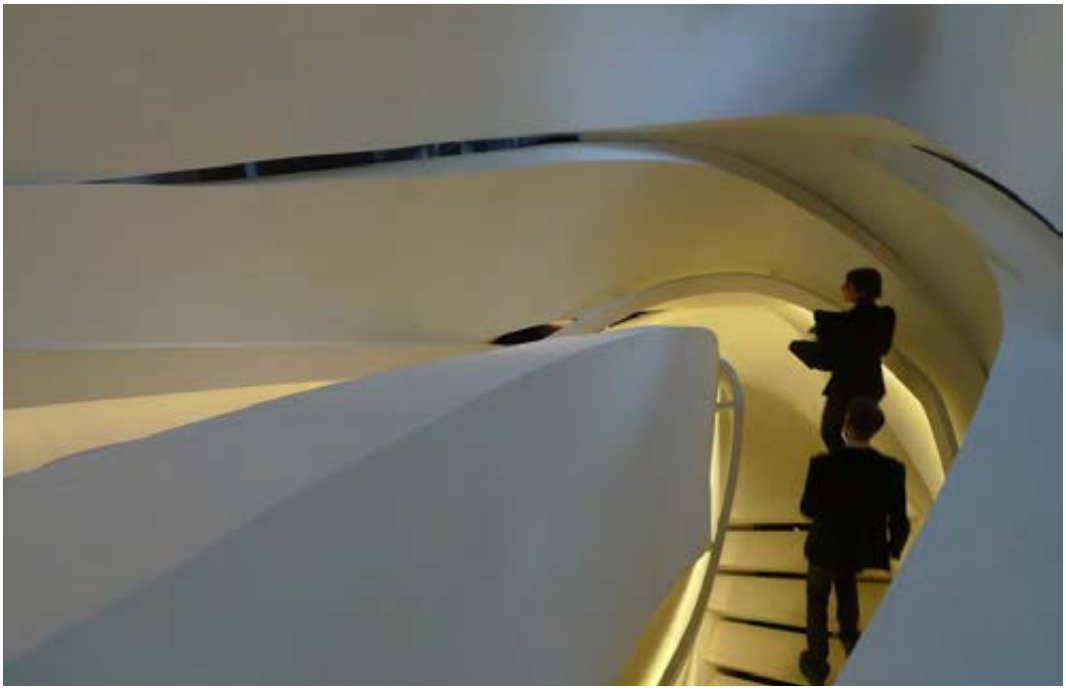


Fig.27

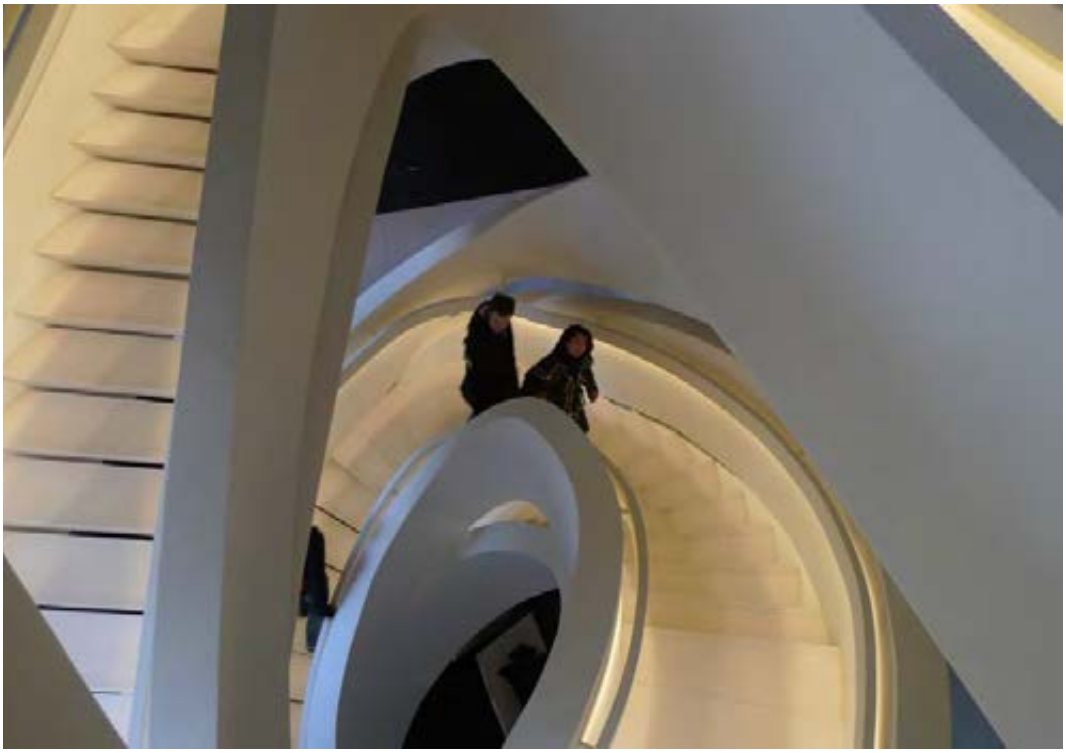


Fig.28

Fig.29

Fig.30

Quando si fanno grandi progetti vien voglia di fare anche progetti più piccoli. Così abbiamo deciso di fare un piccolo progetto.
Un vescovo ci ha chiesto se volevamo partecipare ad un concorso; gli ho chiesto: “per che cosa?”, e lui mi ha risposto: “Per una chiesa”. Progettare una chiesa è sempre stato il mio sogno, fare una chiesa…Però il vescovo mi dice: “noi abbiamo due milioni e mezzo”, e io chiedo: “Per gli onorari?”. Il vescovo precisa: “No, per costruirla”. Io aggiungo: “Credo sia un po’ pochino”. Poi nella notte di Natale del 2003 mi è venuta un’idea, questa qua (che vi sto mostrando). Ho fatto questo disegno (fig.31): due volumi uno dentro l’altro; gli elementi e la luce passano da una parte all’altra e si possono vedere anche dalla strada. Anche il cielo si può vedere. Così abbiamo iniziato a fare il progetto. Questo volume sospeso. Dicono che molte volte uno deve entrare nei miei edifici per capirli. Io non sono della scuola della controriforma che ha fatto le facciate per far vedere che la chiesa era attraente. Io sono del parere che bisogna entrare nei luoghi, qualunque luogo, per poterli capire.

Fig.31 Disegno per il progetto della Chiesa di San Paolo Apostolo a Foligno, Natale 2003.

Anche la Ferrari di Maranello è un progetto in cui non ci entri, se non vedi quello che succede all’interno, non lo capisci. C’è poi tutta la via crucis di Palladino, che è molto bella e poi ci sono quest’insieme di volumi che passa dall’altra parte, sono come dei cannoni di luce che tengono sospesi, è la luce che tiene sospeso questo grande volume centrale. E nessuna delle quattro facciate è uguale (figg. 32-42).

Fig.32

Fig.33

Fig.34

Fig.35

Fig.36

Fig.37

Fig.38

Fig.39

Fig.40

Fig.41

Fig.42

Questi sono i disegni (fig.43) che precedono la costruzione dell'archivio storico di Francia. Questo che abbiamo realizzato, dal 1789 ad oggi, è il primo edificio costruito per il Ministero della Cultura e voluto dal presidente della Repubblica in periferia. Ecco se noi incominciassimo a spostare edifici storici importanti anche in periferia per ricominciare da un punto, come faceva la chiesa che costruiva grandi conventi, chiese e da lì nasceva non solo un borgo, non solo un pezzo di città, ma nasceva una ragione, le cose funzionerebbero meglio.

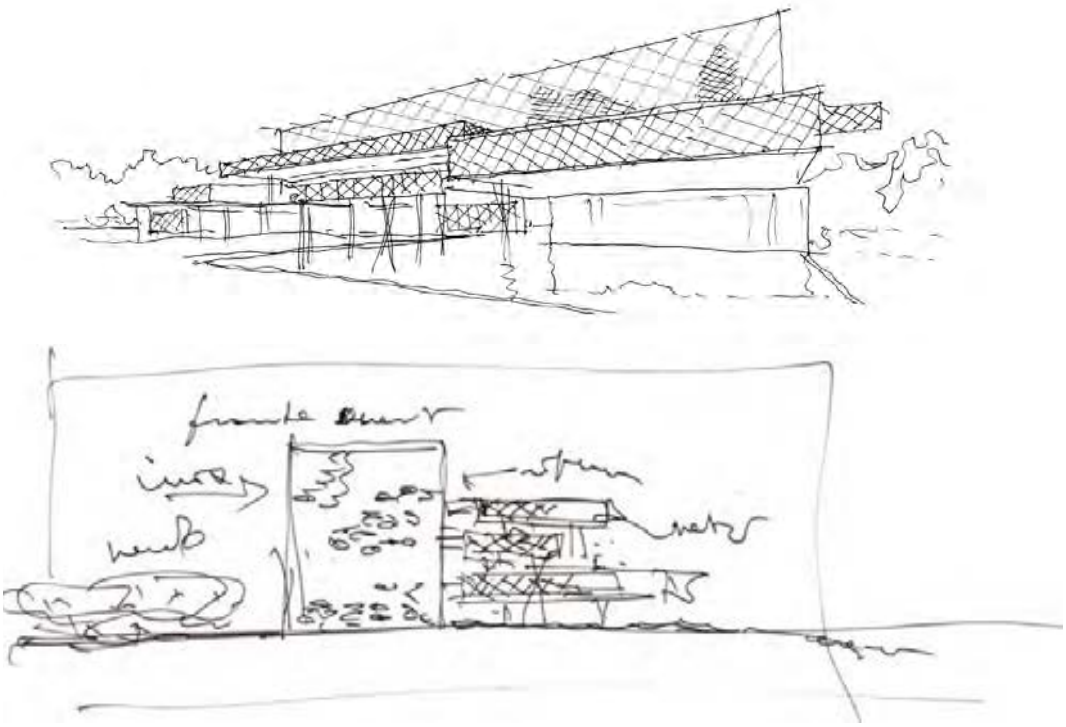


Fig.43 Disegni per il progetto del Nuovo Archivio Nazionale di Francia, 2005 - 2013

Fig. 44 Nuovo Archivio Nazionale di Francia, Pierrefitte sur Seine-Saint Denis, 2005-2013.

Fig.45

Fig.46

Questo è un edificio complesso. C'è un blocco completamente riflettente e l'altra parte dove vivono le persone che lavorano e restaurano è completamente pieno di luce e accompagna questo volume fino a toccare il terreno, perché intorno ci sono case molto piccole.
(figg.44 - 51).

Fig.47

Fig.48

Fig.49

Fig.50

Fig.51

Lì ha lavorato un altro artista. Con l'architettura può nascere la scultura. L'artista si chiama Anthony Gormling e ha creato quell'elemento al centro: sono poliedri estremamente complessi, estremamente poetici fortissimi. Qui (Gormling) è la prima volta che ha usato questo sistema di poliedri. Lavorammo molto bene insieme perché all'interno c'era una faglia con l'acqua. Questa grande scultura si vede dappertutto (figg.52-55)

Fig.52

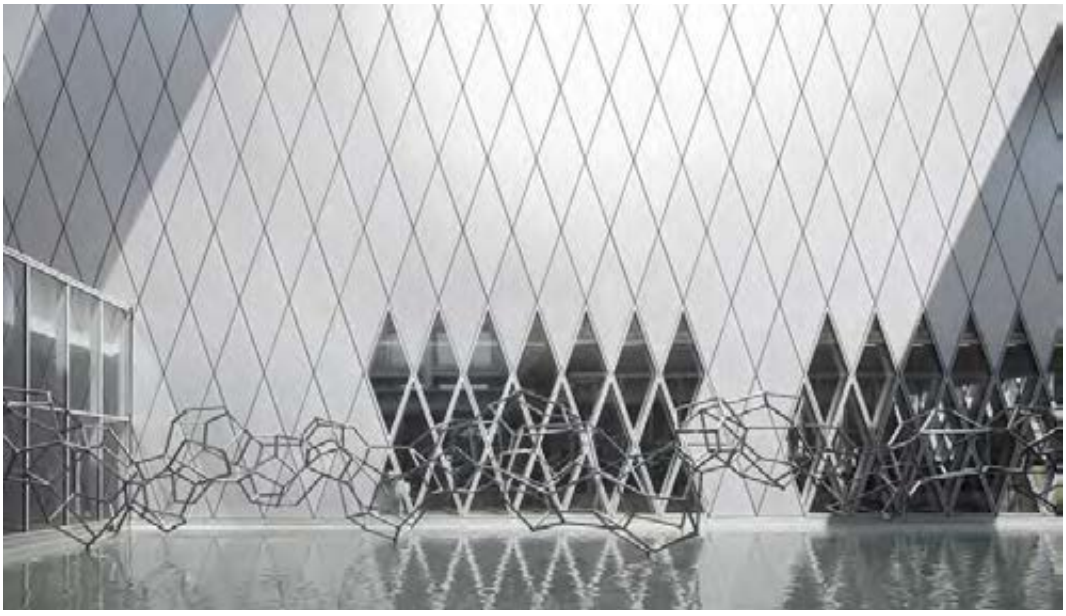


Fig.53

Fig.54

Fig.55

Questi sono gli interni, è la sala di lettura, ai piedi di questa montagna di documenti, 380 km di librerie. All'interno di quel volume c'è l'auditorium. Le poltrone le abbiamo fatte noi, poltrone Frau. (figg.56-59)

Fig.56

Fig.57

Fig.58

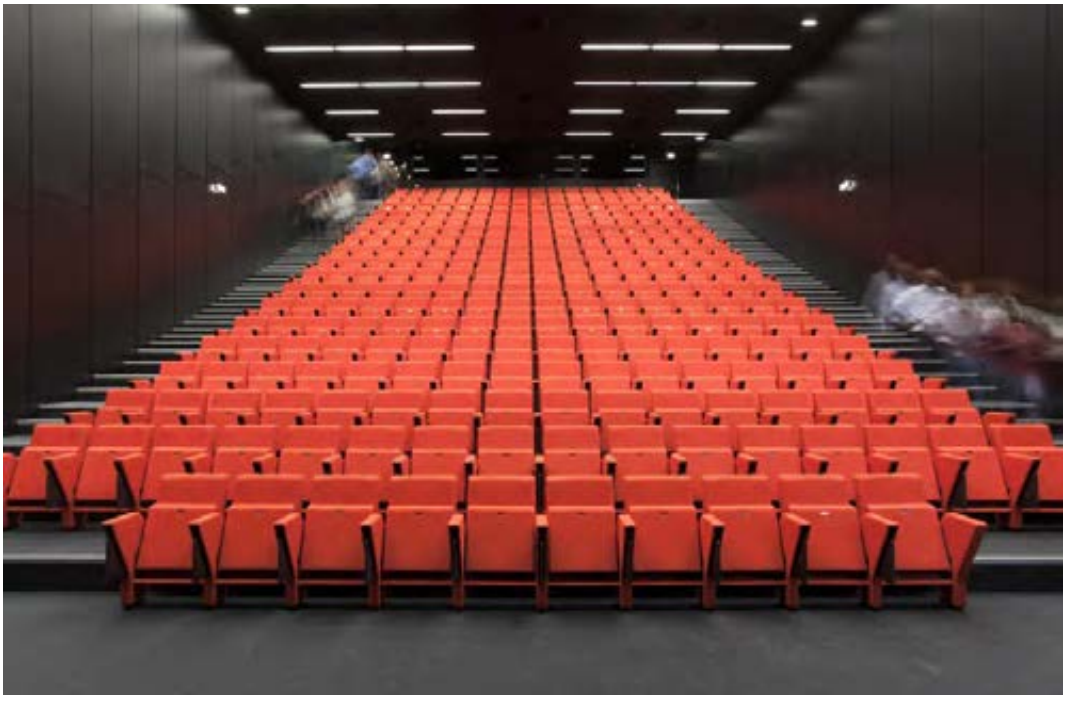


Fig.59

Questa è l'origine del famoso progetto che iniziammo nel 1989.
Questo è un mio disegno del 1989 per il concorso del Palazzo dei Congressi di Roma.(fig.60)
Un edificio importante che ha richiesto parecchio tempo, 18 anni: 10 per aspettare che iniziasse la costruzione e 8 per costruirla.

Fig.60 Disegno per il progetto del Palazzo dei Congressi di Roma, 1989.

Questi sono i primi disegni. (Si vede) l'idea di fare un edificio che fosse una teca di vetro, che tenesse una sorta di cuore pulsante dentro, di un respiro molto forte che cercasse di uscire dalla teca, che fosse costretto e nello stesso tempo avesse una voglia di libertà. Forse era quello che sentivo all'epoca e forse sento ancora adesso, non lo so.
Questi erano i primi disegni.(figg. 61-63)
Questo per dire che si può anche disegnare, non fa male....ma disegnate qualche volta?? Non state solo davanti a uno schermo! Non lo stampate mai? Voi dovete stampare e vedere se va bene, poi correggete a mano, lo dovete fare.

Fig.61

Fig .62

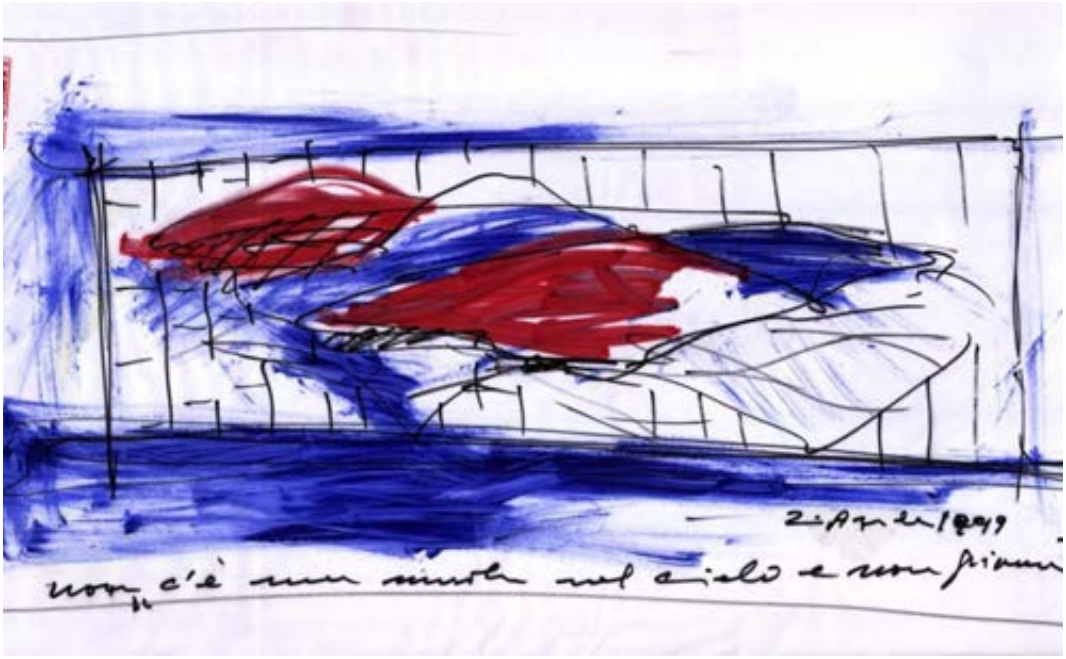


Fig.63

Dopo questa fase (di schizzo, di disegno), subentra un lavoro quasi didattico perché dopo il 3D la prima idea è quella che abbiamo costruito. Poi l'abbiamo scomposta per sezioni, perché la teoria del caos a quell'epoca aveva un certa difficoltà, la quantistica e la teoria del caos sono delle teorie che sono state alla base del progetto, e poi più tardi i frattali.
E allora è stata fatta per sezioni, modelli per sezioni, molte decine di modelli dall'aspetto scultoreo. (figg. 64-66)

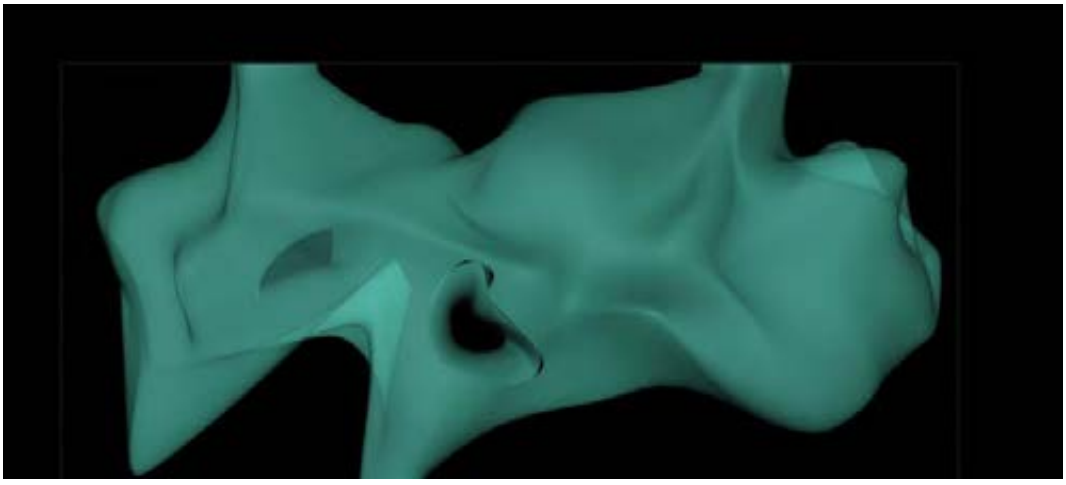


Fig.64

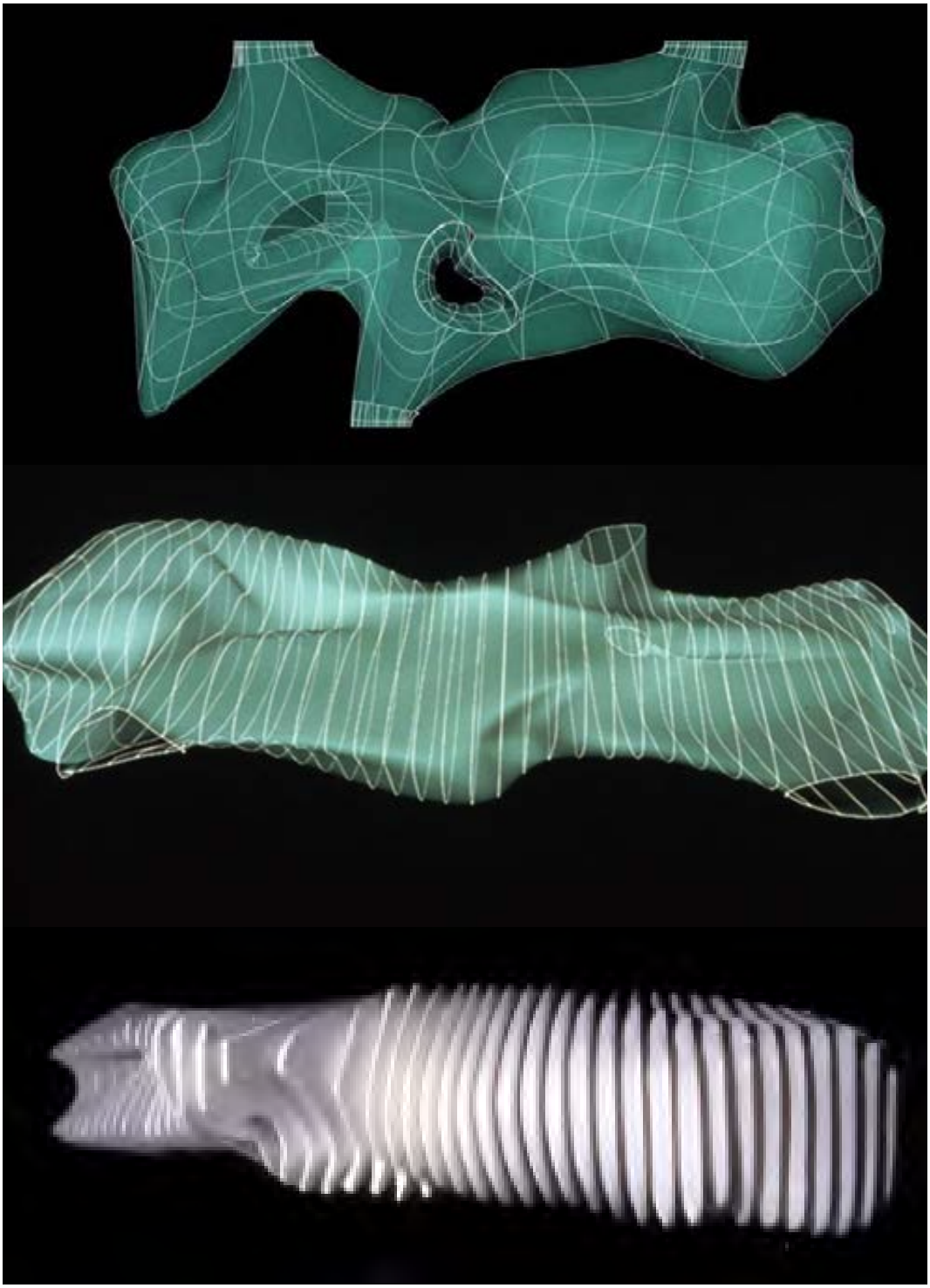


Fig.65

Fig.66

La prima idea è stata di farlo con una tela, rivestire l'acciaio con una tela.
Ci siamo molto sporcati le mani e abbiamo costruito tutto, volumi, strutture interne, esterne...
Poi abbiamo incominciato a fare un modello, quando l'abbiamo dovuto adattare alla legge sismica, già con il progetto approvato, non ce la siamo sentita di rischiare troppo, oltre il consentito, e abbiamo modificato la struttura in termini sismici.
Ma non riuscivamo a capire la dimensione, la scala e abbiamo fatto un modello lungo 7 metri, in legno, per aiutare a costruire l'edificio.(figg. 67-70)

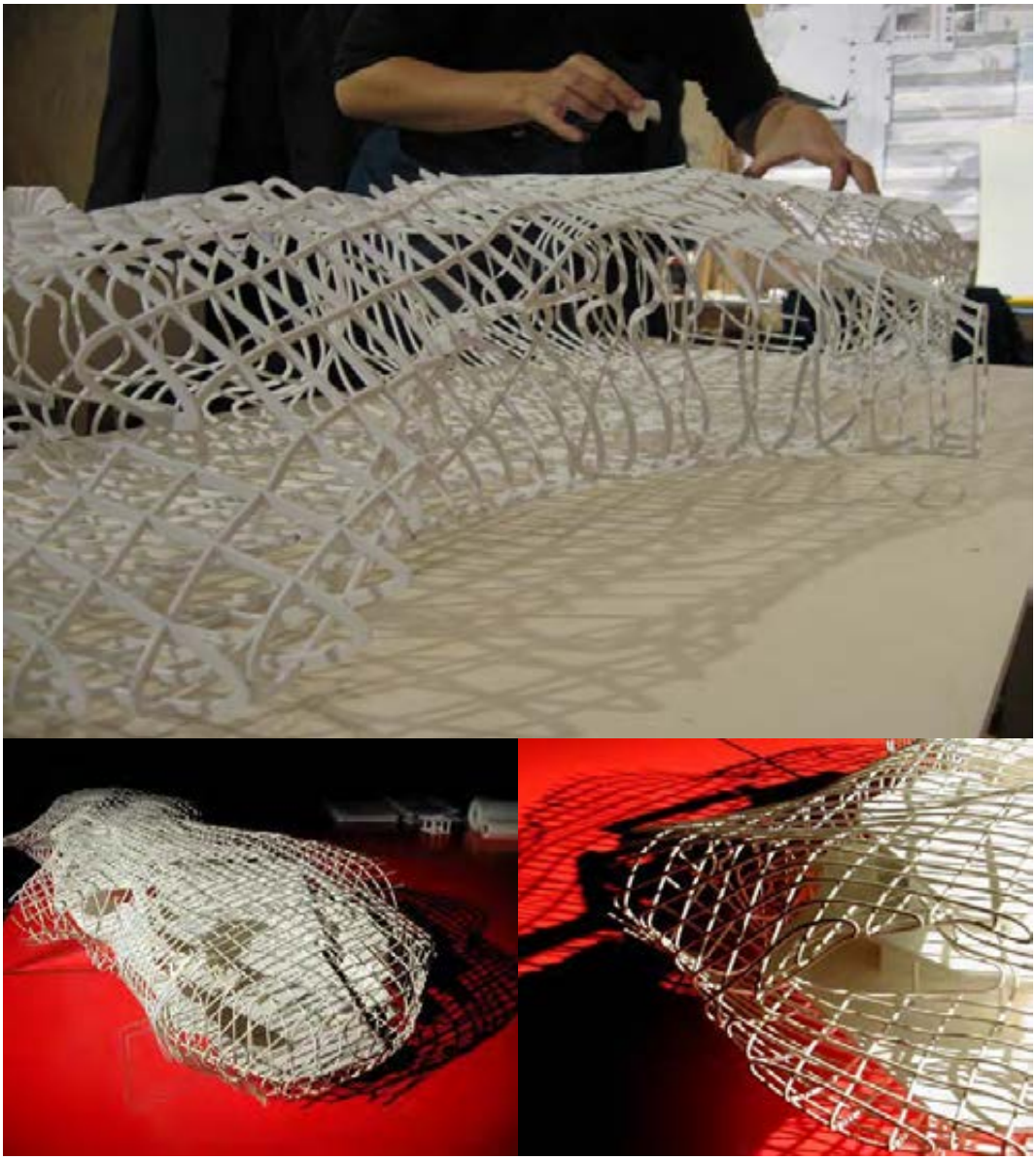


Fig.67

Fig.68

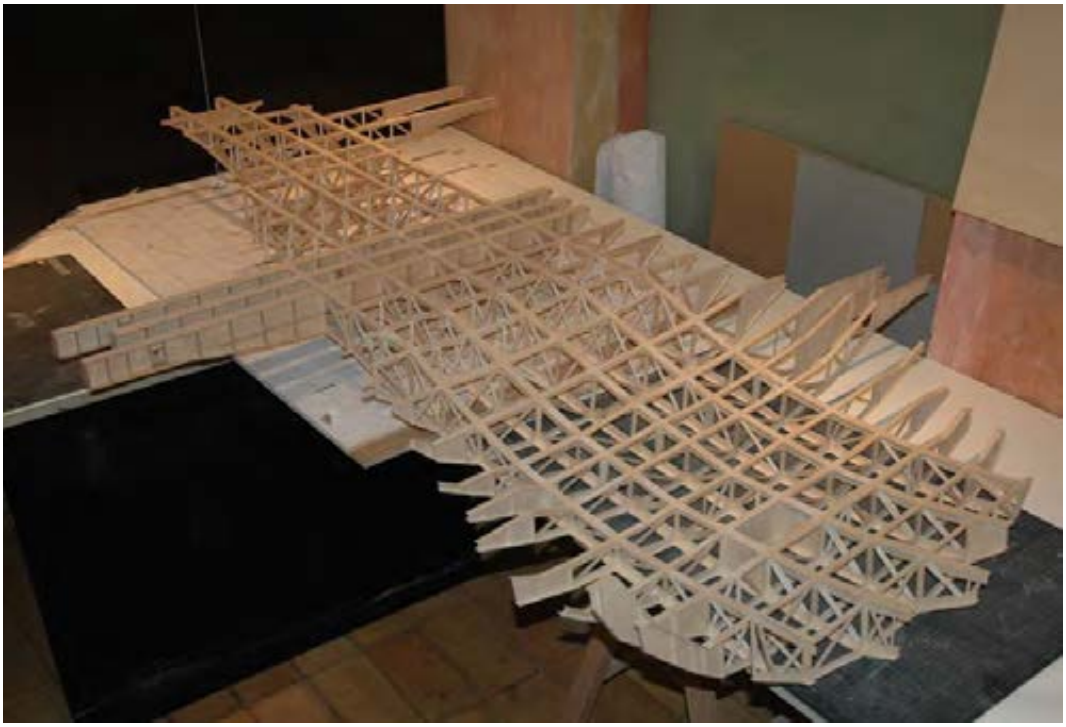


Fig. 69

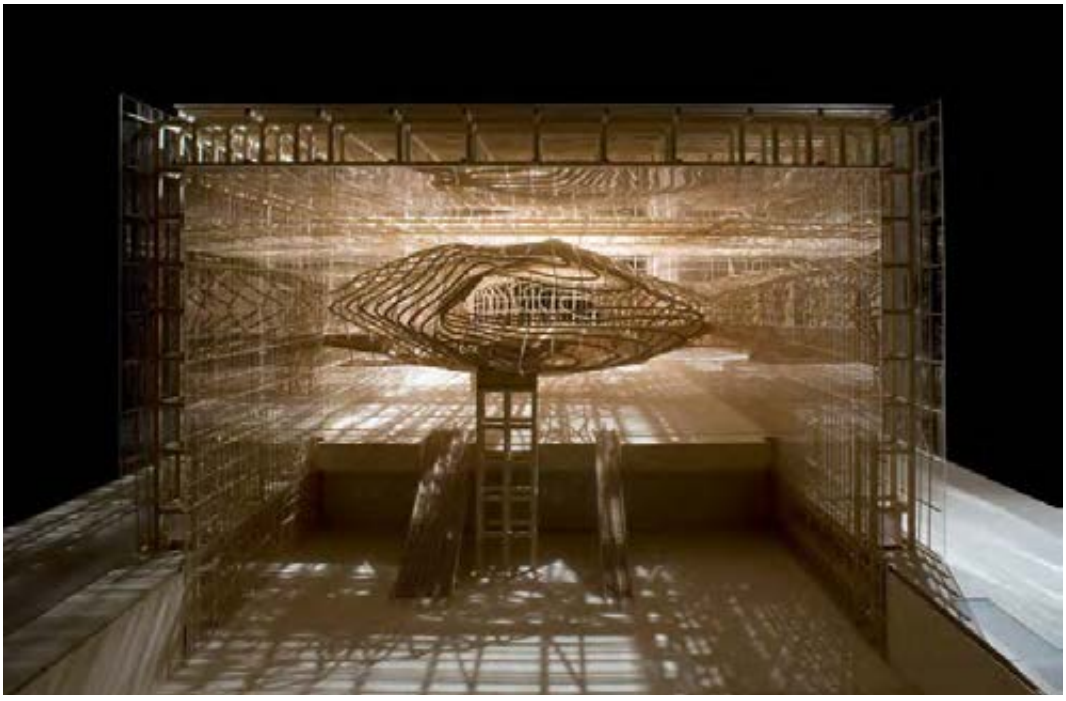


Fig.70

Fig.71

Questo ci ha fatto essere tutti convinti di cose che non avevamo capito quando avevamo fatto la Fiera di Milano.
Quando si costruiscono km di edifici non si capisce quasi mai se le proporzioni sono giuste o no, devi aspettare la fine, e alla fine dici. “Sembra venuta bene”. Fai un grande sospiro e dici: “E’ venuta bene”.
Qui non volevamo correre alcun rischio del genere; perciò il modello in legno…Questo era il modello finale, complesso. (fig.71) Poi ci sono tutti i disegni. Queste sono una serie di sezioni, ne abbiamo fatte circa 1800. Queste sono un po’ di sezioni, per capire l’andamento, per controllarlo. (figg. 72-75) E poi lo abbiamo costruito. (fig.76-79)

Fig.72

Fig. 73

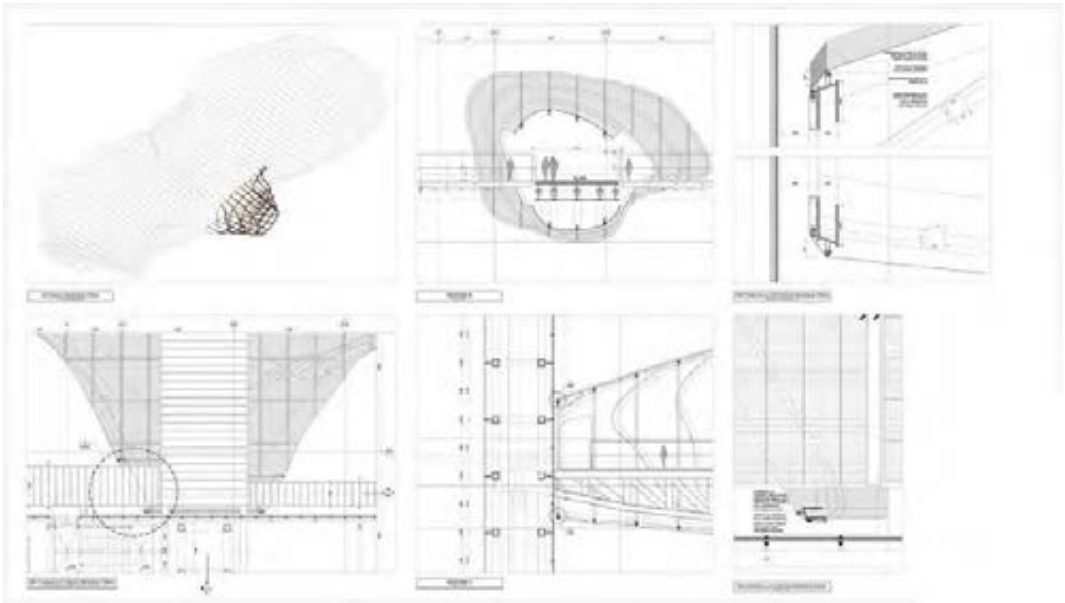


Fig.74

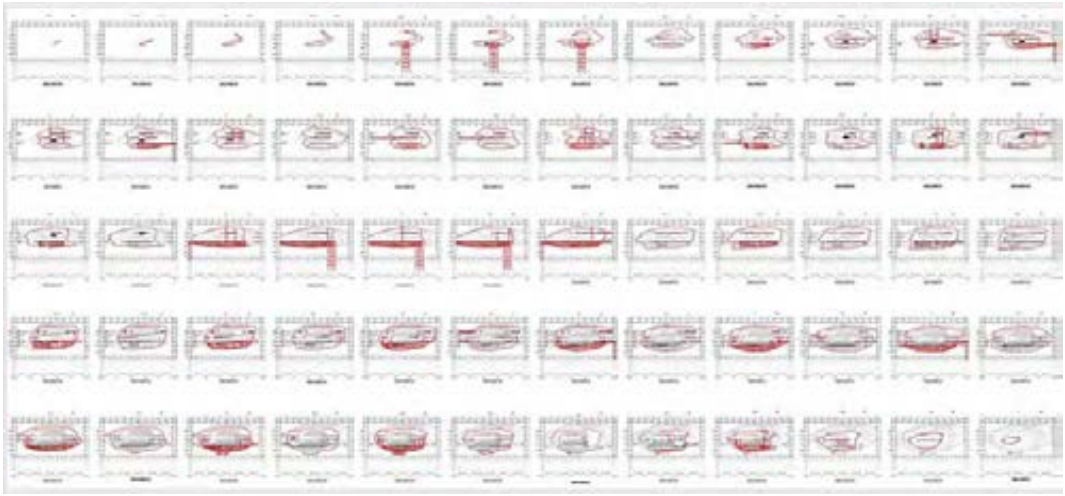


Fig.75

Abbiamo dopo costruito la lama, un elemento di regolarità, che è un grande albergo di 440 stanze. (figg. 80,81). Si è cominciato a costruire uno spazio, urbano. Perché è stato costruito in questa direzione? Perché il piano di Piacentini vedeva l'orientamento rispetto alla Cristoforo Colombo.

Fig76

Fig 77

Fig.78

Fig 79

Fig.80

Fig.81

Andiamo avanti....
Adesso stiamo dentro, e dentro ci sono 50 metri di altezza....
Adesso stiamo sotto la cosiddetta “Nuvola”.....(figg.82-84)

Fig.82

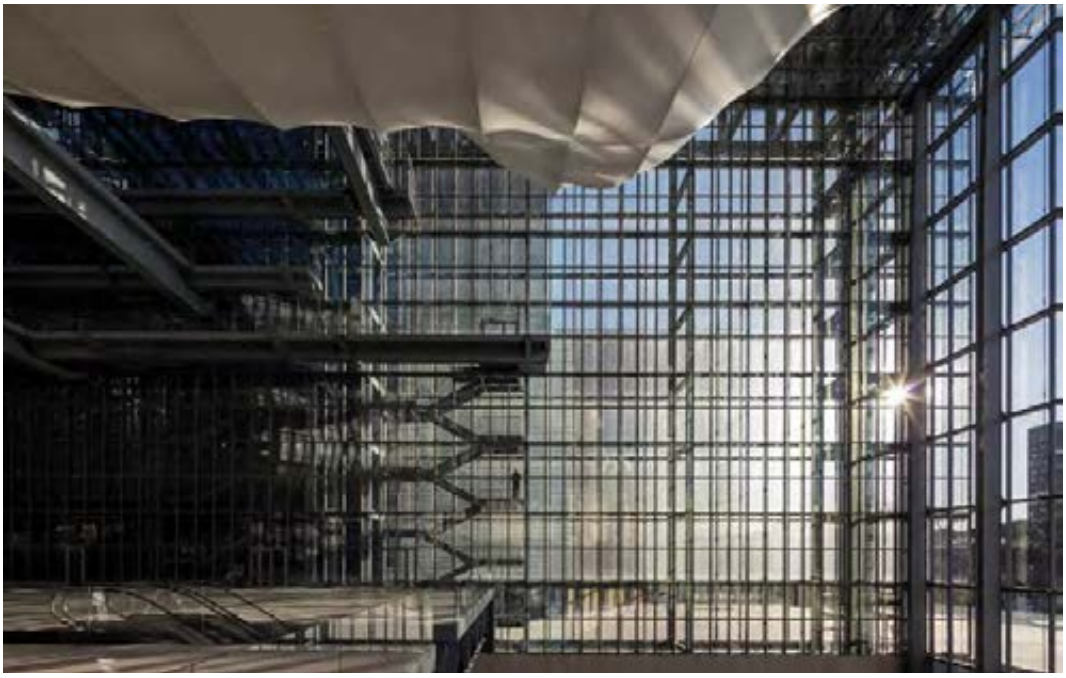


Fig.83

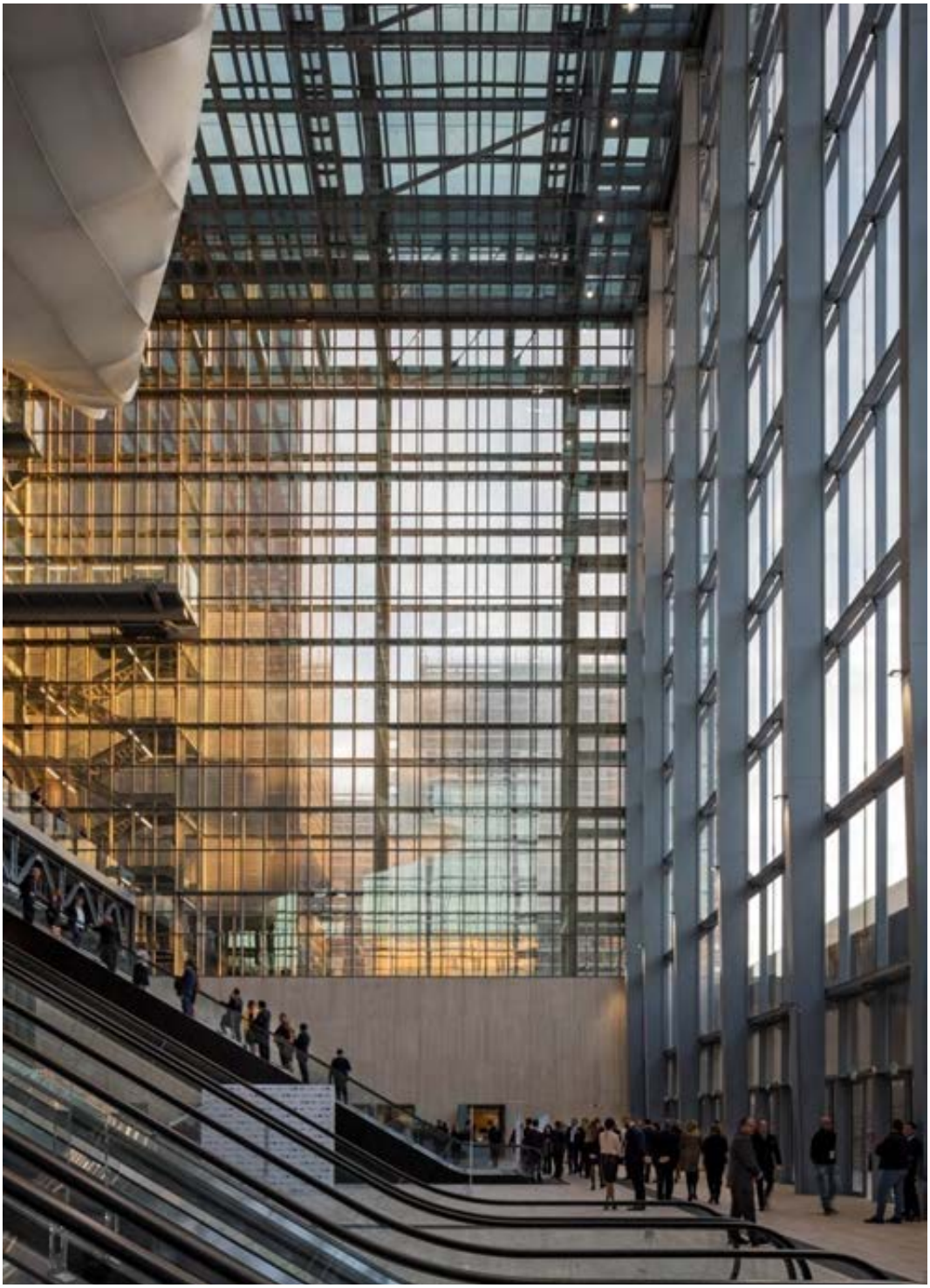


Fig.84

Fig.85

Quello che è più importante è l'interstizio tra la Nuvola e la teca, che dà un altro disegno, un'altra proporzione. Da qui si capiscono i collegamenti che ci sono. Questa (la nuvola) si regge solo su un piede e su un sostegno all'inizio. Uno dei piedi si vede anche. Siamo dentro, siamo nella nuvola, nella nuvola ci si sta. Siamo all'interno: quel punto lì dove ci sono quei signori in piedi è l'unico punto di appoggio per una grossa sala di 1800 posti su due piani.
(figg. 85-92)

Fig.86

Fig.87

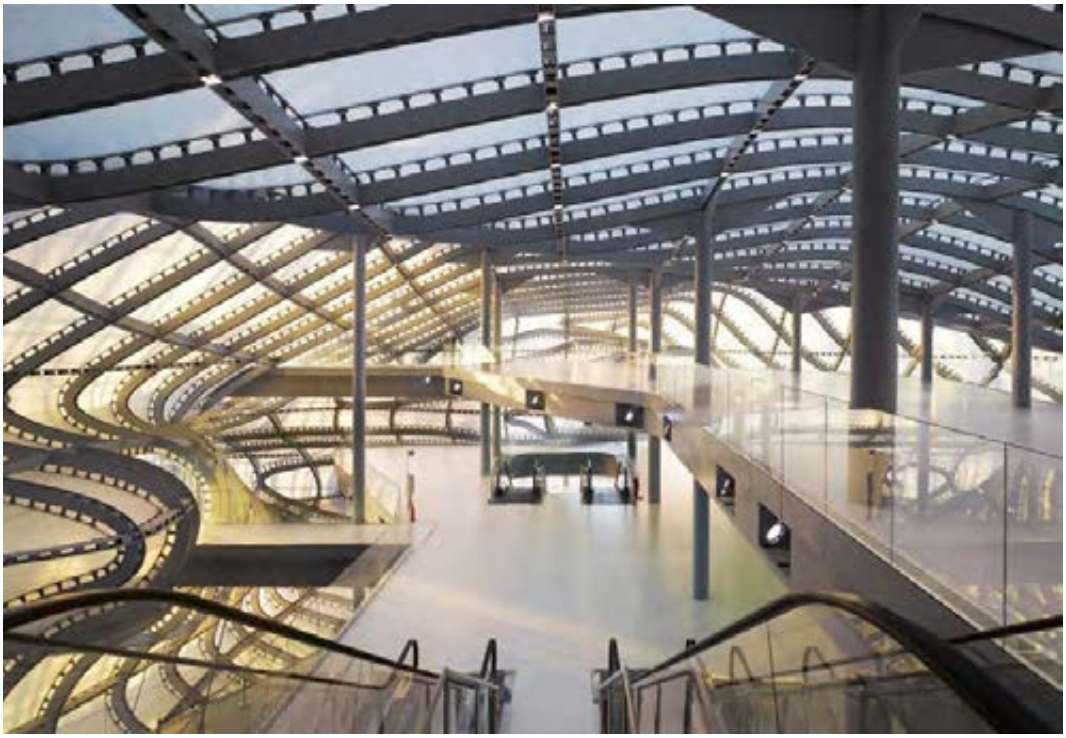


Fig 88

Questa sala sta nella nuvola e dentro questa sala il peso grava solo su quel punto, e quel punto, dal punto di vista sismico, è veramente un pezzo interessantissimo.

Fig.89

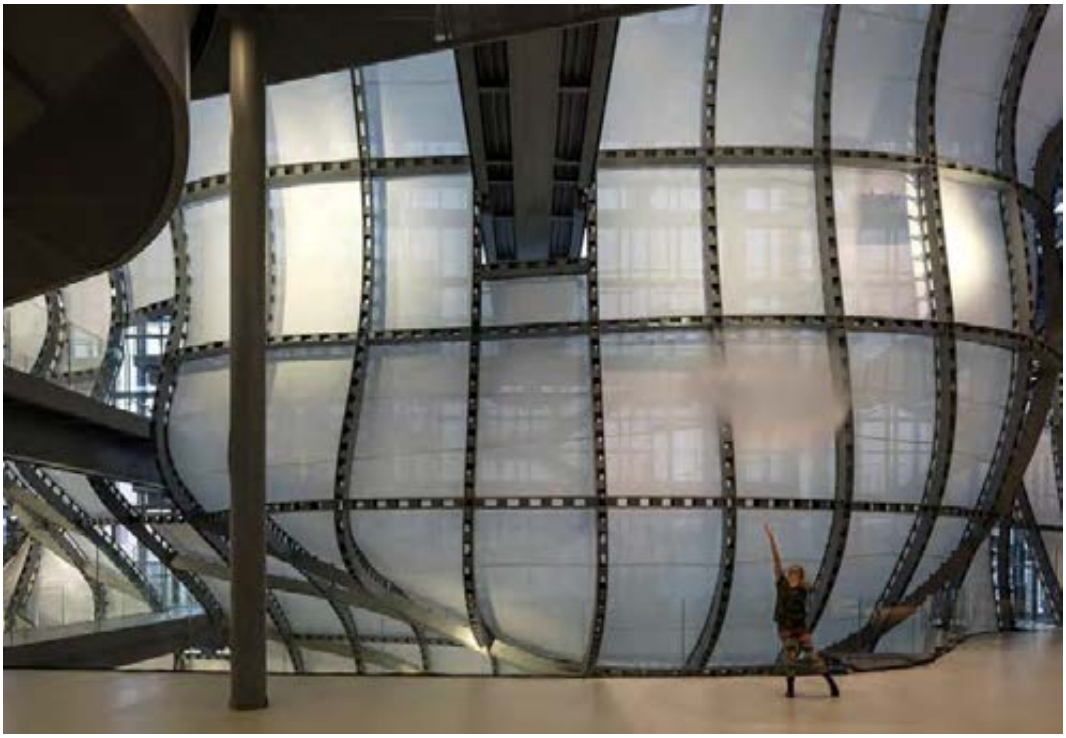


Fig.90

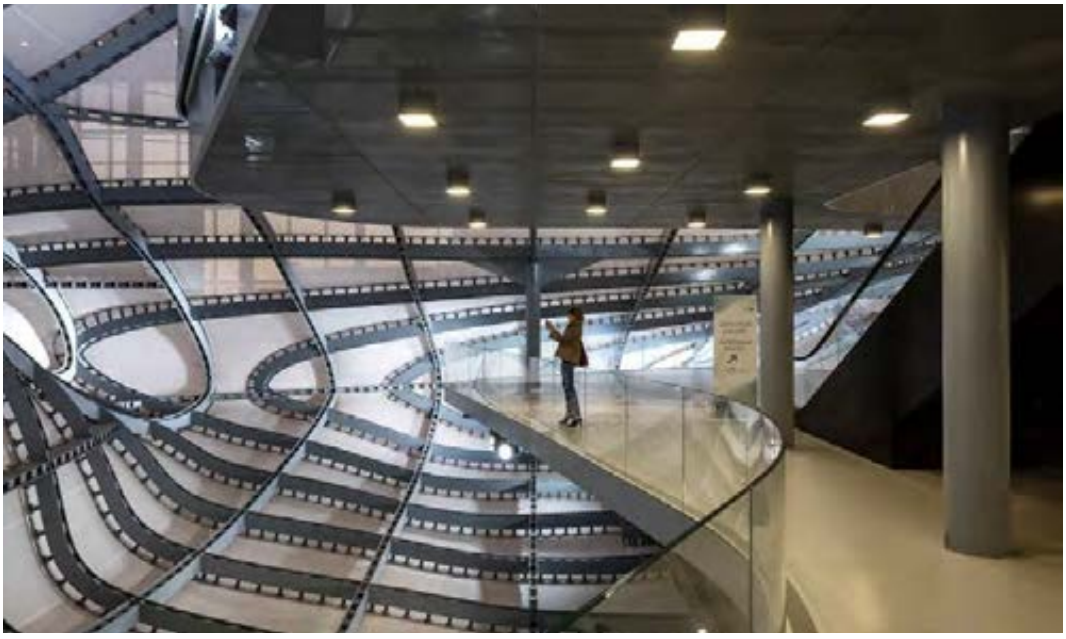


Fig.91

Fig.92

Poi di sera succede qualcosa di diverso, la nuvola si riflette sulle pareti, si vede che si entra da sotto. (figg. 93-97)

Fig. 93

Fig.94

Fig.95

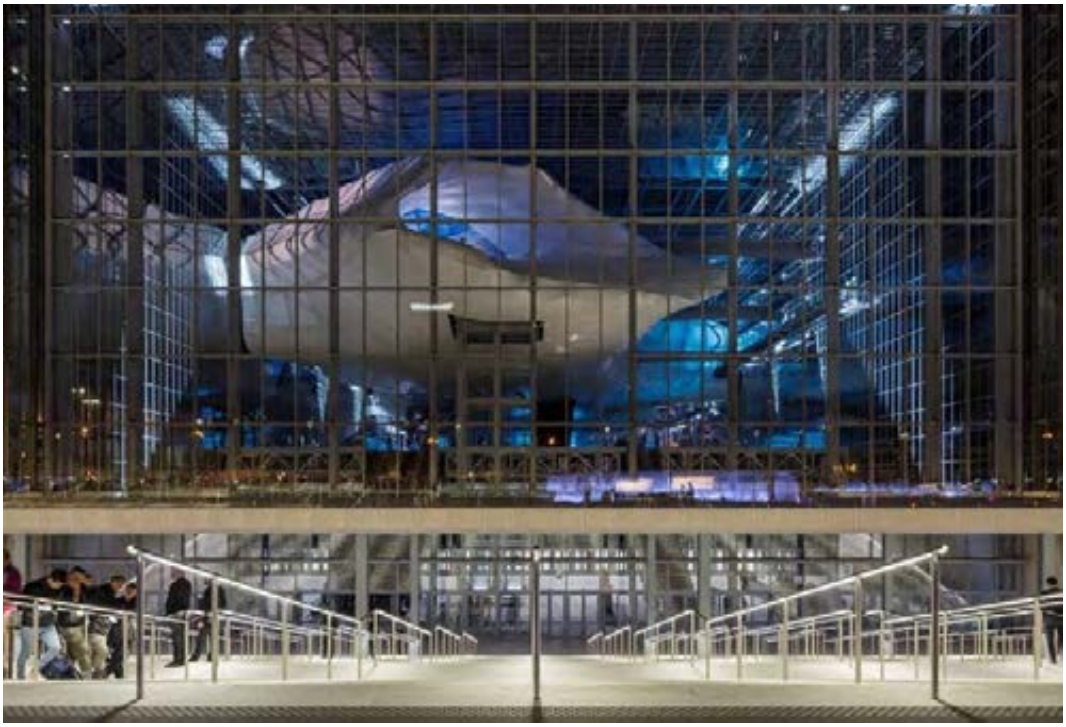


Fig.96

Fig.97

Adesso vi faccio vedere l'ultimo progetto. Anche se per me è faticoso, perché vorrei vedere progetti nuovi. Questo si chiama "honey-comb", (fig.98) nido d'ape, una definizione che abbiamo scoperto dopo. Prima abbiamo scoperto l'origine di questo progetto. Noi avevamo vinto un concorso per fare un aeroporto a Shenzhen, di cui non sapevo nulla. Poi ho scoperto che era un piccolo villaggio, sul mare, in Cina, non lontano da Hong Kong, di 20.000 abitanti inizialmente, poi ha raggiunto i 20 milioni di abitanti. Questo piccolo villaggio, diventato molto grande, aveva richiamato un po' di architetti, più o meno conosciuti, che avevano già fatto aeroporti. Io non avevo mai fatto un aeroporto in vita mia. Il caso vuole che vinciamo questo concorso, e lo vinciamo contro molti distinguished colleagues che voi potete immaginare.

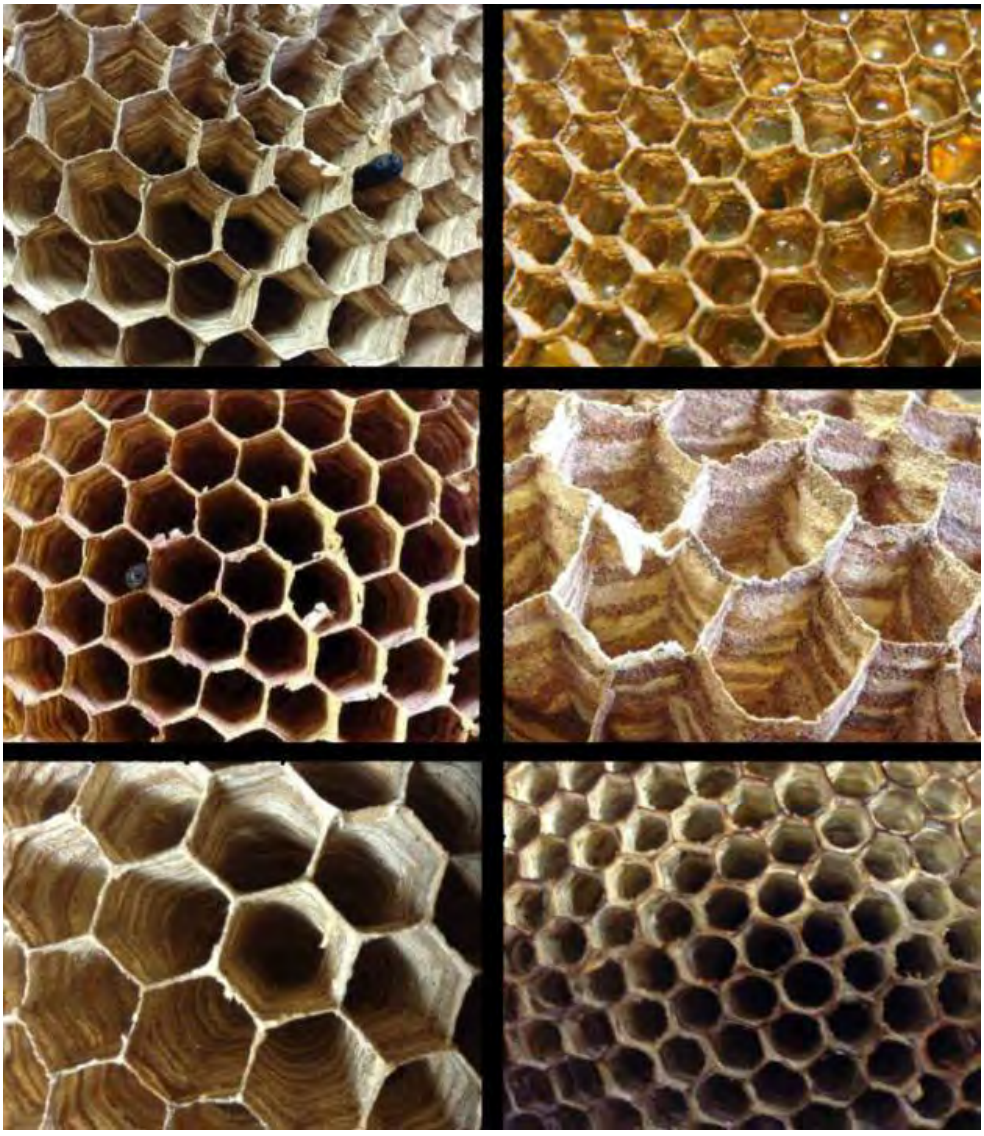


Fig.98

Come nasce questo progetto? Il progetto nasce così: stavamo facendo un altro progetto per Las Vegas e avevamo un cliente e sua moglie che ci avevano invitato a Las Vegas e ci avevano dato un regalo. Doriana e io ci concentrammo sulla visione dell'involucro del regalo, aprimmo il regalo subito, prendemmo la carta, e la carta era straordinaria, era un honeycomb modificabile; erano esagoni, figura importantissima... Di questo pezzo di carta.scoprimmo chi lo fabbricava e ci facemmo mandare la carta...(fig.99)

Doriana e io lavoriamo insieme da 38 anni, siamo sposati e lavoriamo insieme. In ogni caso, lei ha preso questo pezzo di carta e non lo lasciava mai per nessun motivo al mondo...

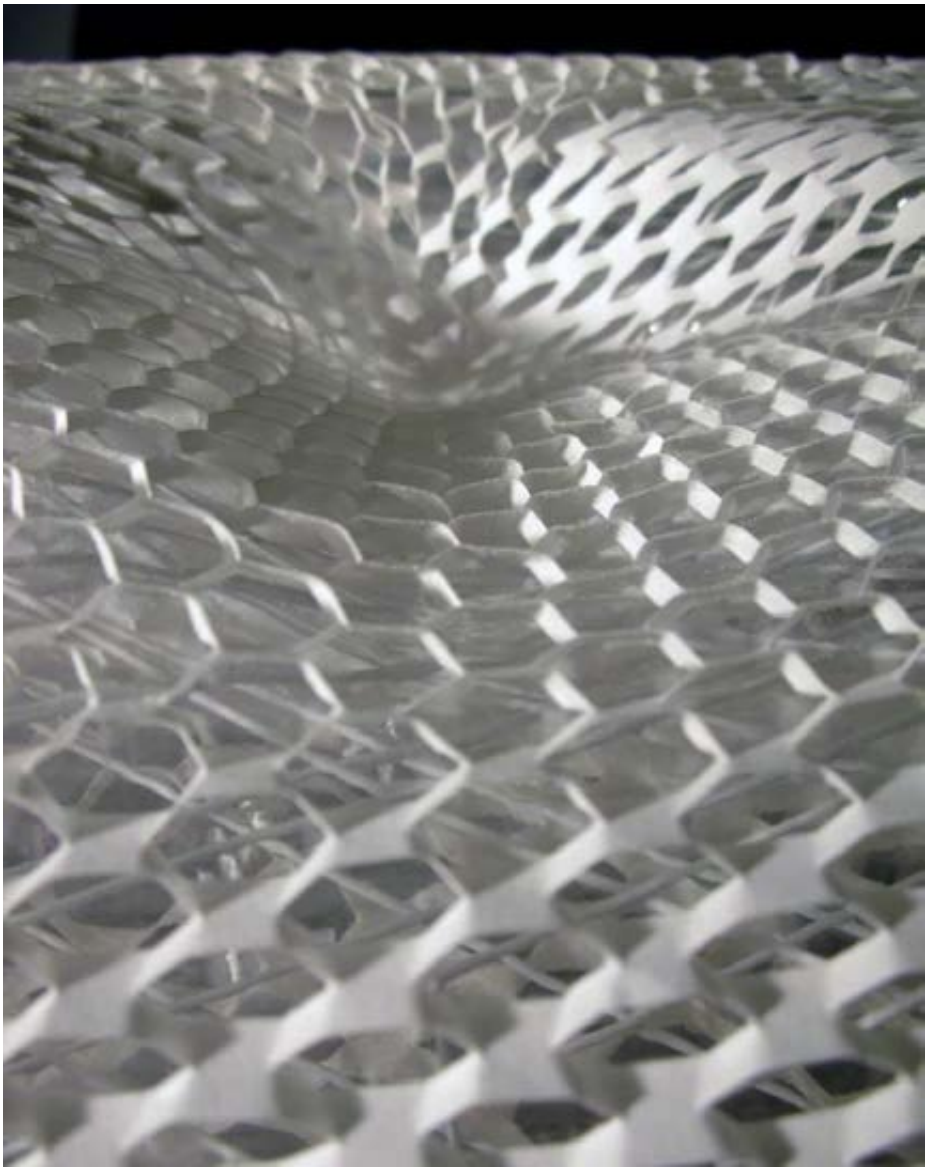


Fig.99

Questo è stato il primo modello (fig. 100). Questi i primi disegni a mano (fig.101).
Questa è una visione del modello con quella carta, e poi ci sono altri modelli più avanzati, un impianto strutturale.
Noi volevamo realizzare questo. Lo abbiamo fatto vedere ai nostri futuri clienti cinesi, finché alla fine rimaniamo in tre al concorso e vinciamo noi.

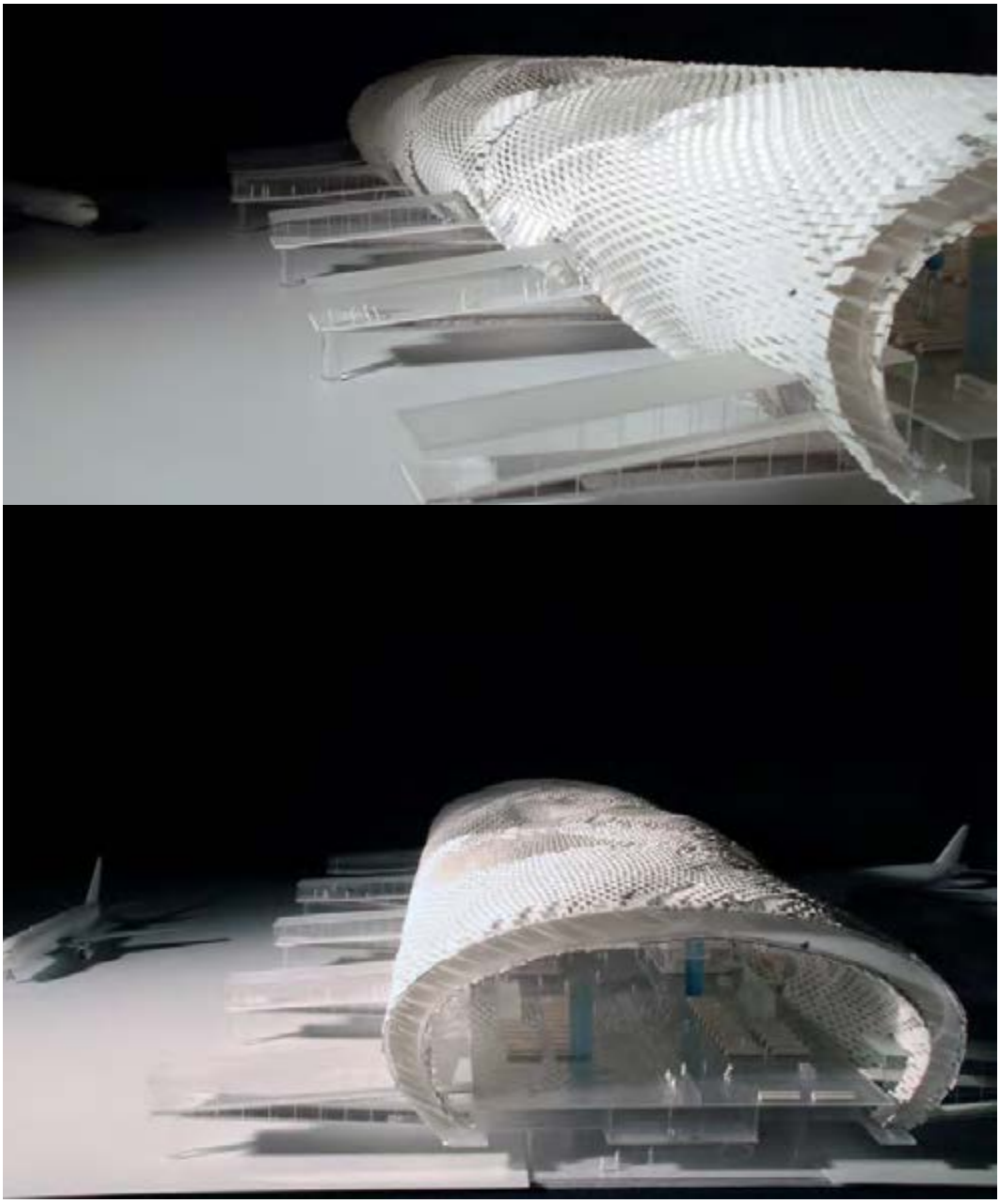


Fig.100

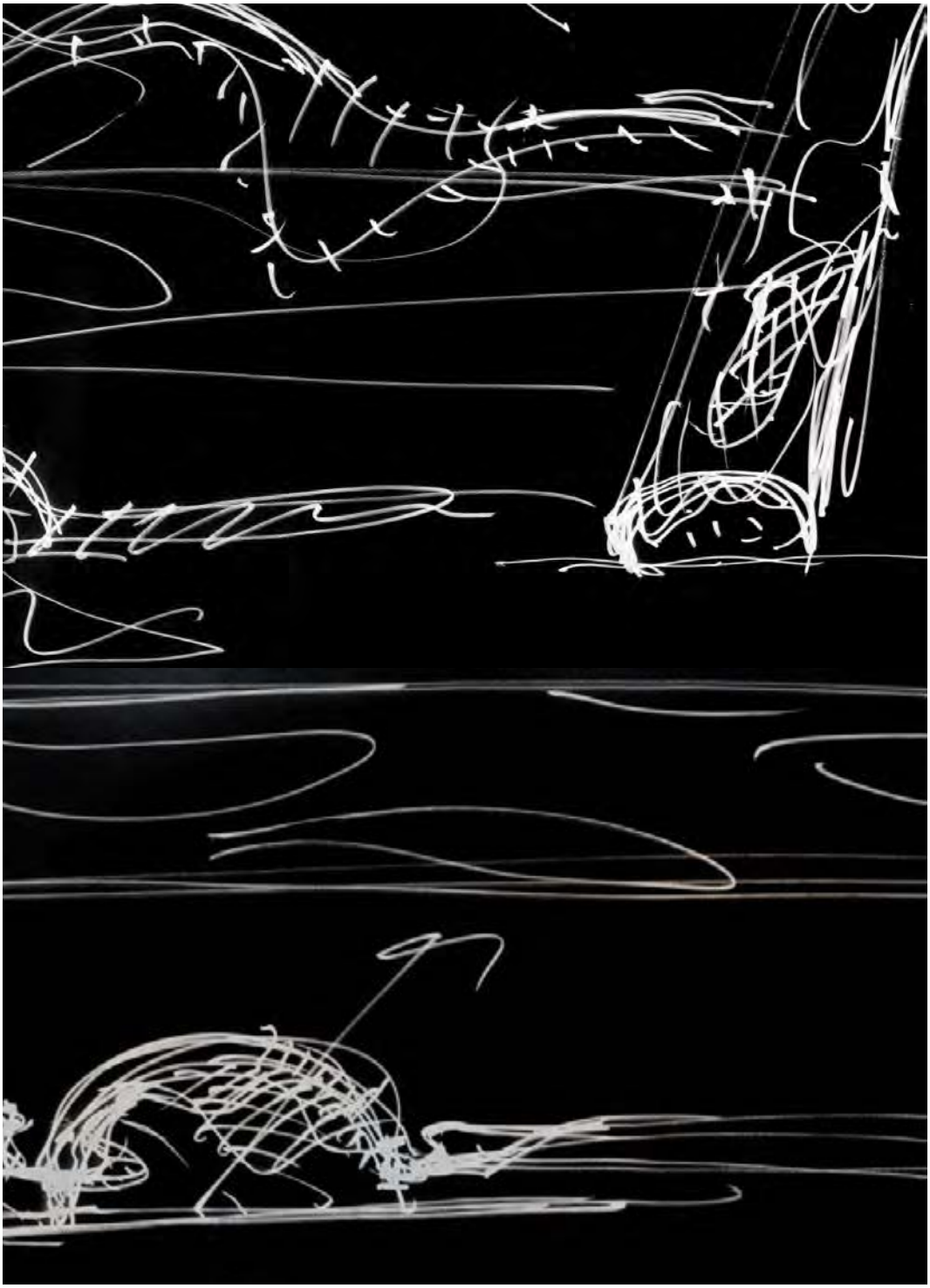


Fig.101

Facciamo una grande cena a Londra con le autorità cinesi e iniziamo a costruire questo aeroporto.
Vi faccio vedere molti disegni e modelli (figg. 102-115).
Qui ci sono tutti i problemi strutturali e i punti critici di tensione (della struttura).
Qui si vedono le prime parti del progetto, i primi dettagli, i primi disegni.

Fig. 102

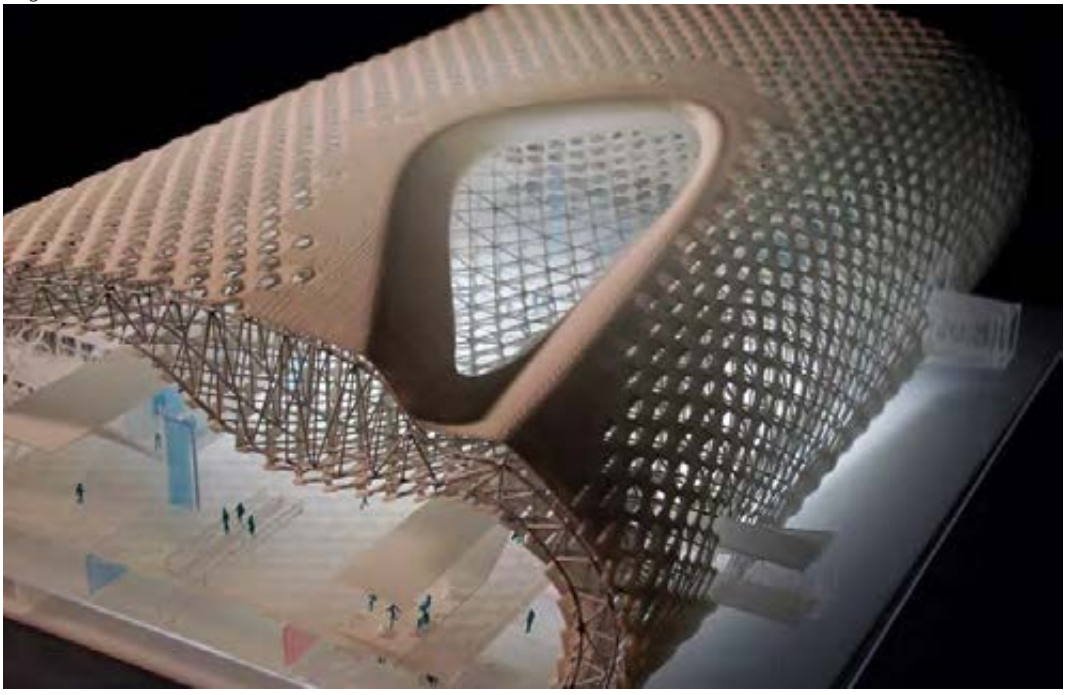


Fig. 103

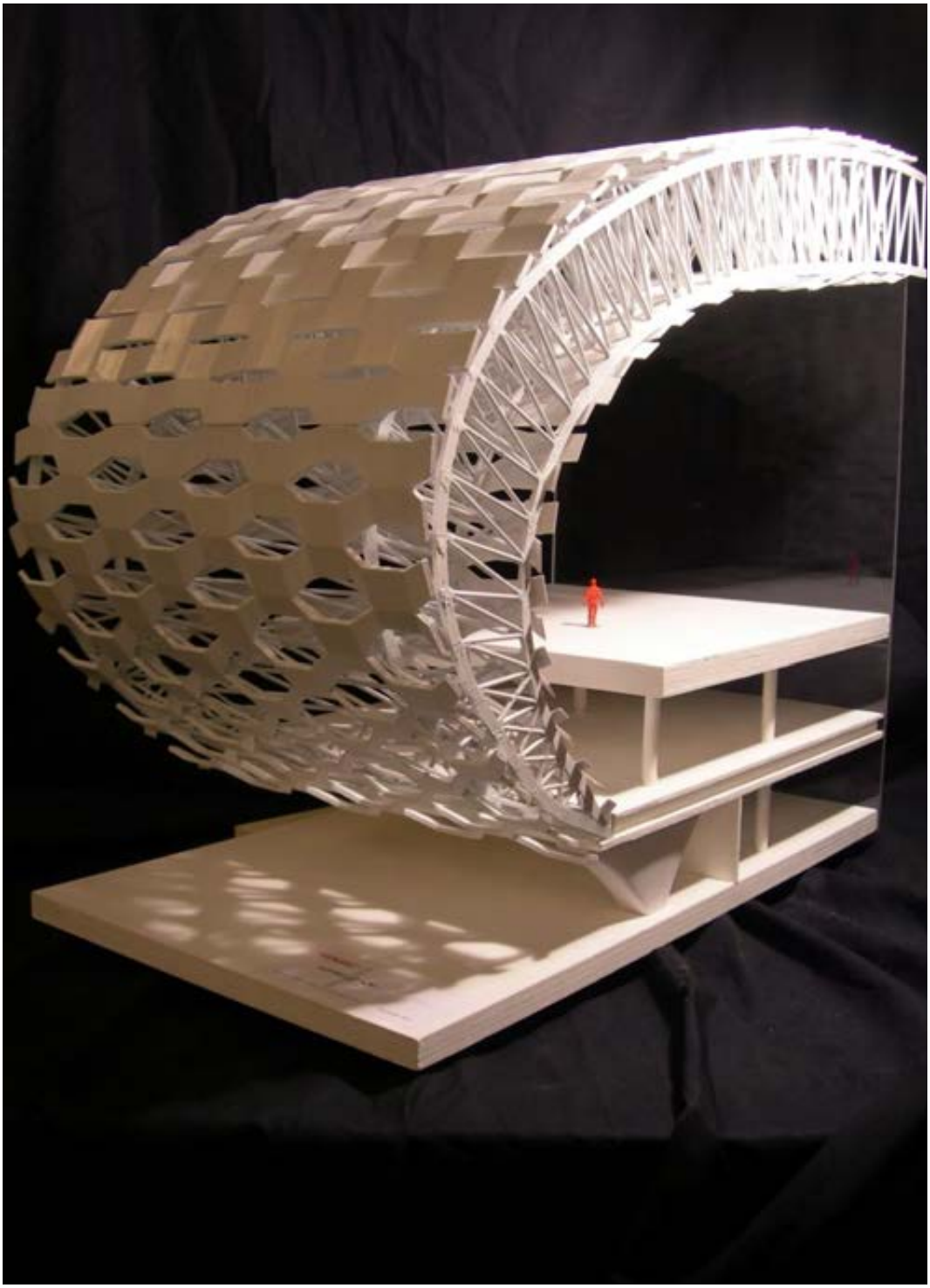


Fig. 104

Fig. 105

Fig. 106

Fig. 107

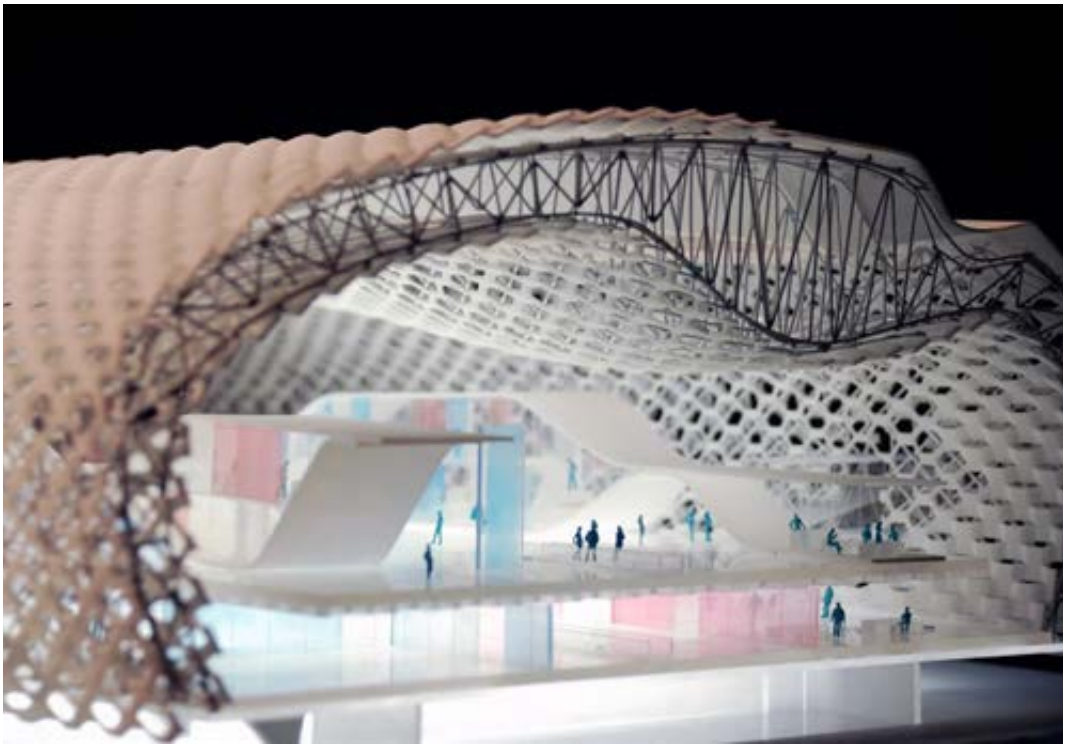


Fig. 108

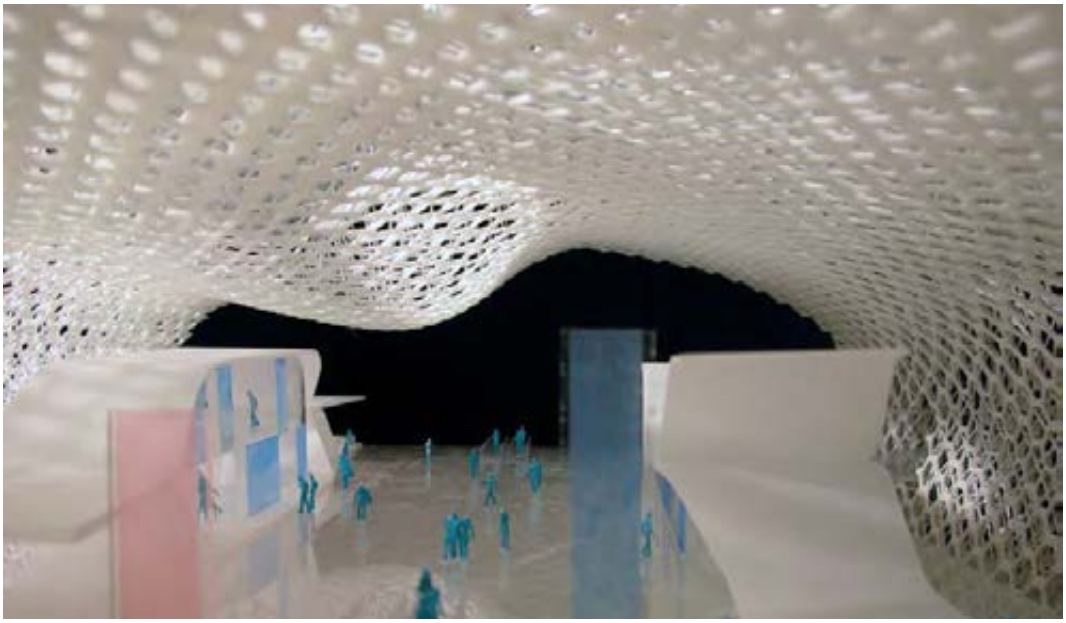


Fig. 109

Fig. 110

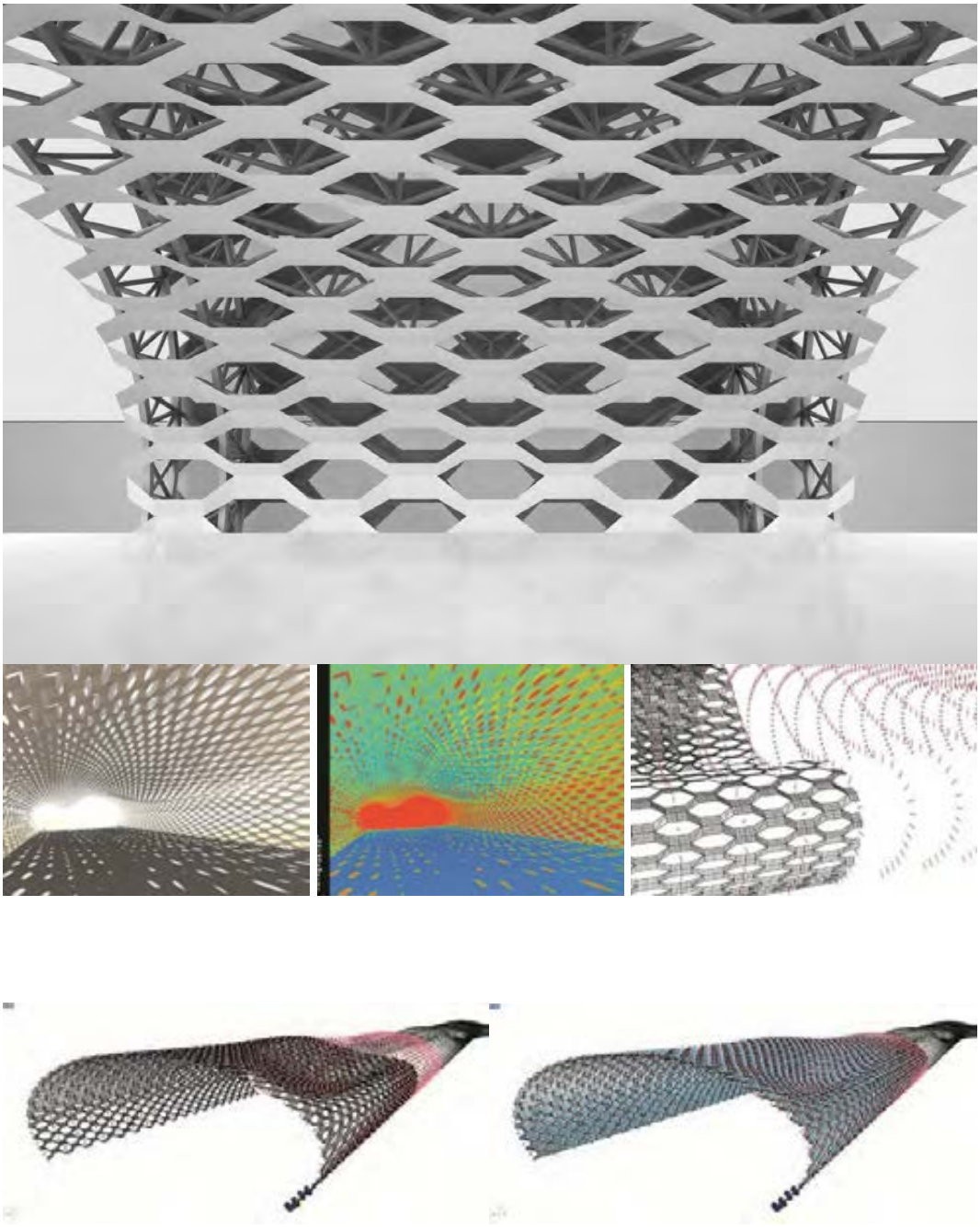


Fig. 111

Fig. 112

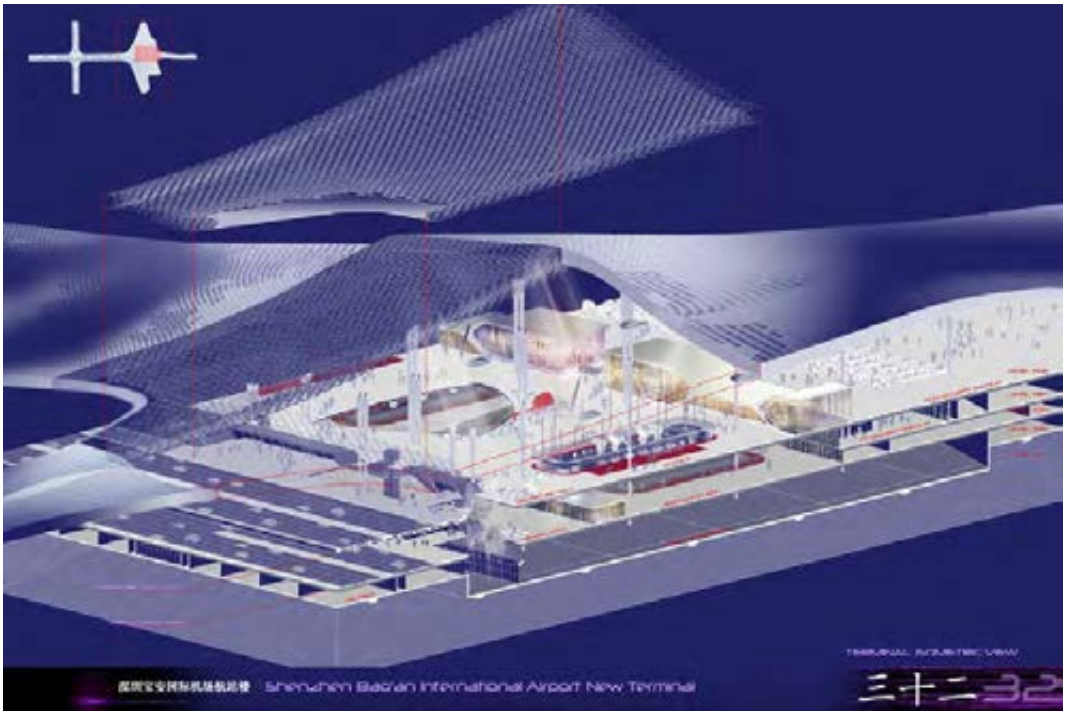


Fig.113

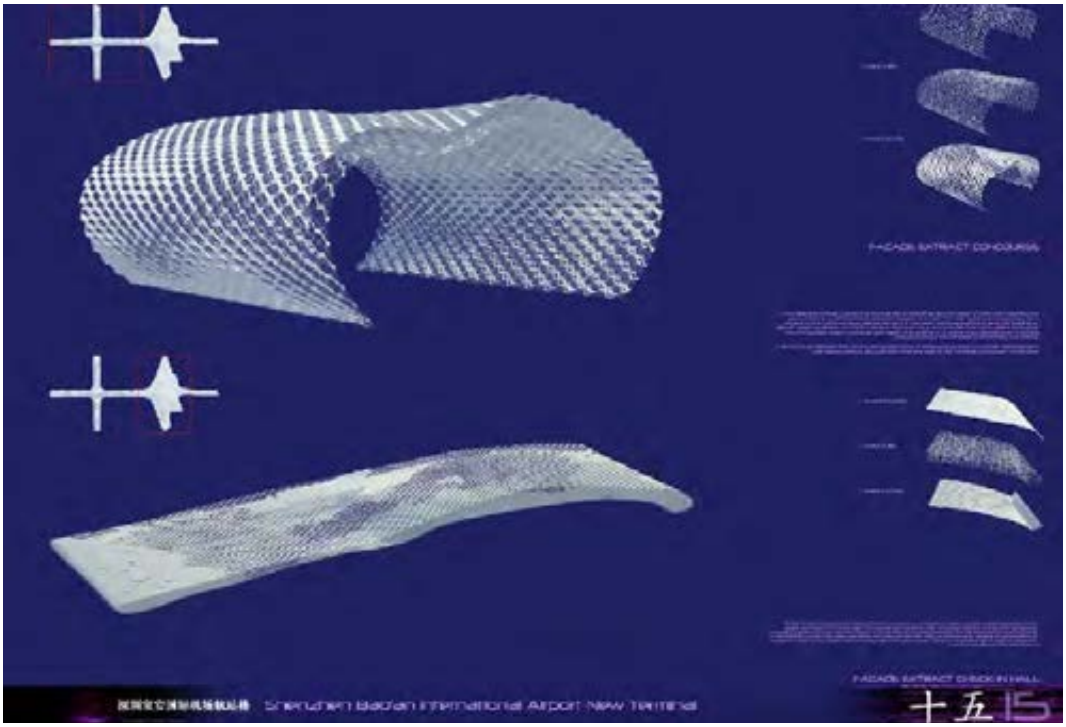


Fig. 114

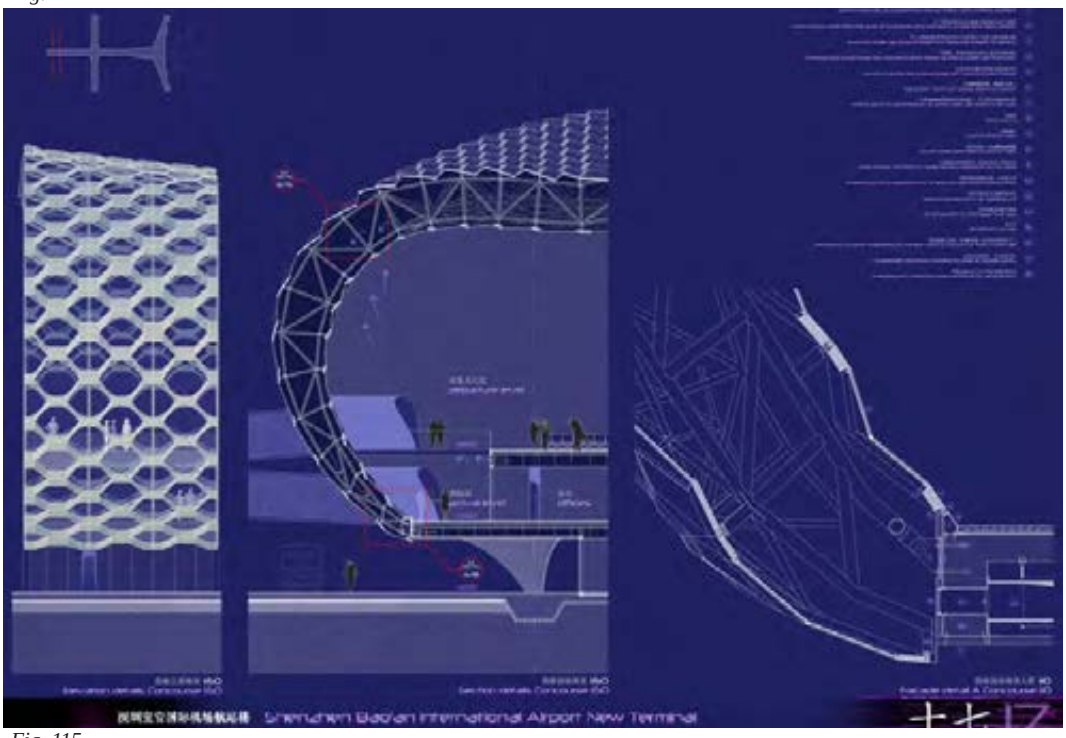


Fig. 115

Questo è il progetto. Hanno iniziato a costruirlo. L'hanno completato in tre anni.
(Figg.116,117)

Fig.116

Fig.117

Questa è la parte che la gente adora: la luce naturale. Non c'è bisogno di luce artificiale.
Ed ecco è quel famoso honeycomb. (fig.118)

Fig.118

Ci sono quegli strani alberi che ad un certo punto a me viene da dire: “Perché dobbiamo fare l’aria condizionata qui? C’è una volta alta 43 metri, è così fresco, è già protetta”. (Mi rispondono): “No, no bisogna farla, anche se non la usiamo.”
Bisognava fare un’uscita per l’aria e abbiamo inventato questa specie di albero.
Qui si capisce abbastanza bene quello che volevamo fare. Grosso modo tutto è uguale al progetto. Tutto quello che pensiamo poi lo realizziamo: si legge la luce, le sorgenti luminose come sono... (fig.119-133)

Fig.119

Fig.120

Fig.121

Fig.122

Fig.123

Fig.124

Fig.125

Fig.126

Fig127

Fig.128

Fig. 129

Fig.130

Fig.131

Fig.132

Quella famosa carta è diventata improvvisamente concreta, è diventata concreta.

Fig.133

Questo è lo spazio del Terminale alla fine di tutto. E' come una grande razza, un pesce che ha una metamorfosi, diventa uccello, poi vola e diventa aereo.
La volta è come un passaggio, una specie di Sahara ricostruito, con queste grandi prese di luce, dove non ci è mai entrata l'acqua, zona di tifoni...
Fine
Grazie molte arrivederci.

Genova, 8 maggio 2018
Aula San Salvatore
Massimiliano Fuksas

Love will save the world n.4

Massimiliano Fuksas

Lecture May, 8 _ Aula San Salvatore

Department Architecture and Design DAD

Aula San Salvatore, Dipartimento Architettura e Design, Scuola Politecnica di Genova

Thank you all. It's thanks to you that I'm here today. What they said is true – if there had been some unforeseeable commitment, I probably wouldn't be here today, but when students, young people call me, I answer immediately.
The only thing I can tell you with certainty is that it's not true that working as an architect is impossible, that it's frustrating, that it's better not to try it or that one has to be rich (though it certainly can't hurt). Don't believe them when they tell you, you'll never build anything – they always say it, they said it for years, they told me that, and they'll definitely say that to you too. It's also not true that there are too many architects out there – actually we need many more, because architects are those who deal with the world, the universe, our universe. They have a better understanding of what should be done and how to help. And this is an important word.
I don't remember if I gave a title to this lecture, but it could be "Love will save art". Love will save the world and creation will save art. As the world belongs to dreamers, those who dream and have dreamt in the past.

An old friend of mine, for whom I built the Peace Centre in Jaffa and that passed away three months ago at the age of 90, once told me: "We need to realise more dreams in the future, than the ones we already accomplished".
The dreams that we achieve are always less than those we wish or have to realise and you must bear this in mind.
Don't ever feel tired, satisfied or fully complete with what we know or do.
The day we feel satisfied, our life will be over. Therefore, the world belongs to dreamers and not to those who don't dream. All dreamers pay a price – and a very high one – but it does often lead to huge satisfaction.
I am going to tell you just a few things, nothing scientific, and I'll show you some images. I'm not even sure myself about what I'll tell you – just remember that your future dreams should always be more than those you have already achieved.

Video Admirant Entrance Building, GLOW Festival,2017.01.05

While renovating and recovering the city centre of Eindhoven, Holland, (fig.1) one day I came across some images and there I understood (and I could have never imagined it before, because the only thing I had done at the time was designing a building) that architecture also works as a support for art. At the time, I had only designed one building, actually a series of buildings, or better a square, a public space, and now I'm going to tell you the story of these spaces, like the Bolle Nardini.

Architecture can act as a support for art, it can be really modest, allowing artists to tell their own stories, and this is what happened in the urban environment where we built the blob, a series of columns in corten steel, which are like sculptures. They turned that space into a square, called 18 Septemberplein, the day of Eindhoven's liberation, after the city had been invaded and destroyed during the Second World War.

There we also completed another project, together with everything around it. The City Council asked us to build a parking space. We created a parking space for 3600 bicycles, there is not one single car, it's great – and as Holland is flat, in this parking lot there is also a tapis roulant to facilitate the access.
Architecture can be useful to others, not only ourselves.

Let's carry on.

I'll show you and tell you some projects.
Whoever knows what we do Doriana and I, knows that we always start from a drawing, or rather I always start from a painting, a drawing, I do not know how to call them.
I'm not so crazy to consider myself as an artist, but not so crazy as not to consider these important works for what we are going to do.
This is the first drawing (fig.2) that was used to build the Milan fair, which began in 2003, many years ago, and in twenty-six months we have completed it.
Italy can also be optimistic because to what you never build, there are projects that are realized quickly, even if you do not talk about it. We don't talk about things that go well, only about what goes wrong. This is a common bad habit of our country.
This picture, which I then gave my daughter (who is a film director), is the drawing, the idea, of the invention of nature that produces architecture, and it is exactly the opposite of what you hear.

This is the first 3D version (fig.3) - in 2003 we began using digital forms, even if they were definitely not as refined as today's ones. Anyway, these were the first digital drawings from which we then built the entire project.
The central axis of the Fair is 1.6 km long (figg.4,5) , it is completely made of glass, and near it we built the rest. Eventually we did finish this sculpture of 1.6 km, a mile; and near it, there is the other part of the fair and the central axis to connect the pavilions, to make the path more coherent.

We immediately asked to build a subway station. Infrastructure!
We wanted people to get there on foot, at the end of this long walk, but by a fast means of transportation, without having to look for a parking space.
The subway and the subway connection were the basic infrastructure.
The use of water, which you will find in almost all our projects, is not entirely innocent. Water participates in saving energy and gives you a big contribution; it cools the temperature in summer and warms it in winter.
This is the meaning behind the large basins of water at the Milan Trade Fair.

This was our dream - I wanted to see people appropriating these spaces: people sitting down, stretching out, and kissing. After that, there is the alternation between a stainless steel mirror and a dense orange colour on the other side. These two alternating things create an illusion, we see a reflection and for us reflection is always the most important part of reality. The reflection of an object is more real than the object producing it.

And there is always water, a system of reflections, of light inlets.
This is one of the entrances ... we all know the story, a skyline reminding the Alps and this kind of lace 60-metre-high lace with an interior space that also acts as a square.
Halfway through this very long space, there are the meeting areas.
At the end there is the sunset and then there is the area where people can meet, or make a different use of the space. This support is composed of two rotated ellipses that create a geometrically complicated structure. At the inauguration there was the (theatrical group) La Fura dels Baus, (fig.6) who did an extraordinary performance, using architecture as a support for the other arts. (figg. 7-21)

This is a stamp, made in my memory by the government of the time. It's my drawing and they did it in my honour ...(fig.22)

This concerns you more directly – it's a model: how do we work?
We use models, paintings, drawings and this is the project realised for Giorgio Armani in New York, on the Fifth Avenue. Giorgio Armani is a great friend of Doriana, and of mine, but more hers. He told us: "why don't you design my store on the Fifth Avenue?".
The result is a complex building, which we still like a lot today. We changed sections and floors, we wanted to create a big space, and then at a certain point we decided to put a sculpture in the centre. A sculpture that could act as a space: if we build a sculpture-staircase, people will no longer take the lift – no one believed us, but in the end it did happen.
This was the model.(fig.23)

The American team, who was supposed to do the work, told G. Armani: "Ok, you want to build it in three months, we can build it in three years; you want to spend 10, we think it'll cost 60". Armani called us and said, "We really like your project, but it costs too much and it takes too long..."

So here is when we rediscovered Italy and we remembered that we did a similar sculpture for Nardini (in Tbilisi), for Bolle Nardini, with a company of a small blacksmith in the province of Forlì or Vicenza. We called him, he came to Rome in our studio and we showed him the drawings. He did not bat an eyelid. The Americans were shocked, upset – he only said: "Give me ten minutes, I'll have a look ...". He leafed through the papers. We were all waiting for the verdict of this blacksmith, who said, "Yes, I can do it", and we: "How long though?", And he said: "In three months", and the cost? "Your estimate sounds sufficient to me". We told Armani. In the end he built the 'sculpture' in a workshop in Italy, then he cut it into pieces and sent it to New York by sea, where it was then reassembled.
This is the result. There is no support on the side walls, the structure rests solely on the base, one point of support only. (figg. 24-30)

It's to say that this is what Italy can be, it's not only what we see today, which everyone wants to talk about. There is also another extraordinary, positive Italy. You, many others like you, like us, like that blacksmith.
When you work on big projects, you end up wanting to do even smaller projects. Therefore, we decided to accept a small project.

A bishop asked us if we wanted to participate to a competition; I asked him: "for what?", and he replied: "To build a church". Designing a church has always been my dream, building a church ... But the bishop told me: "We have two and a half millions", and I asked: "Is this for fees?" The bishop explained: "No, it's to build it". I added: "I think it's not enough". Then on the Christmas night of 2003 I had an idea, the one I'm showing you. I made this drawing(fig.31): two volumes inside one another; both elements and light pass from one side to the other and can be seen from the street. Even the sky can be seen. So we started the project. This suspended volume. They say that one has to enter my buildings to understand them. I'm not from the Counter-Reformation that built facades to show the church was attractive. I am of the opinion that one should enter a space, any space, in order to understand it.

The Ferrari headquarters in Maranello is also a project where you can't go in, if you don't see it what happens inside, you don't understand it. Then there is the Via Crucis made by Domenico Palladino, which is very beautiful and then there is this set of volumes that moves to the other side, they are like cannons of light that hold the suspension. It's the light that keeps this large central volume as if it was suspended. And none of the four facades is the same (figg. 32-42).

These are the drawings (fig.43) before the construction of the National Archive of France. From 1789 to today, this one is the first building built for the Ministry of Culture and that the President wanted in the suburbs. If we begin to move important historical buildings in the suburbs to start again from a different point (as the church did, building large convents, churches from which villages were born, not just parts of a city, but a reason itself) things would work better.

This is a complex building. There is a completely reflective block, while the other part, where workers live, is completely full of light and it accompanies this volume until it touches the ground, because around it there are very small houses. (figg.44 - 51).
Another artist worked at this project. Sculpture can happen thanks to architecture. The artist, Anthony Gormling, created that element in the centre: they are extremely complex polyhedrons, extremely poetic and strong. This is the first time Gormling used this system of polyhedrons. We worked very well together because inside there was a water source. This great sculpture can be seen from all directions. (figg.52-55)
These are the interiors, it's the reading room, at the bottom of this mountain of documents, 380 km of bookshelves. Inside that volume, there is the auditorium. We designed the Frau armchairs. (figg.56-59)

This is the origin of the famous project that we started in 1989.
This is my drawing of 1989 for the competition for the Congress Centre in Rome. ..(fig.60)
An important building that took a long time, 18 years: 10 to wait for the construction to start and 8 to build it.

These are the first drawings (figg. 61-63).
We see the idea of making a building that was like a glass case, with a sort of beating heart inside it, a very strong breath trying to get out of the case, forced in and at the same time wanting freedom. Maybe that was what I felt at the time and maybe I still feel it now,
I don't know.

These were the first drawings. This is to say that you can draw, it doesn't hurt... do you sometimes draw?? Don't just stand in front of a screen! Do you ever print it? You have to print it and see if it's okay, then correct it by hand – you have to do it.
After this phase (sketch, drawing), an almost didactic work takes over, because after the 3D version, the first idea is the one we built. Then we broke it up into sections, because the chaos theory at that time was causing some difficulty, the quantum and chaos theory are at the base of the project, and later fractals too.
So it was made by sections, models for sections, many dozens of sculpture-looking models. (figg. 64-66)

The first idea was to use a canvas, to cover the steel with a canvas.
We got our hands very dirty and we built everything, volumes, internal structures, external ...
Then we started to build a model, when we had to adapt it to the seismic regulations – with the project being already approved we didn't feel like risking it too much beyond what was allowed, so we changed the structure in seismic terms.
However, we could not understand its size, its scale, so we did a 7-metre-long wooden model to help build the building. (figg. 67-70)

This convinced us of things that we didn't understand when we built the Milan Trade Fair.
When you build miles of buildings you hardly ever understand if the proportions are right or not, you have to wait until the end, and then say, "It looks good". You breathe a sigh of relief and say, "It's good".
We didn't want to take any risks here; hence the wooden model ...
This was the final, complex model. (fig.71)
Then there are all the drawings.
These are a series of sections, we made about 1800 sections. These are some of the sections, to understand the trend, to control it. (figg. 72-75)
And then we built it. (fig.76-79)

We then built the Lama, an element of regularity, which is a large hotel with 440 rooms. (figg. 80,81) We began to build an urban space. Why was it built in this direction? Because Piacentini's plan saw the orientation with respect to Christopher Columbus street.
Let's carry on....
Now we are inside, and inside it's 50 metres high ....
Now we are under the so-called "Cloud" ..... (figg.82-84)

The most important thing is the gap between the Cloud and the glass case, which offers another design, another proportion. From here we understand the connections. This (the Cloud) stands only on one foot and on one support at the beginning.
You can see one of the feet. We are inside, we are in the cloud, the cloud is a space you're meant to be inside.
We are inside: that point where there are those men standing is the only point of support for this large room of 1800 seats on two floors. (figg. 85-92)

The room is in the cloud and its weight is held only by that point, and that point, from the seismic point of view, is a really interesting piece.
Then in the evening something different happens, the cloud is reflected on the walls, you can see that you enter from below. (figg. 93-97)

Now I'll show you the latest project. It's difficult for me, because I would like to see new projects. This is called honeycomb, (fig.98), a definition that we thought of only afterwards. We first discovered the origin of this project. We won a competition to build an airport in Shenzhen, which I knew nothing of. Then I discovered that it was a small village, on the sea, in China, not far from Hong Kong, with initially 20,000 inhabitants, that then grew to 20 million inhabitants. This small village, which became very large, attracted a few (more or less) well-known architects who had already built airports. I had never built an airport in my life. Destiny wanted us to win this contest, and we won against many distinguished colleagues, the names of whom you probably know.

How was this project born? The project was born like this: we were working on another project in Las Vegas. A client and his wife invited us to Las Vegas and gave us a present. Doriana and I focused on the wrapping paper. We opened the gift, but immediately took the paper, and the paper was extraordinary, it was a modifiable honeycomb; it had hexagons, a very important polygon ...
We discovered who made it and we had him send us some of this paper ... (fig.99)
Doriana and I have been working together for 38 years, we are married and we work together. In any case, she took this piece of paper and never left it for any reason in the world...

This was the first model (fig. 100). These are the first hand drawings. (fig. 101).
This is a view of the model with that paper, and then there are other more advanced models, a structural system.
We wanted to realise this. We showed it to our future Chinese customers, until there were only three left in the competition and we won it.
We had a big dinner in London with the Chinese authorities and started building this airport.
I'll show you many drawings and models. (figg. 102-115).
Here are all the structural problems and critical stress points (of the structure). Here we see the first parts of the project, the first details, and the first drawings. This is during the construction stage.
This is the project.
They started building it. They completed it in three years. (figg.116,117)
This is the part that people adore: natural light. No need for artificial light. And here is that famous honeycomb. (fig.118)

There are those strange trees… at a certain point I said: "Why do we need air conditioning? There is a 43-metre-high vault, it's so cool, it's already protected ". (They told me): "No, we must have it, even if we don't use it."
We had to make an exit for the air and we invented this species of tree.
Here we understand quite well what we wanted to do. Everything is roughly the same as the project.
Everything we think, we realise: you see the light, the light sources as they are ... (fig.119-133)

That famous paper suddenly became real, it became real.
This is the Terminal space at the end of the project. It's like a great ray, a fish that underwent a metamorphosis, it becomes a bird, then it flies and becomes an airplane.
The vault is like a passage, a kind of reconstructed Sahara, with these great light sources, where water never got in, typhoon area ...
End
Thank you very much, goodbye.

Genoa, 8th May 2018
Aula San Salvatore
Massimiliano Fuksas

The church of the Saints Peter and Paul in Itàla
Survey, analysis, formal and constructive interpretation

Marinella Arena,
Department of Architecture and Territory (Mediterranean University of Reggio Calabria)
marinella.arena@unirc.it;
Daniele Colistra
Department of Architecture and Territory (Mediterranean University of Reggio Calabria)
daniele.colistra@unirc.it;

Abstract
The Arab-Norman church of the Saints Peter and Paul in Itala (Messina), founded by Abbot Gerasimo together with the homonymous monastery in 1092 (thanks to the initiative of Count Roger, future king of Sicily), is a monument with singular characteristics, also present in numerous other buildings located in an area that includes eastern Sicily and Calabria. In this area, between the seventh and thirteenth centuries, a fruitful syncretism has developed between the Greek-Byzantine culture, the Roman-Latin and the Islamic culture: three civilizations in political and military contrast but able, in the field of the arts, to reach to a wonderful synthesis. The survey of the church of the SS. Pietro e Paolo is part of a wider research project, started in 2015 and still in progress, aimed at the cataloguing of architectures that present evident traces of this syncretism. The research forms an implementable and open system; at present, over 80 churches have been studied, of which 20 have been detected with instrumental and photogrammetric techniques. Directly linked to the need to understand, through the tools of survey and graphic analysis, the formal and constructive characteristics of these monuments, we have highlighted the will to communicate at different levels (experts, visitors, tourists, children, etc.) the phenomenon of Italian-Greek religious architecture in its generality. For this purpose, a graphic system has been developed to communicate the peculiarities of an immeasurable, but unknown and underutilized heritage. The church of the SS Pietro e Paolo in Itala represents, in this perspective, a paradigmatic example for the entire system of architectures included in the research program.

Abstract
La chiesa arabo-normanna dei SS Pietro e Paolo ad Itala (Messina), fondata unitamente all'omonimo monastero nel 1092 grazie a un diploma del Conte Ruggero (futuro re di Sicilia) rilasciato all'abate Gerasimo, è un edificio dalle caratteristiche singolari, rintracciabili in numerosi

edifici concentrati un'area che comprende la Sicilia orientale e la Calabria. In questo territorio, fra il VII e il XIII secolo, si è sviluppato un fecondo sincretismo fra la cultura greco-bizantina, quella romano-latina e quella islamica: tre civiltà in contrasto politico e militare ma capaci, nel campo delle arti, di giungere a una sintesi mirabile. Il rilievo della chiesa dei SS. Pietro e Paolo fa parte di un progetto di ricerca più ampio, cominciato nel 2015 e tutt'ora in itinere, finalizzato alla catalogazione delle architetture che presentano trecce evidenti di questo sincretismo. La ricerca si configura come un sistema implementabile e aperto; allo stato attuale sono state studiate oltre 80 chiese, di cui 20 rilevate con tecniche strumentali e fotogrammetriche. Direttamente legata alla necessità di comprendere, attraverso gli strumenti del rilievo e del disegno, le caratteristiche formali e costruttive di questi monumenti, vi è quella di comunicare a diversi livelli (addetti ai lavori, visitatori, turisti, bambini, ecc.) il fenomeno dell'architettura religiosa italogreca nella sua generalità. A questo scopo è stato elaborato un sistema grafico adatto a comunicare le peculiarità di un patrimonio smisurato ma poco conosciuto e valorizzato. La chiesa dei SS Pietro e Paolo ad Itala rappresenta, in quest'ottica, un esempio paradigmatico per l'intero sistema delle architetture prese in esame.

The Church of Saints Peter and Paul in the Arab-Norman architectural context

by Daniele Colistra

This study represents a historical-critical contribution, based on survey and graphic analysis, relating to the Arab-Norman church of the Saints Peter and Paul in Itàla (Messina). The building, in its current appearance, was revealed in 1930, during the works of restructuring and seismic adaptation. Until that date, the church was completely hidden by seventeenth-century superstructures, removed during the aforementioned works.

The choice to study this monument has two main reasons. The first concerns the need to provide an updated and reliable survey, with more advanced techniques than those carried out until today. This makes it possible to verify (and possibly correct) the hypotheses on the construction system, on the decorations, on the geometries and on the differences and similarities with the other Arab-Norman monuments present in Sicily and southern Calabria. The second reason is related to a broader research, conducted by the authors of this essay, aimed at studying with a systematic and comparative method the Eastern-matrix churches present in Calabria, Lucania, Puglia and, beyond the Otranto Channel, the Hellenic peninsula and Turkey. A vast territory that - following the Islamic expansion first in Asia Minor and then towards the western Mediterranean - has hosted numerous religious communities from the Near East and has determined, in particular in the regions of southern Italy, a fruitful syncretism between Latin and Greek culture.

The spread of the Byzantine culture in southern Italy has always been continuous but has had three moments of particular intensity. The first dates back to the mid-seventh century and was a result of the Islamic occupation of Cappadocia (an event that encouraged the emigration of Christian monks to the areas of the empire most protected by the Islamic threat).

The second phase corresponds to the intensification of the iconoclastic struggle, particularly intense starting from 730, following which many monks went from Anatolia and the Balkans to the most

inaccessible areas of Calabria, Puglia and Sicily to freely practice their cult. The third migratory flow was due to the Islamic occupation of Sicily, which began in 827 from the western end of the island and continued eastward until 902.

Fig. 1. Church of Saints Peter and Paul in Itàla. Front view, side view and detail of brick decorations.

Following the Islamic threat, the monks who did not accept the conversion crossed the Strait of Messina and went back to southern Italy, settling in the territories still governed by Byzantium, founding new communities, joining existing monasteries or choosing the eremitical life.

The topic has been extensively dealt with by eminent authors (among others: von Falkenhausen, Guillou, Borsari, Orsi, Venditti, Kitzinger, Krautheimer) who have elaborated comprehensive readings or detailed specific aspects. Our research group has been working on the topic for several years, using a working method based on the following principles:

- elaborate a system for reading churches based on morphological, typological and constructive characteristics, as an alternative to the historically consolidated one based on chronological and geographical criteria. At present, we have examined about 300 churches located between eastern Sicily and Cappadocia, creating an infographic card for each of them;
- compare the examples using a homogeneous graphic analysis procedure. To date, we have studied 84 churches (in Sicily, Calabria, Lucania, Puglia and in the regions of Thessaly, Epirus and West Macedonia in Greece), highlighting the relationship with the context, the morphological typological plant, the construction technique, the system access and natural lighting;
- survey churches with instrumental techniques (laser scanners and photogrammetry). The graphic analysis allowed us to develop a systematic matrix for a detailed morphological, constructive and

typological comparison, also extended to the iconography and decorations;
- design an integrated communication system based mainly on new media, in line with the directives of the European programs for research and innovation.

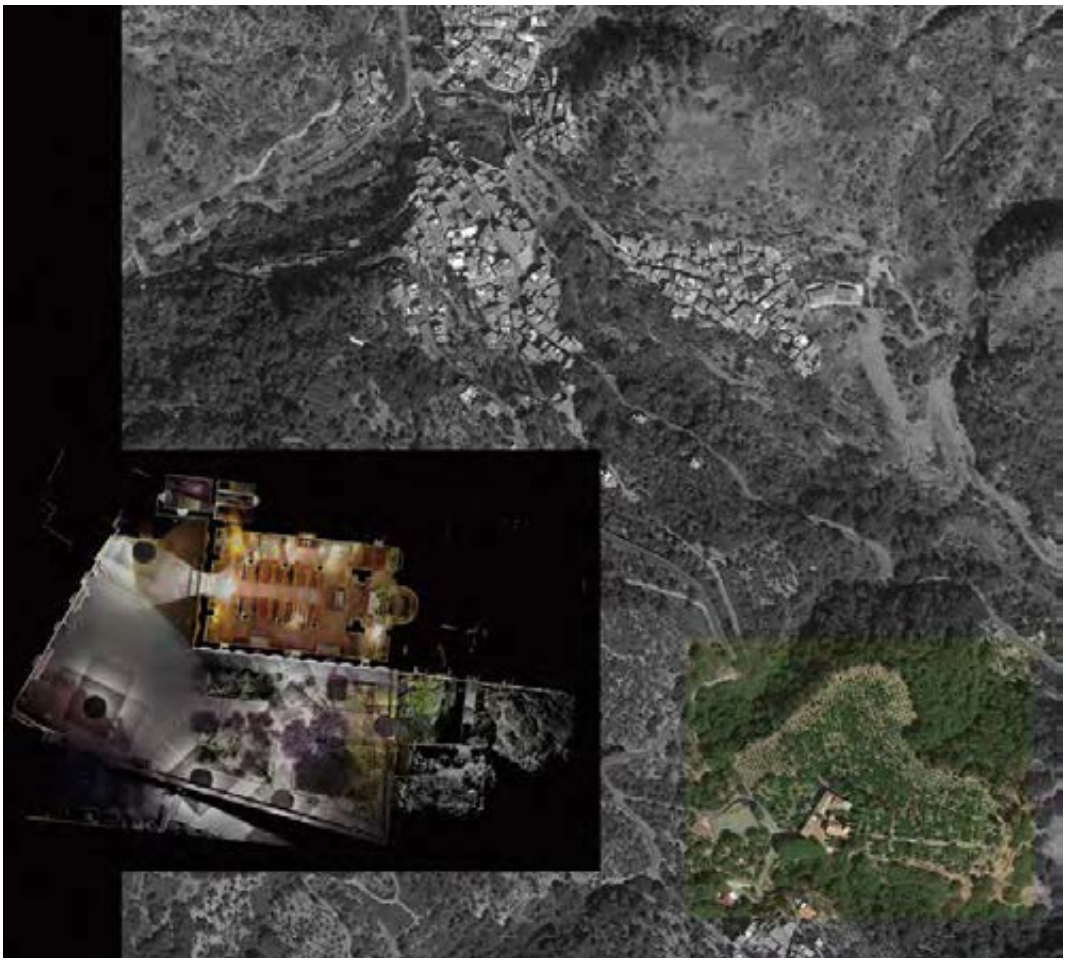


Fig. 2. Planimetry and zenithal photo of the territorial context.

The church of Saints Peter and Paul is located on the slopes of Mount Scuderi, on the eastern side of the Peloritans, not far from the village of Itàla. It was founded, together with the monastery of the same name, in 1092, thanks to a diploma of Count Roger (future king of Sicily) issued to Abbot Gerasimo. The choice of the site would correspond to the place where the Normans defeated the Arabs in one of the first battles of the Christian reconquest of Sicily (which took place from East to West, the Normans had settled permanently in Southern Italy and had chosen as capital Miletus). The foundation document granted the monastery a vast territory, including the villages of Itàla and Alì. The abbey enjoyed tax exemption and independence from the ecclesiastical authorities; the only task was to supply the Crown with fruit and oil. For this reason, the monastic community soon became very rich. The decision to grant a wide autonomy was strategic for the Normans to reorganize Sicily administratively and economically. The Islamic presence was mainly concentrated

in the western part of the island, while in the eastern side there were pockets of resistance to conversion and in which, more or less hiddenly, the population continued to profess the Christian creed and to celebrate the cult. All these factors facilitated the establishment of Norman Christians.

Fig. 3. Perspective views of the point cloud.

The Norman domination in Sicily produced architectures in which the typically Islamic elements blend with others more properly Nordic. But it is not possible to clearly identify the boundaries between the original languages: it is an eclecticism, strongly encouraged by the new conquerors, which mixes elements belonging to the Eastern Byzantine tradition, Islamic elements, italo-greeks models elaborated in southern Italy and Romanic architecture.

The church has a basilica planimetry. The hall is divided into three naves with six columns (three on each side) with bell-shaped capitals on which brick and stone arches are set. The coverage is flaky. The transept has the same width as the nave, so it does not emerge and has three apses. The central compartment of the transept faces the main nave through a triumphal arch and is covered by a dome set on a high prismatic volume; the two lateral rooms of the transept are covered by cross vaults. The external bell tower is posterior and dates back to the 16th or 17th century. The prism

that holds the dome recalls the religious architecture of North Africa and many other Christian architectures with an Oriental imprint: the passage from the square shape of the nave to the circular shape of the dome does not occur through portions of spheres, but through hanging corner arches. The main façade is characterized, on the lower level, by a series of bow-shaped arches, at the center of which is the entrance portal. The portal has a double lava stone architrave and, between this and the first archivolt, there is a zigzag ornamental brick motif. The archivolts are interspersed with limestone inserts. At the top level there is a series of blind arches, with a window in the middle.

Fig. 4. Plan and transversal section.

The side elevations are characterized by a continuous and uniform series of interwoven blind arches, with small alternately blind windows. The arches, intertwining, generate trilobed arches; a geometric pattern very common in Spain and on the southern shore of the Mediterranean, from

Egypt to Morocco. A characteristic that makes the church exceptional is the polychromies of the materials, made up of bricks different in shape and firing, interspersed with stones of different shapes and nature.

Survey and geometric analysis of the monument

by Marinella Arena

The church of SS. Peter and Paul, has a basilica structure similar to the church of the same name in the valley of Agrò and to that, not so far from here, of S. Maria a Mili. The typological characteristics of these three churches are a strongly elongated plant with three naves, completed by one or three apses. All the churches are characterized by the use of semi-spherical domes above a square skew-back. The theme of the relationship between the semi spherical dome and the cubic drum has developed, both in Sicily and in the nearby Ionian Calabria, with a great variety of solutions (pendentives, squinches, and hanging arches). The church has been described several times in numerous theoretical and scientific studies. Many of these studies refer to a survey, perhaps the best known of this architecture, dated 1975, and performed by Francesco Basile as part of a research by the DAU department of the University of Catania.

Fig. 5. Plan and transversal section

Our survey, performed with the Faro Focus Cam 120 laser scanner, during March 2017, aims to obtain new data on the material and geometric complexity of the building and to verify the correspondence between the theoretical form that this should have had and what was actually built by the workers at the time. A discrepancy that can offer ideas for analysing the constructive practices and technical skills of the time. The orientation of the church, with its apses facing east, is in line with the cult of the time.

The main façade of the church, west, opens onto a small square while the side façade, south, faces onto a garden. The east façade, containing the apses, is incorporated into the adjacent building while the north facade falls within a private property and is usually inaccessible due to the ruins of the Basilian monastery, leaning on it and for the presence of dense vegetation. The survey project required 9 scans outside the church and 23 inside. The internal scans also involved the bell tower, which was added after the church, and hides a part of the north facade, also decorated with intertwined arches. The restitution of the instrumental survey allowed the creation of a virtual model composed of about 320 million points that show not only the morphology of the church but also its material characteristics and metric and angular deformations (Fig. 2, Fig. 6). The plan of the church is, on the whole, quite adherent to the form and the theoretical geometry. The spans, measured at the base of the columns, vary in width from 2.38 to 2.50 metres, and in depth from 4.34 to 4.44 metres. The interaxis that cross the church transversely passing through the centre of the columns show slight distortions. The latter are more pronounced in the longitudinal direction. The two axes that cut the church longitudinally and pass through the centre of the columns are slightly convergent, just over one degree. The major deformation, both in linear and angular terms, is present in the north-east span due to the rotation of the transverse axis. The span appears smaller in size and rotated to the transverse axis. In addition, the two spans that form the transept are covered by cross vaults. The latter are based on a square base and leave, on the side of the lateral aisle, space to a round arch that connects the cross with the brick arch that links the central nave to the perimeter wall.

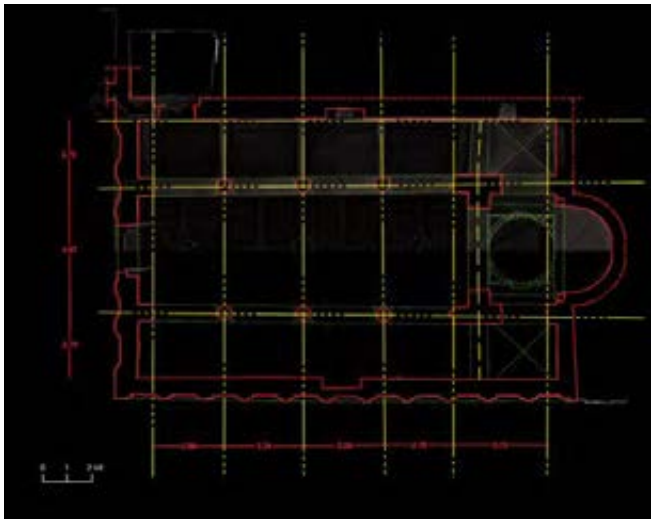


Fig.6. Plan and geometrical axes

The dome (Fig. 8,9), set on a 3.55 metres high cylindrical drum, connects with an almost square drum (2.68 x 2.85 metres) through angular squinches with protruding triangular pedestals. The dome is perfectly tangent in the east-west direction while it is slightly detached in the north-south direction. The morphology of the dome is perfectly adherent to its geometric pattern, a semi-sphere, and even the angular squinches appear regular. The latter consist of a small arch, 15 to 18 cm deep, completed by a semi-circular niche, radius of 20 to 22 cm, completed with a quarter of a sphere. The most deformed angular squinch, both for the morphology of the niche and the corners of the hanging arch, is the northeast one.

The restitution through a cloud of points and orthophotos allows a precise analysis of the best known and most striking aspect of this architecture: the decoration of the side wall (Fig.7). In fact, both this church and that of the Valle D'Agrò have a lively polychrome decoration in the façade animated by walls consisting of intertwined arches. Proceeding from bottom to top we can identify a small base, 20 cm, which only partially compensates for the inclination of the ground. In fact, the whole prospect seems to lie on the slope of the land; the line of the basement, at the bottom, and the one that closes the decoration with arches, at the top, are parallel but not horizontal. In other words, the façade maintains the same height in the steepest part of the terrain.

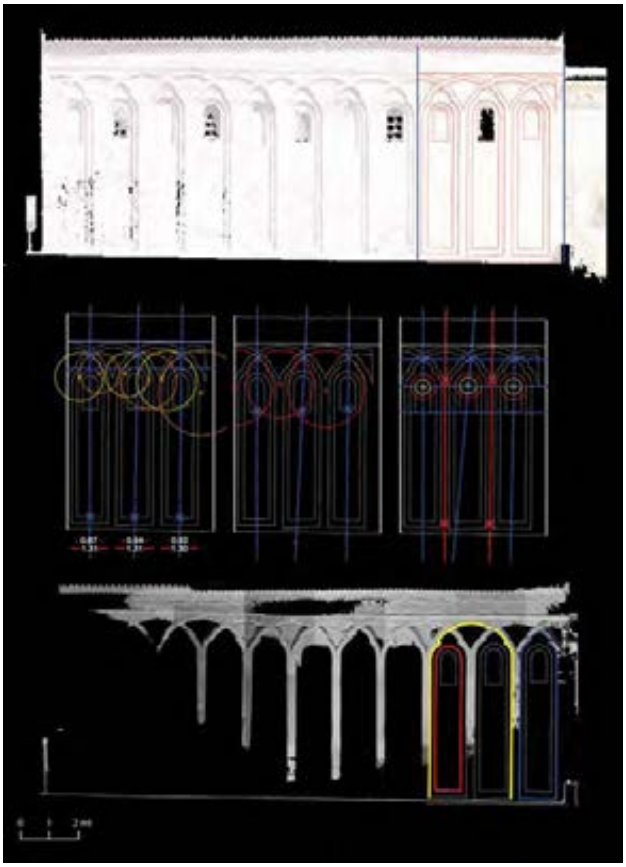


Fig. 7. South elevation and geometrical patterns.

The perpendicularity to the ground is instead assured by the piers of the arches. Placed on the thin base, there are eleven small spans completed by round arches. Above these wider arches there are spread out and embrace two spans at a time and form the characteristic decoration with intertwined arches. The plot originates from the apse area and proceeds towards the main facade. The finding of the arches in the bell tower compartment allowed us to verify that the decoration has the same trend also in the north façade. To simplify the description we can identify three different orders of arches: the first is composed of round-headed arches, which accommodate the windows; the second is composed of trefoil arches that have the same axis as round-headed arches; the third is formed by the arches with five centres, which have, as their axis, the abutment of the round arches. It is possible to read the drawing formed by the arches in more ways. Some scholars follow the trefoil arches, connected above by circumference arc.

But, if the material continuity of the façade is preferred, it is best to follow the arches belonging to the third order, constructed with continuous rows of bricks, drawn by polycentric oval arches. Above these last ones we finally find the small band in bricks, tangent to the polycentric arches and, as we had seen before, parallel to the base. The façade ends with the roof of the south aisle.

Fig.8. Section and plant of the dome area.

The pitch of the round blind arches, first order, is not regular, it is ranging between 1.33 and 1.39 metres; the pitch of the strings of the third order is more regular, it is ranging from 2.96 to 3.01 metres. Analysing a brief sequence of arches, the closest to the apse, we can visualize the vertical

symmetry axes that, due to the metric and angular difference of the elements from whom they descended, are very irregular.

In the first drawing the axes are formed by joining the vertex of the trefoil arc with the centre line of the base of the round arch. It is noted that the first axis is almost vertical, the second is inclined by about 1° and the last by 0,66°. The circumferences that represent the geometry of the second-order arch, trefoil have a very irregular location and dimension.

Fig.9. Axonometric and perspective view of the dome area.

In the second drawing the geometry of the third order arches is highlighted. The dimensions of the circumferences that draw the central part of the polycentric arch are irregular and asymmetric in size and centre position of the arc. The radius of the central arch varies from 1,21 to 1,42 metres.

The axes of the spans are identified taking into account the vertex of the trefoil arch and the centreline of the threshold of the window compartment. The axes thus obtained are irregular and inclined up to 2,5 ° with respect to the perpendicular line.
The third drawing shows that the centre of the trefoil arches and the round arches are horizontally aligned. Alignment suggests that the decorative motif has been worked from these fixed points.
Finally, tracing the geometry of the third-order arc, polycentric, we note that the centres of the minor arches are almost aligned with the central one. It must also be emphasized that the connection between the arches is not always perfect and the arrangement of the bricks is only radial in the central section. (Fig. 11) The south façade as a whole presents a vertical misalignment of about 10 cm. In fact, the top of the façade is projecting about 9 centimetres in relation to the foot. Figure 6 also shows the south façade sectioned with a vertical plane. The image makes evident the deformation in the superior and central part of the façade.
The survey of the church of SS Peter and Paul, conducted with advanced instruments, and investigated with the lens of geometric analysis, can in our opinion, offer some fresh insights on the morphological, technical and formal nature of the Arab-Norman architectural heritage of southern Italy.

Fig.10. Axonometric view of the internal structure

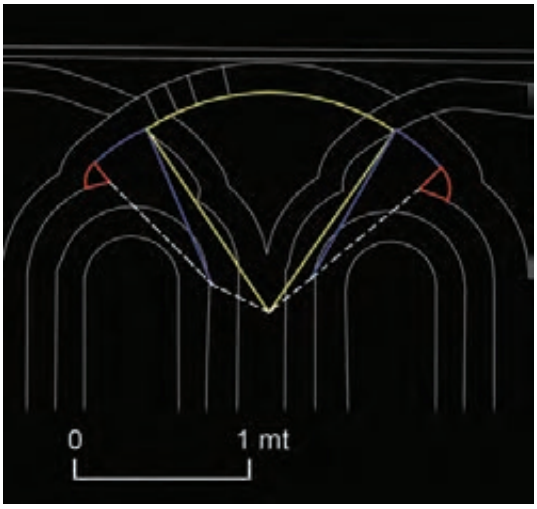


Fig.11 Detail of the geometrical pattern of South elevation.

References

C. Boito, *L'architettura siciliana. Le chiese del XII secolo*, in "Architettura del medioevo in Italia", Milano 1880
G.U. Arata, *L'architettura arabo-normanna e il Rinascimento in Sicilia*, Milano 1914
S. Bottari, *Le chiese basiliane della Sicilia e della Calabria*, Messina 1932
S. Bottari, *La genesi dell'architettura siciliana del periodo normanno*, Catania 1932
F. Basile, *Chiese siciliane nel periodo normanno*, Roma 1938
F. Giunta, *Bizantini e bizantinesimo nella Sicilia normanna*, Palermo 1950
F. Basile, *L'architettura della Sicilia Normanna*, Catania-Caltanissetta-Roma, 1975
G. Bellafiore, *Architettura in Sicilia nelle età islamica e normanna*, Palermo 1990
F. Gabrieli, U. Scerrato, *Gli Arabi in Italia*, Milano 1993

Geographical Open Data e Open Software for land representation

Gerardo Brancucci
Department Architecture and Design DAD, Geomorfolab (University of the Study of Genoa)
email: brancucci@arch.unige.it
Valentina Marin, Paola Salmona
Department Architecture and Design DAD, Geomorfolab (University of the Study of Genoa)
email: geomorfolab@arch.unige.it

Abstract

Territorial representation through maps started in ancient time and cartography still represents a useful tool for many purposes. Technological innovations allow high levels of accuracy and precision and Geographic Information Systems (GIS) permit to integrate different kind of data, managing and elaborating in the same software environment a huge amount of data, even quantitatively. In the last years, a big cultural change has occurred: the diffusion of geographical Open Data and, consequently, the increasing of tools for their management and representation, often constituted by Open Source Software. Free access to an increasing number of territorial information, together with the spreading of mobile devices, has involved also individuals, which more than users has become potential providers of geographical data, both qualitative (knowledge, perception) and quantitative (from field survey). Volunteered Geographic Information (VGI) has been developed on this base.

In this context, an effective cooperation between cartographers/informatics and architects/designers could bring to interesting developments, both for increasing the access and use of these data, taking advantage of their potentiality also in new disciplines, and for improving their usability for the general public.

Abstract

La rappresentazione del territorio tramite mappe risale all'antichità e ancora oggi costituisce uno strumento importante a supporto di numerose esigenze. Le innovazioni tecnologiche garantiscono livelli altissimi di accuratezza e precisione e, da molti anni, i Sistemi Informativi Geografici (GIS) permettono di gestire in uno stesso ambiente diversi tipi di dati, integrando grandi moli di informazioni, anche quantitative. Negli ultimi anni, tuttavia, uno dei maggiori rinnovamenti in questo campo è stato più culturale che tecnologico: la diffusione degli Open Data geografici ed il

conseguente proliferare di strumenti, spesso Open Source, per la loro gestione e rappresentazione. Il libero accesso ad un numero sempre maggiore di informazioni territoriali, associato alla diffusione della tecnologia mobile, ha interessato anche i singoli, che da semplici fruitori si sono trasformati in potenziali fornitori di dati geografici, qualitativi (conoscenza, percezione) e quantitativi (da rilievi in campo), promuovendo la diffusione di quella che viene chiamata Volunteered Geographic Information (VGI). In questo contesto, una collaborazione efficace tra cartografi/informatici e architetti/designer potrebbe garantire ottimi sviluppi, sia per ampliare l'accesso e l'utilizzo di questi dati, sfruttandone le potenzialità anche in settori scientifici oggi non ancora coinvolti, sia per migliorarne la fruibilità anche da parte di un pubblico allargato.

Land representation and mapping

Cartography is the study and practice of making maps. Combining science, aesthetics, and technique, cartography builds on the premise that reality can be modelled in ways that communicate spatial information effectively (Wikipedia).

From clay tablets to digital maps

The first "official" land map dates back to the sixth century BC, the so-called Babylonian Map of the World, a clay tablet with a stylized draft of the known world, with Babylonia, the Euphrates river, the adjacent cities and lands, all surrounded by the sea (Figure 1). Other representations came along, describing a territory through its landmarks, such as villages, rivers, path, useful to find one's bearings. Land representation has since progressed and, following the geography and geometry study, it has became more and more precise, detailed and purpose-oriented.

Actually, a map, beside its original aim to let people find their bearings in a specific land, is also expected to introduce it. Technical, didactic and artistic skills are requirements to meet to get a "good" map. From the technical point of view a map should above all be clear and accurate. With such a view, it is essential to represent the features of a place by means of well known symbols and conventional signs. Here, cartographers are required also an artistic effort to give strength to their representation by making land features easily identifiable, by integrating them in the context and, generally, by giving the map a "charm" so anyone could tell it from a simple report (Casey, 2005). On the other hand, fine arts and especially painting have often been inspired by the accuracy and the abundance of detail that characterize cartography and several pictures show some very specific features usually reported in coeval maps. Interesting examples can be found in some Dutch landscape painters' works, and in several Vermeer's pictures that even show wall maps in the background like a picture within a picture (Ricci, 2013).

Yet, the relevance of artistic features in land representation decreased during the XIX and the XX centuries (Robinson et al., 2017) and during World War Two, aerial surveying started to develop, leading mapping to great strides and to extensive changes. Today, most surveys are supported by satellites and remote land observation techniques and Information and Communication Technologies brought a changeover also in land representation.

This revolution has given access to a huge quantity and variety of data. It is therefore a major issue to develop strategies, innovative methods and tools, as well as to establish a steady cooperation

between data providers, multimedia designers/developers and final users (Cartwright 2004), in order to make the best of the information that such data supply.

Currently used hardware and software allows swiftness, accuracy and detail in land representation, but this is just a small part of the possible processing of the available and continuously gathered data. In such a context also the artistic character of cartography has a new chance, of course in an innovative view.

Fig. 1 Babylonian Map of the World

Geographical Information Systems

A favourable environment where data, users, skills, application fields related to land representation can confront is constituted by Geographical Information Systems (GIS). The acronym GIS is often used in a very short-sighted view as "a software to make nice maps" or, more correctly as a graphic software linked to a Database Management System, able to visualize the filed data in a map. Actually "a GIS is a computer system capable of capturing, storing, analysing, and displaying geographically referenced information; that is, data identified according to location. Practitioners also define a GIS as including the procedures, operating personnel, and spatial data that go into the system" (US Geological Survey). That means that, once data are included in a GIS they get some properties, such as georeference, structure and interoperability that are an asset towards "traditional" maps[1].

[1] http://interoperability-definition.info/it/

The Open Source chance

Within GIS, software can perform several different tasks, from satellite data decoding, to sensor data collection and computing data, to map drafting, to the mere visualization of earth surface (i.e. Google Earth), etc. At the same time, several applications have been implemented, either addressing basic users, or, more complex, that require specific technical and often interdisciplinary skills.

GIS software is subject to many different kinds of licence[2] . Even if proprietary software has many strong points, above all the supply of stable ready-made comprehensive applications, together with effective training programs, documentation and specific support, it is worth to remember the role of Open Source Software[3] in GIS. As a matter of fact, in a field characterised by the dynamic cross of data, requirements and skills, the chance of community based, customizable on demand and swiftly evolving software is not to be disregarded.

Several public and private subjects has moved to open Source software, on the basis of some specific reasons, also shared by the authors:

- Specific and lightweight applications vs comprehensive and heavy ones
- High interoperability as regards applications and formats
- Community support (to receive and to give)
- Lower costs
- Working opportunities in software development
- Sharing of ideas and contents

Geographical Open Data: a new way of mapping

Land representation, in GIS can be seen as a well structured complex of geographical data, that is all kind of information characterised by a spatial reference and that is possible to link to a specific location on the earth surface. Up to a few years ago, geo-referenced data were scarce and lacking, hardly interoperable, and their access was often complicated and expensive.

Presently, also thanks to the European Directive INSPIRE - Infrastructure for spatial Information in Europe (2007) and to the European Directive 2003/4/EC on public access to environmental information, following the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, a large share of geographical data are available as Open Data[4]. Even if policies and also society are oriented to data and content sharing, not all geographic data are Open, for example many maps by some Italian Public Administrations. Anyway, because of general data redundancy, most European geographical data are freely and legally retrievable. The open access to a huge amount of data, from different sources but harmonized in a seamless cover is undoubtedly an opportunity, but it requires as well some skills. On the premise that land and landscape representation is specifically aimed – for example to know an area and its surroundings in view of a project work, or to display the reasons, the uncertainties or the consequences of a decision, two approaches are viable:

[2] Zatelli P. (2009) http://www.ing.unitn.it/~zatelli/cartografia_numerica/slides/GIS_piu_diffusi.pdf
[3] https://opensource.org/osd-annotated
[4] http://opendatahandbook.org/guide/it/what-is-open-data/

- to collect all available information about the study area, point out the most useful ones and use the to set up the work
- to set an objective and identify the information necessary or useful to fulfil it.

In both cases a good skill in data mining is essential to identify the most suitable sources, datasets, formats, scales, and so on. Such capability is quite a novelty because in the past the main challenge was to find the information needed to start a work, now, it is to select actually relevant data.

Even if the always increasing available data and the current technology open the way to represent a territory almost effortlessly and in an effective, shareable and interoperable way, it is possible to incur the risk, on the one hand, of gathering a lot of information yet not purpose-oriented and to start an end in itself out of scale process (i.e. to consider the road net of a whole district before designing a playground), on the other hand, of drafting a project on inadequate data, just because the required ones are not available or ready to use as Open Data (i.e. to leave out winds and insolation when drafting the same playground).

Finally, available Open Data can (or should) be integrated with survey data. In a GIS environment they can be of any kind (photographs, measurements, sample values, interviews, etc.) and again, to gather them is now more and more easier than in the past and through georeferring they can be placed into their context.

Open geographical examples

Geographical open data are scattered all over the world and it is possible to access the sources, collect different pieces of information, match them in a comprehensive systems and to retrieve and display only the features that are required on a case by case basis. A non -exhaustive example of this process of data mining is describe below.

To represent the city of Genova and its neighbourhood it would be useful first of all to consider its morphology. A Digital Terrain Model can be the suitable dataset. For a wider area it is possible to use the US Geological Survey[5] DTM with 30 m resolution. To represent the closer neighbourhoods the Regione Liguria DTM[6] with resolution 5 m is more suitable. Another DTM even more detailed (1m) is available through the Italian "Geoportale Nazionale[7]". It might be useful for focussing on specific areas in town. Rivers and streams can be retrieved from the Regione Liguria Technical Regional Map (CTR), but if some detail were required about water drainage in town, a derived map processed from the DTM would fit. Buildings, roads and other infrastructures as well as some information about land use can be found in the CTR, and to get an overview of the city during World War Two it is possible to refer to the Harvard Library[8] where some maps of the city used by the US Air Force are stored and shared.

Footpaths, restaurants, mountain huts and many other amenities are available in OpenStreetMap[9] a collaborative project to create a free editable map of the world, which also distributes free geographic data and counts with over three million registered OpenStreetMap users (Fig 2).

[5] https://earthexplorer.usgs.gov/
[6] https://geoportal.regione.liguria.it/
[7] http://www.pcn.minambiente.it/geoportal/catalog/main/home.page
[8] http://hgl.harvard.edu:8080/opengeoportal/
[9] https://www.openstreetmap.org

It would be possible to go on with more and more features, this example is just to give an idea of what is quickly available. Indeed retrieved data are bare and maps need to be made clear and expressive. Here technical requirements meet again creativity and the support of communication technologies has already given way to many applications. Below, different current application related to GIS and Open Data are briefly considered, from the most traditional to some of the new ones.

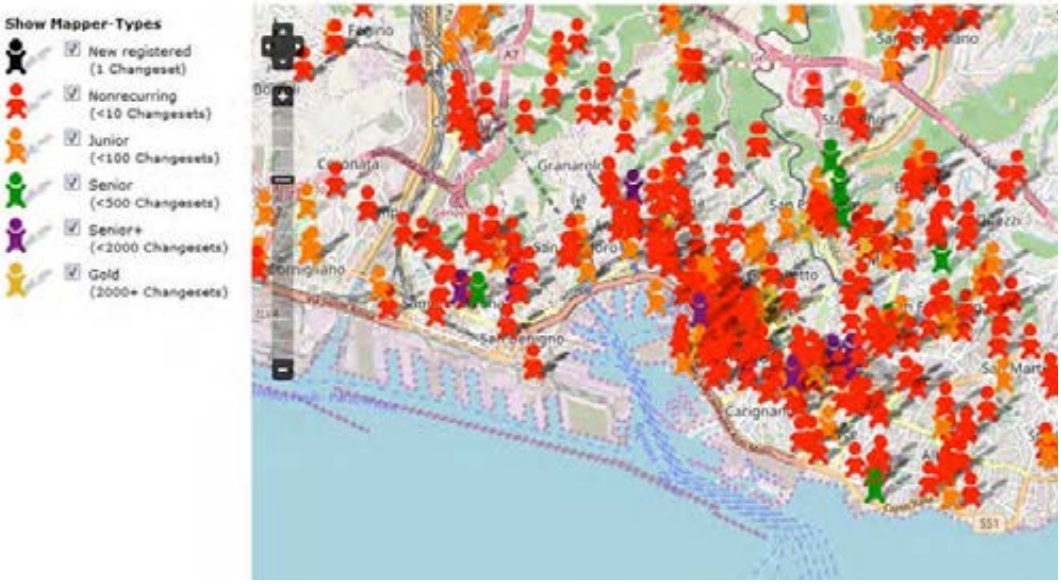


Fig. 2 Overview of the OSM contributors in Genova (http://resultmaps.neis-one.org)

Obvious: thematic maps and simple data processing

Handling both graphic and alphanumeric information, GIS allow several types of data representation in maps. Thematic (coloured) maps can be rapidly realized just using different colours for the different values of any of the alphanumeric attributes connected to the geometric features of a layer. Specific messages can be easily explained by selecting and highlighting core data and creating expressive maps. Some (few) disciplines use specific codes and representation rules that has to be respected in order to preserve the correct meaning of a map (i.e. the colours of a lithological map can't be changed). However, in the majority of the cases a map can be freely edited and different expertises and levels of creativity can lead to very different results.

Map editing is not an aesthetic issues, but it has to be always considered as a way to represent information. GIS can go further the colour code and has to be used for handle and communicate quantitative data resulting form the overlap and integration of different level of information spatially distributed (geoprocessing). This is the key to go beyond the basic description of a territory, allowing a synthesis of different aspects and revealing hidden meaning and new interpretations.

Advanced: models and scenarios

Integrated analysis of multiple geographical data allow experts to develop specific models which help to understand processes and, in some cases, to forecast their possible evolution.

This approach can be applied in different disciplines, ranging from distribution models for pollutants to the definition of urban areas potentially subjected to floods, from solar radiation maps in different seasons to the development of different scenarios for urban microclimate depending on architectural choices, such as green areas, etc.

The possibility of creating models and scenarios has increased enormously thanks to the availability of big data and temporal data. Beside the scientific issues related to correct processing of this data, a new challenge also concerns the way to represents them in an effective way.

Dynamical display, for instance, helps intuitive connection between dynamic processes and data that describe them (Buckley, 2013). Furthermore, the potential utility of virtual reality for geospatial big data representation has to be considered, as a way to explore them in an immersive environment that simulates a physical presence in places (Olshannikova, et al.,2015).

Partecipatory: maps for dialogue

An interesting application which became popular in the early days of web-mapping (Robinson, 2017), is related to participatory processes, the so called Partecipatory-GIS, in which maps are used both as a mean of project presentation by the proponent, as a tool for discussing and including end-users suggestions and for evaluating different scenarios and possible solutions (Rinner, 2001). The maps become a mutual interface for supporting multicriteria and collaborative decision-making (Brewer et al., 2000). New perspective arise now considering the possibility offered by mobile devices, high-performance touch/gesture/voice interfaces, augmented reality, etc. (Robinson, 2017)

"Social": crowdmapping and user-based maps

The diffusion of web maps, starting from Google Earth, has drastically changed the role of maps and allowed the access to geographical data to non experts. Among the numerous social implications, the most interesting phenomenon is the creation of maps based on data supplied by users, both geographical data or general information such as text messages and social media feeds.

This participatory mapping approach is known as Crowdmapping[10] or Volunteered Geographic Information (VGI) (Goodchild, 2007). The first and most known application of this kind of maps is the so called Crowdmapping[11] , mainly applied for generating collaboratively almost real-time detailed crisis maps for disaster management (the Haiti earthquake in 2010 was one of the first examples) (Shahid et al., 2015).

The already cited OSM is another famous example of a collaborative and collective initiative in which users collaborate to edit maps of the world, with a special section dedicated to crisis

[10] the aggregation of crowd-generated inputs such as text messages and social media feeds with geographic data to provide real-time, interactive information on events such as wars, humanitarian crises, crime, elections, or natural disasters" (Quaintance, K., 2014. Concepts to Know: Crowdmapping.http://kimoquaintance.com/2011/09/04/concepts-to-know-crowdmapping/).

[11] "the aggregation of crowd-generated inputs such as text messages and social media feeds with geographic data to provide real-time, interactive information on events such as wars, humanitarian crises, crime, elections, or natural disasters" (Quaintance, K., 2014. Concepts to Know: Crowdmapping.http://kimoquaintance.com/2011/09/04/concepts-to-know-crowdmapping/).

management (Humanitarian OpenStreetMap Team – HOT), which has been greatly useful also in the 2016 earthquake in Central Italy.

The number of people able to supply georeferenced information using smartphones or other mobile devices has incredibly increased in the last few years and this allow to obtain quickly a big amount of data of good quality (Haklay, 2010), a results impossible to achieve through traditional field surveys carried out by experts (Padawangi et al., 2016).

The use of data from social media for generating maps is generating several initiatives, with all the implicit possibilities and risks connected with social media it-selves. Sharing personal information for creating public maps can sometimes lead to unexpected results, as emerged by the recent case of the "Global Heat Map" by the fitness tracking app Strava[12], through which unaware US soldiers released sensitive information about the location and staffing of military bases during their daily running, particularly evident in areas where few geographical data are available.

Beside this exceptional example, user-based and open maps are specifically important in areas where few official maps exist, such as in developing countries, but also considering issues that have few commercial appeal and thus are neglected by common maps (i.e. hiking paths).

Educational: open maps at school

Basic cartography at school normally focus on theory and traditional topography, while web mapping and open data could be really more attractive for students. Recently, many initiatives in this direction have started, in order to give students an up to date tool for understating their territory and developing skills for monitoring and communicating any subject with a spatial component. Particularly, the use of mobile device for collecting data and generating web maps is a good exercise also for awareness raising on territorial issues, including natural risks.

Incorrect: virtual globe browser used as data source

The use of Google Earth or Bing or other satellite images as data source for maps is commons, but generally incorrect from a technical point of view. Their scenographic images and globe visualisers had a great role in the diffusion of geographic content, however they are geocoded but not orthorectified and thus could not guarantee precision at local scale. Furthermore, they are not Open Data and thus they are usually ruled by copyright which should be considered. Since Open Data are now a reality, this common practice should be avoided.

Improper: mapping non geographical data

Geographical data generally refer to an absolute point, i.e. the Equator, Greenwich meridian, etc. Changing the origin of projection, any spatial data could became a geographical data. So within a building it becomes possible to use a GIS to geolocate furnitures, emergency exits, etc., or to propose routing to go from one place to another (Mascitelli e Ravanelli, 2018). With a similar approach, it is possible to georeference the parts of any artefact and make a sort of map of them. An interesting example is the tour of the "The Garden of Earthly Delights" by Bosch[13].

[12] https://www.strava.com/

[13] https://tuinderlusten-jheronimusbosch.ntr.nl/en

The picture has been processed as if were a map, using the same libraries and the same features used for web mapping.

Amusing: fictional geography and geocaching

A good map is an essential element for a fantasy, both a book or a video-game, because users always interact with a space, a land, a town where they have to act. Morphological and geographic elements must be at the same time plausible and unexpected: base data, techniques and software libraries used to produce fantasy maps are the same of those used for digital maps of the Earth.
Also real maps are used to get fun, in different kind of geocaching, as well as in tourism application, with app which unlock contents only when users reach a specific place.

A mixed perspective

Indeed GIS and map processing can go along very well with landscape and architecture representation. Nevertheless, according with the experience of the authors within Geomorfolab, a lab that produces and distributes cartography within the Department of Architecture and Design of the University of Genova, there is a sort of gap between these work fields.
Above all base maps (Regional Technical Map) or aerial photographies are asked for by students in Architecture, in a few cases also land use maps. Up to about two years ago they were used as a mere reference and were often traced to contextualize an intervention. Presently, interoperability between open geodata, commonly used drawing software and GIS is also required in terms of conversion of file formats and georeferring of alphanumeric quantitative data to create thematic maps (i.e. population distribution, urban growth, etc.). As aforesaid, nice or thematic maps are just the tip of the iceberg and the most basic product of a GIS and it is likely that what is supplied doesn't meet the expectations of the people who asked for. Actually it is difficult on the one hand for students to ask for something that is unknown and on the other hand for GIS professionals to supply a refined "product" without knowing the context where it should be placed and the tools that will be used. GIS and drawing environment and software are quite different and it is hardly viable to ask users a proficient knowledge of both, but a closer cooperation is worth.
Some good results have been achieved in our experience in specific projects, when the work has been done actually in a joint way with researchers in urbanism, architecture and landscape architecture, such as (Fig. 3): the reconstruction of the original morphology of the city of Genova based on the maps drafted by Ignazio Porro in 1836 (Brancucci et al, 2013); the interactive representation of stone facades for restoration and/or urban geo-tourism (Brancucci et al., 2016); a webmap for virtual representation of valuable private properties (Marin & Salmona, 2015); map processing to identify and characterise urban brownfields within the project Re-cycle[14] Italy ; the 3D representation of coastal viewsheds from the sea (Marin & Salmona, 2016), etc.
A field where cooperation could lead to interesting achievements is the 3D modelling. GIS are deeply involved in 3D above all in the field of geomorphological analyses.
Many issues are the same, even if often at a different scale, of architectural 3D modelling i.e. for

[14] http://recycleitaly.net/

environmental impact computation, visual analyses, landscape design. The general approach is often similar, but there is indeed a gap in software and above all in work-flow. Most GIS and 3D modelling software are, at least partially, interoperable, but such capabilities are underexploited and there is scarce continuity between land and object processing. A collaborative effort could smooth and make this work-flow more and more effective.

Finally, architects could also supply some valuable hints to land representation in Open data environment also at the software development level. An example may be the proposal for styles to be used in Open map browsers such as OpenStreetMap, to make them besides useful and user oriented, more expressive and captivating. A first attempt has been made in a Degree dissertation considering green areas of for an extra urban area of Genova (Di Rosa et al., 2013) (Fig. 3), but there is a lot that can be achieved. “Open”, even in mapping, is often felt as synonymous of “nerd’s stuff”. Actually, it is an opportunity to share creativity even in technical issues.

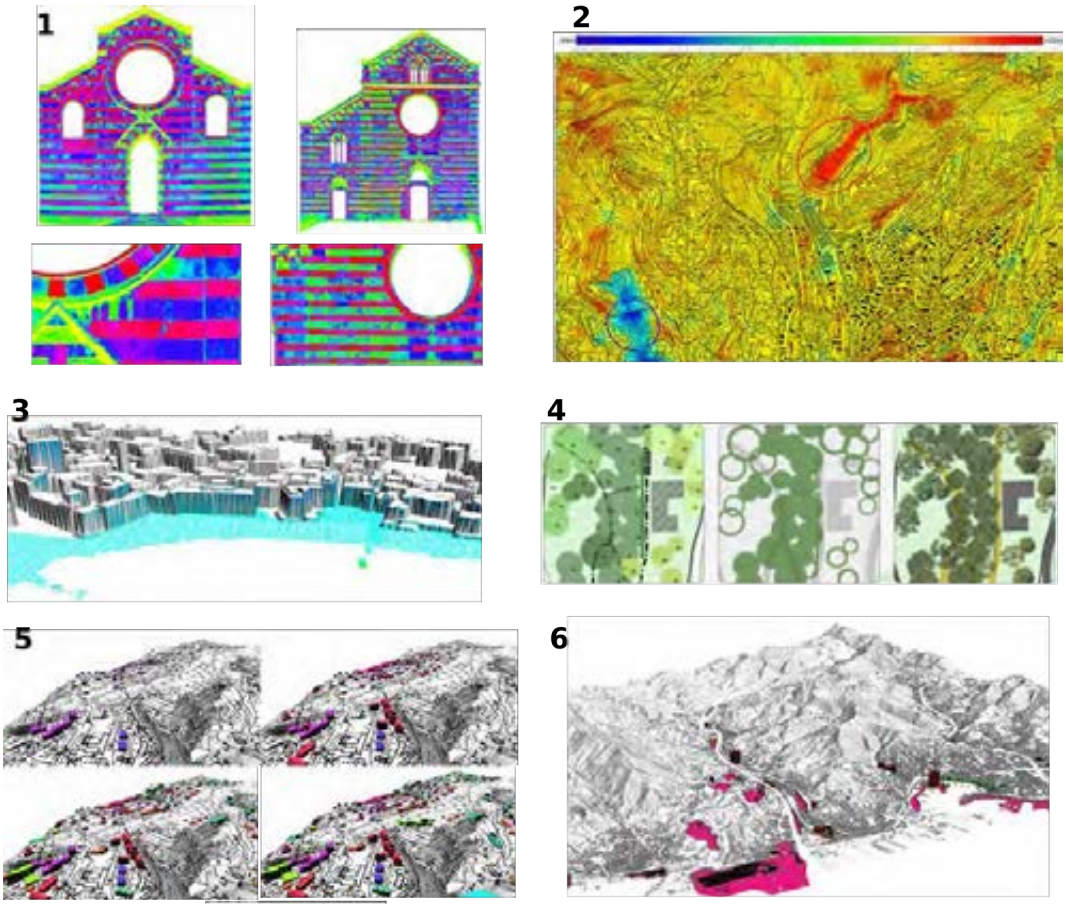


Fig. 3 1) classification of stone facades; 2) localisation of anthropic morphological changes in urban areas (i.e. fillings); 3) 3D analysis of coastal viewsheds from the sea; 4) proposal for high detail trees representation in OpenStreetMaps; 5) evolution of residential estates in a private contest; 6) emerging and depressed areas in the city of Genova for Re-cycle purposes.

References

Brancucci G., Marin V., Raschellà C., Refrigeri L., 2016. *Le pietre di Genova, uno studio nella città e negli edifici*, ArcheoFOSS/GFOSS, Conoscere per comunicare - Strumenti e tecnologie open per l'analisi e la condivisione del patrimonio culturale e territoriale, 7-9 ottobre 2016, Cagliari. [www.archeofoss.org/archeofoss-2016]

Brancucci G., Romairone D., Sarti Cipriani A., Marin V., Salmona P. (2013). *Cartografia storica in GRASS per lo studio e la valorizzazione delle fortificazioni di Genova*. XIV Meeting GRASS e GFOSS, Genova 06 - 09 Febbraio 2013.

Brewer, I., MacEachren, A. M., Abdo, H., Gundrum, J., & Otto, G. (2000). *Collaborative geographic visualization: Enabling shared understanding of environmental processes Information Visualization*. IEEE Symposium on InfoVis 2000, pp. 137–141.

Buckley, A. (2013). *Guidelines for the effective design of spatio-temporal maps*, 26th International Cartographic Congress. Dresden.

Cartwright, W. (2004). *Engineered serendipity: Thoughts on the design of conglomerate GIS andgeographical new media artifacts.*Transactions in GIS,8(1),1–12

Casey, E. S. (2005). *Earth-mapping: Artists reshaping landscape*. Minneapolis: University of Minnesota Press.

Di Rosa S., Salmona P., Marin V., Brancucci G. (2013). *Cartografia libera a supporto dell'escursionismo.* XV Meeting GRASS e GFOSS, Palermo 12-14 Febbraio 2014.

Goodchild, M.F., 2007. *Citizens as sensors: The world of volunteered geography.* GeoJournal, Volume 69, Issue 4, 211–221.

Haklay, M., 2010. *How good is volunteered geographical information?* A comparative study of OpenStreetMap and ordnance survey datasets. Environ. Plan. B Plan. Des. 37, 682–703.

Marin V. e Salmona P. (2015). *Il WebGIS per lo studio e la valorizzazione in ambito privato.* In: Atti del Convegno "Design & Open Source for Cultural Heritage", Genova 03-07 ottobre 2011, Gambaro P. e Vannicola C. (a cura di), Alinea Editrice, Firenze, pp. 238-251, ISBN:978-88-6055-840-4.

Marin V. e Salmona P. (2016). *La costruzione di repertori di siti e di immagini della costa.* In: Bobbio R. (a cura di), Bellezza ed economia dei paesaggi costieri, Donizelli Editore, Roma, pp. 93-119, ISBN: 978-88-6843-512-7.

Mascitelli A, Ravanelli M. (2018). *VGI for supporting indoor navigation in strategic buildings, infrastructures and GNSS denied environments: a preliminary feasibility demonstration*. http://foss4g-it2018.gfoss.it/

Olshannikova, E., Ometov, A., Koucheryavy, Y., & Olsson, T. (2015). *Visualizing big data with augmented and virtual reality: Challenges and research agenda.* J. of Big Data, 2(1), 1-27.

Padawangi, R., Turpin, E., Herlily, Prescott, M.F., Lee, I., Shepherd, A., 2016. *Mapping an alternative community river: The case of the Ciliwung*. Sustain. Cities Soc. 20, 147–157.

Ricci A. (2013). *L'arte del rappresentare geografico. Un confronto tra cartografia e pittura nel secolo d'oro dei Paesi Bassi* in Bollettino della Società Geografica Italiana Roma - serie xiii, vol. VI, pp. 655-677

Rinner, C. (2001). *Argumentation maps: GIS-based discussion support for on-line planning.* Environment and Planning B: Planning and Design, 28(6), 847–863.

Robinson A.C., Demšar U., Moore A.B., Buckley A., Jiang B., Field K., Kraak M-J., Camboim S.P. & C.R. Sluter (2017). *Geospatial big data and cartography: research challenges and opportunities for making maps that matter,* International Journal of Cartography, 3:sup1, 32-60

Shahid A.R and E. Amany (2015). *The Impact of Crowdsourcing on Organisational Practices: The Case of Crowdmapping* (2015). ECIS 2015 Completed Research Papers. Paper 166. http://aisel.aisnet.org/ecis2015_cr/166

Didactics and Research on the drawing of a bidimensional architectural component. The painted decorative apparatuses, aimed at the 'making architecture', in the Genoese facades.

Patrizia Falzone
Department Architecture and Design DAD (University of Genova)
email: falzone@arch.unige.it

Abstract

The digital systems of representation, nowadays widespread in use, allow the elaboration of a three-dimensional representation of the architecture, which communicates the dimensional, proportional, compositional, structural, technological aspects, stylistic and decorative in the same elaborate, or in more elaborates subdivided by topics. Moreover, the historical ones, of the transformations of the factory, reviewed and compared through historical information and archive data.

But sometimes this is not yet sufficient to solve the problem of complete knowledge of all the data of the built, especially those of identity, or rather, some data require to be filtered and decoded through specific knowledge, which allow the most complete and correct representation.

I refer to a very important two-dimensional data, that of the decoration painted on the facades of the historical building, widespread in Genoa from the late fifteenth to the early sixteenth century, as well as in the major Italian Renaissance centers (Rome, Florence, Mantua, Venice, Treviso) , Trento, ...), above all from the north and central Italy.

This also involves the acquisition of another very important data, the chromatic one, in addition to the drawing, since this also requires a particular sensitivity and experience, above all in identifying, when present, the different chromatic and/or drawing stratifications, through the more adequate survey techniques.

In fact, both in teaching and research, this component must be studied in depth, as a fundamental component, since the painted apparatus, in its various decorative typologies, becomes a tangible element aimed at making architecture, that of exteriors, very often directly connected to that of the interior. This is an extremely important aspect that requires specifically study, research and experimentation of methods and techniques - not just digital - to decipher, often in a very complex and modified condition, the deepest meanings to highlight, preserve and valorize.

The research on the representation of all this has therefore unfolded over the decades, addressing the themes of the various decorative typologies and their representations, including the aspect of degradation.

Abstract

I sistemi digitali della rappresentazione, oggi ormai invalsi nell'uso, permettono di elaborare una rappresentazione tridimensionale dell'architettura, che ne comunica nello stesso elaborato, o in più elaborati suddivisi per tematiche, gli aspetti dimensionali, proporzionali, compositivi, strutturali, tecnologici, stilistici e decorativi. Inoltre quelli storici, delle trasformazioni della fabbrica, riletti e confrontati attraverso le notizie storiche e i dati di archivio.

Ma talora questo non risulta ancora sufficiente ad esaurire il problema della conoscenza completa di tutti i dati del costruito, soprattutto di quelli più specificamente identitari, o meglio, alcuni dati richiedono di essere filtrati e decodificati attraverso conoscenze specifiche, che ne consentano la più completa e corretta rappresentazione.

Mi riferisco con ciò ad un dato bidimensionale, importantissimo, quello della decorazione dipinta sulle facciate dell'edilizia storica, diffusissima a Genova da fine Quattrocento a inizio Cinquecento, così come nei maggiori centri italiani del Rinascimento (Roma, Firenze, Mantova, Venezia, Treviso, Trento, …….), soprattutto del nord e centro Italia.

Questo comporta anche l'acquisizione di un altro dato importantissimo, quello cromatico, oltre a quello disegnativo, poiché anche questo necessita di una particolare sensibilità ed esperienza, soprattutto nell'individuare, quando presenti, le diverse stratificazioni cromatiche e/o disegnative, attraverso le tecniche di prelievo più adeguate.

Infatti, sia nella didattica che nella ricerca, questa componente deve essere oggetto di approfondimento, in quanto componente fondamentale, poiché l'apparato dipinto, nelle sue diverse tipologie decorative, diventa elemento concreto finalizzato al fare architettura, quella degli esterni, molto spesso direttamente collegata a quella dell'interno.

Dunque un aspetto importantissimo che richiede specificamente studio, ricerca e sperimentazione dei metodi e delle tecniche – non solo digitali – per decifrare, spesso in uno stato di fatto assai complesso e modificato, i significati più profondi, da evidenziare, conservare e valorizzare.

La ricerca sulla rappresentazione di tutto ciò si è dipanata dunque nei decenni, affrontando i temi delle diverse tipologie decorative e delle relative rappresentazioni, compreso l'aspetto del degrado.

Introduction

The digital systems of representation, nowadays widespread in use, allow the elaboration of a three-dimensional representation of the architecture, of immediate comprehension, which communicates in the same elaborate, or in more elaborates subdivided by themes, the dimensional, proportional, compositional, structural, technological, stylistic and decorative aspects. The state of art of the architecture; precise and detailed surveys that also allow historical reading, from the birth of the factory to its transformations, through comparison with historical information and archive data.

Moreover, all this is often not yet sufficient to exhaust the problem of complete knowledge of all the data of the built, and sometimes even of those more specifically identity; in fact, some aspects

that are often only partially preserved, and they are also difficult to identify and read, require to be filtered and decoded through specific knowledge.

I refer in particular to a very important two-dimensional datum, that of the drawing of the painted decoration on the facades of the historical building, widespread in Genoa from the late fifteenth to early sixteenth, up to the eighteenth century, as well as in major Italian Renaissance centers (Rome, Florence , Mantua, Venice, Treviso, Trento, ..), in the palaces, in the villas and in the buildings in general, above all in the north and in the center of Italy, including the very important datum of the relative chromatic values.

But, to identify, the different chromatic and/or drawings stratifications, to be documented with the most appropriate survey's techniques, a particular sensitivity and experience is required, because this very important aspect requires specific studies and research, and then experimentation of the methods and of the techniques - not only digital - but rather, exquisitely traditional graphics, to decipher and document correctly, often in a complex and modified state of art, the most significant phases, to be conserved and valued, to govern not only the quality of the architecture, but also the quality of life, in the social and cultural spheres where man lives and works, recognizing himself in a a stratified tradition.

Who writes has developed this research over the decades, and the survey and its representation, through the themes of different types of decoration, including the appearance of degradation: in fact, the painted apparatus, in the various types of decoration, and compositional, becomes a concrete element of the architectural facies of the exteriors, often directly connected to the very conformation of the architecture.

This component is present and fundamental both at *the urban and environmental scale - streets, squares, fabrics, sections and entire historical centers - but also at the scale of landscape-environmental episodes, at all levels of the building, therefore to all the levels of perception and fruition*, which expressly underlines the historical, morphological, stylistic, constructive and decorative values.

In this regard, the historic center of Genoa was the scene of extensive urban redevelopment operations carried out through the interventions on the facades of entire streets and squares, constituting over time a network of great urban-environmental value, exemplified by the case of the route of the "Strade Nuove " in Genoa[1]which, together with the system of the Palazzi dei Rolli, in 13 July 2006 that have been included in the World Heritage List. For Liguria it's very important the ad hoc legislation of the Region of the year 2003, following the study and research entrusted to the working group consisting by P. Falzone, V. Galimberti, P. Gasparoli, R. Soro[2] , since 2004, the application spread to the Ligurian historical centers.

So even today, for those who face this so important issue of the historical building, it seems to me fundamental to reaffirm the theoretical assumptions that remain firm, acquired, reference points:

1. The theme of the colour of the finishes of the historical elevations (colorings, painted apparatuses but also stucco finishes, wall coverings and wall hangings), as an indispensable element of identity

[1] This is the sixteenth-century "Strada Nuova", now Via Garibaldi, of the seventeenth-century "Strada Balbi" and of the eighteenth-century "Strada Nuovissima" connecting the two, now Via Cairoli.

[2] P. Falzone, V. Galimberti, P. Gasparoli, R. Soro, IL PROGETTO DEL COLORE, Erga, Genova 2001

of the historical places, to all the reading scales, must always be considered, and developed, in its close relationship with architecture. With regard to this theme, and to all the related problems of a historical, theoretical, cognitive, technical and operative nature, it is clear that it constitutes one of the aspects of that complex system, which is the historical city, or the historical building, of which the components are divided only by necessity of study and work: because *a place is a total qualitative phenomenon that can not be reduced to any of its individual characteristics (.....) without losing sight of its real nature*[3].

2. The survey is an indispensable contribution to the knowledge of this heritage, especially for its conservation, to all scales of the building. For this purpose an exhaustive project of colourr survey is fundamental, that is aimed at the knowledge of architecture in its completeness of all its components, both for the conservation of this aspect of heritage, it must turn to investigate the double dimension, chromatic and material, being a component not only figurative, of surface, but of a real constructive component.

In fact, the methodological approach of all the research that I have carried out in this field is to investigate an architectural / constructive fact, remembering that even the painted facades or the colour of the fronts are the result of a constructive building process, therefore , should always be framed in reference to the vertical perimeter wall structure, since the techniques and materials used for colourings or other types of finish are the last step of a unitary construction procedure, as a unitary is the architectural project, also with regard to the "colour" aspect "And its use, for the purposes of" making architecture ".

3. This type of knowledge, is very important to identify, in addition to the colours and decorative types of individual cases (building level), the building material in the complex (urban-building level), and the city (level urban), the rules and methods of use of decorative repertoires, colours, materials and techniques of execution: indispensable for the purposes of correctness and historical/ figurative /technological compatibility of both conservation and recovery, which unfortunately still today it is not sufficiently practiced, and often with incorrect "interpretations".

4. The study of the colour and of the façade finishes is inseparable from that of the building organism, but this is also true for the urban context space: another very important point of the question, still too often not considered, especially in cases of project of the new in the historical city.

Cesare Brandi, in the opening speech at the 1984 Rome Convention, began with a reference to this theme: In fact, the problem of plaster, of colour and of finishes, in historic buildings, is no less important than that of thecolour in the restoration of the paintings. Basically it is the same, nor does it differ from the theoretical point: the only difference is that, for architecture, it connects to urban planning, and that urban planning is not so much a discipline as it is the same way of being, of make itself known, of the city as a complex of buildings in its historical identity[4].

5. Another of the assumptions that I still want to underline is that the problem of conservation and maintenance of the colour of basic construction is a parallel problem, not secondary (contents and philosophical / methodological orientations), to that of intervention on the colour of emergencies

[3] C. NORBERG-SCHULZ, Genius Loci, Milano 1979

[4] C. BRANDI, Intervento di apertura al Convegno Intonaci, Colore e Coloriture nell'Edilizia Storica, in Atti del Convegno di Studi (Roma 1984), Supplemento al n.35-36", Bollettino d'Arte, Roma 1986, p. 6.

architectural. Because the image of the city is unitary, an expression of the history that has identified it over time, and therefore formed by the coexistence of both categories, closely linked to each other, and therefore to this overall reality we must always refer, whatever the type of building on which one intervenes, and however partial the intervention may be. So analogous must be the methods of approach and attention, for the reciprocity of the effects that are determined at the context level, as when dissonant and ungrammatical interventions are carried out, even in the smallest and most modest building, but belonging to a relevant historical context.

The Genoese painted façades and the colour of the city.

In the context of the complete theme of the colour of the city, the specific theme of the Painted Façades, a phenomenon for which Genoa has been famous over the centuries - most of all in the sixteenth century, the golden age, time of the greatest diffusion and decorative splendor - has found, after decades of negligence and indifference, increasing attention, starting from the great moment of the Conference-Show Painted Façades, of 1982, in which the restorations are resumed, even for isolated cases.

Subsequently, following the interventions in the historical center, on the occasion of the "Colombiane" in 1992, of the Jubilee in 2000 and particularly significant and consistent in 2001, on the occasion of the G8 Summit in Genoa, and finally in 2004, with Genoa as European Capital of Culture[5], there has been a remarkable step forward in the knowledge of this phenomenon, but especially in its conservation / enhancement. So that the ancient center of Genoa is like a 'Museum of pictorial art as was the case with the stupefied descriptions of the many scholars and travelers of the Grand Tour who visited Genoa until the nineteenth century, while the Genoese guides of the seventeenth century did not give much importance to the phenomenon except in the case of painted facades with figures[6].

Meaning and tradition of the painted façade in Genoa

The painted facades in Genoa, documented at least since the middle of the fifteenth century, has always been inseparable from the morphology of the territory, urban development and from Genoese building culture, of which it documents mainly the Renaissance evolution, both in individual buildings and urban transformations, with the opening of the new sixteenth-century axes, characterizing both spaces and volumes that, precisely from the painted finishes, often draw their identity.

Thus, through the methodological work and the activity developed over time, in Liguria and throughout Italy, the 2004 International Conference organized and edited by the writer underlined, among the many topics of interest, as the main meaning of 'colour historian 'is in the restoration of the facades as an element of reading and redevelopment not only of the buildings but of the entire

[5] Interventions that have been reported in numerous specific publications: Speciale G 8, ARKOS Magazine Supplement, year 2 n. 1/2001; ARKOS Speciale, GENOA, THE RESTORATION OF THE PALAZZI DEI ROLLI, Supplement to Rivista ARKOS, n. 7/2001; ARKOS Dossier, Genoa, European Capital of Culture 2004, THE WORKS OF RENEWAL OF THE CITY, Supplement to Rivista ARKOS, n. 8 / 2004

[6] P. BOCCARDO, Le facciate nella lettura dei viaggiatori e delle guide, in AA. VV., Genua Picta. Proposte per la scoperta e il recupero delle facciate dipinte, Genova 1982.

urban space - which is related to the rest of the meaning of these works of outdoor art - as pursued and implemented in Genoa in these last years where the operations, very important, have led to the recovery of both phases of the building history of the city, both phases of history and the formal characters of the individual artifacts and facades. In particular, it should be emphasized that very precious examples of the oldest type, of late medieval style, less known and documented, have been rediscovered and restored.

A spectacular "open-air museum", where architecture, decorations, figurations painted on the facades of buildings and buildings are connected to a complexity of invisible contents, linked to the city's history, to its development, not only building but also civil, economic and social.

In Genoa in particular (but this happens in many other painted cities), the painted façade takes on the unifying element of the new fourteenth-sixteenth-century Genoese palace, which was created mainly for the incorporation of several medieval building units within the existing fabric. new formally unitary building reality through the new façade, which thus testifies, in the stratification of the remakes, the variation of taste, of the needs, and the building transformations undergone by the factory over the centuries; a painted apparatus that wants to create architecture, becomes architecture itself with regard to the external space, but also manifesto programmatic, political and social of the Genoese oligarchic families who aspire to the dogate and to the highest offices of the republic.

Among all these operations, it remains fundamental for the importance of the urban-building episode, of European level, which finally received the right enhancement through a complete intervention (facades, flooring, lighting ..) the case of the highly prestigious Renaissance rectilinear axis of new plant, the Strada Nuova of Genoa, now Via Garibaldi, connected to the other, very important, which precedes the street, of the Fontane Marose square, its natural scenographic backdrop with the fine painted façade of the Palazzo Interiano Pallavicino. From the short side of the square and from the fifteenth century Palazzo Spinola called "dei marmi", which perpetuates the medieval stone finish with white and gray stripes, the path of the Santa Caterina ascent, overlooked by palaces with precious painted facades, up to the edge of the historical city, that is to the Acquasola hill and to the villa palace of Antonio Doria, today Prefettura, which presents on the Largo Lanfranco the two painted facades, restored in 1982, and again in 2001, with more updated criteria and attentive to reading and interpretation of the painted text. To the west the Strada Nuova connects only in the eighteenth century, through the Via Cairoli (the Strada Nuovissima) opened in 1777, and the Piazza del Guastato (now dell'Annunziata), to the seventeenth-century Monumental Road Balbi, both affected by façade interventions, predominantly plastic, with a few painted facades, such as the lateral ones of the palace of Stefano Balbi, via Balbi, then Palazzo Reale, and those of Palazzo Balbi Doria Lamba, located at the corner between via Cairoli and via Lomellini, with simple painted decoration that simulates the traditional stone apparatuses with horizontal bands, green and white, such as rusticane pilaster with pit diamond.

In addition to this privileged and aristocratic internal route of the New Streets, with the Rolli palaces, in 2006, of the Unesco Heritage Liste[7], the other fundamental episode, for those arriving

[7] Of the approximately 150 palaces ascribable to the Rolli structure, 83 were chosen for inclusion in the World Heritage List, considered particularly valuable on the architectural level and integrated according to the criteria of authenticity established by UNESCO. The name of "Palazzi dei Rolli" means "the palaces of the Genoa public housing", a residential hotel patrimony,

and arriving at Genoa from the sea was and is the continuous urban front of Ripa Maris, also interested, in 2001, by an overall intervention, together with that, behind it, of the parallel Via del Campo, with numerous painted facades. Today the ancient Ripa Maris is only partially characterized by the original porticoed medieval building, with high porticoes in the dark Promontory stone and elevations bands in stone and terracotta, transformed by recasting operations in large five- and seventeenth-century buildings whose facades, unitary, ranging from those plastered to monochromic to two-tone, to decorative plastic elements (Baroque and late Baroque era), to the few painted facades still preserved. The seventeenth-century façade of the Palazzo Cellario is exemplary for its decorative and chromatic richness, to which restoration has brought to light a rare architectural-decorative typology with striking scenography, architectural wings, festoons, weapons, trophies, panoplies, bronze herms, the work of the quadraturist bolognese Paolo Brozzi, unlike what happens in Genoa, where the external paintings are almost never very thick, nor do they use the perspective for spatial fictions of breakthrough or protrusion of the volume.

Behind the Ripa Maris, in the compact historical fabric, in the approximately parallel route consisting of the streets of Campo, Lomellini, Fossatello, San Luca, with the squares Pinelli, dell'Agnello, Banchi, Campetto, Soziglia, Vigne, and still in the street Luccoli, and in Via Scurreria, which goes up to the Duomo, many painted facades of great interest are restored on the occasion of 2001 and 2004. Thus, beyond the nineteenth-century axis of the Via San Lorenzo, orthogonal to the coast, in the Roman city the parallel streets Giustiniani, San Bernardo, Canneto il Lungo, with the short squares of Sauli, Cattaneo della Volta, Embriaci, complete the monumental layout studded by the numerous Palazzi dei Rolli, also restored in the facades.

Of particular interest was the 2004 intervention on the Via Lomellini[8], for the rich pictorial palimpsest developed on the facades, where stands the spectacular facade painted by Luca Cambiaso on the front of the Lomellini palace, Saluzzo, at number 4, flanked by the one painted in total harmony of the compositional and chromatic-decorative apparatus by Lazzaro Tavarone on the front of the Saluzzo building, formerly Adorno, at number 6; Opposite is the painted façade of the Palazzo Adorno, today Museo Mazziniano, at number 11, with "illustrious men" (dogali figures, councilors and dignitaries) painted on three floors; type of figures often inserted in recurring niche in many other buildings.

Today, what is preserved of the vast patrimony of facades realized mainly in the Renaissance, Mannerist and Baroque, is chronologically and stylistically referable to the full sixteenth century, because of the first phase, the oldest, fifteenth-century, less known and preserved, to type of character architectural, gothic, which simulates in painting in shades of white, gray and black the elements of built architecture, second half of the fifteenth still of late-Gothic forms, the restorations have brought to light or documented only pieces and fragments of frescoes, and in full a few facades. Some examples of the many still existing at the end of the nineteenth century cited by

established in the 16th century to make available the palaces of the richest and most powerful families of Genoa which, by the will of the Doges and in consideration of their architectonic characteristics of particular merit they form since 1576, by senatory decree, a public system of private residences that the owners had to make available to the republic to host the state visits. This reception system was based on an official list (called "Rollo") of the public housing of the private palaces available, to systematically cope with the arrival of sovereigns, princes, ambassadors and merchants.

[8] Very ancient medieval axis in the area densely populated by artisans, immediately within the medieval walls, with the name of the family settled there since the Middle Ages, which builds monumental palaces.

Mario Labò and again by Piero Boccardo in 1982[9] have returned to light in the fabric of the historic city. The most famous, in the ancient medieval Piazza dei Doria, is the painted facade of the Palazzo di Andrea Doria which, almost completely lost the restoration of 1929, edited and described by Orlando Grosso[10], was finally restored in 2004. In the same The restoration of the mannerist painted façade of the Doria Quartara palace, in 2001, brought to light the fragments of the late gothic painted façade, with medieval turrets from which the Crusader flag of the Republic flies, a recurrent motif of the typology. Not far from the other important façade, rediscovered only in part during the 2004 restoration of the Grimaldi Cebà building in via Davide Chiossone 4, shows the same tardogotic architectural and decorative motifs: large, pointed arched monoforas painted in black and white blocks. One of the most complete and representative of the type is the restored façade of the Valdettaro palace of vico Indoratori 2, significant of the architectural transformation of the medieval porticoed building to stone wall, in a Renaissance palace with a regularized facade, plastered and painted on the four floors. .

So, in addition to the very important recovery of this part of history and image of the façades, almost unknown, the restorations have further highlighted the great diffusion of the second type of facades, the Renaissance - first influenced by Lombard taste, strongly classic, then by the world Roman - for its adaptability to any type of facade.

The wide story of the Genoese painted facades presents an articulation of the different types that sometimes makes rigid division difficult, even if it is necessary to frame this vast subject in periods and main types: study developed over time by the writer[11]in the following chrono-typology , referring to the bibliography and the vast body of the findings made.

In fact, the investigations and the study, the filing, the reliefs, both to complete what existed, and to document what has come back to light, were and are aimed at constructing a picture, as complete as possible, of the decorative and chromatic types, documented from the architectural-decorative-chromatic reliefs developed to the highest level of detail (from the scales 1/50 and 1/25 together with the 1/10 scales, 1/5 of detail up to the 1/1 scale, to the truth, when possible from the scaffolding), and to the construction of the repertoire of decorative types of facades, decorative elements, and Genoese chromatic characteristics, directly derived from precise documentation, building by building, façade for facade. Very important documentation to be used as a reference and control especially for all conservation / restoration / maintenance interventions, and to help broaden the cognitive and reference framework of this rich and very valuable heritage, but also very delicate, exposed to deterioration not only due to aging or wear and tear , but also for tampering and incorrect interventions, unfortunately still widespread. The main types identified, from the second half of the fifteenth century to the whole of the sixteenth and seventeenth centuries, are: A - Gothic type, of archaic taste, diffused between four / five hundred; B - Lombard type, widespread

[9] P. Boccardo, Testimonianze per le facciate perdute, in Genua Picta. Proposte per la scoperta e il recupero delle facciate dipinte, Genova 1982, pp. 46-56.

[10] LA GRANDE GENOVA, Bollettino Municipale, Anno IX n. 10, con rilievi di M. A. Crotta.

[11] Study started with the Cataloging of buildings with painted facades of the Historic Center of Genoa, in the years 1979-1980, for the Superintendency of Environmental and Architectural Heritage of Liguria and as a contribution to the International Congress of Genoa FACADES PAINTED. Conservation and restoration, 1982. Studies carried out over time are also published in the field of national university research: (MIUR Research 1998) and MIUR 2000 Research.

from the end of the fifteenth to the entire five hundred; C - Type informed of the prince's culture, diffused from the first half of the sixteenth century onwards; D - Type informed of the new street culture, widespread from half past five hundred onwards.

The case of Palazzo Interiano Pallavicino in Piazza Fontane Marose.

The importance of survey and critical reading derives from the case of the Interiano Pallavicino palace in piazza Fontane Marose. The bautiful painted façade of the palace was in a remarkable state of decay, with some major shortcomings of the painted plaster; the 2003-2004 restorations brought to light how much of the original painted façade emerged from the lack of plaster, and those removed until the original traces still exist; a facade has emerged characterized by much brighter and brighter colours, as is clearly distinguished from the photographs. The punctual survey from the scaffolding, during the restoration, allowed to make the relief in contact with the most minute elements (herms, capitals, etc ...), to read the perspective and stylistic characters of the design, and to compare the perfect correspondence in the contiguous areas between the rebuilding, punctual, with the original facade, perhaps degraded with the inclusion of marble balconies on the main floor, in addition to the details of the different colors. At the same time the measurements of the colours were performed with the samples of the international system of the Munsel Book of Colour. The survey from the scaffolding, coordinated by the writer, was carried out by P. Falzone, M. Caraffini, D. Aita in 2003.

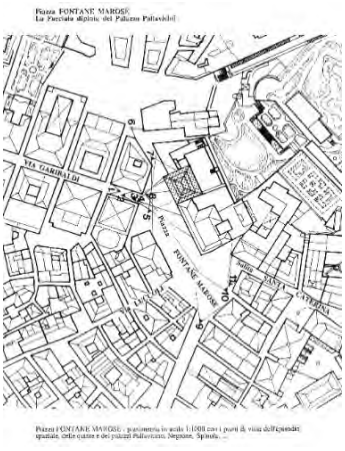


Fig.1 The facade before restoration. Survey in contact with capitals and profile hermes during restoration.

Fig. 2 Photographs at the end of restoration. The original parts of the late sixteenth century decoration were left in view around some windows of the second noble floor, found only in some parts under the next layer, painted, perfectly matching the original one, as can be seen in the details

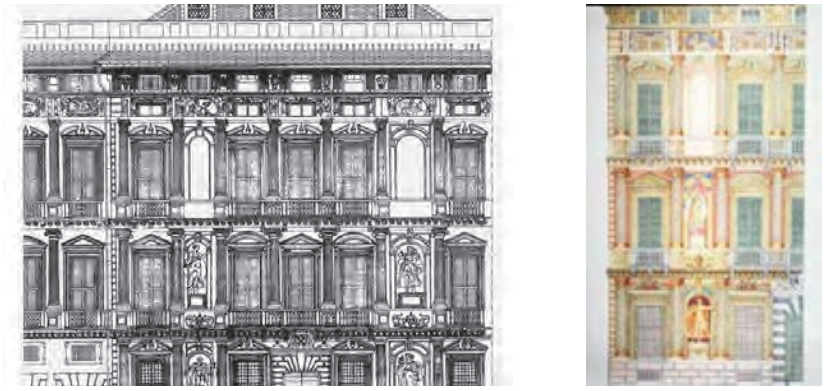


Fig. 3 Architectural-decorative survey. Original Scale drawing 1:50

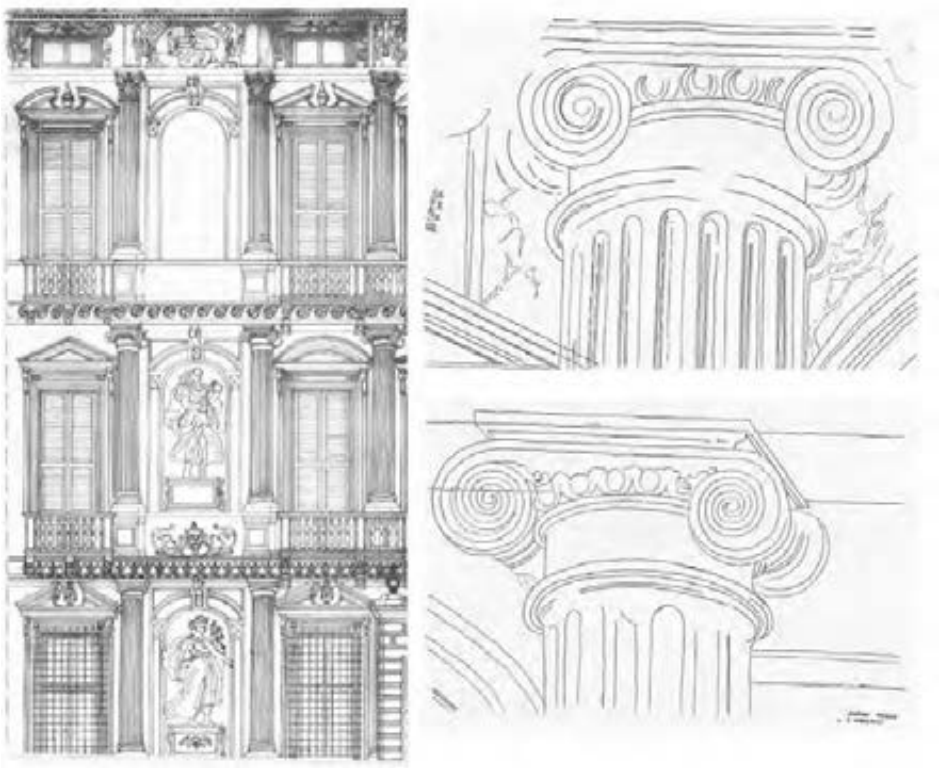


Fig. 4 Detail survey of the architectural order. Original scale 1:20, and Survey in contact with the capitals.

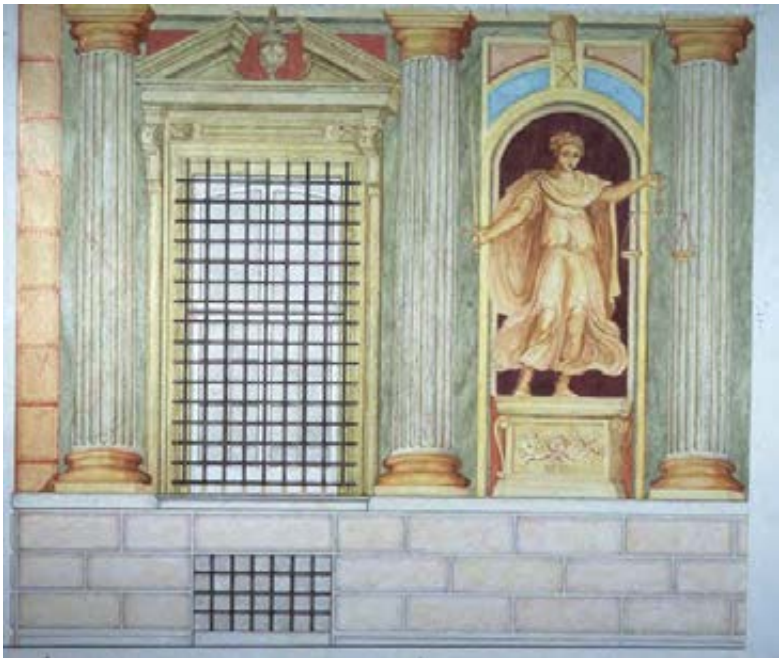


Fig. 5 Colour survey - detail of the order. Original scale 1: 20

Fig. 6 The two layers of painted decoration.

Architectural representation. A proposal starting from Leonardo considering a psychophysiological point of view

Marco Gaiani
Department of Architecture, Alma Mater Studiorum University of Bologna
email: marco.gaiani@unibo.it

Abstract

This paper aims at discussing the repositioning of the architectural representation and related methods and techniques, starting from the central role of the visual knowledge, as already clearly explained in the *Metaphysics* by Aristotle, and repurposed as the basis of neuroaesthetics by Semir Zeki. The text identifies as a cornerstone of the argument this assumption by Leonardo da Vinci: "Therefore it is necessary to figure and describe" and, starting from the Leonardo's complete formulation, it proposes its development by analyzing methods and limits of the current representation of architecture approaches and techniques, considering their critical reanalysis.

Abstract

Questo scritto si propone di discutere il tema del riposizionamento della rappresentazione di architettura e dei metodi e tecniche partendo dal carattere di centralità della conoscenza visiva, così come ben spiegato già nella Metafisica di Aristotele, e riproposto a base della neuroestetica da Semir Zeki. Il testo pone come momento centrale la declinazione di questo assunto da parte di Leonardo da Vinci "Adunque è necessario figurare e descrivere" e, a partire dalla formulazione completa leonardiana, ne propone lo sviluppo analizzando metodi e limiti dell'attuale rappresentazione dell'architettura, nell'ottica di una loro rianalisi critica.

Introduction

Representation is a key means in the architectural process as the construction of a building requires a representation of the idea and because the communication and exposure of the architecture necessarily pass through representation with the expectation to offer a three-dimensional vision, since the object itself cannot be actually shown.The architectural representation is different from other visual disciplines, e.g. painting, because it is a tool for construction and not a final result and

because it has a strong technical component rooted in a five hundred year long well-established practice, which has however its origin in writing dated back almost two thousand years ago.

Today architect's way to draw the project originates from those described by the Roman architect Marcus Vitruvius Pollio, who, in his *De Architectura*, described them using three Greek words without, apparently, their Latin equivalents. They were the *Ichnographia* (literally the graphical description of the traces left on the ground, i.e. the plan), the *Orthographia* (literally the graphical description of what starts from the plan, i.e. the elevations), the *Scenographia* (literally the graphical description of the building according to the scenic modes)[1]. They answer to the need for a conventional system able to account for the 'measures' of space as reciprocal proportional relationships and the need to depict the building as it appears at the man sight: "scenographia est frontis et laterum abscendentium adumbratio ad circinique centrum omnium linearum responsus"[2].

However, in the Vitruvius thought these representations are not a complete 2D restitution of the whole 3D building design, but they are simply the means of the *dispositio*, that is just the arrangement, i.e. the proper placement of architectural elements into a well-structured whole. Thus, for *dispositio* we may assume that what Vitruvius had in mind is the process of designing something, as distinguished from the completed design. *Dispositio* emerges through these three ways of 'depicting the work to be'.It is easy to notice how the representation forms developed over time, starting from the Vitruvius description, tried more or less consciously to bridge the gap between the simple representation of the *dispositio* and the entire building with all its features. Their main limit lies certainly in a basic inability to accurately describe the new knowledge added to the original by the architect, and therefore its inappropriateness to the process and to the type of knowledge to be communicate.Specifically, computer science has brought great changes in the representative process and the use of dematerialized means profoundly changed the management of the architectural project and its form of representation. However, no reflection has been conducted on effectiveness, efficiency and appropriateness of these new digital means. Not only regarding their suitability to the Vitruvian way and the related developments up to the famous letter of Raphael to the Pope Leone X, but also regarding the whole issue of the design by representation. Certainly, a cumbersome heritage of more than two thousand years of processes based on the Vitruvian description makes difficult to leave well-shaped and experimented path and techniques, not allowing a quick formulation of new mental categories able to stimulate new processing and communication methods for the architectural design representation. Nevertheless, the absolute absence of discussion on the topic, as if it did not exist or was a simple 'beautiful toy' to thrown away as soon as fashion turned on other and newer paradigms, is unexpected.

This absence, I think, is primarily due to the extreme difficulty to appropriately use new digital tools by the architect, from the first electronic drafting tables (the CAD systems) - that have almost eliminated any possibility of synthesis and creativity -, to the active sensors, able just to accumulate opaque clouds of millions of points not reusable for any design purpose, up to the recent BIM systems, unable to support the design concept phase, brought to the project development phase, moreover only in its final configuration.

[1] Marcus Vitruvius Pollio, *De Architectura*, I, 2, 1: "Species dispositionis, quae grecae dicuntur ideae, sunt hae: ichnographia, orthographia, scaenographia". On this topic see M. Gaiani, *Rappresentazione*, CLUEB, Bologna, 1993.
[2] Ibidem.

The main motivation could be find in the leading feature of the digital technology: the presence of a third element next to the traditional two, i.e. our hand directly linked to our sensory perceptual, cognitive and intellectual capacity, and a set of instruments to plot, mark, hatch (hardware). This third element is, as we well know, the software, which is a set of instructions, programs, databases able to transform a silicon chip into a high-level intelligence of a sophisticated drawing system. This new arrangement no longer based on two, but on three terms has led to a new structure of 'representing' with the presence of an intermediary between our hand and the finished drawing, generating a set of a-priori conditions for our work, but also providing new assist and insight to the architect both to document and to interpret the architecture, with the aim of an efficient design processing. The software potentially made of the new technology a powerful tool, but for architects it was one of the major limitations of their digital approach.

However, it is evident how digital technology could provide important contributions to highlight the significant of the object, lost in translation from the 3D space to the 2D paper sheet, exploiting its ability to visualize both images and 3D models, its possibility to memorize previous experiences, its capability to autonomously perform the automatic activities that usually skim he architect from the project goals. It allows, in fact, to access to read-write methods able to show completely the non-linear process of design, and those aspects, which the usual representation techniques by projection and section not allows to recognize, to fix and to make known, mainly for existing buildings. This paper aims at discussing the representation of architecture and related methods and techniques repositioning, starting from the central role of the visual knowledge, as well already explained in the *Metaphysics* by Aristotle, and repurposed as basis of neuroaesthetics by Semir Zeki.

The starting point is a full reconsideration of the representation process, moving from the most general approach embedded into the term that means analysis in the most general possible ground. The term representation comes from the Latin *repraesentatio*, and has a medieval origin, although the use that today we make of it is due to much later fortunes, mainly related to Leibniz and, later, to Kant that fixes the meaning of the German *vorstellung* as 'inner determinations of our mind in this or that relation of time'[3]. The Kant's meaning implies the need for a knower subject, a known object and a means or a system of means through which to carry out the knowledge; these are ultimately all the elements that are involved in the representation process, also for the architecture case. Finally, in the *Critique of the pure reason*, the understanding is the dominant faculty in processing representations.

These are also terms concerning the architectural representation process, and also the goal is the same: to acquire knowledge.

The Kantian meaning includes also two key issues that this writing aims to address.

The first: how to transfer a 3D world into a 2D image? There are important differences between perceiving the real world and perceiving it through images.

The second: is it today still efficient the system currently in use, based on 2D figuration?

Authors have suggested guidelines for good visual design[4]. Such rules-of-thumb, based on percepts

[3] I. Kant, *Critique of the pure reason*, 1781, section III, book II, division I, A 197/B 242.

[4] C. Ware, *Information visualization: Perception for Design*, Elsevier, San Francisco, 2004; E.R. Tufte, *Envisioning Information*, Graphics Press, Cheshire, 1990.

of very simple displays, are useful in understanding and guiding design. However, designers may have difficulties applying them to complex projects such as those of architecture. More recently, advances in human and computer vision have produced quantitative models of some aspects of visual perception (what draws attention in a display, visual clutter, perceptual grouping, capabilities of peripheral vision)[5]. While it seems logical that such tools should aid the representation of the design process, no progress has however been made.

To give answer to these two questions this paper entrusts a central role to the relevance of a famous statement by Leonardo da Vinci "Adunque è necessario figurare e descrivere" (therefore it is necessary to figure and describe)[6] and, starting from the Leonardo's complete formulation, its development is proposed by analyzing features and limits of the current representation of architecture methods and techniques, using a psychophysiological approach.

Final aim is an attempt to reconstruct the theoretical bases of representation as a science, considering representation as a form of knowledge.

A psychophysiological approach to the representation of architecture

The development of modern neuroaesthetics is rooted in the Rudolph Arnheim work who applied the principles of Gestalt to the development of a real psychology of art[7]. Following Arnheim, it is no longer possible to consider the visual artistic process as self-enclosed or inspired from above, but this event could be considered as a progression of the activity done by the eyes in everyday life. This position has been updated by the founder of modern neuroaesthetics, the neurobiologist Semir Zeki. According to whom artists and visual brains use two different methods to perform the same task: selecting the constants of a continuously changing reality to provide us with a simpler and more stable representation of the world. As Zeki explains: "All visual art must obey the laws of the visual system"[8].

I do not think to be improper taking as a base hypothesis for a quick analysis on which cognitive processes occur also on the representation of architecture, the well-known thesis of Semir Zeki: "the brain has a fundamental task, the acquisition of knowledge about the world" [9].

This knowledge consists of the specific and stable characteristics of what surrounds us: "the brain is only interested in obtaining knowledge about those permanent, essential, or characteristic properties of objects and surfaces that allow it to categorize them."[10]

The fundamental problem to be solved in order to reach knowledge is the extraction of the information from a mass of ever-changing data, which implies that the brain carries out three separate but interdependent processes:

- the selection from a wide range of always changing information of only those useful to identify

[5] Cfr. R. Rosenholtz, A. Dorai, R. Freeman, *Do predictions of visual perception aid design?,* in "ACM Transactions on Applied Perception", vol. 8, n. 2, article 12, 2011, 20 pp.

[6] Royal Library, Windsor, Fol. RL 19013v, K/P 144 v, Nota I.

[7] F. Gori, *Practice and Theory of Visual Representation*, in "Gestalt Theory", vol. 38/1, 2016, pp. 17-40.

[8] S. Zeki, *The neurology of kinetic art*, in "Brain", n. 117, 1994, pp. 607-636.

[9] S. Zeki, *A Vision of the Brain*, Blackwell, Oxford, 1993.

[10] S. Zeki, *Art and the Brain*, in "Journal of Consciousness Studies: Controversies in Science& the Humanities", vol. 6, n. 6-7, 1999, pp. 76-96, p. 97.

the constant and essential properties of objects and surfaces;
- the cancellation and rejection of all non-relevant information for this purpose, and the comparison of the selected information with the recordings of the past visual information;
- the identification and classification of the object or the scene analyzed.

Summarizing, as Zeki himself describes in *The Inner Vision*[11], today we interpret the vision as an active process in which the brain, in its search for knowledge of the visual world, operates a choice between all available data and, comparing the selected information with stored memories, it produces the visual image.

This new concept was possible through a discovery of great importance: the visual brain consists of many different visual areas, which are functionally specialized to process and perceive different attributes of the visual scene. The visual brain discriminates objects from their backgrounds by using many different signals, such as color, motion, depth and luminance. But because many of these signals are similar for both the object and the background the visual system must rely on small differences in signal, or cues, for its processing. To allow rapid, and correct, discrimination of objects it must integrate different cues, utilizing every available source of information. Different psychophysical studies [12] shown that the human visual system integrates information from different cues so that objects defined by several cues enjoy perceptual advantages over those defined by only one cue. Different attributes of the visual scene are managed in topographically distinct visual brain areas; and there are different processing systems for the different attributes of the scene itself. It is known that these different processing channels have different features. E.g., objects in the visual scene are defined by different cues such as color and motion. Through the integration of these cues the visual system is able to utilize different sources of information, thus enhancing its ability to discriminate objects from their backgrounds. However, color information is processed at lower spatial resolution than information modeling, while the motion-related channel is largely color blind; i.e., the movement perception is greatly reduced when the stimuli in motion have the same brightness but different colors[13].

The time taken to process different attributes varies; consequently, we see some attributes before others[14]. The color is perceived before the shape, the shape before the movement: the interval between the perception of color and the movement is about 60-80 ms. It follows that there is a perceptual asynchrony and hierarchy in visual perception. Because perceiving an attribute is tantamount to becoming conscious of it, it follows that we become conscious of different attributes at different times. Visual consciousness is therefore distributed in time. Given that we become conscious of different visual attributes because of activity at different, functionally specialized, areas of the visual brain, it follows that visual consciousness is also distributed in space.

---

[11] S. Zeki, *Inner Vision: An Exploration of Art and the Brain*, Oxford University Press, Oxford, 1999.

[12] See e.g. J. Rivest, I. Boutet, J. Intrilligator, *Perceptual learning of orientation discrimination by more than one attribute*, in "Vision Research", n. 37, 1997, pp. 273-281; H. Nothdurftm, *Salience from feature contrast: additivity across dimensions*, in "Vision Research", n. 40, 2000, pp. 1183-1201; M. Kubovy, D.J. Cohen, *What boundaries tell us about bindin*g, in "Trends in Cognitive Science, vol. 5, 2001, pp. 93-95.

[13] P. Cavanagh, C.W. Tyler, O.E. Favreau, *Perceived velocity of moving chromatic gratings*, in "Journal of the Optical Society of America A", vol. 1, n. 8, 1984, pp. 893-899.

[14] S. Zeki, *Behind the Seen: The functional specialization of the brain in space and time*, in "Phil. Trans. R. Soc. B", n. 360, 2005, pp. 1145-1183.

These anatomical facts denote two singular features of the organization of the visual brain, from which many consequences arise.

The first is that the specialized visual areas are not all connected with a predominant area able to 'interpret' or understand the results of their processing process. On the contrary each area has multiple connections with the others. The second consequence is that no area of the cerebral cortex is receptive only, but it receives, and at the same time it transmits signals. The emerging knowledge organization is distributed and interconnected. Therefore, visual consciousness is not a single unified entity, but it consists of many micro-consciousnesses.

What overall arises is a framework in which our cognitive processes are not a unique thick magma of inextricable complexity, but a series of well-specialized and clearly identifiable tasks that can be faced one by one. In order to have a conscious and unitary perception of the scene it is therefore not necessary to unify the different activities of the different perceptive/elaborative systems, but rather the micro-consciousness generated by the activities themselves.

A second key-point for our considerations is in the David Marr work made ten years before Zeki's *The Inner Vision* [15].

Marr describes vision as a 'complex information-processing system', whose purpose is to reveal 'what is present in the world, and where it is'. He stated that "Vision is a process that produces from images of the external world a description useful to the viewer" [16]. We know that the input to this process is a two-dimensional visual array (light entering the retina) and that the output is perception of the three-dimensional world. This is completely analogous to the architectural drawing system where a 2D representation need to be translated in a 3D world.

From an operative point of view, he suggested that the visual system generates a sequence of increasingly symbolic representations for a scene, progressing from a 'primal sketch' of the retinal image, composed of visual primitives such as edges, lines and blobs, through a '$2^{1/2}$D sketch' where these primitives are further processed and include an indication of depth relative to the observer, to recognizable 3D objects and scenes in the end.

Early 'primal sketch' involves the extraction of information regarding edges and intensity changes, then a complete 'primal sketch' is created by grouping surfaces and common areas.

After gaining information about groupings and surfaces the viewer needs some spatial information consisting in an evaluation of the spatial locations of objects and materials in relation to the viewer.

At the end, a full 3D description of our spatial environment involving the identification of the objects and materials structure in our visual scene is done. It allows us to work out the 3D environment from a non-egocentric point-of-view.

More completely, integrating the Marr theory with the subsequent contributions, the levels of this processing can be classified as early, intermediate, and late vision.

Early vision extracts simple elements from the visual environment, such as color, luminance, shape, motion, and location[17]. These elements are processed in different parts of the brain.

---

[15] See K.A. Stevens, *The vision of David Marr*, in "Perception", vol. 41, n. 9, 2012, pp. 1061-1072.

[16] D. Marr, *Vision: A Computational Investigation into the Human Representation and Processing of Visual Information*, MIT Press, Cambridge (MA), 1982.

[17] M. Livingstone, *Vision and Art: The Biology of Seeing*, Abrams, New York, 2002.

Intermediate vision segregates some elements and groups others together to form coherent regions in what would otherwise be a chaotic and overwhelming sensory array [18].
Late vision selects which of these coherent regions to scrutinize and evokes memories from which objects are recognized and meanings attached [19].
This sequence of visual processing is likely to be reflected in aesthetics [20]. Any work of art can be decomposed into its early, intermediate, and late vision components, and individual works of visual art (paintings) can be identified as examples of each of these different componential stages.
If we accept Marr's 'sketch' theory, the implication is that the perception of visual complexity is a function of these visual primitives. More primitives and more types of primitives generate greater visual complexity. For this reason, the larger and more complex is the object that we intend to represent, the more we must simplify its parts, making the task 'compatible' with the limited processing resources of the conscious unit.
Our perception uses the same procedure to keep the complexity of representation low and constant: the larger and more complex is the selected object, the more perception detects only the most important variations, standardizing the less important ones. When we produce a new representation inevitably we lean to reproduce this mechanism, in art as in architectural drawing. This way, draftsman and perception maintain a low and constant complexity in every step of visual representation. We easily understand a 2D wireframe drawing if they use a limited set of primitives. When the number of primitives increases the drawings understanding become progressively more complex.
Furtherly, Marr's theory includes three hierarchical levels of analysis:

- the *computational level* which identifies the problem or computational goal to be solved together with any constraint or strategy for solving the problem;
- the *representational and algorithmic level* which spells out the method used to process the input data;
- the *implementation level* consisting in the final stage where the program is executed in a device.

Finally, Marr's computational framework reposes on some assumptions about the nature of biological information processing: (1) *separability of computational strategies*, (2) *separability of representations*, (3) *a pipeline nature of information processing*, and that (4) *the representations employ primitives of low dimensionality*.
These features make the framework particularly suitable to implement systems of visual representation for complex objects, allowing the easy exploitation not only of the low-level vision (the usual target of the wireframe drawing), or the high-level vision (the target of the photorealistic perspective rendering) but also the mid-level vision, presenting enough object specifications to avoid misunderstanding and, at the same time, to permit a relatively easy and simple processing.

[18] I. Biederman, E.E. Cooper, *Priming contour deleted images: evidence for intermediate representations in visual object recognition*, in "Cognitive Psychology", n. 23, 1991, pp. 393-419; S.P. Vecera, M. Behrmann, *Spatial attention does not require preattentive grouping*, in "Neuropsychology", n. 11, 1997, pp. 30-43.
[19] M.J. Farah, *The Cognitive Neuroscience of Vision*, Wiley-Blackwell, Hoboken, New Jersey, 2000.
[20] A. Chatterjee, *Prospects for a cognitive neuroscience of visual aesthetics*, in "Bulletin of Psychology and the Arts", n. 4, 2003, pp. 55-59.

Following Marr's thinking, the process by which humans visually recognize objects offers a framework in which these components and their combinatorial properties can be considered as elements for a new architectural representation system.

The Leonardo's way

Zeki's sentence at the bottom of this paper is not new indeed but is well rooted in the Western culture. Basically, we could find the same statement in an Aristotle writing that, moreover, well underlines the primacy of the sense of sight: "All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves; and above all others the sense of sight. For not only with a view to action, but even when we are not going to do anything, we prefer seeing (one might say) to everything else. The reason is that this, most of all the senses, makes us know and brings to light many differences between things"[21].

This work remains well-known in the following centuries and is popular in the cultural circles of the Italian Renaissance.

A major reader of the passage is Leonardo da Vinci, who used to study Aristotles having translations of his writings in his personal library. Annotations about them are in the *Manuscript M*[22], a document containing his notes on Euclid, Aristotle and the great classical authors. We find a direct reference in a note of the sheet K/P 144 v, today at Windsor Castle in London, in which Leonardo states "Adunque è necessario figurare e descrivere"[23] recalling not only Aristotle but the whole medieval anatomical and surgical tradition from Guglielmo da Saliceto to Mondino da Liuzzi[24]. In this tradition, there is a real cognitive centrality of the sense of sight that Leonardo defines as 'il miglior senso' (the best sense).

Result of this preeminence of sight, painting, which passes through the sense of sight, is the superior art form. This is not a simplistic formalization of a 'visual science', deriving from his activity as a painter, but is supported by an articulated argumentation. The first chapter of the *Libro di Pittura* is titled, significantly, *Se la pittura è scienzia o no*. Leonardo comes to his own definition of painting as a scientific activity, in which it combines experience and theoretical elaboration and in which every effect and form should be based on a true understanding of nature, as light and shade, color, perspective. This principle has an Aristotelian base, but it is also not far from the fundamental assumptions that will be affirmed with the first scientific revolution.

The visual action is therefore cognitive before any other, and it is the necessary condition for each subsequent interpretative act. Using Leonardo's words, the eye competes the immediate perception 'dell'opere de natura', and painting and drawing, which are 'discorso mentale' and 'artificio', as well as 'scienzia', in turn serves the sense through vision.

---

[21] Aristotle, *Metaphysics*, Book I.

[22] Venerella, *The manuscripts of Leonardo da Vinci in the Institut de France*. 12 vols., Ente Raccolta Vinciana, Milano, 1999-2007.

[23] Cit.

[24] See D. Laurenza, *Art and Anatomy in Renaissance Italy: images from a scientific revolution*, in "The Metropolitan Museum of Art Bulletin", vol. 69, n. 3, 2012, pp. 4-48; A. Nova, D. Laurenza, *The Anatomical studies of Leonardo da Vinci. An Assessment*, in A. Nova, D. Laurenza (ed.), *Leonardo da Vinci's anatomical world*, Marsilio, Venezia, 2011, pp. 9-16.

He defines a conceptual circuit as follows[25]:

REAL
EYE
MIND
PROCESSING THROUGH PAINTING SCIENCE
EYE
MIND
REAL

We see that drawing and painting are central in the whole knowledge process and the process is easily subdivided in a series of elementary steps as in the Marr's theory.
This process he called 'experience' of the world around him 'gained through the senses' and it was his starting point for new understanding.
This knowledge process reaches in Leonardo's work its highest expression in the anatomical visualization process.
No other subject engaged Leonardo more than his work on the anatomy of the human body. The human body was the principal subject of the Renaissance artist and then at first Leonardo considers especially the aesthetic side of anatomical studies. However, Leonardo that argued to be the field where it is possible to easily combine the importance of observation with an original thought, and then face it as a scientific activity[26].
Vasari speaks of Leonardo as an 'anatomist' only: "Because of Leonardo we have a deeper knowledge of human anatomy and the anatomy of the horse"[27].
The knowledge about the single parts that constitutes the human body takes place in the Leonardo's knowledge process through direct observation. Through the images processed by the visual experience, the parts of the body become intelligible and visually communicable, actively participating to the cognitive process, also through the verification with the real.
In the winter of 1507-08, Leonardo witnessed the peaceful demise of an old man in a hospital in Florence. This was the starting point of five years of intense anatomical investigation. From 1510 to early 1513, Leonardo was in Milan. During the first two years, he collaborated with Marcantonio della Torre, professor of anatomy at the University of Pavia, dissecting up to twenty corpses. As he writes in the *Treatise on Painting*, he concentrated on the bones and muscles, analyzing their structure in purely mechanical terms. Many drawings of 1510-11 demonstrate these Leonardo's studies. The results in terms of graphics were spectacular.
The first painting in which it is possible to see the results of its anatomical researches is perhaps the Saint Jerome, a not completed oil painting on a table (103 × 75 cm) dating back to around 1480 and now at the Vatican Museums, which shows an accurate study of the shoulder and neck muscles. A

[25] See P. Salvi, *L'anatomia di Leonardo "figurare e descrivere"*, CB Edizioni, Poggio a Caiano, 2013, pp. 29-56.
[26] F.C. Wells, *Leonardo, Anatomist or Natural Philosopher?*, in *The Heart of Leonardo*, Springer-Verlag London, 2013, pp. 17-33.
[27] G. Vasari, *Leonardo da Vinci*, in *Le Vite de'piu eccellenti pittori, scultori ed architettori, nelle redazioni affrontate del 1550 e 1568*, R. Bettarini, P. Barocchi, (eds.), 6 vols., S.P.E.S., Florence, 1966-87.

beautiful drawing in the Windsor collection where are illustrated the neck muscles shows clearly the whole process [28].

Leonardo's anatomical studies introduce visual diagrams as a standard for communicating knowledge, a conviction that "true knowledge of the shape of any body will be arrived at by seeing it from different aspects."[29] To improve the knowledge capabilities of his drawings Leonardo defines a specific graphic language mainly based on architecture and machines project drawing techniques: transparencies, cross sections, exploded figures, three-dimensional shading. The developed methods are still in use today. As underlined by James Ackerman coming to the representation of a skull that will be later discussed: "What gives to the Leonardo's skulls [drawings] their special vividness is the exceptional and inventive use of techniques that had been developed during the previous generation of the fifteenth century and among Leonardo's contemporary artificial perspective and foreshortening, proportion and chiaroscuro, and the handling of gradations of light and shadow."[30] Leonardo clarifies how drawings do not suffer any limitations with respect to the real 3D object, since they consider all aspects, as the eye turning around it, to give 'true and full evidence'[31] in the 2D translation, as well demonstrated by a wonderful study on bones and muscles of the arm today in Royal Collection at Windsor Castle[32].

An important feature of the Leonardo's work, allowing us a further comprehension of its 'knowledge by representation', concerns his technique of omission of not useful parts. As demonstrated by a beautiful drawing about the vertebral column, by disassembling the spine into its individual parts, he graphically illustrated their structure, which would otherwise have had to be explained at great length[33]. To this end, he enlarged certain bones disproportionately to emphasize their particular functionality; with others, he considered necessary to show them from various perspectives to facilitate the understanding from all sides. Leonardo himself explained: "Through this simple way of drawing from various perspectives, one provides full and true knowledge of them"[34].

Anatomy show also another important character of the Leonardo's 'to draw is to understand'. This is not limited to what you see directly. In Codex Urbino, he emphasizes its unique quality "Drawing is of such excellence that it not only studies the works of nature but it is more infinite than those made by nature [...] and, on account of this, we conclude that it is not only as science but as a divine power…"[35].

This whole system is well demonstrated by two drawings of a human skull, that Leonardo obtained

---

[28] *The superficial anatomy of the shoulder and the neck*, c. 1510-11, pen and ink with wash over black chalk 29.2 × 19.8 cm, Keele & Pedretti 137r. K. Keele, C. Pedretti, (eds.), *Leonardo da Vinci. Corpus of the anatomical studies in the collection of Her Majesty The Queen at Windsor Castle*, 3 vols., Harcourt Brace Jovanovich, London, 1978-1980.

[29] K.H. Veltman, *Leonardo da Vinci Untersuchungen zum menschlichen Körper*, in Klaus Schreiner (ed.), *Gepeinigt, begehrt, vergessen. Symbolik und Sozialbezug des Körpers im späten Mittelalter und in der frühen Neuzeit*, Werner Reimers Stiftung, Bad Homburg, 1992, pp. 287-308.

[30] J.S. Ackerman, *Leonardo da Vinci's Church Design*, in J.S. Ackerman, J. Slosburg-Ackerman, *Origins, Imitation, Conventions: Representation in the Visual Arts*, MIT Press, Cambridge (MA), 2002, pp. 67-94, p. 68.

[31] Second "Ordine del libro" Keele & Pedretti 154r. See P. Salvi, *L'anatomia di Leonardo "figurare e descrivere"*, cit., p. 48.

[32] *The bones and muscles of the arm*, c. 1510-11, pen and ink over black chalk 29.3 × 20.1 cm, Keele & Pedretti 135v.

[33] *The vertebral column*, c. 1510-11, pen and ink with wash over black chalk 28.6 × 20 cm, Keele & Pedretti 139v.

[34] Keele & Pedretti 139v, Nota X: "Farai questi ossi del collo per tre aspetti, essendo congiunti, e per tre aspetti essendo separati; e così li farai poi per due altri aspetti, cioè veduti di sotto e di sopra. E così darai la vera notizia delle lor figure. […] ma per questo brevissimo modo del figurarli per diversi aspetti, se ne darà piena e vera notizia…"

[35] Fol. 50r and 116r. See M. Kemp (ed.), *Leonardo on Painting*, Yale University Press New Haven and London, 1989.

in 1489 [36]. He sectioned it vertically and horizontally to investigate its internal structure and exploited the potential of the axonometric. Only the combination of depictions from different perspectives can provide the viewer with a comprehensive and informative image of the inner workings of the skull[37]. As remarked by James Ackerman these drawings "could be used as a lesson in architectural draftsmanship, if the cranium is visualized as a dome. Indeed, they illustrate the three principal types of architectural drawing: plan, indicated in the perspective foreshortening of the horizontal cut, elevation, shown in the exterior profile of the skull, and section, represented by the vertical cut through the lower skull." [38]

Furthermore, these three beautiful illustrations show two other fundamental features of Leonardo's cognitive method: to understand the exterior, it is necessary to know the interior and not to stop at the surface; to know the whole, it is necessary to identify, disassemble and understand the parts individually. Finally, in the skull drawings, many features aim to illustrate the anatomy more theoretically than empirically. The grid of lines, e.g., is intended to illustrate the conformity of the head to a system of privileged geometrical proportions. Within them are geometric lines placed in search of the *sensus communis*, the confluence of the senses within the brain in the medieval doctrine. Leonardo places it at the intersection of three orthogonal lines – an anterior-posterior axis, a vertical axis through the upper point of the skull, and a lateral axis roughly along the ridge of the *dorsum sellae*. This way Leonardo can compare the microcosm of the body and the macrocosm of the universe, following his ancient sources: Plato, Aristotle, Galen, and the anatomist Mondino de' Luzzi. The drawing is thus not merely a depiction of a skull, but a symbol that can't be seen in this form in reality; and it is not a pure anatomical research, but a search for perfection, an ultimate goal not only for Leonardo, but for the whole Renaissance culture.

In Leonardo's days, the most influential expression of these views was the Vitruvius treatise. In *De Architectura* the roman architect introduces human proportions as analogous to architectural proportions. Just like the body, a well-designed and harmonious building should be divisible into equal units, and all its measurements should be expressible as simple fractions of the whole.

In the famous *Vitruvian man*, probably the most famous drawing existing, Leonardo depicts a human body that conforms perfectly to the systematized proportions laid out by Vitruvius[39]. The perfection of this ideal human form corresponds visually to the early humanist belief in the unique central placement of human beings within the divine universal order[40].

Summarizing, as remarked by Kim Veltman "Leonardo's approach, with its notions of layers,

[36] *The skull sectioned*, 1489, pen and ink over black chalk 18.8 × 13.4 cm, Keele & Pedretti 43r; *The cranium sectioned*, 1489, pen and ink 19.0 × 13.7 cm, Keele & Pedretti 42r.

[37] See M. Clayton, R. Philo, *Leonardo Da Vinci: Anatomist*, Royal Collection Publications, London, 2012.

[38] Cit. p. 68.

[39] Leonardo da Vinci, The Vitruvian man, c. 1490, pen and brown ink, brush and some brown wash, over metalpoint, 34.4 x 24.5 cm., Cabinet of Drawings and Prints, Galleria dell'Accademia, Venice, 228.

[40] On the Vitruvian Man cfr.: P. Salvi, The midpoint of the Human Body in Leonardo's Drawings and in the Codex Huygens, in C. Moffatt, S. Taglialagamba (eds.), Illuminating Leonardo - A Festschrift for Carlo Pedretti Celebrating His 70 Years of Scholarship (1944–2014), Brill, Leiden, 2016, pp. 259-284; A. Perissa Torrini (ed), Leonardo. L'uomo vituviano fra arte e scienza, Marsilio, Venezia, 2009; F.I. Apollonio, P. Clini, M. Gaiani, A. Perissa Torrini, La terza dimensione dell'Uomo vitruviano di Leonardo, in "Disegnare idee immagini" n. 50, 2015, pp. 48-59; A. Hudson Jones, Leonardo da Vinci: Art, anatomy and humanism, in F. Fiorani, A. Marazeula Kim (eds.), Leonardo Da Vinci Between Art and Science, University of Virginia, 28 Mar. 2014, <http://faculty.virginia.edu/Fiorani/NEH-Institute/essays/jones>.

levels, transparency, cutaways, sections opens up the body in a new way. Surface features and below the surface features are now integrated into the same process of understanding. But at the same time there is a curious way in which the new methods of visualization lead to a process of externalization: everything can be seen, brought out into the open, not just the insides of arms and legs, but also the inner organs and even the inner expressions of the mind and soul. There is a new belief that everything can be brought to the surface. Hence the study of anatomy, art and an early form of psychology emerge together in Leonardo's notebooks."[41]

Mainly, a systematic and very topical way of representing appears. Firstly, the representation is placed as a basic cognitive act. Then its processing is identified as a simple system involving a myriad of semantically organized elementary procedures, rather than large 'slow' and not easily reconfigurable complex processes. This system is completely in line with the one outlined from today's neuroscience because it is associated with the ability to exploit techniques of understanding that today we could attribute, following Marr, to the mid-level, an area completely unexplored by contemporary methods and techniques. Following Marr's 'Principle of Modular Design' "any large computation should be split up and implemented as a collection of small sub-parts that are as nearly independent of one another as the overall task allows"[42]. Note that modularity is expected from the computation, and not just from the underlying neural architecture, i.e. the visual system can be partitioned into modules corresponding to computational strategies, each understandable in terms of associated goal and 'logic of the strategy'. And this is also the Leonardo's way to produce knowledge.

The Leonardo's way

Leonardo's vision-based processing and drawing techniques establish a powerful system able to fully exploit possibilities of the usual 3D to 2D representation framework. Recent neuroscience analysis and discoveries largely confirmed the Leonardo's intuitions, enriching them with basic motivations and specifying their limits, meanings and applicability.

In this scenario the main question today related to this structure is: how to resume and evolve this scheme to exploit techniques brought by the architectural design process representation, but not central in it, as physical models or photos? Or, above all, how to address emerging digital techniques to have not simply an analogous system of physical instruments and processes, but a new powerful tool able to fully support our perception abilities instead?

A first answer is given by some paths that have already been identified; e.g. the use of 3D digital models as knowledge systems. Basically, as Abraham Moles clearly explained even before the birth of computer graphics, for three-dimensional object the amount of data needed to have their accurate description increases dramatically by using descriptive forms at lower level of iconicity (e.g. text) [43]. Therefore, the 3D representation helps to improve not only the visualization and the storage of the information, but, mostly, their definition, simplifying the organization and integrating

[41] Cit.

[42] D. Marr, *Early processing of visual information*, in "Philosophical Transactions of the Royal Society of London", n. 275, 1976, pp. 483-524, p. 485.

[43] A. Moles, *Teoria informazionale dello schema*, in "Versus", n.2, 1972, 2, pp. 29-37.

the restitution with a system of cognitive data easily understandable. This is confirmed also by the researches of Marr and Nishihara [44] demonstrating that simple qualities such as brightness, color, and depth, that we experience in the world and that we can access cognitively, allow to describe precisely objects by viewer-independent 3D models.

Thus, 3D digital models displayed on devices with high visual fidelity are to be preferred to physical models due to their ability to overcome a typical limit of *maquettes* consisting in the inhibition of the understanding of the effective spatiality, caused by the reduced scale of realization. As already noted almost half a century ago by Rudolf Arnheim: "[…] geometrically a large object has more volume in relation to its surface than a small object; more precisely, surface increases by the second power of the linear dimensions whereas volume increases by the third. In the weightless space of mathematics such a transposition makes no difference, but when it occurs in the physical world under the influence of a constant gravitational pull, the difference matters a great deal."[45]

On the other hand, digital 3D models allow us to exploit a typical property of our cognitive system through vision: "Regions in the lateral-occipital, inferotemporal, and parahippocampal cortices showed strong peaks of differential real-world size selectivity and maintained these preferences over changes in retinal size and in mental imagery. These data demonstrate that the real-world size of objects can provide insight into the spatial topography of object representation." [46]

The fact that biological vision is likely a mapping of spatial measurements across a region of image space into topographical surface descriptors containing many orthogonal components should encourage the search for computational models in which 3D perception is achieved without attempting to reduce all those dimensions to but a few terms (e.g. slant and depth).

This introduces a new and great topic for the digital design not allowed on the paper sheet but predicted by Leonardo: the use of perception as a design representation mean.

Starting from these working hypotheses and from the use of digital 3D models as main technique of representation new topics need to be challenged.

Instead of using time and resource consuming (for both observer and visualization producer) viewer-independent photorealistic 3D models (the today typical use of digital 3D models), we need to identify techniques less expensive but accurate enough.

A very promising research direction is in the Marr and Nishihara suggestion to proceed from a viewer-centric representation (the 2½D Sketch) to viewer-centric 3D primitives, indexing directly into a viewer-centric associative memory more than in the viewer-independent 3D model[47]. Only at the end this viewer-independent model is reconstructed. This approach stops short of reconstructing a viewer-independent 3D model prior to recognition with evident computational advantages for both representation creator and observer, in term of time and resources allocated. Moreover, the path from viewer-centric 'depth cues' to extrinsic shape descriptors are also more direct, at least conceptually because instead of attempting to describe intrinsic geometry, the extrinsic geometry

[44] D. Marr, H. Nishihara, *Representation and recognition of the spatial organization of three-dimensional shapes*, in "Proceedings of the Royal Society B", n. 200, n. 11401978, pp. 269-294.

[45] R. Arnheim, *The dynamics of architectural form*, University of California Press, Berkeley, 1977, p. 124.

[46] T. Konkle, A. Oliva, *A Real-World Size Organization of Object Responses in Occipitotemporal Cortex*, in "Neuron", vol. 74, n. 6, 2012, pp. 1114-24.

[47] Cit.

of surfaces would be described and matched against an associative memory of extrinsic shape (i.e. learned associations of how 3D surface patches appear from different viewpoints) [48].

It seems that the application of this framework to the architectural representation field is not a huge work, mainly due to the use of relatively simple geometries by our discipline.

Another promising research topic concerns active vision and his relationship with the typical perceptual architectural representation: a monocular perspective on a flat surface more or less shaded. In their book *Active Vision*, Findlay and Gilchrist[49] showed how wrong is the model of passive vision that presupposes our eyes seeing a unified, detailed image of the world. They suggested the model of an active process of vision instead, where the constant conscious and unconscious movement of saccades directs our eyes to significant objects while keeping other forms visible but less distinct in peripheral vision. The continual motion of our eyes, zooming over significant forms in our environment and constantly changing points of view, creates the illusion of seamless sight. Sight cannot be separated from motion: retinal muscles move our eyes every few seconds, the heads turn toward objects of interest, and the environment around us perpetually changes in large and subtle ways. This constant motion explains that the experience of vision differs dramatically from static drawings produced from a single point of view and why it is difficult to convert even a still life into a static image. Using traditional static monocular drawing suppress the natural visual processing that strategically prioritizes objects by the type of object and the alignment of our heads and eyes.[50] A new issue emerges related to the architecture representation: how to move from the Vitruvian *scaenographia* (in fact a technique to design optical corrections to take into account the human visual system) with its derivatives as the so-called digital photorealistic rendering images to a method able to activate dynamic sight allowing an easier design comprehension?

A final answer to this and other questions still not exists today, but it is indisputable that from their solution will emerge the new architectural drawing.

[48] K.A. Stevens, Integration by association: Combining three-dimensional cues to extrinsic surface shape, in "Perception", n. 24, 1995, pp. 199-214.

[49] J. Findlay, I. Gilchrist, Active vision: The psychology of looking and seeing, Oxford University Press, Oxford, 2003.

[50] E.I. Schiferl, Both Sides Now: Visualizing and Drawing with the Right and Left Hemispheres of the Brain, in "Studies in Art Education"; vol. 50, n. 1, 2008, pp. 67-82. See also R. Rosenberg, C. Klein, The moving eye of the beholder: Eye tracking and the perception of paintings, in J.P. Huston et al. (eds.), Art, Aesthetics, and the Brain, Oxford University Press, Oxford, 2015, pp. 79-108.

Fig.1 Leonardo da Vinci, The skull sectioned, 1489, Royal Collection Trust, London.

San Siro di Struppa in Genoa, a comparison of direct survey and digital survey technology

Guido Guidano
DICCA, Dept. of Civil, Chemical and Environmental Engineering, (University of the Study of Genoa)
email:guidano@unige.it
Maria Vittoria Chiappetta
Department Architecture and Design DAD (University of the Study of Genoa)

Abstract

The church of San Siro di Struppa, is located along the ancient path that, along the valley of Bisagno halfway up, connects Genoa to Valle Scrivia and Val Trebbia. The first document expressly referring to the parish church of S. Siro dates back to 1143 and it is probable that the Romanesque building maintained its original structure until 1582, when the church began to undergo heavy transformation works to adapt it to the new liturgical and taste needs. Between the end of the nineteenth century and the first half of the twentieth century, the church underwent a radical restoration that brought it back to its original appearance or, at least, to the idea of a Romanesque church imagined by Alfredo d'Andrade, director of the Regional Office for the Conservation of Monuments of Piedmont and Liguria as it can be deduced from the first reliefs received from the church of San Siro di Struppa executed by other illustrious personalities such as: Carlo Ceschi, Antonio Sulprizio and Giacomo Reitano. The methodology adopted involves the research of the original works and their critical analysis. The verification of the direct surveys of Carlo Ceschi, Antonio Sulprizio with two different methodologies: surveys performed with the direct method and with Laser scanner technologies and virtual reality representation of the work so as to highlight, in addition to the interventions performed, other reconstruction hypotheses. From the drawings and the reliefs of the restorers of the early twentieth century clearly emerges the intent to bring the building back to its hypothetical original Romanesque shape. Through the critical re-reading of vintage works and the comparison between drawings and reliefs with current and more technologically advanced ones, it is necessary to clarify which are actually the original parts of the construction and the interpretations of the restorers of the time.

Abstract

La chiesa di San Siro di Struppa, è collocata lungo l'antico percorso che, percorrendo la valle del Bisagno a mezza costa, collega Genova alla Valle Scrivia e la Val Trebbia.

Il primo documento in cui si faccia espressamente riferimento alla pieve di S. Siro è del 1143 ed è probabile che l'edificio romanico mantenne la sua struttura originaria fino al 1582, quando, la chiesa cominciò ad essere sottoposta a pesanti lavori di trasformazione per adeguarla alle nuove esigenze liturgiche e di gusto. Tra la fine del XIX secolo e la prima metà del XX, la chiesa è sottoposta ad una radicale opera di restauro che la riporta all'aspetto originario o, quanto meno, all'idea di chiesa romanica immaginata da Alfredo d'Andrade, direttore dell'Ufficio Regionale per la Conservazione dei Monumenti del Piemonte e della Liguria così come si deduce dai primi rilievi pervenutici della chiesa di San Siro di Struppa eseguiti da altri illustri personaggi quali: Carlo Ceschi, Antonio Sulprizio e Giacomo Reitano.

La metodologia adottata prevede la ricerca degli elaborati originali e la loro analisi critica. La verifica dei rilievi diretti di Carlo Ceschi, Antonio Sulprizio con due diverse metodologie: rilievi eseguiti col metodo diretto e con tecnologie Laser scanner e rappresentazione in realtà virtuale dell'opera così da evidenziare, oltre agli interventi eseguiti, altre ipotesi di ricostruzione.

Dai disegni e i rilievi dei restauratori dei primi del Novecento emerge chiaramente l'intento di riportare l'edificio ad una sua ipotetica forma originaria romanica.

Attraverso la rilettura critica degli elaborati d'epoca ed il confronto tra i disegni e rilievi con gli attuali e più tecnologicamente avanzati vuol chiarire quali sono effettivamente le parti originali della costruzione e le interpretazioni dei restauratori dell'epoca.

The church of San Siro di Struppa in Genoa

By Guido Guidano

The abbey church of Struppa was consecrated in 1025 by the bishop of Genoa, Landolfo, and is dedicated to San Siro, the great bishop of the city in the fourth century. At the beginning, the church was an oratory, but it later became the oldest parish church of the Val Bisagno area as well as the Genoese countryside.

The church of San Siro di Struppa is located along the ancient path that, along the hillside Bisagno valley, connects Genoa to the valleys of Valle Scrivia and Val Trebbia.

The first document expressly referring to the parish church of S. Siro dates back to 1143 and it is likely that it maintained its original Romanesque structure until 1582, when the church began to undergo dramatic transformations, in order to adapt it to new liturgical and stylistic requirements.

The church is located at 190 m.a.s.l. in a fertile basin facing south [Prague, Corinna, 2006]. The site and its architectural volume, despite the alterations of time, have not completely lost their beauty, mainly thanks to the modesty of the surrounding buildings, which do not mar the pre-existing structures.

It seems certain, from historical documents, that, until the end of the XIV century, the territory of the valley between the Cicala river and the Concasca river was called *Mollicciana*, therefore not only the village of Struppa, but also the bishop Siro born in those areas was called *de Mollicciana* (from the Molliciana). It is only since the fifteenth century that the area began to be called with its current name, i.e. Struppa.

After a major restoration work concluded by the Superintendence of the Monuments in Liguria in 1963, the church of San Siro appears today in its original splendour. Over the centuries, the church has been repeatedly marred after it became a parish church and for the serious events occurred: in 1582, a sacristy was built inside, in 1667, the elevated Romanesque apse was destroyed, and in 1747 the church was first burned by the Austrian army and then restored in Baroque style. Between the end of the nineteenth century and the first half of the twentieth century, the church underwent a radical restoration process to bring it back to its original layout or at least closer to the Romanic church planned by Alfredo D'Andrade, director of the Regional Office for Monument Conservation in Piedmont and Liguria. This can be inferred by the first surviving surveys of the church carried out by prestigious experts such as Carlo Ceschi, Antonio Sulprizio and Giacomo Reitano.
The restoration works began in 1921 with professors Nebbia and Grosso, and in 1963 a new marble altar and a bronze door were built .
The church was built in local grey sandstone extracted from a quarry near the site, which, due to oxidation, acquired a warm golden tint both on its façade and along the walls. On the façade there are pilaster strips in correspondence with the internal aisles, with a decorative strip on the top that continues along the sides and the apses, and made up of hanging arches on corbels. On the sides of the gate, there are two single-lancet windows, while in the central part of the façade a rose window replaced the previous Venetian window of the Baroque period.
The church has a basilica plan with three aisles ending in three semicircular apses, divided by imposing columns, surmounted by thick spherical-cubic capitals, and by semi - columns, which rest on the counter-façade and on the junction of the apses. The central apse has three single-lancet windows, while the two lateral ones only have one single-lancet window. Along the aisles another ten single-lancet windows open outwards. The colonnade on the right side is interrupted at the last span with a cruciform pillar, composed, in longitudinal direction, by two half-columns and, transversely, by two pilaster strips. Resting on the colonnade, three arches support the bell tower, which is one of the most ancient examples of a bell tower resting on an aisle. It is a thick tower with a rectangular plan, thirty-two metres high with a double series of windows in the upper part, mullioned windows on the first floor and triple windows in the bell chamber. The frame recalls the motif of the hanging arches.

Church surveys: comparison of the methods

By Maria Vittoria Chiappetta

The survey of the church was conducted using two different methods: the first one with direct survey and the second one with laser-scanner technique. The first step was an attentive inspection of the Church, also taking into account its context. It was important to study the evolution of the building and the changes occurred over time through a careful bibliographic and archive analysis. The eidotypes (survey sketches) were then drawn, a sort of survey by sight including plans, elevations and sections, but also its details, in order to obtain an overall structure of the structure. The various planimetric and altimetric measurements were then written on the copies of these sketches, which were taken with simple laser-distance meters. A fundamental operation was to create a horizontal reference plane at the same altitude thanks to the use of laser levels. This was useful to measure the

slope level of the floor. The bases of the columns were surveyed thanks to the use of profilometers, which defined the sinuous pattern of the mouldings of the structure.
In this phase, many photos were taken for documentary purposes and to be used in subsequent photo-straightening and photo-mosaic operations.
After having defined the position of the windows, the exterior of the church, i.e. its façade and other sides, were surveyed. After reporting on the computer the data that was taken manually, the decision was made to return to the site to carry out an additional survey using, this time, the laser scanner, in order to verify and refine the first survey, integrating it with the less accessible parts of the structure. The tool used was the SCANNER Z + F IMAGER 5006h[1]. The *3D laser scanner survey* is, currently, the most precise technology to survey - especially particularly complex - architectural structures thanks to its high acquisition speed and the large amount of information it can collect. It was therefore an essential step to verify how far this technology has come, both in the acquisition, and in the restitution and processing of data.
When using laser scanner equipment, it is essential to determine the scanning points, through which the geometric information will be acquired. Unlike traditional surveying, collecting data with *3D laser* instrumentation is extremely quick in the acquisition phase and, at the same time, more laborious in its management and restitution phase. The choice of the number of scans to be taken and their position depended on the geometry of the artefact. Regarding the survey of the artefact's interior, the equipment was positioned in various shooting stations to cover the entire internal spatial volume. In total, 27 laser scans were positioned, 23 outside and 4 inside the artefact. The data collected by the laser scans are point clouds characterized by the lack of referencing and not connected with one another. Once all the scans were collected, the data was downloaded on an external memory for data processing. After the data was collected with the laser equipment, the survey continued with the processing of data through the data management software Cyclone 8.1.3, produced by Leica Geosystems HDS. In this way, it is possible to join the point clouds, and, after obtaining a three-dimensional model of the artefact, the data that were not useful to the study were deleted. Regarding the San Siro church, the aim was to study the artefact's geometry and constructive evolution - therefore the data relating to its surroundings was removed.
The last step was the vectorization with AutoCad of the images obtained; this was achieved by aligning the photos taken during the photographic campaign to the data obtained from the laser survey: some portions of the artefact, given the different reflectance of the materials and their complex composition and stratification, are difficult to interpret.

[1] The SCANNER Z + F IMAGER 5006h is a Phase-Shift distance instrument that uses the phase variation of the emitted *laser* wave. This tool was chosen for its specific performances. In particular, the angles of the vertical and horizontal field, respectively of 310° and 360°, allow the study of the elevations even with reduced distance between the instrumentation and the object to be surveyed.

Conclusions

There are various surveys of the church of San Siro - the first known surveys were made by D'Andrade between the late nineteenth and early twentieth century. He did not only survey the state of the building, but suggested solutions for the church's future restoration interventions. This can be seen, for example, in his survey of the church's plan, where the central aisle was still obstructed by the presence of the presbytery, but he suggested the opening of a door on the southern side and the elimination of the superficial external baroque decorations. Another example is in the survey of the bell tower, where he suggested the restoration of the mullioned window (which was walled at the time) to the first order. Also in the survey of the façade, there is a reference to the addition of the single windows and the suppression of the central Serlian window. Other noteworthy surveys were carried out by A. Sulprizio during his visits to the site between 1948 and 1950. In these drawings the church plan still included the baroque superstructures, such as the sacristy leaning against the left apse and the covered passage connecting the right apse to the parsonage. Even inside, it is still possible to identify the central layout of the altar and the baroque balustrade going over the minor aisles. Alongside this relief, the plan and the longitudinal section of the church were added, based on a hypothetical restoration that aimed to bring the church back to its original state.

More information on the state of the church around the 1950s is provided by the surveys of Ceschi, who represented plans, elevations and sections of the building. However, it is not easy to distinguish which elements were actually restored and which are were the result of a restoration proposal. All the aforementioned surveys were performed with a direct method and, despite some slight differences, are perfectly congruent with each other. The direct survey carried out for the present research highlighted a slight difference in the graft between the façade and the southern side, which in the previous surveys was perfectly orthogonal, while there is a small deformation due to the slight overhang of the cantonal. This deformation was also confirmed by the subsequent laser scanner survey.

It is possible to state that direct surveying, requiring more time and therefore forcing one to spend more time with the studied building, results in a deeper knowledge and is able to remove more doubts. Surveying with laser scanner is much faster, but it must be stated that, because it does leave undefined areas, it may not always provide a clear reading, which is why it requires more detailed graphic and photographic analysis.

By combining the two surveys, obtained with apparently very different surveying methods, one more traditional and the other more modern, it was possible to define the work of architecture extremely accurately. One can say that these techniques mutually reinforced one another.

Fig. 1 Photo of the church of San Siro di Struppa from 1921, 1930, 1975, 2017

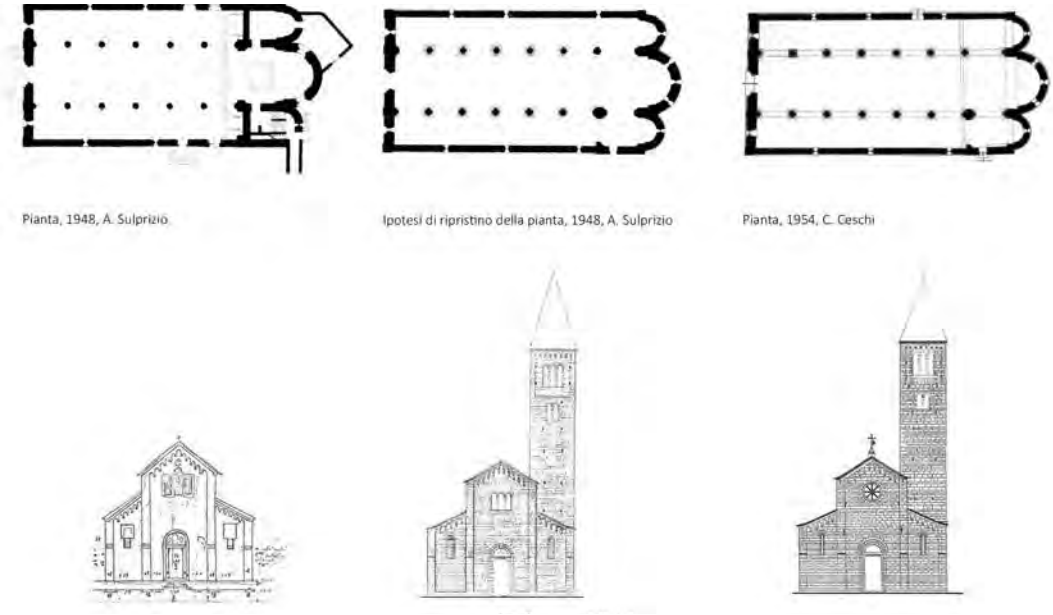
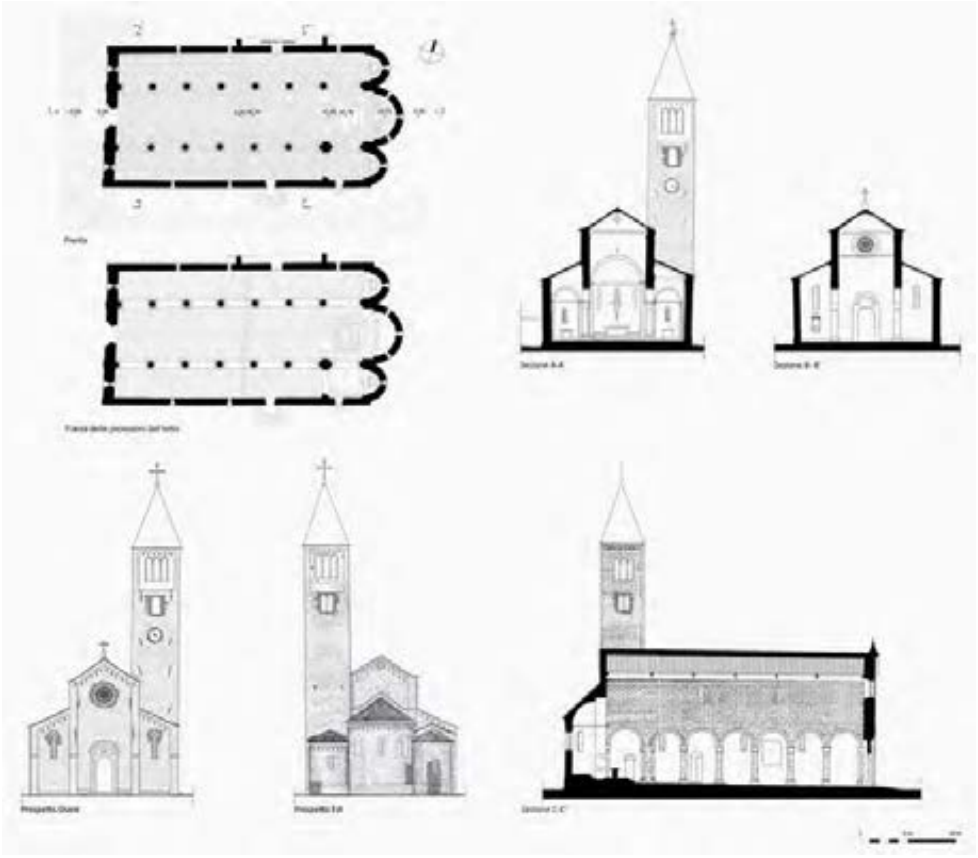


Fig. 2 Comparison between different surveys, from the facade of the Bertea of 1900 c.a., to the survey of A. Sulprizio of 1948 and C. Ceschi of 1954

Fig. 3 The church today



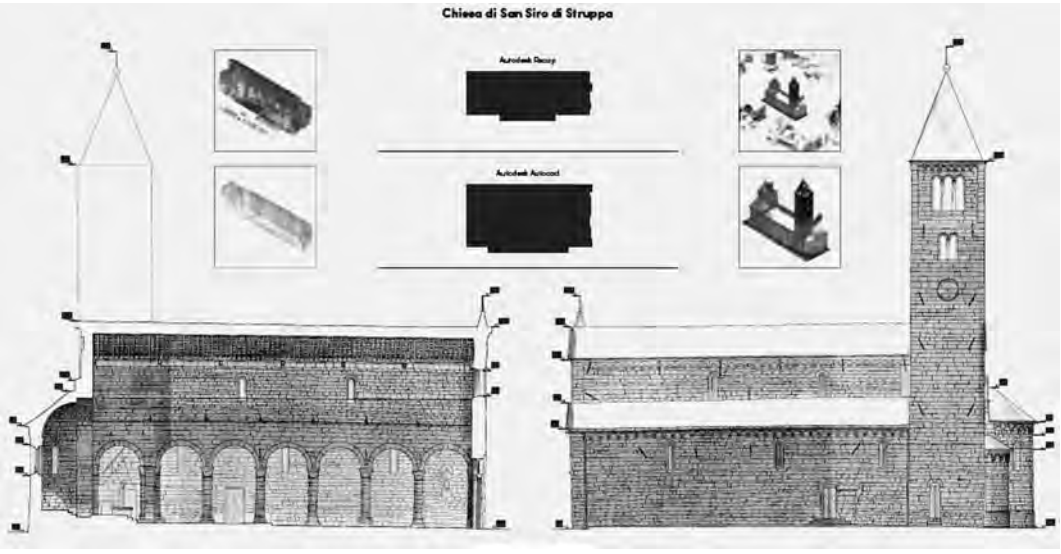


Fig. 4-5 Comparison between the direct survey of M.V. Chiappetta , G. La Rosa (above) and the digital survey performed with the laser scanner of A. Minetto (below)

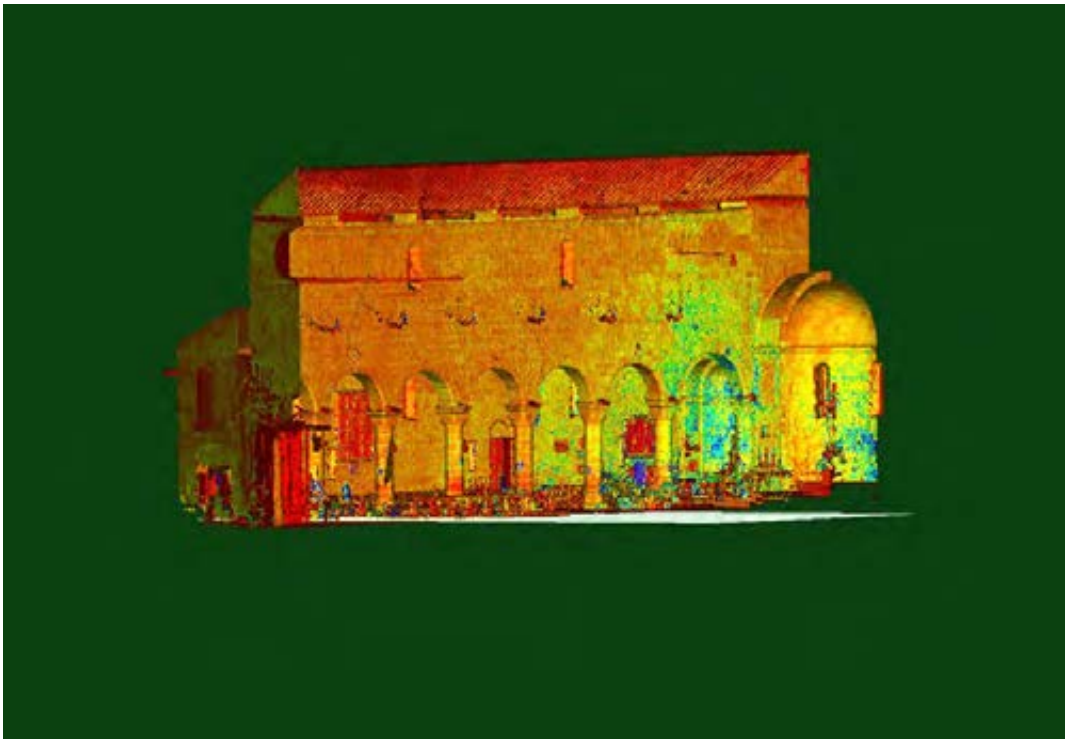


Fig. 6 Longitudinal section of the point cloud taken with the laser scanner

References

Battini C., *Realtà virtuale, aumentata e immersiva per la rappresentazione del costruito*, Altralinea Edizioni, 2017;
Battini C., *Rilievo digitale e restituzione concetti base ed esempi*, Alinea Editrice, 2012;
Ceschi C., *Chiese di Genova*, Stringa editore, 1966;
Citi D., *Italia romanica*, vol. 2°, Jaca Book, 1979;
Da Varagine, J., *Cronaca della città di Genova dalle origini al 1297*, ECIG, 1298;
De Fiore G., *Dizionario del disegno*, La Scuola Editrice, 1967;
De Negri T. O., *Storia di Genova*, Martello, 1974;
De Micheli A., *La chiesa dell'abbazia benedettina di San Siro a Struppa*, 1982;
Guidano G., *Il disegno architettonico tra geometria e fantasia*, Alinea Editrice, 2012;
Heers J., *Genova nel '400*, Jaca Book, 1983;
Ippoliti E., *Rilevare*, Edizioni Kappa, 2000;
Marchi P., *Genova e le valli Bisagno e Polcevera*, Sagep Editrice, 1979;
Mezzetti C., *La rappresentazione dell'architettura: storia, metodi, immagini*, Edizioni Kappa, 2000;
Praga C., *Genova fuori le mura*, Fratelli Frilli Editori, 2006;
Rossi A., *San Siro di Struppa*, Edisigma Genova, 1989;
Vagnetti L., *Disegno e architettura*, Vitali e Ghianda, 1958;
Zevi B., *Saper vedere l'architettura*, Piccola Biblioteca Einaudi, 1993;

New landscapes

Giuseppe Fallacara
Department of the Faculty of Architecture DICAR (Polytechnic of Bari)
email: gfallacara@hotmail.com
Alessandro Melis
Portsmouth School of Architecture (University of Portsmouth)
email: alessandro.melis@port.ac.uk
Diego Repetto
Architect and designer (DoTarchitetture, Guarene CN)
email: dotarchitetture@gmail.com

Abstract

Practice-based research is today at the forefront of research in architecture with the drawing its main tool.

Hence, the paper focuses on the drawing as a research tool and discusses the design experiences shared by practicing architects and academics from different cultural backgrounds that include, among others, the School of Architecture at the University of Portsmouth, the DICAR Department of the Faculty of Architecture of the Polytechnic of Bari and the New York Institute of Technology.

The case studies examined in particular investigate the design of architecture as a sensorial and phenomenological experience and the themes of contemporary architectural and metaphorical language, such as the “limes”, or more prosaically “wall”, in which “boundary” means “go across”.

The research question of the paper is:

- What is the boundary between art and architecture in both the anthropized and natural landscapes?
- What will be the contribution of the new representation tools (among which are virtual reality and augmented reality), in the creation of the aforementioned landscapes?

In the context just described, the proposed design methodologies include integration with computation and digital fabrication for the development of the project interpreted as assembly of elements to be realized with non-conventional materials, including composite stone.

Abstract

La ricerca attraverso la progettazione, la cosiddetta “practice-based research”, è oggi la frontiera più avanzata della ricerca in architettura. Il disegno ne è lo strumento principale.

Il paper oggetto del presente abstract ha come obiettivo quello di raccogliere riflessioni sul disegno come strumento per la ricerca, maturate nel corso di esperienze concorsuali condivise tra professionisti ed accademici provenienti da ambiti culturali che comprendono, tra gli altri,

la Scuola di Architettura dell'Università di Portsmouth, il Dipartimento DICAR della Facoltà di Architettura del Politecnico di Bari e il New York Institute of Technology.
I casi-studio presi in esame indagano, in particolare, il disegno di architettura come esperienza sensoriale e fenomenologica e i temi del linguaggio contemporaneo architettonico e metaforico come il "limes", o più prosaicamente "muro", in cui "confine" significa "attraversare".
La "research question" del paper sono:
- Qual'è il confine tra arte e architettura sia nei paesaggi antropizzati che in quelli naturali?
- Quale sarà il contributo dei nuovi strumenti di rappresentazione (tra cui, la realtà virtuale e aumentata), nella creazione dei suddetti paesaggi?
Nel contesto appena descritto le metodologie di disegno proposte comprendono l'integrazione con la computazione e con la fabbricazione digitale per lo sviluppo del progetto interpretato come assmblaggio di elementi finiti da realizzare con materiali non convenzionali tra cui la pietra composita.

Introduction

a. Premises

The present paper discusses the relationships between Arts and Architecture through Practice Based Research (PBR).
In the first part, we illustrate the relationships between art and architecture through the filter of the wall type interpreted as an architecture paradigm. This initial exploration also becomes an opportunity to discuss the metaphysical meaning of the wall, as a border element, and its opposite, the crossing.
The literature review here includes some precedents that interpret the theme both in the landscape scale (land art) and that of the urban installation.
The first part ends with the introduction and the description of the case study, the "AttrAVerso" project.
The second part of the paper illustrates the methodology that can be used in the construction of the wall. This methodology refers to innovative use of stone systems and derives from research led by Giuseppe Fallacara Chirico in recent years.
We have, therefore, focused on a recent project, as an emblematic PBR case study. "AttrAVerso" (Across) is its title and refers to the use of the wall as a link between arts and architecture and, contextually, as a crossroads between physical and virtual representations.

b. The wall as a vehicle of art

This part of the text speculates on the relations between art and architecture, and on the philosophical nature of the wall type in this specific area.
"Walls, boundaries, passages were the three selected categories of analysis to try to immediately transmit the duplicity (or ambivalence or ambiguity) of delimiting that, without exception, brings together its own double, the crossing. Other terms would have equal opportunities to increase the list, as well: borders, limit, threshold, line, barrier, fringe, edge, all associated, both as a cause and as an effect, together with categories such as overcoming, infiltration, permeability, bypass, entrance. And in other idioms, additional words could easily be added to complete and complicate

the overview[1].” Apparently an oxymoron, the aforementioned aim belongs to history since its origins. The wall is, in factt the first form of colonization of the landscape by humans. The roots of the design idea of the wall lie in megalithic architecture. The northern circles, such as the one of the Stone Age and the Mediterranean Tombs of the Giants, constitute the paradigm of crossing the boundaries from physical to metaphysical dimensions. Born as an extension of the Stone Age “trilete”, the crossing-wall becomes the foundation archetype of the Bronze Age settlements. The Mycenae walls and the Lion’s gate, the most advanced expression of ancient times, is then inherited by Romans that transform the threshold and the entrance into the so called “limes” separating civilization from barbarians. Hence, it is not surprising that the origins of art and architecture coincide with the stone artifacts of the Bronze Age. And still those massive archetypes seem to be the source of the proliferation of civilizations and vice versa.

Thus, this paper also offers the opportunity to reflect on the frail border territories between art and architecture declined through the idea of the wall.

The Treccani Encyclopedia defines “art” as, “in a broad sense, every ability to act or to produce, based on a particular set of rules, and cognitive and technical experiences, then also the set of rules and procedures. To carry out a human activity in view of certain results. The concept of art as a techne, a complex of rules and experiences developed by man to produce objects or to represent images taken from reality or fantasy, evolves only through a critical passage in the concept of art as an original expression of an artist, to reach the definition of an object as a work of art. In the context of the so-called theories of ‘beauty’, or aesthetics, we tend to give the term art a privileged meaning, to indicate a particular cultural product that commonly ranks under the name of the individual disciplines of production, painting, sculpture , architecture, as well as music or poetry[2].”

This text is, therefore, also an opportunity to reflect on some professional and research experiences on the idea of the wall as a cross-disciplinary paradigm.In the past years, artists and architects have often ventured into operations on the landscape through contamination between art, architecture and the environment, whose shared objective was the creation of unexpected and surprising landscapes[3].On a much more imposing scale, a precedent of the idea of crossing was “The Floating Piers” by Christo (Fig. 1), an onwater floating walkway, connecting Sulzano with the islands Monte Isola and San Paolo, that achieved an enormous media success, reviving the mass tourism in the geographical area of the Iseo Lake. In the works of Land Art (a term created by the artist Walter De Maria - Fig. 2 - author of the “Lightning Field” installation) “the accompaniment of natural phenomena is part of the work, it is its constructive and sensorial support”, and it is “impossible to identify the factors that contribute to form the work[4].”Communication is fast. The ephemeral prevails, so the temporary works of Land Art have also become more frequent, today.

According to Richard Long, his art work is rooted in the “concepts of movement, time, transience and permanence of the subject”: in short, it refers to “the reality of our earthly world [...] All good

[1] C. Flamingo, E. Giunchi, Muri, confini, passaggi: studi storico-politici e prospettive giuridiche, Giuffrè Editore, Milano, 2009, p. 2

[2] Treccani, Arte, http://www.treccani.it/enciclopedia/arte/ (Authors’ translation)

[3] Alain de Botton e John Armstrong, L’arte come terapia. The school of life, Guanda, 2013

[4] 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

art is by definition, social[5].”Thus, temporary installations in urban centers and in open spaces become opportunities to allow multiple, and different, uses of the space and to generate new perspectives of the site. Moreover, non-invasive interventions, respectful of the heritage and of the environment, leave no trace in the landscape.

Fig.1 “The Floating Piers” by Christo

Fig.2 Walter De Maria in a 1968 photograph: it seems in contemplation of a border, waiting to cross it (http://www.artslife.com/2013/07/26/addio-a-walter-de-maria/)

[5] Richard Long. I nuovi sciamani e la Land art retrived from https://www.stilearte.it/viaggiatore-dellarte

c. "AttrAVerso" Wall: an emblematic case study of practice based research

In this section, we will introduce the "AttrAVerso" project as an emblematic case study of practice-based research in the interstitial space between art and architecture. We had the chance to develop this project for "The Wall" competition, organized by the CODE digital platform and the Con-Fine Art Association, in 2017, the year in which the term was dramatically associated to the controversies on the Mexican anti-immigration campaign promoted by Donald Trump (Fig.3, Fig. 4), the new cold war unleashed by North Korea, and the escalation of the Israeli-Palestinian conflict (Fig.5).

Fig.3 Kikito by French artist JR, to mock the dividing wall between the United States and Mexico (https://www.agi.it/estero/kikito_muro_messico_usa_artista_jr-2135749/news/2017-09-09/)

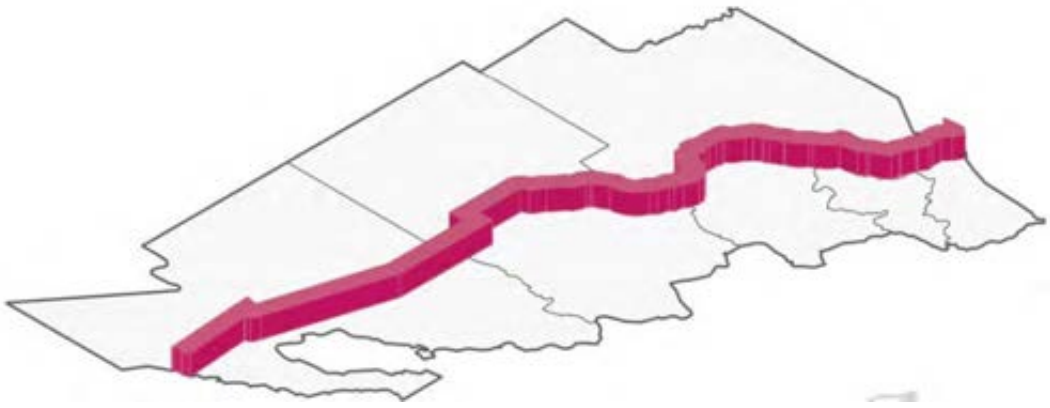


Fig.4 Prison-Wall: the Estudio 3.14 design studio in Guadalajara, imagined an intense pink boundary wall that extends for about 3,150 Km (http://www.syri.net/bote/115501/foto-projektuesit-meksikane-muri-shba-ndash- meksike-do-te-zgjase-16-vjet/)

Fig.5 The wall between Israel and Palestine (http://ruggerodaros.blogspot.it/2013/07/il-muro-della-vergogna-tra-israele-e.html

Thus, the design intends to reconnect with the origins of the wall phenomenology and to explore the genotype of the archaic crossing-wall without indulging in an eventual post-capitalistic interpretation. Hence, our main research question is: how can a contemporary reinterpretation of the masonry contribute to the reintroduction of the symbolic concept of the wall in which the crossing paradigm prevails over that of separation? Here, the concepts of crossing overlap the osmotic needs of a polymorphic, multi-ethnical and mobile hybrid society. Consequently, its definition, in our intentions, turns into a political statement: the separation is a mental map and the wall, therefore, becomes a bridge to the inclusiveness and the diversity, linking different layers of coexistence and culture.

The "attrAVerso" Wall, intended as an installation for Piazza Santo Stefano, a representative site in the city of Bologna (Figure 6), is made of modular bricks realized thanks to the Architectural Hypar System.

The A-shaped and V-shaped bricks also recall the words "attrAVerso".

The installation is conceived in full respect of the surrounding architectural landscape. In fact, as stated initially, in our design the context is relevant in a historic perspective (archaic origins of the wall) as well as in a site-specific perspective. The matrix combination of units from which a holistic architecture derives, represents the link with the location context. Bologna is a city of massive brick walls and porches, where the unity is the result of a masonry composition. The use of a smart brick represents, therefore, our effort in providing today's declination of the Bologna's "topos". In addition, the choice of warm colors is intended as a way of blending with the background colour palette.

The “attrAVerso” project, in addition to integrating and, at the same time, emerging in a historical and urban context, such as Piazza Santo Stefano, has the function of a catalyst: a generator of new sensory experiences, able to attract mass tourism and attentive to art and architecture, both stimulated by the playful aspect of experimenting with new sensations , while the virtual aspect is characterized by the use of augmented reality. The immersive experience of the installation begins with the construction process: visitors have the opportunity to see the evolution of the site and enjoy the fabrication process (Figure 7).

Fig.6 The “attrAVerso” installation: context

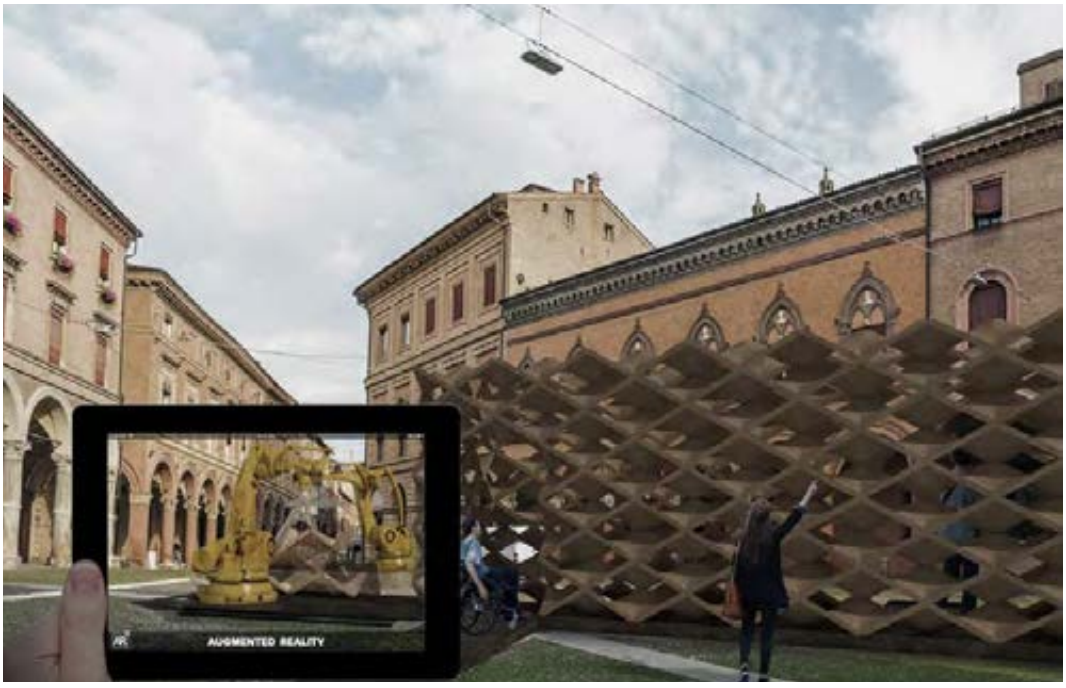


Fig.7 The “attrAVerso” project: virtual and real

To maximize the effectiveness of the immersive experience of the visitors, our installation is designed to frame an outer space as well as an "in-between" space in which the three accesses are conveyed. This interstitial space will provide the visitors with a unique and memorable sensorial experience made of lights. Those features are representative of potentially different sensorial devices that can be applied to the wall and controlled in remote, thanks to Arduino technology. The void spaces of the wall can have multiple uses.

The use of stone also shows ecological advantages. In fact, despite its relative higher embodied energy, if compared to certain organic materials, and though lower than that of other high weight materials, a vast literature shows how the stone provides the longest life span to construction.

Even the use of artificial stone, and its casting in situ, offer a consistent reduction of power generation and transportation energy. Considering the installation and uninstallation potential of the structural components, the final result is consistent with the idea of a closed loop system ("cradle to cradle"), the engineering version of the circular economy.

According to our LCA, taking into account the re-use of the elements, for the installation and for future adaptation, the environmental footprint of our stone wall will be lower than its alternative in timber, also taking into account a relatively short life span (less than 20 years), proving the lack of effectiveness of commonplaces about the ecology of organic materials.

The stone, as an ideal material for the installation, will be the main focus of the Methodology section.

Methodology

The design methodology of the "attrAVerso" is based on the Stereotomy.

The Stereotomy is the discipline of the art of building in cut stone. Stereotomy is the technique (or rather the art) of removing material, in order to create stone blocks, geometrically refined, that allow the construction of elements and architectural systems of triple value: aesthetic, static and functional. Modern Stereolithography, on the other hand, is the technique that makes it possible to create objects, by means of appropriate machines, by adding material (originally liquid resin solidified by UV rays) by overlapping layers. The term Stero, in common between the two techniques, indicates the purpose of the technique or the creation of solid-volumetric objects created mutually: by removal of matter (cut - tomia), or by addition of matter. The two techniques, viewed from a bio-compatibility point of view, in the sense of exploitation of the raw material, could theoretically be complementary and integrative. Specifically, if, by Stereolithography, we mean, in a broader sense, the technique of additive manufacturing or 3D printing through the stratification and solidification of semi-fluid material composed of specific mortar, it is useful to reason on the reuse of stone processing waste for the inert part of the mortar. To do so, Giuseppe Fallacara has conceived the AHS-Architectural Hypar System6[6] as one of the possible processes of updating the ancient stereotomic discipline in the triple aesthetic, geometric and constructive aspects.

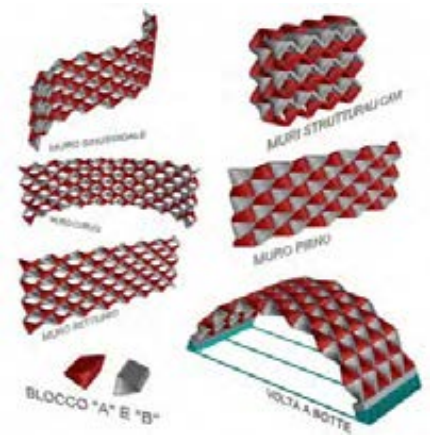
Fallacara's AHS modular construction system was initially designed in 2016 and presented, with the prototype HyparWall, for the first time to the public on the occasion of the exhibition titled

6 Giuseppe Fallacara, Architectural stone elements. Research, design and fabrication, Paris:Presses des Ponts, ISBN: 978-2-85978-508-6, 2016, pp. 26-35

"New Marble Generation[7]", curated by Raffaello Galiotto and Vincenzo Pavan for the 51st edition of Marmomacc in Verona (Veronafiere, 28 September - 1 October, 2016) (Fig. 8). The research on geometric-modular construction refers to the "Modular constructivism", a sculptural trend developed between 1950 and 1960, whose founders are Erwin Hauer and Norman Carlberg.

The AHS-Architectural Hypar System is a modular construction system that allows the construction of many types of wall with the use of "bricks-blocks" of complex shape resulting from the geometry of the hyperbolic paraboloid from which derives the term Hypar (Hypar Hyperbolic Paraboloid). From the geometric point of view, the "type brick" is a solid deriving from the extrusion of a saddle surface (with rectilinear edges) inscribed in a parallelepiped with a square, rectangular, trapezoidal and parallelogram base. The "type brick", based on its topological variation, can be used for the construction of multiple building wall systems composed of discrete elements subjected to compression: walls, vaults, domes, etc. (Fig. 9).

Fig.8 The prototype HyparWall, for the 51st edition of Marmomacc in Verona (Veronafiere, 28 September - 1 October 2016)



Figg.9-10 Composition of multiple systems and cut blocks

7 The annual exhibition is part of the project The Italian Stone Theater, created by Marmomacc with the support of the Ministry for Economic Development (MISE), ICE-Italian Trade Agency and Confindustria Marmomacchine, as part of the Extraordinary Promotion Plan for Made in Italy for the enhancement of the excellence of the national lithic and technological sector

The system is part of the broader research relating to the updating of construction techniques, of a stereotomic nature, whereby the static, the aesthetics and the geometry are part of a unique inseparable designing and constructive thought.

From the material point of view, AHS, it has been conceived for the use of natural stone and / or recomposed stone, according to a triple constructive possibility focused mainly on the elimination of excess processing waste and for the complete recovery of them, in a logic of eco-compatibility of the product and respect for the raw material:

1. Natural stone: CNC cutting with robotized diamond wire;
2. Artificial stone: Realization through appropriate mold;
3. Artificial stone: Realization through large size 3D printing.

In the first case, the use of natural stone required the study of a specific construction and cutting technique that reduced to a minimum the waste of material due to the particular shape of the "saddle brick". The hyperbolic paraboloid, being a striped surface, can easily be made with a diamond wire cut and, in this case, with a computerized numerical control cut by an anthropomorphic robot with a diamond wire head.

The anthropomorphic robot, being able to control more movements during the cut, compared to a static diamond wire cutting machine, is able to realize segments with a rectangular, trapezoidal and parallelogram base, allowing ample freedom of action in the design of complex shapes. In this way, starting from a parallelepiped block, it is possible to easily obtain many identical segments contained in series inside the parallelepiped (Fig. 10).

The loss of raw material, due to the excavation of the tool, is almost zeroed, except for the material removed from the thickness of the diamond wire diameter. The cut blocks are also perfectly stackable for transport and storage. During the assembly phase, the segments can have different configurations that allow both porous and completely closing walls.

In the second case, the waste powders of the stone processing become the aggregates of a specific cement-based mortar to be used as raw material for the filling of the "hypar-bricks" molds.

In this way, in the production process, it is necessary to produce the molds (traditionally made of cement or fiberglass) for the purpose of mass production of the brick (Fig. 11).

Inside the mold, during the filling phase of the mortar, it is possible to insert fiberglass fibers and / or light metal reinforcements in order to make the brick very resistant.

The production of molds can take place after the production of the basic plaster hypar-brick, using traditional manual techniques, or in wood or high-density polystyrene cut with CNC machine tools.

The chromatic appearance and superficial roughness of the brick can vary due to both the specific chromatic qualities of the stone or marble powders used, and the surface treatment of the internal surface of the mold.

In the third case, as well as in the previous case, the raw waste material of stone processing, i.e. residues and stone powders with different granulometry, can be usefully reused to form the aggregates of specific mortars for large 3D printers (Fig. 12).

Thanks to this, the mortar, composed of binder and inert, would have a more natural color and the appearance of an artificial stone. In this regard, the mortars and binders based on geopolymers would be optimal for this purpose.The research, in this third case, focuses on two fundamental aspects: the

mortar composition and the molding technique related to specific machines or anthropomorphic robots and extruders for large-scale 3D printing. At present, the limits of these technologies concern three aspects: the aesthetic quality of the printed product, the difficulty in moving the machinery for the printing and for the continuous production of mortars on the construction sites, and the risk of non-homogeneity of the mechanical qualities of the printed product on the basis of the different climatic exposure during the construction in open places (parts more or less exposed to atmospheric agents could react differently to the maturation of the mortar). Another very important aspect related to this construction technique is related to the geometry of the element to be printed, which is produced by the sedimentation, for successive horizontal layers, of mortar, which solidifies in the compatible times to support the subsequent layer of material without global and local variation of the shape of the element itself. It is, therefore, easily understandable that all the shapes which imply a cantilever overhang of the mortar during printing, beyond the allowed angles, are prohibited or strongly limited. The construction system, AHS, thanks to its geometry, is compatible with the 3D printing process without the use of supporting elements, becoming interesting for large molding systems. In addition, it allows the printing of both bricks, in a single way, and the continuous wall, as a whole, given by the aggregation of several bricks without interruption.

Fig.11 - Fig. 12 Production of the brick and construction with large 3D printers

The experimental phase, concerning the real-scale realization of the prototypes deriving from the three construction techniques previously described, was organized with a diachronic scan starting from the second constructive system, then moving on to the first system and, finally, to the third system currently in progress.

The first prototype of the AHS, created for the exhibition “New Marble Generation” with the aim of creating new high quality lithic design products aimed at mass production, is called HyparWall. This is a sinusoidal modular diaphragm wall, made up of segments of hyperbolic paraboloid. The segments are made using the waste from the Pietra Leccese stone-work, using specific binders able to create a sort of reconstructed Pietra Leccese, very similar to the original.

The research has involved the collaboration of a leading company in the sector, PiMar (Lecce), and the contribution of Tarricone Prefabbricati of Corato (Bari). The production cycle of natural stone, in addition to cutting the elements, ues waste materials in a sustainable and innovative way.

The aim of the research was to extend the production cycle of natural stone in addition to cutting the elements, using waste materials in a sustainable and innovative key. The overall geometry of the whole wall is constituted by the mutual aggregation of two “type-bricks” (specular), which, in an appropriate manner, can be used to create:

- Straight wall, full or pierced;
- Curvilinear and cylindrical wall;
- Sinusoidal wall;
- Barrel vault.

The HyparWall prototype, exhibited in 2016 in Hall 1 of the Marmomacc fair, was selected in 2017 for the exhibition outside the fair, in the heart of the city of Verona within the “Marmomac & the City” format. The second prototype phase, currently underway and developed since 2017 in collaboration with the French company SNBR (Sainte Savine Troyes), has produced two prototypes in natural stone, referring to two different construction systems: the sinusoidal wall and the reinforced barrel vault. The first prototype, very similar to the sinusoidal wall made of artificial stone through the use of the previously described molding construction technique, was realized with the diamond wire cutting technique moved by an anthropomorphic robot (Fig. 13).

Fig.13 Prototype realized with the diamond wire cutting technique moved by an anthropomorphic robot

The starting parallelepiped-shaped lithic block, based on isosceles trapezium, was “sliced” in serial succession by the diamond wire according to a specific spatial direction. The production speed of the blocks and the almost total lack of processing waste made the prototype very interesting from an economic and constructive point of view.

The second prototype, named Hypar Vault, is a perforated barrel vault made of the same two type blocks used for the sine wall geometry.

The structure, while being able to withstand the only condition of natural compression of the stone

elements, has been reinforced and prestressed by the post-tension of harmonic steel wires passing through the linear axis of the individual segments in correspondence with the median axial arc of each row of the barrel vault. For the construction of the vault, it is necessary to have a wooden rib which is removed for the purpose of the assembly of all the segments constituting the entire vaulted structure and of their prestressing (Fig. 14).

Fig.14 Hypar Vault

The constructive system can also be used for the construction of other geometric types of vaulted and dome structures. It is possible to equip the extrados with vaulted structures of a glass or plexiglass covering system, completely integrated into the overall geometry.
The third prototype phase of AHS refers to the development of a research, still in progress, deriving from a recent international architecture award (www.printarch.net - Architectural Hypar System) based on the development of technologies and building components created with the additive technique of the 3D robotic print currently being tested. In general, the priority research themes in this area are exemplified by the application of additive manufacturing to the building elements and systems of architecture (Fig. 15).

Fig.15 Examples of architectural systems

The development trajectories include the research on innovative and environmentally friendly materials and on waste treatment.

The aim, as already underlined, is to manufacture and build on a large scale using additive manufacturing methods and using powders and waste deriving from the stone working process as a printing material.

This application would, therefore, result in a transformation of waste from a cost element to an economic resource, from unusable processing by-products to raw materials for environmentally friendly services and products, in a cyclic process of environmental and economic regeneration.

From this basic concept, the large-scale project Anthill Tower was born, an "anthill" tower inspired by nature and the manufacturing phenomena of the animal sphere, by which it is possible to build large vertical structures thanks to the sedimentation and stratification of small grains of soil (Fig. 16). In this specific case, the incessant and methodical work of the ants is carried out by anthropomorphic robots, coordinated in series, which extrude mortar on parallel horizontal levels developed vertically according to the logic of 3D printing. The specific geometry of the tower, created as aggregation of Hypar-seamlessly maxi blocks, allows the mortar to settle according to the optimal angles of vertical growth of the tower. The interior spaces of the concave-convex tower give a new housing dynamic wherein the sequence of shared spaces and labyrinthine connections is greater than the aggregation of individual private housing cells. The anthropomorphic landscape of the city, thus, returns to reflect on the nature and the biological life that surrounds us.

Fig.16 Anthill Tower project

Conclusion

The present paper has introduced the concept of the wall as an architectural type capable of interpreting the instances of separation and crossing, meant as an archetype of relations between art and architecture from the beginning of civilization.

In accordance with the PBR premises, the text reported a series of reflections related to the AttrAVerso project, the main case study of research. This project object of the wall competition is a hollow and porous wall, which can be walked through thanks to two opposite openings that allow entry into an axial corridor. In this specific case, the wall provides a space for a totalizing experience, taking place both outside and inside. The need of light permeability, as well as the concepts of continuity/ infinity and closed loop, suggested a configuration of the base components that recalls a portion of the Moebious strip, the well-known topologic surface usually associated to the idea of infinity. The construction system designed by Giuseppe Fallacara based on the Stereotomy was the ideal technical solution for this project. To address the research objectives, we have started cultivating the idea of the stone component, as a symbolic representation of continuity with the past, that unfolds in the invention of a contemporary smart brick. The latter is our interpretation of the principle of architecture beyond time and space, able to reconnect "homo" to "humus".

In fact, despite its futuristic aesthetic value, the wall is built with the aggregation of blocks-brick similar to that of a traditional brick or stone blocks wall. The distinctive aspect of the wall is given by the particular geometry of the single modular block that, in its serial aggregation-repetition, recompose a perforated texture of complex and continuous surfaces. Those aspects have been illustrated in the methodology section.

In conclusion, we have demonstrated how it is possible to challenge the idea of separation usually associated to the wall, through an unconventional approach to design. The use of advanced technologies, such as the digital fabrication, allow, in fact, to generate an "atomic" framework that provides the same structural strength as the traditional masonry as well as unconventional attributes, such as transparency and crossability, difficult to achieve through the use of traditional technologies. In addition, the use of a system made by modular components can lead to potentially infinite matrix configurations and adaptation to different sites.

References

Agi Estero, C'è un bambino che sta facendo spazientire i fan del muro di Trump con il Messico. 2017/ Retrieved from https://www.agi.it/estero/kikito_muro_messico_usa_artista_jr-2135749/news/2017-09-09/

Treccani. Arte. Retrieved from http://www.treccani.it/enciclopedia/arte/

Alain de Botton and John Armstrong, L'arte come terapia. The school of life, Guanda, 2013

Arts Life, Addio a Walter De Maria. http://www.artslife.com/2013/07/26/addio-a-walter-de-maria/

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

Richard Long. I nuovi sciamani e la Land art r. Retrieved from https://www.stilearte.it/viaggiatore-dellarte

Giuseppe Fallacara, Architectural stone elements. Research, design and fabrication, Paris:Presses des Ponts, 2016

C. Flamingo and E. Giunchi, Muri, confini, passaggi: studi storico-politici e prospettive giuridiche, Giuffrè Editore, Milano, 2009

Ruggerodars, verso l'India... 2013. Retrieved from http://ruggerodaros.blogspot.it/2013/07/il-muro-della-vergogna-tra-israele-e.htmlSyri.net. FOTO/ Projektuesit meksikanë: Muri SHBA – Meksikë do të zgjasë 16 vjet 2017. Retrieved from http://www.syri.net/bote/115501/foto-projektuesit-meksikane-muri-shba-ndash-meksike-do-te-zgjase-16-vjet/

Agriculture, Tourism and Heritage like devices to draw the Mediterranean landscape

Giorgia Tucci
Department Architecture and Design DAD (University of the Study of Genoa)
email: tucci.giorgia@gmail.com

Abstract

According to the analyzes and reports of the Country Brand Index: "Countries can usefully be understood as the sum of their iden- tity and reputation" and according to the various evaluation criteria considered – such as value system, quality of life, business potential, heritage, culture, made in and tourism, – the countries of the Latin Arc are ranked in in the first half of the 2014-15 re- ports. When we talk about the Mediterranean Landscape and, specifically, the Arco Latino, in addition to the cultural and landscape richness, the tourist component represents an important socio-economic sector in the large-scale, with nearly 3.2 mil- lion employees, this sector generates a total gross value of 183 billion euros and represents over one-third of the maritime econo- my. Since the fifties, the development of seaside tourism and an economy based essentially on the tertiary sector, have signifi- cantly contributed to the cementification processes of the Mediterranean coasts, it is estimated, in fact, that today more than 70% of the coasts of Spain and Italy, and 60% in France, are urbanized (Ferrari, 2008). In addition to this coastalization process, colla- terally it was revealed a massive rural exodus from the territories of the hinterland due to the downsizing of agricultural and pasto- ral activity. The joint action of these phenomena (coastalization and exodus) has sanctioned the still current fracture between coa- stal areas and inland areas, involving: the urban explosion, the anthropic pressure along the coastal areas and, even if indirectly, the spontaneous and uncontrolled renaturalization in rural areas of the hinterland. These are phenomena that are still ongoing, which have critical implications for the landscape from the ecological, scenic, socio-economic and identity point of view (Saliz- zoni, 2012). In this brief discussion we want to highlight, through the promotion of proactive projects, how the agricultural, tou- rist and cultural component of the Mediterranean coastal cities establish a link between them that can reactivate and re-launch the new agro-urban coastal settlements.

Abstract

Secondo le analisi e i report del Country Brand Index: “Countries can usefully be understood as the sum of their identity and repu- tation” e secondo i vari criteri di valutazione presi in considerazione – come sistema di valori, qualità della vita, potenziale com- merciale, patrimonio, cultura, made in e turismo, – i paesi dell’Arco Latino si classificano nella prima metà nei report 2014-15. Quando si parla di paesaggio Mediterraneo e in questo caso nello specifico di Arco Latino, oltre alla ricchezza culturale e paesag- gistica, la componente turistico-costiera rappresenta un comparto socio-economico di grande portata, con quasi 3,2 milioni di ad- detti, genera complessivamente un valore di 183 miliardi di euro e rappresenta oltre un terzo dell’economia marittima. A partire dagli anni Cinquanta, infatti, lo sviluppo del turismo balneare e di un’economia fondata essenzialmente sul settore terziario, hanno significativamente contribuito ai processi di cementificazione dei litorali mediterranei – si stima che oggi più del 70% delle coste di Spagna e Italia, e il 60% in Francia, sia artificializzato (Ferrari, 2008). Accanto a questo processo di litoralizzazione si è mani- festato collateralmente un imponente esodo rurale dai territori dell’entroterra a seguito del ridimensionamento dell’attività agrico- la e pastorale. L’azione congiunta di tali fenomeni (litoralizzazione e esodo) ha sancito la ancora attuale frattura tra aree costiere ed aree interne, comportando: l’esplosione urbana, la pressione antropica lungo le aree litoranee e, se pur indirettamente, la rinatu- ralizzazione spontanea e incontrollata negli spazi rurali dell’entroterra. Si tratta di fenomeni tuttora in atto, che determinano im- plicazioni critiche per il paesaggio non solo di ordine ecologico o scenico, ma anche socioeconomico e identitario (Salizzoni, 2012). In questa breve trattazione si vuole mettere in evidenza, attraverso la promozione di progetti proattivi, come la componente agricola, turistica e culturale delle città costiere Mediterranee instaurino fra loro un legame in grado di riattivare e rilanciare i nuovi insediamenti costieri agro-urbani.

Introduction

According to the analyzes and reports of the Country Brand Index: “Countries can usefully be understood as the sum of their iden- tity and reputation” and according to the various evaluation criteria considered – such as value system (political freedom, envi- ronmental standards, tolerance, etc.), quality of life (safety, health, education, etc.), business potential (technology, good infra-structure, business, etc.), heritage & culture (art & culture, natural beauty, points of interest, etc.), made in (high quality, unique products, authentic products, etc) and, obviously, tourism (range of attractions, food, value of money, etc.), – in the 2014-15 re- ports, the countries of the Latin Arc are ranked respectively France 17th, Italy 18th and Spain 23rd.

When we talk about the Arco Latino, in addition to the cultural and landscape richness, the tourist component represents an im- portant socio-economic sector in the large-scale. Especially the coastal and maritime tourism, with nearly 3.2 million employees, this sector generates a total gross value of 183 billion euros and represents over one-third of the maritime economy. No less than 51% of hotel accommodation across Europe is concentrated in coastal regions. Just think that in 2000, the Latin Arc countries (Spain, France, Italy) accounted for 64% of total flows in the coastal areas of the Mediterranean, already the world’s first tourist destination (Benoit e Comeau, 2005).

Since the fifties, the development of seaside tourism and an economy based essentially on the tertiary sector, have significantly contributed to the cementification processes of the Mediterranean coasts, it is estimated, in fact, that today more than 70% of the coasts of Spain and Italy, and 60% in France, are urbanized (Ferrari, 2008).

In addition to this coastalization process, collaterally it was revealed a massive rural exodus from the territories of the hinterland due to the downsizing of agricultural and pastoral activity. The joint action of these phenomena (coastalization and exodus) has sanctioned the still current fracture between coastal areas and inland areas, involving: the urban explosion, the anthropic pressure along the coastal areas and, even if indirectly, the spontaneous and uncontrolled renaturalization in rural areas of the hinterland. These are phenomena that are still ongoing, which have critical implications for the landscape from the ecological, scenic, socio- economic and identity point of view (Salizzoni, 2012).

2017 has been appointed The International Year of Sustainable Tourism by the UN "as a unique opportunity to advance the con- tribution of the tourism sector to the three pillars of sustainability economic, social and environmental, while raising awareness of the true dimensions of a sector which is often undervalued" (UNWTO Secretary-General, Taleb Rifai). In fact, at community level, many projects have been implemented in recent years aimed at the sustainability of tourism in the Mediterranean, such as the project Sostenibilità e Turismo in Mediterraneo (S&TMED) which is part of the European Territorial Cooperation Program CBC Enpi – European Neighbourhood and Partnership Instrument –, with objectives of economic development, protection and enhan- cement of the natural and cultural heritage through new entrepreneurial activities. However this sector needs constant monitoring and good management to predict the effects and limit the consequences.

The tourism in the Mediterranean regions, in fact, shifts not only an important economic value, but significantly affects the socio- cultural and landscape-environmental development of the countries. Suffice it to say that, according to datas from the World Tra- vel and Tourism Council, for example, the Italian tourism industry as a whole (national and international tourism) creates em- ployment for more than 10% of the population and accounts for 9.4% of Italian GDP with 147 billion euros and 46.1 million in- ternational tourists. The tourist attraction of a country therefore represents a key element both for the economic sector and for the urban-infrastructural and socio-cultural repercussions.Not only in Europe but throughout the world, large infrastructures have been built for tourist and cultural events (ex. Expo di Mi- lano 2015, Expo Shangai 2010, etc.), the same happens for tourist-sporting occasions (ex. Olimpiadi Rio2016, Londra 2012, Mondiali Brasile 2014, etc.), and the religious tourism sector is equally impressive (Fatima, Medjugorje, Gerusalemme, Lourdes, etc.). The flows of people moving to visit and take advantage of one place or another activate mechanisms of promotion and in some way of territorial branding, which often becomes an identifying mark in the collective imagination.

The forms of tourist attraction (cultural, bathing, sporting, religious, gastronomic, etc.) are therefore varied and manifold, howe- ver, in the regions of the Latin Arc are gradually emerging new kinds of tourism, increasingly "complex and refined" (Ferrari, 2008), within which elements such as: the rural landscape and the urban texture, being in close contact, interact with each other in a complex way giving rise to new mixed tourism strategies that have gradually spread more and more in recent years.

In fact, during the last decade the concept of 'rural tourism' has become widespread, giving a strong alternative to the more tradi- tional forms of tourism promotion. Rural tourism is often associated with a recreational experience whose activities are not in the urban areas, but in a nature space, by definition, in effect, rural tourism includes all tourist offers presented in rural areas (Fiquet, 1992; Bourdeau, 2001; Cawley et Gaffey, 2002).
In this context, agriculture, local heritage and cultural identity of the place are combined together in a process of value creation, generating virtuous and proactive examples of regeneration of urban and rural areas, able not only to attract tourist flows, but to manipulate the urban structure of cities, redeveloping spaces, infrastructures and environment.

Methodology

Wanting to describe some of the many variations that the agricultural component makes with the tourism sector, it is useful to identify some significant examples developed in the countries of the Latin Arc, taken into consideration.

Agriculture as a tool of tourist attraction and landscape design

For example, the enotourist districts: tourist and enological areas within which coexist: a strong tourist offer (accommodation, ca- tering, historical and cultural tours, attractions, events, commercial activities, etc.) and a local production system (wineries, vi- neyards, areas of production, natural resources, etc). (Fig.1)
The ability to invest in the wine industry and create world-renowned brands of excellence has allowed many rural countries to attract tourists from all over the world. In the Italian case, for almost two decades, The Wine Roads have been set up, that are areas where "natural, cultural and environmental values, vineyards and cellars" insist on Italian wine tourism. To date there are about 150 wine roads, the most renowned are: Barolo road, Langa road wines, Chianti road, Marsala road, Franciacorta road, Malvasia road, etc.
The same thing happens in Spain, where the certification of the Rutas de Vino de España brand promoted enotourism in many areas, such as Rioja, Jerez, Penedés, Rias Baixas and Ribera de Duero (Fig.2). And also in France, wine tourism is one of the main tourist attractions of the country thanks to the excellence of brand promoted - such as Vignobles & Découvertes - and numerous wine roads, such as: Île d'Oléron, Minervois Saint-Chinian Faugères en Haut Languedoc, La Vallée de la Marne Ouest (champa- gne area), Bordeaux Route des Vins in Graves & Sauternes, Perpignan Méditerranée Rivesalte and many more.
Agriculture – and specifically, in this case, viticulture – is the cornerstone of the campaign for the promotion, retraining and in- ternationalization of the territory.

Fig.1 Antinori Winery, Bargino, Florence (IT). Source: ph. Giorgia Tucci (2016)

Fig.2 Rutas de Vino de España (ES). Source: www.wineroutesofspain.com/ver/2457/Rutas-del-vino-.html

Agriculture and tourism as safeguard of hystorical heritage

In the last decade the awareness of the concept "agriculture like heritage" has become widespread, becoming a significant compo- nent in the projects of recovery, redevelopment and territorial promotion. Agriculture, local heritage and the cultural identity of the place combine together in a process of value creation, generating virtuous and proactive examples of regeneration of both ur- ban and rural areas, able not only to attract tourist flows, but to manipulate the urban structure of the cities, redeveloping spaces, infrastructures and environment. One of these, it's the spanish project: Huerto del Rey Moro, an open urban space of 5000 m2 located in the historic center of Seville, between two of the most densified streets of the city. It's the biggest public space into the historic center and it's part of an old vinculated building – Casa del Rey Moro, a gothic-mudejar house – and its courtyard, buil- ded during the 15th Century. In 1985 the regional goverment decided to declare the house Good of Cultural Interest as "Monu- ment", together with the open space as heritage reserve zone. This area was abandoned for many years and after several attempts to privatize this space, the neighbors decide to occupy and protect it with a sort of actions. They claimed it to the public administration, proposing many projects and activities.The Asociación Amigos del Huerto del Rey Moro promoted archaeological studies and was involved in the legal defense of this site against urban planning changes. As a consequence of this struggle, on Feb. 15th, 2004, the Huerto was inaugurated as a neighborhood space for the use and enjoyment of the neighborhood. Now it currently works as a urban meeting place, with many public activities like as: community gardens, labs, playground, exhibition spaces, cinema, workshops, market and, first of all, an open site of urban agriculture, promoting a rural model of ecological development where agricolture is a way of aggregation, lear- ning and social sharing.

Today it's a dynamic organism that has been able to overcome the concept of object, evolving towards a sense of the whole of natural, social and intangible good, generator of quality of life, social and cultural benefits. (Fig. 3) Urban agriculture in this case, as well as in many other projects, regardless of its location intra or peri-urban, becomes a source of tangible and intangible good: products and cultural heritage (Fleury, Donadieu, 1997).

Fig. 3 Graffiti, Huerto del Rey Moro by Axel Void, Sevilla (ES). Source:elmuseodelgraffiti. blogspot. com.es.

Agriculture as environmental requalification and recover of landscape

"The great overbuilding that has saturated the north of Milan, tries to move towards this stretch of green that is mistakenly seen as a large 'empty area', to be redeveloped, where there is 'nothing'" (Prinelli, 2012).

Set up on 23 April 1990, Parco Sud Milano is an Italian example of landscape design, created with the aim of recovering and en- hancing the agricultural economy of the South area of Milan as well as protecting the environment and the landscape, making available to millions of citizens a huge green lung and a great heritage of nature, history and culture. Managed by the Metropoli- tan City of Milan, the park covers a total of about 47,000 ha and represents about 30% of the total area of the city, involving more than 1400 farms. Thanks to the large size of the park, it is possible to find: natural areas (wetlands, rice fields, protected areas - such as the 41 'marcite' - lakes, oases, water sources, woods, meadows, gardens, nurseries, orchards, etc.), tourist facilities (cycle paths, outdoor gyms, accommodation structures, equipped areas, commercial services, gastronomic activities, educational farms, etc.), and ele- ments of historical and cultural heritage (castles, historic farmhouses, monuments, museums, etc.). (Fig.4) The variety of cultural-educational activities and the tourist-gastronomic events that it offers have made the park a place of great cultural exchange, safeguarding the territory and economic profit for the city.

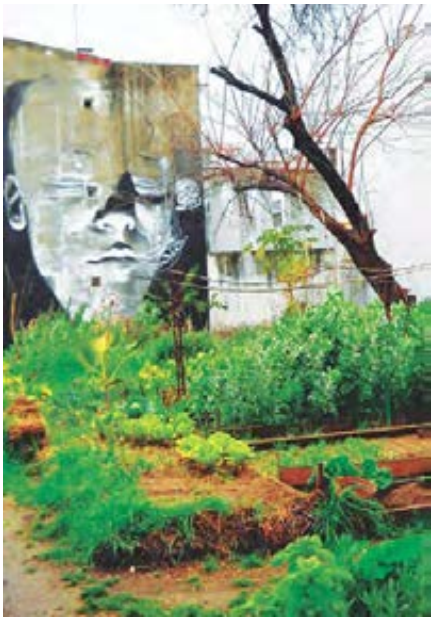


Fig. 4 Parco Sud Milano, map of the cycle paths and municipalities, Milan (IT). Source: cittametropolitana.mi.it

Agriculture as social reintegration and enhancement of heritage

Re-vegetating the city or its surroundings, cultivating and selling products in markets in short and ecological circuits, sensitizing citizens to food and environmental issues, creating jobs and, at the same time, enhancing the heritage.

The experimental site of this French project is an old landfill deriving from the motorway extension, from the excavations of car parks and the tunnels in the Ile de France, a 10-meter high mound over an area of 8 hectares.

The landfill activity closed in 1996 leaving the site abandoned for more than 15 years, but in 2012, this land was acquired by Les Fermes de Gally, with a reconversion of use, to host the demonstrator of urban agroecology of the association Le Vivant et la Vil- le. In addition to the territorial requalification, the main objective of the project is to demonstrate the feasibility of this innovative economic, social and environmental offer on small abandoned or disused areas located in urban and peri-urban areas. The first Ferme en Ville is a demonstrator located in the city of Saint-Cyr l'Ecole (Yvelines). (Fig.5)

The innovative offer of services combines the above-ground cultivation with the market in a circular economy, and moreover, it hosts tourist, educational and professional visits – offering an operational solution in the field of experimental research – infor- ming and educating citizens and visitors about the operation and the role of agriculture, on the origin of products and on the sea- sonality of fruit and vegetables. The entire space is enriched by numerous agricultural activities, such as honey harvesting, flori- culture, wine and beer production, or recreational-tourism, such as hiking trails, the labyrinth of Gally, show-cooking, the educa- tional workshops, which take place during the year in the spaces of the Ferme.

Fig. 5 Les Fermes de Gally, Saint-Cyr l'Ecole (FR).
Source: leslouves.com - www.lesfermesenvilles.com

Agriculture as cultural diffusion and landscape contamination

The Zappata Romana project is a research in progress that investigates the spontaneous shared gardens in Rome as a collective action for the appropriation of urban public space and the development of environmental, economic and social innovative issues. It begins in 2010 with a survey of the existing community gardens with an interactive icon-based map on Google. Since then, when the spontaneous phenomenon was still fairly unknown, over 100 sites have been uploaded. The main objectives are: to de- scribe such emerging phenomenon of positive reaction to vacant or abandoned urban spaces, to observe social sites where the re- lationship with the land encounters themes of public space as collective and shared space along with the integration of social and environmental sustainability, to to encourage the dissemination of experience and skills and to promote green space like an active and attractive that deserves to be visited. (Fig.6)

Agriculture as technological experimentation and sustainable development

Valldaura was Cistercian monastery in 1150, a royal palace of the Crown of Aragon in 1297, a district of Barcelona from 1517, a farm since 1888 and now a research centre (2010), located in the flank of the Collserola Natural Park. Now Valldaura is an inno- vative research centre, that investigates into self-sufficiency. It works into three laboratories: Food Lab, Energy Lab and the Green FabLab which produce the three things need to be self- sufficient: food, energy and many of the things essential to the good life, combining the age-old ancestral knowledge that connects people to nature with the latest advanced technology. Valldaura tooks the energy from food, for this reason they recovered an ac- tivity that is not only productive but also generates biodiversity in the Collserola Natural Park. Food production is based on va- rious forms of cultivation including organic gardens, orchards, edible forests and farms.

In this way, researchers and students can experiment with agriculture new forms of energy and production. (Fig.7) In addition to this, the Valldaura estate offers various workshops and other activities related to the Laboratories and mission. They also host events and organize a mixture of workshops and free open actions that aim to bring similar minded people together in common cause, a coalition of the willing. The Centre has a number of different spaces ideally suited to accommodating a variety of activities such as talks, conferences, presentations, celebrations and festivals within which visitors can try new innovative experiences with and into the nature.

How agriculture, tourism and heritage redesign the landscape through experiences?

The Travel Trends Report 2018 starts its report with the title "Experiences not things".

In a 2014 paper brilliantly titled "Waiting for Merlot", psychologists Amit Kumar, Thomas Gilovich and Matthew Killingsworth show how experiential purchases (money spent on doing) tend to provide more enduring happiness than material purchases (mo- ney spent on having). In the last decade, the birth of many new tourist portals has allowed not only to book online hotels or restau- rants, but also b&b, houses and all sorts of activities around the world. In addition to the receptive or gastronomic character, the tourist offer proposed to the consumers a package of experiences. The case of the Airbnb portal is certainly one of the most em- blematic. (Fig. 8) In an interview with the BBC, Lucy Fuggle, Head of Content at TrekkSoft noted: "In our work with suppliers and tourism boards, we've noticed that visitors are increasingly seeking unique experiences in less 'typical' destinations". This phenomenon is now a growing trend and takes the name of 'experimental tourism', where the activities represent true perso- nal experiences such as: hiking, tasting, cooking lessons, cultural tours, food and wine tours, indoor and outdoor sports, naturalistic activities, artisan workshops, etc. The goal is not only to spend a holiday but to live it, to visit new places by enriching your own background with unique, unconventional, emotional, creative and engaging experiences. The best travel brands are putting, this is especially the case for destination marketing organisations, 56% of which consider experiences to be "a vital part" of their destination marketing (Treeksoft Research).

Fig.6 Hortus Urbis Events by Zappata Romana, Roma (IT). Source: festivaldelverdeedelpaesaggio.it ricreazioni. wordpress.com

Fig.7 Valldaura Self Sufficient Labs, Barcelona (ES). Source: valldaura.net/ spaces

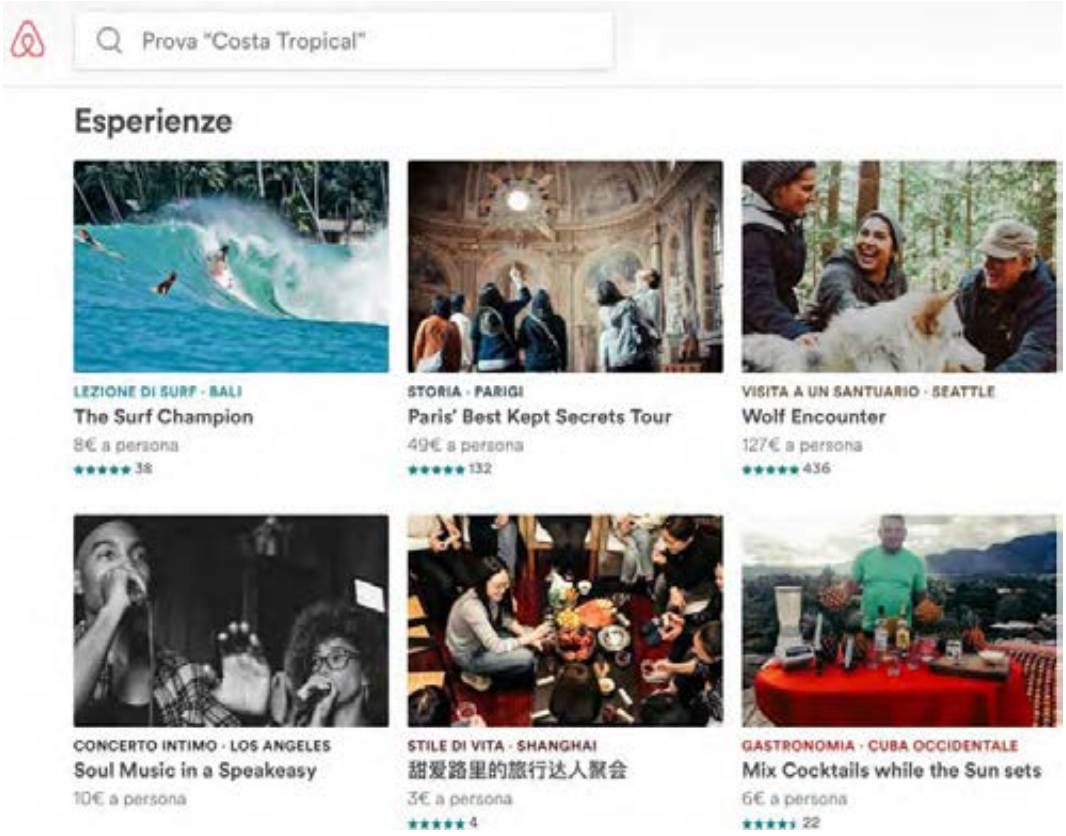


Fig.8 Airbnb site, experiences. Source: www.airbnb.it

Conclusion

Within this context, there is the emblematic example of 'rural tourism' or 'agro-tourism', where travelers interact with nature, agriculture and landscape, experimenting farming activities together with farmers, such as vintage harvesting, olive harvesting, plowing and planting fields, living inside a farm, working with an artisan and more. This new type of traveller aims to expand its horizons and knowledge, deepening local culture and traditions, respecting the place and sustainability. Collaterally to the rural areas of agricultural production, intensive and not, in fact, have been developed com- mercial and accommodation activities, well integrated with the natural context within which they are located – such as farms, educational farms, b&bs, wineries, local markets, etc. – where the consumer can enjoy a quiet holiday surrounded by nature and with the opportunity to taste excellence local products, practice outdoor sports or experiment alternative activities (cooking les- sons, gastronomic tours, tastings in the fields, etc.).

In fact, the numbers of the agri-tourism sector are constantly increasing, in Italy, for example, in 2016 over 22.661 farms were registered, 35% more than in 2006 (Istat, 2017).

In Spain they were about 15,904 in 2017, with a flow of more than 226,668 tourists each year (INE, 2017).

Agrotourism is today a valid and strong alternative for tourists who decide to spend some relaxing moments in a ‘green holiday’. The projects briefly de- scribed are a microscopic example of the actions and phenomena in progress, which, thanks to the cooperation between tourism, agriculture, cultural heritage and social collaboration, have been able to appropriate and give new life to disused spaces, someti- mes without quality, but with great potential.

However, why is it so important to analyze and understand the developments in this sector?

At last estimate, the Millennials generation (22 to 31years old) are worth around $200 billion. In the annual study by Allied Mar- ket Research in 2016, it was estimated that by 2022, online travel will be worth $1,091 billion. By 2025, Millennials will compri- se three quarters of the global workforce, which will bring them into a new era of spending power.

As already described above, the economic volume and the environmental impact that tourism generates within countries has a de- cidedly significant importance. Understanding this sector, the new trends and the possibilities that opens up towards the future public – mostly young like the Millennials, that today seeks a more sustainable and natural form of evasion –, allows not only to optimize the economic resources invested in the tourism sector, but to use it as an innovative tool for the economic, social and environmental development of the cities of tomorrow. In this direction, cities must be targeted, adapting to the new demands of global tourism, with the aim of enhancing cultural heritage, creating an economic relapse for the territory, protecting the environment and offering a product that creates a relational unrepeatable well-being.

References:

Benoit, G., Comeau, A. (2005): *A sustainable Future for the Mediterranean. The Blue Plan's Environment and Developmnet Outlook*, London, Earthscan.

Bourdeau, L. (2001), *"La relation tourisme-ruralité",* Téoros, vol. 20, n° 2, p. 3.

Cawley, M., Gaffey, S. (2002), *"Localization and Global Reach in Rural Tourism Irish Evidence"*, Tourist Studies, vol. 2, n° 1, p. 63–86.

Ferrari, F. (2008), *"Turismo e sviluppo económico"*, in Fuschi F.: Il Mediterraneo. Geografia della complessità, Milano, Franco Angeli.

Fiquet, A-M. (1992), *"Le tourisme rural et la C.E.E."*, Espaces, n° 114, février-mars, p. 4-8.

Fleury A., Donadieu P. (1997), *"De l'agriculture périurbaine à l'agriculture urbaine"*, Courrier de l'environnement de l'Inra, n° 31.

Kumar, A., Gilovich, T. and Killingsworth, M. (2014), "*Waiting for Merlot. anticipatory consumption of experiential and material purchases"*, n° 25, p. 1924-1931

Prinelli K. (2012), *"Il Parco Agricolo Sud Milano"*, Paesaggi Sensibili, ItaliaNostra, Roma, Dossier: I Parchi 2012.

Salizzoni, E. (2012), *"Turismo lungo le aree costiere euro-mediterranee: dalla scoperta al consumo, al progetto del paesaggio",* Ri-Vista ricerche per la progettazione del paesaggio, Paesaggi del turismo, Firenze University Press, n° 1.

Stanley, M. (2011), *Zappata Romana and Spontaneous Urbanism in Rome*, Northeast Modern Languages Conference Rochester, New York.

Research Italy (2013): *Sostenibilità e Turismo nel Mediterraneo (S&T MED*). https://www.researchitaly.it/progetti/sostenibilita-e-turismo-in-mediterraneo-s-t-med/, Il portale della ricerca italiana.

Country Brand Index (2015): Report Country Brand Index 2014-15. https://www.futurebrand.com/uploads/CBI2014-5.pdf, Future Brand.

World Travel and Tourism Council (2017): Country Economic Impact Analysis. https://www.wttc.org/research/economic- research/economic-impact-analysis/, Report.

European Commission (2016): Turismo costiero e marittimo. https://ec.europa.eu/maritimeaffairs/policy/coastal_tourism_it, Affari Marittimi.

ISTAT, Istituto nazionale di statistica (2017): Le aziende agrituristiche in Italia. https://www.istat.it/it/archivio/204238, Report statistiche Istat, 9/10/2017.

INE, Instituto Nacional de Estadistica (2017): Encuesta de ocupación en alojamientos turísticos y alojamientos de turismo rural. http://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176963&menu=ultiDatos&idp=1254735576863, anexo EOTR, Noviembre 2017, 28/12/2017.

Airbnb (2017): Airbnb and The Rise of Millennial Travel, https://www.airbnbcitizen.com/wp- content/uploads/2016/08/MillennialReport.pdf, Report, 11/2017.

BBC News (2017): Are tourists still welcome after protests? http://www.bbc.com/news/business-40960443, by Robert Plummer, 17/08/2017.

UNWTO (2015): United Nations declares 2017 as the International Year of Sustainable Tourism for Development. http://media.unwto.org/press-release/2015-12-07/united-nations-declares-2017-international-year-sustainable-tourism- develop, World Tourism Organization, 5/12/2015.

Travel Trends Report 2018 (2017): TrekkSoft, Report 2018. https://www.trekksoft.com/hubfs/Travel%20Trends%20Report%202018%20-%2061217.pdf?t=1516350774300, by Fuggle L., Kow N., Burkhard S.

Projects:

Enotourism in France (2017): www.it.france.fr/it/enoturismo, France. Rutas del Vino de España (2017): www.wineroutesofspain.com, Spain. Le Strade del Vino (1999): www.agriturist.it, Italy.

Huerto del Rey Moro (2004): www.huertodelreymoro.org, Sevilla, Spain. Parco Sud Milano (1990): www.parcoagricolosudmilano.it, Milano, Italy.

Les Fermes de Gally (2012): www.ferme.gally.com, Saint-Cyr-l'École, France. The Zappata Romana (2010): www.zappataromana.net, Roma, Italy.

Valldaura Self Sufficient Labs (2010): www.valldaura.net, Barcelona, Spain.

Sign, Drawing and Project in the Transfer of Knowledge

Carmen Andriani
Department Architecture and Design DAD (University of the Study of Genoa)
mail: carmenandriani@arch.unige.it
Davide Servente
Department Architecture and Design DAD (University of the Study of Genoa)
mail: davide@gaggeroservente.com

Abstract

Between 1899 and 1901 the most complex and unprecedented work of reinforced concrete conglomerate was carried out in Genoa. The granary silos inserted in the most ancient part of the city is emblematic of its constructive system still carrying the name: silos Hennebique. Despite the fact that it has been abandoned for years, the silos is an essential element in the Genoese port, as other buildings that overlook the waterfront and those that compose the background on the mountainside are obligated to confront themselves with its impressive profile.

Built at the end of the 1920s, the Genoa thermoelectric plant is located on Calata Concenter in the port of Sampierdarena in a neighbouring position to the Lanterna and was extended in the 50s and 60s with the addition of 3 new thermoelectric groups. The power plant uses coal: it will be gradually decommissioned as part of the program to optimize electricity production and, in environmental terms, will start an important process of reconversion that will involve both the port and the part of the city that faces it.

The Naval Technical Museum of La Spezia preserves the evolution of naval art through the centuries, from the age of the pre-unification Marine up to the current Navy: one of the richest and most complete collections of its kind. The museum is located inside the maritime military Arsenal in the western part of the Gulf of La Spezia. The museum, in terms of size and location, is the natural link between the Arsenal area and the city, between military impassability and the urban public space.

The story of the projects developed for these three buildings within the Coastal Design Lab of the Department of Architecture and Design of the University of Genoa aims to be a reflection on the role of drawings and models within the design practice: recognizing and interpreting the built forms; a direct and active reading of the building on which to base the renewal of the city.

Abstract

Tra il 1899 e il 1901 venne realizzata a Genova l'opera più complessa, fino a quel momento, in conglomerato cementizio armato. Il silos granario inserito nella porto più antico della città è emblema del suo sistema costruttivo portandone ancora il nome: silos Hennebique. Tuttora il silos, nonostante sia abbandonato da anni, è un elemento imprescindibile all'interno dell'arco portuale genovese perché con gli altri edifici che si affacciano sullo specchio d'acqua antistante e quelli sulle alture che gli fanno da sfondo non possono non confrontarsi con il suo imponente profilo.

La centrale termoelettrica di Genova è situata su Calata Concenter nel porto di Sampierdarena in posizione limitrofa alla Lanterna. L'impianto, degli anni 1927/1928, è stato ampliato negli anni '50-'60 con l'aggiunta di 3 nuovi gruppi termoelettrici. La Centrale – realizzata alla fine degli anni Venti – utilizza carbone: verrà progressivamente dismessa nell'ambito del programma di ottimizzazione della produzione di energia elettrica e in ottica ambientale, dando inizio ad un importante processo di dismissione e riconversione che coinvolgerà sia il porto che la parte di città che la fronteggia.

Il Museo Tecnico Navale di La Spezia conserva l'evoluzione dell'arte navale attraverso i secoli, a partire dall'epoca delle Marine preunitarie fino all'attuale Marina Militare: una collezione tra le più ricche e complete del suo genere. Il museo è inserito all'interno dell'Arsenale militare marittimo nella zona occidentale del Golfo di La Spezia. Il museo, per dimensione e posizione, è il naturale collegamento tra l'area dell'Arsenale e la città, tra l'invalicabilità militare e lo spazio pubblico urbano.

Il racconto dei progetti sviluppati per questi tre edifici all'interno del Coastal Design Lab del Dipartimento di Architettura e Design dell'Università di Genova, vuole essere una riflessione sul ruolo del disegno e dei modelli all'interno della pratica progettuale: riconoscere e interpretare le forme costruite, lettura diretta e attiva del costruito sulla quale basare il rinnovamento della città.

Sign, Drawing, Models

by Carmen Andriani

In the digital era, architecture is both local and global. Through the plastic articulation of matter and the definition of new spatial relations, architecture is anchored to the context in which it is established and is linked to the site that welcomes it in a relationship of reciprocal and irreversible transformation. Furthermore, architecture is also a virtual phenomenon and, as such, global. It manifests itself (and often comes to its end) in the hyperreal vision of the digital world, eluding the categories of both time and space. While deadlines for implementation of real-world architecture are unpredictable and stretched out, online architecture takes place in an instant and requires constant upkeep. What results is a potentially infinite proliferation of self-referential, self-generated virtual images that have more to do with communication than with the immanence of the project, and which are rapidly consumed and quickly forgotten.

Ours is a profession (and a form of knowledge) that blends together different aspects and includes different skill-sets. The project is an instrument of knowledge and action: it expresses know-how, enhances the contexts in which it operates, frees hidden energies, satisfies a desire and can fulfil a dream. To teach architectural design also means passing down to students the awareness of this contingency. Understanding the meaning of words even before actions is an obligatory step to avoid creating misunderstandings.

Terms such as city, landscape, infrastructure, heritage, territory, express fundamental notions in the design process but are subject to continuous revisions of meaning. Architecture is not an exact science nor an art, in a strict sense: firstly, it responds to a need, and it is then conditioned by the need itself. Although for a long time it was considered to be a minor art, as it was compromised by its relationship to matter and awareness of gravity, in reality, architecture stands out for its ability to forge spaces and give them form[1].

Not everything is transmissible nor can the outcomes of a project's path be foreseen. Each time we set forth on this path of exploration with a new group of young architects, students or collaborators, we create itineraries which may be unpredictable in their development, yet remain fixed in their objective. It is up to those in charge of this process (of training and production) to lead a journey that defends the goal but for which it is willing to negotiate the route from time to time. In a design laboratory, the exchange is reciprocal even if asymmetric. It is a necessary comparison (with students, collaborators, architects, and teachers) since the field of architectural discipline is full of uncertainties, of interpretations, of a plurality of positions, of a diversity of possible solutions. It is a process that must be accompanied at all levels: from those of interpretation and narration to those of instrumentation and techniques, from the coherence of the method to the construction of a logical whole.

Fundamental to this process is the relationship between the project and the prefiguration/ representation techniques that accompany gestation (concept) and development. Etymologically, a project indicates a projection towards the future, it implies an 'ability to see' and entails a transformation. Whatever the instruments of representation accompanying this process, it is easy to understand how these two acts of concept and development are intimately linked in conveying the idea within a unitary narrative.

Signs and drawings are (were) the architect's tools. The sign is an invention; the drawing is a narration. What we call sketches are *«a sort of early state of drawings», as Giorgio Vasari wrote, «which are done to find the aptitudes and the first composition of the work; they are made in the form of a stain, alluded in just one draft, in a short time, expressed by the fury of the artist»*. The sign has the difficult task of beginning the project, it is expressed in a single process and prefigures a possible trajectory of the project. The drawing is the verification of this intuition, a prefiguration of what is not yet there, a suspended interval between the illusory reality and the actual reality[2]. In the digital age, the distance between these two realities has thinned to such an extent that the illusory flows into the actual and vice versa: by producing hyper-realistic images, the tools of virtual modelling have helped to create the idea that sign and drawing can coincide, reducing the times of representation and cancelling the certain identification of the author. But this is not the case: within the project's didactics, drawing must have - today with greater intensity - the role of an instrument for interpreting the forms and shapes of construction and pre-vision of architecture, a graphic text of a critical thought.

[1] See Rocca, Ettore (edit by), Estetica ed Architettura, Il Mulino, Bologna, 2008.

[2] Cf. Andriani, Carmen, Segno-di-segno in «Disegnare. Idee e immagini» n.38, giugno 2009, pp. 7-11.

Interpretation and pre-vision

by Davide Servente

The representation of shapes and forms of the built environment can be seen as an instrument to comprehend the city, and the selection of signs that make up its plot is a first form of knowledge, of critical interpretation and of design. A drawing made by separate layers of the physical characteristics of which the city is composed reveals the relationship between the parts and clarifies its territorial dimension. This critical reading includes the infrastructural reinforcements, the environmental systems, the bits of empty spaces, the fragments of countryside and rurality that creep into the peripheral building constellations. Re-drawing is key to understanding the meaning of these stratified realities, as it creates a framework of operational and critical synthesis. It is the first project action.

In the spring of 1972, the exhibition *Immagine per la città*[3] was inaugurated in Genoa under the direction of Gianfranco Bruno and with Franco Sborgi as Project coordinator. The exhibition, which opened to the public at the peak of the city's phase of industrialisation, linked the built environment with man, and set forth from the assumption that the artistic intervention of the avant-gardes was a useful instrument for urban interpretation to overcome the historical city. The over three hundred works on display - including, among others, Delaunay, Leger, Larionov, Feininger, Hopper and, among Italian artists, Carrà, Balla, Boccioni, Sironi and De Chirico - highlighted the role of the artist as a witness to the cultural specificity of the city, but above all the contribution of the visual arts to the definition of the image of the city itself. The different works on display were the result of completely subjective interpretations, whose expressive power helped create a sort of collective archive in our imagination.

The construction of the image of the contemporary city begins with a historical laceration, according to a process of abstract rationalization and a utopian vision. The twenty boards of Le Corbusier's Ville Radieuse of 1930 represent a new city opposed to the historical one, consisting of continuous structures and punctual elements as an alternative to the compact fabric of the stratified city. The great Plan designed for the future city of Paris prefigures a network of skyscrapers and some symbolic monuments such as the Eiffel Tower and Notre Dame. The rest, however, is to be taken down completely. The rest is the fabric of the city, it is the system of relations of the compact conurbation, ultimately it is what we call context. The tabula rasa of Le Corbusier's project steps away from this notion, in the sign of Modernity and Progress, and at the same time outlines a new radical interpretation: overturning the terms, context is no longer necessarily what pre-exists in the project but what exists or resists with the project.

In the Sixties, Plug-in-City, The Walking City, Ville Spatiale, and Instant City are the extreme forms in which the maximum functionalization of the urban image is realized and its complete loss of formal identity and semantic value: the image of the city, detached from reality and losing any relationship with history, becomes an infinite structure, a graph elaborated by a computer, the lines of the force of a magnetic field. In 1973, The Analogue City by Aldo Rossi re-establishes the link

[3] Exhibition Image for the city (Immagine per la città), Direction Gianfranco Bruno, Coordination Franco Sborgi, stage setting of the Accademia Studio Lavarello, installation of Arch. Mario Semino / Palazzo Reale, April 8th - June 11th 1972. Catalog Image for the city, Prints E.R.C. Casapietra - L. Garibaldi, March 1972.

with History by re-considering the forms of the past, creating an image of the city corresponding to the idea that it has built over time. But the hand that transforms, deforms and moves the world by tracing the signs of analogous cities, still capable of guiding the physical reality of our living, has stopped with the decline of ideologies and the end of the modernist illusion.
In the Nineties, the city brought to fulfilment a phenomenon that had already been predicted since the 1960s: its explosive spread throughout the territory along the infrastructure that precedes this development. The metropolitan dimension describes an interconnected and dynamically undefined polycentric city. With The Carpet Metropolis (1990) and Patchwork Metropolis (1994), Willem Jan Neutelings' intertwines the spatial fragmentation between The Hague and Rotterdam in a coherent carpet. The city is here compared to an evolutionary organism capable of growing and developing in sync with the condition of the historical age. The infrastructural reinforcements are the backbone that innervates the urban phenomenon and measure the territorial dimension, making them an inclusive notion of the landscape. These are some of the visions of cities that, thanks to the evocative power of their images, have acquired their concreteness becoming the cornerstones of architectural and urban culture, as they are recognized as scientific analysis of an evolving environment.

Didactics

by Carmen Andriani

Today the project returns to focus on the existing, with the complexity of acquired contexts of dispersion and with the awareness that the dimension of the city is inclusive, relational and territorial. The project works on a context that is a plurality of contexts, values, customs, and of often conflicting strategies. A context that brings together different times and spaces of the city and that reopens the dialogue with what already exists. It is an inverse process, of implosion towards the inside, that invests the built environment and its assets, in particular, the abandoned, whose numbers are out of proportions. In this sense, Genoa represents a unique urban laboratory of its kind, paradigmatic when compared to some categories such as the relationship with the topography, with the coastline and with the infrastructural armor. Among these infrastructures, the port is certainly the most important. Its transformations over time have influenced the development of the city, in a dialectical and conflictual relationship, and have contributed to writing part of its history.
The interface between city and port is the spatial category on which the educational and research project has placed its attention. In that middle space, which has always been a territory of contention, there are large buildings/machines, architectural artifacts related to trade, tourism, energy, shipbuilding and all the operational activities related to the sea and its traffic. Many of these buildings are now decommissioned. The issue of divestment becomes a concrete issue that re-launches the theme of the city and its future.
It is also the chosen theme for the *Coastal Design Lab*[4] of the Department of Architecture and

[4] The Coastal Design Lab has been active since 2014. It is an integrated laboratory of architecture and urban design within the educational training of the Master Degree Course of Architecture of the Department of Architecture and Design - dAD - of the Polytechnic School of Genoa. The laboratory, coordinated by Prof. Arch. Carmen Andriani with Beatrice Moretti and Davide Servente, proposes a reflection on the port areas of the Ligurian context through project proposals on the border between city and port.

Design of the University of Genoa, a permanent laboratory scheduled in the last year of the master course of studies.

In the interface between city and port, the reasons for maximum complexity in the historical, physical, spatial and relational evolution of the city are condensed, and the project's ability to record all levels of complexity is tested. In return, the project aims to deliver an integrated, multi-level, synthetic vision through the tools of representation.

It no longer makes sense to separate architecture from the fields of urban/ infrastructural/port. Every act of modification made even to the smallest of elements of a context reverberates around it, provoking a chain reaction of movements and a shift of senses regarding a wider spectrum of relations[5]. The assembly of drawings and models is instrumental to the narration of the idea, which finds unity in the sum of the insights over the different scales and their synthetic exposition.

A short circuit is therefore established between the scale of detail and the overall picture: the extent and significance of all the scales is verified for each of the solutions presented. One of the main objectives is the simultaneous exploration of all the design scales and the systematisation, through models and drawings, of all the parts that make up the project. The conviction remains that each modification, although apparently insignificant, requires an assumption of responsibility with respect to the context to which it belongs and contemporarily modifies.

The most recent case studies dealt with in the last few years have been three divested or decommissioned complexes: the Hennebique granary silos and the power plant, both in the Genoese port area, and the Naval Technical Museum of the maritime Military Arsenal of La Spezia. They are exceptional complexes due to their intrinsic value (structural, typological, formal, etc.), but above all, they are paradigmatic cases of possible urban regeneration.

Projects

by Davide Servente

Built between 1899 and 1901, the granary silos Hennebique is a manifesto of the homonymous cement patent named after its inventor, the builder Francois Hennebique. Although abandoned, it is protected by authorities as it stands in the curvature of the ancient port as an impressive building/ city. The granary silos has a high symbolic and perceptive value. Its encumbrance, comparable only to the Lingotto of Turin, enters the skyline of the entire city as an essential element. The cement structure articulated in its interior by the tight rhythm of the grain cells constitutes its static, logical and formal structure. The envelope, characterized by large windows, stringcourses and pilasters, as well as subsequent and functional additions over time, can be considered superfluous, removable or adaptable to new functions[6].

[5] Within the Coastal Design Lab, the goal was to identify a method that, following the peculiarities of each project, allowed to maintain a coherent image and communicative clarity. The representation is guided by a multi-scale approach, which finds its consistency through in-depth analyzes at different scales, whose order is established according to the object of study.

[6] In the first instance, the projects tried to understand how to connect the building with the rest of the city, freeing the elevation of the dock and inserting it into the system of public buildings of the Old Port. The work then focused on how to intervene in the internal structure of the building to identify which functions would best fit the structure and the context in which it is inserted. Students were asked to produce posters that would simultaneously reflect the building's state of affairs and its possible future. They suggested keywords that then guided all the subsequent phases of the project. A significant drawing requested was the cross-section of the building, useful for highlighting the relationship between the city and the new spaces

The Genoa thermoelectric power plant (built between 1927 and 1928) in the process of being dismantled, is also in the port area, in a neighboring position to the historic Lanterna, symbol of the Genoese port and one of the oldest lighthouses in the Mediterranean. The plant was extended in the 50s and 60s with the addition of 3 new thermoelectric groups. Two main aspects of the project to reconvert the plant carried out within the Coastal Design Lab were the connection with the city and the reuse of parts of the structure and its machines, as they are considered to be a significant testimony of industrial archeology. One of the objectives of the project was to reconstitute the relationship with the city behind it, to connect it to the Lanterna, and to redesign its access points starting from the intricate envelope of infrastructures related to port activities[7].

Finally, the Naval Technical Museum of La Spezia, inside the partially disused Maritime Military Arsenal, preserves the evolution of naval art through the centuries, from the age of the pre-unification Marine up to the current Navy: one of the richest and most complete collections of its kind. The museum is located inside the maritime military Arsenal in the western part of the Gulf of La Spezia. The museum, in terms of size and location, is the natural link between the Arsenal area and the city, between military impassability and the urban public space. The strengthening of its undersized exhibition spaces is an opportunity to redesign the border between the Arsenal and the city[8].

Addressed as complex cases, these three examples were an opportunity to test all the tools of the design process. They are paradigmatic cases which, despite the diversity of contexts, individual biographies and functions, retain a huge potential for regeneration, not only for themselves but for the city to which they belong. Through continuous monitoring of the effectiveness of the exchange between the architectural system and the urban one and vice versa, the project and its tools aim to guarantee a widespread benefit and value that can ultimately produce beauty.

---

inside the building designed by the students. Furthermore, both digital and physical models of the structure were produced, along with the various scales to pinpoint and verify the possible actions on it and the real feasibility of the interventions. See video about exhibition Hennebique. Il gigante e il serpente in Palazzo San Giorgio - Port Authority of Genoa https://www.genova24.it/2015/07/un-passante-tra-il-porto-e-la-citta-gli-studenti-di-architettura-disegnano-il-futuro-del-gigante-hennebique-91431/

[7] The Central power plant uses coal: it will be gradually decommissioned as part of the program to optimize electricity production and, in environmental terms, will start an important process of reconversion that will involve both the port and the part of the city that faces it. Although the plant is located inside the port and has a considerable size compared to its surroundings, the port facilities and the lantern complex blend it into the context, making it invisible to see looking from the city towards the sea. To explore possible links with the urban fabric, students produced layouts highlighting the elements considered useful for a possible connection with the city, such as the port's heavy traffic ramps, the sea, and the pedestrian paths leading to the Lanterna, and adding new elements to connect the plant with the city. These initial hypotheses were then verified through zenithal views and territorial axonometric projections, highlighting the emergencies of the port and the new connections. The census of the machinery inside was accompanied by exploded axonometric views and perspective sections to verify the internal spatiality of the building once it was totally or partially freed of the plant. The physical models allowed to govern the relationship between the Central power plant and the surrounding piers.

[8] The first exercise in the Coastal Design Lab was the study of the border between the Arsenal and the city of La Spezia: through maps and models that highlighted the entrances and provided for new ones and the survey of the city's public spaces in relation to the Arsenal and the water profile as a natural connection with the city's waterfront. Subsequently, all the objects contained in the museum were redrawn in scale, allowing to quantify the real need for exhibition space inside the museum.

Fig.1 Coastal Design Lab academic year 2014/2015 Exhibition "Hennebique. Il Gigante e il Serpente". Genoa, Palazzo San Giorgio, July 2015.

Fig.2 Coastal Design Lab academic year 2014/2015 Exhibition "Hennebique. Il Gigante e il Serpente". Genoa, Palazzo San Giorgio, July 2015.

Fig.3-4 Coastal Design Lab. La Centrale elettrica di Genova. academic year 2016/2017

Fig.5-6 Coastal Design Lab. Mutena.Il Museo Tecnico Navale della Spezia. academic year 2017/2018

Fig.7-8 Coastal Design Lab. Mutena. Il Museo Tecnico Navale della Spezia. academic year 2017/2018

Drawing architectonic choices. Representation and optimization in design pathway.

Fabio Bianconi
Department of civil and environmental engineering, DICA, (University of the Study of Perugia)
email: fabio.bianconi@unipg.it
Marco Filippucci
Department of civil and environmental engineering, DICA, (University of the Study of Perugia)
email: marco.filippucci@unipg.it
Marco Seccaroni
Department of civil and environmental engineering, DICA, (University of the Study of Perugia)
email: marco.seccaroni@gmail.com

Abstract

The research arises from a collaboration between the University of Perugia and the Municipality of Perugia for the study of architectural solutions for the associations of citizens in the green parks of its different districts. The goal is to create pavilions that can parametrically adapt to different contexts, even though they represent conceptually similar elements. The unity of the architectural genesis guarantees operative simplification in responding to the many needs of the territory, while having to deal with the variation of needs and places themselves, as well as with the need of paths of identity increasingly present in architectural research. The route therefore falls within the logic of design for mass customization. The rule-based architecture thus derives from the optimization of shape in terms of context, energy and structures. The process begins with the analysis of the site, aimed firstly to find those mathematical relations that allow to schematize the site through parameters. In the proposed case, it is simplified through four parameters (context, layout, orientation, perception) by combining these variables in a linear way, it is possible to generate "n" places by defining a correspondent mathematical model defined and oriented. The next step is to relate the generated model to the set of possible solutions of the building that is also created in a parametric manner. Through the optimization process, it is possible to find the optimal configuration of the building from a perceptive, lighting and structural point of view.

Abstract

La ricerca nasce da una collaborazione fra l'Università degli Studi di Perugia e il Comune di Perugia per lo studio di soluzioni architettoniche per le associazioni di cittadini nei parchi verdi dei suoi diversi quartieri. L'obiettivo è creare padiglioni che possano parametricamente adattarsi ai differenti contesti, pur rappresentando elementi concettualmente similari. L'unitarietà della genesi architettonica garantisce una semplificazione operativa nel rispondere alle molteplici esigenze del

territorio, pur dovendo confrontarsi con la variazione delle necessità e dei luoghi stessi, nonché con l'esigenza di percorsi di identitarietà sempre più presenti nella ricerca architettonica. Il percorso rientra pertanto nella logica del design per la mass costumization. La regola architettonica deriva così dall'ottimizzazione della forma in funzione del contesto, dell'energia e delle strutture. Il processo parte dall'analisi del luogo, proponendosi innanzitutto di trovare quelle relazioni matematiche che permettono di schematizzare il luogo attraverso parametri. Nel caso proposto viene semplificato attraverso quattro parametri (contesto, giacitura, orientamento, percezione), combinando queste variabili possiamo generare n luoghi ed ognuno è un modello matematico definito ed orientato. Il passo successivo è mettere in relazione il modello generato con l'insieme delle soluzioni possibili dell'edificio generato anch'esso in modo parametrico. Tramite il processo di ottimizzazione è possibile individuare la configurazione ottimale del edificio dal punto di vista percettivo, illuminotecnico e strutturale.

Introduction

The vision of architecture as a process and production industry has been one of the key themes of the modern time[1], functionalist interpretation that has led to a disintegration of ties between city and society: replicated typological forms, also dictated in structural elements by productive seriality, are repeated in spaces that remain anonymous for the desire to standardize the vision, a condition also protected by building regulations. Instead, in the historicized city and in the more recent parts[2] that in any case escape the rigid regulation, spontaneous evolution has shown a request to characterize the spaces, to create a dialogue, to mark and draw its presence with elements of unevenness, with variations capable to identify spaces, to make them their own. This phenomenon, easily detectable at different levels, stands out as a structural need of architecture and becomes a design theme for great authors like e alejandro aravena[3] o teddy cruz[4] , pioneers of a methodology influenced by spontaneism: the projects they propose come from the laws of the context and continue to show their characteristic vitality, often modular and redefinable building organisms, where the owner, certainly guided through a limitation of his possibilities of choice, can dialogue with the existing, with the architecture, with himself, with his neighbors. The originality of architecture is linked to its ability to allow those who live it to express their identity, to be a manifesto and a proper place for those who live it. Architecture in our era of images has understood its communicative dimension, which develops in the centrality in the eye, in its relationship with the "inferior sphere of artistic activity, sphere which is on this side of the expression, and which has nothing to do with feeling and temperament[5]" . "seeing", writes rudolph arnheim, "consists in grasping the structural elements rather than indiscriminately recording all the details[6]". On these bases it is possible to

[1] W. Gropius, La nuova architettura e il Bauhaus, Milano, Abscondida, 2004, pp. 19-21.
[2] M. Filippucci, Perugia, Complesso residenziale di via Domenico Cimarosa (Francesco Zannetti, 1963-1972), in Da case popolari da case sperimentali. Un secolo di architettura nell'edilizia residenziale pubblica della provincia di Perugia, Paolo Belardi, Valeria Menchetelli (eds.), Effe Fabbri, Perugia 2012, pp.167-178.
[3] A. Aravena, Alejandro Aravena: progettare e costruire, Electa, Milano 2007.
[4] T. Cruz, A. Boddington, Architecture of the borderlands, Wiley, London 1999.
[5] E. Panofsky, Il problema dello stile nelle arti figurative, in La prospettiva come forma simbolica e altri scritti, G.D. Neri (eds.), Feltrinelli, Milano 1984 p.149.
[6] R. Arnheim, Il pensiero visivo, Einaudi, Torino 1974, p.82.

understand how one of the essential objectives of architectural spaces today, above all of public space, is linked to the strategies connected to identifying and identifying oneself. Thus we do not enter into the postmodern misunderstanding of an "architecture of communication over space but the centrality of perception is linked to imagination as the "faculty of the possible[7]" connected to the future but also to memory with the recognition deriving from experience.

The reactivation of the relationship between places and community, which certainly passes through the vision, can be read as the strategy of urban regeneration and of real participation to restore the transition from urbs a civitas.

The proposal comes from a collaboration between the department of civil and environmental engineering of the university of perugia and the municipality of perugia, in relation to a convention aimed to create wooden structures for citizenship to be placed in the parks of the town.

The functional objective that binds to the definition of a meeting place and garrison is also associated with the desire to connote the place with a space that gives it identity by receiving it from those who use it. The architectural form wants to be an opportunity to rethink the relationship between architecture and community, in the mutual loss of forms and meanings inherent in the excess and approval of the processes of standardization and stereotyping of contemporary culture. These are architectures also placed in an environmental context of value for the city, in those spaces with a strong social identity and therefore also cultural function, places that are designed to promote a new way of building in harmony with the environment and nature.

From what has been shown, here we have three characteristics that want to determine the architecture of these pavilions: the recognizability of the architectural form as a denoting element of the action of the city municipality, the ability to characterize these spaces as a function of the community to make them their own an finally sustainability and the low environmental impact of the chosen solutions.

Methodologies and tools

The research aims to create new tools to achieve a mass customization of architectural forms. Using the tools of parametric and generative representation and in particular rhinoceros with his visual aid for scripting grasshopper, integrating the instruments of the different analyzes necessary to evaluate the sustainability of the work in the same representative virtual environment, we want to create a family of pavilions by drawing their relationships with the schematized surrounding environment.

The first step is identifying which elements can be discretized to define the context of the parks in perugia, identifying a volume of influence that varies according to the measures of the pavilion to be designed. This volume is the minimum portion of space necessary for the construction of the building, taking into consideration the place and must be characterized in every face and schematized. The square base is nothing but the course of the terrain, it will be flat if the ground is flat or inclined by a defined angle if it is sloping. The side faces define if there are obstacles (trees, walls etc) and of which entity. You will then obtain a solid with openings generated by the place (fig.01).

[7] G. Durand, Le strutture antropologiche dell'immaginario, Dedalo, Bari 2009, p.16.

This schematization has been hypothesized in such a way that the relief is expedient, in fact the zone of influence can also be measured in steps.

Another parameter to take into consideration is the orientation, in fact it is possible to rotate the volume according to the cardinal points. These elements that we inserted are real measurements that reflect the place, another parameter to be inserted is perception, or better the space identification of those valuable elements on which we should maximize the view (attractors) or the opposite, the detractors, ie where the vision should be minimized. Only with these 4 parameters we could recreate almost an infinite number of solutions (fig.02). These parameters and therefore these geometries (flat surfaces and points) can be easily transposed in a parametric approach, it goes without saying that it is possible to recreate a schematized virtual model but characterized comparable to the real one. (fig.03)

The next act is to consider the context defined as the input of a parametric algorithm aimed obtain optimized solutions. The architectural form of the pavilion is defined from geometric rules, whise ranges can vary, the more it is free to vary and the more solutions you will get, but at the same time there is the risk that you "lose control" on the final form as it can not foresee all the possible configurations.

The algorithm was conceived with a rectangular base and fixed height pavilion. The variable part consists in the possibility of creating openings in all the possible configurations inside the façades. The building can also rotate its orientation as well as it can vary the inclination and the type of coverage. (Fig.04)

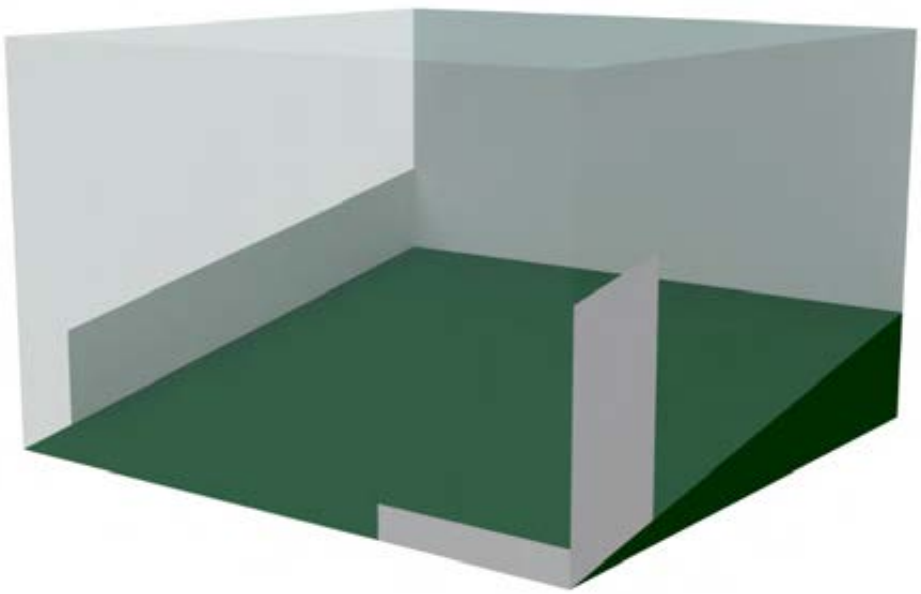


Fig 1- Influence volume

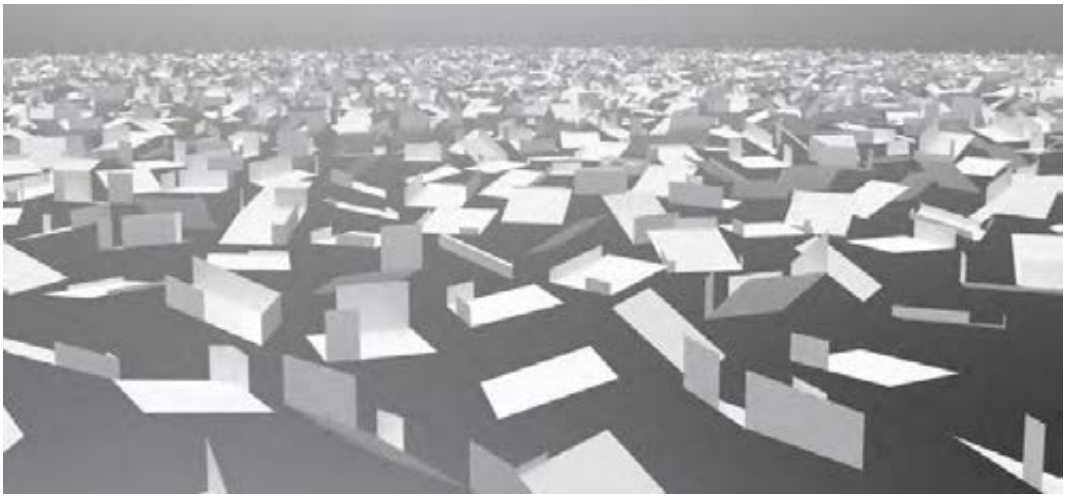


Fig.2 - Some of the possible configurations.

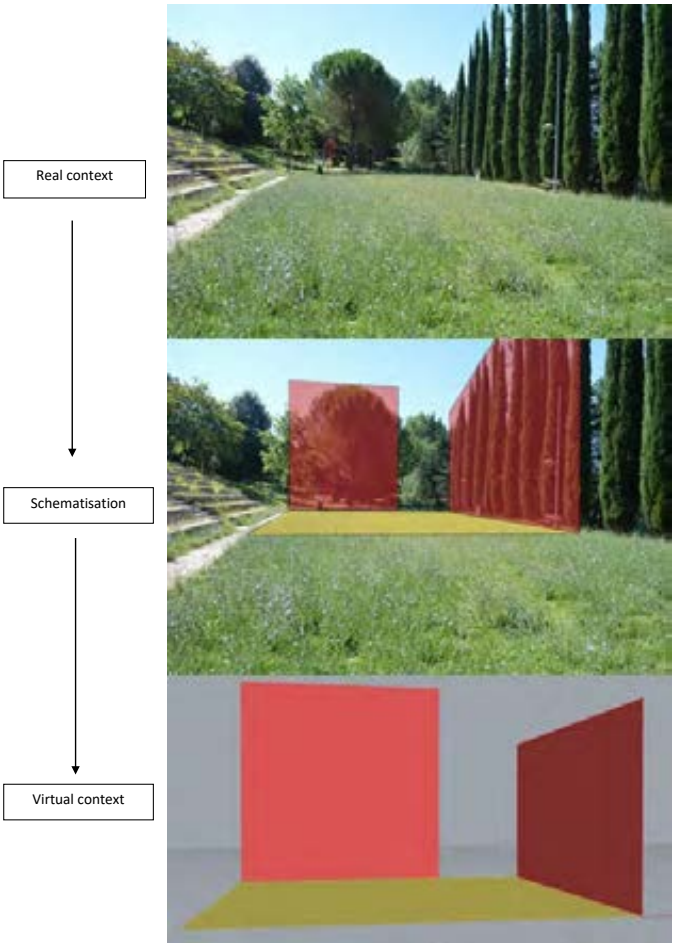


Fig.3- Logical steps to move from a real to a virtual context Vittime delle Foibe park in Perugia.

To find the best solution, the algorithm takes into consideration three values: the annual energy consumption (heating, cooling and electrical system), the emergy of the materials used and their transport and a coefficient of perception.
To evaluate the annual energy consumption, the Grasshopper HoneyBee add-on was used, based on Energy plus. Here it is possible to import the climatic data for the area in question and to characterize them with the geometry of the place generated thanks to the inputs. For the experimentation of the procedure a construction package was defined consisting of an insulation of 0.20 m, an Xlam panel of 0.14 m, and a layer of gypsum plasterboard.
The emergy is evaluated through another plug-in, CLARK'S CROW, where it is possible once defined all the constructive elements in HoneyBee to calculate the emergy due both to the quantity of material used and to its transport[8].
For the perceptive analysis, a specific component of HoneyBee was used, viewAnalysis that allows to exploit attractors and detractors as inputs. The algorithm dissects the analyzed form with a virtual plane placed at eye level (1.7m) and the component divides the surface into a grid where it evaluates in percentage from how many attractor points each portion of the discretized surface is visible.
The algorithm then calculates the average value of all the elements of the grid for the different attractors, thus arriving at a synthesis value determined by the difference between the mean values of attractors and detractors.

Experimentation

The variations of the optimized shape can be analyzed as a function of the transformation of the boundary values. In the parameterization of the form there are always some characterizing traits common to all the configurations according to the imposed rules.
Below are some examples of pavilions optimized from randomly generated contexts.

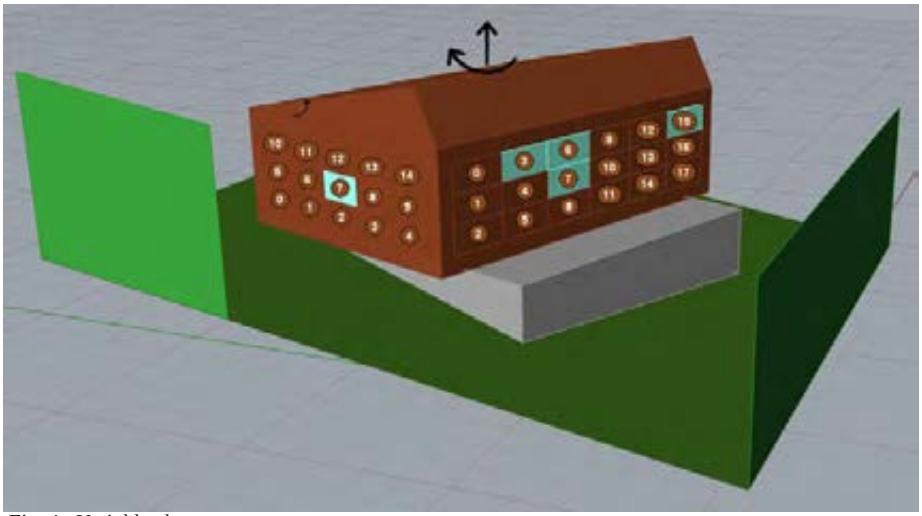


Fig. 4 - Variable elements

[8] Keena, N.; Raugeib, M.; Aly Etmana, M; Ruana, D.; Dysonaa, A. Clark's Crow: A design plugin to support emergy analysis decisionmaking towards sustainable urban ecologies, Ecological Modelling, 2017.

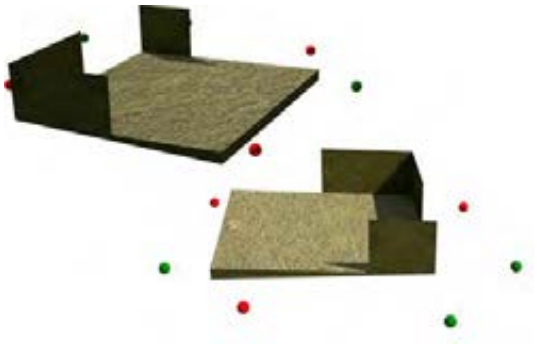


Fig. 5 - Random context

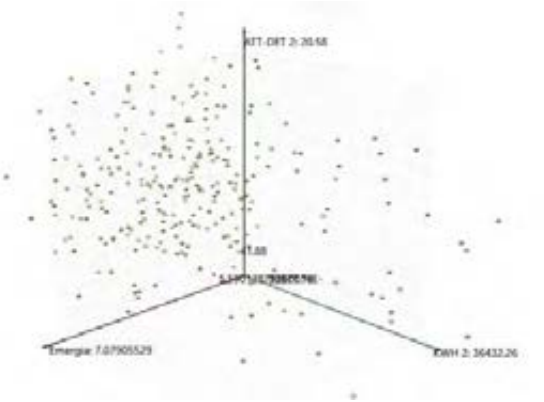


Fig. 6 - A portion of the generated solutions

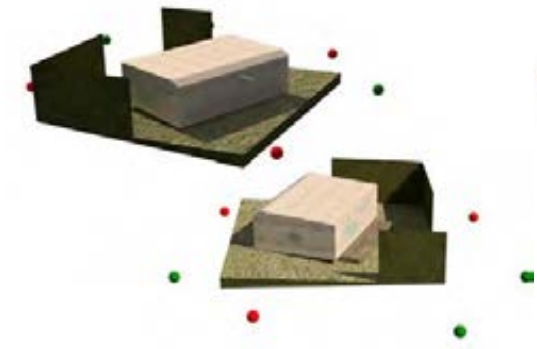


Fig.7 - Optimized solution according to the context, energy and emergy.

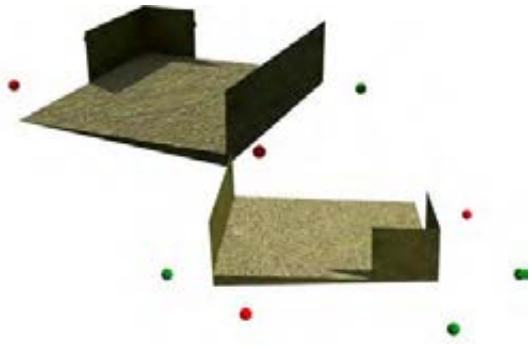


Fig. 8 - Random context

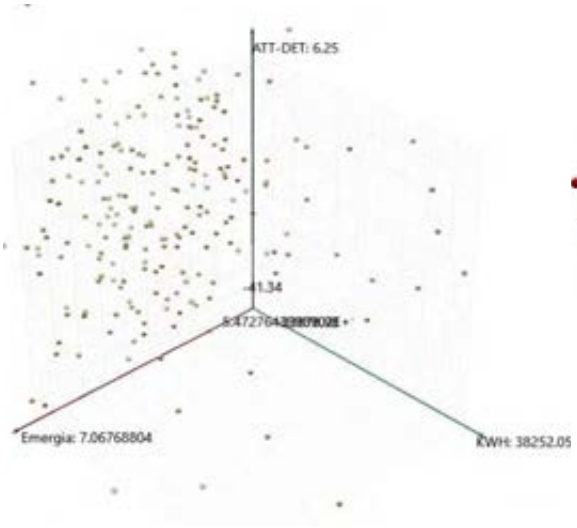


Fig. 9 - A portion of the generated solutions

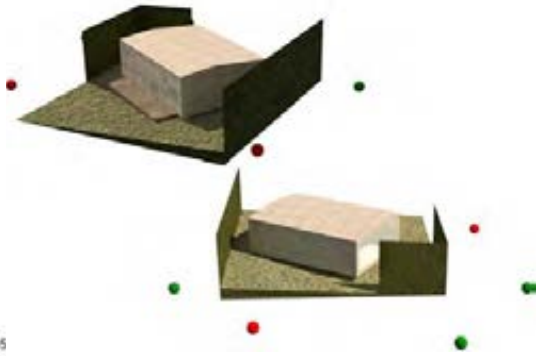


Fig.10. - A portion of the generated solutions

From these solutions it emerges how much the surrounding environment does characterize the geometry of the building despite the form being defined beginning from simple rules. A clear case is the arrangement of the openings in the direction of the attractors but taking into account the rotation in such a way that the energy consumption is also optimized.
Taking as a reference the process carried out, the first step was to identify the ideal location on site where to build the pavilion: It follows therefore a prompt detection of the area of influence, the definition of the volume faces (open, closed, partially shielded) and l identification of attractor points and / or detractors. The configuration in figure (figs 14 and 15) shows the real context of the Chico Mendez park in Perugia. The algorithm first generates a series of random solutions and then refines them more and more until you find a family of pavilions optimized for that context (fig.16). The solution generated is only a meta-project, an indication for the designer who can easily start from these forms to transform the optimized configuration from the point of view of composition and architecture. The output of the algorithm is in fact a digital model of surfaces, which the designer can then transform into an architectural model. (fig. 18)

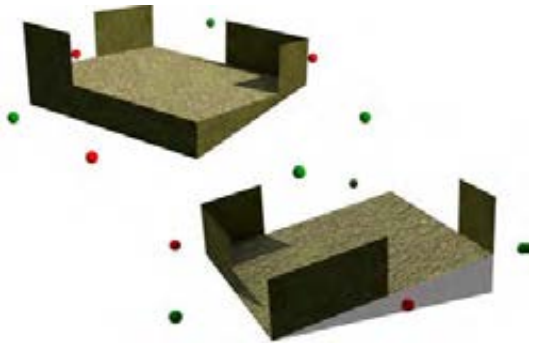


Fig. 11 - Random context

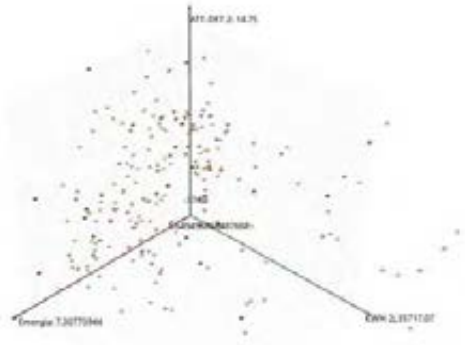


Fig.12 Random context

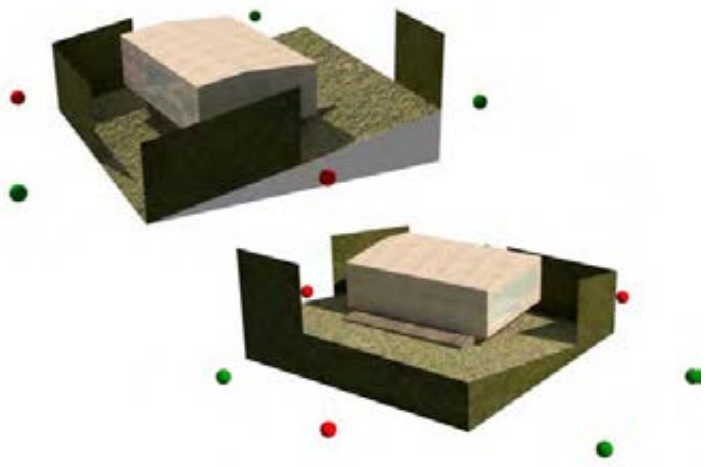


Fig. 13- Optimized solution according to the context, energy and emergy

Fig.14 – Schematisation of the context of the Chico Mendez park in Perugia

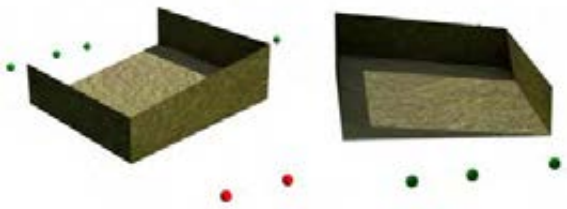


Fig.15 - Context of the virtual Chico Mendez park

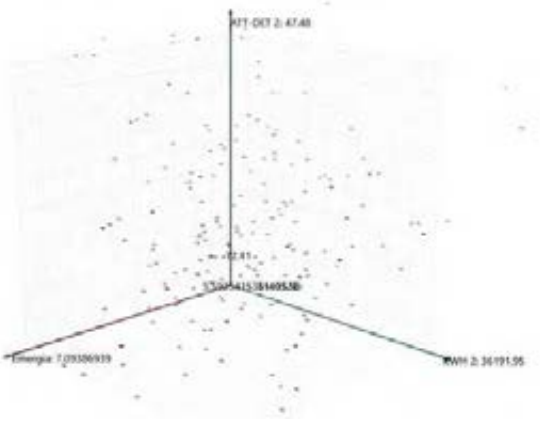


Fig. 16 - Portion of the solutions generated for the Chico Mendez

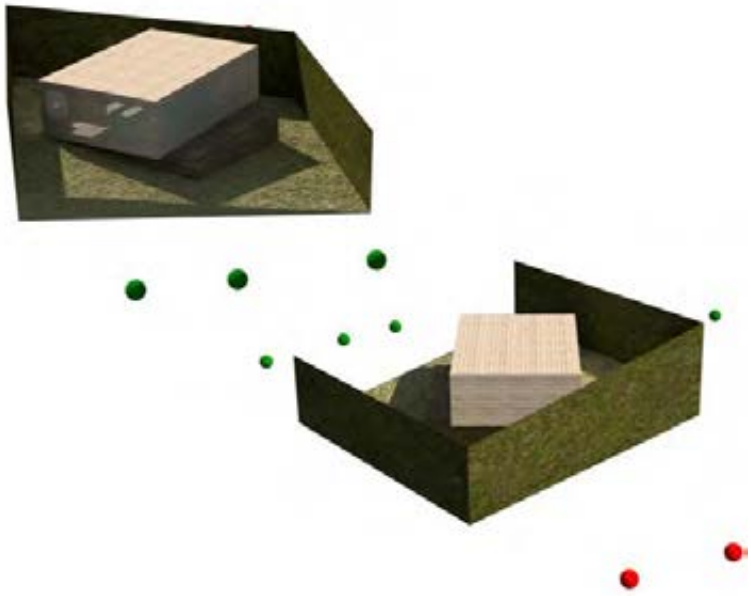


Fig. 17- Optimis

Fig.18- Photorealistic rendering

Concluding remarks

The proposed research represents the first step towards a multiparametric modelling aimed at optimizing the emergy, energy and perception according to the context.

The obtained results help demonstrate the advantages of the form-finding, which opens not only to technical data, but includes perceptive aspects and the possibility of configuring, in a unique way, the representative space of a community.

Thanks to these new tools, a new representative dimension can be added to the design, the immaterial relationship that architecture has with its context. This results in an innovative process that correlates with optimization.

The process thus succeeds in integrating multiple aspects of the complexity of reality into the evaluative phase, determining a unique form, organically characterized with the environment. The organic interpretation of architectural research is reinforced in the simulation by finding its relation on aspects of the context that influence and draw the architectural form to promote its contextualization.

However, it emerges that in this design/modelling process the function of the designer is increasingly central, protagonist of the geometric rules and therefore of the form, the identification of the selected inputs and the values to be used for optimization. The metaphorical value of the proposal then pushes to determine precisely the single product, which certainly can not represent a simple defined output of an industrial process, by virtue of its economic and social value. However, an ineluctable foundation is provided to evaluate the further design choices taking into account the different factors that substantiate the architectural form.

The aesthetic rhythm of pure forms in Magnaghi –Terzaghi architects' works

Alessandra Capanna
Department of Architecture and Design, DiAP (Sapienza University of Rome)
email: alessandra.capanna@uniroma1.it
Giampiero Mele
Department eCampus (Università degli Studi eCampus),
email: giampiero.mele@uniecampus.it

Abstract

The encounter with Paola Magnaghi Delfino, a mathematician teaching at the Politecnico of Milan, actually the daughter of Augusto Magnaghi, was an opportunity to start a systematic research on the drawings by Magnaghi-Terzaghi's atelier. Augusto Magnaghi and Mario Terzaghi, even if nowadays less remembered by the storiography, were two of the most important exponents of Modern Architecture in Milan, collaborators of Pietro Lingeri and Giuseppe Terragni. The square and the equilateral triangle at the base of their architectures show a rationality that binds number, shape and size, generating a modern form that bases its rationalist roots in the classical tradition of the History of Architecture of the past.

This paper deals with the religious buildings, the Cagnola villa church in Gazzada (1959) and San Filippo Neri in Bovisasca district in Milan (1961) designed with equilateral triangles at the base of the matrix generating the shape.

The church of Villa Cagnola has a hall-plan with a fully windowed wall that opens the view from the altar to the pre-existing historical park. The wall has been designed thanks to the skillful combination of equilateral triangles.

The church of San Filippo Neri is based on the geometry of the equilateral triangle as well, in fact, has a central hexagonal plan with a series of annexes such as the weekday chapel and baptistery. The reference to regular polygons as the principle of the form and the related traditional value of geometric "perfection" becomes a model of symbolic rationality, and the useful instrument of conception of the sacred space.

Abstract

L'incontro con Paola Magnaghi Delfino, docente di matematica al Politecnico di Milano, figlia di Augusto Magnaghi, è stata l'occasione per avviare una ricerca sistematica sui disegni dell'atelier di Magnaghi-Terzaghi. Augusto Magnaghi e Mario Terzaghi, anche se oggi meno ricordati dalla storiografia, furono due dei più importanti esponenti dell'architettura moderna a Milano, collaboratori di Pietro Lingeri e Giuseppe Terragni. La piazza e il triangolo equilatero alla base delle loro architetture mostrano una razionalità che lega numero, forma e dimensione, generando una forma moderna che fonda le sue radici razionaliste nella tradizione classica della Storia dell'Architettura del passato. L'articolo riguarda gli edifici religiosi, la chiesa di villa Cagnola a Gazzada (1959) e San Filippo Neri nel quartiere Bovisasca a Milano (1961) progettati con triangoli equilateri alla base della matrice che genera la forma. La chiesa di Villa Cagnola ha una pianta ad aula con una parete completamente vetrata che apre la vista dall'altare al parco storico preesistente.

Il muro è stato progettato grazie alla sapiente combinazione di triangoli equilateri. La chiesa di San Filippo Neri si basa sulla geometria del triangolo equilatero e, infatti, ha una pianta entrale esagonale con una serie di annessi come la cappella dei giorni feriali e il battistero. Il riferimento ai poligoni regolari come principio della forma e il relativo valore tradizionale della "perfezione" geometrica diventa un modello di razionalità simbolica e utile strumento di concezione dello spazio sacro.

Introduction

Magnaghi-Terzaghi's atelier projects, is preserved in the CASVA archives in Milan. Their modern architecture is strongly mathematical in its conception. In fact they employed square and the equilateral triangle to construct their architectures; this compositional method shows a rationality that binds number, shape and size, generating a modern form that bases its rationalist roots in the classical tradition of the History of Architecture of the past.

Even if architectural structures based on a geometric form have ancient roots, adopted with continuity throughout history up to modern times, in the architectures we are analyzing, geometry more than a language is a method. In particular we have remarked that for religious buildings Magnaghi and Terzaghi selected the geometry of the triangle, and that of the hexagon as a multiple of the triangle itself, as the generative element, in continuity with the tradition of symbolic and historical reasons to shape churches and cathedrals.

Geometry and Symbolism in Sacred Architecture

by G. Mele

The triangular geometric figure, closely linked to the number three, in the form of equilateral triangle, represents both the concept of stability and the religious concept of the Trinity,

In fact, this geometrical figure, in the biblical symbolic language, represents the transcendence of God and the Trinity. The latter should be considered the absolute postulate of the New Testament that professes one God in three persons.

This is why, as an elementary geometric figure, the equilateral triangle is often used to generate the form of sacred spaces and, above all in the Baroque period, a composition of triangles becomes a

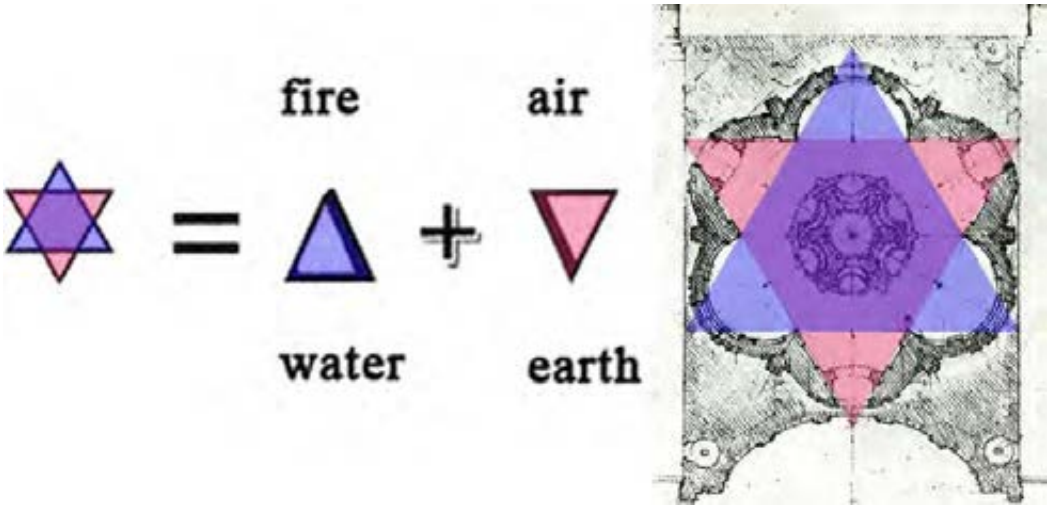


Fig.1 The symbols related to the equilateral triangles and a compositional scheme generating the plan of Borromini's Sant'Ivo alla Sapienza in Rome

generator of planimetric schemes with a high symbolic value. In the form of the intersection of two equilateral triangles which determines the figure of the Star of David, it generated a whole series of important monuments: among them it is enough to remember the Borromini's church of S. Ivo alla Sapienza, where the concept of wisdom (Sapienza means Wisdom and is the name of the ancient academic institution), inherent in the geometrical figure of the 6-pointed star, becomes the basic form of the plant. The triangle therefore, and in particular the equilateral triangle, is considered the symbol of an absolute perfection, both material and spiritual, and has been found since ancient times in all religions. With the vertex upwards or downwards it indicates the four elements (fire, air, water, earth), which once again, in the fusion of the two symbols in the one quoted above, with the meaning of "wisdom" is in the ancient iconography as a seal in the ring of King Solomon.

As regards instead the hexagonal plan, it had the precise symbolic function related to the creative force of God: the hexagon is, in fact, composed of six triangles that allude to the Trinity and to the number of days of creation. Hexagonal plans in ancient times were adopted for central-plan systems, typical of mausoleums, baptisteries, imperial chapels or temples and churches of great importance, all declined with a close symbolic relationship with the shape of the plan, which was more often octagonal or circular. Over the centuries, the use of some regular polygons as a tool for the design of religious buildings is mainly related to those figures whose geometrical-arithmetic qualities assumed the role of symbols. The main feature of these polygons is that they can be inscribed in a square. The utility in the architectural project is in the need to design churches whose basic matrix is a double square. This method, which adopts the elongated rectangle and associates it symbolically to the house of God on earth, links number, shape and size and, through a series of geometric arithmetic operations, allows the characterization of a form which apparently has nothing to do with the double square. To modulate these buildings with multiples and submultiples, and to fit precisely the double square, it is necessary to choose polygons with the geometric characteristics to be inscribed in the square. The most widely used and documented are

the octagon and the dodecagon: the first takes us back to the shape of the baptisteries or of some apses[1] and to the number eight as a symbol. The octagon in fact, in how much similar to the circle, recalls the idea of eternity; moreover, the eight was considered the sacred number symbol of the resurrection. Among the major worshiper of the number eight there were Plutarch, Sant'Ambrogio, S. Agostino from Ippona. About the dodecagon we can recall the shape of apses, rosettes and the number twelve as a symbol, referred to the Holy Virgin. Twelve is a recurrent number through the Bible. What is interesting is that both the octagon and the dodecagon are polygons that can be inscribed in a square and therefore they can be constructed in an approximate way through Cartesian coordinates[2]. In Pythagorean numerology, however, the number eight represents love and friendship and the number twelve is twice the perfect number six.

We can therefore consider the hexagon as a derivation of the dodecagon if we consider that the former can be constructed from the grid of the second.

Again interesting is that six, eight and twelve, related to the hexagon, the octagon and the dodecagon, have been reference figures in Architecture within different historic periods not least that in which the architects Magnaghi and Terzaghi were active.

The Reasons of Form through the History of Architecture

by A. Capanna

In the modern design of the churches the questions of setting up the plan and related spaces, maintained an underlying continuity with the classical symbology, but subordinating it to functional choices and architectural language. From the latter, an important component was the renewed interest in the adoption of geometric and arithmetic proportional relationships deriving from rationalist theories, but also from the organic architecture. The subtle difference compared to the method previously described concerns the fact that in order to reach the completed work no rules defined a priori are applied, but the discovery of its own is identified from time to time; only in this way creativity and production go hand in hand in shaping the composition "according to such a practice that while it does, it invents the way of doing" . Both, therefore, refer to an ordering principle as an indispensable condition of the creative moment, which remains, at times, linked to the a priori search for a creative action as the reason for the composition.

The organization of the modern project spaces, abandoned the safe way of the systematic adoption of the proportional rules, that guaranteed a "beauty-just-like-nature architecture", is subjected to the analysis and the "a posteriori" interpretation; a literary, narrative, sometimes post-planning exercise, which is the principle of a self-reproducing architecture that ends up identifying its model in similar architectural objects, in the questionable logic of references and citations. It is therefore necessary to reason on the compositional structure as a place of regulated expression not so much and not more by the use of data elements, linguistic codes, prefixed forms, but by the mathematical concepts that regulate the making and, if we accept the pregnant image of "aesthetics of the formativity", of the constitutive simultaneity of idea and form, the act of thinking .

1 Just for an example, the baptistery of the cathedral of Florence or the church of San Vitale in Ravenna.

2 See G. Mele "Dalla geometria una regola per il disegno delle chiese medievali tra XIII e XIV secolo", printed and reproduced on its own, Firenze, 2004, pp. 29,30

For the purpose of our research it is important to set some dates of the revival of the theory of proportions applied to architecture: in particular the decade of the 1940s was crucial. The discourse emanated from two different sources: one established by art and architectural historians, the other by practicing architects, the former with analytical goals, the latter with creative purposes. Wittkower's theory of harmonic proportions was first published in 1949, in a chapter of his seminal Architectural Principles in the Age of Humanism and in 1951 he participated in the IX Triennale in Milan, entitled 'Divina Proporzione'. The projects we are analyzing are born in this context. For the two churches of villa Cagnola and of San Filippo Neri, which were built between 1959-63 and 1961-64, at the turn of the liturgical reform of the Second Vatican Council that changed the functional and spatial relationship of the altar and the assembly, the adopted geometric system allows us to make further reflections. We have seen that the hexagonal plan by its nature generates a central symmetry system. Still typical of the Orthodox Christian rite or of different religions such as the Muslim, the Catholic churches over time have adopted a basilica system, apparently in contrast with a tessellation of the plan with the exact triangular shape. It should be noted, however, that many post-conciliar churches designed on the basis of a composition of triangles have as well an organization of the basilica liturgical action within a space that is geometrically similar to that generating a central symmetry. After careful analysis, many of these architectures adopt isosceles triangles, derived from the intersection of squares along the diagonal, then with the base angles of 45 degrees and the consequent rotation of the axis joining the altar with the entry of the church that is no longer parallel to the perimeter of the building, but diagonal. This produces a dynamic effect that represents, once again in a symbolic and metaphorical form, the changed relationship of man towards God, which is no longer passive and static, but active. For our research is interesting to investigate the Baroque period. In Italy in particular, the plan generated by the hexagonal figure had its own precise codification. It is also mentioned as a model in itself in the rich Internet site that Lombardy has dedicated to the publication of cultural heritage in the region.

The drawing here presented (fig. 2, left) of which it was not possible to identify the text of origin, represents a church with a regular hexagonal plan with a central dome, with five radial chapels with a rectangular plan and niches obtained in the thickness of the side walls.

The centralized layout, however, is lengthened in a longitudinal direction by the insertion of a portico on columns with side walls with apsidal termination, to which, on the opposite side, the presbytery with a domed square plan is the counterpoint. The general articulation of the plant is thus oriented according to the input axis, by breaking the scheme with respect to the perfect central symmetry of the hexagonal shape.

Another example of this planimetric organization for ecclesiastical building is the church of Santa Maria del Quartiere (1604-1610) in Parma. Designed by Giovan Battista Aleotti, an architect from Ferrara particularly appreciated by the Duke of Parma Ranuccio I Farnese, for whom he also created the magnificent court theater. Although the dictates of the Council of Trent prescribed longitudinal and Latin cross plants, this church was designed with a central plan, as indeed happened throughout 17th century in Rome and in Europe, with the symbolic intent described above.

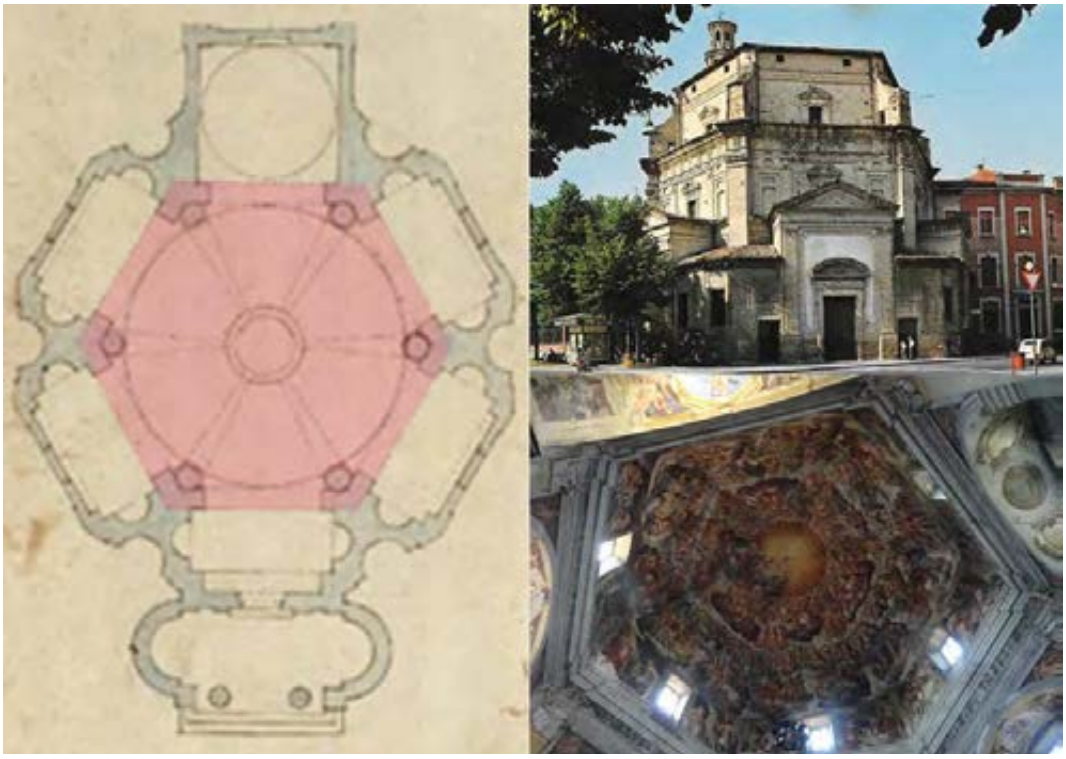


Fig.2 Historical-hexagonal based plan (left)- Giovan Battista Aleotti. church of Santa Maria del Quartiere – Parma 1604-1610 (right)

The plan generated by the hexagonal figure, although less adopted than the octagonal one, essentially for isoperimetric reasons, is also found in the medieval period. Of particular interest for a variation on the theme of this geometric figure, the church of S. Sofia in Benevento, about 752, whose central plan is characterized by a series of concentric figures that continuously change the perception of the interior spaces.

This peculiarity is evident on the outside due to the irregularity of the perimeter, which on the ground floor partly takes the form of a star, and from the double ambulatory system, the innermost of which is precisely that of hexagonal shape, which symbolically represents the generative element of the composition.The use of the hexagonal figure for the genesis of the plan of modern churches, such as the two churches designed by the architects Magnaghi and Terzaghi, seems to be in continuity with this hybridization of the theme of the central plan with the insertion of the axial system that connects the entrance and the altar and includes, in Lombardy, two examples of churches that can be related especially with the second of the projects that we are analyzing: the church of S. Filippo Neri. This is the Church of St. Ildefonso, built in Milan in 1954, by Carlo De Carli and the parish church of S. Sisto in Bergamo designed by Giovanni Muzio between 1961 and 1966. The first presents a polygonal plan, which re-elaborates the traditional model of the religious building with a central plan starting from an irregular hexagon, clearly evident in the urban insertion and partly concealed inside for the outlook of the assembly hall. The fulcrum of the composition is the hexagonal ciborium that dominates the altar, conceived as a bare frame.

This empty volume, carried out for the superimposition of five orders of hexagonal ring beams that connect high circular pillars, is perceived as a series of ascending paths, useful both to host the choir, and also as an indispensable element for the upkeeping of the windows.The second has a lily-shaped aphid plant (a figure dear to Muzio's poetics), divided into three naves and completed by a hexagonal transept. The figure of the hexagon reappears on the main facade which is clad in white marble slabs, decorated with relief elements that form these geometric designs. The interest of this church is exactly in the hybridation of the central hexagonal plan and the basilica classical shape.

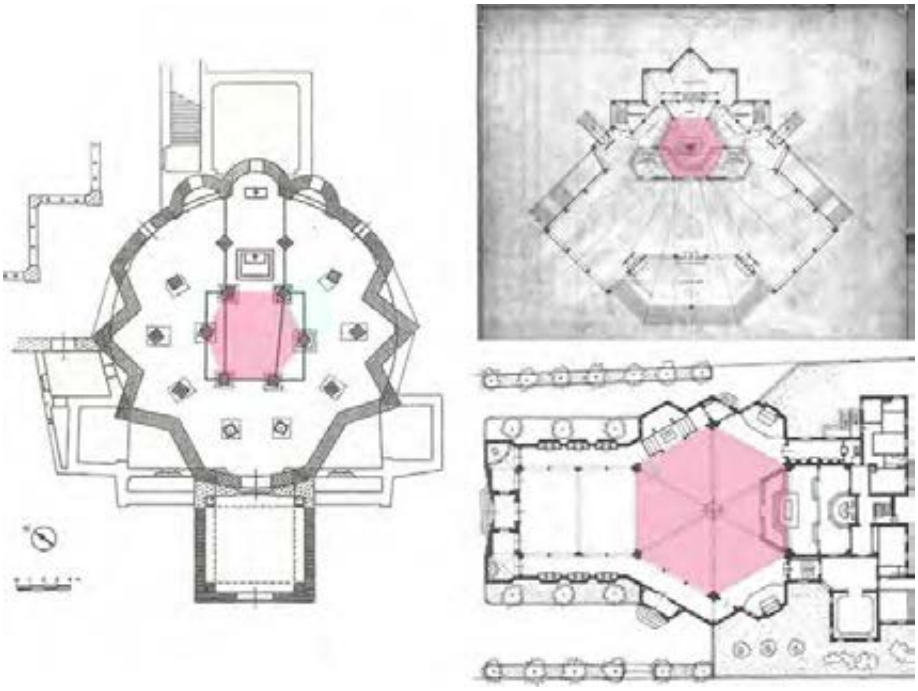


Fig.3 S. Sofia in Benevento (left) Carlo De Carli, Church of St. Ildefonso, Milano 1954. (top right). Giovanni Muzio, Church of S. Sisto, Bergamo 1961-1966 (down right).

Geometrical Matrices in Magnaghi-Terzaghi's Church of Villa Cagnola at Gazzada Schianno (VA)

by A.Capanna

In the churches we are analyzing those characters – historic and symbolic - are also evident in the adoption of a tessellation of the plan. In the case of the church of Villa Cagnola which is of basilica type, the covering of the plan, made with the equilateral triangle. as we shall see, determines the architectural-landscaping solution described below, with the exception of mediating the rectilinear perimeter of the wall with the need to choose how to finish the composition at the edge of the rectangular hall: that is, to choose to halve the series of triangles along the height intercepted by the long side of the rectangle, or to use volumetrically this exception. For the large hexagonal hall of the church of San Filippo Neri, however, it will be precisely the position of the accessory spaces to entail a sort of hybridization of the distributional-functional system with the geometrical-spatial scheme.

The church of Villa Cagnola has a hall-plan with a fully windowed wall that opens the view from the altar to the pre-existing historical park with a secular Lebanon cedar. The project turns its attention to the old tree and does it by opening one of the long sides of the church. A series of equilateral triangles, in plan, have one of the sides consisting of a full-height wall and the other consisting of a stained glass window, which allows to see in transparency the magnificent tree that in some way reminds the biblical tree of the life.
On the opposite side of the church, the continuous wall is composed as a succession of full vertical panels, positioned across the reinforced concrete beams that support the roof and overhang from the façade. Under the beams there are long windows that reach the floor.
The walls are completely covered with brown tesserae. The plan of the church is rectangular.
The ratio of the rectangle is 24:43. The side of the equilateral triangles of the open wall towards the garden is 8 modules. The height of each equilateral triangle of side 8 is 6,9282. The thickness of the walls is equal to 1 module. Also in this case the number 8 is linked to 3 and 6. In the Christian religion these three numbers are meaningful from the symbolic point of view: 6 is the number of creation, 8 is related to the resurrection and 3 to the Trinity.

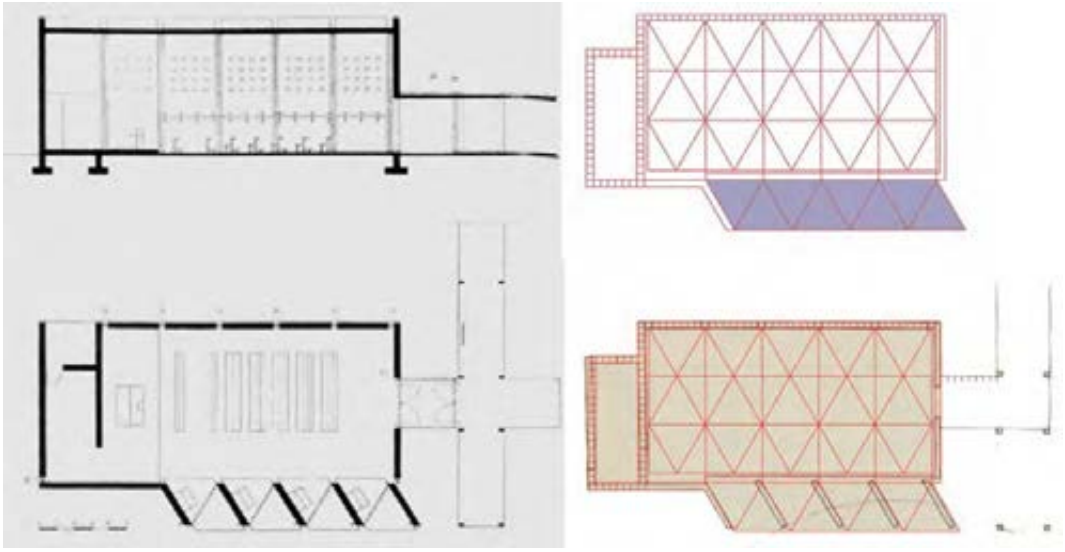


Fig.4 Plan, section e and geometrical matrices in Magnaghi-Terzaghi's Church of Villa Cagnola at Gazzada Schianno (VA)

In fact, if we divide the short side of the rectangle of the church plan into three, we get the side of the square generating the plan of the portico connecting the church to the remaining part of the structure of the villa Cagnola. The number of equilateral triangles that generates the open wall is 8. The ratio of the rectangle that composes the main façade is 16:24. The sacred building is a single hall, and is developed like a simple volume at a constant height with a small sacristy on the back of the same height as the church with a rectangular plan of ratio 8:19. Outside, the long façade is punctuated by a series of gargoyles of 1 module that are separated from each other by 7 modules. The church, even in the simplicity of the lines, shows a rational geometry that binds number, form

and measure to create that ascensional path that brings the spirit to God. The interior space is rich in symbols while reflecting simplicity and geometric purity.

Hexagonal shapes in Magnaghi-Terzaghi's San Filippo Neri church

by G. Mele

The church of San Filippo Neri has a central hexagonal plan with a series of annexes generated by the same geometrical shape based as well on the geometry of the equilateral triangle. The reference to regular polygons as the principle of the form and the related traditional value of geometric "perfection," becomes a model of symbolic rationality, and the courtly instrument of conception of the sacred space.

The church built in 1963 presents a uniform height with annexed hexagonal spaces around the perimeter. On the right of the entrance is the weekday chapel, on the left the baptistery and another little chapel with a secondary altar. Natural light pours from above through 6 semi-transparent plastic domes with a slight underwater twilight effect. A further series of 13 stained glass windows are situated in the upper part of the vertical structure representing the stations of the Via Crucis. The basic module that allows the description of the project is the equilateral triangle of side equal to 4.66 meters. The relationship between the side of the basic module and that of the large hexagon of the church's hall plan is 1:4. The weekday chapel and the entrance porch are generated by the composition of 18 triangular modules (6x3). The chapel and the baptistery are made out of 6 modules that generate the hexagons of each plan and are connected by a space composed of 3 modules which generates a half hexagon. The church's hexagon consists of 144 triangular modules. The height of the church is two modules. Also in the case of the church of San Filippo Neri, number, form and size contribute to generate a shape with great symbolic value. The 3, 4, 6, and 8 are contained in this scheme; about the symbolic meaning of these numbers we have already spoken. About the 144 it is important to underline that it is a number that belongs to the sphere of the 60 divisors of 5040 (number of the ideal city described in Plato - Book V, Le Leggi) [3] [7]. This number has an important reference also in the description of the Heavenly Jerusalem: is clear in fact 144 cubits is the measure of the side of the cube of the walls of the holy city described in the Apocalypse: "15. And he who was talking with me had a gold measuring-rod to take the measure of the town, and of its doors, and its wall. 16. And the town is square, as wide as it is long; and he took the measure of the town with the rod, one thousand and five hundred miles: it is equally long and wide and high. 17. And he took the measure of its wall, one hundred and forty-four cubits, after the measure of a man, that is, of an angel."[4]. So 144 is a symbolic number and its geometric arithmetic quality is a perfect concept to base the design of a sacred building. The design of the church of San Filippo Neri despite the rationality of the scheme, has a high symbolic value as well, just like the historical churches.Our question is: what is the genesis of this design? As a matter of fact, the purpose for this scheme is not only symbolic but also practical, in fact, the hexagon with the same perimeter covers a larger surface than the square or the equilateral triangle.

The hexagon is therefore a convenient form for a large church like this one in the Bovisasca district of Milan, which can house more than 1000 faithful, because it allows to cover, with a defined perimeter, a larger surface.

Fig.5 Church of San Filippo Neri in Milano. Photo of the interiors

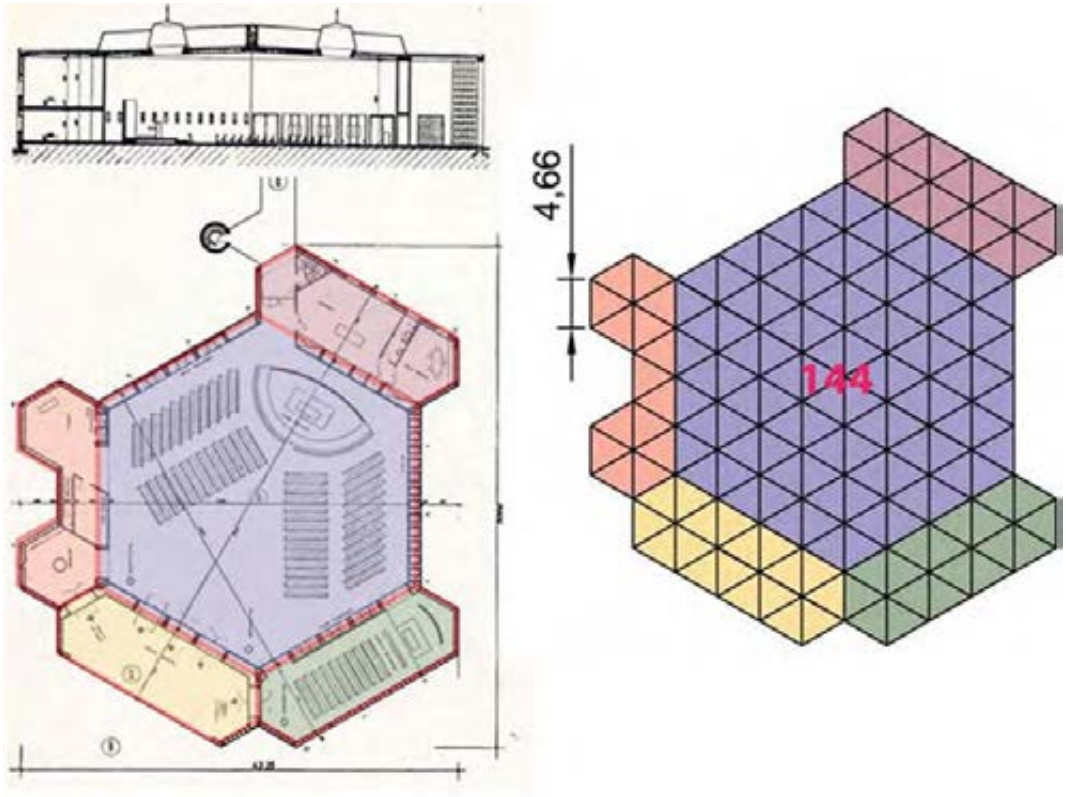


Fig.6 Plan, section and geometrical Matrices in Magnaghi-Terzaghi's San Filippo Neri church in Milan

Conclusions

The modern architecture created by the two architects is strongly mathematical in its conception. The equilateral triangle at the base of these architectures show a rationality that binds number, shape and size, generating a modern form that bases its rationalist roots in the classical tradition of the history of Architecture of the past. The reference to the periodic tessellation of the plan is evident and guarantees a strong and rational design method.

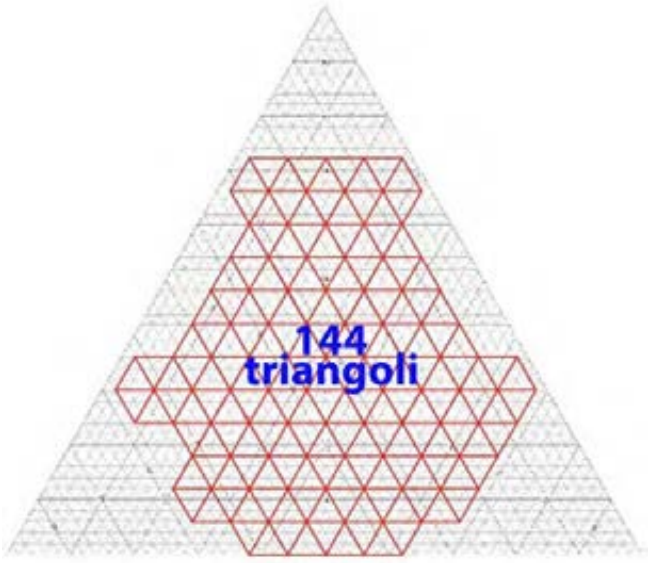


Fig.7 Geometrical schemes demonstrating the periodic tessellation

The geometric figures that generate it are precisely the square, the equilateral triangle and the hexagon. In fact, a tessellation of the plane is a set of limited plane figures and a way of placing them on the R2 plane, so as to cover it without overlapping and without empty spaces. A tessellation of the plane is periodic, if there are two independent translations v, w and a finite portion U of the tessellation, such that all the drawing is obtained by copying U and its translations with all the translations generated by v w, i.e. all the drawings of the type

$$\mathbf{U + mv + nw}$$

with m, n part of Z. Translated from the mathematical language, it means that when we say that we are tiling a plane we mean that we are covering it completely (without leaving holes) with figures that repeat and do not overlap, and are periodic if these figures are always the same one next to the others.

The hexagonal shape that derives from triangular tessellation has the advantage that compared to the equilateral triangle and the square, with the same perimeter covering a larger surface. In fact, if we examine the four figures of equal perimeter p.

Equilateral Triangle T (each side length p/3), square Q (each side length p/4), regular Hexagon E (each side length p/6) and Circle C (ray p/(2pgreco) it is easy to see that the area of the hexagon

is major than the area of the triangle. In fact, we divide the equilateral triangle T= ABC into 4 equilateral triangles. Each one sides is equal to half p/3, so equal to the side of the hexagon E. The difference is that we count six equilateral triangles with side p/6 instead of 4.
Following Euclid's method: the area of the triangle T is equal to the area of the rectangle KJEI and the area of the hexagon E is equal to the area of the rectangle KMEN.

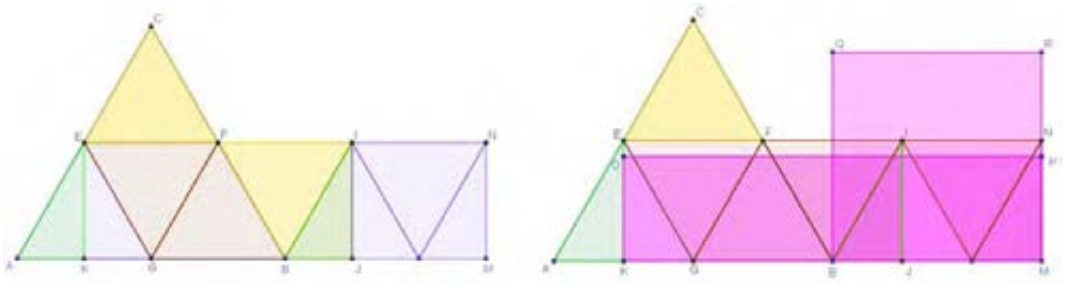


Fig.8 Geometrical schemes demonstrating the isoperimetric construction

We repeat the analysis for the square Q. Again, following Euclide's method of geometric construction, we see that the area of square Q is equal to the area of the rectangle KMOP, and major of the rectangle KJEI, but minor of the rectangle KMEN.
So, the area of square Q is major of that of the triangle T but minor of that of the hexagon E.
It is well known, that it is impossible to square the circle, but we can construct a rectangle whose area is minor of the area of the circle, adding a square to the rectangle KMOP, so obtaining the rectangle KSOT

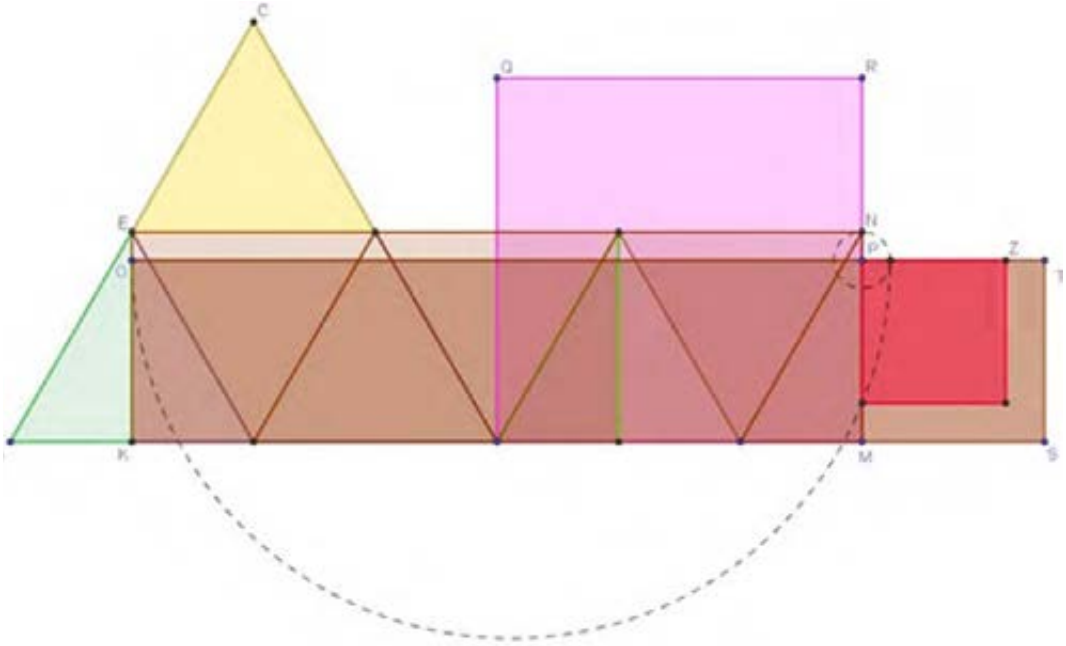


Fig.9 Geometrical schemes demonstrating the isoperimetric construction

Euclide's construction shows that the rectangle OPEN (resulting from the difference between the area of the hexagon and the area of the square) is equivalent to the red square whose side is PZ which is minor of MSPT and as consequence the area of the hexagon E is minor of the area of the rectangle KSOT which is minor of the area of the circle C.

The examples of religious architecture developed by Magnaghi and Terzaghi in the midst of the debate, and in part also of the revision of the Modern Movement, present characters of continuity with the past and its interpretation in a modern key, that adopts the main topics of the architectural composition since ancient times. In a sort of extreme and pragmatic rationalization lies the characteristic of these architects demonstrating to be sensible interpreters of recurrent issues in the practice of the project.

In conclusion, the tools and rational methodology described are at the basis of the architectural composition and in particular in Augusto Magnaghi Delfino's and Mario Terzaghi's design method. They handled a logical deductive approach with practical purposes that in geometry found an important tool to generate the architectural form.

References

AAVV, *La Bibbia - Apocalisse, 21.15-17* – (English version: Holy Bible - Revelation, 21.15-17 http://www.transcripture.com/italiano-inglese-apocalisse-21.html)

C. Bobonich, *Plato's Laws: a Critical Guide*, Cambridge: Cambridge University Press, 2011

M.T. Feraboli, edited by, *Archivio dell'architetto Terzaghi*, CASVA, Grafiche Serenissima, Milano, 2006,

G. Pagano, *Casa a Fino Mornasco*, in Casabella n. 150, giugno 1940, p. 25

G. Mele *"Dalla geometria una regola per il disegno delle chiese medievali tra XIII e XIV secolo",* printed and reproduced on its own, Firenze, 2004

G. Mele, *A geometrical analysis of the layout of Acaya*, Italy, in Nexus Network Journal, vol.14, No 2, Birkhauser, 2012

L. Pareyson, Estetica, Milano 1988, (first edition Estetica. Teoria della formatività Torino, Edizioni di «Filosofia», 1954)

R. Witkower, *Architectural Principles in the Age of Humanism*, London: Warburg Institute, 1949 (first edited in Italy Principi architettonici nell'Età dell'Umanesimo, trad. Renato Pedio, Torino, Giulio Einaudi Editore, 1964).

Isambard Kingdom Brunel, a visionary engineer who changed the history of shipbuilding

Massimo Corradi
Department Architecture and Design DAD (University of Genoa)
email: corradi@arch.unige.it

Abstract

We agree that the full maturity of the iron shipbuilding was achieved with the SS Great Britain, designed by Isambard Kingdom Brunel (1806 - 1859) and launched in 1843. But there is an antecedent. In 1835 Brunel started his first incredible undertaking: the construction of the SS Great Western, the ship that made the first Atlantic crossing with steam-powered propulsion in 1838, and until 1839 the largest passenger ship in the world. An iron monster, framed by a cloud of white floating sails, a riveted mountain of iron, a floating volcano that emitted an infernal black smoke fueled by its 10 powerful boilers like 100 furnaces: this was the new luxury transatlantic of the new Victorian age. It was an era where the new materials, cast iron, iron and steel prevailed; an era characterized by shiny brass, glowing irons, steam engines that emitted puffs, whistles and hisses and where nothing, seemed to be impossible: every engineering challenge was faced and won. And the greatest Victorian engineer was a rather small man with very big dreams: Isambard Kingdom Brunel. Brunel was about a meter and a half tall, he was not a surprising figure, but what he lacked in height was strongly offset by enormous design and entrepreneurial skills: “he was the most intense man in the business, the greatest artist ever to work in iron”. But his most important contribution to shipbuilding was the design and construction of the SS Great Eastern (1854). This was another important step in the history of shipbuilding. These ships were the image of the new that advanced with giant steps. In this short note we want to tell how the ideas of a visionary engineer of the nineteenth century have turned into reality, and how this reality has changed forever the way to go by sea.

Abstract

Si è concordi nel ritenere che la piena maturità della costruzione navale in ferro fu raggiunta con la SS Great Britain, progettata da Isambard Kingdom Brunel (1806 – 1859) e varata nel 1843. Ma c'è un antefatto. Nel 1835 Brunel da il via alla sua prima incredibile impresa: la costruzione del SS Great Western, la nave che compì la prima traversata atlantica con propulsione esclusivamente a vapore nel 1838, e fino al 1839 la più grande nave passeggeri del mondo. Un mostro di ferro, incorniciato da una nuvola di bianche vele fluttuanti, una montagna rivettata di ferro, un vulcano galleggiante che emetteva un fumo nero infernale alimentato dalle sue 10 caldaie potenti come 100 fornaci: questo era il nuovo transatlantico di lusso della nuova età vittoriana. Un'epoca dove hanno prevalso i nuovi materiali ghisa, ferro, acciaio; e poi ottoni luccicanti, ferri incandescenti, motori a vapore che emettevano sbuffi, fischi e sibili e nulla, sembravano essere impossibile: ogni sfida ingegneristica veniva affrontata e vinta. E il più grande ingegnere vittoriano fu un uomo piuttosto piccolo con sogni molto grandi: Isambard Kingdom Brunel. Brunel era alto circa un metro e mezzo, non era una figura sorprendente, ma quello che gli mancava in altezza era fortemente compensato da enormi capacità progettuali e imprenditoriali: "he was the most intense man in the business, the greatest artist ever to work in iron". Ma il suo più importante contributo fu la progettazione e costruzione della SS Great Eastern (1854). Si trattava di un'altro importante passo nella storia della costruzione navale. Queste navi furono l'immagine del nuovo che avanzava con passi da gigante. In questa breve nota si vuole raccontare come le idee di un ingegnere visionario dell'Ottocento si siano tramutate in realtà, e come questa realtà abbia modificato per sempre il modo di andar per mare.

Introduction

It is commonly accepted that a full maturity of steam-powered iron shipbuilding was achieved with the construction of the SS Great Britain, designed by Isambard Kingdom Brunel (1806 - 1859) and launched in Bristol in 1843. However, before exposing the history of "a visionary engineer who changed the history of shipbuilding", it is necessary to make a brief introduction. The steam propulsion in maritime transport sees its first appearance in the eighteenth century, daughter of the "industrial revolution", thanks to the pioneering studies of Denis Papin (1647 - 1713), Jonathan Hulls (1699 - 1758), Claude-François-Dorothée, marquis de Jouffroy d'Abbans (1751 - 1832), William Symington (1763 - 1831), John Fitch (1743 - 1798), James Rumsey (1743 - 1792) and many other engineers and inventors who worked on this important project on both sides of the 'Atlantic. But the first "technological revolution" takes place on the Hudson River in America thanks to John Stevens (1749 - 1838), who designs and builds the Phoenix, a side-wheel steam-powered boat, and simultaneously on the Clyde in Scotland, thanks to Symington who builds the Charlotte Dundas for navigation on the Forth and Clyde Canal[1].In a few years there has been a revolution in shipbuilding involving engineers, manufacturers for the construction of engines, shipyards and inventors who propose and patent new propulsion systems. Oliver Evans (1755 - 1819) designed and built one of

[1] James Williamson. The Clyde passenger steamers: its rise and progress during the nineteenth century: from the 'Comet' of 1812 to the 'King Edward' of 1901. Glasgow: J. Maclehose and Sons, 1904.

the first steam amphibious vehicles in 1804[2]: the Oruktor Amphibolis. Arthur Woolf (1766 - 1837) patents a high pressure compound engine, an invention that brings another great improvement in terms of engine efficiency[3]. Robert Fulton (1765 - 1815) uses the engine invented by James Watt (1736 - 1819) to build the first real steamboat, equipped with paddle wheels, the Clermont, initially known as The North River Steamboat of Clermont, launched in 1806 , thanks to the help of Robert R. Livingston (1746 - 1813), his mentor: "in February or March 1802… that Robert Fulton… 'accidental met' Robert Livingston – the encounter that would change history[4]" . Fulton was immediately convinced that he had opened a new era in river and naval transport, and said that his invention would "certainly make an exceedingly valuable acquisition to the commerce of the Western States[5]". Livingston and Fulton thus initiated a commercial venture that will soon extend to the US East Coast and major waterways such as the Hudson and Mississippi, generating wild competition over the management of steam navigation.

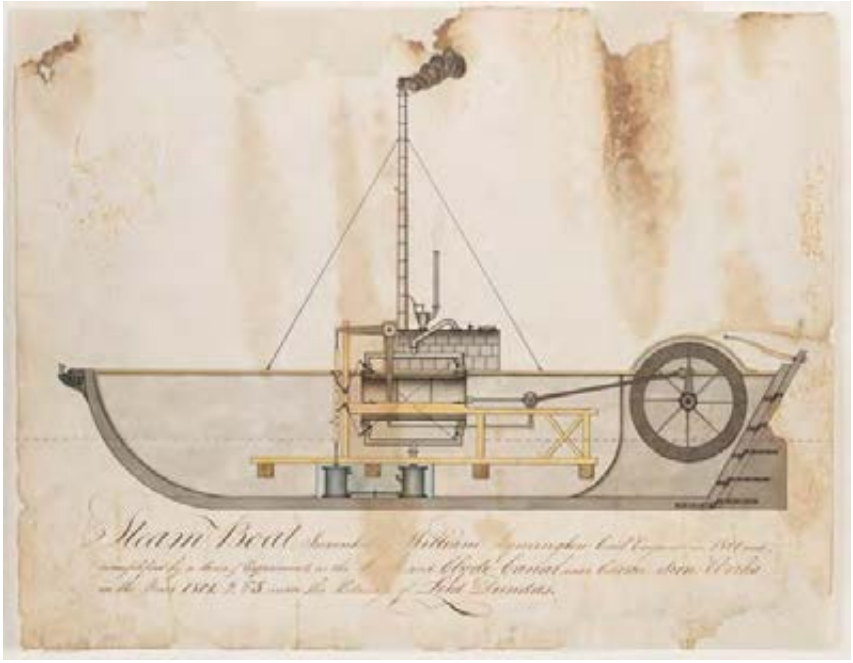


Fig. 1 - Charlotte Dundas, sketch by William Symington (in the Museum Victoria, Australia), which incorporates the patented engine by Symington on April 1801. The design shows the 22-inch (559 mm) diameter double-acting horizontal cylinder with a 4-foot bore (1.219 mm), mounted on a wooden frame placed halfway, with a condenser and an air pump inside a water well in the hold below. At the rear of the engine there is a single paddle wheel mounted near the stern of the ship and at the center of the hull. The engine axis is supported by a roller that runs on the engine frame and is connected by a crank handle to a clutch rod that drives the valve gear and the pneumatic pump, and from a connecting rod directly connected to a crank on the paddle shaft. Behind the engine you can see, partially, a steam boiler and an iron funnel. The wooden hull of Charlotte Dundas, measured 58 feet (17.7 m) in length by 18 feet (5.5 m) in width, and was built by John Hall, in Grangemouth, between July and September 1802. The members metal for the engine, boiler and smokestack in rolled iron were supplied by Carron Ironworks located on the banks of the Carron, a River near Falkirk, a few miles from the construction site.

[2] Robert Henry Thurston. A history of the growth of the steam-engine. New York: D. Appleton and company, 1886; pp. 157-58.

[3] Thomas R. Harris, Arthur Woolf: The Cornish Engineer 1766-1837. Truro: Bradford Barton Ltd., 1966.

[4] Sale, Kirkpatrick. The fire of his genius: Robert Fulton and the American dream. New York: The Free Press, 2001; p. 82.

5 Owen Philip, Cynthia. Robert Fulton: Biography. New York: Franklin Watts, 1985; p. 198.

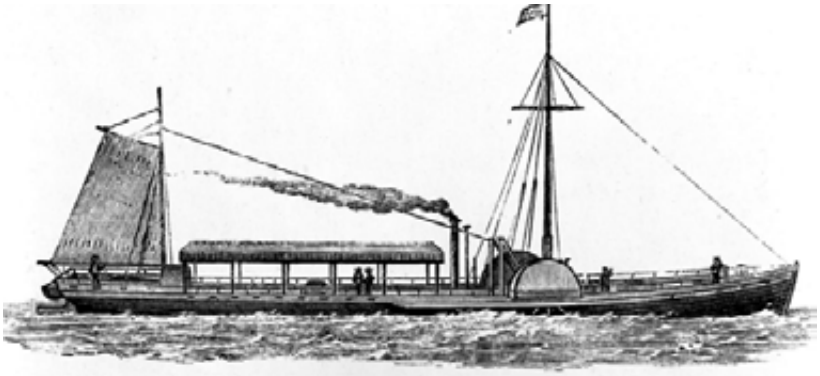


FIG. 49.—THE "CLERMONT," 1807.

Fig. 2 – Fulton's Clermont, by Robert L. Galloway. The Steam Engine and Its Inventors: A Historical Sketch. London: Macmillan, 1881; p. 237.

Similarly, in Europe Henry Bell (1767 - 1830) a Helensburgh engineer begins to pursue the idea that the steam engine, developed by James Watt, can also be used for the propulsion of ships. In 1812 Bell, together with John Rennie (1761 - 1821), entrusts the construction of the Comet, the first British steamer, driven by a steam engine that operated wooden paddle wheels, to John Wood Jr (1788 - 1860) of Glasgow[6]. The Comet was a steamboat of about 25/30 tons. of gross tonnage, about 12.26 meters long and about 3.43 meters wide with two pairs of paddle wheels per side driven by a steam engine of three or maybe four horsepower[7]; it was built by John Robertson (1782 - 1868) of Glasgow with a boiler designed by David Napier (1790 - 1869). The boat was also equipped with a mast that could arm a sail and in the stern it had a small cabin with seats and a table. Its name probably derives from a large comet that had been visible for several months in the years 1811-1812. The whole boat was painted in bright colors, and he its figurehead represented a woman dressed in all the colors of the rainbow.

Edward Church Jr. (1787 - 1843), consul of the United States in France, was a proponent of steam propulsion and he was a supporter of the potential of trade with these new vessels. In 1818 he built the steamer La Garonne, the first commercial steamboat launched in France, and the steamer Guillaume Tell for navigation on Lake Leman (Geneva). In 1818 the first maritime steamer in the world Rob Roy entered into service; it was designed by David Napier and built in Glasgow by William Denny (1779 - 1833). Purchased by a French company, and renamed Henri Quatre then Duc d'Orléans, it was the first steam ship to sail regularly in the open sea, and also the fastest boat of the era on the Clyde[8].

[6] P.J.G. Ransom. Bell's Comet: How a Paddle Steamer Changed the Course of History. Amberley, Gloucestershire: Amberley Publishing Limited, 2012.

[7] Subsequently, the paddle wheels were reduced to one side and the engine cylinder was modified to 32 cm in diameter and the piston stroke to 41 cm thus increasing the speed to 7 knots.

[8] David Napier, engineer, 1790-1869 [and] an autobiographical sketch, with notes. Glasgow: J. MacLehose, 1912; p. 52.

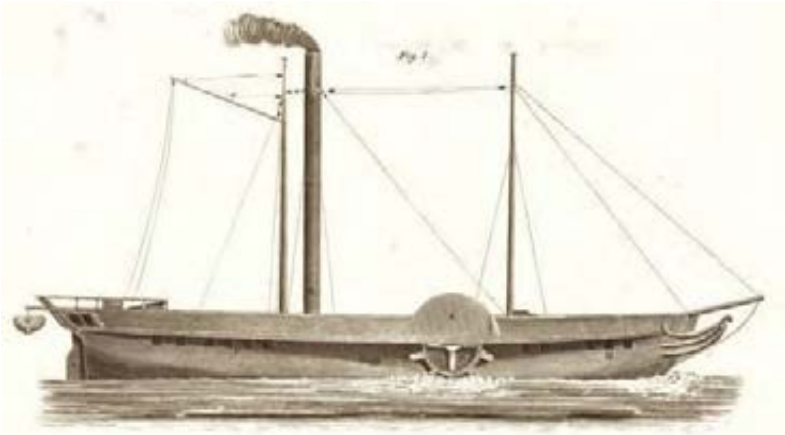


Fig. 3 - Steam boat of about 100 tons, believed to be the Rob Roy, from Encyclopaedia Britannica: Supplement to the 4th, 5th, and 6th Editions ... With Preliminary Dissertations on the History of the Sciences ... Vol. VI. Edinburgh: Archibald Constable & Co., 1824; Plate CXVII, p. 546.

In a few years the construction of steamboats places side by side the construction of sail sailing ships; indeed, at the beginning of this story that will definitely change the way of going by sea, the "new" and "modern" naval constructions all have a mixed propulsion system: sailing and steam. Instead, the first steam-powered ship - albeit an auxiliary - that crossed the Atlantic in 1819 (22 May - 30 June 1819) was, instead, the Savannah, built in New York in the United States on Fickett & Crocker shipyards[9].

Some sources say instead that Savannah crossed the Atlantic mainly sailing, and that otherwise the first steam ship that made the transatlantic route using only the new propulsion system was the SS Royal William, launched in 1831[10]. The arrival in Liverpool was told by the Times of London as follows: "The Savannah, a steam vessel recently arrived at Liverpool from America - the first vessel of the kind which ever crossed the Atlantic - was chased the whole day off the coast of Ireland by the Kite, revenue cruiser, on the Cork station, which mistook her for a ship on fire[11]".

Despite Savannah's historic accomplishment, this was not a commercial success. The enormous amount of space occupied by the engine and its fuel at the expense of the load, and a certain anxiety of passengers in this form of transport by sea did not guarantee a great appreciation from the public and the foreign trade companies. Because the ship was too small to carry the fuel needed for the crossing (the availability was only 75 tons of coal[12]) , much of the journey was still done sailing!

In the following years there was a frenetic succession of patents, projects and achievements in the field of steam propulsion that will influence throughout the nineteenth century the construction of boats first and then ships, all with steam propulsion. In Europe, efforts are being made to equip the fleets, especially the merchant ones, with the revolutionary "steam".

Many years later, doubts about the use of steam propulsion failed when two English-built steam

[9] Elfreth Watkins. The Log of the Savannah. Report upon the condition and progress of the U.S. National Museum during the year ending June 30 ... Smithsonian Institution, United States National Museum. Washington: G.P.O., 1890; pp. 611-639.

[10] In the essay by Elfreth Watkins we read that the SS Royal William was the third steam ship that made the Atlantic crossing; the second was the Curacoa of 350 tons of gross tonnage left from Antwerp on 12 August 1828; cfr. Elfreth Watkins, op. cit., p. 638.

[11] Elfreth Watkins, op. cit., p. 632.

[12] Elfreth Watkins, op. cit., p. 628.

ships with side-wheel propulsion, the SS Great Western - a wooden steamer, designed and built by Isambard Kingdom Brunel, a British engineer - and the SS Sirius built in 1837 by Robert Menzies & Sons, crossed the Atlantic reaching New York in 1838, using only steam power.
Not only that, the Great Western, made the first crossing of the Atlantic with only the strength of the steam and it conquered the primacy of the Atlantic crossing with the shortest time taken. This is not the place to trace an exhaustive history of the early years and the evolution of the construction of steamboats; it is a complex undertaking and requires extensive treatment. For this reason the reader is referred to some reference texts among those mentioned in the note[13].

Isambard Kingdom Brunel, a visionary engineer

Hitherto employed in the construction of machines and civil engineering, the iron found employment in shipbuilding when the wood began to be scarce, especially in England - then the largest shipbuilder, necessary to manage the immense colonial empire -, when at the same time there was a great need for new ships. Nonetheless, there had been considerable prejudice in adopting a material, iron, which was considered unsuitable to build something floating (iron and steel have a specific gravity that is considerably greater than water) to achieve a boat designed to sail. Few engineers and shipbuilders immediately understood that the iron would have allowed - thanks to the best characteristics of mechanical behavior with respect to wood - the construction of ships that are certainly lighter for the same size compared to those in wood, but also more resistant and more large, thus producing the advantage of increasing the displacement and the quantity of transportable goods. The first boat built entirely with the iron hull was the Vulcan, launched in England at Faskine, Airdrie, in 1819 on the banks of the Monkland Canal. It was designed by John Robinson of Edinburgh and built by Thomas Wilson (1781 - 1873[14]). The Vulcan was a barge and it had a long life (over 60 years); in fact, it was first used for passenger transport between Edinburgh and Glasgow and then it was converted back to the transport of coal along the English coasts. In the following years the construction of iron boats attracted the attention of the engineers and shipbuilders who sensed the potential of the new material. In 1820 the Aaron Manby was the first steam ship with an iron hull; it was built on a project by Aaron Manby (1776 - 1850[15]) , his son Charles Manby (1804 - 1884) and Charles Napier (1786 - 1860), eccentric naval officer who had conceived the idea of building a fleet of steam ships for service on the Seine.

[13] An interesting compendium on steam propulsion from its origins to the mid-nineteenth century is found in: The Encyclopædia Britannica, Vol. XX (1842). Voce “Steam Navigation”, pp. 686-711. For further information see also: George Henry Preble. A Chronological History of the Origin and Development of Steam Navigation. Philadelphia: L.R. Hamersly, 1883; Fletcher, R. A. Steam-ships, the story of their development to the present day. London: Sidgwick & Jackson, ltd., 1910; Kennedy, John. The History of Steam Navigation. London: Charles Birchall, 1903.
[14] Cfr. The Inventor of the Iron Ship in Marine engineer and naval architect, Vol. 8. London: Office for advertisements and publication, 1887; pp. 304-305; cfr. p. 305.
[15] Chaloner, W. H. & W. O. Henderson. Aaron Manby, Builder of the First Iron Steamship in Transactions of the Newcomen Society, Vol. 29 , Iss. 1,1953; pp. 77-91.

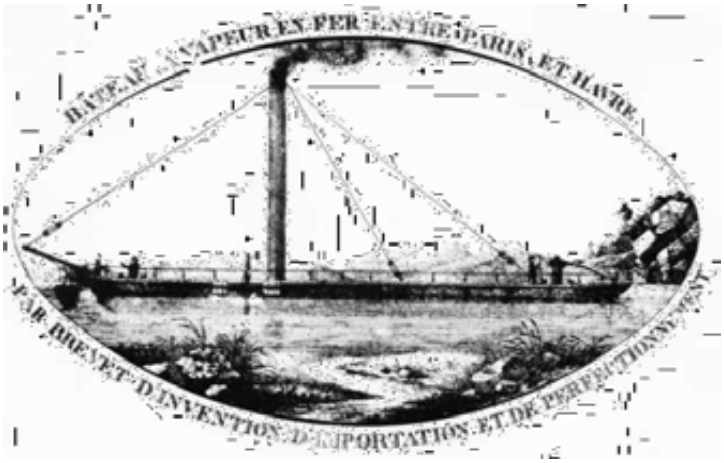


Fig. 4 - The first steam ship with an iron hull: the Aaron Manby, built for the service on the Seine. The ship had a tonnage of 122 tons, a length of 32 meters, a width of 5.2 meters (maximum of 7 meters, including paddle wheels), and was powered by a propeller with a power of 30 Hp. The propulsion was guaranteed by two wheels of 3.7 meters in diameter with blades of 0.76 meters wide, and could develop a speed of 8/9 knots. Its flat-bottomed hull consisted of a 6.4-mm-thick iron plate attached to an L-shaped iron rib. It had only one wooden bridge and had a bowsprit. The distinctive profile of the ship was accentuated by the smokestack, a 14 meter-high iron pipe. The engine was oscillating, designed and patented (British patent No. 4558 of 1821) by Aaron Manby and had a draft of about 30 cm less than any other steamboat [Bernard Dumpleton, The Story of the Paddle Steamer. Melksham: Colin Venton, 1973].

In a few years, the construction of iron ships joins that of traditional wooden boats; the first steam is associated with the propulsion sail, then over the years thanks to a growing number of inventions and patents, slowly supersede the propulsion to sail so much that the twentieth century will see quickly set sail sailing. It is precisely in the 19th century that the genius of Brunel and the birth of the modern steamer were born in the panorama of engineering and maritime transport.

The full maturity, or the awareness that iron shipbuilding would be the turning point in shipbuilding, was achieved with the construction of the SS Great Britain, designed by Isambard Kingdom Brunel, an eccentric engineer from Portsmouth, and launched in 1843[16].

Brunel had design and engineering in his genes. Son of the French civil engineer Marc Isambard Brunel (1769 -1849[17]), the young Isambard worked with his father for the construction of the Thames Tunnel from Rotherhithe to Wapping, in the east of London. He later designed (1929) the Clifton Suspension Bridge, suspension bridge over the River Avon, but his original design was rejected on the advice of Thomas Telford (1757 - 1834) and the bridge was completed in 1864, after Brunel's death.

He worked on the Great Western Railway (GWR) linking Bristol and London and designed and built the viaducts at Hanwell and Chippenham, the Maidenhead Railway Bridge (the Great Western Railway bridge over the Thames at Maidenhead, Berkshire, 1838), the Box Tunnel (railway tunnel in western England, between Bath and Chippenham, built for the original route of the Great Western Railway, 1836-41), the Paddington Station in London (Great Western Railway Terminal, 1854), the Royal Albert Bridge on the Tamar River at Saltash (also called Brunel Bridge or Saltash

[16] Bernard Dumpleton and Muriel Miller. Brunel's Three Ships. Melksham: Colin Venton, 1974; Chicago: University of Chicago Press, 2013.

[17] Clements, Paul. Marc Isambard Brunel. London: Longmans, Green & Co, 19701.

Bridge, 1855-59), and the Temple Meads Station in Bristol (1840), using a 2,130 mm wide track gauge instead of the 1,435 mm canons resulting in more comfortable and faster travel[18].

But there is a previous history. In 1835 Brunel started his first incredible undertaking: the construction of the SS Great Western steamer, the ship that made the first Atlantic route with steam only in 1838[19]; and that until 1839 was the largest passenger ship in the world[20]. An iron monster, framed by a cloud of white floating sails, a riveted mountain of iron, a floating volcano that emitted an infernal black smoke fueled by its 10 boilers, as powerful as 100 kilns: this was the new luxury liner of the new age Victorian. An era where the new materials prevailed: cast iron, iron, steel and then shiny brass; incandescent irons, steam engines that emitted puffs, whistles and hisses, and nothing seemed to be impossible: every engineering challenge was faced and won. The immensity of the Crystal Palace (1851) or the new girdered, tubular, suspended iron bridges or the tunnel under the Thames, the "Crystal Palace pneumatic railway" (1864)[21] - designed by Thomas Webster Rammell (c.1814 - 1879) - built inside the Crystal Palace and then developed by Alfred Ely Beach (1826 - 1896) for New York, they were the image of the new that advanced with giant steps. And the greatest Victorian engineer was a rather small man with very big dreams: Isambard Kingdom Brunel. Brunel was about a meter and a half tall, not a surprising figure, but what he lacked in height was heavily compensated by his great planning and entrepreneurial skills. "He was the most intense man in the business, the greatest artist ever to work in iron. He smoked 40 cigars per day and slept 4 hours per day".

In the same year, 1838, three other ships had completed the Atlantic crossing with steam propulsion: Sirius, Royal Williams and Liverpool. But the one that picked the most attention was the Brunel's Great Western. The Great Western was launched on July 19th, 1837 and completed in 1838. It was built, on behalf of the Great Western Steamship Co., to perform service on the Atlantic routes. It proved to be an efficient ship, enough to be taken as a model for the construction of similar steamers (even the Britannia of Cunard Line was a reduced version of the Great Western), and competitive enough to gain the archetype of the blue ribbon in 1843[22]. The Great Western was built in the

[18] Brunel, Isambard B.C.L. The life of Isambard Kingdom Brunel, civil engineer. London: Longmans, 1870.

[19] On March 31, 1838, the Great Western set sail for Avonmouth (Bristol) to begin its maiden voyage to New York. Before reaching Avonmouth, however, a fire broke out in the machine room; Brunel was wounded and was disembarked at Canvey Island. Although the fire was turned off and the damage to the ship was minimal, more than 50 passengers cancelled their reservations for the Bristol-New York trip and when the Great Western finally left Avonmouth, it only embarked 7 passengers, those who still trusted in the new system of transport.

[20] The Great Western was to have a twin ship, tentatively called City of New York [Vernon Gibbs, Charles Robert. Passenger Liners of the Western Ocean: A Record of Atlantic Steam and Motor Passenger Vessels from 1838 to the Present Day. New York: John De Graff, 19572; p. 41 (London: Staples Press, 19521].

[21] It is the pneumatic railway of the Crystal Palace, an experimental railway that developed inside the Crystal Palace Park in the south of London in 1864.

[22] The rival company British and American Steam Navigation Co. competed, with the Great Western, the steamer Sirius who arrived in New York on 22 April, before the Brunel steamer, despite the coal was exhausted, but using the furniture of the cabin, wooden accessories and even a tree. Everything was burned by the crew, pushed by his Commander to win the race. The Great Western arrived the following day, with still 200 tons of coal on board. Although the term Blue Riband ("Blue Riband of the Atlantic") had not yet been coined, it entered, in fact, in use many years later (1890), Sirius is often considered the first record holder of the Atlantic crossing at a speed of 8.03 knots. However, Sirius kept the record for one day just because the Great Western journey was faster, sailing at 8.66 knots. The delay was due only to the fire on board. During the voyages in the years 1838-1840, the Great Western travelled the average journey in 16 days at a speed of 7.95 knots to the west and New York and in 13 days and 9 hours, at a speed of 9.55 knots towards Bristol. See also: Vernon Gibbs, Charles Robert. Passenger Liners of the Western Ocean: A Record of Atlantic Steam and Motor Passenger Vessels from 1838 to the Present Day. New

Patterson & Mercer shipyard in Bristol and it had a tonnage of 1,340 tons. (subsequently brought to 1,700 after some changes to the size of the steamer); it was 71.6 meters long (then 76.73 meters[23]), 17.59 meters wide including paddle wheels, had fifty watertight compartments and a maze of bulkheads, and installed a 2-cylinder engine system designed by Henry Maudslay (1771 - 1831), and built by Maudslay, Sons and Field of Lambeth Marsh, London, and had a power of 750 Hp. The propulsion, guaranteed by two paddle wheels, could reach a speed of 8.5 knots in optimal sea conditions. It was also equipped with four masts that were used for auxiliary propulsion and also to stabilize the ship and always ensure a set-up such that the blades fished steadily and continuously, and there was no waste of energy produced by the steam engine. The Great Western could taken in 128 passengers with twenty staff members and a crew of 60 men. In 1836, supported by a group of Bristol investors, Brunel and his friend Thomas Richard Guppy (1797 - 1882) founded the Great Western Steamship Co, to start a line of steam ships on the Bristol-New York route.

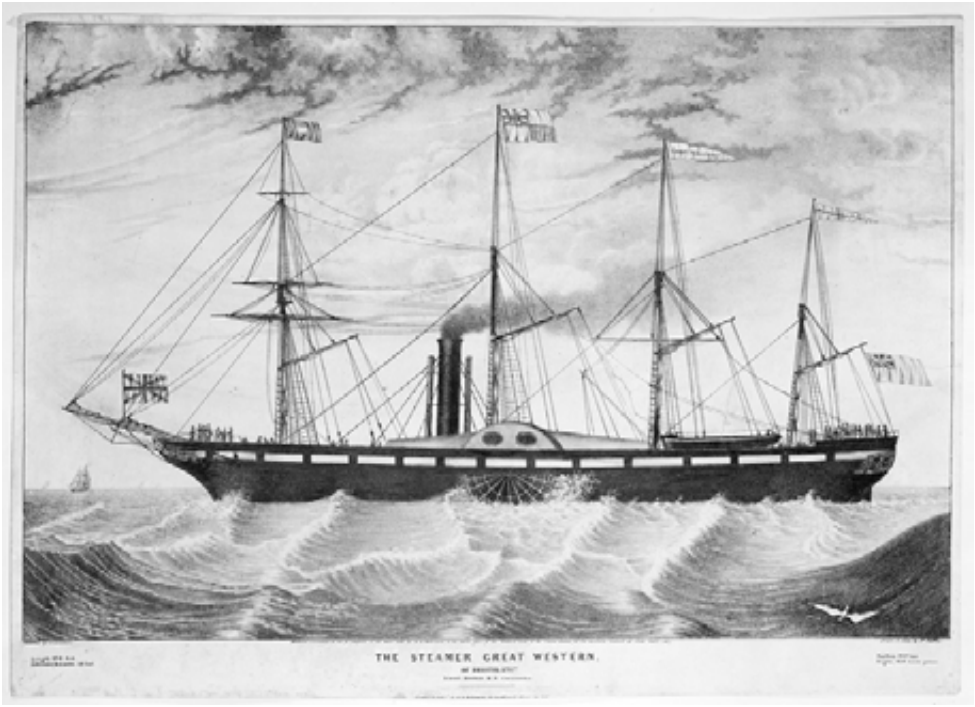


Fig. 5 - Lithography depicting the SS Great Western, first transatlantic steamship [National Maritime Museum, Greenwich, London].

York: John De Graff, 19572; pp. 41–45 (London: Staples Press, 19521). On the history of the first transatlantic navigations see also: Kludas, Arnold, & Dietmar Borchert. Das Blaue Band des Nordatlantiks: der Mythos eines legendären Wettbewerbs. Hamburg: Koehlers Verlagsgesellschaft, 1999.

In the years 1839-40 it was subjected to a profound overhaul and lengthened by about 5 meters, at the same time increasing displacement to 1,700 tons.

[23] In the years 1839-40 it was subjected to a profound overhaul and lengthened by about 5 meters, at the same time increasing displacement to 1,700 tons.

The idea of starting a regular transatlantic liner service was in question in those years by different shipowning groups; in fact, the rival British Steam Navigation Co. was established during the same period. The design of the Great Western aroused, at its appearance, not a few controversies from the critics who claimed it was too big. The principle that Brunel adopted was the following: the loading capacity of a ship increases as the cube of its dimensions, while the resistance to water increases only as the square of its dimensions, therefore - according to the engineer from Portsmouth - it was necessary to build large ships, according to him more efficient in consumption, which is very important for long trips across the Atlantic. Despite the technical and technological innovations, it was still a wooden ship with steam propulsion and paddle wheels and four masts to hoist the auxiliary sails. The sails were not only to provide auxiliary propulsion, but they were used to keep the ship in a uniform position in rough seas and to ensure that both paddle wheels remained immersed in water, guiding the ship in a straight line.

Fig. 6 - This image shows the SS Great Britain at the time of the launch on July 19, 1843, the largest ship in the world ever built. The event had great renown so much that the company that owns the steamship, the Great Western Steam Ship Company, organized an event attended by an impressive crowd and among the personalities who participated in the launch, including the Prince Consort Albert of Saxe-Coburg-Gotha , husband of Queen Victoria (1819 - 1901). Lithography from a painting (c.1843) by Joseph Walter (1783 - 1856) conserved at the SS Great Britain Trust.

Brunel's second major project was the construction of an all-iron ship: the SS Great Britain[24]. The construction of the Great Britain was started at Bristol. It was a steamer of about 3,400 gross tons and a nominal power of 1,000 Hp. It was a truly daring human work of art that would change the history of shipbuilding; Great Britain was the longest passenger ship in navigation from 1845 to 1854. Designed by Brunel, Thomas Richard Guppy, Christopher Claxton (<1804 - >1842) and William Patterson (1795 - 1869) for the Great Western Steamship Co. and built in a basin of dry dock specially adapted to Bristol.

[24] Claxton, Christopher. History and Description of the Steam-Ship Great Britain, Built at Bristol for the Great Western Steam-Ship Company. New York: J. Smith Homans, 1845. Cfr. anche: Corlett, Ewan. The Iron Ship: the Story of Brunel's SS Great Britain. London: Conway Maritime, 1975.

The construction of the Great Britain was almost certainly influenced by the Rainbow[25], a steamer that operated on the English Channel, the largest iron-hulled ship in service that occasionally flew to Bristol. SS Great Britain was the first ocean ship to have propeller propulsion and an iron hull, and when it was launched in 1843, it was the largest ship in operation. On July 19, 1843, among the screams of thousands of people Prince Albert of Saxe-Coburg-Gotha (1819 - 1861) hurls a bottle of wine against the ship's hull and pronounces the name by which the ship was known: Great Britain[26].

The designers led by Brunel launched themselves into the construction of the largest of any ship that existed at the time[27]. The trees were built of iron, fixed to the deck with iron joints, hinged at the base to allow their lowering and thus reduce the resistance sailing with strong winds against. Likewise, the rigging was donewith iron cables instead of the traditional hemp, always with the aim of reducing wind resistance[28]. The bridge had papapets to railing so that the water could drain easily and at the same time the overall weight of the ship was smaller[29]. The ship's hull was designed by Brunel in a highly redundant manner, with ten longitudinal beams at the keel and robust iron ribs measuring 15.2 × 7.6 cm; the reinforcement plates of the iron keel were 2.54 cm thick and the rivets were double. In addition, the ship had a double bottom and five iron watertight bulkheads[30]. The quantity of iron used, including that used in engines, amounted to about 1,500 tons[31]. The Great Britain was equipped with two engines supplied by Maudslay, Sons and Field and by Francis Humphrys with John Hall and Sons of Dartford, installed halfway and it had a total weight of 340 tons[32]. The Great Britain had the novelty of propeller propulsion. The propeller propulsion was introduced after the experimentation started on the SS Archimedes, built by the Propeller Steamship Company by Francis Pettit Smith (1808 - 1874)[33]. In this regard we read: "In her it was incontestably proved that a three or four-bladed screw was a decided improvement on one of six blades, and that without any propeller at all the Great Britain was a triumph of naval architecture as a sailing ship, which of course cannot be said of a modern Atlantic, or, in fact, any ocean passenger screw steamship"[34]. Brunel, convinced of the new propeller propulsion system, abandoned the paddle wheel drive, although they were already in an advanced state of construction for Great Britain. According to Brunel, the propeller drive gave numerous advantages including: lighter and smaller machines, with the effect of achieving significant fuel savings; machinery with the center of gravity lower than wheel systems and consequently increased stability of the ship; less resistance to motion thanks to the absence of the bulky paddle wheels and better manoeuvrability

[25] The Engineer, March, 29 1901; pp. 318-319.
[26] Illustrated London News, July, 29 1843 (Vol. III); p. 73.
[27] Fox, Stephen. Transatlantic: Samuel Cunard, Isambard Brunel, and the Great Atlantic Steamships. New York: Harper Collins, 2003; p. 148.
[28] Claxton, Christopher. History and Description of the Steam-Ship Great Britain, Built at Bristol for the Great Western Steam-Ship Company. New York: J. Smith Homans, 1845, pp. 19–20.
[29] Fox, Stephen. Op. cit.; p. 152.
[30] Fox, Stephen. Op. cit.; p. 150 e Claxton, Christopher. Op. cit.; p. 5.
[31] Claxton, Christopher. Op. cit.; p. 5.
[32] Claxton, Christopher. Op. cit.; p. 18.
[33] Pettit Smith and Brunel worked together for several months to find the right propeller to use on the Great Britain [Fox, Stephen. Op. cit.; p. 148, p. 151].
[34] The Engineer, November, 26 1897; p. 525.

of the boat; continuous efficiency of the propeller compared to paddlewheels influenced by wave motion and load; finally, propeller propelling machinery was cheaper. On the Scientific American of 28 August 1845 we read: "If there is any thing objectionable in the construction or machinery of this noble ship, it is the mode of propelling her by the screw propeller; and we should not be surprised if it should be, ere long, superceded by paddle wheels at the sides". The interior was spread over three bridges, the upper two for passengers and the lower one for loading. The two passenger bridges were divided into bow and stern compartments, separated by the engines and the boiler, placed in the middle of the ship. Originally it carried 120 first-class passengers (26 of them in single cabins), 132 second-class passengers and 130 officers and crew members. On July 26th, 1845, the ship embarked on its maiden voyage to New York, a journey that completed in just over 14 days. In fact, his first trip lasted 14 days and 21 hours, at an average speed of 9.25 knots, about 1.5 knots slower than the record set at that time, and completed the return journey in 13 days and half, again a not exceptional time[35].

But Brunel's biggest and most utopian enterprise was the planning and construction of the SS Great Eastern. The Great Eastern was born from a brilliant idea of Brunel. His goal was to make long journeys to Australia with a ship that could travel around the world without needing to refuel[36]. Affectionately called the "great babe" by its eccentric designer, and the fruit of the work of thousands of workers, the Great Eastern lived, however, longer than its designer. Unfortunately, Brunel died only four days after the first sea trial of his large ship. In 1854 the construction of the Great Eastern in Millwall, London began, by J. Scott Russell and Co. It was another important step in the history of shipbuilding. According to Brunel, such a large ship would have benefited from economies of scale and would have been both fast and cheap, requiring fewer crew members than the equivalent tonnage of smaller ships. Moreover, according to its designer, the Great Eastern could compete with the fast clippers that dominated the routes to the East. Brunel had imagined an imposing ship: in his notebook he wrote "Say 600 feet x 65 feet x 30 feet" (183,88 × 19,81 × 9,14 meters). The Great Eastern would have been by volume, four times larger than any ship at the time in service. But Brunel did a lot more. The length[37] of this ship was 211 meters, 25.30 meters wide and with a draft of 6.10 meters discharge and 9.15 meters at full load, it had a displacement of 18.915 tons and 32.160 tons fully loaded[38]; 4 blade motors with a nominal power of 1,000 HP and a propeller propulsion system with an additional engine of 1,600 HP rated power. The paddle wheels were 17.07 meters in diameter and the four-blade propeller was 7.32 meters in diameter. The total power has been estimated at 8,000 Hp. In addition, it was also equipped with a sail propulsion to be used in case of need. It had six trees (which were called the days of the week: Monday was the front tree and Saturday the mainsail, for a sail area of over 5,435 square meters of sails, armed with schooners, with a square main sail on each tree, a bow on the front tree and three square sails on trees n. 2 and n. 3 (Tuesday and Wednesday). The setting of the sails proved to be

[35] Fox, Stephen. Op. cit.; p. 153.
[36] Rolt, Lionel Thomas Caswal. Isambard Kingdom Brunel. London: Longmans, 1957; New York: St. Martin's Press, 1859; p. 237.
[37] The length of 211 m. it was only surpassed in 1899 by the 215 meter RMS Oceanic, while its gross tonnage of 18.915 tons was only surpassed in 1901 by the RMS Celtic with 21.035 tons. of gross tonnage.
[38] Dawson, Philip S. The Liner: Retrospective and Renaissance. London: Conway Maritime Press, 2005; p. 37.

unusable at the same time as the paddle wheels and the propeller they were in operation, because the hot exhaust of the five chimneys (subsequently reduced to four) would have set them on fire. Its maximum speed was 13 knots. The hull was entirely in iron, double-walled, a feature that would no longer be seen in a ship for almost 100 years, made of 2 cm thick slabs of iron and with ribs every 1.83 meters. Internally the hull was divided by two longitudinal bulkheads and other transverse bulkheads divided the ship into nineteen compartments, and developed on four bridges. The iron plates were expressly laminated at Millwall to build this large ship, and had variable dimensions from 2 tons to 2½ tons of weight; the widest plate measured 8.23 meters in length by 1.30 meters in width and 3 cm in thickness. It was the largest ship ever built at that time (1858) and had a transport capacity of 4,000 passengers, capable of navigating for thousands of miles without stopping for refueling, and employing 418 crewmembers. He also landed 18 lifeboats, brought to 20 after 1860. "She has made in all eight or ten trips with passengers across the Atlantic. She has carried troops to Quebec. In 1863 she knocked a hole 83ft. long in her bottom on Montauk Point. In 1860 she encountered the storm in which she lost her paddles and broke her rudder head. A sensational story was told at the time about the fitting of jury steering gear by an American engineer, Mr. Towle, which, like many other sensational stories, is not true[39]". The hull lines of this ship were designed by John Scott Russell (1808 - 1882), a Scottish naval engineer. On June 17, 1860, after two test trips in 1859, he set off on his maiden voyage from Southampton to New York. Born for the service with the Far East, she actually made her first trips to the Atlantic: "She was designed for the Far Eastern trade, but there was never sufficient traffic to put her into this. Instead, she was used in the transatlantic business, where she could not compete in speed and performance with similar vessels already in service[40]".

Fig. 7 a, b – The SS Great Eastern was a luxurious ship, that's how the dining room and lounge inside it appeared, probably at Arklow in 1870 [Source: National Library of Ireland]. The interior was divided into three bridges, the upper two for passengers and the lower one for loading. The two passenger bridges were divided into bow and stern compartments, separated by the engine and the boiler placed in the middle of the ship.

[39] The Engineer, May, 7 1886; p. 349.

[40] Buchanan, R. A. The Great Eastern Controversy: A Comment. Technology and Culture. Vol. 24, N. 1 (Jan. 1983): pp. 98–106.

On his maiden voyage of eleven days he carried 35 paying passengers, 8 “dead heads” (non-paying passengers) and 418 crew members. Among the 35 passengers, there were eight company officials and two engineers, Zerah Colburn (1832 - 1870) and Alexander Lyman Holley (1832 - 1882); the trip lasted 10 days and 19 hours. After returning to England the Great Eastern was chartered by the British Government to transport troops towards the Canadian Dominion. The Great Eastern had a long life and overcame incredible adversities. On August 27th, 1862, the immense steamer suffered an accident similar to that of the RMS Titanic, but did not sink. The hull hit an unknown rock off the coast of Long Island, which opened the outer hull for a width of 2.74 meters and a length of over 25 meters. However, the inner hull of the Great Eastern remained intact, and the steamboat gone up to New York sailing for a whole day with a deep gash of water; she was repaired with a metal box used to close the leak and returned to Liverpool on January 6th, 1863. Many other Atlantic crossings followed, but the competition between the shipping companies and a fierce price war made the Great Eastern no longer competitive, the losses increased and the steamer was disarmed. Purchased by Daniel Gooch (1816 - 1889), it was entrusted to the fledgling Great Eastern Steamship Co., and chartered to Telegraph Construction and Maintenance Co. In 1837 the electric telegraph was developed independently in Europe and North America. However, telegraphic communication lines between Europe and North America, however, were still limited by the time taken by a ship carrying a message to cross the sea: at least 10 days. Within two decades, both continents were crossed by cables that connected almost all the major cities of the two continents, allowing day-to-day communications between almost all the urban locations of the countries that faced the two Atlantic shores. Thus it was decided to use the Great Eastern as a cable ship. So, at the end of his career (1865) Great Eastern was then converted into a cable ship. From 1866 to 1878, under the command of Captain Robert Halpin (1836 - 1894), the ship placed over 2,600 miles of submarine telegraph cable from Brest to St. Pierre-Miquelon (1869) and from Aden to Bombay (1869-1870)[41]. He ended his life as a floating music hall and advertising billboard (for the famous Lewis’s department store) in Liverpool, and was demolished in 1889-90.

[41] Cfr. The Engineer, June, 18 1869; p. 424; The Engineer, May, 7 1886, pp. 349-50; May, 14 1886, pp. 369-70; October, 15 1886, pp. 302-03.

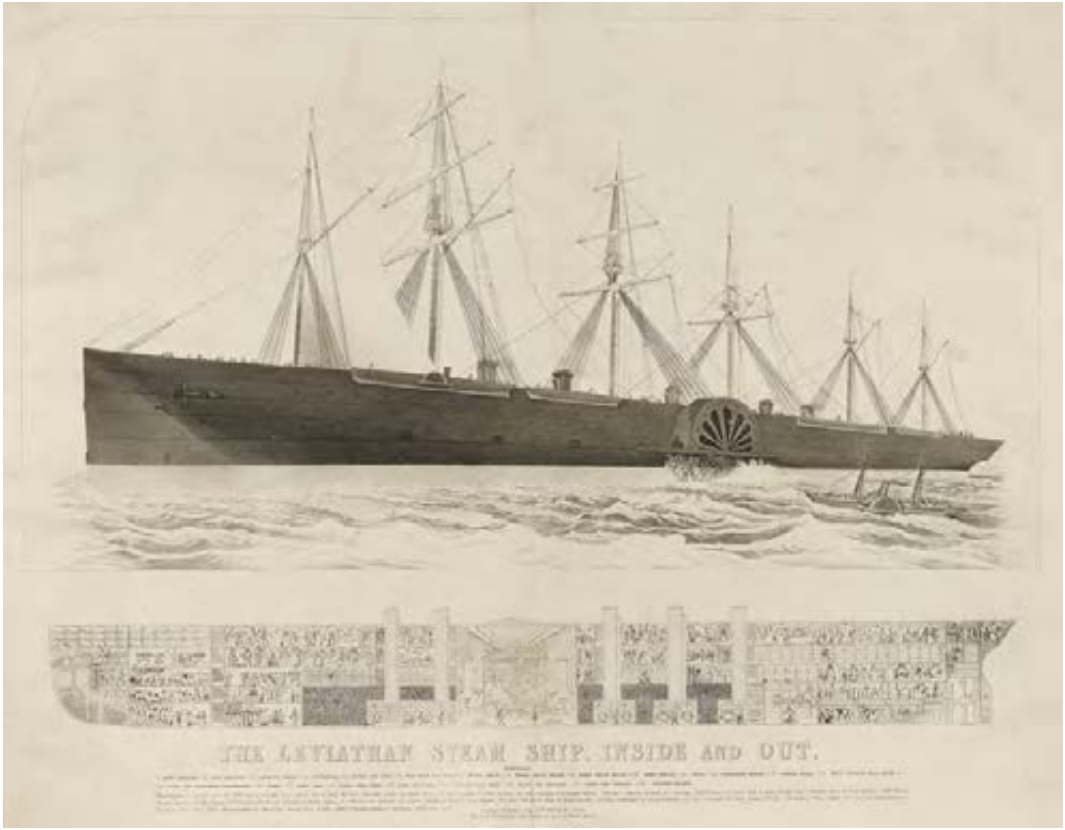


Fig. 8 - The steam ship "Leviathan" (Great Eastern), National Maritime Museum, Greenwich, London.

Conclusion

Brunel's contribution to shipbuilding has shown how the ingenuity and design invention of this 19th-century engineer has enabled him to achieve important results from a constructive, mechanical and technological point of view. The experimentation of advanced construction techniques in shipbuilding, the introduction of new technologies such as screw propeller propulsion, the use of iron in the construction of ever larger ships, has actually shown how the intuitions of Brunel, romantic dreamer of the Victorian age, have paved the way for a new way to go by sea. In the second half of the nineteenth century all the forecasts of Brunel came true and in the space of only fifty years, steam navigation surpassed that of sail sailing in the maritime transport of passengers and goods. The iron ships supplanted those of wood, but above all the ships became bigger and more able to travel longer and longer routes without a stop. A scientific-technical-technological revolution that has deeply influenced engineering and shipbuilding, thanks to many enterprising inventors, designers, builders, entrepreneurs, but above all to the genius of Isambard Kingdom Brunel, a pillar of 19th century engineering, ingenious and versatile civil, railway and naval designer.

Fig. 9 - Isambard Kingdom Brunel at the Launching of the SS Great Eastern (first called Leviathan, for its gigantic size). In order from left to right: John Scott Russell, Henry Wakefield (- 1899), Isambard Kingdom Brunel, Edward George Geoffrey Smith-Stanley, 14th Earl of Derby (1799 –1869) [Photo by Robert Howlett (1831 - 1858) [The J. Paul Getty Museum].

References

Brunel, Isambard B.C.L. *The life of Isambard Kingdon Brunel, civil engineer. London: Longmans*, 1870.

Buchanan, R. A. *The Great Eastern Controversy: A Comment. Technology and Culture*. Vol. 24, N. 1 (Jan. 1983): pp. 98–106.

Chaloner, W. H. & W. O. Henderson. *Aaron Manby, Builder of the First Iron Steamship in Transactions of the Newcomen Society,* Vol. 29, Iss. 1,1953; pp. 77-91.

Claxton, Christopher. *History and Description of the Steam-Ship Great Britain, Built at Bristol for the Great Western Steam-Ship Company.* New York: J. Smith Homans, 1845.

Clements, Paul. Marc Isambard Brunel. *London: Longmans, Green & Co*, 19701.

Corlett, Ewan. *The Iron Ship: the Story of Brunel's SS Great Britain.* London: Conway Maritime, 1975.

Dawson, Philip S. *The Liner: Retrospective and Renaissance*. London: Conway Maritime Press, 2005.

Dumpleton, Bernard. *The Story of the Paddle Steamer.* Melksham: Colin Venton, 1973.

Dumpleton, Bernard and Muriel Miller. *Brunel's Three Ships. Melksham: Colin Venton,* 1974; Chicago: University of Chicago Press, 20132.

Fletcher, R. A. *Steam-ships, the story of their development to the present day.* London: Sidgwick & Jackson Ltd., 1910.

Fox, Stephen. *Transatlantic: Samuel Cunard, Isambard Brunel, and the Great Atlantic Steamships.* New York: Harper Collins, 2003.

Harris, Thomas R. *Arthur Woolf: The Cornish Engineer 1766-1837. T*ruro: Bradford Barton Ltd., 1966.

Kennedy, John. *The History of Steam Navigation.* London: Charles Birchall, 1903.

Kludas, Arnold, & Dietmar Borchert. *Das Blaue Band des Nordatlantiks: der Mythos eines legendären Wettbewerbs.* Hamburg: Koehlers Verlagsgesellschaft, 1999.

Owen Philip, Cynthia. *Robert Fulton: Biography*. New York: Franklin Watts, 1985.

Preble, George Henry. *A Chronological History of the Origin and Development of Steam Navigation*. Philadelphia: L.R. Hamersly, 1883.

Ransom, P. J. G. Bell's Comet: *How a Paddle Steamer Changed the Course of History.* Amberley, Gloucestershire: Amberley Publishing Limited, 2012.

Rolt, Lionel Thomas Caswall *Isambard Kingdom Brunel.* London: Longmans, 1957; New York: St. Martin's Press, 1859.

Sale, Kirkpatrick. *The fire of his genius: Robert Fulton and the American dream.* New York: The Free Press, 2001.

Thurston, Robert Henry. *A history of the growth of the steam-engine.* New York : D. Appleton and company, 1886.

Vernon Gibbs, Charles Robert. *Passenger Liners of the Western Ocean: A Record of Atlantic Steam and Motor Passenger Vessels from 1838 to the Present Day.* New York: John De Graff, 19572.

Watkins, Elfreth. *The Log of the Savannah. Report upon the condition and progress of the U.S. National Museum during the year ending June 30* ... Smithsonian Institution, United States National Museum. Washington: G.P.O., 1890.

Williamson, James. *The Clyde passenger steamers: its rise and progress during the nineteenth century: from the 'Comet' of 1812 to the 'King Edward' of 1901.* Glasgow: J. Maclehose and Sons, 1904.

Drawing as a critical compositional basis of the analogical methods and historical and aesthetic instances in the theories of Quatremère de Quincy and Jean-Nicolas-Louis Durand

Giulia Pellegri
Department Architecture and Design DAD (University of the Study of Genoa)
email: pellegri@arch.unige.it

Abstract

The theoretical corpus of Quatremère de Quincy (1755-1849) influenced the culture of late European neoclassicism, with the publication of *Le but et les moyens de l'imitation dans les beauxarts* (1823) and *Le Dictionnaire Historique de l'Architecture* (1832) , and Essai sur l'idéal dans ses applications pratiques aux oeuvres de l'imitation propre des arts du dessin (1837), highlighting the role of graphic language as a critical point in the analysis and in the definition of type and model, through an analogical method based on the relationships between measures and proportions of the component parts of the architecture. The cataloging through distinction between imitation, archetype and abstract imagination is compared to the idea of type and typology as a design methodology presented in the *Recueil et parallelèle des edifices de tous genres, anciens et modernes* (1799-1801) by Jean-Nicolas-Louis Durand, (1760-1834) through the elaboration of a fragmentation of the typical parts in a sort of systemized abacus and aimed at the rational definition of architectural design. The concepts of taxonomy, repetition, type, recomposition are introduced. Starting from the definition of idea and ideal of Quatremère de Quincy, where idea and image are metaphysical considered as synonyms and the ideal, more applicable to the arts of imitation where nature becomes a visible model and where no art, more of architecture, is based on the principle of what is ideal, The drawing, in its linguistic and geometrical components, is investigated as a significant tool of the generative rules of composition.

Abstract

Le teorie di Quatremère de Quincy (1755-1849) influenzarono la cultura del tardo neoclassicismo europeo, con la pubblicazione di Le but et les moyens de l'imitation dans les beauxarts (1823), Le Dictionnaire Historique de l'Architecture (1832), e Essai sur l'idéal dans ses applications pratiques aux oeuvres de l'imitation propre des arts du dessin (1837) ponendo in evidenza il ruolo del

linguaggio grafico come spunto critico nell'analisi e nella definizione di tipo e modello, tramite un metodo analogico basato sui rapporti tra misure e proporzioni delle parti componenti l'architettura. La catalogazione tramite distinzione tra imitazione, archetipo e immaginazione astratta, viene qui comparata all'idea di tipo e tipologia come metodologia progettuale presentata nel Recueil et parallelèle des edifices de tous genres, anciens et modernes (1799-1801) di Durand, Jean-Nicolas-Louis (1760-1834) tramite l'elaborazione di una frammentazione delle parti tipiche in una sorta di abaco sistematizzato e finalizzato alla definizione razionale della progettazione architettonica. Si introducono i concetti di tassonomia, ripetizione, tipo, scomposizione, ricomposizione. Partendo dalla definizione di idea e ideale di Quatremère de Quincy, dove idea e immagine sono considerati metafisicamente sinonimi e l'ideale, più applicabile alle arti dell'imitazione dove la natura diventa un modello visibile e dove nessuna arte, più dell'architettura, è basata sul principio di ciò che dicesi ideale, il disegno, nelle sue componenti linguistiche e geometriche viene indagato come strumento significante delle regole generatrici compositive.

Introduction

In the historical dictionary of Architecture Le Dictionnaire Historique de l'Architecture (1832) Quatremère de Quincy defines the idea as the images that produce and leave in us the impressions of objects declaring that idea and image are, metaphysically speaking, synonyms.

But some metaphysicians argued that the word image served to represent everything that affects the external meaning of bodily images. and that the word idea was used for representation. The reflection and the habit of setting up information, ideas and projects to the system gives the artist the greatest ease of clearly representing everything he proposes to accomplish: the more the idea has been distinguished in his spirit, the more the representation that he will want to do it, he will acquire truth, and will make it easy for the spectator to understand.

The word idea is used, in the arts of drawing and in architectural drawings, "as a synonym of sketch" therefore it is said to give the idea of a composition form the idea of a monument project. The sketch therefore corresponds to a combined or reduced image of an object, which is sometimes sufficient to fix the general data, or to recall the whole.

Operating according to an idea also means designing or repurposing by memory and imagination painting or drawing not according to a given model or from the natural, but according to the type or image that we have formed: It is as if it were said, reproduce the view of a monument not from the truth. but from the image that has preserved its memory, forming in us with the study a kind of type intended as an ideal specimen. According to Quatremère de Quincy we also use the word idea in another sense, such as when we say operating in an idea, painting or drawing to an idea, reproducing an idea of a monument: which in general means, to perform for reminiscence by imagination. But in essence it is the same as saying, painting or drawing not according to a given model or from the natural, but according to the type or image that we have formed: he is as if it were said, reproduce the view of a monument not from the truth . but from the image that has preserved its memory. Regarding the ideal word, instead, we analyze the two distinct meanings: the first is synonymous "imaginary, fantastic, fictitious, like the product of an unbridled imagination that takes dreams for inspiration of genius, or falls into falsehood by the desire to do new things.

The second way of understanding the word ideal is more particularly applicable to imitation arts. That they have a visible pattern in nature, so in the theory of imitation the ideal voice is opposed to that of natural. And then we understand that the way to imitate, to which we add the natural, is that which is limited to the exact copy of the model, considered individually: and vice versa, it is intended that the manner called ideal is that which represents the objects or beings considered under a point of general view, ie from which they can or could be.

In this last ideal sense he expresses the result of an operation of the intellect, of an abstract system that we call, for example, the ideal of this subject, of this nature, of this kind of composition, etc., the characteristic type, the generic principle of this or that other object of imitation, deduced from the nature considered in its intentions and in the general laws of its works, rather than in the individuality of its productions. This imitative theory does not seem very applicable architecture, which can not operate behind a real and positive model. However, when one thinks that the system upon which this art is founded, and the principles that serve it as a basis, the results of the intellect are necessary, and when it is recognized, that every system based on the universal laws of nature belongs to an order of ideal things, it can be allowed to say that no more than architecture is based on the principle of what is ideal[1].

Durand tries to find a systematic method for classifying various kinds of buildings Durand's diagrams mainly capture the structural elements of various "types" of buildings, including a layer of grids that denotes both the structure and the geometric composition. Durand proposed to create new "types" for the emerging urban condition recently through the adaptation and recombination of these typical elements to specific sites, responding to its constraints. This notion of "type" as a model, represented graphically as structural axes in the case of Durand, introduces precepts that are fundamental to function typologically: previous, In this way, he built an architectural science that inadvertently outlined a didactic theory of "type" and constitutes what we mean by "typology".[2] Although Durand uses the "typology" in a pragmatic way, highlighted in his pedagogical approach in the teaching of architectural design in the École Polytechnique, his greatest ambition was to arrive at a general principle.

Methodology

The drawing , meant as a disciplinary sector despite the delicate academic balance, has always played a fundamental role in the management of design forms, starting from the distinction between type, model, image, perception through a semantic cognitive survey that can take place only through a graphical visualization Ludovico Quaroni, in 1977, in his book Design a building. Eight lessons of architecture, in the Fourth Lesson, focuses on the definition of "model" and "type" of Quatremère de Quincy "The model understood according to the practical execution of art, is an object that must be repeated as it is; on the contrary, the type is an object according to which everyone can conceive of works that will not resemble each other."[3]

[1]Quatremère de Quincy Le Dictionnaire Historique de l'Architecture (1832) Le Clere, Paris.
[2]Jean-Nicolas-Louis-Durand, Précis des leçons d'architetture données à l'Ecole Polytechnique, Paris 1802-1805.
[3]Ludovico Quaroni, Progettare un edificio. Otto lezioni di Architettura. G. Esposito Quaroni , a cura di, Ed. Gangemi, 1993, Roma.

These theories are associated with the concept of space, a relative and functional concept also with respect to movement and therefore to the perception of movement which determines new spatial conceptions between interior and exterior, determining the design scheme.

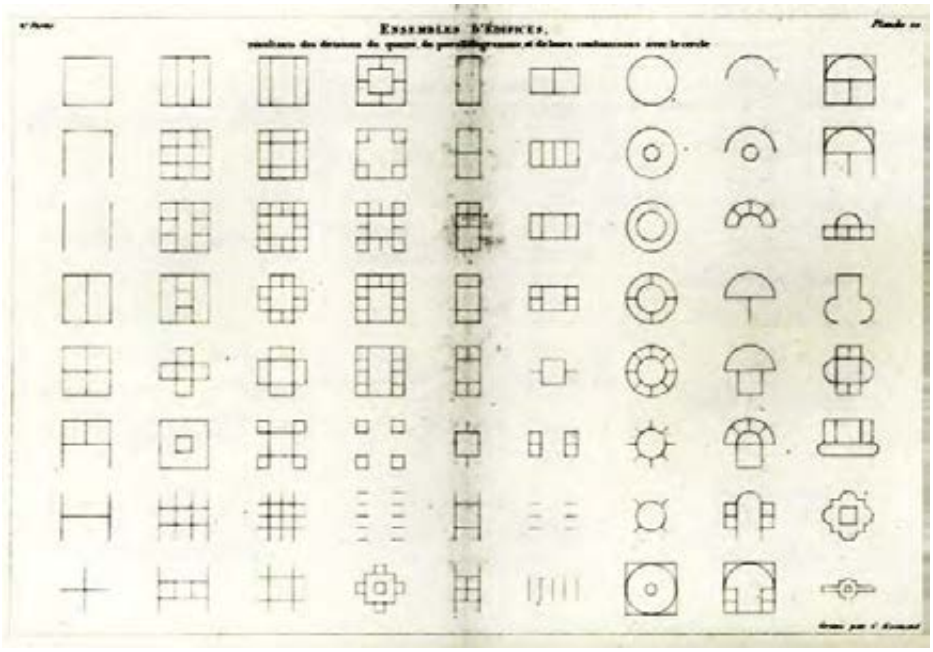


Fig.1 J.-N.-L.-Durand, Result of the divisions of the square, of the parallelogram and of their combinations with the circle tav. 20.

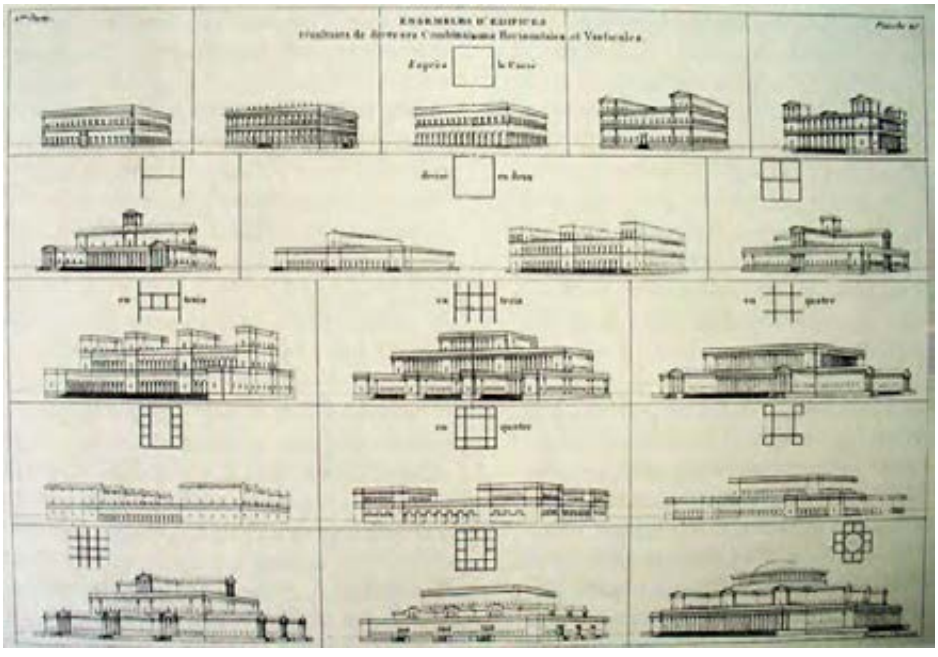


Fig.2 J-N.-L.-Durand, Abacus of the different horizontal and vertical combinations.tav 80.

In the ideational phase, the design approach through the drawing, of fundamental importance is the dichotomy imagination and genius. The imagination, again according to Quatremère de Quincy, is the moral faculty that has the property of preserving, reproducing and recalling the images of external objects, or the impressions of internal feelings. Imagination has been considered from two points of view: now supposing it is a kind of repertoire, in which the impressions should be ordered and classified produced by external objects, or internal feelings, and in this sense it participates in property of memory now it is regarded as a kind of laboratory, where the images, combined in a different way, come to produce new entities associations of objects, of feelings, of impressions, and under this point of view the imagination participates in the power of what is called genius, imagination is one of the tools of creative faculty. *It is another defect produced by the lack of the judiciary, taken as regulator of the imagination, without subverting the foundations of the architecture, it manifests itself in the arrangement of the buildings. when, for showing imagination, the architect submits to arbitrary effects, to unusual uses and to a false one picturesque, the needs of the building, the conveniences of the composition and the graces of the decoration.*[4]

But a fundamental aspect of the legacy of the theories of the two eighteenth-century treatmentists is the production of real manuals that propose models and examples with the result opposite to intentions, especially de Quincy, with a relapse on the composition technique, where by composition we mean the modality of interpretation, also and above all through the practice of drawing as resolution between form and function. The interpretation of Durand's theories sees just this tendency i.e the abandonment of de Quincy's idea to acquire elements, shapes and dimensions in relation to uses and materials, proposing the lattice and the use of the axes. This compositional methodology, precisely for the assertion essence, is read as synonymous with immobility by the exponents of the Modern Movement, which abandoned, only apparently, the classical concept of type, wanting to emphasize the plastic space beyond the function. They begin to work on prototypes on an industrial level, and thanks to the relationship between form and function, the type is a work tool and not an imposition, that is, not from the existing architecture, from the slow accumulation of experiences produced by humanity within a specific tradition, but from an analytical-synthetic process without any symbolic and intentional historical contamination. The masters of Modern Movement considered themselves as inventors of original compositional systems, the result of a selection that we could call evolutionistic, separating architecture from its material tradition and its historical events, building a new language and a new system of artistic, compositional and civil values. In this way they gave life, willy-nilly to a new type. It is the dynamism of the function that determines not only the shape, but also the type of buildings.

Marcello Piacentini in the Preface the New Italian Architecture, in 1936, declared: "while at the beginning of the first affirmations of modern architecture, Italian architects were considered above all to create exceptional palaces and sometimes, unfortunately, like some façade set designers, today, thanks to a wider understanding of the limits and tasks of architecture, the participation of the architect as a technician and as an artist in the formation of the physiognomy of contemporary Italy

[4]Quatremère de Quincy Le Dictionnaire Historique de l'Architecture (1832) Le Clere, Paris.

is ever more complete. This is enough evidence of this collection of the most recent and remarkable Italian works, exhibited at the sixth triennial. A more complete and thorough examination of these works denounces a unitary appearance, organically coherent and stylistically defined, not only in obedience to current tastes but in direct relation with national influences. Influences of climate and constructive materials, aesthetic impulses determined by the natural action of the Italian artistic environment, analogy relationships, with other times in which architecture had a plastic value of masses and not simple decorative mission, particular sensibilities of the Italian spirit to clarify ideas and concepts in a logical and simple way, they contribute to give a definitive character to these architectures."[5]

Fig. 3 Agnoldomenico PicaExposure to the VI Italian Architecture Triennale of Milan, 1936.

[5]Agnoldomenico Pica, Nuova Architettura Italiana, Quaderni della Triennale, Prefazione di Marcello Piacentini, pag.6, U.Hoepli Ed, Milano 1936.

Fig.4 Franco Albini, Pavilion of the National Institute of Insurance, 1935.

Fig. 5 Filippo Beltrami, Giovanni Pestalozza- Private house at Ronchetto sul Naviglio, Milan, project drawings exhibited at the 6th Triennale di Milano.

Fig.6 Giuseppe Capponi , University of Rome, Institute of Botany and Pharmaceutical Chemistry.

Fig.7 Giorgio Calza Bini, Francesco Fariello, Saverio Muratori, University of Rome, Student House.

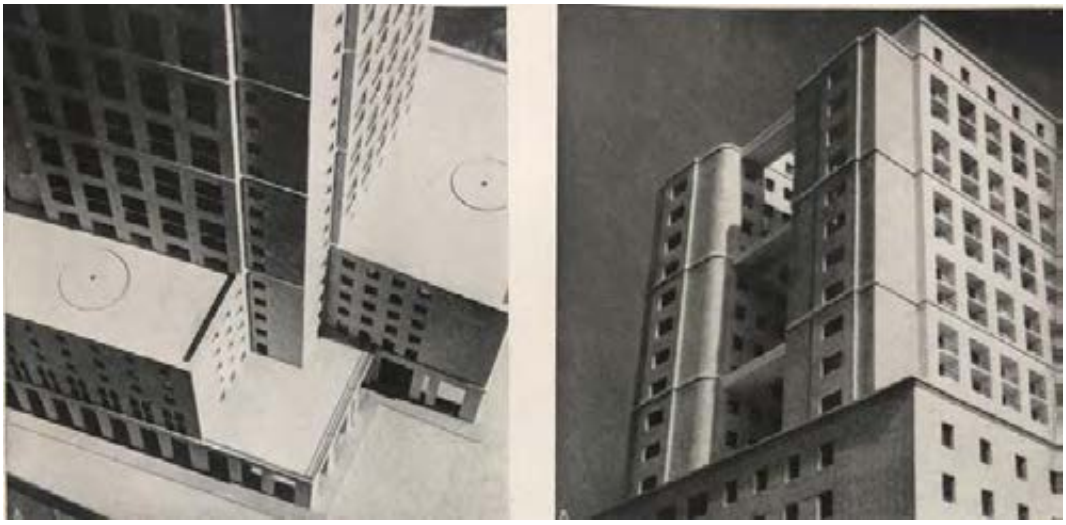


Fig.8 Giuseppe Rosso, Tower House in Genoa, Views of the model.[6]

Since 1927, the application of Ludwig Hilberseimer's theories in the tectonic relationship found in the connection between form, function and city, is evident in the search for a vertical application of proportional diagrams; vertical lines and repeated modules in the idea of Vertical City, propose a model of functionalism from a rational design.[7]

[6]Figg. 3,4,5,6,7,8 taken from Agnoldomenico Pica, Nuova Architettura Italiana, Quaderni della Triennale, Prefazione di Marcello Piacentini, pag.6, U.Hoepli Ed, Milano 1936 (pagg.12,151,153,167,207,223)

[7] Hilberseimer, Ludwig. Groszstadt Architektur. Stuttgart: Julius Hoffmann, 1927.

Fig.9 L.Hiberseimer, Groszstadt architektur, 1927

Conclusion

The theme of the typology in Italy, fits into the theoretical-cultural debate of the second half of the twentieth century, with the figures, among others, of Carlo Argan, Saverio Muratori, Aldo Rossi, the postmodern influence of Robert Venturi e Franco Purini.

Carlo Argan, in the 1962 conference on architectural typology, interprets the nineteenth-century theories of the definition of type from the phenomenological point of view, which describes the 'type' phenomenon as it occurs in reality and in its existential process. The type is born upstream of the design process and is critically deduced from the comparison of real examples. "The operation that leads to the identification of the type is similar to that of redrawing on transparent papers works already made that have particular common characters, to superimpose the drawings and to identify all the coinciding elements, to discard those that do not coincide."

The Saverio Muratori schools carry out the study of the relationship between city and morphology through the multi-scale study, i.e the result of typological evolution, where the type determines the evolutionary model of the city. These studies resulted in research methods in the major Italian schools of survey , such as in Genoa, through the survey of the historic center of Genoa in 1972, by prof. Luigi Vagnetti. dsxAldo Rossi contributes to the reconciliation on the concept of the type between the morphological vision and the more traditional ones placing at the center of the design culture the type as the logic of the form, as a balance between memory and reason that defines the building itself of the city. "The type is being built according to the needs and aspirations of beauty. It is therefore logical that the concept of type is built on the foundations of architecture and returns to practice as in the treatises. The type is the rule, therefore the constructive way of architecture."[8]

[8] Aldo Rossi, L'architettura della città, ed. Marsilio, Padova, 1966.

From these considerations arises the need to explore through the practice of drawing as an expression and graphic experimentation of proportion, measurement, overlap, multi-scale and any possible combination of types and models.

Franco Purini, architect and maximum exponent of the "drawn architecture" in the figure Classification, by sections, of spatial situations, 1968, describes a programmatic draw that proposes a taxonomic survey on the possibilities of thinking a cubic volume. It is about seventy-two possibilities of organizing space. Each of them expresses a primary organization of the elements. "The drawing is the synthesis of themes of Italian rationalism, of the theory of Noam Chomsky on generative grammar, and of minimalist sculpture, in particular those of the works of Donald Judd." [9]Franco Purini, Lectio Magistralis 2016

The type is intimately linked to reality and to society, by its very nature the idea of change and its transformation is not a rigid mechanism. The most intense moments in the history of architecture are those in which a new type is born, for example for the advent of new technologies or social needs or even for exceptional personalities[10].

Fig.10 Aldo Rossi, The Modena Cemetery, 1971.

[9] Franco Purini, Lectio Magistralis, International Conference De-Sign Environment Landscape City, University of Genoa, Architecture and Design Department, 16 maggio 2016.

[10] Rafael Moneo, La solitudine degli edifici e altri scritti. Questioni intorno all'architettura, A.Casiraghi, D.Vitale (a cura di), Ed. Allemandi, Torino, 2004.

Fig.11 Franco Purini, drawings: Classifications, by sections, of spatial situations, 1968; Fragments of the ancient protruding on new remains1984; How to act in architecture,1994.

Fig.12 Franco Purini, Pavilion of the bus stop, Poggiorale, 1987. Office building at EUR, Rome, 2006-2009; Chapel and Sagrato di Sant'Antonio da Padova, Poggioreale, 1984-1995.

References

A.C. Quatremère de Quincy *Le Dictionnaire Historique de l'Architecture*, Le Clere, 1832, Paris.
J.N.L.Durand, *Précis des leçons d'architetture données à l'Ecole Polytechnique*, Paris 1802-1805.
L. Quaroni, *Progettare un edificio. Otto lezioni di Architettura*. G. Esposito Quaroni , a cura di, Ed. Gangemi, 1993, Roma.
A. Pica, *Nuova Architettura Italiana*, Quaderni della Triennale, U.Hoepli Ed, Milano 1936.
L. Hilberseimer, *Groszstadt Architektur*. Julius Hoffmann, Stuttgart, 1927.
A. Rossi, *L'architettura della città*, Ed. Marsilio, Padova, 1966.
F. Purini, *Comporre l'Architettura*, Ed.Laterza, 2000
F.Purini, *Gli spazi del tempo. Il disegno come memoria e misura delle cose*, Ed. Gangemi, Roma,2011.
R. Moneo, *La solitudine degli edifici e altri scritti. Questioni intorno all'architettura*, A.Casiraghi, D.Vitale (a cura di), Ed. Allemandi, Torino, 2004.

Il design un equivoco fortunato

Franco Purini

La condizione attuale dell'architettura nell'età della globalizzazione è, a mio avviso, assimilabile a un labirinto. Se fino a trent'anni fa era possibile individuare nel dibattito internazionale tre o quattro orientamenti, ciò che consentiva a ciascun architetto di riconoscersi in una di queste poche tendenze, a oggi il numero degli schieramenti teorici e operativi si è moltiplicato a dismisura, al punto che l'accurato e nutrito diagramma delle maniere di pensare l'architettura che qualche anno fa è stato tracciato da Charles Jencks è stato, di fatto, vanificato. In realtà, se si guarda con una maggiore attenzione al panorama della produzione architettonica di quest'ultimo periodo penso che sia lecito ridurre la maggior parte degli orientamenti attualmente presenti a un neofunzionalismo. Non definito, però, come tale, ma considerato solo nei suoi componenti, visti peraltro come ambiti separati. Va anche detto che oggi prevalgono gli specialismi, che hanno esautorato quasi del tutto il pensiero generalista, con la relativa perdita del senso unitario dell'abitare e delle sue espressioni ideali e concrete. Non c'è spazio in queste note per affrontare quest'ultimo punto, ma si può dire che la drastica riduzione del contenuto umanistico dell'architettura produrrà senza dubbio problemi sempre più consistenti non solo ai progettisti ma soprattutto agli utenti delle loro opere.

Le componenti del neofunzionalismo sono la tecnologia, che preferisco chiamare tecnica; i media, nel loro pretendere dall'architettura un prevalente ruolo comunicativo; l'atopia, come esito della rinuncia dell'architettura contemporanea a costruire e a continuare nel tempo i luoghi; il formalismo plastico, ovvero l'archiscultura, secondo la definizione di Germano Celant, un'imitazione impropria delle modalità della scultura e dell'istallazione; la sociologia come scienza che si sta sostituendo, soprattutto per quanto riguarda la città, all'analisi della struttura urbana e degli spazi privati e collettivi degli edifici; l'ambientalismo, in particolare dal punto di vista della sostenibilità; il paesaggismo o, come lo chiamava Bruno Zevi, la paesaggistica e il design. Luoghi entrambi, come cercherò brevemente di spiegare più avanti, di qualche equivoco teorico e operativo.

E' evidente che questo elenco, ancorché parziale, presenta più di una difficoltà di pervenire a sintesi efficaci per quanto riguarda il pensare e l'esercitare oggi il nostro mestiere. Ciò anche e soprattutto a causa della convergenza pressoché totale su un'idea relativista dei saperi e delle arti.

Il risultato della condizione appena descritta è una concezione diffusa del linguaggio architettonico come una sorta di esperanto. Si pensa infatti, da parte di molti, che un'architettura sia in sostanza un collage di brani linguistici provenienti da contesti culturali diversi, montati in sequenze spesso casuali. Progettare è divenuto così la realizzazione di un mosaico di frammenti lessicali indipendenti l'uno dall'altro, semplicemente accostati senza la necessaria coerenza di scrittura, che risulta quindi prima della sua necessità. La forma non è più l'esito di una costruzione sapiente, duratura e insieme capace di evolvere nel tempo, ma il prodotto di una performance gestuale nella quale la citazione di immagini architettoniche prelevate dalla rete, e un sottofondo celebrativo del presente, un'esasperazione tecnica danno vita a un discorso privo di una autentica logica e di quella esigenza aurea per la quale ogni scelta dovrebbe iscriversi in un ordine superiore, che è strutturale, intellettuale e spirituale.

Rinviando a un'altra occasione un discorso sulla paesaggistica, sul suo insegnamento e sui suoi risultati nelle Facoltà di Architettura vorrei proporre, alla luce di quanto ho già esposto, alcune considerazioni sul design. Come è noto questo termine inglese, che risale al latino "designare" e all'italiano "disegno", denomina l'attività progettuale. Nella recente situazione del dibattito architettonico italiano e delle relative categorie l'uso di questo vocabolo proviene in realtà dalla dizione industrial design, dalla quale è caduto l'aggettivo specificativo. Negli ultimi anni, filologia a parte, questa parola indica un campo problematico più vasto, ovvero un territorio tematico coincidente con l'intero ambiente, uno spazio discorsivo che Rosalind Krauss chiama l'insieme delle elaborazioni concernenti le sfere artistiche, che coinvolge non solo gli oggetti d'uso ma gli scenari spaziali, gli edifici, il rapporto naturale/artificiale, i comportamenti sociali, i modelli di vita individuali e collettivi, la grafica, la moda. A causa di questa notevole estensione il design è considerato oggi l'esito dell'incontro tra l'arte, i media, la sociologia, l'industria, l'ecologia, l'economia e l'intero spettro dell'abitare. E' evidente da questa apertura a trecentosessanta gradi che l'idea di design ha assorbito completamente quella di architettura e di urbanistica. Due entità che, per inciso, il Novecento aveva cercato di separare, senza però riuscirci del tutto.

In tutto il nostro paese i corsi di Laurea in Architettura hanno subìto negli ultimi anni, in modo notevole e improvviso quello che si sta per concludersi, un improvviso crollo delle iscrizioni, mentre quelli di design hanno visto una crescita notevole. Probabilmente la ragione di questo fenomeno consiste nel fatto che la parola architettura identifica per i giovani uno spazio culturale tradizionale, mentre il termine design fa pensare non solo al futuro, ma a una dimensione innovativa che coinvolge ogni aspetto della nostra vita. Si tratta di un'illusione mediatica che contiene comunque qualcosa di vero, E' un'illusione perché vorrebbe immettere la dimensione dell'architettura nell'ambito di un effimero consumistico come quello che, nella misteriosa metafisica dell'obsolescenza programmata e della visibilità mediatica vorrebbe proporre a livello

di massa uno spettacolo ambientale sempre nuovo. E' vero perchè fa indirettamente comprendere che senza il disegno, inteso prima di tutto come prodotto di una visione attenta del mondo attraverso l'analisi grafico-interpretativa, non ci potrebbero essere modificazioni positive del mondo stesso. Il limite dei Corsi di Laurea in Design mi sembra, in sintesi, dovuto all'accentuazione, potrei dire neoavanguardista, di quel neofunzionalismo del quale ho parlato all'inizio di queste note. Un limite il quale, occorre riconoscere, non è presente, almeno in forme estrinseche, all'interno dei Corsi di Laurea in Architettura, nei quali esistono ancora aree di resistenza alla riduzione dell'architettura alla sola utilitas e firmitas. La venustas non è più presente nella mente di molti architetti esperantisti con la conseguenza che il paesaggio, gli insediamenti urbani e gli edifici non conservano più la memoria di ciò che è la fonte più vera del nuovo.

Prima di concludere voglio fare un riferimento a un testo fondamentale di Jean Baudrillard, "Il sistema degli oggetti", del 1968. Mezzo secolo fa lo studioso francese vedeva nel grande numero degli utensili che popolano il paesaggio, le città e le nostre case un universo di segni organizzati in un linguaggio. Successivamente egli modificò questa opinione considerando gli oggetti, ovvero il mondo creato dall'industrial design, una "rete informativa", identificandoli così come mass media. Occorrerebbe chiedersi se questa interpretazione, nata negli anni Ottanta nel clima del Postmodernismo, abbia ancora validità. Forse si potrebbe pensare oggi il sistema degli oggetti come consideriamo la fauna e la flora, ovvero come un certo numero di specie viventi che possiedono la loro intrinseca energia evolutiva. Se questa ipotesi fosse fondata, cosa che mi auguro, occorrerebbe riconoscere nel disegno tale energia. Un disegno da considerare in termini nuovi, capaci di confermare e di amplificare quella sua attitudine generativa già nota ai trattatisti dell'Umanesimo e del Rinascimento. Ciò contrasterebbe quella deriva concettuale, oggi prevalente, che vede nel disegno un semplice strumento tecnico e non più quel luogo misterioso che è pensiero e azione, ragione e mistero, finitezza e infinità. Un luogo in cui si incontrano con la massima intensità il soggettivo e il collettivo. In breve il disegno è quell'origine delle forme di cui hanno parlato Paul Valéry ed Henri Focillon.

Queste note terminano con la convinzione che se l'architettura è "sostanza di cose sperate", come pensava Eduardo Persico, lo è perché esiste un suo momento nativo che la contiene in tutte le sue potenzialità governando nel tempo le sue inevitabili trasformazioni. Nelle attuali facoltà di Architettura oggi il Design è un equivoco fortunato. Esso può farsi risorsa più autentica, operante e umanistica solo opponendosi, secondo le sue possibilità, a quella omologazione consumistica sorretta dai media che è una nuova e ingannevole religione. L'architettura non può limitarsi ad assecondare la realtà in cui nasce, ma deve interpretarla, modificarla, a volte combatterla. E' nel ritrovare questa complessità di azione che essa, assieme al disegno da cui nasce, può contribuire a rendere l'abitare più libero, aperto e felice.

The design a lucky misunderstanding

Franco Purini

The current condition of architecture in the age of globalization is, in my opinion, similar to a labyrinth. If until thirty years ago it was possible to identify three or four orientations in the international debate, that which allowed each architect to recognize himself in one of these few tendencies, to date the number of theoretical and operative lines has multiplied excessively, to the point that the accurate and substantial diagram of manners of thinking about the architecture that a few years ago was drawn by Charles Jencks was, in fact, nullified. Actually , if we look with greater attention to the overview of the architectural production of the latter period, I think it is permissible to reduce most of the guidelines currently present to a neo-functionalism.
Not defined, however, as such, but considered only in its components, seen however as separate areas. It should also be said that today specialisms prevail, that have almost completely expropriated generalist thought, with the relative loss of the unitary sense of living and its ideal and concrete expressions. There is no space in these notes to deal with this last point, but it can be said that the drastic reduction of the humanistic content of the architecture will undoubtedly produce more and more consistent problems not only to the designers but above all to the users of their works.

The components of neo-functionalism are technology, which I prefer to call technique; the media, in their demand of architecture as a prevalent communicative role; atopy, as a result of the renunciation of contemporary architecture to build and to continue places over time; plastic formalism, or archisculpture, as defined by Germano Celant, an improper imitation of the modalities of sculpture and installation; sociology as a science that is replacing, especially as regards the city, the analysis of the urban structure and of the private and collective spaces of the buildings; environmentalism, in particular from the point of view of sustainability; landscape painting or, as Bruno Zevi called it, landscape and design. Both places, as I will briefly try to explain later, of some theoretical and operative misunderstanding.

It is evident that this list, even if partial, presents more than one difficulty to arrive at effective synthesis regarding the thinking and the exercising of our profession today. This is also and above all because of the almost total convergence on a relativistic idea of the knowledge and of the arts.

The result of the condition just described is a widespread conception of architectural language as a sort of Esperanto. In fact, many people think that architecture is essentially a collage of linguistic pieces coming from different cultural contexts, assembled in often random sequences. Designing thus became the realization of a mosaic of lexical fragments independent of each other, simply juxtaposed without the necessary coherence of writing, which is therefore before its necessity. The form is no longer the result of a skilful, lasting construction and capable of evolving over time, but the product of a gestural performance in which the citation of architectural images taken from the network, and a background celebrating the present, an exasperation technique give life to a discourse lacking an authentic logic and that golden need for which every choice should be inscribed in a higher order, which is structural, intellectual and spiritual.

Returning to another occasion a talk on the landscape, its teaching and its results in the Faculty of Architecture I would like to propose, in light of what I have already explained, some considerations on design. As is well known, this English term, which dates back to the Latin “designare” and to the Italian “design”, calls the design activity. In the recent situation of the Italian architectural debate and related categories, the use of this word actually comes from the term industrial design, from which the specific adjective has fallen. In recent years, apart from philology, this word indicates a broader problem field, that is a thematic territory coinciding with the whole environment, a discursive space that Rosalind Krauss calls the set of elaborations concerning the artistic spheres, which involves not only the objects of use but the space scenery, the buildings, the natural / artificial relationship, the social behaviors, the individual and collective life models, the graphics, the fashion. Because of this remarkable extension, design is today considered the outcome of the encounter between art, the media, sociology, industry, ecology, the economy and the entire spectrum of living.
It is evident from this 360 degrees view that the idea of design has completely absorbed that of architecture and urban planning. Two entities that, incidentally, the twentieth century had tried to separate, but without succeeding at all.

In our country the Degree in Architecture courses have suffered in recent years, in a remarkable and sudden way that is about to end, a sudden drop in registrations, while those of design have seen considerable growth. Probably the reason for this phenomenon consists in the fact that the word architecture identifies a traditional cultural space for young people, while the term design makes us think not only of the future, but of an innovative dimension that involves every aspect of our life. It is a media illusion that still contains something true,
It is an illusion because it would like to introduce the dimension of architecture in the context of an consumer ephemeral like the one that, in the mysterious metaphysics of programmed obsolescence and media visibility, would like to propose a new environmental spectacle at mass level. It is

true because it indirectly makes it clear that without drawing, intended first of all as a product of a careful vision of the world through graphic-interpretive analysis, there could not be positive modifications of the world itself. The limitation of the Degree Courses in Design seems to me, in short, due to the accentuation, I could say neo-avant-gardist, of that neo-functionalism of which I spoke at the beginning of these notes.
A limit which, it must be recognized, is not present, at least in extrinsic forms, within the Degree Courses in Architecture, in which there are still areas of resistance to the reduction of architecture to only utilitas and firmitas. Venustas is no longer present in the minds of many Esperantist architects, with the consequence that the landscape, urban settlements and buildings no longer retain the memory of what is the truest source of the new.

Before concluding I want to refer to a fundamental text by Jean Baudrillard, "The system of objects", 1968. Half a century ago, the French scholar saw in the great number of tools that populate the landscape, the cities and our houses a universe of signs organized in a language. Subsequently he modified this opinion considering the objects, or the world created by industrial design, an "information network", identifying them as mass media. One wonders if this interpretation, born in the eighties in the climate of Postmodernism, still has validity. Perhaps today we could think of the system of objects as we consider fauna and flora, that is, a number of living species that possess their intrinsic evolutionary energy.
If this hypothesis were founded, which I hope, we should recognize this energy in the drawing. A drawing to be considered in new terms, able to confirm and amplify that generative attitude already known to the treatises of Humanism and the Renaissance. This would counteract that conceptual drift, now prevalent, which sees in design a simple technical instrument and no longer that mysterious place that is thought and action, reason and mystery, finitude and infinity. A place where the subjective and the collective meet with the greatest intensity. In short, the drawing is the origin of the forms mentioned by Paul Valéry and Henri Focillon.

These notes end with the conviction that if architecture is "the substance of hoped things ", as Eduardo Persico thought, it is because there is a native moment in it that contains it in all its potential, ruling over time its inevitable transformations. In the current faculties of Architecture today Design is a lucky misunderstanding. It can become a more authentic, operative and humanistic resource only by opposing, according to its possibilities, that consumerist homologation supported by the media which is a new and deceptive religion. Architecture can not be limited to supporting the reality in which it is born, but must interpret it, modify it, and sometimes fight it. It is in rediscovering this complexity of action that, together with the drawing from which it is born, can contribute to making living more free, open and happy.

I colori dell'architettura di Steven Holl

Francesca Salvetti
Department Architecture and Design DAD (University of the Study of Genoa)
email: salvetti@arch.unige.it

Abstract

"To draw? A form of thought. I only try to turn my paintings into buildings ". In these statements, Steven Holl expresses his privileged instrument, his most intimate expressive nature, the distinctive trait that is reflected not only in the representation, presentation and definition of a concept but also in its design development. In his countless watercolors and sketching notebooks you can trace the entire creative process of over forty years of activity, in which the technique, the gestures, the sensitivity to the cultural condition of the time, lead back to those permanent architectural values in order to interpret significant spaces characterized by fundamental elements such as light, materials and colors. This is not a matter of a already determined procedure, as in a work of art that stops at the ideation and realization, but of a very close relationship between thought, draw, image and design.
Here we want to analyze the different characteristics of the draw by Steven Holl as a form of exploration and compositional inspiration in the different phases of his professional experience.

Abstract

"Disegnare? Una forma di pensiero. Cerco solamente di trasformare i miei quadri in edifici". In queste dichiarazioni S. Holl esprime quale sia il suo strumento privilegiato, la sua più intima natura espressiva, il tratto distintivo che si riflette non solo nella rappresentazione, presentazione e definizione di un concetto ma anche del suo sviluppo progettuale. Nei suoi innumerevoli acquerelli e taccuini da disegno si può ripercorre l'intero processo creativo di oltre quarant'anni di attività, in cui la tecnica, la gestualità, la sensibilità alla condizione culturale dell'epoca, riconducono a quei valori permanenti dell'architettura per interpretarne spazi significativi intrisi e caratterizzati dagli elementi per lui fondamentali quale la luce, i materiali e i colori.
Non si tratta, quindi di un rapporto scontato, come in un'opera d'arte che si ferma all'ideazione e alla realizzazione, ma di un rapporto strettissimo tra il pensiero, il disegno, l'immagine, il progetto.

Si vogliono qui analizzare le diverse caratteristiche del disegno di Steven hall come forma di esplorazione ed ispirazione compositiva nelle diverse fasi della sua esperienza professionale.

Introduction

Steven Holl is both an architect and a painter, with a particular vocation for the watercolor technique, as evidenced by the publications[1] and the many exhibitions dedicated to his work. This characteristic propensity for conceptual sketches, reflecting his instinctive and distinctive qualities, is described in both the anthologies he wrote: *Anchoring* and *Intertwining*, published respectively in 1989 and 1996.

In these texts the mental process is outlined, to which all his works designed and realized are inspired, and in particular in the introduction of the first publication Holl writes: "Architecture is subject to circumstances. Unlike music, painting, sculpture, cinema, and literature, a building (which rests on the ground) is also the result of the experience of a place. The site of a building is not a mere component of its conception; it is a physical and metaphysical foundation. [...] The definition of the ideas developed from the first perception of the site, the reflections on the initial thoughts, or the reconsideration of the existing topography can become the basis for the invention. [...] Architecture is not so much an insertion into the landscape as the tool to explain it [...]. A building corresponds to a specific site and it is in this particular situation that its intentions are manifested. It is therefore outlined the intentionality in the design activity of the American architect who has undergone, throughout his career, a shift of emphasis, from his previous concern for the type, to his current attention to the existentialism of man, instead of imposing a style on a site, he claims, is the site itself that should generate the architectural idea[2]. This draw on the theories of phenomenology [3], which is the discipline that inserts the essence into the experience, and catching with its own sensitivity, the cultural, geographical and sociological condition of the moment, have earned him the definition given in July 2001 by Time magazine, America's best architect for "buildings that satisfy the spirit and the eye".

Holl has in fact resisted deconstructivism, architectural cultural thought in vogue at the time of his training[4], imposing with his projects an architecture in movement that is "experience of time, light and matter", in an act and multidisciplinary dialogue with the visual arts and the show. It is no coincidence that the course he holds at the School of Architecture, Planning and Conservation at Columbia University is entitled "Architecture Apropos Art".[5]

---

[1] S.Holl, Written in water, Lars Muller Pubblishers, 2002 e S. Holl, Steven Holl – Scala. An Architect's Sketch Book, Lars Muller Pubblishers, 2011

[2] In the important essay Anchoring (1989), Holl defines the "dialectical relations" between buildings and places: clear examples are the New York works of the eighties, which bring fame and recognition to his study.

[3] Phenomenology, a philosophical movement that originated in the twentieth century, whose primary objective is the direct investigation and description of phenomena as consciously lived, without theories about their causal explanation and the most free possible from unexamined preconceptions and presuppositions.

[4] After attending the University of Washington (BA, 1971), Holl continued his architectural studies in Rome and London. Back in the United States, he founded a studio in New York City, where he also worked at Columbia University since 1981. He became a member of the American Academy of Arts and Letters in 2000.

[5] Cit. S.Holl "At the base of our belief are the art of architecture and the potential collaboration with artists".

The drawings as conceptual maps

For over forty years of activity, two hundred and fifty projects of which seventy are made around the world[6], each Steven Holl's architecture has been generated, studied and configured starting from a drawing - usually a watercolor on paper, collected in spiraled notebooks and standard size of 5x7 cm. To date, about thirty thousand of these drawings are filed in his studio in New York.

They are animated thoughts that combine light, space, colour and words used to define a concept. Many ideas, contained in these watercolors, have not survived the confrontation with reality, but all the drawings, through a gesture that the architect Holl practices daily, have contributed to achieve a synthesis, a solution. As he says: "For me, drawing is a form of thought. I start each project with a conceptual map made of drawings that commits me several hours. Around 1979 I started to do it through watercolors in 13x18 cm format, easy to carry also by plane. The first thing I do in the morning, listening to good music and drinking green tea ". And he concludes: "You can have thousands of problems in your head compared to a project, then go to sleep, you wake up and draw.

Steven Holl does not neglect the role of digital technology in the development and representation of the project. He does not stigmatize it or assign it a decisive role. He recognizes a mediation to which, however, anticipates that of the design that for him is an instance, behavior and connection. Actions that the computer still can not do because only in drawing Holl finds that wealth of nuances and possibilities necessary for the creative process of architecture, from concept to realization.[7]

Drawing therefore as an expressive form of the project idea, described in a discrete way by a few signs that synthesize the work without distorting its essence.

"The transition into architecture must lead from the abstract to the built, from the informal to the formal. While the painter and the composer can move from the built to the abstract, the architect must travel in the other direction, gradually assimilating human activities into what is initially an abstract representation"[8].

The design concept, with blurred outlines and yet sketchy, is made clear by what is the practical and implementation mental diagram that is the final design, in which the project from simple visual signs is transformed into architecture made up of spaces, light and colour.

The design as an incipit, primordial and primary gesture becomes an instrument of thought, creation and investigation for all his projects that concretize the work, which give shape and colour to thoughts, because in the drawing there is everything (Fig.1).

---

[6] Holl's work includes large buildings in many cities around the world, including the Museum of Contemporary Art Kiasma in Helsinki, the Nanjing Sifang Art Museum in Nanjing, China, an addition and renovation of the Amerika-Gedenkbibliothek (American Memorial Library) in Berlin and an annex to the John F. Kennedy Center for the Performing Arts in Washington, DC. His subsequent work focused on urban-scale residential and commercial projects in China, in particular the Linked Hybrid, a complex of apartments, hotels, schools and restaurants in Beijing, and the Vanke Center, a "horizontal skyscraper" in Shenzhen. Among his many awards are the Alvar Aalto Medal (1998), the Cooper Hewitt National Design Award for Architecture (2002), the American Institute of Architects Gold Medal (2012) and the Praemium Imperiale Award for Architecture Japan Art Association (2014).

[7] M. Sammicheli, Interview for the exhibition: One Two Five, at the Galleria di A. Jannone from 18/04/2018 to 3/06/2018.

[8] S. Holle, Anchoring, Princeton Architectural Press, New York, 1988 p. 345

Fig. 1 S. Holl preparatory sketches

In the drawing, made of pure spontaneous simple gestures, attentive to the intuition and the reflections of the mind, notes of key words intertwine that give comprehension to the sketches.
In the sketch given by the speed of execution, by the synthesis of the lines, by the immediacy of expression, there is a precise and punctual regard to the use and combinations of the colors often proposed in their primary basic coding.
The chromatic aspect in the architecture is essential in all the work of Steven Holl in which attention is paid to its use in various forms of expression and the bond that is found throughout the path generator. The colour is used in the preparatory studies, in the sketches as a simplifying element, decoder of shapes and design choices, which represent the idea and often as an anticipator of the colours used in the final project.
In this regard and with reference to the construction of the Chapel of St. Ignatius for the Seattle University (Washington, 1994-1997) - an early project with the famous watercolor of Seven bottles of light in a stone box that organize the chromatic space similar to those designed by Le Corbusier, the architectural historian Kenneth Frampton (Electa, 2002-2009) wrote that "Holl's imagination is not limited to the search for combinations of various aspects with which architecture presents itself but also permeates the construction itself , giving rise to a tectonics that, although in a minor tone, is expressed by the technologies and the tactile nature of the materials used ".
The colour as a unitary element, unique and immediate message, in this project is represented on paper as colored bottles placed inside a box, visible entirely thanks to the transparency of the watercolor that conceptually anticipates the metaphor of the light modeled.
In fact, the concept of different colored lights, to mark the different moments of the Catholic Jesuit cult doctrine, is explored externally, from volumes emerging from the roof and whose irregularities aim to enhance the qualities of light and in dialogue within each volume between the colored lens and the reflected color field. Complementary colour fields in reflected colour backgrounds are contrasted with small colored lenses to create a pulsating pair of opposites that shape the space. A green field is associated with a red lens, with a blue field with a yellow lens, with a yellow field with a blue lens, with an orange field with a purple lens (Fig.2).

Fig.2 S.Holl – Chapel of St. Ignatius – Washington, USA, - Project: 1994-1996 - Realization: 1997

The creation of the chromatic space as a central concept in the design work of Holl has already been anticipated in 1991 in the organization of the D.E. offices. Shaw & Co, one of the first online trading companies in the world; in which the invisible work activity, represented by the transactions exchanged on the net 24 hours a day, has a parallel in the concept of interior design. The colour applied to the back or bottom surfaces of some cracks and cuts made in the walls, is invisible to the viewer inside the space and perceived only thanks to natural and artificial lights that project this color into the space around the walls and cracks (Fig.3).

In this experimental project, which explores the phenomena of spatial reflection of colors or "projected color", the chromatic space: light (color) is phenomenon, mystery and wavelength.

Fig.3 S.Holl – D.E. Shaw & Co Office – New York, United States, - Project: 1991- Realization: 1992

The use of lighting, in this natural case, as a generator and source of inspiration for new coloured visions, is also found in the creation of the Bellevue Art Museum, Washington, USA 1997-2001.

The Museum, anticipated in the sketches for shape and colour, is characterized according to the tripleness concept and on which the whole building is organized: three levels, three galleries, three different lights and time conditions and therefore colour effects, three circulation options. It is also characterized by the articulated shape and the external walls, consisting of a special "shot crete" construction of a deep red color, interspersed with mirrored glass openings and white walls, ideas originated and remained unchanged from the first preparatory sketches (Fig.4).

Fig.4 S.Holl – Bellevue Art Museum, Washington, USA - Project: 1997 - Realization: 2001

Similarly, even in the watercolors of one of his most famous works, Maggie's center Barts, the concepts on the colour theme are evident from the beginning. As described by the architect "ship inside a ship inside a ship", the structure is a branched concrete structure, the inner layer is in perforated bamboo and the outer layer is in opaque white glass with glass fragments colored that recall the "notation neume" of medieval music of the 13th century. The word neume derives from the Greek pnevma, which means "vital force". The interior character of this building will be modeled by a colored light that will wash the floors and walls, changing according to the time of day and season. The interior lighting is organized to allow the colored lenses together with the translucent white glass of the facade to present a new, joyous and luminous presence in this corner of the large square of the Barts Hospital (Fig. 5).

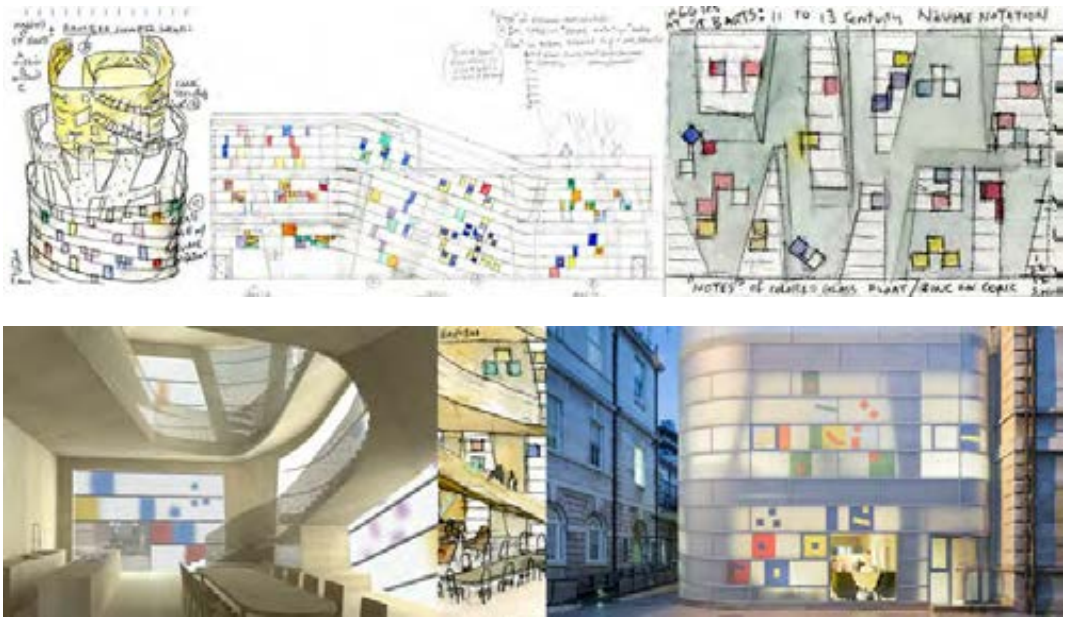


Fig.5 S.Holl – Maggie's centre barts – London United Kingdom - Project: 2012 - Realization: 2018

This great attention to the bright colour effects that not only shape the architecture at different times of the day, but that have a specific function at the community level, is also evident in another museum by the architect. At the Museum of Fine Arts, the task is given, through form, lighting and color to open up to the community for a possible redevelopment of the city. Here then the horizontal activity, the transparency and the porosity will unify the new MFAH and provide stimulating and inviting public spaces. And it is precisely through the preparatory drawings of the building imagined and represented in its nocturnal vision, that this concept is connoted to give specific information: this public space must be visible, perceptible and accessible especially in the evening (Fig.6).

Fig.6 S.Holl – Glassell school of art, MFAH– Houston, USA, - Project: 2015- Realization: 2018

In other cases the use of color, as an explicit diagram of Holl's thinking and reasoning, remains predominantly on paper, particularly when it is articulated in many nuances. An example of this is the colorful preparatory watercolor with the help of the new Shanghai Cofco Cultural and Health Center, both built in white cement, which feature the roofs in green sedum roofs to blend more closely with the surrounding landscape (Fig.7).

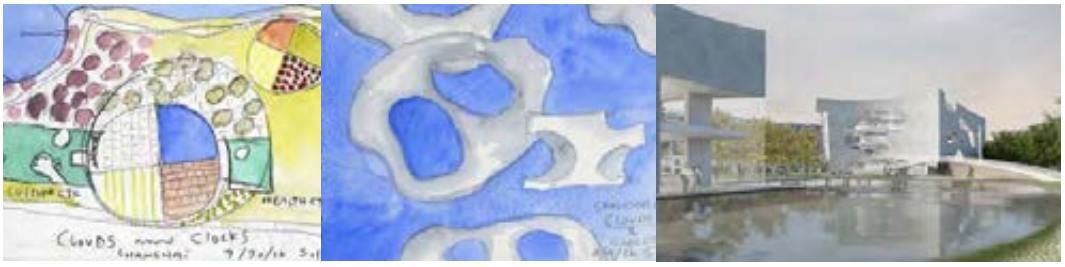


Fig.7 S.Holl – Cofco cultural & health center– Shanghai, People's Republic of China, 2019

This is not the case for the new project of residential towers in the Tushino district of Moscow where both the sketches and the renderings seem to faithfully anticipate form and colors; in particular the use of primary colours, seems to enhance the concept of comfort given by the vision of simple colours, skilfully combined for an immediate reading that generates chromatic understanding and harmony (Fig.8).

Fig.8 S.Holl – Tushino residential towers – South Tushino, RUSSIA, 2020

Conclusions

"I can not deal with architecture with a fixed vocabulary of forms, materials, strategies of the place to reiterate in every project [...]. What gives me energy in my work is the discovery, in every assignment, of a new concept and of the path that leads you ".

Each project, responding to different problems and insisting on a different site, has different characteristics that make it unique and independent in its being; guided by those conceptual diagrams, pure expression of the idea conceived in the immediacy of the perception of the genius loci; but the strategy of simplifying the conceptual and practical method, which links all Holl's projects in a single thread, is inherent in the diagram. Diagram that is expressed in drawing, in watercolor, in colors: in conceptual sketches, reasoned. Here then the light that is color creates harmonious contrasts in all his works. Clean, simple, clean colors that cut and outline that idea of a designed shape. This is Holl's style, the sites can change the boundary conditions the design requirements and the subject but not the tool with which it arises: the design and the color: because the world is colored.

References

S. Holl, *Anchoring*, Princeton Architectural Press, New York, 1989

S. Holl, *Intertwining*, Princeton Architectural Press, New York, 1996

K. Frampton, *Steven Holl Architetto*, Electa, Milano, 2002

J. Pallasma, *Pensamiento, Material y Experiencia*: una conversaciòn con Steven Holl, in "El Croquis", n.108/2002

S. Holl, *Parallax. Architettura e percezione*, Postmedia Srl, Milano, 2004

E. Tinacci, *Steven Holl*, Edizioni Kappa, Roma, 2005

A. Perez-Gomez, J. Pallasmaa, S. Holl, *Domande di Percezione. Fenomenologia dell'architettura*, William K. Stout Pub., San Francisco, 2006 (2a edizione).

Documentary, *Steven Holl: The Nelson-Atkins Museum of Art, Bloch Building*, Scacchiera Film Foundation 2008.

Image sitography

All images are taken from the site www.stevenholl.com and processed in a collage to support the text.

Drawing as a tool for expressing imaginary visions of reality: the works of Lebbeus Woods.

Michela Scaglione
Department Architecture and Design DAD (University of the Study of Genoa)
email: scaglione@arch.unige.it

Abstract

Lebbeus Woods (1940-2012) was an important American architect famous for his utopian visions of architecture: in addition to a rich literary production, Woods between 2007 and 2012 shared his thoughts on a personal blog actively participating in public discussions about his articles.
His production of drawings is undoubtedly his most famous work and the importance that he attributed to this medium has been repeatedly expressed in his career.
"Woods, last to speak, ran with the baton. "I don't care very much about building buildings. I care about building ideas." Since most ideas will never be built, Woods sees it as his role to build on paper, through graphic speculation. "These drawings are not preparations for construction—in most cases, they are the project. The act of rendering is the making of a version of reality," he concluded. His final message was simple but potent: if architects wish to avoid obsolescence, they must reverse the de-politicization of architecture by the dominance of the beautiful, but meaningless, render. As architects, our aspirations for reality must begin in our drawings ".[1]
Zaha Hadid, Steven Hall, Daniel Libeskind and many other famous architects personally knew Woods and the influence of his ideas and drawings is easily recognizable in many contemporary architectural works.
In an age characterized by digital design and by the hyper-realism of renderings, Lebbeus Woods expressed his work with the hand drawing, the hatching, the study of perspective. This article aims to analyze his work, both from a technical and expressive point of view, to identify those characteristics that still make them so current today.

[1] RENDERING SPECULATIONS, A Symposium at the Architectural Association in London, May 7, 2010, article written by Jack Self appearing in the June 2010 issue of the Architectural Review

Abstract

Lebbeus Woods (1940-2012) è stato un importante architetto americano famoso per le sue utopistiche visioni dell'architettura: oltre ad una ricca produzione letteraria, Woods tra il 2007 ed 2012 ha condiviso i suoi pensieri su un blog personale partecipando attivamente alle discussioni pubbliche sui suoi articoli.

La sua produzione di disegni resta, sicuramente, la sua più celebre opera e l'importanza che lui attribuiva a questo mezzo è stata più volte manifestata nella sua carriera.

"I don't care very much about building buildings. I care about building ideas. These drawings are not preparations for construction, in most cases they are the project. The act of rendering is the making of a version of reality. As architects, our aspirations for reality must begin in our drawings" (Lebbeus Woods).

Zaha Hadid, Steven Hall, Daniel Libeskind e molti altri famosi architetti conoscevano personalmente Wooods e l'influenza delle sue idee e dei suoi disegni è facilmente riconoscibile in molte opere dell'architettura contemporanea.

In un'epoca, caratterizzata dal disegno digitale e dall'iperealismo dei render, Lebbeus Woods esprimeva la sua opera con il disegno a mano, il tratteggio, lo studio della prospettiva.

Questo articolo vuole analizzare l'opera disegnata di Woods, sia dal punto di vista tecnico che espressivo, per individuarne quelle caratteristiche che ancora oggi la rende così attuale.

Introduction

After studying architecture at the University of Illinois and engineering at Purdue University, Woods started work in the office of Eero Saarinen, one of the pioneers of the 20th-century American architecture, as a field representative on the Ford Foundation building in New York City. In 1976 he left his office work and turned exclusively to theory and experimental projects and drawings becoming one of the most influent and independent researcher, architect, artist of our time.

It is important to reflect on the new current of experimental architectural approaches of the studios such were Superstudio and Archigram in the '60s and '70s for deep understand the work of Lebbeus Woods. Superstudio was an architectural group founded in 1966 in Florence they were Italian exponents of the radical architecture: "in the middle years 60 our work has been a critical work but above all a work in a species of earth of none, that was the one that has been between the art and the design, between the politics and utopia, between the philosophy and anthropology, was an attempting of radical criticism and here it had the name of radical architecture, of radical criticism to society, understood and so as simply as a consumer company, but as all the context in which we were to work"[2]. Archigram was an avant-garde architectural group formed in London that was neo-futuristic, anti-heroic and pro-consumerist, inspired by the progress of technology; their visionary projects show a different reality express by the medium of the drawing.

[2]Adolfo Natalini, co-founder of Supertudio, interview for Rai Educational

Fig.1 Lebbeus Woods in his office in New York 2008 (photo by Robert Caplin), Sketchbooks, Archigram Walking city 1964, Superstudio The continuous monument 1969-1970

Woods based his theoretical projects on the concent that architecture has significant political force in society and, through his drawings, he developed his personally unconventional vision of the future on examining new horizons of the relationship between architecture and technology.

"Architecture and war are not incompatible. Architecture is war. War is architecture. I am at war with my time, with history, with all authority that resides in fixed and frightened forms. I am one of the millions who does not fit in, who have no home, no family, no doctrine, no firm place to call my own, no known beginning or end, no "sacred and primordial site." I declare war on all icons and finalities, on all histories that would chain me with my own falseness, my own pitiful fears. I know only moments, and lifetimes that are as moments, and forms that appear with infinite strength, then "melt into air." In 1988, Woods co-founded the Research Institute for Experimental Architecture, a nonprofit institution devoted to the advancement of experimental architectural thought.

He wrote nine books and conducted a personal blog where he personally conversed with his visitors. In 1994 he won the Chrysler Design Award. He was a professor of architecture at the Cooper Union in New York City and at the European Graduate School in Saas-Fee, Switzerland; he also was visiting professor at many schools of architecture, including The Bartlett (London), SCI-Arc (Los Angeles), Columbia University (New York), and Harvard University (Cambridge, Massachusetts). He designed the Light Pavilion with Christoph Kumpusch in the Sliced Porosity Block, Chengdu, China projected by Steven Holl.

In 2012 San Francisco Museum of Modern Art was preparing an exposition of Woods's work, when the architect has passed away during the Hurricane Sandy on New York. Unbelievably, his death coincided with topics that occupied his life the most.

Early drawings and utopian cities

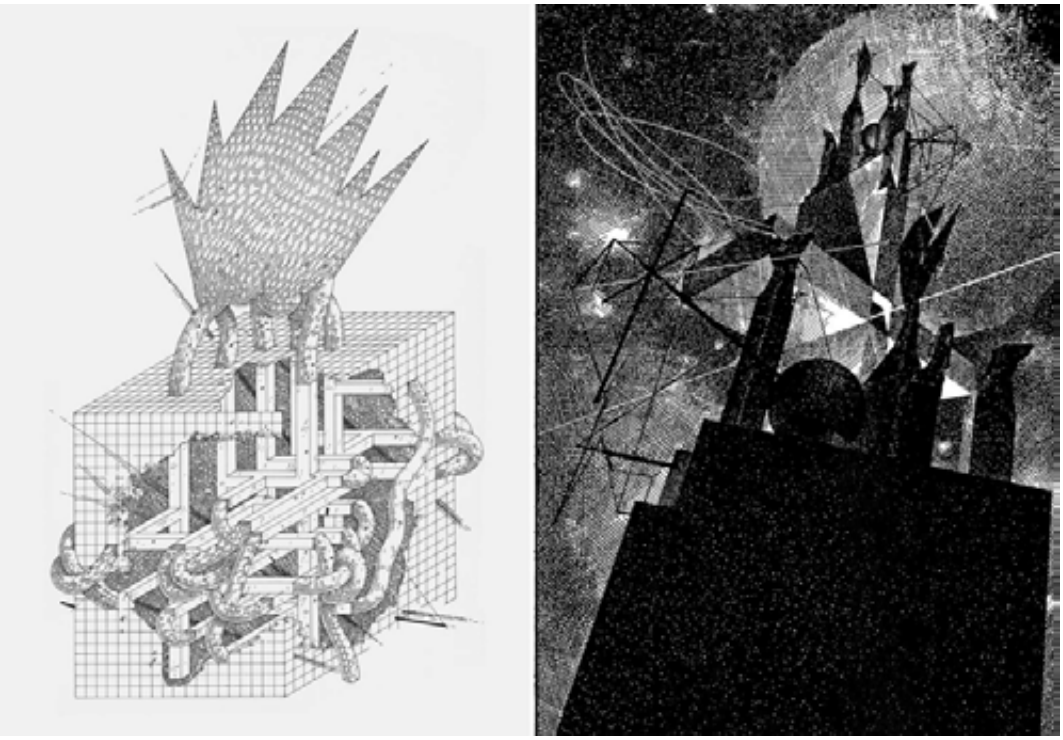


Fig.2 L. Woods: Lost and found (1973), Einstein Tomb (1980)

"What I'm most interested in recently, at the end of the Centricity series, is this idea of curvilinear things, of double curvations and triple-curvations, of hyperbolic geometry and compound geometry, so you are not just dealing with pure Euclidean forms."[3]

The series of experimental drawings entitled "Lost and Found" from 1973 represent the beginnings of Woods' thinking on the subject of conflict and transformation.

The basic shapes and ideas were already present: the drawings in black and white and in axonometry represent a building with rigid forms besieged by a parasitic element that devastates its structures.

The Einstein's Tomb project (1980) was created as a memorial to the life and work of Albert Einstein, a symbolic structure such as Newton's cenotaph by Boullè: not a static element to be venerated, but an object to be launched in the space where he would travel to the end of time and space.

Between 1981 and 1992, Lebbeus Woods concentrated on the development of projects related to the theme of utopian cities: imaginary future urban centres contradicted by the massive presence of machinery and technology. Clearly influenced by the work of Piranesi in his early work, the study of utopic cities was not limited to a single vision-image but he realized real projects divided into several tables with perspectives, plans and sections.

[3] From Lebbeus Woods interwiew for Skala Magazine 1988

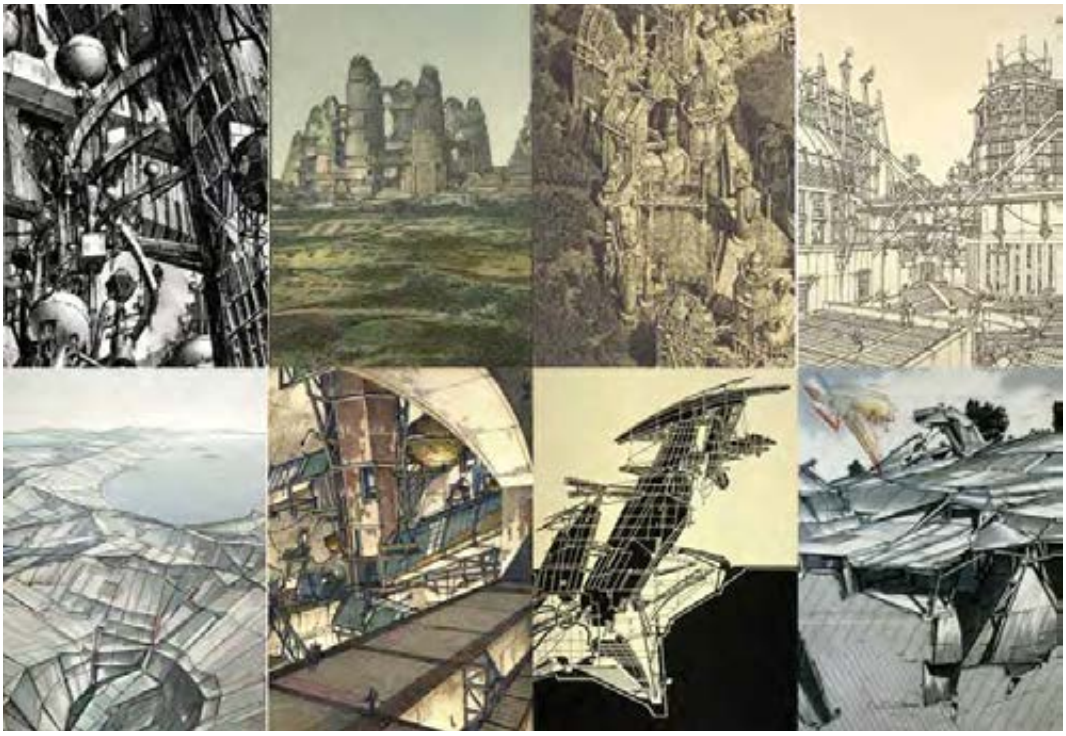


Fig.3 L. Woods: Aeon (1981), 4 Cities & Beyond (1983), A-City (1987), Centricity (1987-1988), Terra Nova (1988), Underground Berlin (1988), Aerial Paris (1989), Arcadia (1992)

War, reconstruction and architecture

Fig.4 L. Woods: Berlin Free Zone (1990), Zagreb Free Zone (1991), High Houses and Sarajevo (War and architecture, 1993), The Havana Project (1994)

"….. I am an architect, a constructor of worlds, a sensualist who worships the flesh, the melody, a silhouette against the darkening sky. I cannot know your name. Nor can you know mine. Tomorrow, we begin together the construction of a city."[4]

Since the 90s, his work focused on the theme of reconstruction, influenced by the historical events of that period: the demolition of the Berlin Wall of 1989 and the war in Yugoslavia of 1991 and the consequences of the US embargo by Cuba.

The majority of his works explore the design of systems in crisis: the existing destroyed construction confronted by the new projects, his drawings are politically provocations and different visions of a possible reality.

Proposing an unprecedented vision of the reconstruction project, Lebbeus Woods offered an alternative solution to the faithful reconstruction, desired by the population who wants to start living by cancelling the signs of war.

He proposed to rebuild a better world through new projects and urban spaces to not forget the drama of the war conflict.

In his "War and Architecture" pamphlet, dedicated to the citizens of Sarajevo, he proposed to fill the empty spaces and to construct in the cracks destroyed buildings with new modern signs different from the style and materials of the existing building.

[4] From Lebbeus Woods, War and Architecture, Princeton Architectural Press, 1993

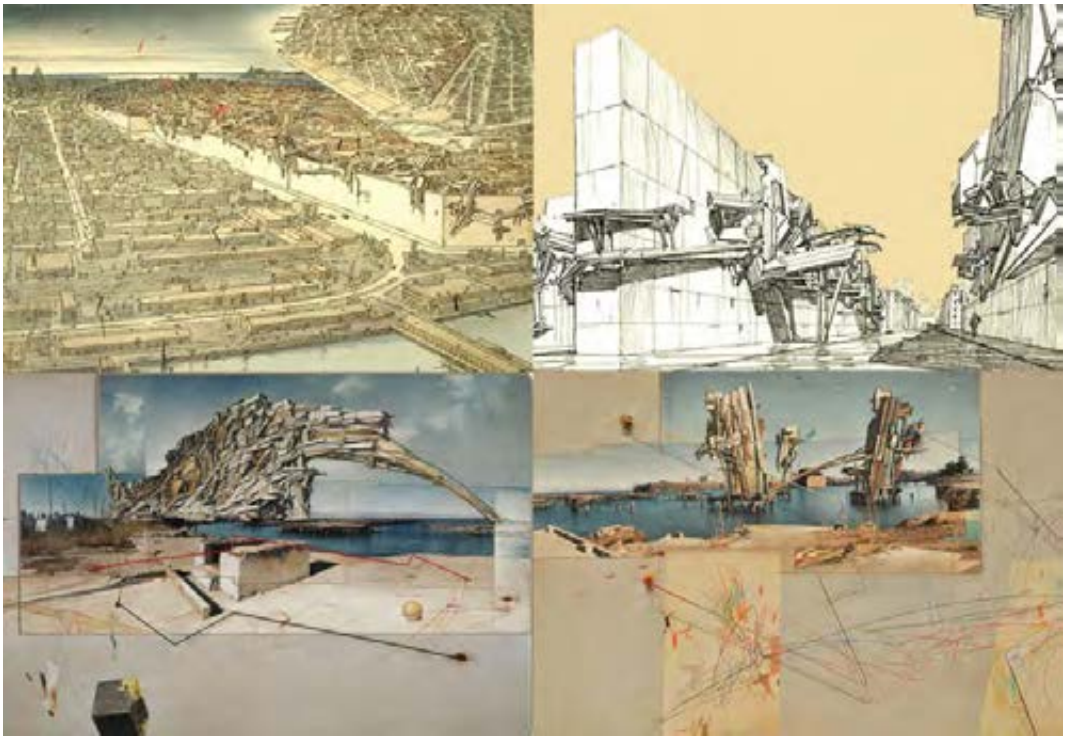


Fig.5 L. Woods: Radical reconstruction: Havana (1994) and The San Francisco Project (1995)

His drawings depict the cities with the devastation of war clearly visible and define his interventions of radical reconstruction as injections, scabs, scars: deliberately choose this language that evokes the human body and its ability to regenerate and the signs that derive as a result of a trauma.

His most famous drawings are collected in the 1997 publication "Radical Reconstruction" where we can find his proposals for Sarajevo after the war, for Havana in the grips of the ongoing trade embargo, and for San Francisco after the Loma Prieta earthquake.

"The projects presented here for Sarajevo, Havana and San Francisco propose various forms of peripheries and edges commonly referred to as "walls"…….. The walls of these projects do not simply separate other spaces but define spaces within themselves, spaces "between", zones where the norms and conventions of living on either side of the wall's divide do not or, more likely, cannot apply".[5] The series The San Francisco project, on the other hand, explores the possibilities of architecture to establish creative relationships with the effects of the earthquake and, in general, with the effects of natural disasters. These drawings invite us to reflect on alternative solutions to classical orthogonal systems structures (x, y, z) in seismic zones to create buildings that can withstand shocks in a better way.

Although his preference was hand drawing, for the San Francisco series he used the collage method, inserting his sketches into graphic compositions made with photographs of the site.

[5] From Lebbeus Woods Radical Reconstrustruction

The Electrical Management Building project

Fig.6 Electrical Management Building in Sarajevo: before the war (Ivan Straus 1978), the building destroyed by the war (1993), Lebbeus Woods project (1984), Computer rendering by Carlos Fueyo (2004)

"My answer was that architecture, as a social and primarily constructive act, could heal the wounds, by creating entirely new types of space in the city. These would be what I had called 'free spaces,' spaces without predetermined programs of use, but whose strong forms demanded the invention of new programs corresponding to the new, post-war conditions. I had hypothesized that "90% of the damaged buildings would be restored to their normal pre-war forms and uses, as most people want to return to their old ways of living….but 10% should be free spaces, for those who did not want to go back, but forward." The free spaces would be the crucibles for the creation of new thinking and social-political forms, small and large. I believed then–and still do–that the cities and their people who have suffered the most difficult transitions in the contemporary world, in Sarajevo and elsewhere, have something important to teach us, who live comfortably in the illusion that we are immune to the demands radical changes of many kinds will impose on us, too."[6]

The project for the reconstruction of the Electronic Management Building is an example of the application of this theory: most of the building would have been restored to accommodate offices again, however, the destroyed part would have been destined to free space to reinvent new ways of living the space paving the way to the future.

[6] From Lebbeus Woods blog: post The reality of theory 6 February 2008

The Light Pavillon

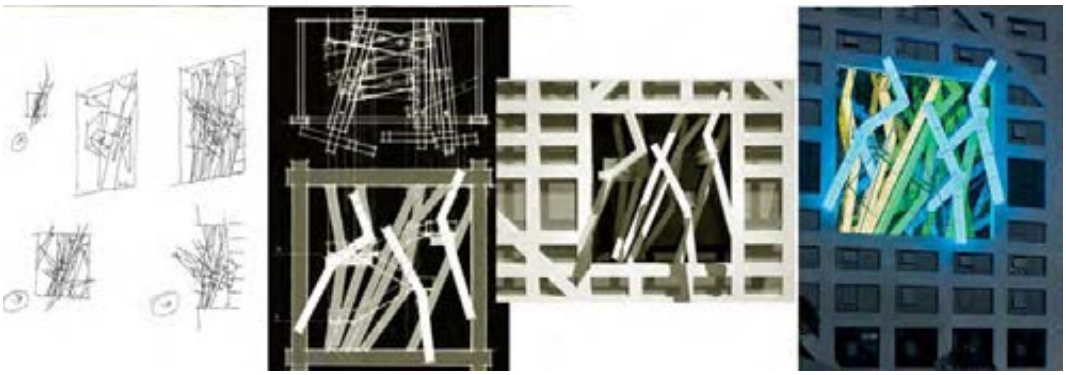


Fig.7 L. Woods: Drawings and Light Pavillon, Chengdu, China (2011)

"The Light Pavilion is designed to be an experimental space, that is, one that gives us the opportunity to experience a type of space we haven't experienced before."[7]

Lebbeus Woods was able to realize, together with Christoph Kumpusch, a lighting installation commissioned by Steven Holl for his Ruffle City Complex project in Chengdu, China.

It is the first true designed and built architectural work by Lebbeus Woods: one of the world's most famous and influential architects had to wait until the age of 70 to see his first completed building. This fact, however, underlines and confirms the low interest that Woods had for the realization of the works with respect to the development of projects and theoretical ideas.

In 2007 the architect Steven Holl, a close friend of Lebbeus Woods, hired him to design a pavilion for a residential complex he designed.

The result of this collaboration was a towering composition of bridges and bright ramps that intersect, the project is certainly close to the thought of Lebbeus Woods and its cone of true architecture: a dense space inspired by the work of Giovanni Battista Piranesi in which people can really climb and get lost to observe the urban expansion of the new China.

"I'm not interested in living in a fantasy world. All my work is still meant to evoke real architectural spaces. But what interests me is what the world would be like if we were free of conventional limits. Maybe I can show what could happen if we lived by a different set of rules."[8]

"Lebbeus's Pavilion, constructed of huge beams of light, can be entered at several levels. Walking on sheets of glass suspended by steel rods, the view is infinitely multiplied via the polished stainless steel lining the four-storey gap in the building it occupies. It is a brilliant and engaging architecture. An experience there, especially at night, seems to dissolve the view of the city beyond. This work merges art and architecture as they have merged in the past and are merging in the future.

[7] From Lebbeus Woods blog: post A Space of Light 15 February 2011

[8] The New York Times 24 Augost 2008: An Architect Unshackled by Limits of the Real World

Next week, I will travel to Chengdu, walk into his Light Pavilion, stand suspended on steel rods and imagine Lebbeus's tomb has been launched – on a beam of light."[9]
This work, which concludes his long career as a theorist and designer, manages to synthesize and realize his entire thought in a single architectural gesture.

Conclusion

Fig.8 Lebbeus Woods "Havana, radically reconstructed", 1994, and Zaha Hadid The Port House, Anversa, 2009; Lebbeus Woods "Sarajevo",1993, and Daniel Libeskind Addition to the Royal Ontario Museum Toronto, 2007

"I want to provoke questions. I've never felt that I provide a definitive, conclusive answer to anything."[10]
Anti-ideological, visionary, fearless in using words far from the architectural vocabulary and evoking unpleasant images, for this and not only Lebbeus Woods was an architect able to influence architects, students and thinkers.
His ample theoretical production has always been accompanied by a graphic representation, expression and means to develop his thought: a skilled user of perspective, master of the technique of hatching and pencil, his drawings have been able to realize on paper his idea of a different world developed through the sign and the stroke.
The strangeness, the paradox that is opposed to the familiarity and daily life in the designs of Lebbeus Woods voluntarily want to provoke profound reflections on architecture and its ability to transform violence into new ways of memories of the conflict.

[9] Steven Holl, The guardin, 31 Octuber 2012
[10] Lebbeus Woods interview for Carnegie 2004

The work of Lebbeus Woods is opposed to a hyper-visual, hyper-connected and instantaneous contemporary world: the honesty of his hand, the time needed to make a work, the tactility of the pages seem to be a superficial vision, very far from the current architecture.
In reality, his utopian visions are still today a source of inspiration for many architects.
Zaha Hadid, Peter Eisemann, Steven Hall, to name but a few, have had contacts with Lebbeus Woods and were inspired by his drawings.
"I hope that what I draw reflects my love of building and my love of actually making architecture, I think that these things could be built. Of course, some of them are probably technologically not possible at the present moment, maybe never. But by and large, I would like them to be built, and to see what we can do with them, to see what they would mean to us"[11]
Zaha Hadid, for example, has been able to transform its utopian visions of the world into reality even with the use of sophisticated digital design software and thanks to new construction technologies.
In the short words of Peter Eisemann following the death in 2012 of Lebbeus Woods, we find the most moving and close description of the architect: "Lebbeus was one of the last of a generation of visionaries who dedicated a life in architecture to drawing an alternative world, one important for the present and the future. His singular mind and hand will be deeply missed."[12]

References

Neil Spiller, *Celebrating the marvellous: Surrealism in Architecture*, Architectural Design, Vol. 88, 2018
Aitor Goitia Cruz, *Los dibujos del arquitecto*, CEU Ediciones, Madrid, 2018
Clare Jacobson, *Slow Manifesto: Lebbeus Woods Blog*, Princeton Architectural Press, 2015
J. Becker, J. Dunlop Fletcher, *Lebbeus Woods Architect*, The drawing centre, New York, 2014
Lebbeus Woods, *OneFiveFour*, Princeton Architectural Press, 2011
Lebbeus Woods, *The Storm and the Fall*, Princeton Architectural Press, 2004
Lebbeus Woods, *Radical Reconstruction*, Princeton Architectural Press, 2001
Lebbeus Woods, *War and Architecture*, Princeton Architectural Press, 1993
Lebbeus Woods, *The New City*, Touchstone Book, 1992

[11] From Lebbeus Woods interwiew for Skala Magazine 1988
[12] Peter Eisemann, The guardin, 31 Octuber 2012

User experience – design interface – new learning tools: evolving and involving the traditional training thanks to design thinking

Silvia Bernardini
Umanìa Srl
email: silvia.bernardini@umania.it
Angelo Rondi
Umanìa Srl

Abstract

As a matter of fact, the "Design Thinking" in its main meaning is considered one of the most powerful tool for modern problem solving, thanks to the ability developed of deconstruct problems to warrant various possibilities and solutions. Moreover, industrial design gives impulse to new study of the interface as possibility to create better instrument of interaction Human/Machine, and the E-learning methodologies

search a privileged channel with students, scholars and all people who want to learn through their computers instead of going into equipped classrooms. Actually but the traditional training activities seem to have no interests in developing new methodologies (based not on different instrument but on different approaches) nor in using new digital instruments to tempt people in learning in a different way. So can we just imagine how could be interesting "stressing" the architecture of the information of James Garrett in the architectural designing of new methodological

but usable project, under both singular and a collective co-operating point of view? Are the "social interfaces" good enoguh to allow a quick but solid learning? From E-learning projects to global S-colearning projects: vision of possible interdisciplinary training of the future.

Abstract

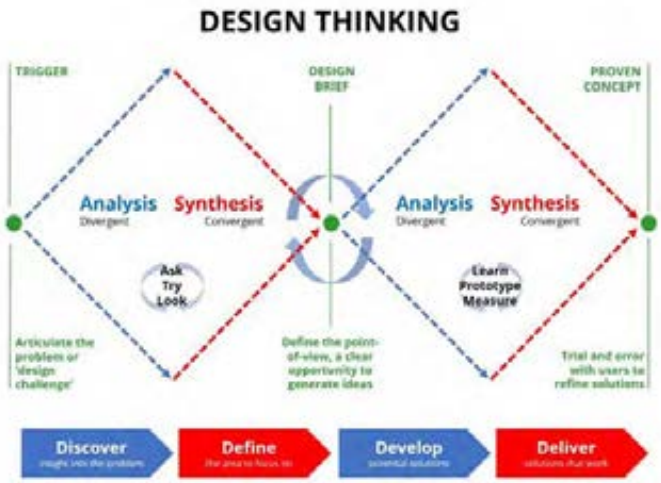
Il design thinking considerato nel suo significato principale è uno dei più potenti strumenti moderni di problem solving, grazie all'abilità che sviluppa di destrutturare i problemi per garantire il più alto e vario numero di possibili soluzioni. Oltre a ciò, il design industriale ci fornisce indicazioni per lo studio di nuove interfacce uomo-macchina che diano la possibilità di creare interazioni sempre migliori, e le piattaforme e-learning ugualmente cercano un canale privilegiato con studenti e scolari, oltre che discenti in genere che vogliano studiare attraverso lo schermo di un computer anziché recarsi di persona in classi attrezzate.

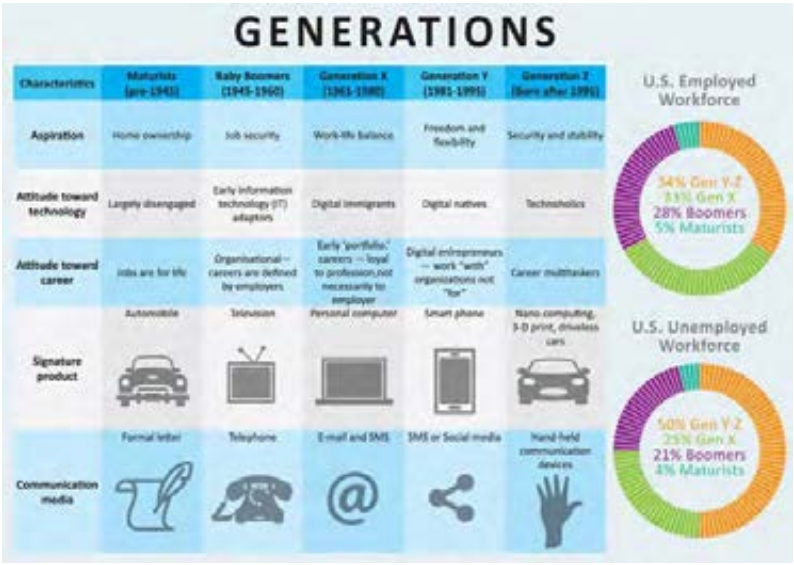
Tuttavia ci sono alcune aree legate alla formazione tradizionale che sembrano da una parte non interessate a sviluppare nuove metodologie (non basate semplicemente su differenti strumenti di erogazione, ma riviste attraverso i diversi approcci all'utente) e dall'altra non interessate ai nuovi strumenti digitali che possano agevolare ed invogliare allo studio in modi diversi.
Possiamo solo immaginare come potrebbe essere interessante quindi "stressare" il concetto di architettura dell'informazione di James Garrett nel design industriale nella prospettiva di progetti di usabilità metodologica, sia da un punto di vista dell'apprendimento individuale che collettivo: ad esempio sono le interfacce "social" abbastanza evolute per garantire un apprendimento veloce e duraturo? Dai progetti di E-learning ai progetto di S- Colearning: visioni di una possibile realtà formativa interdisciplinare futuribile.

Introduction

As a matter of fact, the "Design Thinking" in its main meaning is considered one of the most powerful tool for modern problem solving, thanks to the ability developed of deconstruct problems to warrant various possibilities and solutions. Moreover, industrial design gives impulse to new study of the interface as possibility to create better instrument of interaction Human/Machine, and the E-learning methodologies search a privileged channel with students, scholars and all people who want to learn through their computers instead of going into equipped classrooms. Actually but the traditional training activities seem to have no interests in developing new methodologies (based not on different instrument but on different approaches) nor in using new digital instruments to tempt people in learning in a different way.
So can we just imagine how could be interesting "stressing" the architecture of the information of Jesse James Garrett in the architectural designing of new methodological but usable project, under both singular and a collective co-operating point of view? Are the "social interfaces" good enough to allow a quick but solid learning? From E-learning projects to global S-colearning projects: vision of possible interdisciplinary training of the future. What is really an interface? In this time is really difficult to give a definition to something that is so common in use, so simple to find everywhere, so complex to define.
Actually an interface is "a point where two systems, subjects, organizations, etc. meet and interact". The interface is but also the result of disruptive researches that put on the table lots of different information that lead to innovative solutions.
The "Design Thinking[1]" re-iterates lots of information creating special contexts full of different possibilities, and the developing fase impose choosing activities to deliver correct output. But in this special anthropological and sociological moment, if you think to the different generations living nowadays, you can also realize the sociological difficulties to give the right definition to the concept of "point where meeting and interacting" related to "concrete output[2]".

[1] Design thinking refers to creative strategies designers use during the process of designing.[1] It has also been developed as an approach to resolve issues outside of professional design practice, such as in business and social contexts (Wikipedia)
[2]Image from: www.generionty.ie

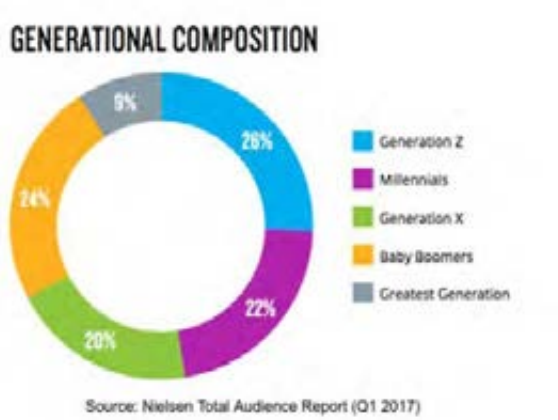


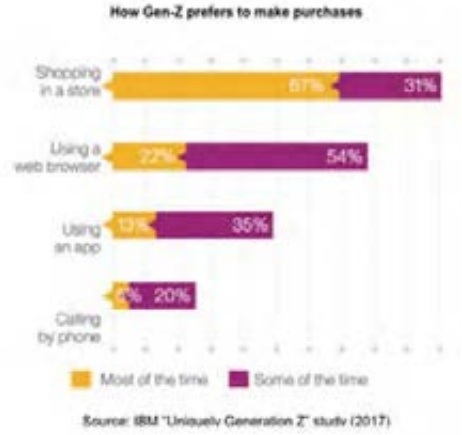


If you think in the logic of this scenario, you can understand why design correctly an interface cannot be done without a correct analysis of the "user experience".Of course, marketing activities became pioneer in trying to understand the mechanism that involves a deep change in the customer habits: starting from the main shopping activity, marketing strategists individualized first the potential use of special digital devices to allow customer to buy on-line[3].

Unlikely, the same act was not sponsored nor considered enough interesting by other economical activities, who decide to build virtual space to tempt people to learn more and better thanks to digital devices.

[3] Nielsen Tool Audience Report (Q1 2017) and Ibm Generation Z Study (2017)





But if there's more than one generation who decides to use a smartphone or pc to simplify their life, why don't considered also the approach to culture and to learning system as a possibility to be widespread to the population low cost with the right instruments?

The Distance learning experience was born under the necessity to build not a new way of learning, but a new way to distribute operas or materials without printing paper. The real revolution of such APP as Kindle or CALIBRE[4], effectively is the answer not to a new way of reading, but to the possibility to have en entire library in two hectograms of weight.

[4] The Amazon Kindle is a series of e-readers designed and marketed by Amazon; Calibre (stylised calibre) is a cross-platform open-source suite of e-book software

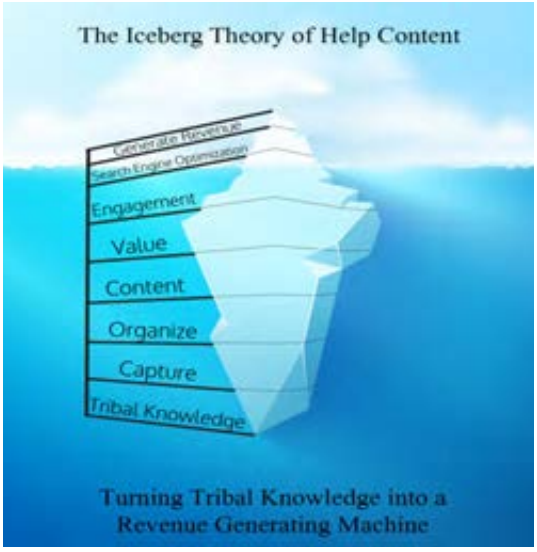
That's no innovation, that's cost saving: the logic is of course provide a system that gives no problems to eyes and a saving money in buying books, but the device itself reproduces the experience of a real reading, allowing the person to feel the same perception for the same activity. So, where's the innovation?

Thinking to a different kind of interface for reading, is not thinking to the expectation of a category target who likes reading and desire to reproduce the same activity with a modern book-shape device: the innovation is finding a special interface that allow people learning without reading, with a device that probably even doesn't seem a book, nor a space of learning.

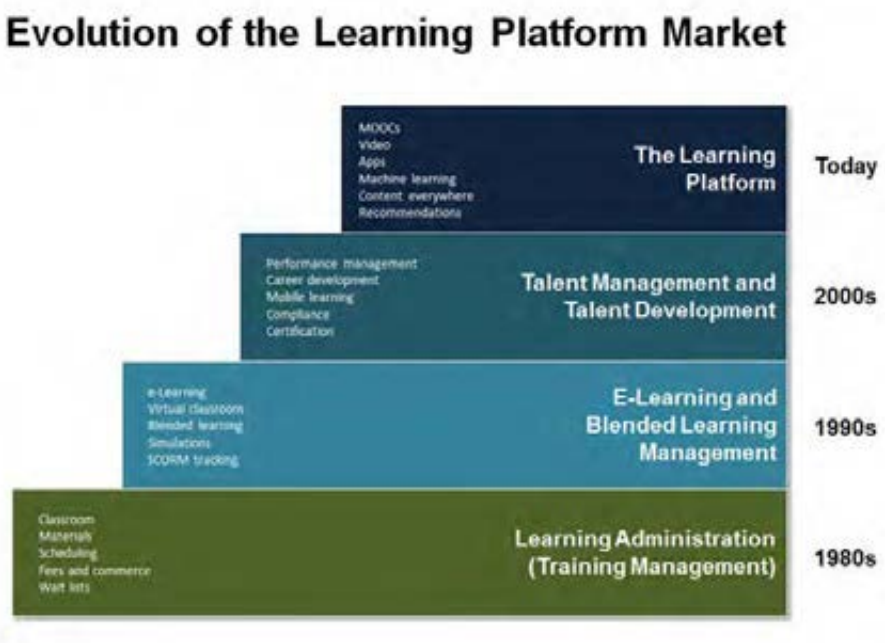
Raised in the "always on" world of interactive media, the Internet, and digital messaging technologies, today's student has different expectations and learning styles than previous generations. This net-centric generation values their ability to use the Web to create a self-paced, customized, on-demand learning path that includes multiple forms of interactive, social, and self-publishing media tools.

But how the real player of this digital revolution are listening to these necessities in building their e-learning interface platforms? The sensation is that is very difficult to improve learning system, mainly because the user interface is not considered the tip of the iceberg of a very deep necessities, but mainly a graphical and stylist activity, which is more appealing if more identified under a big brand[5].

Marketing strategists analyzed the 10 best tecnological tendencies that are influencing the different industries: about the training there are different but strong opinion on the necessity to create collaboration, interaction, self direction, authomony and relevance, all necessities that starts from the users, and not from the designers. Moreover, the trend in act makes the evidence of five different learning possibilities, and particularly; microlearning, gamification, social learning, adaptive learning and immersive learning.



[5] Using the Hemingway's Iceberg Theory for presentation content can help you get your message across to every audience

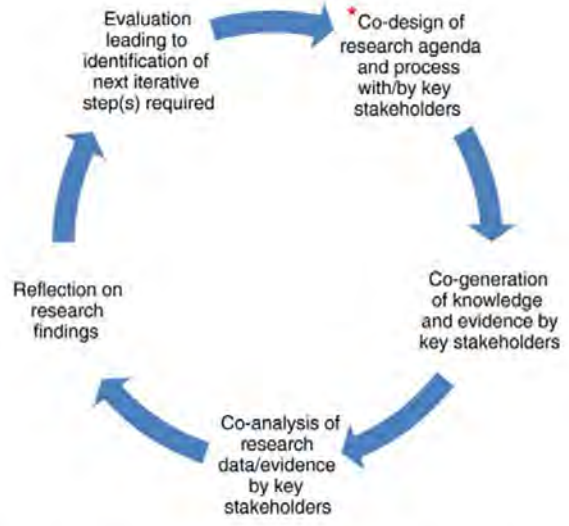


But building a real good and interactive interface is not a graphic work: as J.J. Garrett teaches, there are some steps that cannot be avoid in doing a good job. And a good Job is not a job in its time, but its a good job in the perspective of continuous market and social change. What we see is the end of the cognitive and experiential process. So how can we match the new experimental theory of learning with the correct theory of interface realization?

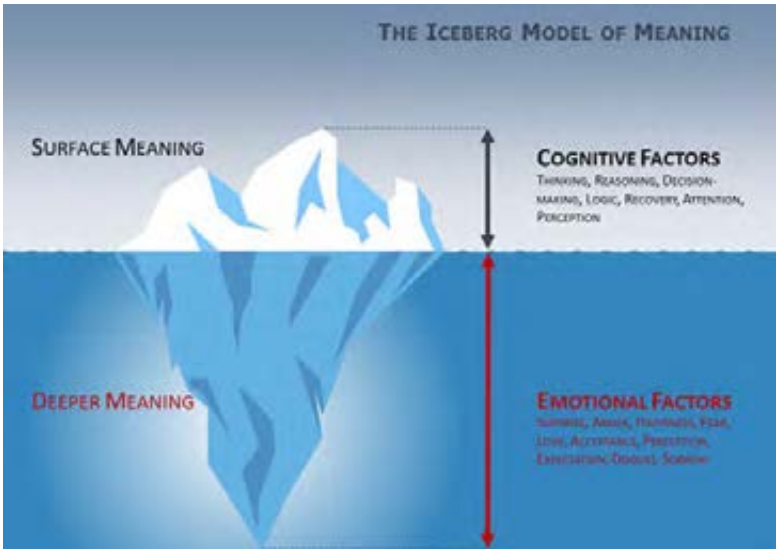
The main interface of each system has given the perception of the wonderful world inside only if its based on the real users needs: differently it's only style, but style doesn't help learning better and its normally not so intuitive. So the VISUAL DESIGN that normally is judged first in each works is not efficient in allow people to interact better with the device (so how can it be the better frame to help people learning?)

Under the surface but ther's a skeleton which shall engage the person and organize the architecture of the information the user can reach. If you already decide the graphic and the style, you cannot imagine to produce something innovative, but you're driven just like in an a funnel to a path that show only bond and limitation in the visual realization, with no possibility to jump out and improve the navigation[6].

Down the funnel to the structure, the necessity is to compose all the action which will allow the person to interact with the different functions: the more will be easy and intuitive, the more will be appealing. But what if the style and the architecture of the information limited the possibility of the device to share information or to allow different activities? What if I cant use the contemporary option to catch more information to let my knowledge grow up? And what if in learning the limitation of the model I decide that the virtual space where I should learn, is not so interesting for my learning activities. If the scope is to give the user all the possibility to learn thanks to all the possible devices and in a very innovative way, the "learning space" cannot be limited. But if you don't decide first the scope, you easily create forms and limited rooms (such as the old classrooms) in which replicate the old lesson, thanks to old papers and materials to be learned in an old way, and no skype or hangout will give the right perception of innovative way of learning, as they are simply method to communicate under this point of view. So what is the real differences between a valid innovative interface, and an old one?



[6] Jesse James Garrett gives readers the big picture of Web user experience development, from strategy and requirements to information architecture and visual design. (www.jjg.net)



The strategy: the real design activity that starts from the users need, the possibility of real technological and digital interaction, the learning needing activity, and the possibility to integrate in an harmonic way all the interdisciplinary competences that together give a complex but reach panel of information that can make the difference in all kind of interfaces, both for learning, or for teaching. Strategy implies the necessity to know, observe and research to have data both on social trend directions and users mental model. Starting from the strategy means build a solid and durable base, able to enrich the users, and to be flexible to adapt each time to new exigencies that can be foreseen or easily discovered while raising to the the surface.

Fig.7 McIntosh Revolution in 20 Years

Starting from the strategy it's easier to underline all the scope the interface can reach: the aim of the users (both student and teachers, who can interact teaching and learning by doing, as writing instead of reading, or listening instead of talking, or building moment of informal learning thanks to video game or tutorial).

After decided the real scope we want to reach, it's easier to decide the structure (one or more): a old type (for baby boomers or smartphone addicted), a new one for the millennials generation with different kind of IOT application. To reach the scope is naturally necessary to decide the information architecture: the more complexity you need, the more activities you will structure, over a solid and defined base, which is not limited, but which can be developed in a multiple possibilities of different projects.

The structure will underline the skeleton, which will of course prioritize the main points to help teachers to teach (from a base to a deep knowledge) and students to navigate and enlarge their knowledge thanks to different approaches and means to the main hints.

The surface, finally: graphic and style, more childish or elder, just pressing the button that drives the users to its comfortable virtual space to teach and learn.

Finally the building of a new sustainable "eco-learning-system" is the only possibility to lead all the necessity in a new "space" who allows in an ergonomic way to manage all the different needs both of teachers and learners, and both of designers and IT researchers.

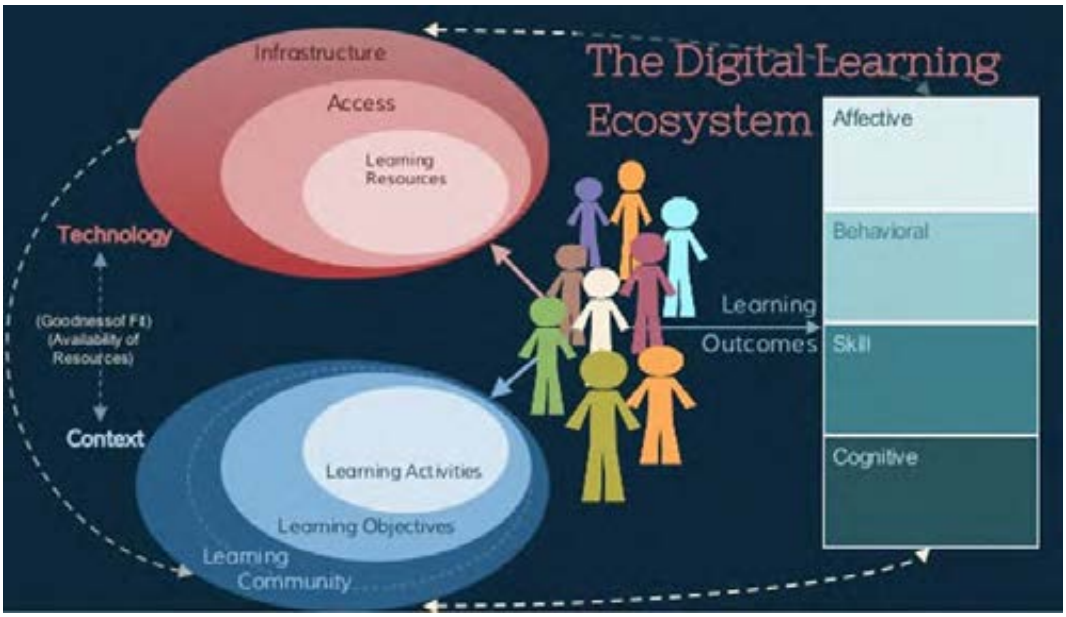


Fig. 8 https://www.slideshare.net/molly_bullock?utm_campaign=profiletracking&utm_medium=sssite&utm_source=ssslideview

F.I.T. - Forma Informa Trasforma – (Shape Inform and Trans-form) A new Method (T.Game) to learn and live emotions and relation-ships in a given space

Alessandro Bertirotti
Michele Massimo Casula
Department Architecture and Design DAD (University of the Study of Genoa)
email: info@bertirotti.com

Abstract

Scientific international studies made in the last years in fundamental branches of knowledge, such as pedagogy, psychology, anthropology, and neuroscience, confirm the decisive role of playing a game in individual cognitive evolution. On this bases, the format T. Game, Total Game, finds its birth. It's been created to present in fifty minutes of a playful educational activity, relational and emotional dynamics we encounter during our lives. A gameinside which we learn to become acting and acted individuals, according to the perspective of social cogni-tive psychology too. In this format, music and movement, mind and body, have the main role, according to a cognitive view, as they stimulate and motivate participants to become aware of the emotions role in human relationships, both in our private and professional life. The format is an example of real Design Thinking, and it's been offered in different educational and pro-fessional situations. An emotions map has been given to people taking part in the event. They had to find out, inside the map their own existential situation, according to four life sceneries (work, love, home, and relationships). We also have been able to explore reactions of partici-pants, through two research ranges done before experiencing the format and six months after it. Interesting data emerged to demonstrate the scientific validity of the format, and the role that art and music have in building winning cognitive procedures.

Abstract

Gli studi scientifici internazionali, condotti negli ultimi anni in fondamentali branche del sapere, come la pedagogia, la psicologia, l'antropologia e le neuroscienze, confermano il ruolo determinante del gioco nell'evoluzione cognitiva individuale. Proprio sulla base di questi presupposti, nasce il format T.Game, Total Game, ideato per simulare, in cinquanta minuti di attività ludico-formativa, le dinamiche relazionali ed emozionali che si verificano nel corso della vita.

Un gioco all'interno del quale si impara a diventare soggetti agenti ed agiti, anche secondo la prospettiva della psicologia sociale cognitiva.
In questo format, la musica e il movimento, dunque mente e corpo, acquistano un ruolo predominante in ottica cognitiva, perché stimolano e motivano i partecipanti nella presa di coscienza del ruolo delle emozioni nelle relazioni umane, sia nella vita privata che professionale.
Il format, un vero e proprio esempio di Design Thinking, è stato proposto in vari contesti professionali e formativi. Ai partecipanti è stata fornita una mappa delle emozioni (spirale delle emozioni), all'interno della quale riconoscere la propria situazione esistenziale, in riferimento a quattro scenari vitali (lavoro, amore, casa e relazioni). Abbiamo inoltre effettuato un'indagine esplorativa sui partecipanti, attraverso due scale di ricerca, proposte prima dell'esperienza e riproposte dopo sei mesi da essa. Emergono dati interessanti, che dimostrano la validità scientifica del format, e il ruolo che l'arte e la musica svolgono nella formazione di processi cognitivi vincenti.

Introduction

by Michele Massimo Casula

In our brain, there are whole populations of neurons which are organized in interconnected structures. In their work they are able to represent our life experiences in very different ways, that's to say as images, sounds, words, and sensations, concrete ideas or abstract perceptions. How their function organizes is a mystery in itself, as we still do not know how it happens.We know inter-neural communications methods, which are bioelectrical and neuro-chemical, but we don't know how these processes lead to representations, to real mind designs. Indeed, the ways we have just mentioned are part of the great type calledperception, because even if cognitive processes start from our senses, which record internal and external impulses, only the following mental processing transforms them in something detected, in other words in a mental process. The final result can be considered as a more refined and biologically deter-mined expression of Design Thinking.
The way we process data from reality is what we commonly define as personal experience of reality, which however is a personal and widely sharing way.
Public dimension is such because human beings have the same biology (senses, brain and its functioning), but private dimension is the way our mind individually processes received data. And it is a necessary processing.
Otherwise, we wouldn't be able to manage our past through our memories or organize our fu-ture either. Human communication organizes itself between these two dimensions, inside them, every representation has a specific meaning. As we know, the brain develops information and, according to used linguistic codes, each per-son gets in tune with other people. It is a tune we can define as relational-affective. 85% of brain functioning is designated to receive and transmit emotions and to our ability to react. Only 15% of our brain is used for what we call critical, rational, and abstract thinking, which is the job of our cerebral cortex. This clear inequality has an important role, both individually and phylogenetically. It clearly settles the priorities evolution itself considers necessary for an appropriate mind functioning. We've been born to gather and share the most possible emotions. We are biologically programmed to that. And different structures of linguistic codes help us in our task.

"The ways two people are sharing their representational worlds, are the basis of their ability of emotional fine-tuning, and of the development of their connection with other people" (D. Siegel, 2001:160).
For that reason, or better for that biological command, a synchronicity is created between what we think we are and what we are able to express through the codes that better represent us. The result is an unconditional bond to our way to express as if it were the only one able to tell the world what we are. S. Pinker reminds us that "(…) a mental symbol (…) holds information and it creates an effect" (S. Pinker, 1977:57). The meaning is that reality, as we experience it, is alike as we tell it. So it doesn't exist an objective reality. It normally exists the reality we tell, that is to say, the reality we mentally represent as symbolic icons (design thinking) or as a lan-guage, and it has inside itself only the information that every single person wants to express about that specific reality. "(…) We are able to learn, to observe similarities and differences, to generalize, to classify, to link, to analyze, and to create new connections inside the tangled pat-terns of excitement in our brains" (D. Siegel, op. cit.:161). In otherwords, these neuronal excitation patterns (and as pattern we mean an organized neural time/space structure), are symbols or codes, that's to say information, that in our brain are caus-ing some mental events.
When external or internal reality data reach these neuronal patterns, a scattered excitement happens and it starts the mental event. Symbols in the code create new ones as mentalrepresentation as if mind organizes symbols of reality together with more symbols of which it is the matrix itself. This is usually defined as a cognitive process, and it is a real design thinking exercise, that means a computational sequence through which we learn to interact with reality. Design, like any other communicational code, proceeds according to equal neuronal processes. In essence, a set of emotional sensations and stimulations creates a corresponding excitation of the neuronal pattern assigned to decode it, so giving the opportunity to the whole mind to have an access to these data creating an emotional-affective sharing. T.Game has been studied to get to know our emotions. The scientific basis of this format is in the pedagogical role of playing. Through it, we easily reach behavioralinformation, and we learn personal attitudes role. On this basis, T.Game is a concrete application of interactive de-sign thinking, where communication and psycho-physicalaspects oh behavior transform into a practical action. We've seen that mind is fundamentally emotional, even if its operation mode is rational too. Emotional mind, compared to the rational mind, is quicker in executing, as it is immediately aimed to action.
Emotions task is to move the "excited persons" into actionwhile preparing them to properly react to incitements coming from external and internal environment. This the reason why emotions produce possible future choices (V. Pasca, 2010). The upcoming reaction between emotions and perception of future activates our memorybecause our reaction in perspective dependson our previous experiences, and among them, we especiallyremember the ones that touched us.
Emotions are not something metaphysical (theoretical), as they help us to run our relationship with the environment, even enduring its effects. They are "dynamic phenomena creating inside brain processes of evaluation, meaning, situations, and events.
For this particular reasons they are affected by social and cultural influences" (A. Bertirotti, 2018:240). Emotions are dynamic systems which play an essential role in establishing our existence quali-ty, and so our projects and expectations qualities.

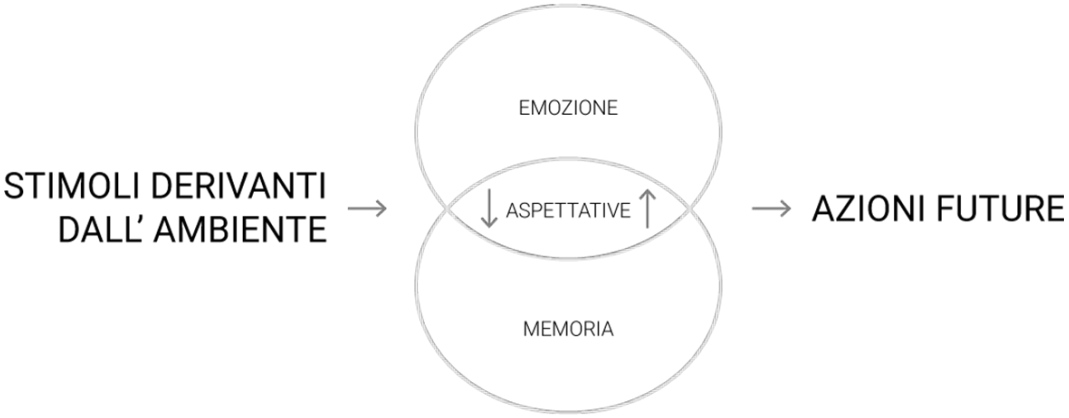


Fig.1 Percorso delle emozioni (designed by Mirko Sostegni)

"Actions identifying our daily life appears according to a three-step sequence. First step: in our brain the goals towards which we can direct our actions arise.
Second step, we act and build our meanings after having sensory recorded the outcome of our actions.Finally in the third step learning topologically modifies neuronal networks programming in the brain.
The set of these three stages goes with several dynamic processes, which prepare the bodyfor action. And emotions are what we feel about preparation itself.
All intentional behaviors are emotional. They born from neural activity self-organization, thanks to the limbic system action, where we can notice amplitude modulation (AM) configura-tions which are emotionally considerable (A. Bertirotti, 2014:223)[1].

Fig.2 Le sei emozioni primarie (Designed by Doris Millia, by A. Bertirotti, 2018

[1] "Topological modification of neuronal networks, which is possible thanks to our brain plasticity, means that neuronal fila-ments (dentrites and axons) undergo to a real modification of their map. For example, let's think to our city printed on a tour-istic map, and let's consider streets like neuron filaments. The point where streets meet at a crossroad is like the cell body of a neuron, from there another street-filament starts. This road network experiences such modifications that individual neurons can create new road networks among them, removing some of them, or finding new little paths as shortcuts, where they can make the biochemical or bioelectrical puls travel. Every time we learn something new, and we want to memorize it for a long time, some topological modifications of the neuronal metwork (streets of our turistic map) happen. It means some real changements of the neuronal places (topos) represented in the map" (A. Bertirotti, 2014:223).

In fact “during our daily life, it happens we find ourself in a mental state where we realize that something meaningful, original and new is going to happen.
It can be something inside our mind, as a feeling pf sadness, as our thoughts are suddenly looking to some happy past situations. Or it can be something external, as rage arising when we see an abuse towards a handicapped person who’s trying to cross the road on the pedestrian crossing. In these cases our mindsets it-self in an alert state, it means it tries to quickly adapt to an unexpected situation, and it prepares to rapidly act according to it. The meaning is that the emotional process prepares our mind and system to action, according to an immediate evaluation of the stimulus, considered “good” or “bad”. There is a considerable evolutionary advantage in this: we learn to quickly evaluate posi-tive or negative events, which are present in our environment, acting accordingly to the type “attack” or “escape”.
Evaluation process activates on the basis of many factors. Some of them are external others are internal. Some of them are: a) previous experiences connected to the stimulus that raises, in-cluding emotional and representational elements which have been retrieved from long-term memory; b) internal emotional states and social environment where the stimulus arises; c) inten-sity and the high or low familiarity level of the stimulus; d) the set of expectations the person has at the right moment, which relate to the presence of the stimulus. In some situations, there is a discrepancy between the stimulus, which activates an emotional arousal, and the person expectations in that period of his/her life. For example, when studentshave to take an exam they considerfundamental according to their desire of beinggraduatedbecause without that particular exam graduation can’t be possible, tension that creates between the desire to pass the exam and the thought of graduation can be binding. In other words, if those studentsare too much focused on their desire of being graduat-ed,so developing negative emotions about the exam theyhave to prepare, or they think that the exam itself is too difficult to pass according to graduation, the emotional tension that creates could disadvantage them.
It would be better that our students think to pass their exam trying to find in it the opportunity to increase theirself-confidence, whether or not the necessity to graduate later. This technique of giving to every achievement and attainment its emotional value, not regarding the path of which this achievement is part of, it’s a fundamental one to keep a positive self-confidence. Thinking about ourselves with a positive attitude puts our mind in the activation of positive emotions, even when in life is inevitably we have to hold onto frustrations.” (A. Bertirotti, 2018:241-243).
T.Game exactly inserts itself in this picture. It is a 50 minutes simulation of events, situations, and emotions of affective relational dynamics that can be developed in families, at school,andin the working field. Through the application of F.I.T. Method (Forma, Informa, Trasforma – Shape Inform and Transform), we are able to discover how our mind handles emotions (Forma - Shape), how this handling of emotions affects our behaviour (Informa - Inform), and finally how to memorize al-ternative ways of using emotions to keep a good relationship with the environment and our-selves (Trasforma – Transform). Moreover using the emotional spiral is quite significant ac-cording to Design thinking, as it is like an emotional autobiographical narration. A narration means a settingwhich is a time-space organization, where we can perform interpersonal relationships, based on the handling of our emotions.

All this is possible thanks to the tools we use, to the dynamics which are offered by the leaders of the Game, to the colors in the game, and to the interactive showing of video and music. All these elements are fundamental to the success of T.Game itself.

Methodology

by Alessandro Bertirotti

The data we are presenting is part of a research which is not a statistic, but we mean to explore the subjective validity of F.I.T. Method expressed during T.Game.

Data concern 14 people who took part twice to the playful – educational format in six months distance. Medium average age of the experimental group was 43, and it was composed by 3 males and 11 females. Both of the times the following emotional map was given to attendants. We asked them to mark on the map where they felt they were at that specific time in their life. We also asked them to draw a path they thought they could make from the point of the map towards other points, which expressed as well other subjective situations in which they felt being. This emotional blueprint allowed a first awareness of their emotional state in that period. When the game was finished the attendants were asked to draw a new emotional blueprint, and re-searchers (Alessandro Bertirotti e Michele Massimo Casula), processed the data, then they de-livered their report with a new interpretation about a possible change. After six months we performed the same procedure with the same attendants, to verify and confirm data of the first performance.

Emotions Spiral shows the presence of a wide kind of emotions, behaviors, and functions, which is divided into three big areas:

a) possible situations and our thoughts

b) outcoming behaviors and

c) role of emotions and behaviors

So people must outline, according to their opinion and awareness, the relationship among these three big areas, referring to the following emotions which are all in the Spiral even if with dif-ferent names[2]:

- 6 main emotions:
- Joy, surprise, sadness, rage, disgust, fear.
- Emotions coming from a sensorial experience can be an external or inner one:
- Pain, disgust, horror, pleasure, sorrow
- Emotions bonded to self-evaluation:
- Shame, pride, satisfaction, dissatisfaction, guilt.
- Emotions bonded to our relationship with other people:
- Hate, love, pity, envy, jealousy,
- Emotions to appreciate:
- Humour, appreciation,and admiration.
- Mental features emotions:

[2] Emotions are inserted in a Spiral becouse this drawing better shows the idea of biological and psyco-anthropological functioning of emotions themselves. In other words centifugal force of these dynamic structures (emotions) causes the real behaviour, of human beings both in private and public world. A spi-ral can represent that kind of force.

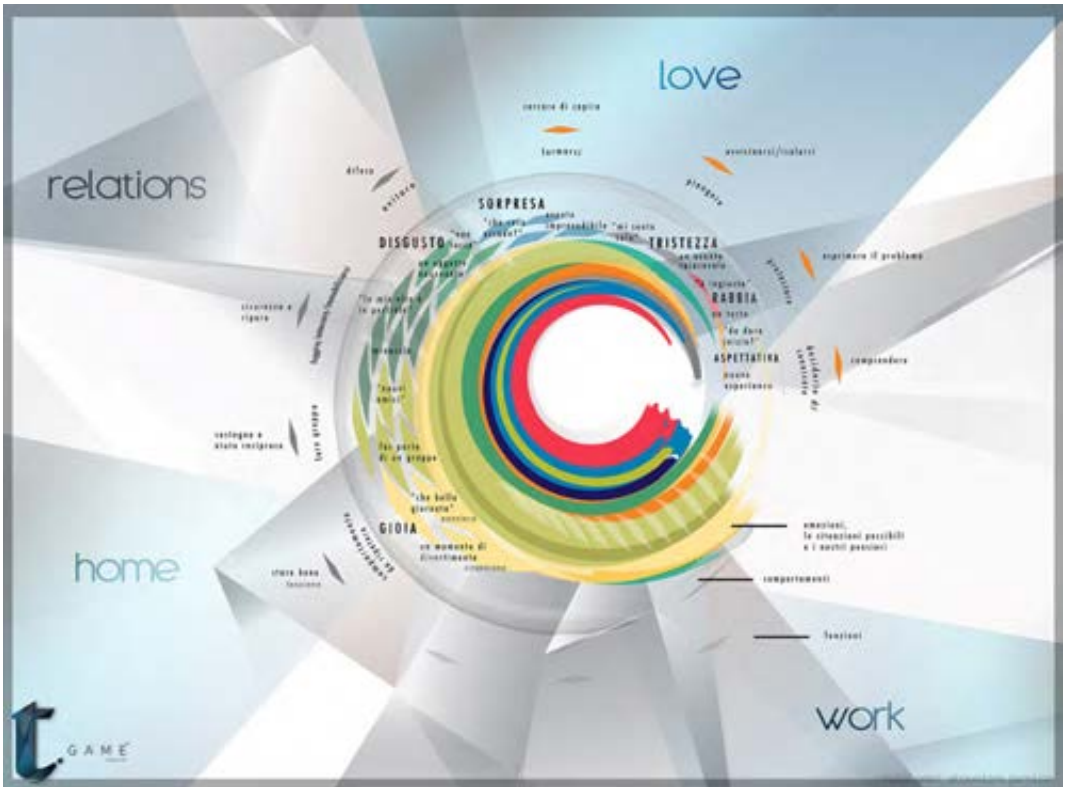


Fig.3 La spirale delle emozioni (Design of Doris Millia, in A. Bertirotti, 2018)

Conclusions

by Alessandro Bertirotti

Before we explain the data coming from our research, we have to make two important observa-tions. First one refers to the research perspective itself. That is to say,this collection of data is not a statistic, but it is an interesting explorative investigation from which we can possibly start towards a new research that could become a statistic. Second observation is about the typology of explanations we are providing here. We use scientifical premises of Anthropology of Mind.

This interpretation, like all humanistic sciences,has to be considered a subjective knowledge, without any aim to be a diagnosis of any kind of existential situation.

Furthermore, data we are presenting, have not been divided by age and sex, as we think that in this particular kind of context it is not necessarilyto separate these two typologies,but, for the research itself identifyingconcise visions of the emotions according to the scenarios in the spi-ral, is more considerable. Finally researching scales given to attendants confirm data of the Emotions Spiral (E. Diener, R.A. Emmons, R.J. Larson, S. Griffin, 1985; S.J. Lopez, C.R. Snyder, J.L. Magyar-Moe, L.M. Edwards, J.T. Pedrotti, K. Janowski, 2004). On this basis, after having shown the spiral to people twice in six months, the following data representing the summary of the two submissions, arise.

Home Scenario. Most of the people taking partin T.Game feels this existential circumstance as positive. It clearly appears that HOME idea still gives a feeling of safeness and haven.

Specifically, we can observe that trust attitude is expressed 4 times; joy attitude 3 times; helping and supporting 2 times; expectation 2 times. So we have positive attitudes for 11 times on 14 people interviewed. Instead, negative attitudes are only 5 and specifically: sadness 2 times, rage 1 time; fear 2 times. Only one person in the whole spiral didn't say anything.

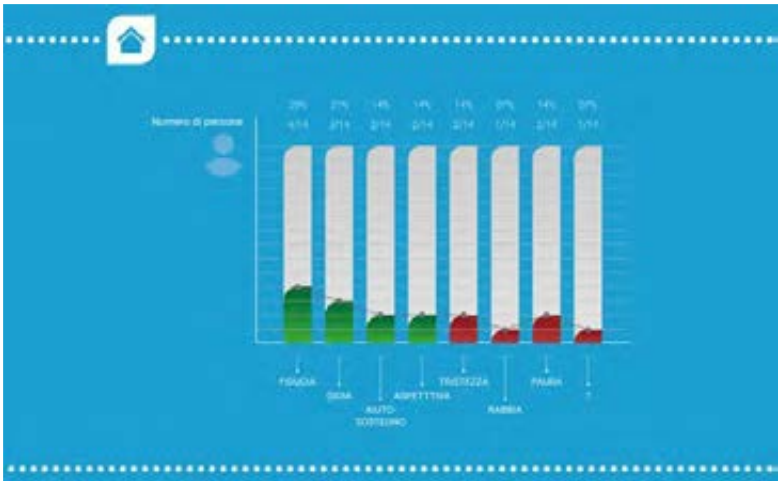


Fig.4 Infographic (Designed by Mirko Sostegni)

Job Scenario. Despite actual difficult time worldwide, we must say that optimism overcomes pessimism. Trusting attitude is more predominant 5 times; then follows joy 4 times, and confi-dent expectation 4 times. An interestingfact is that for all the personsinterviewed job is bond to home, except in one case where job is bond to a general self-confidence feeling. It is interesting to point out that among negative feelings the highest value is fear: 5 votes on 14; then monoto-ny follows with a value of 2, and in the end dissatisfaction, rage, and disgust with a value of 1 each.

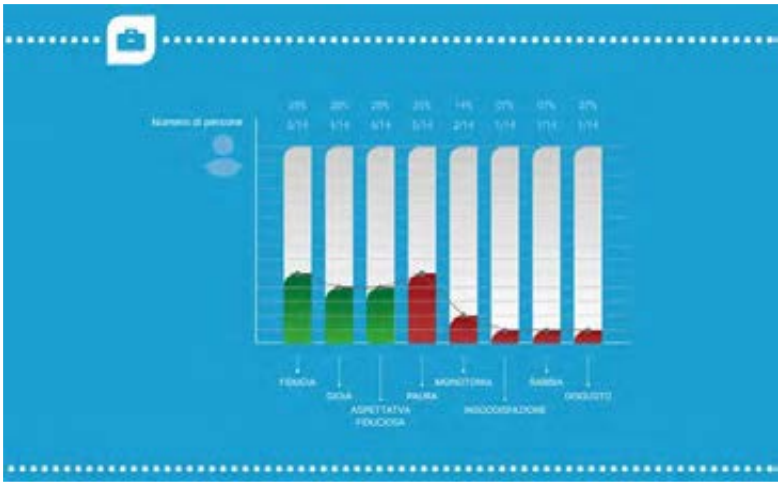


Fig.5 Infographic (Designed by Mirko Sostegni)

Relationship Scenario. We can draw the following conclusions: like the previous oneabout job, we still have more positive than negative aspects. In particular: Joy has 6 preferences; trust 4; surprise 4; expectation 1; research of support and haven in a relationship 1; joy against fear 1. Despite this general positivity, in this scenario we find a lower personal satisfaction level: we have2 references to fear, 2 to rage, 1 to boredom and 1 to disillusion and disappointment, and 1 to disgust.

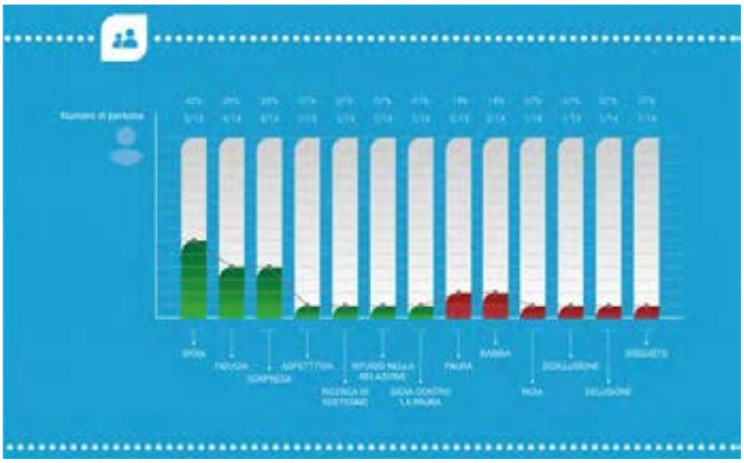


Fig.6 Infographic (Designed by Mirko Sostegni)

Love Scenario. Interesting data is that 10 persons on 14 refer to love idea as follows: Joy 5, trust 4, surprise 1. 10 people on 14 are so optimistic referring to their love scenario. A pessimis-tic attitude raises in 5 persons on 14, balancing one person element who expresses both opti-mism and pessimism. We have in factone person who expresses fear, 2 persons sadness, and 2 rage.

We can conclude from what we received from people who took part in the fundamental scenari-os of T.Game, that a positive and increasing attitude towards life is increasing. We also must note that during the first T.Game experience people showed a positivity towards future, and they were appreciating their present emotional situation as satisfactory in its wholeness.

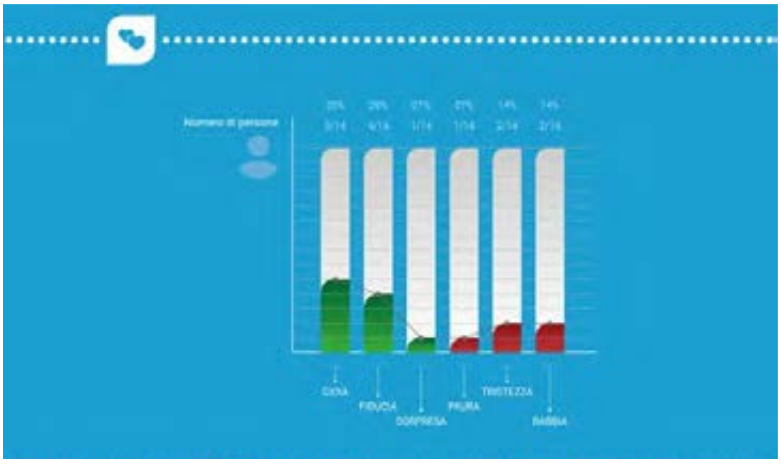


Fig.7 Infographic (Designed by Mirko Sostegni)

Those who during the first T. Game experience had a tendency to a pessimistic evaluation of their own existential experience, had an improvement in the following months, even if it has been moderate.

T.Game experience works on emotions management and it allows an increase of awareness. It becomes so useful in time, especially when it is repeated. Many researchers show the cognitive value of repetition, as thanks to that, some mental attitudes can consolidate in time. We must notice that most of the people involved already had a positive feeling towards life and future. This positive attitude allowed an improvement in the same direction. Something we've found really interesting is the role empathy has inside an effective group communication espe-cially in constructing a positive team feeling. Having the opportunity to increase self-awareness with respect to one's emotions, creates a better management of interpersonal relationships.All participants showed in their emotional spirals, the tendency to consider love as the main re-sponsible for their existential wellness. In other words, according to participants, a satisfactory quality of life depends on a satisfactory affective experience as well. A positive parents' love or partners' love generates an improvement in human relationships, and in our profession too. This is a confirm of latest psycho-anthropological researches about this subject.

We'd love close reminding that "we should once for all understand that fundamental mistake (…) of western science, which has been and keeps being a refined form of power offered by so-called governors and priests, is in dividing what in nature is bonded and permanent.

When we finally will study the world and interpersonal relationships without this comfortable but restricting fragmentation, we will discover much more than what we believe we know up to now" (A. Bertirotti, 2014:47).

References

A.Bertirotti, Psico-antropologia per il Design, David &Matthaus, Pesaro, 2018, 2a Ed., (in stampa).

A. Bertirotti, La mente ama. Per sapere ciò che siamo con gli affetti e la propria storia, Il Pozzo di Micene – Lucia Pugliese, Firenze, 2014.

E. Diener, R.A. Emmons, R.J. Larson, S. Griffin, The Satisfaction With Life Scale, in "Journal of PersonalityAssessment", 1985, 49, 71-75.

S.J. Lopez, C.R. Snyder, J.L. Magyar-Moe, L.M. Edwards, J.T. Pedrotti, K. Janowski, et al.,Strategies for accentuatinghope, in P.A Linley, S. Joseph, (edited by) Positive Psychology in practice, Hoboken, NJ, Wiley, 2004, pp. 388-403.

V. Pasca, Il design nel futuro, Treccani, Roma, 2010.

S. Pinker, How the Mind Works, W.W. NortondEditions, New York, 1977.

D. Siegel D., The DevelopingMind, The Guilford Press Inc., New York, 1999, trad.it, La menterelazione. Neurobiologia dell'esperienzainterpersonale, Raffaello Cortina Editore, Milano, 1999.

Knowledge processes and conceptual procedures of representation in architecture

Andrea Donelli
Department of civil, environmental, and mechanical engineering (University of Trento Italy)
e mail: andrea.donelli@unitn.it

Abstract

The set of signs, of the features of the textures, of the color and of the codes with which the architecture is described and with which the acquired data for the knowledge about a phenomenon are expressed and defined, highlights a wide articulation to the initially mental, cognitive and subsequently comprehensive process of the participatory and cultural form, both visual and communicative, which investigates the idea from which the project is then realized. The study of the modes of representation is important because it allows us to analyze and control the procedures and the knowledge that contribute to defining an architecture. These knowledge constitutes, in their different phases of realization, a constant control of how an architecture is formed and the cognitive processes, related to the procedures put in place, allow to represent with an expression both conceptually and abstractly, the object architectural study. It is therefore essential to identify, through critical knowledge, what are the foundational aspects, or considered important, but also the problems, that is the set of experiences that underlie the cognitive process and the understanding of an architectural object. The object in question will be given by the relationship established by the reality we know through our experience and then transferred to the plane and the space through the representation that helps to define its knowledge and judgment.

Abstract

L'insieme dei segni, dei tratti delle texture, del colore e dei codici con cui si descrive l'architettura e con cui si esprimono e si definiscono i dati acquisiti per la conoscenza attorno ad un fenomeno, pone in evidenza un'ampia articolazione relativa al processo inizialmente mentale, conoscitivo e successivamente comprensivo della forma partecipativa e culturale sia visiva che comunicativa che indaga l'idea da cui si realizza poi il progetto.

Lo studio dei modi di rappresentazione risulta importante perché esso consente di analizzare e di controllare i procedimenti e le conoscenze che concorrono a definire un'architettura.
Tali conoscenze costituiscono, nelle loro differenti fasi di realizzazione, un costante controllo di come è formata un'architettura ed i processi conoscitivi, relativi ai procedimenti messi in atto, consentono di rappresentare con una espressione compiuta sia concettualmente, che in astratto, l'oggetto architettonico di studio.
È fondamentale pertanto, individuare attraverso la conoscenza critica quali sono gli aspetti fondativi, o ritenuti importanti, ma anche i problemi, ovvero l'insieme delle esperienze che stanno alla base del processo conoscitivo e di comprensione di un oggetto architettonico. L'oggetto in questione sarà dato dalla relazione fissata dalla realtà da noi conosciuta attraverso la nostra esperienza e trasferita poi nel piano e nello spazio mediante la rappresentazione che contribuisce a definirne la conoscenza e il giudizio.

Introduction

The theme to be treated within this contribution concerns the system of cognitive representation processes, described through a graphic-geometric language coded for architecture. To do this, we take as an example the case study of a project created by Carlo Scarpa: the Brion tomb located in the Cemetery of San Vito di Altivole. The Brion tomb is not considered an independent part of the entire cemetery system. The arrangement of the whole relating to the architectural organism of the municipal cemetery fully falls within a broader and more profound explanation with the historical drawing of the land belonging to the Treviso territory. While retaining its own formal recognizability, the Brion tomb relates, together with its geometric complexity, to the entire system constituted by the cemetery itself. This aspect can be deduced from precise references to the design of the territory traced by the ancient surveyors.
This set of facts constitutes a continuity and contiguity of unity that is not only determined by intent but is sustained by an interest that manifests itself in demonstrating how the processes of knowledge and the conceptual processes of representation reveal the same architecture considered here. It is possible to glimpse a sort of backward process, a rewinding of the tape, implemented through the method used to reconstruct the theme of work for figures and transfiguration that become recurring elements, as well as tracing a kind of rhetorical figures that, without ambiguity, they are placed as measures or reiterated values. The process put in place by Scarpa is given by a set of shapes that derive from figures according to certain measures, made such by the mutation of numbers, shades, colors, textures and material. A unit that can be described and represented through a geometric graphic system of codes.

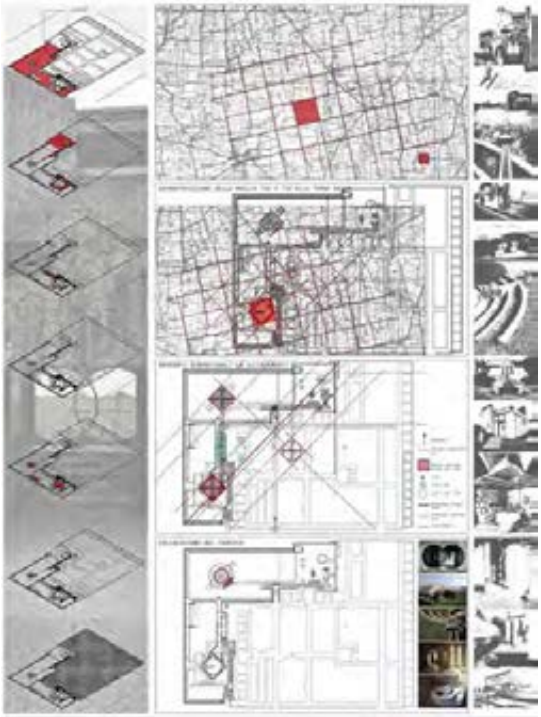


Fig.1 Territorial classification and report of the historical drawing of the soil relative to the Brion tomb in the Cemetery of San Vito di Altivole (Treviso). Drawing by: Sara Pirovano and Yanjia Cui,(Corso di Rappresentazione e Rilievo dell'Architettura - Politecnico di Milano, docente: Andrea Donelli)

Methodology

The objective of this study is to investigate the architectural space through a process of representation in which the codes constitute a knowledge that manifests itself around this phenomenon. The method is articulated through a graphical lexicon that demonstrates, on a Cartesian basis, an experience in the topological geometric context referred to the representation of space in architecture. In this way a complex set of relations is determined which also belong to the signifier and the meaning. Significant means the physically perceptible part of the mainly linguistic sign, but in the specific case of the study it concerns what is relative to the description of the architectural geometrical space. In this way the set of elements of graphic matrix are associated with a meaning (which is a mental concept), which refers essentially to the object, that is to the referent, what we are talking about, an element that is extra linguistic. This representation constitutes a process of knowledge both in its different phases of investigation, and in the relationships that observe and describe the space defining it through the conceptual graphic recognition of a code that decrees a system inherent to the spatial regions as well as to the frontiers. This set of facts and linked elements described graphically allows constant control but is also a precise communication that graphically relates and reveals how an architecture is formed. In fact, through the cognitive processes related to the procedures put in place, it is possible to represent with an expression both conceptually and abstractly, the architectural object of study.

This theme related to the research invests the considerations related to the representation as well as to a form of graphic communication decreed and defined by the set of signs, the features of the textures, the color; a set of useful elements to represent the object of study and above all to establish a set of recognizable codes. The study of ways of representing is important because it allows us to analyze and control the procedures and the knowledge that contribute to defining an architecture. In the case study of the Brion tomb located at the cemetery of San Vito di Altivole, the use of representation codes through connotated graphic - geometric relationships constitutes an instrument of knowledge. It assumes as a basic value the system of the orthogonal projection method performed as a principle of systematic and procedural modeling. Because of the geometric properties that belong to it, it allows the elaboration of representations in which the description of the architectural object in its individual elements, or in its entirety, can be metrically verified, ie a scale drawing of numerical relation is recognizable. In other cases, always using the geometric rules of Monge fixed as a basic data, it is possible to perform speculative representations referring to the topological geometric and consequently this form of representation assumes a conceptual value in some cases almost abstract. This elaboration can also refer to a textual experience so much that it can also be considered as an added value, to the point of constituting a virtual type representation. The concept of virtuality is found and proved both graphically (graphic statics) and analytically in the study of construction science. For virtuality we do not mean the simulation decreed by systems, images, generally derived from informatics - computer visualizations, in fact, this reference or juxtaposition would be a wrong and misleading consideration, typical of exclusively procedural and not methodological aspects. With virtuality we must consider a dual relationship with reality, the same that is found in determining the equilibrium condition through the connection between position (kinematics) and applied force fields. In this way it can be said scientifically and technically that for a system in static equilibrium at each infinitesimal virtual displacement in the phase space is associated a null mechanical work. In other words, the work done by external forces on a deformed continuous solid is the same as that performed by internal forces. The virtual term therefore indicates that the theorem is valid for calculated works for any given system of external forces (surface and volume forces) balanced with unit voltages, and for any displacement field congruent with unitary deformations but, not necessarily, resulting from the system of external forces applied. This phenomenon that belongs to the science of construction determines an objective method in considering the systems between virtual analyticity and their reality. The representation of Monge's geometric system through the codes is also to show that drawing according to the rules codified in history by the science of drawing from descriptive and projective geometry and describing according to the dictates as also in the specific case addressed here implies the fact to consider before of the whole model concept. The model subtends to a theoretical device consisting of a complexity that is configured both in the way of conceiving the representation, and as the synthesis between the different systems through the consequential operations to which it refers. In fact, the graphic model - geometric by its nature consists of quality values, properties, a set of elements that make up constant and continuous relations governed in this case by descriptive and projective geometry.

Of particular and significant importance is the thought expressed by Vittorio Ugo regarding the concept of model considered as a fact of essentiality that embodies the complexity that the model generates. It is a matter of considering and elaborating the model as skhêma, a particular conformation tool which allows to make recognizable even in the process phases of construction, the steps and interpretations of poietic-mimetic kind that lead to the final achievement. The skhêma allows through the introspections made necessary the understanding and knowledge of the object itself, but also to be able to control and compare the virtuality and the reality of the models referred to the object investigated. In fact, from the reading and the study of the object made of distinction and of dependent and non-dependent parts, the meaning and the signifier emerge, nature itself constituted in all its parts and forms. Observe how the processes of knowledge and the conceptual procedures of representation in architecture related to the case study of the Brion tomb belong to a connective tissue traceable from the historical drawing of the soil of the territory of San Vito di Altivole. Space organizations in turn differ in categories that always belong to the space itself. The first categories are related to the grid. This square grid, perimetrated by the limetes, is the ancient Roman layout, made up of the units of measure, which are consequential, referring to the centuria, as well as to their submultiples inherent in the sub - division of the ground. This system is traceable, in the comparability of the measure, even within the entire cemetery and with further metric developments to the Brion tomb. The form of the entire cemetery system coincides with the figures, and the Brion tomb is the event that marks the transition between figure and form. Scarpa's work between figures and transfiguration also implies other and new considerations of a physiological, perceptive and psychological nature. Without wanting to go into very particular aspects and not yet fully studied and analyzed, it can be said that the case study is of an exemplary type and in it the continuous relationships between form and shape modules determine the fabric of the whole unity of space.

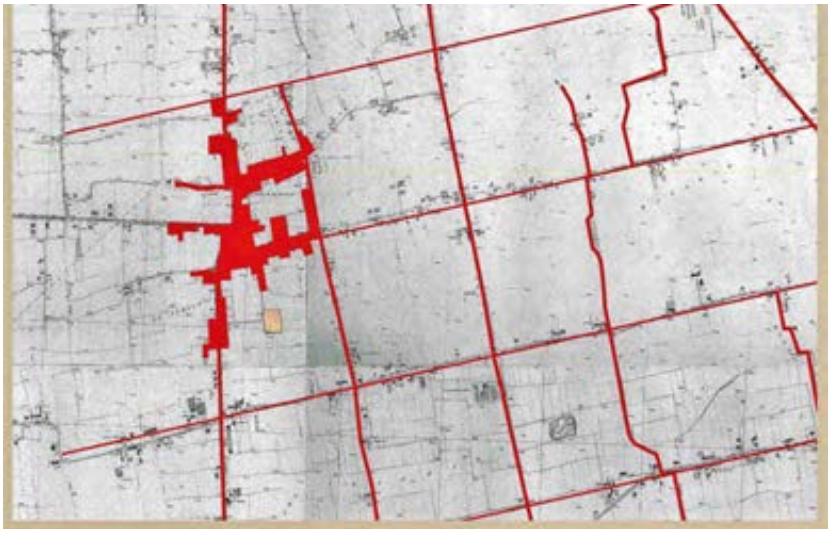


Fig.2 Map related to the form urbis and the centuria of the locality of San Vito di Altivole with annexed the cemetery and the tomb Brion. Drawing by: Riccardo Gialloreto and Francesco Giuggioli, (Corso di Rappresentazione e Rilievo dell'Architettura - Politecnico di Milano, docente: Andrea Donelli)

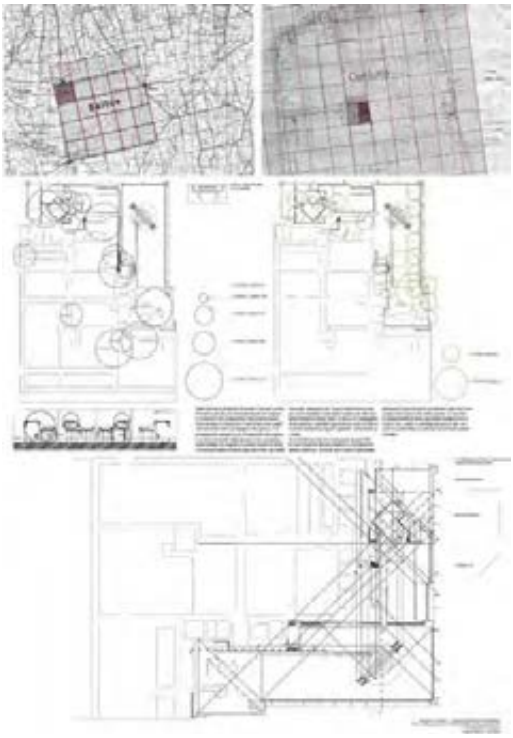


Fig.3 Study related to the historical drawing of the soil with the search for geometric generators related to the unity of the territory - cemetery with the Tomb Brion. Drawing by: Caterina Biondi and Yiwei Xiang, (Corso di Rappresentazione e Rilievo dell'Architettura - Politecnico di Milano, docente: Andrea Donelli)

Describing the connotations of the Brion tomb through the system of spatial regions and frontiers used as a cognitive process of representation reveals a constant stratified growth of morphologies, stratifying and articulating patterns in turn of other competing configurations, forming a corpus of morphologies. Recognizing the morphologies and admitting their specific figurability means recognizing the complexity of the project and above all the coherent and integrated amplitude of the languages defined by the connection of the form, the figures and the trans-figuration. In this case the institution seeks its form also in the form of the organism, so that this eloquence is not always covered in particular metaphors to represent it. There is the aesthetic condition that constantly oscillates between the plasticity of the forms and a fictio of the figures, a wise game of connections, of complexity that transfigure in a research in which the project grafted poeticity. The strong question that allows to give body to the aesthetic content can be observed through the cognitive processes that represent space. The structures of the frontiers system in their geometric graphic rendering allow us to understand the different morphologies, which are materially the meaning and the meaning of constructive experience, in which the codified drawing representing the spatial regions completes the configuration of a whole; and from another observation point it can be understood that the plant, the structure, the construction also meet on the plane of expression. Through the critical knowledge, the question of the experimentability or the

flexibility in graphically and geometrically conjugating the codes of the forms, of the figures, of the organizations in the arrangement of the system and of the unity of the same spatial figures becomes evident and identifiable. However, the Scarpa project related to the Brion tomb communicates, once again, a venetian lexicon and grammar. The analogy with the competition project for the area of Cannaregio by Peter Eisenman is assumed as referent, in which the consequentiality and the dimensional reciprocity of the objects from the small, medium and large are contained. And in this way the great contains all the others. In fact, the sequence, as well as the relationships between objects, are used to question the concept related to the meaning of the function.

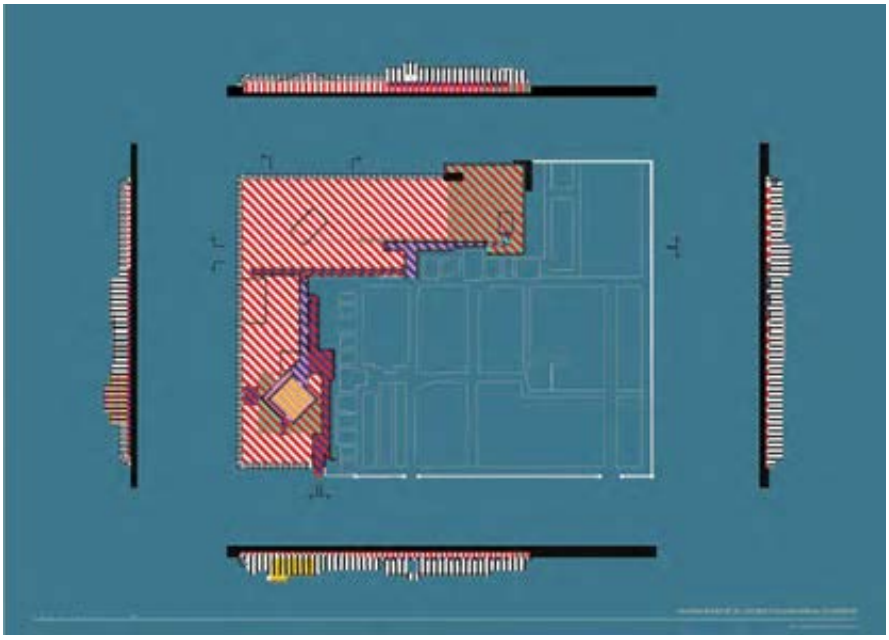


Fig.4 Drawing on the representation of the codes describing the system of spatial regions and frontiers inherent to the tomb of Brion. Drawing by: Marianna Frangipane and Egidio Giurdanella, (Corso di Rappresentazione e Rilievo dell'Architettura - Politecnico di Milano, docente: Andrea Donelli)

The same applies to the Brion tomb, where the same concepts concerning the question of emptiness, of an open space that is configured through a temporal triad: the emptiness of the future, the emptiness of the present and the emptiness of the past. These trans figurative patterns, conjugated in turn to the pattern of the figures, are connoted to the forms, that is to the pattern of the structures. This interpretation guarantees an autonomous but also unique and unitary reading. The colors in this architecture, on the other hand, are what is not structure; knowing that even the structure has its color that becomes texture. The dominant color in addition to the gray of the concrete is the golden yellow of the gilding. The gilding can be found inside the temple of the altar given by the chromatic reverberation of the covering of the covering, as well as in the tessellated mosaic of the water tank. Gold is the color of Venice as is rosy red. These are the colors of the seventeenth-century "irrationality" of the city, a phenomenology that affects the city, its in-fidelity to its origins, but also its very nature. Scarpa, in the alchemy of his drawing, first figure and then trans also figures color and color.

In fact, the Brion tomb is the result of a particular and introspective unity in which the drawing of the place, the materials, the nature, everything is form, figure, structure and color.

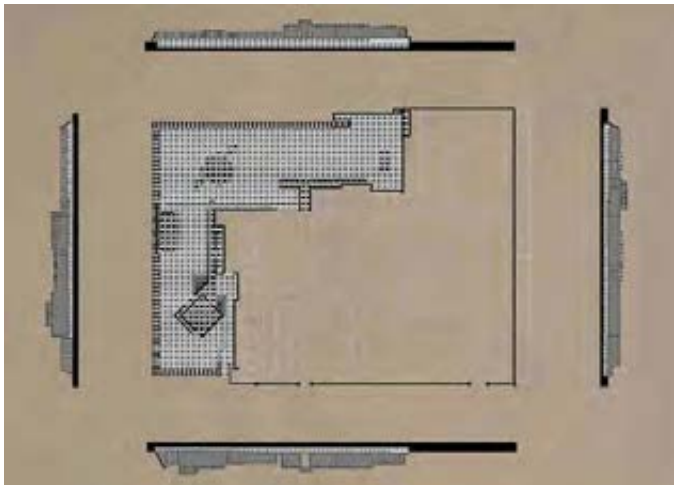
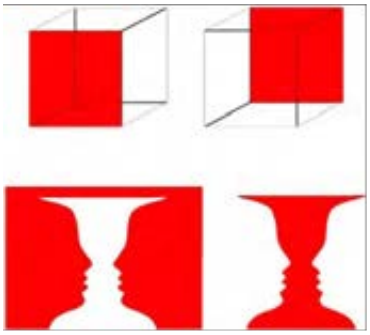


Fig.5 Drawing of the "essential" code referring to the system of regions and frontiers concerning the tomb of Brion. Drawing by: Marianna Frangipane and Egidio Giurdanella, (Corso di Rappresentazione e Rilievo dell'Architettura - Politecnico di Milano, docente: Andrea Donelli)

Representing the cognitive processes through a graphic-geometric process focused on the codes, the forms, the figures relating to the project of the Brion tomb by Carlo Scarpa, determined to know and understand the structure of the architectural space through an experimental study. This research related to the ways of representing is important because it allows to analyze and control the procedures, the knowledge that participate in the explanation of an architectural object. This experience has allowed the critical knowledge of the ways and procedures to consider the aspects that determine the articulations, the composition and the decomposition of the case study and, in broader terms, also of other cases or topics of interest. Construct a vocabulary and a grammar of representation that subsists to the structure of communication related to an architectural experience also falls on issues that affect the Gestalt. In this way the operations that belong to a criterion of explanation formed by thought, comprehension and intuition are concretized. Thought develops a series of relationships that constitute connotations and form; for example in the representation codes consistent in the hierarchy of the line and the architecture they represent. Understanding is the eloquence and correspondence between the representation, the forms and the figures of the architecture of the object of study.

Finally, intuition, from the latin intŭĕor that is "entering into the eye", represents a form of knowledge that can not be explained in words, in the case analyzed it is meant through a sequence of signs, thicknesses, traits, colors, textures. The terms such as frontier and spatial region belong to the topological mathematical lexicon, as well as the word camp, which in turn can be represented graphically and geometrically as a spatial region. Even the term frontier which is the limit that distinguishes two spatial regions assumes an essentially overall value. Similarly, the spatial region can also be a frontier, in which case the plane which is a region becomes a frontier with respect to another plane which is perpendicular to it or oblique.

In this case it is a question of controlling and defining establishing logical relations between a set of possible meanings. This fact takes place in the communicative recognition of a system related to the object of study, the basis of which remains within the processes of knowledge and conceptual procedures of representation in architecture mainly related to the euclidean notion based on the groups of identities of metric properties, for develop further conceptual representation or in some abstract cases.



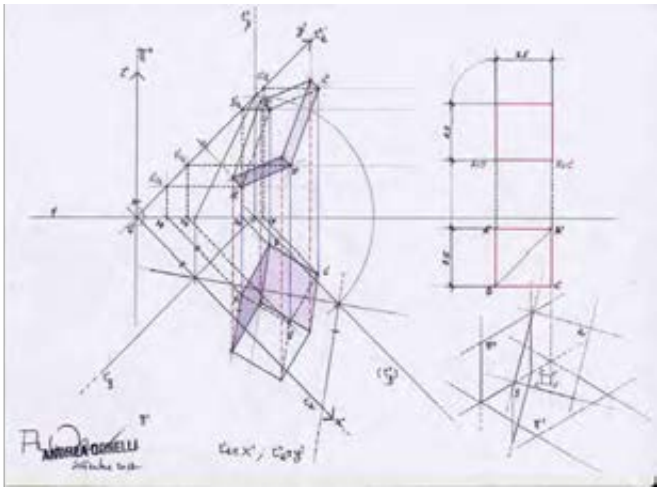


Fig.6 sx, Re-elaboration of notes related to the Necker's cube and the profile and / or Rubin's cup concerning perceptual experience and non-verbal communication. Initial acquisition of the figures through: https://optometriaherberhold.wordpress.com/2014/12/03/le-illusioni-ottiche/

Fig.7 dx, Drawing in orthogonal projection with the homology of a solid (cube) projected on an inclined plane. The image projected on the inclined plane loses the properties in true size, acquiring a perceptual value with forms to the true form. Drawing of: Andrea Donelli

Conclusions

Take the experience with the well-known Necker cube for example. It concerns an "ambiguous" two-dimensional representation. The experience concerns a structure of an image that corresponds to an oblique, axonometric cavalier projection of a cube. The intersections that occur perceptively between two lines do not show which line is above the other and which below, so the representation is ambivalent: it is not possible to indicate which face is facing the observer and which is behind the cube. Looking at the figure you can easily switch from one interpretation to another, there is a multistable perception. As for the profile or the cup in the representation of Rubin. The effect is interesting because each part of the figure is doubtful for itself, while the human perceptive system gives an interpretation of the parts that make the whole figure congruent.

In this way, representing spatial regions and frontiers through a graphic-geometric code generates a way, not only to perceive and consequently understand, the multiplicity of relationships but also to understand the same complexity of the system as the space thus represented can be subject to both positive and negative reading. The correct communication can therefore take place if the code is regulated in compliance with the hierarchies that make up the forms and structures of the architecture. The figures, like the trans figures, are further elaborations that are connoted with their initial figures, forms and structures.

For the architectural project of the Brion tomb, one might almost say that architecture is an indifferent witness to life. As if to say that from the architectures designed emerges, in their graphic-geometric quality, that unity and clarification of the facts that constitute the architecture itself, but that escape if they are given too many meanings. And it is in this way that the experience of the whole is prefigured, that is to say that overlapping forms, figures, which are rooted between drawing, sign, texture, color and built architecture. The facts of the experience are drawn and the drawings, like dreams, become possible realizations. Signs and dreams, terms separated by a short phonetic distance. The graphic use of the vowel and in the italian language instead of the vowel or transmutes the dreams (sogni) in signs (segni) and on the contrary, as if the words with time had given shape to the thoughts.

References

R. Arnheim, The Dynamics of Architectural Form, University of California Press, 1977

B. Aterini, Rappresentazione della sfera tra scientificità e casualità, Alinea Ed., Firenze, 2005

G. Bachelard , La poetica dello spazio, Dedalo Ed., Bari, 1984

L. Baglioni, The method of mathematical representation in the analysis of planar quadrilateral meshes, in Descriptive geometry and digital representation: memory and innovation, M. Rossi, Mc Graw-Hill, Editor, Milan, 2012

R. Codello, A.Torsello A., Architetture veneziane di Carlo Scarpa. Percorsi e rilievi di cinque opere, Edizioni Marsilio Ed., Venezia, 2010

A. De Rosa, Il cardine proiettivo: filogenesi e ontogenesi per una nuova geometria descrittiva, in DisegnareCon, [Online], 13-22, Giugno, 2012

A. Donelli, Scritti scelti sulle ragioni del disegno, Universitas Studiorum Ed., Mantova 2018

A. Donelli, Survey and architectural representation of the frontier, in "Caumme III", Naples, Ermes Serivizi Editoriali Integrati Srl, 2016

P. Eisenman, La rappresentazione del dubbio: nel segno del segno, in Rappresentazioni, "Rassegna" n°9, Electa Periodici, Milano, 1982

M.L. Falcidieno, Comunicazione - rappresentazione. Testo, immagine, segno grafico, Alinea Ed., Firenze, 2010

M.L. Falcidieno, S. Giulini, Parola disegno segno. Comunicare per immagini. Segno, significato, metodo, Alinea Ed., Firenze, 2006

P. Falzone, La rappresentazione dello spazio strutturato, in «Atti del XIII Convegno Internazionale dei docenti delle discipline della Rappresentazione nelle Facoltà di Architettura e Ingegneria», Lerici, Ed. a cura dell'Istituto di Rappresentazione Architettonica, Facoltà di Architettura di Genova, pp. 215-234, 1992

D. Formaggio, Fenomenologia della tecnica artistica, Pratiche Ed., Lucca,1978

G. Grassi G., Il carattere degli edifici, in "Casabella", n. 722/ Maggio, Electa Periodici, Milano, 2004

A. Giuffrè, Il rilievo dell'architettura come momento analitico del progetto di conservazione, in "XY" 23- 24- 25 Gennaio/ Dicembre, Roma, 1985

E. Guazzoni, Tradizione costruttiva e progetto. Viaggio attraverso la coltivazione architettonica della terra, in "Urbanistica" n. 86, pp. 20-29, 1987

A. Loi, Introduzione alla topologia generale, Aracne Ed., Roma, 2013

L. March, P. Steadman, La geometria dell'ambiente, Gabriele Mazzotta Ed., Milano,1974

D. Sandri, Il momento dell'invenzione, in Zibaldone Rilievo progetto Disegno esperienze di un laboratorio di laurea, Cluva Ed.,Venezia, pp. 61-75, 1979

F. Semi, A lezione con Carlo Scarpa, Cicero Ed., Venezia, 2010

M. Scolari, et Al, Teorie e metodi del disegno, Città Studi Ed., Milano, 1994

U. Tubini, La rappresentazione dell'architettura, in Zibaldone, Rilievo progetto disegno, Cluva Ed., Venezia. pp. 29-38, 1979

V. Ugo, R. Masiero, La questione architettura, Cluva Ed., Venezia, 1990

V. Zanchetin, Carlo Scarpa. Il complesso monumentale Brion, Marsilio Ed., Venezia, 2005

Verbal, visual and sound Communication: languages in comparison

Maria Linda Falcidieno
Department Architecture and Design DAD (University of the Study of Genoa)
email: falcidieno@arch.unige.it

Abstract

There is an undeniable similarity of immediate understanding between the verbal language and the visual one, due to the fact that both are intended to convey information, whether they are drawn from reality, or from the inventiveness and imagination of the individual; only the tools are different, since in the first case they are based on the word, in the second on images.

Not even this difference is so substantial when you consider the forms of written language employing the "drawings" in place of "letters": from hieroglyphs to the ideograms, the language path started from the representation to arrive at the written text, gradually losing immediacy and possible spreading of the opportunity to be identified, to arrive at the written text, dedicated only to those who know the code.

But, on the other hand, even the language of images, which should potentially be universal, isn't actually always like this, because you just need to think of the examples of the "dedicated" languages to understand how the question is not the choice between text and image, but the wider one of the transmission of the code that is the basis of the used language.

It is now to develop some considerations of general validity for all the communication tools that use sound to convey information more effectively. To this end, we will try one more correspondence with the world of visual communication, according to what has been stated programmatically.

Abstract

Esiste un'indiscutibile analogia di immediata comprensione tra il linguaggio verbale e quello visivo dovuta al fatto che entrambi hanno lo scopo di trasmettere informazioni, siano queste tratte dalla realtà, come dall'inventiva e dall'immaginazione del singolo; solo gli strumenti sono diversi, poiché nel primo caso sono basati sulla parola, nel secondo sulle immagini. Certo, neppure questa differenza è poi così sostanziale, se si pensa alle forme di linguaggio scritto che impiegano

i “disegni” in luogo delle “lettere”: dai geroglifici, agli ideogrammi, fino ai fonemi, il cammino percorso dal linguaggio è partito dalla raffigurazione, per giungere al testo scritto, via via perdendo immediatezza e diffusione di possibilità di essere compreso, per giungere al testo scritto, dedicato solo a chi conosce la lingua usata nell’espressione.
Ma, d’altro canto, anche il linguaggio per immagini, che dovrebbe essere potenzialmente universale, in realtà non sempre lo è, poiché basta pensare agli esempi dei linguaggi “dedicati” (l’alfabeto Braille e quello dei segni, ma anche la stenografia, il Morse, le segnalazioni navali…) per capire come il quesito non sia la scelta tra testo e immagine, bensì quello, molto più ampio, di trasmissione del codice che sta alla base del linguaggio adoperato.
Comunicazione come codice, dunque, con livelli di maggiore o minore intenzionalità; sempre l’emittente deve assicurarsi che il ricevente (o i riceventi) sia nelle condizioni di possedere la chiave interpretativa.
Si tratta, ora, di mettere a punto alcune considerazioni di validità generale per tutti gli strumenti di comunicazione che si avvalgono del suono per veicolare in maniera più efficace informazioni; a tal fine, si cercherà ancora una rispondenza con il mondo della comunicazione visiva, secondo quanto finora programmaticamente enunciato.

Introduction

As for the visual and textual communication, the main components that characterize it in relation to the concept of "representing" and to the issues related to it, are identified in the text (always here analyzed in terms of image and visual perception and not of contents), in the image (in all its forms, from the sketch to photography, to computer and polimateric elaborations) and in the accessory sign (from the "fillets", to the colors, the textures and so on).
A word or an image as a signal, an element of the written or represented message, a signal with a multiple nature - conventional, expressive and unique; only in accordance with these parameters we can reasonably hope to achieve a satisfactory result.
And it is precisely the concept of style, as an expression of personal language choices, tending to become collective heritage flowing into the models, which requires a further clarification and can act as a communication through the parallel between visual and sound communication: an attempt to systematic reading, in fact, should provide some analysis from the point of view of the instruments – i.e. eminently technical aspects that allow the processing and the changes - but also of the methods - that is the choice possibilities to set such processing and modifications - for the purpose of the communication project.
Whether we speak of visual communication or of sound communication, in fact, systematizing the various system components leads to the result, of course, with the indispensable contribution of the author's creativity, which is the element that can not be quantified, nor classified, and which lets, with comparable premises and technical-methodological choices, obtain different products.
Nothing new, on the other hand, because what has been described is exactly what always happens in any creative process, from pre-established assumptions and data: the contribution of the individual, in fact, is the main discriminating action.
Now we must proceed in a critical manner to check if visual communication and sound

communication can be compared to each other, both for what concerns the components, both in terms of the role that these components play for the formulation of messages ; in particular, it is important to experiment this parallelism from the point of view of representation and communication of identity.

Sound and translations

At the opening we dealt with a range of issues related to the definition of the visual language, borrowed from the written and spoken one, as well as with the different meanings that language can take more or less depending on the present level of criticality and coding ; at this point we will try to think about the influence of communication through sound images and on which language basis it should or could take place.

The sound, in itself, is listening, a perceptive attention linked to the physicality of hearing; communicating the sound in a graphical manner is an evident contradiction in terms and, therefore, apparently has neither any reason to be, nor certainty of success; yet, this non-sense is always practiced, or at least since we needed to convey information and knowledge and to set up as a collective heritage of knowledge and experience.

And certainly one of the main reasons is this: to make possible the recurrence of harmonic structurations related to the ability of the individual, to allow them to break free from the field of creativity to get into that of reproducibility, perhaps seemingly less rewarding, but undoubtedly useful.

In short, it aims to involve "all" into “one” ‘ s good; in a similar manner, writing and reproduction of images have allowed the perpetration of narratives owned by peoples and countries along the centuries, with the possibility to adapt, change, and transform parts and details according to the new needs and ability of the writer-witness,in a continuous proceeding of focus and achieved goals, soon to be overcome.

Not only that. Nowadays communicating the sound visually, is to make it possible for everyone, even those who do not physically have the opportunity to enjoy the sensations that music gives; in this direction experiments begin to develop, whether due to musical groups or related to research, with video combining sound and graphic representation, which are the logical consequences and continuation of the introduction of sign language, which has made possible the participation of deaf people in the relationship life.

But not only we moved into the field of translation of sound into image; a further aspect of research and testing is the one related to the comparison of sensitivities different in the approach to a common topic. In 1998, for instance, together with the Centre for Ancient Music Practica Musicae, for example, the course of Diploma in Industrial Design at the Faculty of Architecture in Genoa promoted a work on Ornamentation between Renaissance and Baroque, seen in a variety of applications, from music, to furniture design, to fabrics design, as collected into the volume Music, image, representation, published by Graphic Arts Lux in Genoa in 2000. One of the first consequences of the above expressed study is the one that makes us think about how tying an image to a particular sound or noise is - at least partly - undoubtedly a subjective and arbitrary process; this is the most interesting aspect and is still, partially to be overcome in the experimentations that, as above described, are concerned with the translation of the sound language into a visual one.

We proceed by trial and error, by similarities and rhythms, by associations of color and intensity, trying to make comparable two worlds very different and far apart, each connected to a different physical context: sight and hearing.

As well, if it is true - as the experience in other areas teaches, for example in written and spoken language and the visual one - that the external stresses and the individual interpretations can be translated and transmitted to the outside through language and, therefore, more or less instinctive codes, even for the communication of the sound similar roads must be identifiable. It will be necessary to perfect translation systems and, above all, to broaden the context of knowledge of the assumptions that is to teach the fundamentals of the used code.

The question of how to communicate visually the sound is closely related to the observations made above and also in this case it is of great help the comparison with the mechanisms of transcription and transmission from the world of images, which can be broadly categorized into two broad areas:

- predominantly "instinctive"communication
- predominantly “codified” communication.

In the instinctive representation of the sound you rely on “realistic" images: this means to use the language as immediate as possible and understandable to all, where the abstract and arbitrary code plays a marginal role, at least programmatically; to rely on "realistic" images, which are the collective heritage, known and intuitively recognizable; to use all the mechanisms already experienced in other disciplines and decline them sub species " of sound."

It means, basically, to visualize the sound , as indeed happens in the transcription of the sound phenomena in the comics, where there is a need to translate any information directly, without the aid of the description, whether information concerning the dialogue , or thought, movement, sound or noise; the resolutive technique was that of the representation through images, partially encoded, partially iconic and intuitive.

As for the dialogue and thought, the element of communication is the balloon, where the code to be transmitted is related to the contour design ; in addition, the balloon has other side meanings, indicating whether the tone is high or low, angry or frightened, always transmitted through the code of the contour design.

To visually represent the movement, however, kinetic lines suggest the characters' actions: running, walking, slipping, flying, jumping and so on. Not infrequently these lines are accompanied by letters or words that indicate the noise produced by them and it is interesting to underline that, in these cases, they draw on the language of the place, with a possible slight change in the sound of the word.

And here, already dealing with the transcription of the act of talking in the comic and the movements of the characters, it is shown that the noise (another form of sound) is translated into an image and text, to become "readable". In what way? Just through onomatopoeia that is through written reminiscencies of the sound or noise that you want to play.

Also to examine the communication of sound predominantly "coded"we must first define the meaning of the terms: transcribing the sound through codes means relying theoretical assumptions basically arbitrary, in a similar way to what happened with the written languages similar to ours, where neither images are conveyed – even if simplified and stereotyped -nor iconic elements, as the

case in pictographic or ideographic languages, but phonemes, whose matrix, linked to the original and instinctive mode of oral transmission, is reduced to a very small part of the present structure.
In the case of the representation of the sound, the comparison is with languages designed and dedicated to very specific targets owning the cultural tools and information to understand them: from the language for the blind and deaf to the languages offering a "universal " communication such as Esperanto and Bliss language.
Of course, the greater the use of cross-references to the visual heritage of the community, the better the chance of being understood without any special need of decoding; on the contrary, the more we refer to designed items, symbolic, and divorced from a context of "instinctive" type, the more there is a need to carefully identify the audience target, so as to cater to send them the information needed to decode the message.
The communication of sound through abstract images, therefore, makes use of the above just said: writing music means to trace the signs that take on a meaning only for an audience culturally structured to understand the assumptions; for all others, there is the visual perception of the composition, considered as a global image, but not understandable as for the contents.
It is then quite intuitive to think that, in the case of the graphic transcription of the sound according to the traditional method of the score, the meaning of this term is referable to the musical context and therefore, according to this perspective, the word "music" is its synonymous.
But, always according to that sense, noise must be read and catalogued as music, at least in the sense of assigning a tonality, an amplitude, in short attributing parameters that can play notes and musical sequences; when this is not possible, the reference, then, can be to the equalizers, indicating sonic characteristics in a visual form.
Finally, the visual communication of sound designed in order to make it possible for everyone, especially for those who do not physically have the this opportunity, to enjoy the sensations that music gives, obeys to rules that tend to be inspired partially by the sphere of spontaneity, of instinct and intuition, but partially follow coded references; at the opening of the songs translated for the deaf, then, it becomes necessary an explanation of the main theoretical assumptions at the basis of the experimentation itself, so as to make the target of users able to enjoy and learn from each quotation and nuance.

Sound to communicate

sound: acoustic sensation that, as opposed to noise, presents clearly identifiable characters in height, intensity, timbre or color; (this sensation is determined by the transmission through an elastic medium of vibrations communicated to the same tool from a sound source in its turn in vibration (by G. Devoto-Oli, Dictionary of the Italian language, Le Monnier, Florence, 1978)
But, in some cases, sound is synonymous with noise. The transmission of a sound must respond to precise compositional rules, both for what concerns the composition of the track - regardless of the brevity of the piece -, both as regards the way to convey to the listener this piece and this applies to distinguish vthe sound vehiculation from that of the noise (for example of a horn, a leaky faucet or other similar); nevertheless, it is not uncommon a case where even a noise (the afore mentioned horn or leaky faucet) can assume the value of sound and, therefore, be rewarded to a different

position from its nature.
One of the fields in which this happens more frequently is advertising, the ad, in particular, the spot that in a very short time must indicate a precise concept, induce a certain behaviour, promote a product; in such situations, communication can also take place with the aid of an audio contribution, be it sound or noise.
It is quite obvious that such a use of the sound element makes it necessary to establish a highly critical and mediated relation between the various component parts of the communication itself, the text, images and, especially, the narrative and the message linked to it. And it is just the construction of the "story" told and the relationship established with the individual making up elements that place the contribution in a context rather than in another one, to make a sound become a noise or vice versa; In fact, it is the relationship between the listener and the designed element that drives the unfolding of communication; the greater the correspondence between the intention of the designer and the response of the user, the greater the bond established between the message and the result, in view of the premises and the end to be pursued.
Two, at least to a first approximation, are the possible behaviours that can be identified in the relationship between sound element and listener, one more "personal and subjective" and the other basically "widespread and objective"; in the first case the communication is all played on a instinctive plane, in the second, on the contrary, it is carried out in terms of code, similarly to what was also identified for the visual communication of sound.
It will, therefore, be a dual type of vehiculation of the message sound, which will take place:
• According to a "instinctive" communication which is what the sound transmits to the individual listener. With the term "instinctive communication" we mean a communication playing mainly on the level of emotion and a response in personal psycho-perceptive terms; listening to the same piece of music, for example, involves stresses different from person to person, depending on different factors.
Not a single way to understand communication, then, but potential infinite ways, at least as many as the possible listeners; Not only that, but even the same person may experience different stresses even in the presence of the same piece, depending on the time and his contingent psychological state.
• According to a "codified" communication which is what the sound transmits the sound to all the listeners. With the words "codified communication," however, we mean to speak of a communication based on a code of interpretation precise, defined and, therefore, that can also transmitted to all or at least to those who know the rules. Always to bring the considerations on the importance of using a code to facilitate wide users, here is sufficient to recall that the sound is a crucial help for the visually impaired - for example traffic light crossings - which transmits different impulses according to the possibility, or not, to pass and which so binds a specific rhythm to a specific color - red, yellow, green; to mention, however, codes which we all use, what is the beat of the hours of a clock that transmits precise information, the same for those who are able to listen, not interpretable, or, in principle, subject to personal suggestion.
And having introduced the concept of personal and instinctive-language of coded-objective language is to understand how the field of reading is always the same, whether it is written and

spoken language, such as visual language and, now, of sound language, as already mentioned at the beginning of this study; also possible interferences, therefore, will be similar and will result in undefined intermediate variations summarized in many levels, as many as the kinds of contamination, from a maximum of objectivity, which corresponds to a maximum diffusion of knowledge of the interpretative code, to a maximum of subjectivity, to which the personal response of the individual, unique and different each time, corresponds.
Communicating with sound (or noise, depending on what previously said), in conclusion, can be an added value to the dynamic graphic design, through the structuring of videos, commercials or interactions; the best or worst performance will depend on how closely the listeners are in possession of interpretative codes of narrative or how deeply they are involved involved on a personal level in the story. So the noise and the sound can take on a symbolic significance and represent respectively the code objective and the subjective one.

Sound

The sound as a sign of identity and connotative. Once setup a first critical reading of the possible forms of communication - and thus of representation - of sound, understood as noise or music, you should try to understand how the sound sign can be a sign of identity and connotation.
To arrive at a method answer, you can proceed in the manner that has already been tried previously to compare the sound to a visual element, think of its representation for the purposes of communication to verify proven solutions and propose innovative ways.
First, it is necessary to clarify what is meant, in this context, for identity and connotative sign.
Identity: relationship of equality or coincidence, especially if it is based on a finding of cause or effect; as another meaning, the complex of fundamental characteristic data that enable the identification or ensure the authenticity, especially from the personal, or bureaucratic point of view..
(by G. Devoto-Oli, Dictionary of the Italian language, Le Monnier, Florence, 1978)
This means that the identifying sign is a sign that perfectly adheres to that specific object and to no other, that allows a certain and unambiguous identification, guarantying a certainty; this means that the observer is put in a position to immediately understand what it is, regardless of his personal history, of the current situation, the assumptions and possible developments.
It is evident that it is very difficult to find sounds that "identify"; reference must be made as much as possible to the instinctive and naturalness world to trace examples that are not objectionable or, at least, in a reduced manner. Every time you introduce a critical area, in fact, the recognition of the identity becomes dependent on the knowledge of the conditions and, therefore, at least in the specific socio-cultural, historical and psychological conditions of the observer.
As an example, we refer to the sound of a baby crying, which identifies a child; the sound of rain, which identifies rain; wind noise, which identifies the wind and so on. Each identity, then, is liable to be transformed into a category ID, typed in some way, then, or to remain linked to the specific, unique and unrepeatable example: the sound of the cry of the child identifies a specific child, the sound of that typification identifies the physical moment when the storm broke loose and so on.
The thing that's interesting here is, of course, that of sound or noise typed, as it is the representation of the type involved in communication projects, whether they are movies, videos, commercials or

interactions; from this typing we loan to exemplify specific situations, mimesis of reality.
Here is on of the probable matrix of sound sign in communication, which certainly gives an added value to the persuasive-suggestive system of representation "in the round", three-dimensional and with auditory sensations, as well as visual.
Attempts to convey the sense of smell and let the user in the communication are, for example, those of some perfume advertising, offering on weekly and periodicals, paper inserts impregnated with the essence to make known.
On the contrary, for the reproduction of sound, at the dawn of cinema a musical accompaniment marked the different situations represented, by playing certain sounds or noises considered particularly significant for the understanding and enjoyment of the story
The connotative sign plays another role, however, in communicating:it is the sign that determines connotations. (Connotation: the associated or secondary meaning of a word or expression in addition to th obvious or primary meaning by G. Devoto-Oli, Dictionary of the Italian language, Le Monnier, Florence, 1978)
Even at a first reflection it is evident the wide margin of applicability of the sound element as connotative element of a communication element that is matched and / or added to the content of the communication itself; in absolute terms, a sound can connote a situation, an event. Many The possible examples are many: from the hymn that describes a certain country, the wedding march.
A common Fil rouge is however, the condition that the observer is an active part of the project and knows the conditions on which this project is founded, in a manner contrary to what firstly specified as for the unequivocal role of the sound signal of identity ; in the absence of this condition, the communication may be unsuccessful and conveyed to a wrong target.
It's useless, for example, to send a national anthem, if the listener is not aware of the nature of that music, as well as a wedding march can't raise any emotion specifically linked to love in someone who does not know the purpose for which this song was compound; of course, many emotions will be aroused, but in a way totally linked to the sensitivity of the individual and irrespective from the correct interpretation, so it could also happen that the wedding march creates anxious thoughts that have nothing to do with the joy and solemnity of the moment.
Then the connotative role of sound, can also be closely linked to the world of graphic communication and, therefore, to brand identity, understood in a large way; in this sense, the first inevitable comparison to a proper understanding of the potential and the unavoidable impact that the introduction of the sound element can have is with the logo / brand, which is the basic element of recognition of the communication promoter , whether it be a individual, a firm, a company, a brand.
The logo / brand, in fact, is just the visual identity and, therefore, has a direct relationship with any element specifying that identity; by the logo / trademark descend the main criteria for the design of corporate identity and that of visual communication (corporate image), with all the consequent enforcement tools and choices that determine its feasibility.
The sound sign is part of this chain and must therefore respond in terms of the project in a manner consistent with the premises, so as to comply with the basic features that allow a targeted approach to a specific target audience, be such a sound sign, a single sound or composed as a piece of music - or a noise.

In these terms, the sound or noise can be indicated as connotative identity, in a similar way to what happens for the other applications listed above.
The best areas of intervention to accommodate the contribution of sound and / or additional noise as a sign of brand identity are undoubtedly those related to the promotion and gadgets, environments, and especially to advertising in all the paperless realizations: movies, videos, websites, commercials can accommodate audio elements, which are repeated in different variations, but coordinated, just like it happens for traditional graphic apparatus.
Each different media, in fact, requires an adjustment of the project communication: is not enough to dilate or contract the same components according to space - to time, in the case of sound - available, but we need to reformulate each time the composition, taking into account the main connotative factors, which derive from the basic elements of coordinated identity : whole passages can quantitatively characterize a more challenging communication, some parts can become repetitive refrains in the shorter ones, up to contract even in a single sound the aspect considered fundamental and significant.
Finally, it is quite intuitive to understand how the tool of advertising that most lends itself to different treatments is similar to the dynamic video advertising.

Sound and Communication

First of all, the first step is to analyze the role of sound in the context of communication "dynamic-video", compared to the context "static-paper". In this sense, the correspondence is with the element "text", as the sound (speech and / or music, noise and more) plays the same role in the script, in all its possible meanings, narrative, short quote, onomatopoeia, single word and / or letter, logo / brand, and so on. The correspondence between the parties of sound that coexist in the same time, therefore, must meet very specific criteria to ensure correct and easy understanding, just as with the legibility of the text components.
And the tools of communication in which there is a widespread presence of different sound sources and on which it is necessary to consider at least the documentaries and commercials, as in both it comes to designing a narrative where the word and the music (or, in a broader sense , sound) identify the constituent parts; the fundamental difference between the two media - the purposes of the issue - basically covers the time spent, the former compared to a book or a short story, the latter to a maxim, an epigram, a poem.
The correct use of these different sources of sound contemporarily, therefore, can be defined by the verification of the appropriateness of the sound choices and the relationships established, that is from the bonds created among music, sound and phrasing .
Just as in the text there are recommended and not recommended combinations and as regards the combination of different typefaces, so there are combinations recommended and not recommended as for the sound. In an audio visual composition, spoken text and monodic music only monophonic will result - as a rule - a nasty perception and a not immediate understanding.
The second aspect to investigate and to compare to the choices related to the world of paper-based communication is the one linked to the relationship text / image which then becomes sound / image relationship.

Also in this case it is possible to identify, both for the text, both for the sound, a double possibility of relationship, the first connecting closely the text / the sound to the perception solicited from the image, the second that deviates programmatically.

Perhaps the most unusual and certainly of immediate suggestion is to choose a consonant, which in the case of sound can be translate an exemplary manner into the so-called "historical consonance"; this consonance is not always precise, but sometimes may be brief, while maintaining a good level of communication, as occurs, for example, when Renaissance images don't match specifically Renaissance music, but it is always possible to limit to a choice of "large period "plugging even baroque compositions. This means, ultimately, relying on stereotypes and leverage on '"collective imagination", which uses consolidated pairings, although culturally and / or scientifically not fully correct.

The second possibility, which is to combine a sound in contrast to the perception of the image, it is undoubtedly more complex, especially for the large degree of arbitrariness and subjectivity of interpretation that leaves just as it happens in the field of paper, where this potential is evident in composing texts in stark contrast to the visual representation or however far from it. It should be noted, in this regard, the context of advertising, with the design of advertising campaigns, where nobody shows the product for example, nor do they talk about the product, but reference is made to potential scenarios due to the absence (or the consequences of the presence) for that product; naturally the contrast that is created is intentional and is nothing more than a means refined and not immediate to connect anyway the visual perception to the textual in one case - and sound in another , according to a mechanism that belongs also to figures of speech, well-tested as for the language: metaphors, allegories, transpositions can become parts of the audio-visual language , as they are for the textual-visual equipment.

Of course, the shorter the communication the greater care is in regulating the relations among the different component parts, so as to ensure a complete and correct understanding and correct: in this sense, the spot is a project of considerable complexity, since it exhausts its strength in a few moments and during this period it must deal with and conclude the narrative, in unequivocal and memorable terms in the sense of permanent memory of the observers and listeners.

The role of sound in communication, as can be seen already from the numerous above considerations , is the subject of researches and studies, because of the potential that still can be increased and, consequently, there are numerous critical readings on various aspects of existing cases , as indispensable tools for future direction.

In 1999 for instance Jean-Remy Julien analyzed and catalogued the main functions of music in advertising, reasoning especially in radio communications and has come to define the five possible positions:

• demarcative; • implicative; • decorative; • affective; • poietic.

Once analyzed, at least briefly, the components of the audio-visual projects, identified in words, sounds and images, as well as the possible main linguistic variants that correspond to the major structural types, we must investigate the relationship that adjusts the sound to image; it is fundamental , of course, the perfect synchronization between music, words and visual system. These elements may be all present or only partially and synchronization becomes a discriminating

factor in terms of the final good yield, especially in the world of video clips, commercials and music in all projects where even the narrative text is set to music.
This synchrony is regulated and audited by “singular” points" that interrupt the flow of the narrative, and which can also be used as special moments suitable to support a change of scene, to introduce the chorus or to follow the rhythm of the music.
The factors that characterize the design of an audio-visual instrument from the point of view of the narrative structure are nine:
• discursive repetition, unity of great length (sentences);
• demarcation (segmentation data elements from music);
• symmetry;
• repetitions of museme (basic unit of musical expression);
• direction (direction of movement toward something);
• flow motor (relationship between image and rhythm);
• dynamics;
• sound processing;
• predominance of individuality factor (relationship between vocal and instrumental).
Communicating with sound, ultimately, means - as stated so far – to represent, by means of a language, other than visual or literal, phenomena, facts, impressions, feelings that we want to remain etched in the memory of the listener; communicating with the sound in advertising means also to link the traditional slogan performed and / or written, to a a headline sound, often even more memorable than the linguistic, although in some cases, more difficult to reproduce vocally: a primary tool of this form of communication is certainly the spot or, in a more general sense, the video clip with sound. In any case, to highlight the sound sign, the composition should provide a kind of buffer zone, which has the function of isolating such a sign to make it unique and not confuse it with other elements; in terms of composition it is also arguable that there are a few possibilities:
• The sound sign is unique;
• The sound sign is connected synchronously with the graphics text and / or visual;
• The sound sign is connected synchronously with the video image;
• The sound sign is connected synchronously with graphics and image video.

Conclusions

In conclusion, it should take some of the concepts that are used to connect the compositional elements of communications with sound characterization to the graphic ones.

First, some considerations of a general nature, concerning the relationship between the various parties that is among the text, images, marks, and the sound aspect. Of course, if already in the projects of static communication the correlation between the different elements (word, visual and graphic support) is of paramount importance for the success of the communication itself, even more so by inserting the additional variable given by sound and movement that correlation must exist and be completely treated in detail; therefore, any choice of composition-design will have as its primary goal and starting point the coherence with the final message and the participation of all elements in the establishment of such a message.

And also for what concerns the use of sound as a sign of identity and connotative apply, in principle, the same considerations are valid: in some cases it is not necessary to follow the visual narrative to know where to connect the information, in fact, very often happens that is not the image or sequence of images to reveal the protagonist, but only the sound sign.

This means, ultimately, to be able to express in forms even deeply different, but with the same effectiveness, also opening to the sound sign -acquired as well as for the image- a potential character of universality, well above the inherent sectoralisation of the word, whether written or oral.

Digital traces as tool of a human-centred design approach

Ami Licaj
Department Architecture and Design DAD (University of the Study of Genoa)
email: licaj.ami@gmail.com

Abstract

Today humanity generates 5 exabytes of data every 12 hours, through devices that are now extending of our skin, our mind and our existence. The hyperconnected society generates digital traces that, for those who are able to read them, describes the reality of the existence of people, their habits and their needs. Digital traces of online life, the life in which we exist for most of our time - probably coming into the future to live in continuous online flow -, are readable signs of problems related to every aspect of people life's and therefore citizens. Knowing how to read and understand these traces - data - means knowing how to listen society and its needs, and above all the city and its citizens, the starting point for a human-centered design.

Abstract

Oggi l'umanità genera 5 exabyte di dati ogni 12 ore, tramite device che ormai sono estensione della nostra pelle, della nostra mente e della nostra esistenza. La società iperconnessa genera dunque tracce digitali che, per chi è in grado di leggerle, raccontano la realtà dell'esistenza delle persone, delle loro abitudini e delle loro necessità. Le tracce digitali della vita online, che sempre più sta diventando la vita in cui esistiamo per la maggior parte del nostro tempo – probabilmente arrivando in un futuro a vivere in flusso online continuo –, sono segnali leggibili di problemi relativi ad ogni aspetto della vita di persone e dunque cittadini. Saper leggere ed interpretare queste tracce – i dati – significa saper ascoltare la società e le sue esigenze, e soprattutto la città e i suoi cittadini, punto di partenza per una progettazione human-centred.

Introduction

"All of us are both producers and consumers of information" the concept is expressed in the Introduction of Jacobson's book "Information Design". The sense is that designers are not only the

professional figure between technology and usability, user and interface, message and communication. They are also consumers, users and recipients of the message, as much as their users. As Iaconesi claims, quoting Bateson, we ourselves are part of the ecosystem and this becomes a fundamental element for his observation and ecological thinking.[1] So the designer is both a person and a user, he lives in society and is an active part of this system.

The designer and professionals of any field, have the power to be able to observe with careful and critical eye according to the criteria of their discipline. What designers should start doing is to consider the digital environment as a first analysis place for their projects. It's no longer enough nowdays sitting on a bench watching people to design, as designer Paul Ulian says[2], because we would probably face only the image of people folded on their devices, intent to exist in their digital environment while walking in the natural one. In the digital environment there is a large part of their time and it is in that place that the needs of the end users of their projects and work are hidden. Another reason to consider, during the design process, even online existence is that often the two existences do not coincide, but in both there are elements of truth.

The digital traces that define our digital identity are in fact a part of the often different and contrasting ego, as Sara M. Watson demonstrates in the analysis of her digital data from social networks and different platforms in common use. What comes out is a fragmented profile but with interesting variables, which show that digital traces can capture aspects of ourselves that we can not grasp in analogue life, and these variables can not be ignored when considering needs of our users and citizens.

"She is between 25 and 34 years old. Or he is less than 32 years old. It's a Millennials. She is deducibly married. But she uses her phone as one single woman.

(...) Listen to rock, rap and hip-hop music and read children's literature. Is passionate about robots and renminbi. She likes water, ice, oranges, the wellness centers, the Chinese New Year, the cervical vertebrae and the color of the Human skin. It has a retro style.

(...) He only did 40,094 steps last week. It could qualify for a medical study on anorexia[3]"

However, having a complete picture allows us to apply processes, methods and tools of design in order to carry out projects that are functional on the totality of the individual and that respect its existence, its daily rituals and needs; being the designer who solves problems must have a complete picture of them, and not partial. The analysis of the traces of digital identities on the web in general, and on social networks in particular, should become an integral part of the profession of the designer and his education.

" Ask questions because data has the answers[4]"

The traces of online existence are data, informations that hides problems, needs but also answers. Designers contribute with our daily slice of data to feed this system that now as ever homologates us through social and device. Within this homologation these two constants – social and devices –, almost present in everyone's lives, allow us to have starting points to understand what the new

[1] S. Iaconesi, O. Persico, La cura, Codice, Torino, 2016

[2] T. Bovo, Paolo Ulian: Non devo parlare inutilmente, www.frizzifrizzi.it, 6/10/2017

[3] S. M. Watson, Bits of me, www.schirn.de, 21/06/2016

[4] D. de Kerchove, Cultura e società in trasformazione: l'era digitale, conferenza Palazzo Ducale, Genova, 10/04/2016

Fig. 1 "Social Decay" Andre Lacatusu behance.net

Methodology

"(…) we have recognized that INFORMATION is the MERCHANDISE par excellence. The interesting fact, however, isn't this, in my opinion, but the fact of recognizing that traditional merchandises (goods, objects, services) are in very strong decline values. We no longer know what to do with traditional goods and this come designers we should be worried.

The only good that matters is information (data) and if we include this in the acquired ability to implement data (big data analytics) in real time and in enormous quantity, the phenomenon becomes interesting and action is urgent.[5]"

Never before, being part of the system from the inside, designers can try to understand these complex systems, to try to understand how all this can be used in terms of an instrument and a means of analysis, problem-solving, problem-finding and ethical communication.

A possible way to do this could be starting from self-observation, as user-designers. Observe themselves to observe; be test subject of themselves, to understand relationships and behaviors between body, devices, social networks and data; starting from the personal case study, to comprehend the common one homologously.

The practice of observing oneself has not always been an applicable method in the design process, indeed it is often used to make a kind of self-censorship of what are their intimate visions and opinions, trying to keep the most objective vision towards the project and as detached as possible. Probably because, even if always present in different forms, the homologation has never been measurable.

In recent years, self-tracing practices have allowed many designers, such as Giorgia Lupi and Nicolas Felton, to develop projects and studies on body-device-data relationships. Starting from the analysis of oneself led to reflect, and give answers, on common problems, contributing to validate neonative theories.

Giorgia Lupi, designer and creative director of Accurat, and Stefanie Posavec, with the Dear Data project, have collected and measured every week, for a whole year, data that examined, from time to time, aspects of their daily lives, carried out in two different cities, New York and London.

[5] F. Celaschi, Intervista Dicembre 2017.

The two designers processed these monitors every week on different themes, and turned them into Views on a postcard, ready to be sent to the other side of the Atlantic.
How many times have they complained or when they have felt envious, how many times have they looked at the time, how many times have they said "thank you", the sounds they have heard, etc. Tackling each theme involved understanding more and more the relationships between technology, space, time and one's identity[6].
Listening to ourselves but also listening to the world, this is what we tried to do through the project with the participatory performance Baotaz realized in August 2016 and exhibited at the Triennale Design XXI, on the occasion of the "Knowledge Sharing" convention. The installation was designed and developed during an international Summer School at the ISIA in Florence, organized by Salvatore Iaconesi, Oriana Persico and the Nefula team. Baotaz consisted of three elements which made the experience of multi-sensorial and extremely immersive enjoyment.
In its entirety it allowed to "listen", in different ways, the conversations of the hyper-connected world - through real-time data coming from social networks - on the theme of inhabiting the planet. The intensity of the conversations and the emotional aspects were translated by a silicone brain - a metaphor of the hyper-connected mind - which lit up through the leds according to the emotional progress of the conversations, a helmet that transformed intensity and emotions into vibrations, allowing the user to listen through the wearable and therefore his own skin, and finally an online platform that, through an interactive visualization, allowed to explore data on emotions and conversations.
The performance therefore acted on the extremes of the immersiveness and on the power of the permeability of the message through use contemporary of almost all the senses. Data, skin, eyes, body, mind and social networks gathered around an ubiquitous conversation.

Fig. 2 "sur-fake" Antoine Geiger. http://antoinegeiger.com

[6] S. Posavec, G. Lupi, Dear Data, Particular Books, London, 2016.

Fig. 3 "Baotaz" La Cura Summer School. Triennale Design XXI, Milano 2016

Conclusion

Data are traces of people's lives and the digital environment where we actually exist online. Designers should try to understand how to observe the digital environment, collect these traces and learn how to read them in order to discover problems and solve them. Learning to collect, process and make accessible data's users of the project means placing their existence, their body and their identity at the center of the project, because data derive from them. A closed-circle process, the data produced by the people / users / citizens are shared, borrowed from the designer and returned to the direct owners in the form of a customized project.

References

T. Bovo, Paolo Ulian: *Non devo parlare inutilmente*, www.frizzifrizzi.it, 6/10/2017

S. D. Carli, *"Nella società ipercomplessa, la strategia è saltare le separazioni,"* 09-Jun-2017. [Online]. Available: http://www.vita.it/it/interview/2017/06/09/nella-societa-ipercomplessa-la-strategia-e-saltare-le-separazioni/119/. [Accessed: 29-Jan-2018].

P. Ciuccarelli, G. Lupi, and L. Simeone, *Visualizing the Data City: Social Media as a Source of Knowledge for Urban Planning and Management*, 2014 edizione. Springer, 2014.

C. Chen, *Information Visualisation and Virtual Environments.* Springer, 1999.

J. A. G. M. van Dijk, *The Network Society*, Third Edition edizione. SAGE Publications Ltd, 2012.

Q. Fiore and M. McLuhan, *Il medium è il massaggio*. Mantova: Corraini, 2011.

S. Iaconesi, O. Persico, *La cura*, Codice, Torino, 2016

R. E. Jacobson, *Information Design*. Cambridge, Mass: Mit Pr, 2000.

D. de Kerchove, *Cultura e società in trasformazione: l'era digitale*, conferenza Palazzo Ducale, Genova, 10/04/2016

J. Lankow, J. Ritchie, and R. Crooks, *Infographics: The Power of Visual Storytelling*, 1 edizione. Hoboken, N.J: John Wiley & Sons Inc, 2011.

T. Maldonado, Memoria e conoscenza. *Sulle sorti del sapere nella prospettiva digitale.* Milano: Feltrinelli, 2006.

M. McLuhan, *Gli strumenti del comunicare.* Il Saggiatore, 2015.

S. Posavec and G. Lupi, *Dear Data*, 01 edizione. London UK: Particular Books, 2016.

S. M. Watson, *Bits of me*, www.schirn.de, 21/06/2016

A. C. Telea, *Data Visualization: Principles and Practice*, Second Edition. CRC Press, 2014.

G. Ziccardi, *Il libro digitale dei morti: Memoria, lutto, eternità e oblio nell'era dei social network.* Utet, 2017.

From vision to visualization

Massimo Malagugini
Department Architecture and Design DAD (University of the Study of Genoa)
email: max.mala@libero.it

Abstract

In the digital age, new areas of application are being defined for the disciplines of representation. The digital representation has now replaced the rigorous design with the ruler, while in the process of visualization of ideas plays an increasingly decisive role the freehand drawing. The increasing use of digital tools for representation, including in teaching for the training of architects and designers, leads to the increasingly scarce experimentation and application of freehand drawing. The professional studies report the lack of attitude in the new graduates - more and more related to the use of software - for freehand drawing and sketching, highlighting the risk of having to give up a fundamental step in the design phase: the moment in which the designer's vision is displayed on the card. The ability of the designer to be able to represent effectively and immediately the idea that is taking shape in his mind is, in this first phase, of fundamental importance. This is the moment in which, for the first time, the idea is visualized and as such it must still maintain a margin of indefiniteness that can be developed in successive steps.

The analysis of project sketches and works created by some great contemporary architects shows how this initial phase of the project is particularly delicate and must not be neglected; freehand drawing is still the most effective way to visualize the idea.

Abstract

Nell'era digitale si stanno definendo nuovi ambiti di applicazione per le discipline della rappresentazione. La rappresentazione digitale si è ormai sostituita al rigoroso disegno con il righello, mentre in fase di visualizzazione delle idee svolge un ruolo sempre determinante il disegno a mano libera. Il crescente impiego degli strumenti digitali per la rappresentazione, anche nella didattica per la formazione di architetti e designer, conduce alla sempre più scarsa sperimentazione e applicazione del disegno a mano libera. Gli studi professionali denunciano la mancanza di attitudine

nei nuovi laureati – sempre più legati all'uso dei software - per il disegno a mano libera e lo sketching, ponendo in evidenza il rischio di dover rinunciare ad uno step fondamentale in fase di progetto: il momento in cui la visione del progettista viene visualizzata sulla carta. La capacità del disegnatore di riuscire a rappresentare con efficacia e immediatezza l'idea che sta prendendo forma nella sua mente è, in questo prima fase, di fondamentale importanza. È questo il momento in cui, per la prima volta, l'idea viene visualizzata e come tale deve ancora mantenere un margine di indefinitezza che potrà essere sviluppato in step successivi. L'analisi di schizzi di progetto e opere realizzate di alcuni grandi architetti contemporanei evidenzia come questa fase iniziale del progetto sia particolarmente delicata e non vada assolutamente trascurata; il disegno a mano libera resta ancora il mezzo più efficace per la visualizzazione dell'idea.

Introduction - Sketching: a project means for the concept

Sketching is the fundamental means for the representation of a concept: the immediacy of the gesture that he draws by free hand is very effective for grasping thought's fluidity and mutability. Plotting graphic signs on the paper implies awareness of what you are viewing and, above all, obliges the designer to 'walk' with his hand what the thoughts describe.

In the concept design, the designer's personality emerges in all of his expressive force: it is not just a matter of putting a real and concrete fact on paper, but to interpret and shape one's own thought.

The authorial component then becomes dominant in the representation itself, as the concept design is the personal display of one's own idea. This is why drawing, even in its immediacy and simplicity, has to capture a lot the essencof thought as the personality of its author.

In the concept phase, drawing is an essential means of investigation, because the idea that is displayed in a non-detailed way is simultaneously analyzed, processed, modified, up to adhere to the same thought with greater punctuality. While transposing on paper the forms that are being thought, through the drawing the relationships between them, their functionality, are verified. Occurs if their perception is really what was thought. From these observations, conducted in real time while the concept is being elaborated, further reflections start that lead to differently elaborate the already designed shapes, or to think about them of new, in a continuous comparison between vision and visualization. Shapes and elements can be represented by the different methods: a perspective representation allows you to have a visualization very close to the real one, while an orthogonal projection allows to clearly visualize the dimensional and proportional parameters of the object itself and its parts.The choice of the method to be used is often related to the type of project and to the type of approach adopted during the design phase. To think of a space articulated on several levels, with double height environments, illuminated from above or in any case characterized by a particulary covering, it can easily induce the designer to operate through sections represented in orthogonal projection. The distributive development of a sequence of spaces arranged on a single level, may require an effective planimetrical study. In the case of complex architectures and buildings, the separate view of plants and elevations it may not provide the elements necessary for a clear view of the space same and for this reason it is useful to resort to the perspective representation. With the perspective you can effectively visualize the three-dimensionality of what you are drawing, re-proposing those relationships that the parties could have in the reality.

This with a more difficult definition of the real proportions between the different elements.
Renzo Piano's projects are generally displayed through sketches in section, elevations, and in any case drawings in orthogonal projection. They find in this type of representation a remarkable correspondence to the idea that is at the basis of the project itself. Comparing the concept drawings made by the Genoese architect with the buildings and architectures realized, there is a faithful correspondence between the initial idea and its realization.Much more abstract, however, are the dynamic and yet sketchy visions of Frank O. Gehry, who are able to immediately visualize the complexity of the forms that will be created.

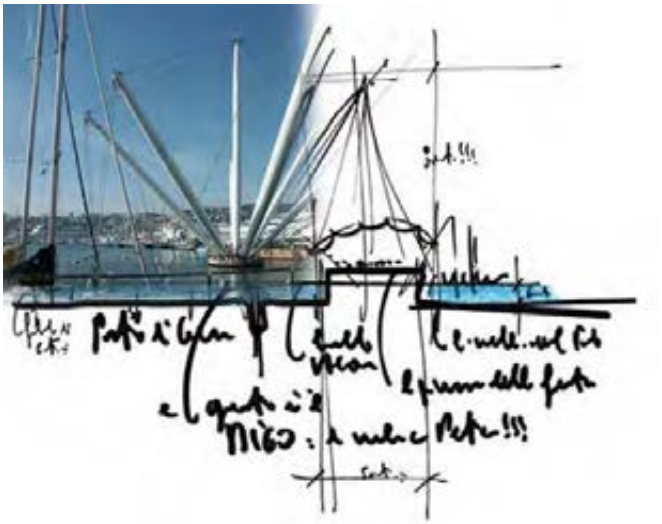


Fig.1 Renzo Piano, Bigo (Genova, 1992): overlapping of the project sketch with the image of the work created.

Fig.2 Frank O. Gehry, Guggenheim Museum (Bilbao, 1991-97): overlapping of the project sketch with the image of the work created.

Methodology - Between idea and realization

If architects like Renzo Piano or Frank O. Gehry manage to keep the idea present in their sketches until the realization of the work, it may happen that works created by other designers are not completely consistent with the initial concept and with the first drawings.

The reasons for this possible discrepancy between the initial drawings and the work carried out are to be found both in the technical and economic requirements that can modify the project itself during its elaboration, and in the scarce descriptive character of the drawings themselves.

The indefinite character that represents an expressive potentiality for the initial sketches may, in some cases, not have the strength to define even the main constitutive elements of the project itself. This, of course, is a limit that is closely related to the designer's ability to consistently control the design in all its phases (from the first approach to the final steps) through design control.

It is extremely interesting to analyze the process of elaboration of an idea from the initial concept up to the realization of the work itself, through the reading of the graphic works that have been drawn up during the project phase.

In addition to the correspondence between drawing and work, it is useful to analyze how the personality of the designer can be traced back to his works, that is, how these are recognizable and identifiable.

The more recognizable the author is in the works created, the greater the possibility that there will be an absolute coherence between the initial sketches and the building created.

The works of the American architect Frank O. Gehry, realized over half a century are extremely significant for this study: both the first works realized in the '60s - expression of a first break with the post-rationalist currents of the twentieth century - and the most recent works that have opened the way to the experimentation of parametric architecture, are the consistent manifestation of the original idea of the designer.

Fig.3 Frank O. Gehry, Davis House (Malibu, California, 1968-72): Comparison of the sketches and the constructed building.

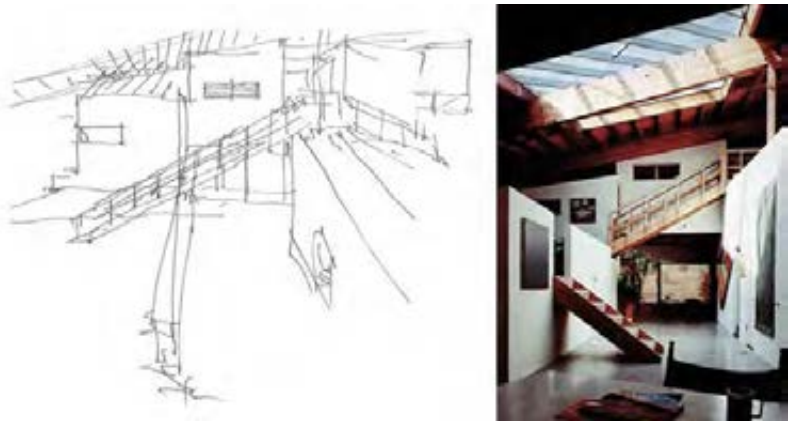


Fig.4 Frank O. Gehry, Davis House (Malibu, California, 1968-72): Comparison of the interior's sketch and the constructed house.

The professional career of the American architect can also be seen in his sketches related to the respective works: his drawings are recognizable for an extreme graphic synthesis realized through black pen (or Indian ink) strokes and have the prerogative of being able to represent with extreme immediacy the essence of his projects. Significant are the sketches produced for the Davis home-studio in Malibu (1968-72), in which a few strokes of felt-tip pen manage to provide the concrete image of the building that the architect had in mind. These drawings show with simplicity and immediacy both the external forms of the house-studio and the interior spaces articulated on several levels. These drawings start from still rather simple forms (typical of Gehry's early works) that seem to break down to generate dynamic forms.

Fig. 5 Frank O. Gehry, Aerospace Museum (Los Angeles, California, 1982-84): Comparison of the sketches and the constructed building.

This is also reflected in the drawings for the Gehry-house of Santa Monica (1977-78 and 1991-94) in which the traditional form of the original house is composed with features that define a new formal reference. Simplicity and dynamic component are found in all the sketches made by Gehry in those years.

As Gehry's design choices become more and more daring, his sketches become more complex as well. The author always maintains the black and indefinite line and the drawn forms can still be traced back to a composition of simple forms (as in the sketches for the Aerospace Museum of Los Angeles in 1982-84).
Gehry's ability to synthesize allows the sketch to be immediately brought back to the work and, at the same time, allows the architect to control the idea until it is realized.
Even when the American architect's architectural works use figurative elements, they are visualized with extreme simplicity and immediacy both in the sketches and in the realization. So it happens that the "fish" - made on a large scale - becomes for some years a connotative element of his works, as a sort of "comment on postmodernism".

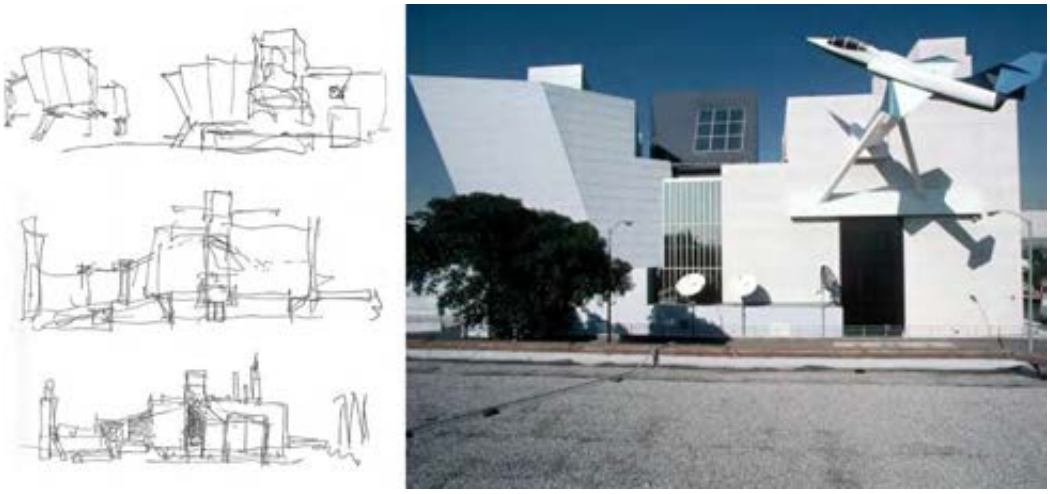


Fig. 6 Frank O. Gehry, Sketches for the performance "The course of the knife" at the Venice Biennial in 1985 and for the study of the "Fishdance Restaurant" in kobe, Japan (1986-87)

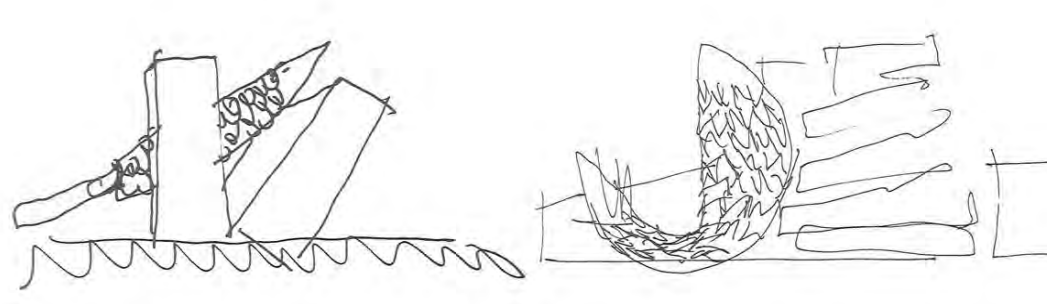


Fig. 7 Frank O. Gehry, Office building for National-Nederlanden, Praga, 1992-96): Comparison of the sketches and the constructed building

The evolution of Gehry's idea of architecture leads to extremely articulated projects that find a direct correspondence in the sketches that are increasingly rich in lines and seem to generate increasingly complex and dynamic forms. The American designer's tendency is to visualize his idea mainly through views of external forms that seem to seek a compositional balance between shapes and textures, enhancing the dynamic character of the entire composition. Even his works are real architectures in motion, which appear to the observer always different at each sight, but always strongly recognizable.
In particular, the sketch for the office building of the National-Nederlanden in Prague (1992-96) not only clearly visualizes the final forms and proportions of the architecture, but also simply describes the genesis of the project itself (and of Gehry's projects in general): from simple, static and linear forms to fluid, dynamic and complex compositions, culminating in the Guggenheim in Bilbao (1991-97).

Fig.8 Frank O. Gehry, Office building for National-Nederlanden, Praga, 1992-96): Comparison of the sketches and the constructed building.

Conclusion - Author, idea and project

The analysis of the sketches and related works by Frank O. Gehry provides an architectural reading model applicable to each designer's work. In this sense it is possible to verify how the expressive force of the designer has influenced the creation of the final work with greater or lesser authority. It is also possible to analyse the evolution of architecture itself through the evolution of architectural drawings relating to individual authors, also initiating a transversal comparison between the personal expression of each author and the common forms and languages of architecture.
Different graphic techniques, different methods of representation, different approaches to the project and its characters (plans, sections, elevations, overall perspective views, etc..) are the basis of the graphic language adopted by each designer as an expression of his or her idea.
Contemporary digital technologies certainly allow a more correct visualization of forms with respect to reality, but they require a too conscious and bound definition of the idea, with the consequent loss of potentiality of the idea itself.

It is therefore necessary to safeguard the ability of each designer to visualize the idea quickly and immediately through drawing. Hand drawing is, in fact, the first means that succeeds in transposing the idea onto paper, that is, it succeeds in visualizing what up to that moment were simple visions in the mind of the designer.

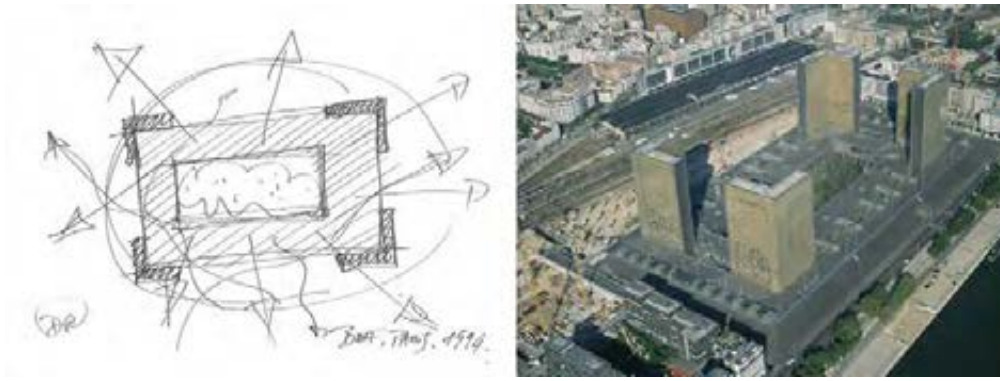


Fig.9 Dominique Perrault, National Library, Parigi 1989-95): Comparison of the sketches and the aerial view of constructed building.

Fig.10 Massimo Malagugini, "L'architettura e la sua immagine". The sketch should be an image of what the architect is thinking. (Iceberg dwellings, Aarhus, DK, JDS, Cebra, L. Paillard and SeARCH architects, 2012)

References

D. B. Brownlee, D. G. De Long, *Louis I Kahn*, Rizzoli, New York, 1992

F. Dal Co, Kurt W. Forster, H. Soutter Arnold, *Frank O. Gehry. Tutte le opere*, Electa, Milano, 1998

M. Malagugini, *L'architettura e la sua immagine – il disegno fra indagine e progetto*, Genova University press, Genova, 2018

C. Paredes Benitez (a cura di), *Schizzi e modelli per edifici pubblici,* Logos, Modena, 2008

F. Serrazanetti, M Schubert (a cura di), *La mano dell'architetto/the hand of the architect,* Moleskine – Editrice Abitare, Segesta, 2009

J. Will, *Architect's sketchbooks*, Ippocampo, Londra, 2011

The art of sailing at the time of steamboats: cultural and territorial identity.

Claudia Tacchella
Department Architecture and Design DAD (University of Genoa)
email: corradi@arch.unige.it

Abstract

In the early years of the nineteenth century before the introduction of steamboats, the fluvial navigation was entrusted to boats, barges and flat keelboats. The barges equipped with a long low deckhouse and the keelboats sailed the rivers and lakes, but they were heavy boats, even with a long and slender keel. The boatmen used the power of the current to move these boats, in addition to the oars. They also used an oar rudder to operate these kind of boats, fighting with force and tenacity against the murky and swirling waters of rivers and lakes. The only justification for classifying these vessels as boats was because they floated on water and were used as means of transport. The birth of steam propulsion has significantly changed this way of sailing. In this short note we want to tell a story of our home: the history of the *Concordia*, a steamboat built by Odero shipyards in Genoa- Sestri Ponente, for navigation on Lake Como. *Concordia* is a majestic metallic swan, a steamboat with wheels, that for more than ninety years it has been shovelling on «that branch of the lake», quoting Alessandro Manzoni. It is a story of images, colours and sounds, of cultural and territorial perceptions and identities, but also of science, mechanical technique and technology that has characterized lakeside navigation in Italy for almost a century.

Abstract

Nei primi anni dell'Ottocento la navigazione fluviale, prima dell'introduzione dei battelli a vapore, era affidata a barconi, chiatte e barche a chiglia piatta. Le chiatte, dotate di una lunga tuga bassa, e i barconi salivano e scendevano i fiumi e i laghi, ma erano imbarcazioni pesanti, anche se con la chiglia lunga e slanciata, e i barcaioli usufruivano della forza della corrente, oltre ai remi per muovere questi natanti e a un remo timone per le manovre, combattendo con forza e tenacia contro le acque torbide e vorticose dei fiumi e dei laghi. L'unica giustificazione nel classificare questi natanti come imbarcazioni era dovuta al fatto che galleggiavano sull'acqua ed erano usati come

mezzi di trasporto. La nascita della propulsione a vapore ha sensibilmente modificato questo modo di navigare. In questa breve nota si vuole raccontare una storia di casa nostra: la storia del Concordia, battello a vapore costruito nei cantieri Odero di Genova- Sestri Ponente, per la navigazione sul lago di Como, un maestoso cigno metallico, un battello a vapore con ruote a pale cha da più di novant'anni naviga su quel «ramo del lago» di Manzoniana memoria. Si tratta di una storia di immagini, colori e suoni, di percezioni e identità culturali e territoriali, ma anche di scienza, tecnica e tecnologia che ha caratterizzato per quasi un secolo la navigazione lacustre in Italia.

Introduction

In the beginning of the eighteenth century before the introduction of steamboat, the river navigation was entrusted to the flat-boats, the barges with long and low deckhouse and the keel-boat. All of these to sailed on lakes and rivers, exploiting the current or using the oars. The only reason to call their "boats" was that they floating and they were used as transport. The *coches d'eau* were the most used transport for the river navigation in the France of the XVI century. They were horse-drawn covered boats of big dimension, used especially on the Seine to transport merchandises and passengers. But in the end of the century, following the invention of the steam engine, the first paddle steamers appeared on the river. They replaced the *couche d'eau* and provided an increasingly intense service. It was thanks to foresight and efforts of enlightened characters like Claude François Joseph d'Auxiron (1728 - 1778), Claude-François-Dorothée, marquis di Jouffroy d'Abbans (1751 - 1832) e Edward Church Jr. (1787 – 1843), consul of the United State at Lorient, that the experiments of the paddle steamer began, first on the Seine, and later on the Saône[1], and then on the Garonne and on rivers and canals of the France[2]. They wanted to build a boat able to transport more merchandise and more quickly than transport by men and horses. In the 1818, Edward Church Jr. was one of the steamboat promoters in the Europe, and he also was the owner of the patent for building steamboat in France. With a help by some businessmen, he built a steamer called *Garonne*, that was launched on August the 3rd, 1818. In a few years the success of the first pioneers generated the birth of several steam companies, as the "Société des Quatre-Bateaux". This company started the activity, with only three steamers called *Henri IV*, *Français* and *Sully*. In consequence of the positive feedback from customers, the "Société des Quatre-Bateaux" ordered other boats in the following years. Stendhal (1783 - 1842) wrote in *Voyage dans le Midi de la France* (Paris: Le Divan, 1930): «Mais songez-y, voyageurs, quelques jours suffisent pour voir Bordeaux. Si vous voulez remonter aujourd'hui la *Garonne*, hâtez-vous, car le moment du départ approche … Ecoutez … l'heure sonne, les fourneaux s'allument, la machine fonctionne, la vapeur s'élève, tourbillonne, la cloche tinte, les passagers accourent, les matelots jurent; …tumulte général! Confusion! C'est étonnant! Adieux, saluts, regrets, sourires et promesses sont échangées de part et d'autre… Mais le capitaine l'ordre du départ, on pousse au large, le navire s'ébranle, les adieux plus bruyants se renouvellent, les retardataires accourent essoufflés, s'élancent et se cramponnent aux sabords.

[1] Rivet, Félix. *La Navigation à vapeur sur la Saône et le Rhône, 1783 -1863*. Paris: Presses universitaires de France 1962.

[2] Dutens, Joseph-Michel. *Histoire de la navigation intérieure en France avec une exposition des canaux à entreprendre pour en compléter le système*. Paris, Sautelet et C., 1829 and Le Sueur, Bernard. *Batelleries et bateliers de France, histoire illustrée de la navigation intérieure*. Roanne: Horvath, 1984.

A bord, les maris cherchent leurs femmes, les femmes leurs enfants; on examine les passagers, les spectateurs groupés sur la rade; puis vogue la galère, à la garde de Dieu». A new chapter of boat transport had therefore opened; steam would soon become the leader of rivers, lakes and seas.

So, the birth of the steam engine had sensibly change the way to navigate. While the navigation in different parts of the two continents turned to sea navigation first in France and then in Switzerland, there was a great diffusion in the fluvial and lacustrine traffic[3].

In a few years, thanks to the pioneering experiments of Robert Fulton (1765 - 1815), builder of *Clermont*, and William Symington (1763 - 1831), builder of *Charlotte Dundas*, just to mention the best known, the steamboat became the most widespread means of transport for coastal and river navigation[4]. Throughout the nineteenth century the new discoveries of technology and new construction technologies brought continuous improvements to steamboats and new businesses were launched between Le Havre and Caen, and then in Paris on the Seine (with the *bateaux-mouches*) thanks to the famous "Compagnie Générale des Bateaux Parisiens". In a very short time the "steamboat fever" reached the Danube (1829) thanks to the "Donau-Dampfschiffahrts-Gesellschaft"[5], the Rhine[6], where at the beginning navigated the English steamer *Defiance* launched in 1815 on the Thames and also in the Dutch canals (1823), through the "Nederlandsche Stoomboot Maatschappij" company. As well as in France, Edward Church Jr. introduced the steam navigation in Switzerland. In 1823 he launched the first paddle steamer on the Lake Geneva. This steamboat was the *William Tell*: its length was 25 meters long and the capacity was 200 passengers. A new era of the steam navigation was born[7], and it found his maximum moment of expansion between the 1900 and the 1913, the *Belle Époque* period.

The history of this invention is so wide that it is impossible to describe it in a few words, and for this reason, for further information, we invite readers to consult the books in the bibliography[8].

We want to tell a story of our country: the history of the navigation in the most important Italian lakes and among the men, shipyards and boats stories. We will focus on the *Concordia*, a paddle steamer built by "Odero" shipyard of Genoa, Sestri Ponente, for the lake of Como navigation. It's a majestic metallic swan, which for more than ninety years has been navigating on «that branch of the lake», quoting Alessandro Manzoni.

It is a story made up of images, colours and sounds, of cultural and territorial perceptions and identities, but also a story of science, mechanical technique and technology that has characterized the Italian navigation on rivers and lakes for more than a century[9].

---

[3] Mollat, Michel (Sous la direction de). *Les Origines de la navigation à vapeur*. Paris, P.U.F., 1970.

[4] Woodcroft, Bennet. *A sketch of the origin and progress of steam navigation from authentic documents*. London: Taylor, Walton, and Maberly, 1848.

[5] Hajnal, Henry. *The Danube: Its Historical, Political and Economic Importance*. S. l.: The Hauge: Martinus Nijhoff, 1920.

[6] Delrieu, André. *Le Rhin: son cours, ses bords, légendes, mœurs, traditions, monuments, histoire du fleuve depuis sa source jusqu'à son embouchure*. Paris: Desessart, 1846.

[7] Rusca, Giovanni. *La navigazione fluvio-lacuale nell'Europa centrale ed un suo obbiettivo principale*. Locarno : tip. artistica di V. Danzi e C., 1902.

[8] Kennedy, John. *The history of steam navigation*. Liverpool: Charles Birchall, 1903; Morrison, John. *History of american steam navigation*. New York: W. F. Sametz & Co, 1903; Wardle, Arthur. Early steamships on the Mersey 1815-1820. *Transactions of the Lancashire and Cheshire Historical Society*, Vol. 92, 1940; pp. 85-100.

[9] Moschini, Alessandro. *Sulla navigazione fluviale in Italia*. Padova: Società cooperativa tipografica, 1903 and Ogliari, Francesco. *La Navigazione Sui Laghi Italiani - Lago di Como*. Milano: Cavallotti Editori, 1987.

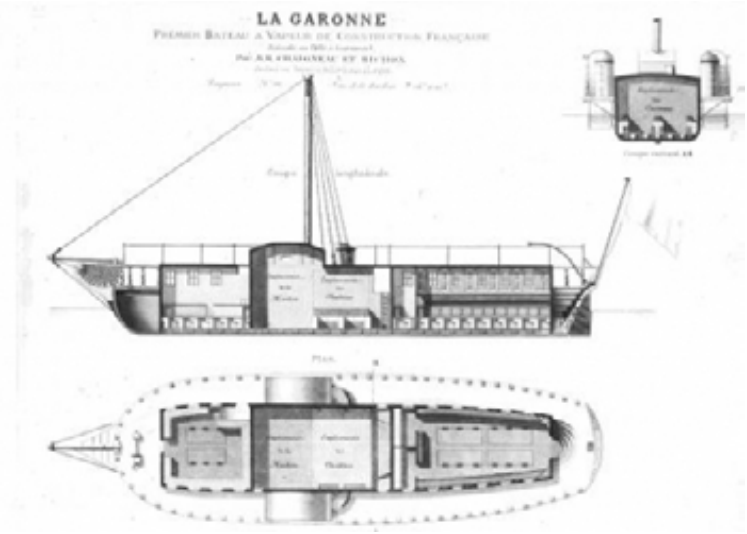


Fig. 1 The Edward Church Jr's Garonne. She was 24 meters long, with a displacement of 82 tons. There was a first class room in the aft, able to accommodate 60 passengers; in front of this there was the restaurant room, in the middle of the deck there was the engine room, and in the bow a room for the second class. Both the rooms were closed, ventilated and give the opportunity of sit down comfortably[10]. The double acting steam engine, of Watt and Bolton type, worked with low pressure, condenser and was 28 hp powered. The paddle wheels' blade were forced by a machinery to exit from the water more or less vertically, to increase their efficiency. On August, 23 1818 the Garonne left Lormont traveling at a speed of 5 knots, this was the maximum speed that a boat of those times could have.

The history of this invention is so wide that it is impossible to describe it in a few words, and for this reason, for further information, we invite readers to consult the books in the bibliography[11]. We want to tell a story of our country: the history of the navigation in the most important Italian lakes and among the men, shipyards and boats stories. We will focus on the *Concordia*, a paddle steamer built by "Odero" shipyard of Genoa, Sestri Ponente, for the lake of Como navigation. It's a majestic metallic swan, which for more than ninety years has been navigating on «that branch of the lake», quoting Alessandro Manzoni.

It is a story made up of images, colours and sounds, of cultural and territorial perceptions and identities, but also a story of science, mechanical technique and technology that has characterized the Italian navigation on rivers and lakes for more than a century[12].

Lake navigation in Italy

The lake navigation in Italy started in the first twenty five years of the 19° century, exactly in the 1824, when a group of Milan bankers founded the "Società Milanese per la Navigazione a vapore nei Laghi del Regno Lombardo Veneto", to the passengers and postal service[13].

[10] Chaigneau, Charles. *Recherches sur les bateaux à vapeur bordelais*. Bordeaux: Imp. Durand, 1899.

[11] Kennedy, John. *The history of steam navigation*. Liverpool: Charles Birchall, 1903; Morrison, John. *History of american steam navigation*. New York: W. F. Sametz & Co, 1903; Wardle, Arthur. Early steamships on the Mersey 1815-1820. *Transactions of the Lancashire and Cheshire Historical Society*, Vol. 92, 1940; pp. 85-100.

[12] Moschini, Alessandro. *Sulla navigazione fluviale in Italia*. Padova: Società cooperativa tipografica, 1903 and Ogliari, Francesco. *La Navigazione Sui Laghi Italiani - Lago di Como*. Milano: Cavallotti Editori, 1987.

[13] Gandini Ercolano. *I servizi postali sui grandi laghi italiani*. Padova: Ausilio editore, 1976.

Three years later the company launched the first steamboat of the Lake Garda, the *Arciduca Ranieri*, which had two steam engines of 28 hp and a capacity of 400 tons, for the passengers service between Riva and Desenzano.

The success of this society brought Francesco Montagnani, a businessman of Riva, to start a his own enterprise on January 25, 1830; he owned a boat with a capacity of 1,000 quintals, the *Amico a prora*. This boat was peculiar: it was propelled by eight real horses!

Due to the diffidence of the steam engine, the public greatly appreciated this transport system. Its particularity also intrigued the Viceroys, Archduke Ranieri (1783 - 1853) and his wife Maria Francesca Elisabetta of Savoia-Carignano (1800 - 1856), who during a trip from Venice to Milan, on April 22th, decided to visit the boat anchored in Desenzano, and they curiously examined the mechanics of the new propelling system[14]. On 1834 the company of Milano decided to renew itself, demolishing the old steamship that had continuous engine failures and problems, and building a new boat, the *Arciduca Ranieri II*, with a fixed cylinder machine that was 18 horsepower and a capacity of 300 quintals, safer and faster than the disused one.

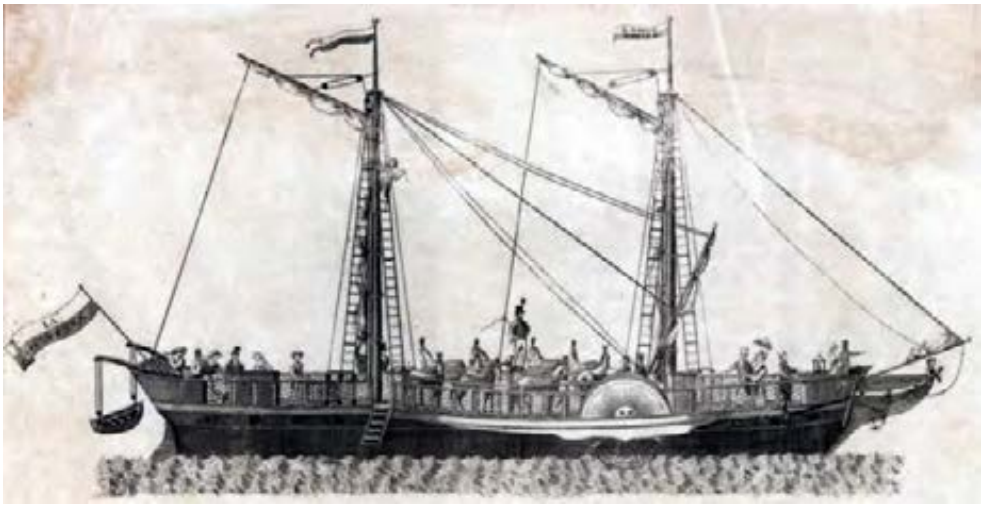


Fig. 2 Steamboat Amico a prora*. From La Navigazione Sui Laghi Italiani - Lago di Como di Francesco Ogliari (Milano: Cavallotti Editori, 1987), p. 18.*

Once again, the success of the enterprise on the lake brought to the birth of another steam navigation company, on the 1824, the "Società Benacense per l'esercizio della navigazione a Vapore sul Lago di Garda". This company began to work in the 1843 with the steamer *Benaco*, built by the shipyard "Escher-Wyss" of Zurich; its engine was 42 horsepower. The "Escher-Wyss" had already built some steamboats for the navigation on the Swiss lakes and it will continue to realize boats for other steam navigation company in Switzerland and in Italy in the following years. The independence wars had caused some difficult to the navigation in the Garda lake. The steamboats *Arciduca Ranieri II* and *Benaco* travelled on the lake, showing the Savoy flag first[15], then the *Austro-Hungarian one*; in the end one was disarmed and the other was sunk.

[14] Arseni, Alessandro. *La navigazione a vapore e i servizi postali sui laghi italiani*. S.l.: The Postal History, 2009; p. 1.

[15] Bignardi, Adolfo. *Lago di Garda. Parte 1: Navigazione e servizio postale dall'impero austro-ungarico al regno d'Italia (1800 -1890)*. Associazione Italiana Collezionisti Posta Militare e Storia Post, 2013; p. 11.

In spite of these difficulties, the new method to navigate was introduced in the Lake Garda, and in a few years a renewal and a enlargement of the fleet was done. This story finished only during the second world war, when mechanical technique and technology innovations introduced another new type of boat: the motorboat[16].

In the same way, also the steam navigation in the Lago Maggiore began in the middle of the 19° century, as that of river navigation in the Po and in the Ticino. Already in 1818, a steamer Carolina, called "pachebotto", served Venice; this steamer connected Venice to Trieste. The following year the steamer *Eridano* was launched to Genoa, by the "Biga" shipyard, to connect Milan with Pavia and Venice. The same company also opened a line for navigation in Lake Maggiore, first with the *Guglielmo Tell* and then with the *Verbano*[17]. In the mid-twentieth century, the "Società Privilegiata per l'Impresa de' Battelli a Vapore nel Regno Lombardo Veneto" obtained control of the navigation of all the internal state water. So on 1841, the company decided to increase navigation with a new modern steamboat. The steamboat was ordered at the Escher & Wyss in Zurich. This steamship was launched on August 19th, 1842; it was the *San Carlo*, built in iron and with a steam engine that was 32 hp. The following year, due to the success, the company built another steamer, the *Verbano II*.

Fig. 3 Steamboat Verbano in an old print [Private collection].

The fortune of the steam navigation continued for several years, in spite of the independence wars. When the conflicts was finally ended, the service was increased with new steamers bought by Switzerland, and with new propulsion systems, introduced in steamboats like the *Benedek* (later *Sempione*), the only one of the fleet with a screw propeller in place of the side paddle wheels.

Since the unification of the Italy, the steam navigation was again increased, and several steamboats were introduced in the first decade of the twentieth century.

[16] Cambié, Giorgio Maria. *Uomini e merci: la navigazione sul Lago di Garda*. Bosco Chiesanuova: Edizioni scaligere; Santa Maria in Stelle, Verona: Gruppo culturale Italo Montemezzi, 1988.

[17] Cherini, Aldo e Nigido, Manlio. *La navigazione sul fiume Po e il contributo del Lloyd Austriaco*. Trieste: Associazione Marina Aldebaran, 1994; p. 3.

There were the older steamboats: the *Paleocapa*, an iron steamboat with screw propeller, the *Verbano III*, first steamer realized by the "Ansaldo & Co." of Genoa, completely iron boat, the *Italia*, in the 1818, and the *Elvezia II*, in the 1890. New steamboats were introduced in support of the old ones: *Moltrone*, built at Genoa by the "Società Anonima Cooperativa", *Milano* on the 1912. One year later, *Torino* and *Genova* had been launched. The Genoese "Ditta Bacigalupo" had built both of them. However, with the First World War the "Impresa di Navigazione sul Lago Maggiore" went through a very difficult period. On June 18th, 1917 the commander Cesare Mangili (1850 - 1917), director of the company, died, leaving an administrative vacuum. It was very difficult to find a person of equal value able to lead the Company. Moreover, without his political support as a senator of the Kingdom, after a short time the shipping company was forced to suspend the lake service. It was a period of neglect and limited service; the new management of the company adopted a solution to improve the service, which envisaged replacing, where possible, the old steam apparatus with the new oil-fired technology. In Monfalcone the new company "Società Subalpina di Imprese Ferroviarie" commissioned nine motor boats, with screw propeller and a oil-fired engine. The first five were launched between August and September 1923; they represented the *Dovia* series, and included steamboats *Dovia*, *Arona*, *Legnano*, *Monfalcone* and *Racconigi*. Unfortunately, once launched, all of these proved inadequate for the service, because of the lack of manoeuvrability and the insufficient capacity of only 250 passengers per unit. In November of the same year also the motorboats of the "fiori" series started their activity. They were: *Azalea*, *Camelia*, *Fiordaliso* and *Magnolia*. Even these motorboats, each of 150 passengers, were totally inadequate for the management of navigation on the lake and the company had to remedy the situation putting three ships back for demolition: *Alpino* (with the *Ticino* hull), *Elvezia* and *Sempione*. On 1925 another motor boat was launched on the Lake Maggiore, this was the *Mimosa*, with the three-screw propeller, built by the Bremen "Roland Werft, Virtues & Co.". This last boat guaranteed to the company the possibility to continue the service, with an ever increasing demand in the years to come[18].

On 1925 the largest steam ship in the fleet was *Lombardia*, with a capacity about 800 passengers, but could carry up to a thousand people; in order of size there were the steamers *Milano*, *Torino*, *Genova*, *Regina Madre* and *Francia*, with a capacity of 500 passengers and then *Italia* with a capacity of 450 passengers.Although during the Second World War, the steamboat service on Lake Maggiore was stable, the war's problems and the need to protect the steamboats by American air strikes induced the company to limit the service during the night, and to suspends the races for all day long. When the conflict was over, the number of surviving steamers was very low and those, which had avoided the flying bullets, had been damaged by poor maintenance and the use of inappropriate fuel. The first to resume the service were the steamers *Italia*, *Piemonte* and *Lombardia* and the motorboats *Airolo*, *Monfalcone*, *Legnano*, *Verbania* (ex *Dovia*), *Arona* (ex *Racconigi*), *Alpino* and by the "flowers" series: *Fior d'Arancia*, *Magnolia*, *Azalea*, *Camelia* and the ferry *San Cristoforo*. In addition to the bad state of the units, the piers were also in precarious conditions: on April 15th, 1948 as a result of such a difficult situation, Pio Zocchi decided to leave

[18] Biazzi, Ferruccio. *La navigazione sul lago Maggiore*. Roma: Ugo Pinnarò, 1924.

the management of the "Navigazione sul Lago Maggiore" in the hands of the Government.
The Government management tried to save the company, with the introduction of new steamboats. On the 1950 the *Torino* was again launched completely changed in the superstructures and in the engine room: the modern lines didn't remember anymore of the previous forms, and the engine, replaced with two diesels of 150 hp each, no longer needed the traditional funnel, *Torino* became a modern motor boat. Even the four "flowers" series motorboats had been transformed with the replacement of superstructures and powerful engines. In 1952 a new motorboat was launched, the first with bidirectional propulsion in Lake Maggiore: it was the *San Carlo*, 41.50 meters long and 8.50 meters wide with a capacity of 120 tons of vehicles and 420 passengers. It also had a diesel engine: it was 300 horsepower. The following success revived the company, which immediately launched two new motorboats, *Milano* and *Genova*, both with a capacity of 400 passengers and with the same dimensions: the length was 37 meters and the beam was 6 meters.
Even in the Lake Maggiore the era of the steam navigation was turning to the end, replaced by new and modern motorboats; in spite of this an article of the local newspaper "Corriere d'Informazione" wrote « Tourists prefer the old steamboats », and explained that the tourist preferred the traditional steamboat trip, that allowed him to take a walk on the outer deck of the boat and that was like a real terrace floating on the lake, remaining linked to the romantic idea of the travels that had accompanied them in the past years.

Fig. 4 Steamboat San Gottardo, in the first years of service. From: F. Ogliari, op. cit., p. 65.

Steam navigation on the Lake Como

The navigation on Lake Como[19] introduced the history of the *Concordia* steamer, which we will analyse in the next chapter. The history of navigation in the Lario (old name of Lake Como) began in the early 19th century[20]. On November 6th, 1817 the Emperor of Austria Francis I (1793 - 1875) granted privileges to anyone who had activated a steam navigation service on the waters of the Kingdom called Lombardo-Veneto. On 1825 the duke Carlo Visconti di Modrone (1770 - 1836), with Count Vitaliano Borromeo (1792 - 1874), and other partners founded in Milan the "Società Privilegiata per l'Impresa de' Battelli a Vapore nel Regno Lombardo Veneto" and on February 8th, 1825 the company obtained the exclusive privilege of steam navigation in the Lombardo-Veneto region for 15 years. On July 29th, 1826, in Como, the first steamboat of the lake was launched, the 28 meter long *Lario*, equipped with a double effect Boulton-Watt steam engine built by the "Fawcett" company of Liverpool that was 12 hp. Built in the "Church-Andreny" shipyards at the Olmo beach, at Borgo Vico di Como, it had a wooden hull and side paddle propulsion.

Lario began the service on Agust 16th, 1826 between Como and Domaso. During the following years two twin steamboats were launched: *Plinio* on the 1826, that had to navigate between Lecco and Domaso, and *Falco*, on the 1830. The latter, in 1838, had the honor of transporting the Emperor Ferdinand I of Hapsburg-Lorraine (1793 - 1875) up to Como. Due to the too small size of the piers, the port of Como was not able to accommodate the two boats, which then had to embark and disembark passengers through small rowing boats. In the 1835 the steamboat *Otello*, built by "Smith & Hox", was brought to Como renamed *Arciduchessa Elisabetta*, after a period of navigation across the Po. *Otello* had a length of 22 meters and a beam of 2,4 meters. Because of its very elongated forms, born as a result of its original destination on the river, it seemed initially too thin to navigate on Lake Como, often agitated. After some checks, they established his suitability for navigation and the steamer could start its service. The company ordered to the London shipyard "Albano Reny" a new steamboat, the *Veloce*. It was a paddle steamer with an armoured hull. It was 33 meters long and 4 meters wide. It had a displacement of 105 tons.

Its engine was 32 hp: the most powerful of the whole lake. Despite the number of steamboats that operated on Lake Como, the transport request was so high that the service was unsatisfactory. This situation led Count Gian Pietro Porro (1773 - 1852) to promote (1842) a new company: the "Società Lariana", for the navigation of Lake Como. On June 7th, 1843 the first iron steamer was launched in Como, built by the company "Escher & Wyss" in Zurich: the *Lariano*, 33.50 meters long, 4.60 meters wide and with a low pressure steam engine 42 hp, subtracting every record from the *Veloce*. The public, being more spacious, fast and elegant, even if more expensive, immediately appreciated it. For this reason it was mostly preferred by the wealthy, who considered others steamboats as the boats of the poor persons. Porro also built a new pier outside the port for his steamboat. Navigation on the lake now also saw a kind of competition between the two competitor companies: the "Società Privilegiata" and the "Lariana". The conflict was inevitable and despite an initial dominance of the

[19] Gozzi, Massimo. *I battelli del Lario*. Milano: Mondadori Editore, 1995 and Terragni, Giorgio. *A tutto vapore: storia della navigazione lariana*. Como: E. Pifferi, 1987.

[20] Zimolo, Giulio C. *Cenni sulla storia della navigazione lariana*. Como: Noseda, 1965 and Gozzi, Massimo & Gianpaolo Brembilla, Roberto Brembilla. *Sulla scia del vapùr: storia dei piroscafi che hanno solcato il Lago di Como dalle origini al dopoguerra.* Varenna: Associazione culturale L. Scanagatta, 2003.

old Milanese "Società Privilegiata", the public preferred the Como society; indeed, the porters tried to boycott the Milanese steamers, and the newspapers reported only news about the activity of the *Lariano*. The Milanese company was forced to withdraw, giving up its steamers to the winner, who took the name of "Società Lariana di Navigazione a Vapore", with Porro as president. In the Fifties of the nineteenth century, the company bought three other steamers: in 1851 it bought the *Ticino* from "Escher & Wyss", 28 meters long iron steam and a 32 hp engine, renaming it *Adda*, and then the *Unione*, also built in Zurich, in steel, 47 meters long with a steam engine of 250 hp of 1857. In 1859, the company bought also the steamboat *Forza* built by the "Lariana" shipyards, in steel with a 35-horsepower engine. *Unione* was the first steel hull with innovative lines: swan neck bow and elliptical stern. *Unione* is also the first steamer called "half saloon" of Lake Como. In those years the steam journey on the lake was a known reality, and the pleasure trips began. In 1860 a post office was set up on board the "Lariana" steamboats.

In the 1865 the steel steamboat *Italia*, built by "Escher & Wyss" of Zurich, began the service. The engine was 60 hp, repowered in 1903 at 300 hp. It was 50,50 meters long and 9,55 meters wide; the weight was 168 tons and it had 480 passengers capability. The steamboats *Falco*, *Veloce* and *Lariano* were instead retire from service. In 1872 *Lariano II* e *Volta* began the service. Both with an engine power of 400 hp. On February 28th,1872 was founded a new rival company named "Società Italiana per la Navigazione a Vapore sui Laghi" of Milan. In 1873 the new company put into service two iron steamers: *Lombardia* and *Elvezia* both of 450 hp of power and able to board 800 passengers and other two the following year: *Como* and *Lecco* both of 450 hp of power and 500 passengers. The company "Escher & Wyss" built all these steamers in Zurich. The competition led both of companies to economic losses, leading to the joint decision of a merger on June 8th, 1874. This is how the "Società Riunite per la Navigazione a Vapore sul lago di Como" was born. In the years 1873-74 the "Lariana" had an average of 280,000 passengers. In 1884 the steamboat *Cadenabbia*, of 130 tons was launched: it was the first screw propeller steamer on Lake Como, built in Zurich by the company "Escher & Wyss" with a 160 hp engine, while the *Adda* steamer was demolished. On December 30th, 1884 the company took the name of "Lariana Società Anonima in Como per la navigazione a vapore sul lago di Como". The fleet was then composed of 14 units: *Unione* (1857), *Forza* (1859), *Vittoria* (1860), *Italia* (1865), *Lariano* (1872), *Volta* (1872), *Lombardia* (1873), *Elvezia* (1873), *Como* (1874), *Lecco* (1874), *Menaggio* (1877), *Bellagio* (1877), *Umberto* (1877), *Cadenabbia* (1884).

Fig. 5 Poster of the company "Lariana" of 1910 [Private collection].

At the end of the century, new steamers entered the scene. On May 17th, 1892 the steel *Plinio II* was launched, built by the company "Escher & Wyss" in Zurich, equipped with side paddle wheels. *Brunate*, had an engine of 130 horses and a capacity of 75 passengers in 1897. *Adda II* had an engine of 160 horses and a capacity of 180 passengers in 1899 and at last the steamboat *Menaggio* in 1899, with an engine of 80 hp and a capacity of 100 passengers.

The "Lariana" in the new century had a total of 17 steamers. But the transport demand was always on the rise and on August 28th, 1904 the steamboat *Milano*, built from the Genoese company "Odero" of Sestri Ponente, was delivered to the "Società Lariana", with a capacity of 260 passengers. The "compound" type machine with inclined cylinders had a power of 420 hp, which could achieve a cruising speed of 12.5 knots, and during the inaugural journey reached a maximum speed of 13.5 knots. A novelty of this steamer was the saloon dedicated to the second class, never before seen on the waters of Como. In 1907 the *Bisbinio* steamer also entered service. With the new century, most of the port facilities at the service of the Larian navigation were renewed.

The new wharves, designed by the engineer Ernesto Canobbio, therefore had, as well as a perfectly functional structure, a design inspired by the floral style, with extensive use of new building materials that had become established in architecture throughout Europe: iron and glass. New boats replaced those in disarmament and the company "Lariana" provided for the commissioning of new steamboats: the *Gardenia*, built in iron in 1912 by the Royal Arsenal of Venice, the steamer *Torno*, the steamship *Cadanebbia*. Indeed, on May 13th, 1925 the first Italian auto-boat called *Mussolini* was launched, soon after renamed *Bellagio*, with the aim of transporting cars and their passengers from all the sides of the lake.

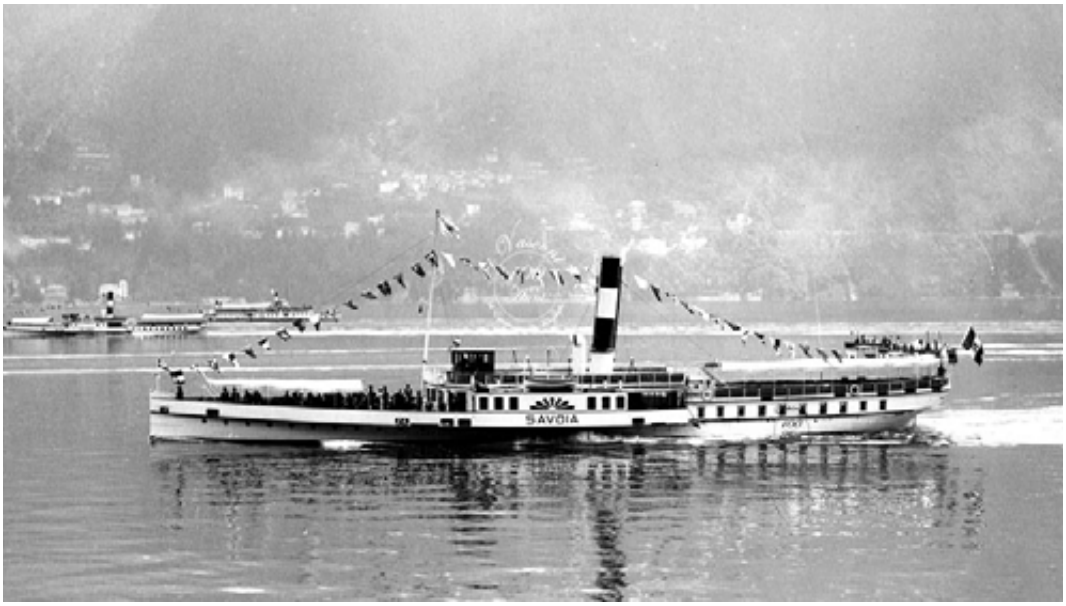


Fig. 6 Steamboat Savoia *in front of the Grand Hotel Villa d'Este of Cernobbio, the 28 May 1927 during the trip with Italy King Vittorio Emanuele III of Savoia (1896 - 1947), on board, for the visit to Como to celebrate the centenary of the death of Alessandro Volta (1745 - 1827). IN the background the steamboats 28 Ottobre and Plinio that escorted the sovereign during the cruise on Lake Como [Negative on glass plate. Historical photo archive Vasconi, Cernobbio].*

And again in June 1925 the company announced the entry into service of the *Lombardia* and *Lariano* steamers and the commissioning of other steamers, testifying that the boat trip was still appreciated by the population. In this period of fleet renewal, in 1926 the steamer *Milano* was transformed into a motor ship: its engine was replaced by a "diesel Tosi" with a 6-cylinder of 350 hp, and the paddle wheels was replaced by a screw reversible propeller. The covers of the wheels, now empty, were exploited to obtain room for passengers. On July 31st of the same year, the *Savoia* was launched and shortly after the twin *28 Ottobre*. Also because the intense use of these boats led to their "fatigue"; in fact, on 18th February 1927 the steamship *Lecco* sank near the pier of Piazza Cavour in Como. After two unsuccessful attempts to recover it, on May 19th of the same year the *Lecco* was finally saved. On April 4th, 1829, *Trento* was able to transport 200 passengers, demonstrating a significant increase in passenger traffic on the lake.

After the last war, the tourists returned to crowd Como and to travel on the steamboats. In the fifties there was again a modernization of the fleet: *Baradello* returned to service with a modernization of interior and exterior parts, *Italia* and *Lariano* was demolished and at the *Patria* (ex *Savoia*) the old coal-fired boilers were replaced with new oil-fired boilers, and the funnel was reduced to 3 meters of high. But the war had left the company in recession and after "Lariana" had forced to close, the lake transport management was entrusted to the Government Administration on August 21th, 1952. The following year four of the oldest steamers were demolished: *Unione*, *Menaggio*, *Como* and *Adda*. In the same year a new line of motorboats of the "flowers" series was inaugurated (*Narciso*, *Dalia*, etc.). From that moment the company didn't build steamboats anymore: the diesel had already taken over the coal and the paddle wheels were replaced by the screw propellers.

Post-war reconstruction and economic boom brought new demands and new boats looked out over the lake by retiring old steamboats[21].

The history of the *Concordia* steamboat.

In the twenties of the twentieth century diesel had already shown its power in the naval field when two twin steamers were built in Como because of their considerable size, excessive to be supported by the limited power developed by the engines in naphtha: *Savoia* (then *Patria*) and *28 Ottobre* (then *Concordia*). These two units were the last steamboats launched on the waters of this lake. On September 3th, 1926 the construction of *28 Ottobre* took place at Dervio in a shipyard of the company "Lariana" by the workers of the "Odero" of Genoa-Sestri Ponente. It was launched on November 2th, 1926, after only two months of intense work. After *28 Ottobre* had been launched it was brought to the Tavernola shipyard for the preparation of the luxurious interiors. It was an important steamer of considerable size: 53.77 meters long and 12.30 meters wide, including paddle wheels; it had a full load displacement of 286.14 tons; *28 Ottobre* could take 435 passengers, of which 283 in the seats and 152 standing. The engine was about 600 hp. The *Savoia* and *28 Ottobre*, being the largest steamers sailing on Lake Como, were immediately used in connections with the capital, carrying out an important and indispensable passenger service.

On 28 May 1927 the *28 October* and the *Plinio* escorted the steamboat *Savoia* with King Vittorio Emanuele III on board, who came to Como for the inauguration of the Voltiano Centenary Exhibition at Villa Olmo. In the second half of the thirties the coasts of Como became a very popular tourist destination; foreigners enjoyed the steamboat trips so much that the steam navigation company offered promotions and discounts on travel, so *28 October* lived a period of considerable number of rides increase.

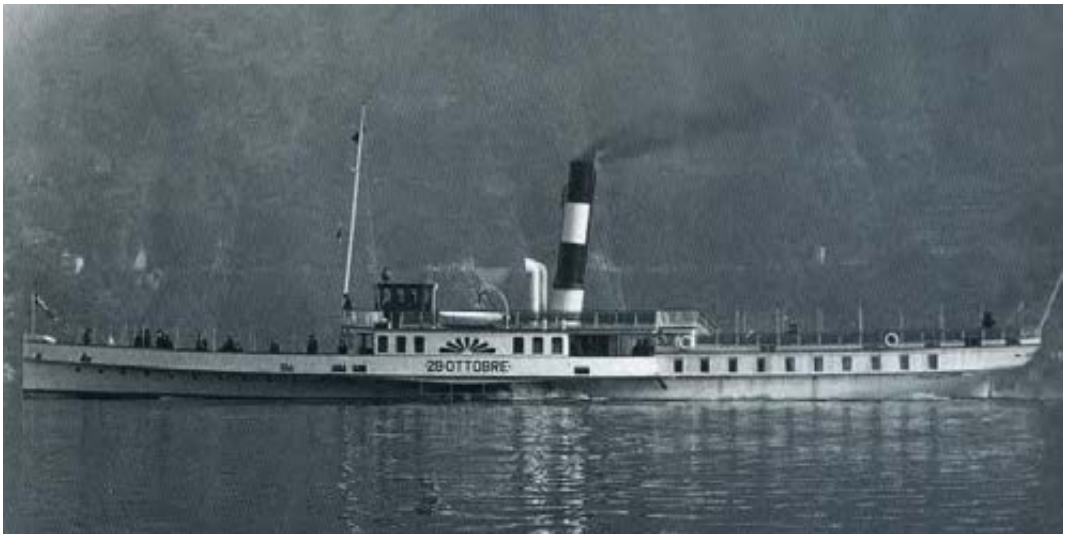


Fig. 7 Steamboat 28 Ottobre *in a 1942 picture [Private collection].*

[21] Gozzi, Massimo. *I battelli del Lario: storia e catalogo delle imbarcazioni di linea a propulsione meccanica, attive sul Lago di Como, dalle origini ai giorni nostri*. Milano: Mondadori, 1995.

On June 15, 1935 the two steamers were employed by the "Lariana" for the IV Lariano Meeting of the "Azzurri di Dalmazia" Volunteers of War. In this occasion the two units transported from Como to Lecco and returned over 1,500 volunteers of the Fiumana enterprise. Following the fall of the fascist regime, on July 25th, 1943, the Como Presidium Command requested to the "Lariana" president, Commander Felice Baragiola to change the names of the steamers. *28 Ottobre* was renamed *Concordia*, while the twin *Savoia* was renamed *Patria*. To avoid the incursions of the Anglo-American fighter-bombers on the autumn of 1944, the *Concordia* and the other steamboats, were moored near the canal between the island Comacina and Ossuccio, in a place called "Zoca de l'oli", and they were camouflaged with the vegetation. On January 1945 *Concordia* returned in service and on the 15th of that month it was gunned to the Como funicular pier, without however suffering human losses in dead and injured. Then the steamer was, of necessity for its safeguard, brought back to the "Zoca de l'oli" and again camouflaged. After the war, the "Lariana" was struggling with a serious economic crisis, due to the huge damages suffered during the conflict. Nevertheless the company managed to make some important improvements on the fleet. After a period on shipyard, the *Concordia* returned to service on April 17th, 1950, with new diesel burners, because coal was more expensive for the maintenance of the boilers and for the cost: at the same power, the naphtha had a lower price. In addition, removable glass windows were also installed on the paddle wheels covers, so that the deck room could be closed in winter. In spite of the economic-industrial recovery, the aftermath of the war was grave and on August 21th, 1952 the "Lariana" was forced to cease its service, and the Government Administration Commission took over.

On February 18th, 1974 the *Concordia* again entered at Tavernola shipyard for complete refurbishment. After three years of work it returned to service on June 25th, 1977 completely changed in the furnishings and in the superstructure, with a covered porch on the aft deck. Unfortunately, the original furnishings were lost and replaced by exposed sheet metal interiors. Moreover, the addition of the porch proved to be a failure: under low load conditions, hit by the wind, it created an disturbing "sail" effect that influenced the motion of the steamer causing continuous skidding. A wooden plaque was also affixed to the cockpit with the motto of the steamer, chosen by the president of "Lariana" comm. Felice Baragiola in 1943: "Concord (*Concordia*) health of the homeland (*Patria*)", to symbolize the connection between the twin steamboats. The activity of the steamer has continued over the years demonstrating the good work of a project and that it has been able to carry out his duty if maintained in efficiency with great satisfaction of ship-owners and above all of passengers. In the early '90s the use of steamers on Lake Como had a strong contraction: *Patria* was placed in disarmament, while *Concordia* was subtracted from the line service and even if it was usually used every Sunday, it was reserved only for private rentals.

Fig. 8 Steamboat Concordia *departing from Como on August 24th, 2017 [Private collection].*

In the spring of the 1998 there was a change in the management of this historical steamboat. The company decided to make some technological adaptation works on the *Concordia*. So the steamboat received a new cockpit and some modifications for safety (like the increase in handrail height) and radar. The funnel was decorated with blue lines and the Government Administration logo was applied on it. In winter 1999-2000 the steamboat was equipped with new plastic chairs and tables, in place of the old sheet metal furniture: these changes represented the new that advanced and the detriment of a romantic image of the steamboats, which if it outwardly remained, in the interior design now has been lost. In an attempt to re-evaluate the steamer, since 2000 its summer service was increased, adding mid-week races.

In the winter of 2001-02 the internal exposed sheets metal of the sides were covered with plastic panels, not much in tune with the historical value of the steamer. Since 2003 *Concordia* made numerous special races, private cruises and some night races with great satisfaction of the public who took advantage of these cruises on the lake.

In the winter of 2003-04 it underwent complete maintenance again, and important works were carried out, such as the installation of a new porch, the modernization of the living room, the adding of parquet floors and a restored of handrail. Immediately after the launch on April 17th, 2004 the newly refurbished steamer resumed the scheduled service, in addition to being privately rented and the public had the opportunity to appreciate the new look restored by a historic boat. However, the vicissitudes of this steamboat did not end. Since 2011 the *Concordia* spent a period of total abandonment on the shipyard site. However after five years of degradation *Concordia* returned to sail the waters of Lake Como ninety years after his birth. On May 20th, 2016 has returned to service renewed and with the maintenance of its steam engine, which can still reach a considerable speed of 12.6 knots. The Director of "Navigazione Laghi", Salvatore Vitulano, said about the works:

« Abbiamo sostituito le caldaie e i gruppi elettrogeni e realizzato due salette in stile Liberty. Siamo orgogliosi del risultato perché abbiamo recuperato un patrimonio storico che ora è a disposizione di tutti. Con i suoi 54 metri, il piroscafo è imponente, ma allo stesso tempo snello ed elegante.

Siamo certi che sarà un grande richiamo per i turisti e non solo »[22].
The crew is made up of seven people, including the commander, the double in comparison with modern motor ships that typically require 3 or 4 people. Currently there are 435 seats available, of which 143 are sitting indoors. Since the summer season of 2016 a program to increase its races has also been designed, providing tours and special cruises that allow the rediscovery of the villas in the center lake. A puff of steam and the inevitable siren: long life the Concordia!

Conclusion

This short note doesn't want to be exhaustive about the phenomenon of rivers and lakes steam navigation, which developed over two centuries mainly on the great Italian lakes. The intent is to open a window on a romantic story, a story that could be resumed and proposed in the years to come as a phenomenon of entrepreneurial culture, technology, but above all human and custom. Experience the lake while traveling on steamboats, why not?
Rather than on modern and fast motorboats or hydrofoils it can be a different and more romantic way to enjoy the beauties of the lake and navigation, to appreciate the breeze caressing the face on the bridge and to feel the mountain scents that the wind carries.
This can be a journey no longer understood as a mere transport from one place to another, but rather an experience that gives to you deep sensations also transmitted by the many noises that can be heard during the trip: the sweet water lapping on the sides, the buzzing of the engines or the creaking of the paddle wheels, the sound of the siren when you leave or arrive at the pier and many others; you could imagine to stop the time and enjoy the journey in its entirety of dream, wonder and memory; the memory of what you have savoured in observing, looking, listening, feeling. Because the journey never ends, but it repeats itself endlessly in the most silent corners of our mind; and - quoting Edgar Allan Poe - "Travelling is like dreaming: the only difference is that not everyone, once awaken, can recall their dream. Whereas, everyone has a vivid memory of the trip from which he has returned".

[22] "We have replaced the boilers and generators and we have built two Liberty style rooms. We are proud of the result because we have recovered a historical heritage that is now available to everyone. With its 54 meters, the steamship is impressive, but at the same time slender and elegant. We are sure that it will be a great attraction for tourists and more", in Anna Campaniello, Corriere della Sera, Milano, Cronaca, pubblicato il 21 maggio 2016.

References

Arseni, Alessandro. *La navigazione a vapore e i servizi postali sui laghi italiani*. S.l.: The postal history, 2009.

Biazzi, Ferruccio. *La navigazione sul lago Maggiore*. Roma: Ugo Pinnarò, 1924.

Bignardi, Adolfo. *Lago di Garda. Parte 1: Navigazione e servizio postale dall'impero austro-ungarico al regno d'Italia (1800 -1890)*. Associazione Italiana Collezionisti Posta Militare e Storia Post, 2013.

Chaigneau, Charles. *Recherches sur les bateaux à vapeur bordelais*. Bordeaux: Imp. Durand, 1899.

Cherini, Aldo e Nigido, Manlio. *La navigazione sul fiume Po e il contributo del Lloyd Austriaco*. Trieste: Associazione Marina Aldebaran, 1994.

Delrieu, André. *Le Rhin: son cours, ses bords, légendes, mœurs, traditions, monuments, histoire du fleuve depuis sa source jusqu'à son embouchure*. Parigi: Desessart, 1846.

Dutens, Joseph-Michel. *Histoire de la navigation intérieure en France avec une exposition des canaux à entreprendre pour en compléter le système*. Paris, Sautelet et C., 1829.

Gandini Ercolano. *I servizi postali sui grandi laghi italiani*. Padova: Ausilio editore, 1976.

Gozzi, Massimo. *I battelli del Lario: storia e catalogo delle imbarcazioni di linea a propulsione meccanica, attive sul Lago di Como, dalle origini ai giorni nostri*. Milano: Mondadori, 1995.

Gozzi, Massimo & Gianpaolo Brembilla, Roberto Brembilla. *Sulla scia del vapùr: storia dei piroscafi che hanno solcato il Lago di Como dalle origini al dopoguerra.* Varenna: Associazione culturale L. Scanagatta, 2003.Kennedy, John. *The history of steam navigation*. Liverpool: Charles Birchall, 1903.

Hajnal, Henry. *The Danube: Its Historical, Political and Economic Importance*. S.l.: The Hauge: Martinus Nijhoff, 1920.

Le Sueur, Bernard. *Batelleries et bateliers de France, histoire illustrée de la navigation intérieure*. Roanne: Horvath, 1984.

Mollat, Michel (Sous la direction de). *Les Origines de la navigation à vapeur*. Paris, P.U.F., 1970.

Morrison, John. *History of american steam navigation*. New York: W. F. Sametz & Co, 1903.

Moschini, Alessandro. *Sulla navigazione fluviale in Italia*. Padova: Società cooperativa tipografica, 1903.

Ogliari, Francesco. *La Navigazione Sui Laghi Italiani - Lago di Como*. Milano: Cavallotti Editori, 1987.

Rivet, Félix. *La Navigation à vapeur sur la Saône et le Rhône, 1783 -1863*. Paris: Presses universitaires de France 1962.

Rusca, Giovanni. *La navigazione fluvio-lacuale nell'Europa centrale ed un suo obbiettivo principale*. Locarno : tip. artistica di V. Danzi e C., 1902.

Terragni, Giorgio. *A tutto vapore: storia della navigazione lariana*. Como: E. Pifferi, 1987.

Wardle, Arthur. Early steamships on the Mersey 1815-1820. *Transactions of the Lancashire and Cheshire Historical Society*, Vol. 92, 1940; pp. 85-100.

Woodcroft, Bennet. *A sketch of the origin and progress of steam navigation from authentic documents*. London: Taylor, Walton, and Maberly, 1848.

Zimolo, Giulio C. *Cenni sulla storia della navigazione lariana*. Como: Noseda, 1965.

Chromatic transformations in architecture and in the landscape

Patrizia Burlando,
Department Architecture and Design DAD (University of the Study of Genoa)
email: patrizia.burlando@arch.unige.it
Sara Grillo,
Department Architecture and Design DAD (University of the Study of Genoa)
email: saragr93@hotmail.it

Abstract

This study aims to highlight the importance of color in the relationship between architecture and landscape. The change of the vegetation's colors in the different seasons generates continuously different landscapes.

An architecture inserted in a natural landscape is always perceived differently. The Fallingwater looks different in autumn, winter, spring and summer.

Some architects conceived their design in a landscape that changes with the passing of the seasons: the Therme Vals are a building in the landscape, but at the same time the landscape penetrates the building, modifying it in different periods, from the extreme of the snow to that of the explosion of late spring blooms.

Vegetal elements inserted in an architecture make it always different: each tower of the Bosco Verticale has 4 prospects differentiated by the plant species, which change seasonally.

In the reflecting buildings the change of seasons generates a real renovation of the front, especially in those totally immersed in the landscape.

On the other hand, the color's change of architectural elements in a context with natural elements can generate unexpected transfomations.

An example is the Villa Garzoni in Collodi and its winter park, characterized by predominantly evergreen vegetation, where the terracotta balustrades of the terraces were once red, are now white.

The intention is to demonstrate how the chromatic variations are ''a sort of fourth dimension'' in architecture, in the landscape and in their interaction through a visual-perceptive analysis of some case studies and a survey on the role of color in architecture and landscape.

Abstract

Questo studio vuole evidenziare l'importanza del colore nella relazione tra architettura e paesaggio. Il cambiamento di colori della vegetazione nelle stagioni genera paesaggi continuamente diversi. Un'architettura inserita in un paesaggio con elementi naturali viene percepita sempre in modo diverso. La Fallingwater appare diversa in autunno, inverno, primavera ed estate.

Alcuni architetti hanno concepito la loro opera in un paesaggio che muta con l'avvicendarsi delle stagioni: le terme di Vals sono un edificio nel paesaggio, ma nello stesso tempo il paesaggio entra nel l'edificio, modificandolo nei diversi periodi, dall'estremo della neve a quello dell'esplosione delle fioriture tardo primaverili. Elementi vegetali all'interno di un'architettura la fanno apparire sempre diversa. Ogni torre del Bosco Verticale ha 4 prospetti differenziati per la presenza di specie vegetali, che a loro volta mutano stagionalmente. Negli edifici specchianti l'avvicendarsi delle stagioni genera un cambiamento vero e proprio dei prospetti, soprattutto in quelli totalmente immersi nella vegetazione.

D'altra parte il cambiamento di colore di elementi architettonici in un contesto con elementi naturali può generare cambiamenti inaspettati. Un esempio è la Villa Garzoni a Collodi e il suo parco invernale, caratterizzato da vegetazione prevalentemente sempreverde, dove le colonnine in cotto delle balaustre dei terrazzamenti un tempo erano color rosso scuro, oggi sono bianche.

L'intenzione è quella di dimostrare come le variazioni cromatiche siano "una sorta di quarta dimensione" in architettura, nel paesaggio e nella loro interazione attraverso un'analisi visivo-percettiva di alcuni casi di studio e una indagine sul ruolo del colore in architettura e paesaggio.

Introduction

This study, at various levels of detail and in various ways, wants to highlight the relevance of color in the relationship between architecture and landscape.

Beyond fundamental references that demonstrate the important effect of color on the human psyche, the intention is to demonstrate how the chromatic variations are 'a sort of fourth dimension' in architecture, in the landscape and in their interaction.

The definition of landscape of the European Landscape Convention as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" is an essential reference. The color variations allow us to perceive, to listen and to describe the landscape, its individual elements and its totality, always in a different way (Andreotti, 1996): from the most elementary and spontaneous seasonal variability of plants to design chromatic effects of changing vegetation as architecture background. The continuous change of the surrounding environment is similar to the change of color and texture of architecture, making it always different.

References

The colour had an evolution throughout the history, every age uses the colour from available resourses: in the past that had a simbolic value, associated at the same time with magic rituales and life shelter. In psycological terms the colour was associated with dominant class until the advent of the industrial age, where that is artificially produced and that becomes an element of everyday life. At the beginning of the twentieth century the important effect of color on the human psyche is studied;

an elemental reference is the Wassily Kandinsky theory. Kandinsky in his works exposes his theories on the use of color, seeing a very close connection between a work of art and a spiritual dimension. The color can have two possible effects on the viewer: a physical effect and a psychological effect. Kandinsky describes the colors according to the sensations and emotions that arouse in the viewer, comparing them to musical instruments.

According to Faber Birren, who works around 1930 and is considered the father of psychology applied to color, the study of color is essentially a mental and psychological science, for the term color itself refers to sensation. Color has an important effect on ergonomics, places with different functions must differentiate themselves in the use of color to convey a correct message to those who work in that place.

In the last 50 years a holistic approach of colour has been carried forward "the armonizing of architecture with the surrounding landscape and with the inhabitants" (Lancaster, 1996).

The role of the environment's color in relation to man today is studied within the cultural current defined by Caivano (2006) 'Environmental Architecture'.

In contemporary Mahnke studies color in relation to the visual impact, starting from the concept that the color always played a role in the human evolutionary process. Color is an integral element of our world, not just in the natural, but also in the man-made. The environment and its colors are perceived, and the brain processes and judges what it perceives on an objective and subjective basis. Psychological influence, communication, information, and effects on the psyche are aspects of our perceptual judgment processes. Hence, the goals of color design in an architectural space are not relegated to decoration alone.

The color of the vegetation

In the Nordic countries characterized for most of the year by gray skies the color of the vegetation is very important; most of the time bright colored plants are used to contrast monotonous backgrounds and landscapes without lights and shadows; on the other hand, the blue sky of the Mediterranean lands allows the use of many gradations of evergreen vegetation, enhancing the characteristics of this landscape.

There are also fortunate experiments in monochrome gray skies as the white garden, still today one of the most famous of Sissinghurst characterized a few shades of color; Vita Sackville-West created it, inspired by the monochromatic garden described in his Garden Book.

In Paris between the thematic and serial gardens of the Parc Citroen, application of the 'jardin en mouvement' by Gilles Clement, the most successful ones are those less bright colors. For example, the silver one, mainly characterized by white elements, and the green one.

The change of colors of the vegetation in the seasons continually generates different landscapes and architecture within a natural landscape is always perceived in a different way.

A universally known example is the Fallingwater, which looks different with the seasons. The famous work of F. L. Wright, characterized by light colors, in the winter is perceived as a mimetic element of all white surrounding nature, instead in the summer the artifact stands in stark contrast with the green of the surrounding landscape.

Fig.1 The white garden , Sissinghurst (image source: www.flickr.com)

Fig.2 Parc Citroen aerial view (image source: www.flickr.com)

Fig.3 Fallingwater Mill Run, Pennsylvania (image source: littlecloudydreams.wordpress.com/tag/monet/)

Some architects conceived their work in a landscape that changes with the seasons: the Therme Vals by Zumthor are a building in the landscape, but at the same time the surrounding enters the building, modifying it in different periods, from the extreme of the snow to that of the explosion of the late spring blooms.In some cases, plants are designed as an integral part of a building and they shall become the identifying element, in this way the building looks different during the year. An eloquent example is the Bosco Verticale, this architectural complex has four differentiated prospects, for the presence of different plant, depending on the exposure to the sun and for the change of color and shape seasonally. As a final case the example par excellence of a recovery and reuse of decommissioned infrastructure: the New York High Line. This is one of the many places of application of Piet Oudolf's theory, after numerous studies and observations in the field of borderline landscapes, such as rocky mountain environments, the American prairies or the

marine coasts. According to Oudolf in the same way that a painter works with a palette of coloured pigments, so the garden designer can select what plants to use from a palette of plants. Traditionally, a plant's colour was its most important characteristic; today, besides the colour, even the shape of flowers, seedheads, leaves and their textures assume importance in the overall composition.

Fig.4 Mixed Borders RHS Garden, Wisley (image: P. Burlando)

The color of architecture

The Greek temples were colored, but in the nineteenth century they were studied as if they had been white and they were imitated as such for a long time; the most famous temples and the Parthenon have been incorporated as monochromatic elements to be appreciated for their solemnity, created exclusively with the masterly use of materials and architectural elements. The cultural movements (the neo-classical and its fortune in the Anglo-Saxon countries) that derive from the admiration for the Greek civilization, seek in it the purity and the perfect proportions of the architectural orders and the artistic results that are obtained throughout Europe are monochrome and solemn; the temples in general, but especially the Parthenon, have a perfectly proportioned architecture, and skillfully adorned with sculptures and friezes that show the greatness of mythological Greek battles. Over the centuries the cultural significance of Greek architecture has varied in different historical periods, the fact that the temples in reality were decorated with colorful colors internally and externally completely upset the cultural reference that has been attributed to it. Neoclassical cultural movements did not immediately accept the vision of the colored temples because obviously they totally changed their perception, the effect in the landscape was totally different compared to the skillful, magnificent and rigorous play of the 'white' volumes under the light, probably less emerging in the landscape, but to be observed at a lower distance for the richness of the details of colored painting. One example among many of the desire to understand how the temples were really and to analyze them as they were designed is the faithful reproduction of the colors that was made on the full-scale replica of the Parthenon of Nashville, thanks to the lights projected on the building appreciate how it appeared in the past.

Fig.5 Parthenon, Athens; Vilnius Cathedral, Parthenon, Nashville (image sources: www.flickr.com www.tennessean.com)

The color variation of artificial elements in a natural context can generate unexpected changes. In the case of the park of the Villa Garzoni in Collodi, defined as winter, because it is characterized by predominantly evergreen vegetation, the replacement of the balustrades of terraced terraces, once in terracotta, with white elements has led to the disappearance of one of the Tuscan characters of the complex, stripping it of one of its identifying traits.

The Park Güell (1900-14) built in Barcelona by Antoni Gaudí is an example of a particular use of color and not only; with this project the architect conducts an experimentation already begun in other works, tries to completely abandon the traditional architectural references, inspired by geological eras and zoological and botanical species giving life to new architectural forms that are difficult to assimilate to a reference movement; Gaudí creates deformed architectural elements looking for a fusion with the surrounding nature, besides the park is rich of symbolic elements and representation of animals. n this work Gaudí seeks a language that reflects Catalan identity and reflects on the perishable nature of matter. As mentioned above the theme of integration with nature is central, integration is implemented with the use of a green Mediterranean vegetation that is the background to the architectural elements, the color throughout the park is made with the use of ceramics put into place with the trencadís technique, thanks to this technique the elements of the park shine and characterize it. So thanks to architectural elements of neutral color, white or that integrate with the ground, and the homogeneous green that are the background that the colored coating elements stand out and create the image that everyone perceives.

Fig.6 Park villa Garzoni, (image: P. Burlando)

Fig.7 Park Güell, Barcelona (image: G. Manfroni)

Another case study is the Villa Savoye in Poissy (1928-31), undoubtedly this villa is the symbol of a 'revolution', Le Corbusier designs this architecture as the emblem of his 5 points d'une architecture nouvelle, expression of a complete system based on regulatory patterns dictated by the geometry of the triangle and the golden ratio. In reality, the architect's compositional capacity creates an articulated volume suspended in the green, which determines a sequence of interior spaces in connection with the landscape through ribbon windows, terraces and cantilevered canopies. As for the exterior, the villa is designed by everyone as a white volume surrounded by greenery thanks to the most known point of view, in fact having a global view of all the prospects the idea of the single white volume is lost; as regards the interior, also in this case the predominant color is white, the relationship with the external environment and the colors of the landscape, skilfully framed, is surprising and creates a very different point of view from the common imaginary. Inside there are walls plastered with colors, initially all the walls were white and all the historical images that have fortified this idea, in fact from the original drawings of Le Courbusier we learn that they were designed colored. In conclusion, even if the symbol of Villa Savoye is linked to the monochrome, in reality the relationship with the landscape, the colored walls, the wooden furniture, the cobalt blue tiles of the bathroom, the metal of the kitchen create a set of colors that give an image 'different' and unexpected of the villa.

Fig.8 Villa Savoye, Poissy (image sources: www.inexhibit.com/it/case-studies/le-corbusier-villa-savoye-parte-2-architettura/)

An example of contemporary architecture is the Quai Branly museum in Paris, completed in 2006, designed by Jean Nouvel. The museum houses a collection of objects of primitive arts and this has certainly led the architect to conceive a particular project. The building is a hybrid of elements that completely break the Parisian fabric, colored volumes follow each other and create many colored rooms embossed on the garden below, some volumes take shape in the gradation of warm colors of the earth, which symbolically recall the arts primitive, museum theme, in contrast with the green of a minimalist garden, even if declined in different ways.
A covering of grasses with light blond gradations is a uniform pattern on which the bright colors of the architectural elements stand out, a fundamental reference to the museum theme in contrast with the monochromatic vegetation.

Fig.9 Quai Branly, Paris (image: G. Manfroni)

The color of urban regeneration

A final aspect of the use of the color to be analyzed is that of shared color to demonstrate how it can become a sort of fourth dimension even in urban regeneration. Color is an effective tool able to create public spaces and quality buildings, if shared by the population.
Superkilen was created in 2012 in Copenhagen and is the result of the collaboration between the BIG studio, the landscape designers of Topotek 1 and the artists of Superflex.
The district, dense neighborhood is characterized by 57 communities of different cultures and has often been affected by social tensions in the past. The response of this project has been very strong and revolutionary as it is opposed to the customs and seeks a meeting point between the various places and cultures.
Superkilen wants to be a contemporary interpretation of universal garden in which there are objects from around the world and numerous elements ‘’surprise effect’’ as billboards from various countries, writings and drawings on the walls and flooring.
The garden consists of three large areas: a red one dedicated to sport, a green that is a large playground and finally the black zone where social activities are carried out.
the collection of international objects makes this project very interesting, the various communities have been asked to propose elements of their culture, the objects have been selected according to their functionality according to a strong utilitarian vision: the most comfortable bench, the most beautiful fountain and so on. Superkilen is therefore made up of objects selected for their functionality coming from all cultures and communicating 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.

The revolutionary operation carried out with this project, has the color as a protagonist: the thematic areas are made with the use of colored floors of various gradations but also with the use of specially chosen vegetation, urban furniture and signs coming from various countries are rich in colors and reflect the various cultures, it is evident that in this project color is an instrument of integration and redevelopment, it is undoubtedly successful.

A social project that exemplifies the use of color as urban regeneration is 'Favela Painting', Jeroen Koolhas and Dre Urhahn, two Dutch street artists, they managed to see beyond the drug and the crime of the favelas of Rio de Janeiro, identifying this place for one of their works.

In their first mural of 2007 they have chosen together with the inhabitants the subject of the work and the meninos de rua have collaborated, the artistic and social result has been so strong that the two artists have decided to expand the project in the favelas: the whole favelas has been completely painted with colors of strong impact chosen by the inhabitants themselves allowing the children to participate in this experience and attracting the attention of the media.

The success of this project, centered on the use of color, is on many levels: the colored favelas has certainly a more pleasant appearance for the inhabitants, the inhabitants participating directly in the project have willingly accepted the initiative out of problematic situations, the media attention has allowed us to significantly reduce crime and increase integration.

Fig.10 Superkilen, Copenhagen (fonti immagini: www.flickr.com)

Fig.11 Favela Painting, Rio de Janeiro (fonti immagini: www.flickr.com)

Conclusions

Color in architecture can become a landmark, like the Haunted House, a 24-carat gold-plated building of the Prada Foundation. Until today, this precious cultural center is associated with the preciousness of gold, although it is not even the most expensive coating of the entire complex, represented instead by the finish of the podium, an aluminum foam, generally used for military purposes. With the imminent inauguration of the white concrete tower projected with a large overhang and a height of 60 meters towards the center of the city of Milan, perhaps the perception of the whole complex in the common imaginary will change?

Fig.12 Fondazione Prada, Milano (fonti immagini: http://afasiaarchzine.com)

References

M. Biraghi, Storia dell'architettura contemporanea I, Einaudi, Torino, 2008
M. Biraghi, Storia dell'architettura contemporanea II, Einaudi, Torino, 2008
J. L. Caivano, The research on environmental color design: Brief history, current developments, and possible future, Color Research & Application 31(4):350-363, 2006
G. Clément, L. Jones, Une écologie humaniste, Aubanel, Geneve, 2006
J. Glancey, 70 questions that will change the way you think about architecture, Laurence King Publishing, London, 2017
M. Lancaster, Colourscape, Academy editions, London, 1996
P. Oudolf, N. Kingsbury, Designing with plants, Timber press, Portland-London, 1999
V. Sackville West, Garden Book, Michael Joseph Ltd, London, 1968
V.M. Zybaczynski, The colour of architecture. Past and present, in Urbanism. Architectura. Constructii, vol. 4, n. 4, Nr & Di Urban-Incerc
https://www.archdaily.com/62689/favela-painting/
https://www.archdaily.com/575928/ted-talk-how-painting-can-transform-communities-haas-and-hahn
https://archinect.com/features/article/53292622/color-in-architecture-more-than-just-decoration
https://www.dezeen.com/2018/03/06/oma-rem-koolhaas-fondazione-prada/
https://www.favelapainting.com/about/
https://www.inexhibit.com/it/case-studies/le-corbusier-villa-savoye-parte-2-architettura/
http://www.ziguline.cm/favela-painting-larte-che-si-colora-nelle-favelas-di-rio-de-janeiro/

Chromotherapy in the Wellness Park G.F. Novaro in Costarainera (IM)

Adriana Ghersi
Department Architecture and Design DAD (University of the Study of Genoa)
email: aghersi@arch.unige.it

Abstract

Colours have positive psychic and physical effects, that can stimulate our body and calm some symptoms (physical and mental weakness) helping to find a natural equilibrium. Their effect is widely enlarged when they lay in a site that can facilitate a direct contact with nature. For this reason some interesting experiences refer to chromotherapy in gardens and parks, where the living and changing colours of plants (foliage and flowers) can activate also the senses of touch and smell. In the Novaro Park, in Costarainera (IM), some themed "rooms" have been realized, to characterize a new Therapeutic Park, re-proposing healing purposes as in the former complex (built in the years '30, to treat tuberculosis patients, mainly abandoned in the last decades), that the local Municipality wants to revitalize.

Thanks to a wider process of revaluation, a first experimental "starting tassel" has been opened to public fruition, near the entrance, offering a variety of different new compatible uses in a green area. The therapeutic "rooms" have diverse roles and meanings, from the path of medical plants to the garden of breath, aromatherapy, Bach flowers. One in particular deals with colours: the theme of chromotherapy is narrated, showing the relation among colours, specific parts of the body, functions and benefits (for example: orange stimulates the metabolism and lungs, cures spasms and cramps, restores the balance of nervous system to overcome anxieties and fears), together with food education (five colours diet and edible flowers).

Abstract

I colori hanno effetti psichici e fisici, che possono stimolare il nostro corpo e calmare alcuni sintomi (debolezza fisica e mentale), aiutandoci ari- trovare il nostro naturale equilibrio. Il loro effetto si amplifica in modo rilevante quando si trovano in un luogo che facilita un contatto diretto con la natura. Per questa ragione alcune interessanti esperienze si riferiscono alla cromoterapia in giardini e

parchi, dove i colori vivi e mutevoli delle piante (fogliame e fiori) possono attivare anche i sensi del tatto e dell'odorato.
Nel Parco Novaro a Costarainera (IM), alcune "stanze" a tema sono state realizzate, per caratterizzare un nuovo Parco Terapeutici, che ripropone finalità curativa, come nel complesso elioterapico originale (costruito negli anni '30 per la cura della tubercolosi, abbandonato negli ultimi anni), che il Comune vuole rivitalizzare. Grazie ad un più ampio processo di rivalorizzazione, un primo "tassello" di avvio è stato aperto al pubblico, vicino all'entrata, offrendo una varietà di nuovi usi compatibili in un'area verde. Le "stanze" terapeutiche hanno diversi ruoli e significati, dal sentiero delle piante medicinali al giardino del respiro, dell'aromaterapia, dei fiori di Bach. Una in particolare riguarda i colori: la cromoterapia è raccontata, mostrando la relazione tra colori, specifiche parti del corpo, funzioni e benefici (ad es.: arancione stimola il metabolismo e i polmoni, cura spasmi e crampi, ristabilisce l'equilibrio nervoso per allontanare ansietà e paure), insieme al tema dell'educazione alimentare (dieta dei 5 colori e fiori edibili).

Chromotherapy

Colour is energy that can be absorbed by our organism at different levels (physical, chemical, psychical, ..) and through different canals, not only by sight: cutaneous layers and the skullcap are particularly receptive to it. Chromotherapy is based on the healing power of the different colours, that have peculiar wavelengths. As we see a colouyr, our brain interpretes it, and a physiological response activates the cortical centre (associated with memory, attention and perception), interacting with the autonomic nervous system and the endocrine system, reducing or stimulating hormone production. In the visible spectrum, the different colours send us vibrational frequences that are able to stimulate reactions in our inner districts, rousing answers at both physical and emotional level[1]. The body is stimulated by colours and colours influence the correct working of various functional systems[2]. Chromotherapy dates back to ancient cultures (in Egypt, China and India), to cure various diseases. The energy of each of the seven colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) can be related to the seven energy centres of the body (chakras). Colour therapy provide balance among all energies in our body. The Egyptian built rooms of colour (the temple of Heliopolis had a quarz crystal in the dome, splitting sunlight into the seven colours, each of which filled a healing chamber, where various coloured glasses, materials and herbs were used to heal people. In 1870s Pleasanton wrote about the positive influence of blue on crop growth,

[1] *"Light is responsible for turning on the brain and the body. Light enters the body through the eyes and skin. When even a single photon of light enters the eye, it lights up the entire brain. This light triggers the hypothalamus, which regulates all life-sustaining bodily functions, the autonomic nervous system, endocrine system, and the pituitary (the body's master gland). The hypothalamus is also responsible for our body's biological clock. It also sends a message, by way of light, to the pineal organ, which is responsible for releasing one of our most important hormones, melatonin. The release of melatonin is directly related to light, darkness, colors, and the Earth's electromagnetic field. This necessary hormone affects every cell in the body. It turns on each cell's internal activities, allowing them to harmonize with each other and nature. The pineal gland is believed to be responsible for our feeling of oneness with the universe and sets the stage for the relationship between our inner being and the environment. If that relationship is harmonious, we are healthy, happy, and feel a sense of well-being. An imbalance in this relationship makes itself known in the form of disorders or disease in our physical, mental or emotional states. The Pineal is our "light meter", and receives information from the heavens above, to give us that sense of oneness with the universe, and from the Earth's electromagnetic field below to keep us grounded. A perfect balance is necessary to maintain our health and to keep us in harmony with the environment" (*A. Peterson, *Our relationships with light and colour*, 2001, http://www.inlightimes.com/2001/02/colour-light.htm).

[2] There is an energetic level at which every organ functions best. Colours generate electrical impulses and magnetic currents or fields of energy that can activate biochemical and hormonal processes in the human body, to keep us in harmony with nature.

livestock and human health, and chromotherapy uses coloured lights for the healing of burns, nervous excitability and cutaneous tubercolosis[3]. To understand chromotherapy we need an olistic approach, like in Einstein's theory, where the human body is not the assemblage of chemical parts, but a total, complete system, in harmony with the electromagnetic/energy system of the universe, opposite to Newtonian mechanistic approach.Colours have a deep effect on us. If our energy levels are blocked or depleted, then our body cannot function properly, and this can lead to a variety of problems.Natural therapists use chromotherapy to recover stroke victims and patients affected by chronic depression. Healthcare facilities now tend to borrow colours from nature: the practice of green and biophilic design brings people closer to the healing power of nature's sights.

Colour	Chakra	Gland	Parts of human body	Primary functions	Associated element
VIOLET transcendence	Crown	pituitary	Brain, central nervous system, hair	Connection with the divine	**light**
	VIOLET: is relaxing, promotes concentration and meditation, fights pain and fatigue, acts on the spleen, contrasts headaches, rheumatism, neuralgia.				
INDIGO consciousness	Brow	pineal	Forehead, temples, eyes, ears, sinuses of the nose, lower part of the head, cerebellum, nervous system	Intuition, extra-sensorial perception	**thinking**
	INDIGO: acts on our senses, it increases the tone of the mood in case of melancholy or light depressive states, it has a strong relaxing power and helps in meditative practices.				
BLUE SPIRIT relief, purification	Throat	thyroid	Throat, neck, jaw, mouth, bronchi, parotid, shoulders, arms	Word, expression of oneself	**life, sound, ether**
	BLUE: calming and relaxing, eliminates headaches, decreases blood pressure, is antiseptic and reduces pain.				
GREEN LOVE harmony and reflection	Heart	thymus	Heart, lungs, circulatory system, immune system, arms, hands, skin	Devotion, universal love, compassion, healing	**air**
	GREEN: relieves insomnia, headaches, asthma, heart problems and hypertension, stomach and intestine problems, is antibacterial and acts in cases of nervous breakdown				
YELLOW INTELLECT good mood and happiness	Solar plexus	pancreas	Stomach, small intestine, liver, gall bladder, bile, sympathetic nervous system, eyes	Mental functions power, control, freedom to be oneself, career	**fire**
	YELLOW: stimulates intellect and concentration, strengthens the immune system, acts on the pancreas, is purifying, treats depression, anorexia and intoxication.				
ORANGE EROS enthusiasm, optimism	Sacral	gonads	Spleen, small intestine, ovaries, uterus, testicles, prostate, urinary system	Emotion, sexuality, creativity	**water**
	ORANGE: stimulates the metabolism, the lungs, cure spasms and cramps, restores balance to the nervous system to overcome anxieties and fears.				
RED MATTER joy, strength and passion	Root	adrenal	Legs, feet, bones, kidneys, bladder, large intestine, reproduction system, nose, teeth, gums	Instinct, survival, safety	**earth**
	RED: stimulates physical and intellectual activity, is euphoric and antibacterial, improves circulation and production of red blood cells, treats acne, burns, dry skin				

[3] See the pioneeristic studies by Antonino Sciascia and Niels Finsen, Nobel prize in 2003, for his results about phototherapy to cure tubercolosis.

In gardens and parks, the living colours of flowers and foliage can impress our visual memory and interact with different parts of our body, helping to assess our inner balance and to mend physical decline. In the design of some gardens, the use of colours (articulating nuances and tones of different colours) interact with the theory of chromotherapy and other alternative medicine and esoteric studies, from alchimy and numerology to different oriental cultures.

One famous example is the Citroën Park in Paris[4] with the analogical sequence of the "serial gardens" associating 6 colours, 6 metals and 6 senses: green/tin/Hearing, blue/copper/Smell, red/iron/Taste, orange/mercury/Touch, silver/silver/Sight, golden/gold/sixth Sense.

Some interesting gardens of colours create an healing outdoor space for hospitals or healing structures, like the Azul healing garden in MLK Hospital, in Los Angeles, by Dan Corson[5], where the calming blue glass mulch, gray-blue plants, twinkling solar blue lights induce relax, reduce blood pressure, calm breathing and heart-rate, stimulate the parasympathetic system, fighting physical and mental tension.

Colour therapy in the Wellness Park in Costarainera (IM)

Especially in the XIX century, the heliotherapy is considered as a remedy for many cronicle diseases. Numerous travellers (scholars, artists, doctors) find out the therapeutic characters of Ligurian western riviera climate, transforming it in a winter healing place of prililedge beauty and wellness. The clean air is useful to cure respiratory diseases (such as tubercolosis and asthma). The vegetation is transformed, by the insertion of exotic plants, simbols of warm climate and distant sites. At the beginning of the XX century the diffusion of tourism, also related to sea bathing, and some important healing structures are built, surrounded by vaste parks, like the Park Novaro in Costarainera (IM).

The Department of Architecture and Design was charged, by the Municipality of Costarainera, of a scientific advice (under the responsability of the author), to deepen, from the preliminar study approached with the students of Landscape Architecture (University of Genoa, Architecture Faculty, Urban Parks Design Studio 2005-2006, teachers: A. Kipar, A. Ghersi, see: Ghersi, 2007), an attentive analysis of the existing condition of the park and of the relationship between the park and its contest to help the activation of an enhancement strategy.

The complex Novaro- Barellai dates from 1930s, to cure tubercolosis: the buildings are located in a place with a particular mild climate, surrounded by a park (rich in exotic plants, where the patients could sunbathe and breath the clean air) and by a large agriculture terraced property, to ensure food self sufficiency. The continuity among the sanatorium, the formal park and the rural area is fundamental.

Main aim of the project is to restore the therapeutic role of the park, helping to read the story of the heliotherapic complex, proposing new activities for psycho-phisical rehabilitation and wellness, especially by the use of plants, respecting the original structure and linking it to the landscape and

[4] Designed by Gilles Clément, Alain Provost, Patrick Berger, Jean-Paul Viguer, Jean-François Jodry and realized from 1986 to 1992, after an international competition in 1982 (I. Cortesi, 2000, pp. 117-125).

[5] Realized in 2016.

social contest. The first actions can be realized thanks to the Jardival project[6], to open to public fruition a pilot-area, as a wellness therapeutic sensory park, with recreational, didactic-cultural intention, showing different open air natural therapies, to underline the healing meaning of the park. The path of medical plants proposes a serie of plants with healing principles and leads to the the centre of the breath garden, where it is possible to see the main axe of the formal garden, at the other side of the road. Some intervention on the vegetation has opened the view to the sea, offering "sun/air-bathing". Some plants deal with good breathing (rosemary, mint and thyme, together with existing pines and eucalyptus). A sequence of "rooms", that are defined by pitosporum hedges, is dedicated to specific therapies, of which the most significant plants are shown (lavender collection, aromatic and fragrant plants for Aromatherapy essential oils, honeysuckle, heater and rosehip in the garden of Bach's flowers, to transmit the power of harmony; odorous plants for the garden to be smelled, like the curious Coke-smelling artemisia).

The chromotherapy garden refers to the possibility to stimulate our inner reactions by different colours, recreating our psycho-phisical balance. An explanatory panel shows the influence of each colour on different part of the human body, different glands, different chakra.

Again with the help of colours some principles of food education come from the 5-colours diet, an easy way to make children get the habit to eat fruits and vegetables daily. The edible flowers garden, according to the lesson by Libereso Gugliemi (famous "Calvino's gardener"), suggests the tasting of flowers, that can enrich our feeding, both in the fresh (spiced lavender and calendula, acid begonia, cucumber flavored borage, minty violet) and cooked version (like in traditional Ligurial cuisine, for example: filled zucchini flowers).

Around the cement basement of a demolished glasshouse, the Art/Horticultural Laboratory takes place, becoming an open air classroom for children. On that pavement some little benches have been built, recently covered by an attractive mosaic, by the artist Judith Török (realized with the help of a volunteer group of apprentices), narrating all the therapeutic themes expressed in the park.

An extraordinary place for team-working

The opening of the Park involved many different actors in its realization and management.

In the particular atmosphere caused by the place, all the people working on this project got a sense of wellness in the sharing of actions and programs. Volonteers came to learn how to create the artistic mosaic, different local associations participated to the animation of the park, hosting schools and groups or accompanying visually impaired to touch and smell the different species. The park has been selected for Tai Chi outdoor practice, and it is usual to find people walking or using the exercise equipment for fitness, and children enjoying playgrounds around fragrant plants. The most surprising is the natural building up of an affective relation with this special Park and with all the people working as a team for its valorization.

We all hope to be able to convert this positive energy to start the recovery of the whole complex, in the next future.

[6] http://turismovallesanlorenzo.com/parco-novaro-e-jardival/

Fig.1 Vegetation survey made by the students of the Urban Parks Design Studio, in 2005 (Ghersi, 2007, p. 193), with the main compositive axes and indication of the pilot-area.

Fig.2 Scheme of the healing themes in the pilot-area (didactic mini- orchard, Art/Horticultural Therapy; 5-colours diet, edible flowers; chromotherapy garden; smell garden; Bach's flowers; aromatherapy; breath garden and medical plants path). Drawning by Anna Sessarego.

Fig.3 Explanatory panel of chromotherapy garden: the significance of the different parts of the park are told, enriched by other info by a QR code.

Fig.4 Yellow flowers, with a touch of violet.

Fig.5 Explanatory panel of the garden of edible flowers.

Fig.6 Detail of the mosaic, by the artist Judith Török, in the outdoor classroom of the Novaro Park, made with the help of a volunteer group of apprentices.

References

E. Bach, F.J. Wheeler, *The Bach Floral Remedies*, Keats, New Canaan, Connecticut, 1998.

R. Berger, J, McLeod, *Incorporating nature into therapy: a framework for practice*, Journal of Systemic Therapies, vol. 25, n. 2, 2006.

C. Borghi, *Un giardino per stare bene*, Apogeo, Milano 2011.

S. Cicolani, *Cromoterapia emozionale*, DEd'A, Roma 2013.

L. Clark, *Cromoterapia. Gli effetti curativi dei colori e della luce*, Red, Como 2004.

I. Cortesi, *Il parco pubblico. Paesaggi 1985-2000*, Motta, Milano 2000.

F. Cusimano, *Cromoterapia vibrazionale*, Armando, Roma 2009.

A. Ghersi, *Il colore nel progetto contemporaneo di architettura del paesaggio*, in Atti X Conferenza Internaz. del Colore, 11-12 sett, Genova (a cura di M. Rossi, V. Marchiafava), Vol XA, 2014, pp. 521-529.

A. Ghersi, *Progetti di Paesaggi terapeutici*, in A. Ghersi (a cura di), *Therapeutic Landscapes, or the promotion of the diversity for human well-being*, Alinea, Firenze 2007, pp.187-202.

T. Gimbel, *The healing energies of colour*, Gaia, London 2005.

Y. Heat, evaluating the efeect of therapeutic gardens, American Journal of Alzheimer and other Dementia, vol. 19, n. 4, 2004.

W. Kandinsky, *Concerning the spiritual in art*, Dover, New york 1977.

B. Lassus, *Couleurs, lumière .. paysage. Instants d'une pédagogie*, Monum, Ed. du Patrimoine, Paris 2004.

M. Lüscher, *Il test dei colori*, Astrolabio-ubaldini, Roma, 1976.

O. Marchisio, C. Porchia (a cura di), *Mangiare il giardino. La lezione di Libereso Guglielmi*, Socialmente, Bologna 2009.

M. Nieri, *Bioenergetic Landscape*, SE, Milano 2009.

A. Pleasanton, *Blue and Sun Light*, Claxton, Reuser & Haffelfinger, Philadelphia 1876.

V. Primitivo, *Cromopuntura. Le frequenze dell'anima*, L'Età dell'Acquario, Torino 2015.

V. Sanfo, *Cromoterapia. Guarire con i colori*, Aemetra, Brescia 2009.

D.G.White (a cura di), *Tantra in practice*, Princeton University Press, 2000.

[extra]ordinary

Maria Elisa Marini
Department Architecture and Design DAD (University of the Study of Genoa)
email: memarini.arch@gmail.com
Luca Mazzari
Department Architecture and Design DAD (University of the Study of Genoa)
email: l.mazzari@archifax.it

Abstract

Architecture can be defined ordinary in the ways in which it is built and presented, in the quality of the materials from which it is made. It is ordinary anything without qualitative exceptions and that is not significant in any respect. During the 50s and 70s, a large number of residential buildings were built in Italy and Europe. They represent a common vision of the city, a politics interested in densification and modern models of shared living as a response to widespread social and economic problems. In Italy, the law 167/62 established the zone plans for the Economic and Popular Building that defined the turning point for the definition of these buildings.

In Genova, the areas chosen for the expansions are outside the consolidated fabric of the city. Each resulting intervention, although very different from the others, is strongly homogeneous, ordinary and repetitive within it and is totally detached from the context in which it is inserted. The crisis that is established within the complexes is twofold: on the one hand the new expansions fail to interact with the city, on the other they are impotent and unable to organize themselves and for this reason they can not raise their level of self-sufficiency to a quality of adequate social life.

The existence of every human being, in every moment of life, is carried out in relationship with architecture. We can not be exempt from this relationship, we spend our time in the house and in the city, we live inside architecture. For this reason it can be said that an ordinary urban context, characterized by a qualitatively lacking aesthetic, formal, material and finally cultural, can be a problem for the emotional balance of the people who live in this environment in which they don't identify. To overcome this limit the chromatic component, an element that is not negligible in the architectural project, can contribute to create a system of signs through which visual, tactile, environmental and material communication is implemented. In this way there is a transmission of meanings. With a shared use of color, the ideas of identity and belonging can be recovered through

a chromatic identification of one's home. For example, this happened in the historic seaside villages in Liguria and Veneto, where the boat had the same color as the facades of fishermen's houses. The redemption process is implemented in Genoa in a complex of buildings whose nickname, "lavatrici" (literally "washing machines"), is an image of the ordinary; this image will be renewed through a participatory project of appropriation of spaces through the use of color. The fact that an ordinary architecture can become extraordinary through its character of belonging and uniqueness as well as becoming unique through a new perception that color can give, is the leitmotif of the project. This goal is achieved by allowing everyone to choose if and how to give color to his property, within a shared participation project. Ordinary becomes extraordinary because it becomes unique. The ordinary is homologation, standardization and when these characteristics are eliminated through a color that is specific and unique because chosen within a shared project, the ordinary becomes extraordinary.

Abstract

L'architettura è definibile ordinaria nei modi in cui è costruita, in cui si presenta, nella qualità dei materiali da cui è costituita. È ordinario ciò che non presenta eccezioni qualitative e che non è significativo per alcun aspetto.I grandi edifici residenziali che sono stati costruiti in Italia e in Europa tra gli anni 50 e 70 rappresentano una comune visione di città, una politica interessata alla densificazione e ai moderni modelli dell'abitare condiviso come risposta a problemi sociali ed economici diffusi. In Italia è la legge 167/62 che istituisce i Piani di zona per l'Edilizia Economica e Popolare che definisce il punto di svolta per la definizione di questi fabbricati. A Genova le aree scelte per le espansioni risultano esterne al tessuto consolidato della città. Ogni intervento risultante, pur diversissimo rispetto agli altri, è fortemente omogeneo, ordinario e ripetitivo al suo interno ed è totalmente staccato dal contesto in cui è inserito. La crisi che si instaura all'interno dei complessi è duplice: da una parte le nuove espansioni non riescono ad interloquire con la città, dall'altra sono impotenti e incapaci di organizzarsi e per questo non riescono ad elevare il loro livello di autosufficienza ad una qualità di vita sociale adeguata.

L'esistenza di ogni essere umano, in ogni momento della vita, è svolta in rapporto con l'architettura. Non ci si può esimere da questo rapporto, si trascorre nella casa e nella città il proprio tempo, si abita dentro l'architettura. Per questo si può affermare che un contesto urbano ordinario, caratterizzato da un'estetica qualitativamente carente, formale, materiale e infine culturale, può essere un problema per l'equilibrio emotivo delle persone che vivono questo ambiente che non si riconoscono negli edifici in cui abitano. Per superare questo limite la componente cromatica, elemento assolutamente non trascurabile nel progetto architettonico, può contribuire a creare un sistema di segni attraverso cui si attua una comunicazione visiva, tattile, ambientale e materiale, che invera una trasmissione di significati. Con un uso partecipato del colore si può recuperare l'idea di appartenenza attraverso un'individuazione cromatica della propria abitazione come è avvenuto per esempio nei borghi storici in Liguria e Veneto in cui la barca aveva lo stesso colore delle facciate delle abitazioni dei pescatori. Il processo di riscatto viene attuato a Genova in un complesso di edifici il cui soprannome, "le lavatrici", è immagine dell'ordinarietà; tale immagine sarà rinnovata tramite un progetto partecipato di riappropriazione degli spazi attraverso l'uso del colore. Il fatto che un'architettura ordinaria possa diventare straordinaria attraverso il suo carattere di appartenenza e unicità nonché diventare unica

attraverso una nuova percezione che il colore può dare, è il leitmotiv del progetto.
Tale obiettivo è raggiunto permettendo ad ognuno di scegliere se e come dare il colore nella sua proprietà, all'interno di un progetto di partecipazione condiviso. Ordinario diventa straordinario perché diventa unico. L'ordinario è omologazione, standardizzazione e nel momento in cui si eliminano queste caratteristiche attraverso un colore che è specifico e unico perché scelto all'interno di un progetto condiviso, l'ordinario diventa straordinario.

Paper

The existence of every human being, in every moment of his life, is carried out in relationship with architecture. We can not be exempt from this relationship, we spend our time in the house and in the city, we live inside architecture.
In this regard, Sigfried Giedion, in the book "The beginnings of architecture" writes:
Authentic aesthetic values are inseparable from the object. They radiate from the object (...) and determine our sensitive or emotional reactions. At any moment, aesthetic impressions condition us. Sometimes consciously, more often but unconsciously, they produce favorable or unfavorable reactions in us ... Aesthetic values are not therefore simple ornamental additions. The shape of objects, houses, bridges and, above all, the configurations of the human environment depend on them. If aesthetic needs or sentimental needs are not met, the consequences are disastrous in the long run[1]"
An urban context characterized by an aesthetic, formal, and finally cultural deficiency can be problematic for the emotional balance of the people who live in this environment. The chromatic component is an important element in the architectural project and can contribute to creating a system of signs through which a visual, tactile, environmental and material communication takes place, which inverts a transmission of meanings.
Isaac Newton studied the phenomenon of colors and identified them with a scientific and mechanical corpuscular theory, whereby colors depended on light and had physical[2] dimensions. This theory is widely criticized. Hooke and Huygens criticized its hypothetical character, moreover it is refuted by Johann Wolfgang Goethe in 1810 with the book "Zur Farbenlehre[3]". He believed that a natural

[1] Giedion, Sigfried. "The Eternal Present, Volume II: The Beginnings of Architecture: A Contribution on Constancy and Change." New York, 1962.
[2] Newton is the first to attribute a physical dimension to colors by subtracting from them those subjective and physiological aspects that had influenced their investigation until then.
According to Newton:

> *«Those who until today have talked about the colors, or have done so in words, like the Peripatetic, that is, as the Epicureans and other more modern authors who have come to investigate the causes and nature. What the Peripatetics taught about color, even if it was accurate, does not have any importance for our purpose, since they did not deal with the process by which colors are born or the causes of their variety. [...] As for the opinion of other philosophers, they believe that colors are born either from a different mixture of the shadow with light, or from a rotation of spheres, or from vibrations of a certain ethereal medium [4]. [...] All these assertions contain a common error, namely that according to which the modification of the light that produces the colors, does not belong to it from the origin, but is acquired in reflection or in refraction. [...] I have found, on the contrary, that the modification of light, from which colors derive, and an innate property of light [...] and can not be destroyed or changed in any way ».*

The passage is quoted by S. Vavilov, "Isaac Newton" (Italian translation by G. Panzieri Saija), Turin, Einaudi, 1954, p. 72
[3] Goethe, Johann Wolfgang. "Zur Farbenlehre." Tübingen: 2 Bde. Cotta, 1810.

phenomenon such as color, bringing intense emotions, could not be explained in a scientific way. Goethe studied the colors analyzing the eye that is the medium through which they are perceived and with a series of experiments he proved that the eye not only receives but also produces colors. He also stated that colors are a thing of the mind and not of nature. The author worked intensely from 1790 to the essay which is considered the "first design of a psychology of perception[4]" in which a particular mood is associated with each individual color.

About a century later, Joannes Itten again analyzed the effects of colors based on their aesthetic-communicative appearance. Itten carries out a rigorous study, in which he describes the behavior of colors within the light spectrum and shows how different colored lights change the appearance of objects and images. Later, he is interested in the expressionistic theory of color; he emphasizes the correspondence between psychological and optical processes that are produced in the eye and in the brain at the sight of colors. Although each individual sees and judges colors in a very personal way, Itten demonstrated with examples of practice that chromatic perception and receptivity has an objective foundation.

Now let's think about the urban context of Genoa, the project that we will discuss comes from the analysis of the current situation of a certain type of buildings of so-called economic and popular construction[5].

Looking back over the normative affair briefly, we know that the law of April, 18 1962 n.167 instituted the P.E.E.P. (Zone Plans for Economic and Popular Construction) and defined the provisions to favor the acquisition of building areas for this type of building. The zone plans assured Municipalities the availability of areas for housing interventions at low cost (in Genoa there are many, in particular: Begato, Borzoli, Granarolo, Pegli, Prà-Voltri, Quarto, Quezzi, Sestri Ponente, and S. Eusebio).

During the second half of the seventies, two urban instruments came to light in Genoa, which included the distribution and rebalancing of the residence in the city, favoring public intervention on the private one. An important part of the new housing stock was reserved to economic and popular construction. Moreover, the localization choices of expansion started in previous years were arranged; the starting point were the areas already identified by the implementation plan with the law167 of April, 18 1962 (Begato, Borzoli, Granarolo, Pegli, Prà-Voltri, Quarto, Quezzi, Sestri Ponente, S. Eusebio). For several years, they remained largely unbuilt and then progressively reconfirmed with successive partial and integral variations during the seventies and eighties.

At this point the problems emerged, namely that the areas chosen for the expansions were all external to the consolidated fabric of the city and totally devoid of urbanization. This, linked to the morpho-geological characteristics of the Genoese territory, led to huge expenses to give accessibility to the new districts and to connect them to the urban fabric. Furthermore, each intervention is different from the others, but strongly homogeneous and repetitive inside and totally detached from the context in which it is inserted. The expansions are crown interventions, none manages to enter

[4] Citation, Giulio Carlo Argan in the Italian introduction to J.W.Goethe, "The theory of colors", Il Saggiatore, Milan 1981, pp. X-XI, XVII-XIX

[5] The historical reading of the story linked to the economic and popular areas of Genoa is based on a text by Federico Morchio in "Treccani", Vol. XVI, App. V, Rome, 1993, 547 ss

into a relationship with the historical city or with the more deeply structured one. Moreover, they are placed at the edge of the city, already as a choice of the Regulatory Plan and do not possess within them a level of structuring such as to make them autonomous. The urban planning provides that the implementation tool is well defined and unitary, but fails to regulate or impose criteria of relationship with the context.
We are facing an unknown phenomenon in other historical periods or other contexts.
In dealing with the Pegli 3 color project, the district commonly known as "Le Lavatrici" (literally "The Washing machines") will be taken into consideration:
- context of insertion,
- objectives of the chromatic project,
- color chart and modalities of intervention,
- and finally, the theme of participation will be discussed .

Context

The name of the district in which the project takes place is San Pietro. It is located in the Genoese west and develops on the top of a hill on the heights of Prà. The hill to the west is lapped by the Rio San Pietro, from which the district takes its name, which flows into the calm channel of Prà.
The complex develops along a north-south axis, so the buildings have two east-west views. The material used is 15 cm thick cement in sheets and frames with steel frame. The only colors we noticed is white of the structure and the gray / black of the shadows. In the district of San Pietro there is a lack of care for both the context and the buildings, which in the long run can establish in the inhabitants what is defined by the broken windows theory, according to which an example of disorder, such as waste and negligence, establishes a mechanism that encourages other negative behaviors, such as theft.
The aforementioned aspect, places the inhabitants of the district in a state of discontent that, added to the absence of color, the modular repetitiveness of the buildings, the anonymity inherent in the structure and the impossibility of personalization, generates a strong lack of sense of belonging in the inhabitants.

Aims

The color project defines the interaction of three elements: light-color-form. Color defines space, enlarges it, deforms it, structures it creating perceptive relationships with man. We consider the interaction between the "vision", intersubjective and connected to common sense and "perception", subjective and that depends on the individual. The project acts on the environment perceived by the individual, and on the set of perceived environments.
In particular the objectives of the color project are:
- Conceiving the environment as a system of perceptive scenarios that foster intersubjectivity, avoiding perceptual conflict;
- Communicate, make sure that architecture transmits care, consideration to those to whom it is addressed;

- To realize environmental affordance[6], that is to create a scenario able to immediately communicate all the information necessary for orientation and use of the environment, and, at the same time, improve usability to increase people's attachment to places;
- Create a model of user-architecture interface that makes the environment for collective use perceivable as a participatory tool, in order to favor the individual's sense of belonging and respect for the inhabited area.

The original color of the building is maintained in the external façades, since the project has a social objective, but why? Because, the most important intervention is on the internal façades and on the public spaces that are visible only from the road to the coast, from the courtyard and from the apartments in the bars to the intervention on the external facades, which will be limited and not very perceptible. It matters little how others see the complex from outside, the focus is on the inhabitants of the neighborhood, how do they see these spaces? How do they feel? Do they recognize themselves in the buildings? The project responds to the growing demand for identity manifested not only by the inhabitants of this district but in general by those of this type of buildings. Moreover, we considered important the connecting spaces within the complex, too. Currently the pedestrian paths are cold and colorless environments in which it is difficult to recognize and which establish a strong sense of alienation in the passer-by.

The result of the coloring will be a more personal space, in which the inhabitants can be recognized. In a world of globalization where flattening and homogeneity happen, the will to emerge, defined, and recognized is stronger and stronger. The idea of the project is that everyone must be able to identify himself in his building, which will be different from the one next to it.

Color chart and intervention

The participation of the inhabitants in the choice and application of colors is a fundamental component in the process that generates loyalty.

We proposed to identify buildings with four colors, one for each part. The choice refers to an anthropological-cognitive study by Brent Berlin and Paul Kay (1967 - 1969) on color categories. According to their theory, all natural languages possess between two and eleven basic color names. The Berlin-Key hypothesis states that there is a consistent hierarchy within these names: if a language has only two basic color terms these will be black and white, if it has three the third will be red, the fourth will be green or yellow, then blue will be added and so on towards brown, purple, pink, orange and gray.

The complex can be divided easily into four groups, we assigned each one a color: red, yellow, green and blue. The project is divided into three areas of interest, each includes the participation of the inhabitants of the neighborhood. In the exterior and interior facades, the inhabitants will choose the brightness / saturation of the color from an available palette. In the public-semi-public spaces two degrees of brightness / saturation will be chosen, with the approval of the inhabitants.

[6] term introduced by James J. Gibson in 1966. It represents the immediacy with which the object communicates what it is and what it is used for, what actions make it possible or impossible. ENVIRONMENTAL AFFORDANCE means a scenario that can immediately communicate all the data necessary for orientation and use of the environment. Affordances help determine people's attachment to places.

Participation

The interventions identified as external and internal elevations concern private parts of the apartments, therefore the inhabitants will have the possibility to choose whether to apply the color or not. The color plan will be prescriptive on colors but not mandatory. For the implementation of the project there is a collaboration with the Municipality of Genoa, with the heads of the municipal buildings of public housing and the managers of the color office. The participation of the inhabitants is taking place both through meetings and through the internet. The inhabitants will be able to view the colors available according to their apartment and everyone will be able to monitor the development of the project. For the choice of colors, impossible through the screen, samples were made on site to be visible by the inhabitants.

Attached, the translation of two small extracts from the text of articles published on the website of the municipality of Genoa.

December 2015:

"Adopted the Color Plan for the San Pietro di Prà district. The "Washing Machines" can redo their make-up. This was decided by the council of Genoa within a wider project of recovery in the neighborhoods of public housing, which also includes aesthetic interventions. According Fracassi, a Commissioner of the city: "these are actions that include recovery projects, aesthetic interventions and energy-saving interventions, construction of pedestrian paths and social policies[7]."

December 2017:

"The undifferentiated modularity and the uniform gray of the buildings, the isolation of the neighborhood and the lack of services induce in the inhabitants a sense of loss, of homologation, of poor urban quality. The City wants to intervene to improve the perception of the residential complex through a color plan that, complying with the requests of the inhabitants, gives a greater identity to the building organisms that compose it. It stimulates the sense of belonging to the neighborhood and lightening the visual "weight" of the complex building.[8]

[7] For Italian reference: http://www.comune.genova.it/content/adottato-il-piano-del-colore-il-quartiere-san-pietro-di-pragrave

[8] For Italian references:http://www.comune.genova.it/content/progetto-colore-la-valorizzazione-quartiere-san-pietro-di-pegli

References:

Giedion, Sigfried. “The Eternal Present, Volume II: The Beginnings of Architecture: A Contribution on Constancy and Change.” New York, 1962.

S. Vavilov, “Isaac Newton” (trad. it. di G. Panzieri Saija), Torino, Einaudi, 1954, p. 72.

Giulio Carlo Argan nell’introduzione a J.W.Goethe, “La teoria dei colori”, Il Saggiatore, Milano 1981, pp. X-XI, XVII-XIX

Albers Josef, “Interazione del colore”, Milano, Il Saggiatore editore, 2009;

Mahnke Frank, “Il colore nella progettazione”, Torino, Utet editore, 1996;

Steiner Rudolf, “Colour”, Rudolf Steiner press, 1992;

Charles Goodwin, “Il senso del vedere”, Roma, Meltemi Editore, 2003;

David Batchelor, “Cromofobia”, Mondadori editore, 2001;

Pietro Barozzi, “Lineamenti dello sviluppo urbano di Genova”, Genova, ECIG, 1988;

Federico Morchio, “Genova” in Enciclopedia Italiana Treccani, sez. architettura - V Appendice,1992;

Maurizio Rossi, Andre Siniscalco, “Colore e colorimetria”, Maggioli ed., 2012;

Antida Gazzola, “Intorno alla città”, Liguori ed., 2008;

Aa.Vv, “La 25 a Genova“, pubblicazione del Comune di Genova, Sagep S.p.a. ed., 1984; Ugo Carughi, “Città Architettura Edilizia Pubblica“, Napoli, CLEAN ed., 2006

What is the colour of Climate Change?

Adriano Magliocco
Department of Architecture and Design (DAD), University of Genoa
email: magliocc@arch.unige.it
Maria Canepa
Department of Architecture and Design (DAD), University of Genoa
email: mariacanepa@hotmail.it

Abstract

The Climate Change currently under way – subject of discussion for its possible anthropogenic nature – is bringing many changes on our planet, among which (though perhaps less important than others, except as a sign of transformations under way) is a change in its colour, both in natural areas and, less evidently, in anthropic ones.

NASA's 20-year satellite monitoring system was succeeded by the Sea-Viewing Wide Field-Of-View Sensor (SeaWiFS), a satellite-borne instrument with the ability to observe changes in progress on both land and oceans. For example, Chris Potter, a researcher at NASA's Ames Research Center, reports that, in Alaska, large fires caused by storms, triggered by rising temperatures, destroyed a moss layer that protected permafrost, exposing frozen ground that has changed in consistency to a sea of mud.

One of the most noticeable effects of Climate Change in densely-urbanized areas is an accentuation of the Urban Heat Island (UHI) effect. This is causing big cities' municipal administrations, but also citizens' associations, to undertake initiatives to protect buildings from solar irradiation in summer. These include the White Roof Project, in New York, and the International Green Roof City Network, in Tokyo, which treat buildings with reflective paints or vegetal layers aimed at reducing solar heat absorption.

Abstract

Il Cambiamento Climatico in atto – oggetto di discussione per la sua possibile natura antropogenica – sta portando numerosi cambiamenti sul nostro pianeta, tra i quali (forse meno importante se non

perché segnale delle trasformazioni in corso) un cambiamento di colore, sia nelle aree naturali che, meno evidente, nelle aree antropizzate. Il monitoraggio, ormai ventennale, da parte della NASA - con il programma di osservazione dei mari (SeaWiFS) realizzato con i sensori dei satelliti – ha la capacità di rilevare i cambiamenti in corso nei mari e sulla terra. Chris Potter, ricercatore del Ames research Center della NASA, riporta che in Alaska gli ampi incendi provocati dai temporali stimolati dal cambiamento delle temperature, hanno distrutto lo strato di muschio che protegge il permafrost, scoprendo il terreno gelato che cambia così consistenza e si trasforma in un mare di fango. Uno degli effetti più evidenti del Cambiamento Climatico nelle aree densamente urbanizzate è una accentuazione dell'effetto Isola di Calore. Questo sta inducendo le amministrazioni delle grandi città, ma anche le associazioni di cittadini, a intraprendere iniziative per proteggere gli edifici dall'irraggiamento solare in estate. Sono così sorte iniziative come il White Roof Project a New York e l'International Green Roof City Network a Tokio, ove il trattamento degli edifici con strati riflettenti o con coperture verdi hanno lo scopo di ridurre l'assorbimento di calore dovuto all'irraggiamento solare.

Introduction

Colour perception and Global Warming

Colour is the visual perception of the brain's interpretation of nervous signals sent from the retina's photoreceptors and related to the stimulation by electromagnetic radiation of certain wavelengths and intensity in the visible spectrum. If, from the perceptual point of view, the visualization of a colour is linked to physiological factors (with variations due, therefore, to characteristics of the perceiving subject), from the physical point of view it is possible to associate the colours of living beings with specific reaction phenomena to electromagnetic radiation. Variations in intensity and composition of the radiative spectrum –solar radiation is composed of a much wider spectrum than the visible field alone – determine different reactions in the natural world, but also in the anthropized one, as illustrated in this paper.

Greenhouse gases interact with solar radiation by capturing it and warming the atmosphere, which is one of the factors that allows for life on our planet. "Ninety-seven percent of climate scientists agree," however, "that climate-warming trends over the past century are very likely due to human activities, and most of the leading scientific organizations worldwide have issued public statements endorsing this position," according to NASA. Global Warming is a current warming trend of particular significance. It is the result of human activity since the mid-20th century, and it is proceeding at an incredible rate, according to the UN's Intergovernmental Panel on Climate Change (IPCC). Global Warming is changing the characteristics of land itself in many respects, inducing changes to the colour of our environment corresponding to changes in the characteristics of the soil, vegetation, and, in limited cases, the anthropized space.

Environmental colour-related strategies

Today, most of the world's population lives in cities, and this tendency toward urban living is growing every year. This movement is directly connected to environmental issues and manifests at the global scale. Several environmental problems, such as Climate Changes, the UHI effect,

greenhouse gas emissions, and reductions in energy source availability, can be attributed to dense urbanisation and affect environmental urban quality. The building sector, according to United Nations Environment Programme (UNEP), accounts for 40% of total energy consumption; in Europe, 36% of total greenhouse gas emissions relate to buildings, and a significant portion of energy is consumed by buildings for heating, cooling, and lightening purposes (Besir-Cuce 2018). For these reasons, an effective control of urbanisation and Urban Heat Island through energy-efficiency and eco-friendly buildings, which integrate elements such as cool materials and green strategies, are relevant. In the last decades, governments in European Union countries, Japan, China, and the United States have taken measures to face Climate Change and reduce carbon emissions and energy use in the building sector. Some of these governmental strategies are connected to building energy regulations, which when developed and implemented, which are mostly related to heating, cooling, and water heating devices and lightning systems.

Methodology

A bluer Earth or a sea of mud?

Climate Change has effected a sudden change in the climatic conditions on our planet. This has many consequences. Researchers, using satellite surveys (which are carried out with different sensor systems in order to reduce the possibility of error in data interpretation), believe they can identify changes in the Earth's colour and texture as a direct result of changes in cloud, aerosol, or the surface texture over the past 15 years (Zhao et alii, 2016). "Here, we identify statistically significant trends in the colour and spatial texture of the Earth as viewed from multiple directions from the multi-angle imaging spectroradiometer (MISR), which has been sampling the angular distribution of scattered sunlight since 2000." Researchers have found that the Earth has been appearing relatively bluer (an increase in up to 1.6% per decade from both nadir and oblique views) over the past 15 years. From observation, it is not possible to trace causes even if, in general, researchers attribute it to changes in the distribution and stratification of clouds and aerosols, as well as changes in soil characteristics, which could be Climate Change effects.

A period of observation of 15 years is very short to make deductions; in order to interpret the data, it is necessary to combine these observations with others, such as those mentioned in the following paragraphs. Sweden researchers (Johansson et al., 2006) observed permafrost in the sub-Arctic region thawing and transforming peatland ecosystems, with subsequent vegetation changes in the sub-Arctic Swedish mire. This effect seems due to emissions of greenhouse gases carbon dioxide (CO_2) and methane (CH_4) observed through images of the mire (ca. 17 ha) and surroundings taken with film sensitive in the visible and the near-infrared portion of the spectrum, from 1970 and 2000. "The results show that, during this period, the area covered by hummock vegetation decreased by more than 11% and [was] replaced by wet-growing plant communities". Thawing permafrost peatland acts as a larger greenhouse gas source over the growing season because of increased CH_4 emissions. Researchers have concluded that, "even if sub-Arctic mires are assumed to have a net warming effect, the [transforming of] the whole sub-Arctic due to warming is difficult to project because the heterogeneous landscape is an amalgamation of different ecosystem with presumably unequal responses to warming and moisture changes." Of course, shapes and colours of sub-Arctic

hummock vegetation comprise very different forms of wetland plants; changes in shape and colours correspond to changing in climate and land characteristics.
In an article on the NASA climate website (accessed November 13, 2017) by Kate Ramsayer of NASA's Goddard Space Flight Center, the author tells how NASA satellites, since 1997, have continuously, and at a global scale, observed all plant life at the surface of the land and ocean. A paper entitled "The changing colors of our living planet" clearly demonstrates a strong relationship between colours and things happenings on the planet, reading: "Satellites measured land and ocean life from space as early as the 1970s. But it wasn't until the launch of the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) in 1997 that the space agency began what is now a continuous, global view of both land and ocean life."
The Earth is breathing every single day, changing with the seasons, but the Sun, space agency's scientists have also discovered, causes long-term changes across continents and ocean basins. While satellites have measured the Arctic getting greener, with shrubs expanding due to warmer temperatures, as ocean waters warm, there's been a shift in phytoplankton populations across the planet's five great oceans corresponding to an expansion of "biological deserts", areas where little life thrives. Chris Potter (2018), a researcher at NASA's Ames Research Center, reports that, in Alaska, large fires caused by storms, triggered by rising temperatures, destroyed a moss layer that protected permafrost, exposing frozen ground that has changed in consistency to a sea of mud.

White coral

Among the effects of global warming seems to be a sea temperature increase. One of the effects of rising sea temperature is the phenomenon of coral bleaching. Coral bleaching is a destructive phenomenon that affects coral reefs, and is especially damaging in terms of the loss of the symbiosis between coral polyps and photosynthetic unicellular algae of the Zooxanthellae family (this algae gives coral its red colour). The first global bleaching event was in 1998, during a strong El Niño that was followed by an equally strong La Niña, according to the National Oceanic and Atmospheric Administration (NOAA), an agency of the U.S. Department of Commerce. A second bleaching occurred in 2010: "Earth Observation information from ocean and coastal colour satellite sensors can provide spatially and temporally dense information on sediment flows." (Jetske et al.). Thanks to satellite observation, NOAA claims that, based on data, it can be argued that the extensive coral bleaching process is undergoing regression, although many scientists argue that the danger remains. In fact, in 2016, Australia's Great Barrier Reef saw a whitening process in 90% of its corals, and the death of 20% due to a temporary increase in sea temperatures of up to four degrees. Coral reef protection is of great environmental and economic value, offering habitats for marine life. If the corals die, reefs degrade, and so do the corals structures. Changes in coral colour, which is strongly linked to human economy, is therefore a sign of the risk of the degradation of ecosystems whose conservation is necessary for the support of the sea economy in certain ocean areas.

Cool materials and green strategies

The increase of phenomena related to Climate Change and surfaces' colour includes the Urban Heat Island effect.

UHI intensifies the energy consumption in urban areas, increasing the cooling demand, and worsens the environmental urban quality of cities.
The urban structures are often very dense and the main materials surfaces dark (concrete or asphalt), so solar radiation is absorbed in the form of heat; at the same time there is a lack of vegetation or green areas. To contain this effect, mitigation approaches have been widely studied over the past few decades.

Reflective materials

The main action to confront UHI is using materials with a high solar reflectance to increase the albedo of surfaces in urban areas. This can significantly modify the urban microclimate, mostly due to the large surface area of roofs within urban blocks. These materials, known as "cool materials," have a high solar reflectance and infrared emittance, with the objective to increase the albedo.
This mitigation technique presents an environmentally-friendly, passive and easy solution that can significantly impact the energy consumption of individual buildings, as well as the overall climate of urban areas. Generally, this technique is done by layering a liquid material, such as a white paint or an acrylic coating, or using a reflective product, such as a Ethylene-Propylene Diene-Terpolymer Membrane (EPDM) rubber. These materials have evolved recently due to discoveries in the nanotechnology field leading to the conception of highly reflective thermochromic paints designed to be thermally reversible: during the summer months, the cool roof will have a high reflectivity; and during winter, a high absorption rate. An alternative solution could be phase change materials (PCM), which possess a high latent heat capacity that makes it feasible to use as an energy storage media in building envelope (Roman et al. 2016).
Some cities have experimented with painting their streets with reflective materials, including a recent experiment in Los Angeles where black asphalt was covered with a material called CoolSeal (Holfeld 2017), and California's adoption of white roofs in its building codes as well as Leadership in Energy and Environmental Design (LEED) environmental tools. The non-profit White Roof Project coats buildings' roof surfaces with a paint-like, white, reflective coating, and has focused on buildings with low-income residents, coating them for free using private donations and teams of volunteers (http://www.whiteroofproject.org). Some recent studies question the benefits of using white roofs in cold climates, however. Studies done in the late 1990s and early 2000s at the California-based Lawrence Berkeley National Laboratory purportedly showed the efficacy of using white reflective roofing anywhere, including in northern climates, but those studies did not take into account thermal performance, air infiltration, or vapor drive and only measured surface temperature at the roof level. White roof membranes have high reflectivity, which directs heat upward into the atmosphere where it mixes with black and brown soot particles, thought to contribute to global warming. Due to the atmospheric computer modelling, the Stanford report, written by Jacobsen and Hoeve, references previous studies finding white roofs increased average space heating use more than they decreased average air conditioning use in northern climates (Jacobsen-Hoeve 2011).

Green strategies

As previously stated, the rising concentrations of greenhouse gas emissions and their negative,

Climate Change-related environmental impacts require new strategies for buildings design to mitigate their effects. The broader concept of green structures, such as green roofs and green facades, becomes more developed by the day as the lack of vegetation in urban areas causes remarkable increases in surrounding temperatures, affecting the thermal conditions of indoor environments – the UHI effect. For this reason, green systems (roofs and facades) are considered an appropriate and sustainable solutions to resolve Urban Heat Island-related issues, improving urban environmental quality by modifying the microclimatic conditions of existing buildings and urban blocks, effecting changes in water and air quality, storm water management, temperature and carbon emissions, and providing additional social and economic benefits to the public. Green strategies have a large impact both on citizens psychological aspects and the aesthetics of cities. Green roofs are rooftops that are partially or completely covered with vegetation growing on soil of differing thicknesses (depending on whether they are extensive or intensive green roof systems). Green facades are made up of wall superstructures that hold vegetated panels with very different characteristics (e.g., green walls, living walls). Green envelopes in particular can provide wide vegetated surfaces in dense cities. An extensive study on different vegetation species (Perini et alii) relating to the case of the vertical greening system located in a dense urban area of Genoa city centre, in Italy, demonstrated the different capacity of vegetation to collect fine dust, thereby reducing atmospheric pollution. But green facades can substantially modify the appearance of a building and consequently of an urban road and its variations in colour. To improve and encourage storm water-designs utilizing green strategies, several initiatives in the United States are financing projects undertaken by public administrations or non-profit organizations, including Washington, D.C.'s Department of Energy and Environment's provision of $300,000 for a green roof development, as ordered by a settlement.

Fig.1 Green Facade in Genoa (photo by Anna Positano for Facciata Verde INPS project)

In New York City, Earth Pledge, an industry association of green builders, oversaw the construction of seven roof projects in the Bronx, Brooklyn, and Harlem (Taylor 2007).
In Tokyo, where about half of all land is urban area and natural areas and greenery have shrunk markedly, the Tokyo Metropolitan Government (TMG) is making efforts to preserve greenery, regulate development, and promote the greening of urban areas based on the Nature Conservation Ordinance and the 10-Year Project for Green Tokyo.
Starting in 2000, the TMG added green roofs to its 1985 advisory guidelines for greening the city, and with the plan for a green Tokyo receiving funding, the number of green roofs in the city grew. Expected benefits to this change included storm water management, biodiversity preservation, decreased UHI, improved air quality, mitigated Climate Change effects, energy savings, and the beautification of the city. In Taipei, Taiwan, the government has promoted sustainable architecture to mitigate buildings' negative impacts on the urban environment and to create harmony between human and other inhabitants who live in urban areas. It found that creating more green roofs in the city would be the best ecological solution, improving air quality, mitigating the Urban Heat Island effect, beautifying the environment, and simultaneously making the city more sustainable (Chen-Yi Sun et al.).

Fig.2 Green Roof in Genoa (photo by Adriano Magliocco)

PV panels

There are different opinions, supported by research, about the role played by photovoltaic (PV) panels on the UHI. Some authors, like Barron-Gafford (2016), underline the importance of being very cautious when intervening in urban environments because large PV installations risk emphasizing the UHI effect: it would perhaps be better, in this view, to improve white-coloured roofs, enlarge the albedo and parks, and provide tree shade. The Barron-Gafford study considers the potential effect of PV "heat islands" understudied and this so-called "PVHI" effect may in fact warms surrounding areas, thereby potentially influencing wildlife habitat and ecosystem function

in wildlands, and human health and even home values in residential areas. As with the Urban Heat Island effect, large PV power plants induce a landscape change that reduces albedo so that the modified landscape is darker and, therefore, less reflective.
Other studies, such as Masson's (2014), present a way to implement solar panels in the Town Energy Balance scheme, taking account of the energy production (for thermal and photovoltaic panels), the impact on the building below, and the feedback to the urban microclimate through radiative and convective fluxes.
A scenario in which large but realistic deployments of solar panels in the Paris metropolitan area is simulated shows that solar panels, by shading the roofs, slightly increases the need for domestic heating (by 3%).
In summer, however, the solar panels reduced the energy needed for air-conditioning (by 12%), as well as the Urban Heat Island by 0.2 K in the day and up to 0.3 K overnight. Therefore, to correctly evaluate PV effects, planning should use quantitative, microclimatic methods.

Conclusion

Climate Change is causing a modification in "chromatic" terms, both on the natural environment and on the anthropized one. While colour change in the natural environment has dramatic consequences on biodiversity and ecosystem conservation – as in the case of the tragic example of the coral reef – urban colour change, on the other hand, represents a challenge requiring a strategy of mitigation and adaptation. Urban environment changes do not disrupt ecosystems, rather it is the perceptual, cultural, and historical factors that are changing: for example, the landscape regulations affecting our country impose, in fact, chromaticism linked to the bonds of landscape heritage, certainly not to the effect of the UHI.

References

G. Barron-Gafford, R.L. Minor, N.A. Allen, A.D. Cronin, A.E. Brooks. M.A: Pavao-Zuckerman, *The Photovoltaic Heat Island Effect: Larger solar power plants increase local temperatures*, in "Scientific Reports, Nature", 2016.
A.B. Besir, E. Cuce, *Green roofs and facades: A comprehensive review*, in "Renewable and Sustainable Energy Reviews", n. 82, pp. 915-939, Elsevier, 2018.
J. A. Bouma, O. Kuik, A.G. Dekker, *Assessing the value of Earth Observation for managing coral reefs: An example from the Great Barrier Reef*, in "Science of the Total Environment" 409 (2011) 4497–4503. doi:10.1016/j.scitotenv.2011.07.023
Bureau of Environment, Tokyo Metropolitan Government, Environmental Services City of Portland *International Green Roof City Network Case Study Tokyo, Japan* (http://www.kankyo.metro.tokyo.jp/en/greenery), 2011.
S. Chen-Y. L. Yi-Jiung, S. Wen-Pei, O. Wen-Sheng, L. Kang-Ming, *Green roof as a green material of building in mitigating heat island effect in Taipei city*, in "Applied Mechanics and Materials Vols. 193-194" pp. 368-371, 2012.
K. Hohlfeld, *Keeping cool by design*, in "Daily Journal of Commerce"; Portland, Or., Aug 9 2017, BridgeTower Media Holding Company, 2017.
M.Z. Jacobson, J.E. Hoeve, *Effects of Urban Surfaces and White Roofs on Global and Regional Climate*, web. Stanford.edu, 2011.
T. Johansson, N. Malmerw, P.M. Crillz, T. Friborg, J.H.A Kerman, M.L Mastepanov and T.R. Christensen, Decadal vegetation changes in a northern peatland, greenhouse gas fluxes and net radiative forcing, in "Global Change Biology"

(2006) 12, 2352–2369, doi: 10.1111/j.1365-2486.2006.01267.x
V. Masson,M. Bonhomme, J.L. Salagnac, X. Briottet, A. Lemonsu, *Solar panels reduce both global warming and urban heat island*, in “Frontiers in Environmental Science”, June 2014, Vol.2, 2014.
K. Perini, M. Ottelé, S. Giulini, A.o Magliocco, E. Roccotiello. *Quantification of fine dust deposition on different plant species in a vertical greening system*. In “Ecological Engineering” 100, pp. 268–276, 2017.
C. Potter, Ecosystem carbon emissions from 2015 forest fires in interior Alaska, in “Carbon Balance Manage” (2018) 13:2 https://doi.org/10.1186/s13021-017-0090-0
K.K. Roman, T. O’Brien, J.B. Alvey, O. Woo, *Simulating the effects of cool roof and PCM (phase change materials) based roof to mitigate UHI (urban heat island) in prominent US cities*, in “Energy” 96, pp. 103-117, Elsevier, 2016.
D. Taylor, *Growing Green Roofs, City by City*, in “Environmental Health Perspectives” 115, pp. 306-311, National Institute of Environmental Health Science, 2007.
G. Zhao, L. Di Girolamo, D.J. Diner, Senior Member, IEEE, Carol J. Bruegge, Kevin J. Mueller, and Dong L. Wu. *Regional changes in earth’s color and texture as observed from space over a 15-year period*, in “IEEE transactions on geoscience and remote sensing”, vol. 54, no. 7, July 2016. doi 10.1109/tgrs.2016.2538723
https://climate.nasa.gov/news/2652/the-changing-colors-of-our-living-planet
http://www.noaa.gov/media-release/global-coral-bleaching-event-likely-ending%20

City branding and enhancing a territory identity of Genoa

Martina Cavalieri
Department Architecture and Design DAD (University of the Study of Genoa)
email: m.cavalieri@arch.unige.it

Abstract

«Cities also believe they are the work of the mind or of chance, but neither the one nor the other suffices to hold up their walls. You take delight not in a city's seven or seventy wonders, but in the answer it gives to a question of yours.»

The quote is taken from Italo Calvino's The Invisible Cities. It offers food for thought on the current practice of city branding, which is used to enhance the value and identity of a certain place as well as its community.

Every city tends to distinguish from the others in it's own peculiar way and this process can be very committing.

It's important to remember that to define it's own identity, a city can't simply cover itself with some magic dust or something to attract people. On the contrary, it has to define a recognizable identity, something able to position the city in the collective imagination. The goal is to create a shared idea which could convey everything the city embodies and represents. That should apply both to the people living there and to those willing to invest there, creating a sharing network between these two parties.

When it comes to the Italian territory, analysing the different aspects of marketing and management, the text will focus on the case study of Genoa, pointing out how the project could define are recognizable and shared identity people could easily share.

Keywords: branding; place branding; city branding; cultural identity; creative city, experience city.

Abstract

«Anche le città credono d'essere opera della mente o del caso, ma né l'una né l'altro bastano a tener su le loro mura. D'una città non godi le sette o settantasette meraviglie, ma la risposta che dà a una tua domanda.»

La frase in questione, presente nello scritto "Le città invisibili" di Italo Calvino, vuole essere spunto di riflessione sulla pratica estremamente attuale del city branding, usata per accrescere il valore e l'identità di un determinato luogo e della sua comunità.
Ogni città tenta di definire delle modalità con cui può essere identificata. Ognuna, nella miscela di elementi che ha a disposizione, dà la priorità ad alcuni rispetto ad altri e, il processo per arrivare alla definizione di un'operazione di city branding risulta impegnativo.
Questo tipo di approccio infatti non si limita a rivestire la città di una patina per attirare persone, ma definisce un'identità riconoscibile, che possa posizionare la città nell'immaginario collettivo. Il suo obiettivo è quello di creare un'ideale condiviso che sia in grado di comunicare tutto ciò che la città rappresenta, sia alle persone che vivono al suo interno, sia a quelle che vorrebbero investire in essa, creando una fitta rete di condivisione tra le parti.
Analizzando gli aspetti del marketing e del management a livello territoriale italiano, il testo prenderà in esame alcuni casi studio ed evidenzierà come il processo progettuale possa arrivare a definire un'identità riconoscibile e condivisa dalla collettività.

Introduction

«In a world where cities and regions aggressively compete for investment from public and private sectors, brand reputation is critical. The brand is both a lens through which information is viewed and a decision criterion.» (K. Dinnie, 2010)
Like economy and marketing, a city is a series of productive activities developed by local people working to create value within their territory. In a bigger context, such activity must be defined in relation to competition in such market.
Therefore, a territorial brand must fulfil the *requirements of 'characterizing name and/or symbol (logo or trademark) identifying a certain area, making it different from other territories and representing a synthesis of objective, cognitive, emotional and valuable elements of the offer.*
It is absolutely clear that tourism market has become global, and competition for destinations must be carefully analysed and dealt using advanced tools, using best practices and methods taking such change into due account.
Today, in order to be recognized and acknowledged on an international level, a city must be attractive and able to define its own positioning. This must be done because of the increased mobility that makes people more willing to move, but only if certain conditions are met at destination.
Cities thus decide which aspects to highlight, in order to attract capitals and people. Building a brand for a city, though, is not a matter of classical marketing. It is actually about storytelling: choosing the right pictures, colours and feeling to tell its story at best.
Thus, citizens in the first place will appreciate the quality of life and the city will be able to attract tourists and investments.
Exchanging experiences is an important aspect, in order to learn not to make the same mistakes others have. Today, investing in branding is extremely important, and it is not only about designing a logo. A logo is like a business card, a necessary but not sufficient condition. Some build their brand developing technology for services, other increase the involvement level. Every city tries to define different ways to be identified.

Each city, with its distinctive elements, gives priority to some elements.
It is a very demanding process, which is not about painting the city with a layer of colour to attract people. It is actually about defining an identity that is visible from the outside and which can position it in the collective imagination.

City branding: the mission of the territory

Unlike city marketing, city branding aims to transform a city from a simple collection of buildings and people to a place worth visiting. .
What does this mean? Cities are not real products, but need a global recognition in order to compete with each other; to do this it is necessary that they create an image of themselves capable of reflecting the values of the territory and of the people living within it, trying to make itself attractive also to the outside world. The brand function is in fact to create a series of actions to build a positive image of the city and to communicate through images, narratives and events at local and international level to obtain a competitive advantage among other cities.
In conclusion, city branding is therefore the application of traditional branding techniques (which are usually applied to companies) to a geographical place in the broadest sense of the word. Its goal is to attract inward investment and tourists and reinforce the local identity and identification of the citizens with their city.

The importance of territorial identity.

Before creating a city brand, a city must first define what is it's image
Anholt, an independent political consultant expert in places and perception, argues that, in most cases, there is a gap between the actual identity of a territory and the perceived identity. Very often, in fact, places are perceived in a positive or negative way; but the real problem lies in the fact that public opinion usually has a distorted perception of what the image of a given place is [5].
In many cases, the risk is to have a negative perception of the territory in question.
This kind of superficial opinions are very often related to misinformation and this can affect the image of a place. Moreover, these perceptions tend to establish themselves in the collective imagination in an extremely profound way.
So, when we talk about territorial identity to start with an operation linked to city branding, we need to pay attention to the kind of perception that citizens and foreigners have of the territory in question. The need arises, in negative cases, to go and modify the image that some places have created of another. The point is that if on the one hand ***"the identity of a country, then, changes, the reputation does not go at the same speed". "The way to gain a better reputation is to strive to be what you want to appear."*** *(Socrates)*
In conclusion, a city must be able to promote itself by showing its best sides, in order to manipulate and influence the way in which it is perceived, but at the same time trying not to distort it's identity.

Cultural branding: inside city

Cultural branding is something already inherent in the city; its can be defined as any brand used in the field of culture.
But what does 'culture' mean?

In recent times, the term 'culture' actually saw an extension of its meaning, especially with regard to the cultural property and its legal regulation. The meaning of the word culture went from a traditional one,related to arts, literature, ethnology and anthropology to the one of heritage .
A cultural brand is typically associated with positive values such as the expression of creativity, beauty and the message heritage conveys at the level of social memory. Given all these positive contents, it is clear how high is the added value of such cultural brand and how it can create a meaningful and positive associations with commercial products or services. Taking this semantic, emotional and important asset into due account, the added value related to cultural brands is clearly visible.
In terms of values, representations and experience, a cultural brand plays a semiotic function.
Only a very well calibrated campaign focused on cultural positioning is able to generate the right contents and at the same time define its audience.

Tourism like a motor of city brand recovery.
The tourist-local branding has three different functions: *identification*, *evaluation* and a *fiduciary* one. The identification function is the function performed by the sign (or signs,) something allowing tourists to recognize the offer of a certain territory, making it stand out and able to be distinguished from the others. During the purchasing process, this function defines all the possible alternatives and the functions that will satisfy a certain tourist need.
The assessing function is performed by the meaning given to the sign, which allows tourists to identify the offer of a certain territory and also understanding the differences between such offer and the competitors' ones. During the purchasing process it contributes to assess and evaluate all the possible alternatives to satisfy a specific touristic need.
Last, we have the fiduciary function, for it to keep the promises and give specific levels of performance in time and space with regard to the terms of the offer. In the purchasing process it reduces the perception of the perceived risk level as well as the cognitive dissonance related to the time lapse between purchase and use.
In the near future, a wide range of approaches will be used and tested in order to shape the identity of companies, products and services. At any rate, the characteristics of a living organism is not only pertaining to companies.
Whichever citizen, person or tourist can find traits of dynamism and vitality, with an identity that is easy to define and recognize.

Case study: Genoa, More Than This. The logo.

Fig. 1 Picture of San Lorenzo cathedral details with "Genova More Than This" logo

Many Italian regions and cities, like Florence or Bologna, felt the need to promote their territory not only through events, conventions or exhibitions, but also by implementing and expanding their touristic offer with a new mix of modern marketing strategies, new initiatives, and a consistent experience for the visitors.

Big cities such as the above mentioned were easily attracted by the concept of city branding, but smaller locations struggled to implement it because of its scope and its costs, although they would also benefit from it for promotion purposes.

The case I'd like to describe here is the City of Genoa. A few years ago, the municipality of Genoa launched an international competition, looking for idea in order to create a logo or brand they would use to promote the city.

The winner should have represented the city in an attractive and characteristic way, as well as provided a signature in all the cultural and touristic offer and all promotional initiatives, at both national and international level. It should have also strengthened the regional marketing activities to attract businesses and people in the territory. The decision to create a logo to strengthen and unify the promotion of the city was part of a process that Genoa started in 2012, as a participant in the project City Logo, which aimed to address the issue of the Innovative City Brand Management. The project still supports European cities that have been engaged for some time in branding strategies to improve their image in the eyes of tourists and businessmen interested to invest, but also for the citizens themselves. Before starting the actual competition, Genoa activated a series of focus groups on the city's image: the present one and the one it wishes to have. Those reflections were gathered in a number of documents, made available to those who wanted to take part in the competition.

What emerged was: "Genoa, more than this."

Fig.2 Image of Genoa with the "Genova, More Than This" logo

373 propositions were submitted and eventually the international panel, made up by professors and designers, chose the logo by studio 7vicocrema from Savona.

Authors Anna Giudice and Valeria Morando explained their decision:

"Genoa, superb and mysterious city.

Many know of it but only a few know what it truly conceals among the narrow carruggi of the biggest historic centre in Europe. Only those who venture out in its heart will discover some of the most beautiful palazzi in Italy, unexpected glimpses of the sea or the hills and a harbour full of life and history. Only those who experienced it can connect the dots of all the cultures that coexist there. Genoa is "MORE THAN THIS."

This is the slogan intended to match the logo: it's in English, so that foreigners from all corners of the world would feel invited to come and discover it.

The logo can be read horizontally as well as vertically, the latter highlighting the concept of a city which is multi-layered both geographically and culturally. Red was chosen, inspired by the city's history - it is in fact the colour of Saint George's Cross, ancient symbol of the ancient Republic of Genoa. Breaking down the G and the O provided a strong graphic element, a parenthesis, which completes the logo and becomes an integral part of the graphic design. Often, it's only in brackets that we can find the true meaning of the sentences we write."

Fig. 3 Color declinations of "Genova, More Than This" logo

The launch of the new brand was preceded by a teaser campaign in the historic centre and other locations of Genoa, where the payoff and parts of the logo could be seen. As expected, the city's

"new clothes" attracted much attention and reactions, even though not always positive.
The press, media and social networks hammered away the panel's choice, and its presentation in the boardroom of Palazzo Tursi, divided the city between supporters and detractors.
The biggest controversy concerned the huge sum paid to the winners of the competition, that is €14,000. However, this issue was quickly solved as the municipality declared that the "Citylogo" project was fully sponsored by the European Union.
Even so the citizens weren't happy and bombarded the social media with non-flattering comments, parody videos as "The new logo of Genoa: the real story" and even mocking and ironic websites (for example, on uleugo.it you could re-create the new city slogan). There have also been other types of interventions, far more proactive and forward-looking, including an article written by Francesco Derchi on medium.com: he did not criticized the aesthetics of the logo, but underlined the city branding action that Genoa undertook and inferred socio-cultural, touristic and economic aspects of the city.

Conclusions

Genoa has always been a hidden wonder, newspapers like the Mirror [9] have confirmed it and, at the level of sightseeing, the city still continues to attract many tourists. Just think that this year Forbes included Genoa in the 5 cities to visit during 2018. As for the development of city branding, the Ligurian capital still can not reach cities like Rome and Milan. In the ranking drawn up by the Reputation Institute regarding the reputation of the cities, the beautiful Ligurian city while we find Milan in ninth place and Rome in the thirteenth.

Fig. 4 Screenshot of the tourist portal www.visitgenoa.it

As the city has managed to return attractiveness for tourists, this is missing when it comes to analyzing the internal data: the lack of work, the emptying of the city and the age that keeps on rising does not make Genoa a coveted city for the livability. In light of this, we can affirm that the city branding approach to the Ligurian capital was developed to promote the city abroad, but in the current state of things much has not been done to make it a local attraction which is a fundamental part for a correct development of city branding. Communicating the territory means not only promoting it outside but also making it attractive to the people who live within it.
And this is not solved only by creating a corporate image.

References

Severino, Fabio. *Un Marketing per La Cultura*. F. Angeli, 2005.

Severino, Fabio. Economia e Marketing per La Cultura. F. Angeli, 2011.

Carmi, Elio. Branding: *Una Visione Design Oriented*. Logo Fausto Lupetti, 2011.

Nes, Irene Van. *Dynamic Identities: How to Create a Living Brand.* BIS Publishers, 2014.

Anholt, Simon. Places: Identity, Image and Reputation. Palgrave Macmillan, 2010.

Maria C., Golinelli & Simoni, Michele. (2006). *Gli strumenti del marketing turistico e territoriale*. SINERGIE. 23. 61-78.

"Presentato Alla Città Il Nuovo Logo: Genova è MORE THAN THIS." Comune Di Genova., 19 Mar. 2014, www.comune.genova.it/content/presentato-alla-cittagrave-il-nuovo-logo-genova-egrave-more.

Derchi, Francesco. *"Genova More than This"* Medium, 9 Apr. 2014, medium.com/@francescoderchi/genova-more-than-this-3146b8087203.

Rkaina, Sam. "Everything You Need to Know about Genoa, One of Italy's Best Kept Secrets." Mirror, 30 Aug. 2017, www.mirror.co.uk/lifestyle/travel/europe-short-haul/genoa-city-guide-travel-tips-10942513.

Shurvell, Joanne. "Five Under The Radar Destinations For 2018." Forbes, Forbes Magazine, 31 Dec. 2017, www.forbes.com/sites/joanneshurvell/2017/12/30/five-under-the-radar-destinations-for-2018/#76f8ee6c7808.

Strauss, Karsten. "The World's Most Reputable Cities In 2017." Forbes, Forbes Magazine, 3 Oct. 2017, www.forbes.com/sites/karstenstrauss/2017/10/03/the-worlds-most-reputable-cities-in-2017/#584970e26dcf.

"Ecosistema Urbano 2017, Legambiente Presenta i Dati Sulle Performance Ambientali Dei Comuni Capoluogo." Legambiente, www.legambiente.it/contenuti/comunicati/ecosistema-urbano-2017-dati-performance-ambientali-comuni-capoluogo.

Territorial identity through material culture. The role of configurations in the project system.

Xavier Ferrari Tumay
Department Architecture and Design DAD (University of the Study of Genoa)
email: xavierferraritumay@hotmail.it

Abstract

It is usual to think of design as a skillful creator of pleasing and attractive forms. In reality the form, and the material product that results from it, is only the expression of a far more complex system of values that are articulated in material and immaterial aspects. It is no coincidence that knowing how to do things and
manual work are becoming the point of contact between two worlds almost to the antithesis, that of bits and that of atoms (Anderson 2010, 2012), that is digital and analog ones. Atoms, at the same time, are closely linked to the dimensions of time and space: real matter can become an expression of the resources and the territory from which it derives, and can be the vector for the enhancement of identity and material culture. So, the concept of craftsmanship is covered by new meanings and connotations, taking us very far "from the image of Geppetto and his carpenter's shop" (Micelli, 2011). Consequently, the role of the designer is also progressively changing in relation to this framework: what he designs is not a "final result", such as when a chair is designed, but the conditions are designed, so that a desired event has greater possibilities of future. This is the methodological approach of systemic design (Bistagnino): designing the relationships between the material, but above all intangible components that generate a system, enhancing the identity and resources of a specific context, in order to produce goods and wellbeing for the single and for the community.

Abstract

Si è soliti pensare al design come un abile creatore di forme gradevoli e attrattive. In realtà la forma, e il prodotto materiale che ne consegue, è solo l'espressione di un sistema ben più complesso di valori che si articolano in aspetti materiali ed immateriali. Non a caso proprio il saper fare le cose e il lavoro manuale stanno diventando il punto di contatto tra due mondi quasi all'antitesi, quello

dei bit e quello degli atomi (Anderson 2010, 2012), ovvero il digitale e l'analogico. Gli atomi, allo stesso tempo, sono strettamente legati alle dimensioni di tempo e spazio: la materia reale può diventare espressione delle risorse e del territorio da cui deriva, e può essere il vettore per la valorizzazione dell'identità e della cultura materiale.
In quest'ottica il concetto di artigianato si ricopre di nuovi significati e connotazioni, portandoci ben lontano "dall'immagine di Geppetto e della sua bottega di falegname" (Micelli, 2011). Di conseguenza anche il ruolo del progettista sta progressivamente cambiando in rapporto a questo quadro: ciò che progetta non è un "risultato finale", come quando si progetta una sedia, ma sono le condizioni ad essere progettate, affinché un evento desiderato abbia maggiori possibilità di avvenire. Questo è l'approccio metodologico del design sistemico (Bistagnino): progettare le relazioni tra i componenti materiali, ma soprattutto immateriali che generano un sistema, valorizzando l'identità e le risorse di uno specifico contesto, in modo da produrre beni e benessere per il singolo e per la collettività.

The "city making", is that discipline with a high rate of adaptability, resilience and innovation that characterizes the territorial planning and structures the complex fluidity of resources, knowledge, traditions and peculiarities of the "city-system", proposing an approach to theme of "doing", in its absolute value, whose semantic spectrum is from the concrete action of production of material goods to social activism, and supported by an ethic that helps cities to become places of real solidarity and functional and daily sharing between individuals and between groups.
Starting from the not univocal nature of the term Territory, I report below the definitions more inherent to the speech that I am going to deepen:
• In geography, we mean the portion of terrestrial space that is identified by its physical or natural peculiarities and by the different qualities and quantities of anthropization.
• In urban planning, it is the geographical space concerning urbanized, agricultural or natural areas where it is possible to implement the planning, regulation and development of the built environment.
• In anthropology, reference is made to a social artifact derived from human processes of territorialization and, therefore, to a reality controlled and modified by societies.
And it is on this last meaning in particular that the discipline of design must go to intervene, on the processes that take place within and as a consequence of the increasingly emerging binomial between design and territory, ie all those actions that are implemented in a given time and under certain circumstances for a particular place.
It is usual to think of design as a skillful creator of pleasing and attractive forms. In reality the form, and the material product that results from it, is only the expression of a far more complex system of values that are articulated in material and immaterial aspects.
Intervening on this complex system means giving design a different role than "traditional design", which we can identify as "the industrial design of the last century": the design of the 21st century is very far from that, and in this evolution, it is losing its mere link with physical products and industries. The design that has emerged in the last two decades is proposed as a set of socio-cultural skills, as a cluster of soft and hard skills in a wide-ranging perspective, but above all as a new

approach, both from the methodological and design point of view. , and applicable to virtually every problem area.

Consequently, the role of the designer is also progressively evolving in relation to this framework: what is designed is not a "final result", such as when a chair is designed, but the conditions are designed so that a desired event or a pre-established situation has greater chances of future. This is the methodological approach of systemic design (Bistagnino): designing the relationships between the material, but above all intangible components to generate a system, enhancing the identity and resources of a specific context, in order to produce goods and wellbeing for the single and for the community.

In this context, parallelism is spontaneous with the "Futurecraft" method, developed over the years by the Senseable City Lab of the Massachusetts Institute of Technology (MIT), directed by Carlo Ratti, and explained in his latest book "The City of Tomorrow, like the networks are changing the urban future ".

Ratti states: "We propose to use design - in the Anglo-Saxon sense of" project "- as a systematic exploration and seed of possible future. Our goal is not to portray a hypothetical tomorrow but to apply a method that we call "futurecraft", the art of building the future: we hypothesize future scenarios, examining their consequences and needs and sharing their outcomes, to allow an exchange of ideas and open a public debate."

Basically this method does not want to correct the present nor to predict the future but to influence it positively, insinuating in the collective mind a new concept that, beyond being concretized or not, will open future roads and certainly create a certain impact.

So the "expert designer", as defined by Manzini (Design, when everybody designs, 2015, MIT Press) or who belongs to the community of those who have been trained, becomes a pivotal figure, taking charge of the creation of systems aimed at self-sustainability and planning strategies for change, proposing itself as an actor capable of promoting and supporting different types of design processes and at different scales.

At this point, using a theatrical metaphor, once defined the screenplay (futurecraft) and chosen the writer (designer), all that remains is to establish and define the stage (territory), intense as "milieu". This concept, which originates from geography, defines the territory as the set of natural and socio-cultural conditions sedimented throughout history and which become collective heritage and founding characteristics of the identity of a place.

A milieu, however, is also the unexpressed potential of the territory from which, obviously, the design project can incorporate transformational and development issues (Governa, 1999, Magnaghi, 2000).

A paradigmatic and absolutely topical case study is certainly that of "ALPE RUBRA, Telling the territory through its know-how", an innovative line of products for the table. With the Alperubra project the landscapes of Valtellina become narrative forms. Through the digitalization of their morphology, the Alpine structures, first mapped by Google data, then reworked through slicing and three-dimensional modeling techniques, are transformed into instrumental objects. The wood, exclusively that of oak and chestnut of the ancient wine barrels found in the valley, finds a new life, continuing the story around the wine that has welcomed: from container for its maturation,

to an instrument at the service of food and wine experience. Alperubra brings together history, sedimented in the grain of wood, with contemporary digital technologies, triggering a strong dialectic between the territory and its raw material, through the history of wine as a product able to open its own historical-traditional narration, synchronizing it with functional technologies of digital manufacturing.

To underline the collaboration between the various stakeholders who believed in this project:

- Tecnificio, makerspace and reality founded by Patrizia Bolzan and Marcello Pirovano
- BremaWood, carpentry workshop of the Province of Sondrio
- Botteghe Digitali, manufacturing incubator 4.0
- Stefano Micelli, scientific supervisor of Ca 'Foscari
- Banca Ifis Company
- Arena Marketing Agency

This means raising the pull and exploring new routes of the discipline, mapping paths not yet beaten, hybridizing areas that until a few years ago did not interact with each other, obtaining the general extension of the disciplinary boundaries towards strategic design, service design and design for the territory.

In this new configuration with fringed borders, design, and the related design method, must necessarily be oriented towards the link between local culture and material culture, between product and territory, between tradition and innovation; thickening sense nuclei, "meaning baricenters" (Anceschi, Botta, 2009), based on a renewed design culture. It is no coincidence that knowing how to do things and manual work are becoming the point of contact between two worlds almost to the antithesis, that of bits and that of atoms (Anderson 2010, 2012), that is digital and analog. Atoms, at the same time, are closely linked to the dimensions of time and space: real matter can become an expression of the resources and the territory from which it derives, and can be the vector for the enhancement of identity and material culture. With this in mind, the concept of craftsmanship is covered by new meanings and connotations, taking us very far "from the image of Geppetto and his carpenter's shop" (Micelli, 2011).

Quoting Schumpeter's process of "creative destruction" and declining it in a territorial key, it can be said that technological and managerial innovations transform the production cycle, disrupting the balance of the markets. The process is selective: some companies are born, others are strengthened, those unable to innovate disappear, and it is precisely here that the potentials of craftsmanship, digital fabrication and industry 4.0 are conjugated to the atavistic excellences of Made in Italy manufacturing.

Each territory has its own specificities, which have deep roots, as environmental context, prevailing activities, and so on but to enhance them from an economic point of view, we need to rediscover and reinterpret them: with one eye on the world and another on the future.

The territory should be understood as an innovative platform of local systems that are constantly evolving and of innovative processes that are essential to ensure the maintenance of competitive advantages, not forgetting the metamorphosis of the so-called "prosumer" and "mass customization" production.

This is a form of contemporary production, where design, or at least a part of it, is combined with a logic of craftsmanship: "tailor made", customization with components and parts of derivation

and of techno-industrial inspiration, therefore a hybrid model, in response to the crisis of the first decade of the 2000s, where we started to see in our national production contexts a progressive change of de-industrialization, in which the factories closed, or became concrete progressively the phenomenon of offshoring; and this prospect for designers starts to become a serious problem, because there is no lack of that system of relationships and potential work that supported the classic relationship between design and manufacturing company.

While this process of atrophization of the formal economy continues today, in the cities there is a contrary phenomenon based on the relocation of manufacturing activities, the "Small Urban Manufacturers" (Pratt Center, Byron and Mistry, 2012) linked to a wider trend in in the advanced countries, or "insourcing", there is basically the reappearance of new forms of micro and self-production within urban and metropolitan areas.

The S.U.M develop a production that is highly design-oriented not only for the product but also for the model of communication, for the development of the Brand, for the use of the attached services and for the experience that is offered. Their size and their positioning within the city, allows them to enter into direct connection with people, ie we are no longer in the presence of giant companies that do not personally know their customers, but we speak of very small companies that develop a new relationship model, also enabled by the Internet and social media, and above all enabled by the idea of not building a market but rather of the community-market, ie users who are at the same time part of the processes, passionate about the product and willing to intervene in the development of the project and the production of the product so as to have customized items tailored to the end user, output that defines this type of production.

In this way the population of the city itself produces its own culture of consumption, which is propagated within the territorial context to which it belongs, consequently we have the birth of territorial brands, such as "Made in ....", and systems consortium members of micro-producers who create alliances on an urban scale to bring out their production capacities.

Also in Italy, this reasoning begins: the City of Milan, through the initiative of "Manifattura Milano", builds a policy where all the actors of the city are involved, such as universities, fab-labs, start-ups, artisans, associations of category, companies and citizens to think about how it is possible to develop and resettle manufacturing within the city and therefore also new forms of the same and how it can affect the urban social fabric.

What could this be the right way for Genoa too?

Visual perception analysis for landscape evaluation. An experimental case, Campello sul Clitunno

Marco Filippucci
Department of civil and environmental engineering, DICA, (University of the Study of Perugia)
email: marco.filippucci@unipg.it
Fabio Bianconi
Department of civil and environmental engineering, DICA, (University of the Study of Perugia)
email: fabio.bianconi@unipg.it
Michela Meschini
Department of civil and environmental engineering, DICA, (University of the Study of Perugia)
email: michela.meschini@yahoo.com
Elisa Bettollini
Department of civil and environmental engineering, DICA, (University of the Study of Perugia)
email: elisa.bettollini@outlook.it

Abstract

In the present research, it is analyzed the complex link between image and landscape, experimenting innovative tools for analysis. The object of the research, in the experimental case of Campello sul Clitunno, is the typically Umbrian rural landscape of the territorial area between Assisi and Spoleto, characterized by medieval town immersed in the olive grove that perceptually connect the two cities. The aim of the experimentation is to identify the potentiality of the new tools in the analysis of perceptual characteristics, using biometrics as a theoretical basis and the eye tracking devices able to quantify visual attention. The eye tracking tool and the related Pupil Labs software for the capture and analysis of data are born for visual marketing, the experimentation has therefore proceeded first to identify the right calibration parameters for use in the landscape. In a empirical approach, lead by direct survey, it is conducted two different experiments: in a static case of observation from a panoramic terrace and a dynamic one through video support shots on the road network in the territory of Campello sul Clitunno municipality. Based on the results of these two experiments, two project proposals were developed for the enhancement of the landscape of the municipality, one concerning the requalification of a critical situation and one for the definition of an orientation plan for the municipal infrastructure network.

Abstract

Nella presente ricerca si vuole analizzare il legame tra immagine e paesaggio sperimentando strumenti innovativi per l'analisi. L'oggetto della ricerca, nel caso studio di Campello sul Clitunno, è il paesaggio rurale tipicamente umbro della fascia territoriale compresa tra Assisi e Spoleto,

caratterizzato da borghi medievali immersi in quella fascia olivata che unisce percettivamente le due città. L'obiettivo della sperimentazione è di individuare nuove metodologie per l'interpretazione delle caratteristiche percettive, utilizzando come base teorica la biometria attraverso l'uso di dispositivi eye tracking in grado di quantificare l'attenzione visiva. L'eye tracking e i relativi software Pupil Labs per la cattura e l'analisi dei dati, nati originariamente per il visual marketing, vogliono essere testati qui per analizzare "quella parte di territorio così come è percepita", quindi, per definizione, per l'interpretazione del paesaggio. In tal senso, con un campione di simulazioni redatte con l'ausilio di alcuni volontari, sono state condotte due sperimentazioni differenti: in un caso statico di osservazione da una terrazza panoramica e in una condizione dinamica, con un supporto video girato sul tracciato stradale. I risultati di queste due sperimentazioni sono stati spunto per la presentazione di due proposte progettuali di intervento per la valorizzazione del paesaggio: la prima riguarda la riqualificazione di detrattori dell'immagine del luogo attraverso il ridisegno delle connessioni pedonali dei principali beni paesaggistici, la seconda è per la definizione di un piano dell'orientamento per la rete infrastrutturale del comune.

Introduction

Landscape is born when a place is felt, lived, suffered, owned, when it is perceived, in the etymological sense of the term. The underlying theory is related to its etymological link with the vision (theoreo), in the eye investigative value that "measures and recognizes" the link between images and memory. In this article is analyzed the complex link between image and landscape by experimenting innovative tools and analysis methodologies. At the base is the definition of the essential and figurative elements of the landscape. These elements are those that man perceives and with which he identifies himself and the landscape. One of the greatest experts in the landscape, Eugenio Turri, defines iconema as an image relating to a place, different to the place itself; the place, in fact, is a point in a space, in where many events may have happened. The territorial iconema arrange themselves harmoniously or not in the context and those are what it is seen as essential and figurative elements of the landscape; then man does not invent landscape, but it "acted in the landscape from nature", on availability, by its dictates in relation to what the man asks[1].

Gestalt theory was the first to study the principles that govern vision and it demonstrated the famous laws of the form (proximity, similarity, common destiny, closed form, good curve, good shape and past experience)[2], analyzing the relation between image and perception, research useful also in the landscape context. In fact, according to Kevin Lynch, "the world can be organized around a series of focal points, it can be divided into regions or reconnected trough memorable itineraries"[3].

Another theory of vision, that was inspired by the Gestalt, is the ecological approach to perception of Gibson: his studies are based on the assertion that perception can be explained by structure analysis of the organism environment (the ecology of the vision) and not the brain mechanisms; the discipline that comes from this assumption was in fact called by Gibson "ecological perspective",

[1] E. Turri, *Il paesaggio e il silenzio*, Venezia, Marsilio, 2010.

[2] M. Wertheimer, *Experimentelle Studien über das Sehen von Bewegung*, in „Zeitschrift für Psychologie und Physiologie der Sinnesorgane", Barth J.A., Lipsia, 1912

[3] K. Lynch, *L'immagine della città*, Marsilio, Venezia, 1985, p.29.

which therefore does not study the biological basis of perception nor the brain, but the environment. In any case, reading a place precludes an action to limit and search for order, then geometric interpretation, "the first analytical approach to the experience"[4], in order to correlate the vision to the scheme[5], the appearance to the structure, the image to the form[6], the "existing view" to the "emerging view" as well as "the existing image" to the "revealed image"[7].

Then, without contesting the centrality of an ecological vision that must be the basis of the development of the area, it is for survival that the areas are reclaimed, the land is cultivated and geometry is used as a way to create order, to create images related to reality lived in the anthropized space, also to know and dominate the image of the area. In their studies, *The view from the road*, Appleyard, Lynch, and Myer, argued that "the experience of a city is basically a moving vision, and this is the vision that we must understand if we want to reform the aspect of our cities"[8], introducing highway field of aesthetics in the mid 60s. And it was already clear that this motion picture studies would be used to help the research on landscape. The idea that designers should engage with perception of landscapes on the move has also been favoured by the American writer and philosopher J.B. Jackson, who realized the crucial role of mobility and road[9], particularly in defining national identity of North American landscape[10]. J.B. Jackson's work highlighted the self-vernacular character of landscape as formed by the interaction of all people and he coined the term "self-vernacular landscape" to describe the culture of road and traffic facilities created around the car[11].

In the road the number of viewers increases hyperbolically and the impact of the new infrastructures of XX century changes the relationship between society and landscape. The view from the road become, in this context, a dynamic process in the definition of a significance and construction of a language. The image stands as an essential element in the active role that everyone has read and wrote in our places, the duty to feel and to be leaders[12]. Landscape, while remaining an aesthetic value, it also acquires "ethic" dimensions when through popular action[13] it shares the value of the Common Good[14]. It is therefore necessary to develop new participatory instruments to investigate these issues and provide the necessary data to understand its evolution.

---

[4] D. Gioseffi, *Rappresentazione geometrica dello spazio.*, in "I fondamenti scientifici della rappresentazione", Università degli studi di Roma La Sapienza, Dipartimento di rappresentazione e rilievo; Unione italiana per il disegno, Atti del Convegno, Roma 17-19 aprile 1986, Arte della Stampa, Roma 1989, p.17

[5] V. Ugo, *Schema*, in "XY", dimensioni del disegno, 1987, 3, 21-32.

[6] M. Filippucci, *Dalla forma urbana all'immagine della città. Percezione e figurazione all'origine dello spazio costruito*, PhD Thesis in Scienze della Rappresentazione e del rilievo, La Sapienza, Roma, 2012.

[7] G. Cullen, *Townscape. Paesaggio urbano. Morfologia e progettazione*, Calderini Editore, Bologna, Italy, 1976, p.6-7.

[8] D. Appleyard, K. Lynch, J.R. Myer, eds., *The View from the Road*, The MIT Press, Cambridge, USA; 1964; p. 63.

[9] J.B. Jackson, *A sense of place, a sense of time*, Yale University Press, New Haven and London, England; 1994.

[10] J.B. Jackson, *Landscape in sight. Looking at America*, Helen Lefkowitz Horowitz (ed.), Yale University Press, New Haven and London, England; 2000.

[11] J.B. Jackson, *Discovering the Vernacular Landscape*, Yale University Press, New Haven and London, England; 1984.

[12] J.R. Linehan, G. Meir, *Back to the future, back to basics: The social ecology of landscapes and the future of landscape planning*; in "Landscape and Urban Planning", n.42, 1998, pp. 207-223.

[13] S. Settis; *Azione popolare. Cittadini per il bene comune*; Einaudi, Torino, 2012, p.14.

[14] Mattei, *Il benicomunismo e i suoi nemici*, Einaudi, Torino, Italy; 2015.

Methodology

In the traditional case study, the methodology mainly used to analyze a place is the direct surveys[15]. Developed in a sociological commixture. For the present case, an online survey was drawn up prior to the qualities of Campello's landscape, developed with the people that were not from the place. From the survey data, it has emerged, among all valuable characters, olive groves, components of the countryside, and villages that surrounded them, elements of the historic landscape. While, among the detractors of the qualities of landscape, most guidance encountered difficulties in crossing the landscape itself for the loss of proximal landmarks.

This lack of perceptual coherence is due to a simple difference in distance of the points of view, it led the study to think about how a landscape, so easy to read in a distance, it appears so confused and not very "perceptible" when located to enter more in touch with it. Certainly, a part of the problem resides in the physical conformation of the place, that with the observer's approach precludes the view of olive trees side which identifies the location and villages that serve as reference points. However, other factors may contribute to this loss of orientation. To analyze this particular situation an experimentally used tool is the eye tracker.

Eye-tracking is the process of measuring ocular fixation point or the motion of an eye relative to the head used in the anatomical and physiological study of the visual apparatus, in cognitive linguistics and in designing of commercial products. In this study case this approach has been extended to the study of the area, in order to identify any perceptual difficulties.

Such measurements can be obtained through an eye-tracker: specifically, it has been used an eye-tracker Pupil, made of a world camera and an eye camera (Fig.1).

Fig.1 Pupil Head Set and Software

The first has a sensor of 1910x1080 30fps and an amplitude of the visual field of 90 degrees diagonally, with a latency of 127.7ms; the eye camera has a sensor of 640x480 and 120fps, with a latency of 5.7 ms; room and lighting are IR, not to disturb the observer since the wavelength

[15] A. Colléony, A.C. Prévot; M. Saint Jalme, S. Clayton, *What kind of landscape management can counteract the extinction of experience?*, in "Landscape and Urban Planning", n. 159; pp. 23-31; March 2017; C.M. Raymond, S. Gottwald, J. Kuoppa, M . Kyttä, *Integrating multiple elements of environmental justice into urban blue space planning using public participation geographic information systems*; in "Landscape and Urban Planning", n. 153, September 2016; pp. 198-208; P. Garrido, V. Elbakidze, P. Angelstam, *Stakeholders' perceptions on ecosystem services in* Östergötland's *(Sweden) threatened oak wood-pasture landscapes*; in "Landscape and Urban Planning"; n. 158, February 2017; pp. 96-104; N.M. Anderson, R.M. Ford, K. J.H. Williams, *Contested beliefs about land-use are associated with divergent representations of a rural landscape as place*; in "Landscape and Urban Planning"; n. 157; January 2017; pp. 75-89.

IR does not belong to the visible spectrum[16] .The data is recorded through the open source Pupil Capture software that once calibrated, associates the movement of the pupil in the eye chamber to the respective point in the world camera, in doing so it is possible to associate the fixations and/or eye movements to an element present into the surrounding environment. The recorded data is then processed through another open source software, Pupil Player, where it is possible to export a video with the areas with a greater determination or an heat map, which shows a graphical representation of where, in a time interval, the gaze lingers longer.

Eye tracking analysis in a static case:
The data collection experience with the use of the eye tracker was carried out in two different cases, with a direct observation of landscape and through a recording.
The use of the instrument in the first case presents this path:

PHASE 0 - Preliminary Test
The preparatory phase to the actual testing involves a series of preliminary tests, among which the correct settings for the calibration of the instrument in the natural environment were identified.

STEP 1 - Capture
The actual data collection experiences was held in occasion of the meeting on March 9, 2017, *The next landscape–Invention or narration?*, held in Pissignano. After the conference, it was asked to some volunteers to wear the eye tracker and look out from the panoramic terrace of the castle of Pissignano, observing the landscape for about a minute. After the experimentation with eye tracking, it was asked to answer a few questions about the experience and to participate to a survey about the landscape and the valuation of what was observed.

STEP 2 - Analysis
The collected data in the previous phase were processed in accordance with the purpose of identifying the particular characteristics of the observed territory, paying attention in the value elements and in the landscape detractors. The eye tracker allowed us to know the points on which the eye focuses more regardless to the viewer's will, considering unconscious perception.
By using the software Pupil_Player it was possible to conduct analysis on different videos collected during the capture phase. Firstly, a different fixation setting was tested to filter out unnecessary results: human eye continuously performs fixations, but some of those are so fast that the brain processes even if they do not exceed to a certain value. It was therefore decided to adjust the analysis with the plugin Pupil Dispersion Angle Fixation Detector 3D, so that it could highlight only the points in which the viewer's gaze was fixed for at least 0:45 seconds with a maximum scattering angle of 2.5°.
This plugin allowed not only to identify graphical points on individual frames of the video played by the front camera, but also to export from a table software to identifies the points in the plane as a

[16] Pupil labs. Available online: docs.pupil-labs.com (accessed on 08/09/2017).

function of time, considering how the vertical plane is associated with the field of vision of the front camera coordinated and how long the length of the video is.

Considering short intervals of the video (maximum 5 seconds), between them corresponding to observed objects (panoramic view towards Assisi), it is possible to superimpose different results using the plugin Offline Surface Tracker. This plugin recognizes a surface through the marker (automatic or manually set) and analyzes the observer fixations by generating a Heat Map, a map of heat, on which it identifies the most observed areas (Fig 2).

Fig.2 Pupil Heat Map and Landscape visual decorator.

PHASE 3 - Results

Immediately after the observation, it was asked to the participants what they thought about what they has observed. Almost all of them has answered to the inquiry that they was searching to watching Assisi in the distance. This information coincides with the extracted data with HeatMap and PupilAngleDispersion FixationDetector3D, however most of the recordings were insisting on a particular area of the observed territory, except those directly focused on Assisi: a real detractor that continuously distracted the eye. This element corresponds to a lotting of decontextualized buildings from the surrounding environment for both colors and building type, capturing the unknowingly observer (Figure 2). From here it was stressed how useful the analysis and the perceptual study are, in order to implement mitigation strategies of these problems and to define targeted limitation rules.

Another important result is that none of the participants in the trial had fixed his eyes on the Clitunno Temple (UNESCO heritage asset), which remained completely ignored because of the lack of recognition.

Eye tracking analysis in a dynamic case:

In the second case the observers were asked to watch a video of the route of the former SS3 Flaminia crossing Campellino's territory from south to north. With this experiment, it was observed that the major problem is represented by signs (Fig.3) that, for the detected quantity, are the real disturbing elements. Also, from North, a strong negative impact is the airline that disfigures the olive trees hill below Pissignano's Castel – even more serious from the Castle (Fig. 3), in which the electric line is a high impact element for an asset subjected to landscape bond. Finally, the massive wall and obsolete road gate just ahead attract attention at the expense of the Temple on the Clitunno that remains completely indistinguishable (Fig. 3).

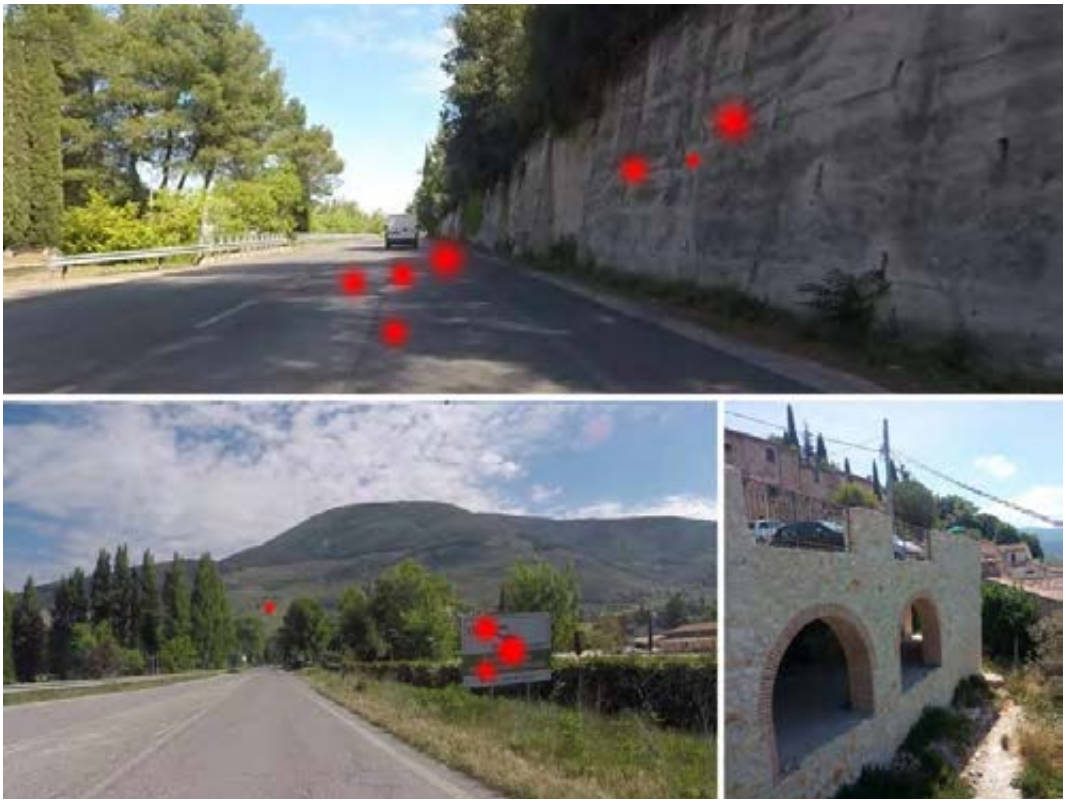


Fig.3 Landscape visual dectrator

The design inspiration that derives from these studies, it suggests to act on the signage, thinking on a plan that will limit its use and a typology to better contextualize the territory and its products. Also, it becomes interesting and a functional potential the study of an orientation plan that leverages this technology to identify new strategies that enhance the audibility of a punctual assets of the territory in an alternative or supplementary way to the signage. The analysis developed through Eye Tracking is based on the image projected from the environment on the retina. In order to generate a real evaluation on the territory, it is necessary to correlate the projection data with the spatial forms that generated them.

It therefore becomes necessary to reconstruct the physical space involved in the investigations.

Data acquisition was carried out with the ITALDRON EVO4HSE drone, on which the Panasonic DMC-GH4 camera was mounted. The acquisition of the images through the flight of the drone lasted approximately 8 hours, which includes: technical times of assembly and dismantling of the drone, the recharging of the batteries, the displacement of the landing point and the flight. For a good image capture, it ran a flight to sweep. This process is ordered and allows to acquire all the various exposures of the object. The flights needed to survey the built were six, each lasting five minutes. The post-processing phase was carried out using CONTEXTCAPTURE CENTER software, which, in addition to supporting aircraft and drone systems, can create animations, videos and aerial views, as well as generating 2D and 3D GIS models. It has gone to the phase of the data processing: the photos are imported and the aerotriangulation process begins, through which the point cloud is generated. By correctly setting the different settings of the program, the 3D mesh has been reconstructed; finally, the model was exported to the desired extensions. The software allows the display and, subsequently, the export in different ways: without texture, with highlighting of the mesh, and complete with texture (Fig. 4).

Fig.4 Reconstruction of Borgo Lizori

In this way, therefore, it was possible to obtain the three-dimensional model of an area of the Municipality of Campello sul Clitunno, in particular Borgo Lizori and the hamlet of Pissignano Basso. The newly applied method offers a series of potentialities: the first is inherent in the immediacy of the approach itself, as it has been possible to detect a large area in times certainly less than a traditional survey carried out with the classic topographic tools. It is also possible to elaborate the model obtained: in the case in question in the part of Borgo Lizori it was interesting

to understand the altimetry of the place, consequently environmental sections were made (Fig. 4). In the district of Pissignano Basso, the studies already carried out by the Eye Tracker have suggested the implementation with the generative algorithms of the plug in Grasshopper. Recent studies applying the theories of biometrics (perception of space) developed with the typical tools of today's representation, such as Rhinoceros and Grasshopper, are able to analyse, using algorithms the audibility, in terms of visual cones, three-dimensional models whose results are comparable with those of Eye Tracking.[17]

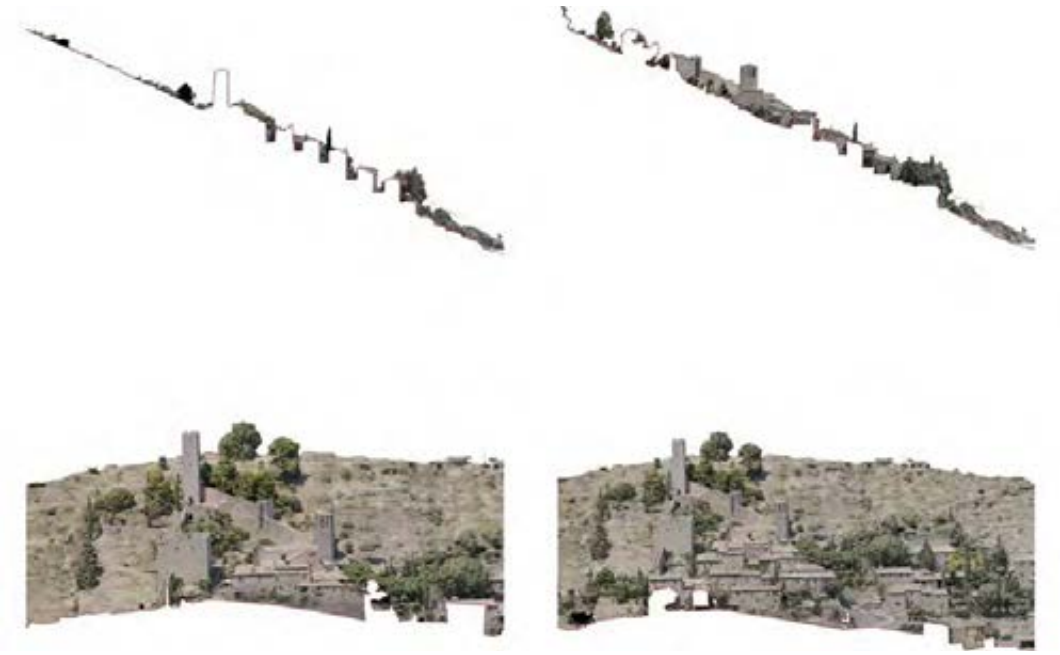


Fig.5 Environmental section

An algorithm was then drawn that, through logical operations starting from the input data (3D model, in the specific case a street of the district of Pissignano Basso), returns a mesh as output: this one at each vertex has a numerical attribute value *d* as a function of the observer's traveling speed and the position of the point according to the route. The solution domain is between 0 and 1 within irrational numbers: 0 represents the element not perceived while 1 indicates the maximum perception. The solution domain is between 0 and 1 within irrational numbers: 0 represents the element not perceived while 1 indicates the maximum perception. The function that allows to assign values is not accidental but originates from studies on ocular perimetry applied in a dynamic context; for an easy visual interpretation the mesh is also colored with a chromatic scale that goes from white (not perceived) to red (maximum perception).

The results of this study confirm that the two types of surveys are comparable; both experiences identify the same areas of visual field in which the eye is attracted, as shown by the images. (Fig.6)

[17] M. Seccaroni, *Rappresentazione delle relazioni immateriali. Sperimentazioni percettive attraverso algoritmi parametrici per il progetto di Paesaggio*, Tesi di laurea magistrale in Ingegneria Edile-Architettura, Università degli Studi di Perugia, AA 2015/2016.

On the base of the analyses conducted with Eye Tracking, in fact, it emerged consistently with the studies of ecological optics, which signs, elements of danger on the path and obstacles, typical detractors are more perceptible. The algorithm in Grasshopper, the second tool used, associated with the three-dimensional model of the route, produced the same results.

The comparison between the methodologies was possible because the simulation was parameterized with the same speed (40km/h), height of point of view (1.2 m, comparable with the height of a seated person's eye) and orientation; data that were performed in the video produced for the experimentation phase with Eye Tracking. In this way the two methods acquire a mutual scientific value.

It becomes possible with these tools to study the landscape not only as it is perceived, but also evaluate it and catalogue it with comparable data and then create a new "image" from a scientific criteria. Based also on an approach of parametric nature, such means can also be used for the study of new elements to be included in the territory, or to assess how it will globally change the perception if it is enriched by new elements acting for both protection and modification of the landscape.

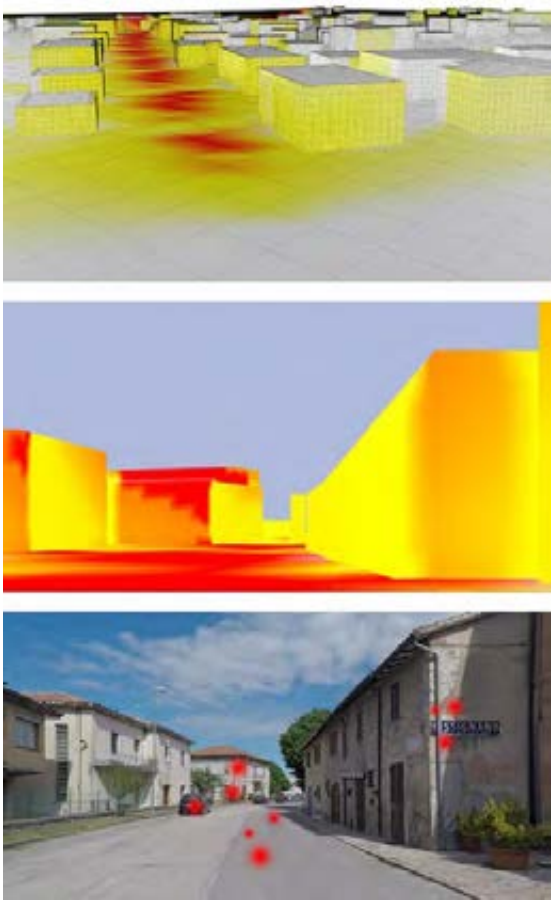


Fig.6 Comparison of the two methods of analysis

Conclusion

The theme was that of the analysis of the relation between perception and landscape and methodologies and tools to investigate this issue. The results obtained showed the need to deepen the use of these representative technologies applied to landscape.

In this sense, further research developments for perceptive analysis involve the use of EEG electroencephalogram systems, initially used in hospitals and in specialized laboratories; currently this technology is available as a low-cost peripheral device by connecting it to a laptop computer, encouraging its use in many external research contexts, such as the urban environment.

Using the different software that have been developed it is possible to obtain cognitive responses to stimuli, situation and environments: the diodes in fact, appropriately positioned, allow to understand the different sensations aroused; the application for the perceptive study of the landscape is therefore interesting and worthy of future in-depth studies. These new technologies allow you to draw the landscape, by detecting or by designing it means to give order to the experiences, express identified connections, indicating the meanings, understand the identity reflected and demonstrated in places. Understanding the mechanisms inherent in the sequence of images[18], enables it is possible to perceive reality not as "units instantly created, but as processes in progress, tireless transformations of spatial configurations"[19]. In this context, Franco Purini writes, is the aspiration that "is built through cross-fades of mental images arising from archiving of previous retinal images on which the will to form new work groups and radical transformations; these images are not more than drawings"[20]. The landscape thus becomes a representative act of human communication instrument attributable to the plane of speech[21]: The construction itself of the idea of landscape[22]is configured through a language that has an eminently narrative nature and a semantic structure of the speech based on the images.

[18] R. Arnheim, *Dinamica della forma architettonica*, Feltrinelli, Milano, 1985, p.148.
[19] G. Kepes, *Il linguaggio della visione*, Dedalo, Bari, 1971, p.15.
[20] F. Purini, *Dodici frammenti per disegnare il disegno… Lettera romana a Margherita De Simone*; in "Palermo: Le parole e i segni"; La Collana di Pietra, 2; 1982; rip. in Dal Progetto. Scritti teorici di Franco Purini, F. Moschini, G. Neri (a cura di), Kappa, Roma, 1992, p.341.
[21] A. Chiera, I. Adornetti, S. Nicchiarelli, F. Ferretti, *Linguaggio, tempo e narrazione*, in "Soglie del linguaggio. Corpo, mondi, società", A. Bertollini, R. Finelli (a cura di), RomaTre Press: Roma, 2017, pp.31-45.
[22] J. Rykwert, *L'idea di città: antropologia della forma urbana nel mondo antico*, G. Scattone (a cura di), Adelphi, Milano, 2002.

References

E. Turri, *Il paesaggio e il silenzio*, Venezia, Marsilio, 2010; ISBN 9788831784139.

M. Wertheimer, *Experimentelle Studien über das Sehen von Bewegung*, in „Zeitschrift für Psychologie und Physiologie der Sinnesorgane“, Barth J.A., Lipsia, 1912

K. Lynch, *L'immagine della città*, Marsilio, Venezia, 1985, p.29; EAN 9788831772679.

D. Gioseffi, *Rappresentazione geometrica dello spazio.*, in “I fondamenti scientifici della rappresentazione”, Università degli studi di Roma La Sapienza, Dipartimento di rappresentazione e rilievo; Unione italiana per il disegno, Atti del Convegno, Roma 17-19 aprile 1986, Arte della Stampa, Roma 1989, p.17

V. Ugo, *Schema*, in “XY”, dimensioni del disegno, 1987, 3, 21-32.

M. Filippucci, *Dalla forma urbana all'immagine della città. Percezione e figurazione all'origine dello spazio costruito*, PhD Thesis in Scienze della Rappresentazione e del rilievo, La Sapienza, Roma, 2012.

G. Cullen, *Townscape. Paesaggio urbano. Morfologia e progettazione*, Calderini Editore, Bologna, Italy, 1976, p.6-7.

D. Appleyard, K. Lynch, J.R. Myer, eds., *The View from the Road*, The MIT Press, Cambridge, USA; 1964, p. 63.

J.B. Jackson, *Discovering the Vernacular Landscape*, Yale University Press, New Haven and London, England; 1984.

J.R. Linehan, G. Meir, *Back to the future, back to basics: The social ecology of landscapes and the future of landscape planning*; in “Landscape and Urban Planning”, n.42, 1998, pp. 207-223.

S. Settis; *Azione popolare. Cittadini per il bene comune*; Einaudi, Torino, 2012, p.14; ISBN 9788806212933.

U. Mattei, *Il benicomunismo e i suoi nemici*, Einaudi, Torino, Italy; 2015; ISBN 9788806218614

A. Colléony, A.C. Prévot; M. Saint Jalme, S. Clayton, *What kind of landscape management can counteract the extinction of experience?*, in “Landscape and Urban Planning”, n. 159; pp. 23-31; March 2017; ISSN 0169-2046.

C.M. Raymond, S. Gottwald, J. Kuoppa, M . Kyttä, *Integrating multiple elements of environmental justice into urban blue space planning using public participation geographic information systems*; in “Landscape and Urban Planning”, n. 153, September 2016; pp. 198-208; ISSN 0169-2046.

P. Garrido, V. Elbakidze, P. Angelstam, *Stakeholders' perceptions on ecosystem services in* Östergötland's *(Sweden) threatened oak wood-pasture landscapes*; in “Landscape and Urban Planning”; n. 158, February 2017; pp. 96-104.

N.M. Anderson, R.M. Ford, K. J.H. Williams, *Contested beliefs about land-use are associated with divergent representations of a rural landscape as place*; in “Landscape and Urban Planning”; n. 157; January 2017; pp. 75-89.

Pupil labs. Available online: docs.pupil-labs.com (accessed on 08/09/2017).

M. Seccaroni, *Rappresentazione delle relazioni immateriali. Sperimentazioni percettive attraverso algoritmi parametrici per il progetto di Paesaggio*, Tesi di laurea magistrale in Ingegneria Edile-Architettura, Università degli Studi di Perugia, AA 2015/2016.

INTERNATIONAL PERIMETRIC SOCIETY, (2004), Perimetry Update 2002/2003, Kugler Publications, Amsterdam

R. Arnheim, *Dinamica della forma architettonica*, Feltrinelli, Milano, 1985, p.148.

G. Kepes, *Il linguaggio della visione*, Dedalo, Bari, 1971, p.15.

F. Purini, *Dodici frammenti per disegnare il disegno… Lettera romana a Margherita De Simone*; in “Palermo: Le parole e i segni”; La Collana di Pietra, 2; 1982; rip. in Dal Progetto. Scritti teorici di Franco Purini, F. Moschini, G. Neri (a cura di), Kappa, Roma, 1992, p.341.

A. Chiera, I. Adornetti, S. Nicchiarelli, F. Ferretti, *Linguaggio, tempo e narrazione*, in “Soglie del linguaggio. Corpo, mondi, società”, A. Bertollini, R. Finelli (a cura di), RomaTre Press: Roma, 2017, pp.31-45.

J. Rykwert, *L'idea di città: antropologia della forma urbana nel mondo antico*, G. Scattone (a cura di), Adelphi, Milano, 2002

From the Peri-phery to the Para-phery. New logics of recording and representation for the urban edges in the transfer of centuries.

Manuel Gausa Navarrro
Department Architecture and Design DAD (University of the Study of Genoa)
email: gausa@coac.net
Nicola Canessa
Department Architecture and Design DAD (University of the Study of Genoa)

Abstract

The revisionist response to the crisis of modernity (historicism, "turning back", reconstruction and evocation, mannerist eclecticism, etc.) marked most of the postmodern urban cultures of the late twentieth century. In the face of the diverse figurative expressions – emphatically "stylistic" or gently "calligraphic" – of this retroactive vision which saw in the evocation of a referential centre (ideally civic, cohesive, and harmonious) its main reference, the critical reaction – favoured during a good part of the nineteen-eighties by certain theoretical positions – would be to return to the basis of modern production – more contemporary (abstract, objective, technical) – accepted in all its "dry and hard radicalism". In this context it is possible to interpretate the interest, manifested in the eighties, for a "new" expressive landscape: the landscape of the periphery (the "suburb", the "crown" of the "broken" city, its crust more or less cracked) as "alternative scenario" (Mateo 1987). The explosion of the cities, manifested with all its evidence in the nineties and the irruption of the new digital technologies in the beginnings of this century have expressed new challenges for our urban environments but, also, new lectures and interpretations for the term "periphery" understood with other conceptual keys. Approaches and interpretations that have also be recorded, expressed and communicated with different (and renovated) models, formats and logics of analysis and formulation.

Abstract

La risposta revisionista alla crisi della modernità (storicismo, "tornata indietro", ricostruzione ed evocazione, eclettismo manierista, ecc.) ha segnato la maggior parte delle culture urbane postmoderne della fine del XX secolo. Di fronte alle diverse espressioni figurative – enfaticamente "stilistiche" o dolcemente "calligrafiche" – di questa visione retroattiva che ha visto nell'evocazione di un centro referenziale (idealmente civico, coeso ed armonioso) il suo riferimento principale, la

reazione critica – avverata durante buona parte degli anni ‘80 da certe posizioni teoriche – sarebbe stata di ritornare alle basi della produzione moderna – più contemporanea (astratta, oggettiva, tecnica) – accettata in tutto il suo “ secco e duro” radicalismo.
In questo contesto è possibile interpretare l’interesse, manifestato negli anni ottanta, per un “nuovo” paesaggio espressivo: il paesaggio della periferia (il “sobborgo”, la “corona” della città “spezzata”, la sua crosta più o meno incrinata) come “scenario alternativo” (Mateo 1987). L’esplosione delle città, manifestata con tutta la sua evidenza negli anni Novanta e l’irruzione delle nuove tecnologie digitali agli inizi di questo secolo hanno espresso nuove sfide per i nostri ambienti urbani, ma anche nuove lezioni e interpretazioni per il termine “periferia” capito con altre chiavi concettuali. Approcci e interpretazioni che sono anche stati registrati, espressi e comunicati con diversi (e rinnovati) modelli, formati e logiche di analisi e formulazione.

Introduction. 80s – 90s. Another form, another place: the periphery as “alternative landscape”

The revisionist response to the crisis of modernity (historicism, “turning back”, reconstruction and evocation, mannerist eclecticism, etc.) marked much of the postmodern urban cultures of the late twentieth century.
Confidence in formal architectural language and design were the main strengths of models more attentive to the lyrical and punctual approach than to possible holistic conceptions of the city.
In the face of the diverse figurative expressions –emphatic “stylistic” or gently “calligraphic” -of this retroactive vision which saw in the evocation of a referential centre (ideally civic, cohesive and harmonious) its main reference (but also, in the face of the dream, sought to recover “lost paradises”) the critical reaction favoured during a good part of the 1980s by certain theoretical positions would be to return to the basis of modern production - more contemporary (abstract, objective, technical) - accepted in all its “dry and hard radicalism”.
In this context it is possible to interpret the interest manifested by the researches produced in these period around a “new” expressive landscape: the landscape of the periphery (the “suburb”, the “crown” of the “broken” city, its crust more or less cracked) as “alternative scenario”.
Faced with the decadent harmony of a recreated history, in the face of the impossible sentimentality of the traditional city, the periphery became, in effect, an alternative “new place” (present in a systemic and almost interchangeable way in most large cities) revealing a new epic scale open to the boarding of their own latent potentials.The attention to the periphery would then appear, for much of the 1980s and 1990s, as the “impossible” dream of a “possible” –by “interrupted”- lost modernity: the quasi-poetic scenario of a failed city but also susceptible of being potentially re-interpretable, that contrasts the rigorous, austere and abstract intensity of the modern city to the evocative model of the historical city. The urban *schematism,* its productive mechanics and, generally, the poor constructive quality that had been, in most cases, the main characteristics of the “modern city” in post-war Europe (thus converting its architectural translation into a symbol fragmentation, dislocation, imposition, as epic as it was autistic, as “self-sufficient” as it was indifferent to the environment) did not prevent the interpretation of the peripheral space as big spaces of possibilities, of “expectant scenarios” rather than “significant spaces”.

A space more strict than ceremonious; more severe than solemn; more purist than pure. The subtle border line between the “periphery” of the eighties as an alternative “cult landscape” –a space of latencies but also of values – and the “suburb” of the nineteen-sixties as a political scene of social denunciation -–deficient, conflicting, belligerent, socially “resistant” – traced an ambiguous scenario of contradictions and intersections at the same time. However, inside of this scene, one would find prevailing and continuing to underly these notions the very idea of the periphery as a “limit” (or perimeter). That notion of peripheral perimeter would, however, be that which at the end of the nineteen-nineties, mutated and changed to give way to a more diffuse, fractalized and ambiguous scenario in its expressions and manifestations.In this sense, if the dichotomy between a “centre frozen by history” and an “expectant periphery” had for some time constituted a revitalizing leitmotif at the end of twentieth century, it had also limited the debate the debate to a sort of aesthetic confrontation between two figurative landscapes: that of the morphological continuity of the historical city and that of the objective freedom of modern growth; this reduced the perception –and the approach– of space to a problem of forms: old or new forms, old or new some scenarios –inner fabrics or perimeter boundaries– located, in any case, in the family context of what had traditionally been conceived as “city”. Thus, it is, a recognizable and virtually coherent and continuous enclosure (or object), a scenario whose old geometries have already begun to fray.

Fig. 1. Mario Bellini: Design for the restructuring of central Berlin- Schlossplatz, 1990.

Fig1bis. Montse RIBAS: Design illustrations Del Liceu al Seminari, ed. Clotet-Tusquets, Barcelona 1981

Fig. 2. Der Himmel über Berlin (Win Wenders, 1987)

Fig. 2bis. Manolo LAGUILLO: Diagonal Sur (in H/C, ed. COAC, Barcelona 198

II. New methodologies and recently approaches

IIA. 90´- 2000´. In the "urban-territorial" space: dispersions, decohesions, dis-densities. The periphery as "multi-place".

At the end of the twentieth century, it was evident that the geographical limits of what had been understood as a city had, almost suddenly, given way to the new scales of a new urban-territorial space in constant vibration and reconfiguration in which even what was understood by the periphery could no longer be conceived as a "location" (a precise place or landscape: the boundary of the city, its border), but rather as a "condition" in the womb of a process (that of the dissolution of the urban in the territory) in which consolidated realities and scattered, often contradictory realities would coexist, alluding to a new entropic and definitively unfinished definition of the "new city."

The widespread increase of new phenomena of transformation associated to the impact of mobility and distant communication in the territorial occupation itself, the appearance of new "territorialities in network", the refocusing of the city in its outskirts, demographic or real estate explosions (with

no necessary connection between them), the emergence of hypertrophied "world-cities" and specialized ghettos (produced at all levels, spatial and social), and, in a nutshell, the emergence of urban "forms" and "targets" of irregular development were, effectively, provoking local and global transformations that hardly seemed to not have been anticipated,- addressed or foreseen by an urban science enclosed in the linear imposition-composition of those traditional models that were, often, limited to themselves. The field of the periphery now pointed to that "eccentric" space, with no limit (coherent or apparent). An *n-borderland* called to express its condition *multinter* (*multilayered* and *inter-networks*, multi-level and inter-territories) becoming vast and vague, more and more ambiguous in their expressions or manifestations.The old boundaries (and the old enclosures), more or less defined, of the old city "perimeter" – with "flanks" still and "rear" – had almost "succumbed" to the many demands of a new type of "geo-strategic-territorial" assemblies, just as the old, genuinely compositional factors had done so in the face of the evidence of an increasingly polyhedral, elusive and vital reality.

The more or less defined old boundaries (and the old enclosures) of the old city "perimeter" –still with "flanks" and "rear" – had almost "succumbed" to the many demands of a new type of "geo-strategic-territorial" arrangement(s), just as the old, genuinely compositional factors had done so in the face of the evidence of an increasingly polyhedral, elusive and vital reality

In the incipient networked nature of the new multiple structures of urban-territorial exchange and development, a new kind of more elastic condition –a fractal and irregular topology– could be seen where the old expansive forms of "metropolitan" accumulation, with large referential centres and "*aureolar*" peripheries, would gradually give way to less hierarchical polycentric, polyhedral and poly-cooperative groups; discontinuous and related, "concerted" or "arranged" and not always univocal but articulated differentials; destined to combine "centres" and "edges" at the same time (large nuclei as attractors and new intermediate nuclei, connection meshes and surfaces of relation, boundary landscapes and in-between landscapes) in a new type of network structures –more complex, elastic and flexible– between "in(ter)dependent identities" rather than between "subordinate entities": structures defined beyond the traditional "metropolitan areas" or the eternal dichotomies "urban/rural", "centre/periphery" . In the case of European and spatially Mediterranean realities this *geo-urban* condition would be even more explicit in highlighting the value of a varied geography, usually rich in populations and directly related to living and exchange spaces. The current dynamics of global development, multiplied by the information revolution itself, have given rise to the conditions of a new type of flexible and open (polyhedral and polyphonic) order in the territory: an order that would give special prominence to the interactive nature of the processes and phenomena associated with them, and whose most obvious manifestation would be that of an organism –the city– constantly re-informed –redefined and transformed– by continuous operations of action and reaction, adjustment and adjustment, between material realities and immaterial ("layers" of "information" and networks of articulation) in constant evolutionary combination.

These dynamics construct today a new global framework, more complex and plural, for a new projective interpretation of the territory: that of a *pluri-city* (*poli-polis*) agreed to a multiple network of *infrastructures* and *intra-structures*, landscapes and *in-between-landscapes*, density nodes and exchange cores, with relational and differential vocation, integrated and balanced at the same

time, in a poly-territory that would no longer be manifested as a "single place" (associated with a centrifugal or radial movement around a large centre) but as a multiple set of dynamic scenarios of relationship and interaction. A structure of variable geometry that today expresses, conclusively, its definitely dynamic condition and requires a new integrated and relational interpretation; with the capacity to articulate new visions, new schemas and, therefore, new connections between old and new polycentric structures implicit in this new complex system of independent and interdependent "sets" at a time, where strata and layers intersect and overlap. Integrating multi-level systems (layers of information and relationship networks) from visions, oriented strategies and open at the same time would be one of the objectives of the new research.From these considerations various questions can then arise around the "multiple", strategic and relational volition of the current conjunction *city-territory, centre(s)-periphery(s)*, and its own network articulation:
– How should the geo-urban scale of the city be approached?
– From what guiding criteria could this new geo-urban dimension of the city be approached "in", "with" and "towards" the territory and how would be oriented in a new assemblage of structures "in set" and "in net", capable of conjugating municipal realities and inter-municipal relations, articulation networks and cohesion pockets, development matrices and link landscapes, in new integrated models ?.
– What role should the main polling centres and the various intermediate nuclei play in these polymorphic models, and how could an effective articulation between mobility, growth, nature and landscape be defined in and between them.In fact, it would be a matter of rethinking the possible propositional quality implicit in the dynamic potential of this new "geo-urban" scenario, of displacement, mobility and exchange –but also of landscapes and inter-landscapes, of the connectivity and the (inter) relationship– connecting it with a new understanding of the idea of place or context –as a field of forces "articulated", in network– as well as with a new projective –and conceptual– tool, emerging today, associated to the new information technologies: thus recovering a certain optimistic –ambitious– epic of the glocal involved in the profound changes of scale and structures characteristic of the new metropolitan forms; favouring a positive and at the same time critical action, attentive to those conflicts, tensions and deficits generated by the phenomenon approached. Tensions and deficits, social and spatial and environmental, that appeal to new approaches, resilient and integrated at the same time, of our life scenarios and relationship.

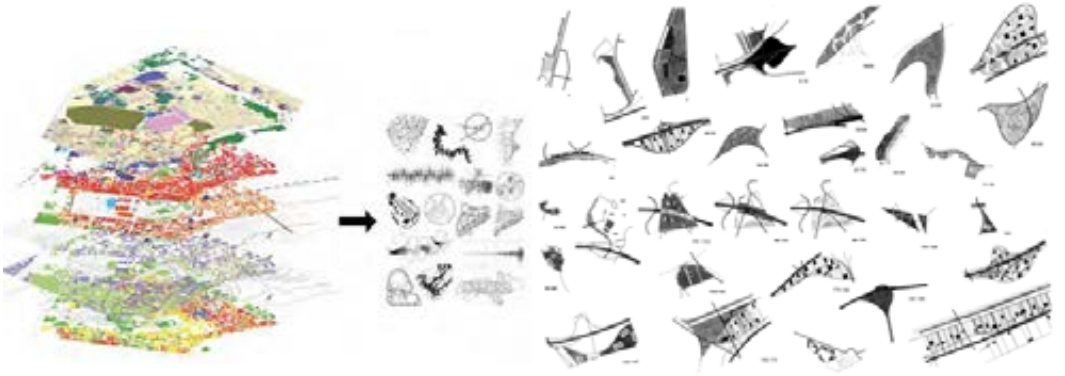


Fig 3a. Città Multi-Layer (Font. Mathilde Marengo). Mapping Capacities and Diagrammacities
Fig3b. The city, a place of places (MVRDV: "Living along the highway, Almere 2050, 1997-98)

Fig 3c. Barcelona Land-Grid. Topographical Model (Actar Arquitectura, 1998-2000).

Fig 3d. The city, a place of places (Actar Arquitectura: "Barcelona Metapolis, 1998)

II.b- 2000s-2015 Expanded Realities. The periphery as "disconnection".

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 launch of new, more personalized interfaces –from the emergence in the nineteen-nineties of the first personal computers to the multiplication of new portable devices, from the idea of inter-cities to the idea of a global network, from the multi-layer interaction (Windows, GIS, Scan) to the multi-environment interaction (apps, sensors, IA)– translates the progressive perfection of the operational programs and operative systems destined to extend the possibilities of interaction among means, means and users, favoured by the consolidation and increase, as of 2010, of applications for mobile and open programs (Open Source) and Real-Time readings, as a corollary of these processes.

The researches developed at this third stage of search seem to tend to deepen the exploration of these new capacities associated with the accelerated progression of the encounter (and crossing) between reality and virtuality, materiality and digitality (integrated digitization) (reactive) and environment (reactivated), but also between the environment (actuated) and agents involved (actuators): agents and materials (*Agents & Matters*) raise new focuses of attention, from interest to the hyper- (co-participatory, co-decision-making) and its implicit empathic quality (new communities and new collective behaviours, *Commons & Behaviours*), as paradigms directly associated with a new interchange system.

The exploration of a new co-participatory definition (empathic or eco-empathic) for the inhabited environment but also of a new endo-sensitive definition of/for an environmentally responsive matter (ubiquitous, embedded) related with the environment (nano- technologies, bio-technologies, dark-ecologies, etc.) marks today many of the trials produced in this new era. Information understood as *input-output* (shared, cooperative) or as indicator-actuator (supra-environmental) leads, in effect, to new formulations inclined towards deepening new active and

interactive responses not only relational but decidedly synergistic (empathic) with a medium and with a reality, as it has been pointed out, not only distributed but ubiquitous, augmented in its own capacities of hyper-connection and sensing; an expansive, systemic, responsive and "collective/ connective" condition, associated with an *endo-technological* definition, as an increased relationship capacity in and between systems.

Parallel to this type of advanced environment, the inertias associated with other, less positive global situations related to the conflicts and threats linked to climate change and their devastating effects on less developed populations (environmental risks, housing devaluation, pollution and contamination, *ghettofication*, rising poverty lines, etc.). The informational capacity of the des-localized productive exchange has increased the plural complexity (rich, varied, diverse) of scenarios and relationships, but also, it has contributed to increase the entropic effects on land use and the progressive inequality between realities and communities and, therefore, the emergence of a new type of periphery no longer only physical but also socio-economic (and cultural?).

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*) [11]. The old urban notion of "periphery" (*peri-pheros*, the city displaced around it) seems to give way to a new concept, the "para-feria" (*para-pheros*, the city displaced by the margin ... and on its margins) in which the urban would pass from being a single place to a "place of places", real and virtual; diverse, irregular, differential and (potentially and qualitatively) *(re)orientable* and/or *interlaceable.*

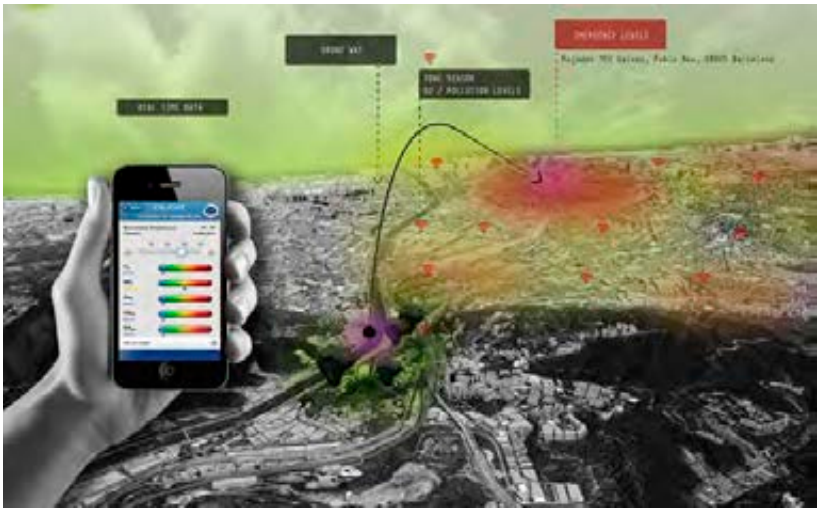


Fig 4. IAAC MAA01- A new hyper-connected multi(pli)city: Master in Advanced Architecture, Introductory Studios, Markopoulou-Diez-Rubio-Bravo-Ros, course 2012-2013 (source IAAC archives

III. Conclusions. (Re)presentation and (Pre)presentation.

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. It is evident that all the revisionist logic of postmodern historicism was going to support itself in a type of figural register, of evocative vocation; shapes and figurations of recognizable geometries, perspectives (of pen or watercolour), black and white planimetries with fine lines of "engraving", calligraphic thoroughness, semantic and morphological analysis in cartographies of clear iconic-descriptive vocation) would translate a "timeless" (re)presentation of clear analogical-symbiotic (and metaphorical) connotations associated to the recreation and re-proposition of an ideal (and idealized) "urban centre" and the description of a busily contextualized territory, decidedly "extramural". 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.

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. "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 application of these new recording capacities not only to the optimisation of our urban management and engagement but to the environmental answers (associated with a new implicated sensibility) talk about a new *resili(g)ent condition* (resilient and intelligent, at time) open to evolutionary and adaptable scenarios and designs. The old analogical *(re)presentation* gives way, more and more, to a new type of *(pre)presentation* –or multiple *(proto)presentation*, virtual and visual– as open and indeterminate as potentially *orientable* and *vectorizabl*e in its own definition, definitely processing and procedural.

Fig 5. Data Maps Energy 01, Barcelona Valldaura. A new reactivated peri-urbanity (interactive scenarios, IAAC Global Summer School 2014

References (TNR 9)

J.L. Mateo, *No existe el centro,* in "Quaderns" n. 175, COAC, Barcelona, 1987.

D. Steiner, *Vielleicht eine Biographic der Peripherie* in "Daidalos" n. 15, Berlin, 1993.

W. Wenders-H.Kollhoff, *La ciudad. Una conversación,* in "Quaderns" n. 175, COAC, Barcelona, 1988.

W.J. Neutelings, *Patchwork City* in "Architectural Design" nº 2/4, vol. 64, London, 1994 – W.J. Neutelings, , *Patchwork City,* 010 Publishers eds., Rotterdam, 1992

M. Batty, *The Fractal City* in "Architectural Design" nº 9/10, vol. 67, London 1997

D. Harvey, *The Urbanization of Capital*. Johns Hopkins University Press, Baltimore, 1985.

M. Gausa, *Open-Espacio-Tiempo-Información*, Actar ed., Barcelona 2010.

F. Asher, *Métapoles ou l´Avenir des villes*, Odile Jacob ed., Paris 1995.

M. Gausa, V. Guallart, W. Muller, *HiperCatalunya, Territories of Research,* Actar ed - Generalitat de Catalunya, Barcelona 2003.

M. Gausa, *City Sense: Territorializing Information* in V.V.A.A., *City Sense, 4th Advanced Architecture Contest, IAAC-Actar eds, Barcelona 2012.*

J. Rifkin, *La nouvelle société du coût marginal zéro,* LLL Les Lines qui Libèrent ed., Paris 2014.

V. Guallart, *La ciudad autosuficiente,* RBA ed., Barcelona 2012.

M. Gausa, *Fattori <ri>: verso una città <ri>attivata, verso un'urbanistica <ri>attiva)* in M. Gausa, M- Ricci-P. Scaglione, *AUM.02 Atlante Urbano Mediterraneo 02. MED.NET.IT.2.0,* List ed, Trento, 2013

Novara Fair pavilions: relationship between drawing and preexistences in the Architetti Associati's work

Valentina Marchetti
The Department of Design , Polytechnic School of Milan
email: valentina.marchetti@mail.polimi.it

Abstract

"Let's move visitors among the centenarians trees, open them new prospectives on the city castle red walls, make them look out over the ramparts that separate the upper part of the park from the lower one, it was a spontaneous and natu-ral assumption. It was about associate to this spectacle the one created by pavilions themselves with their shapes, ma-terials and colors.[1]"

These are the words used on Casabella Continuità by the Architetti Associati to describe the aim behind the Novara Fair design. From the sentence and the study of the archive drawings it's immediately clear the relationship between the pa-vilions design and the Novara park natural environment. This relationship terms should be understood not only from a spatial point of view but also from a formal one. Indeed all the structures are designed considering their content and the surrounding space.

Considering this premise the aim of the paper is to underline the relationship between place and pavilions designed in the project of Novara Fair by Architetti Associati, highlighting the role of the drawing as a tool to create a specific sym-biosis between natural element and artificial ones. A balance reached not through a mimetic process but through a deep research in geometric elements hidden in the natural context, dimensional relationship between full and empty spaces and the study of specific points of views.

Abstract

"Far muovere il flusso dei visitatori tra gli alberi centenari, aprirgli delle prospettive sui muri rossi del castello della città, farlo affacciare sui bastioni che separano il parco alto dal parco basso, era una premessa spontanea e naturale. Si trattava di associare a questo spettacolo lo spettacolo dei

[1] F. Buzzi Ceriani, V. Gregotti, L. Meneghetti, G. Stoppino, Padiglioni 1 in un parco, "Domus", 289, dicembre 1953, pp. 8-13.

padiglioni stessi, con le loro forme, e i loro materiali e i loro colori."
Con queste parole gli Architetti Associati descrivono su "Casabella Continuità" i propri intenti nella realizzazione del progetto per la Fiera di Novara. Dallo studio dei disegni di archivio emerge come fondamentale il rapporto tra i padiglioni e lo spazio naturale del parco di Novara. I termini di questo rapporto sono tuttavia da intendere non solo dal punto di vista spaziale ma anche formale: la struttura stessa dei padiglioni, infatti, è studiata in modo tale da relazionarsi sia con il proprio contenuto che con lo spazio circostante. A partire da questa premessa l'articolo vuole sottolineare la relazione tra ambiente e pro-gettazione nei padiglioni per la Fiera di Novara, ad opera degli ArchitettiAssociati, evidenziando il ruolo del disegno come mezzo per la creazione di una peculiare simbiosi tra elementi naturali ed artificiali. Un equilibrio raggiunto non attraverso un processo puramente mimetico, ma attraverso una profonda ricerca sugli elementi geometrici nascosti nel contesto naturale, sulle relazioni tra pieno e vuoto e uno studio accurato dei punti di vista.

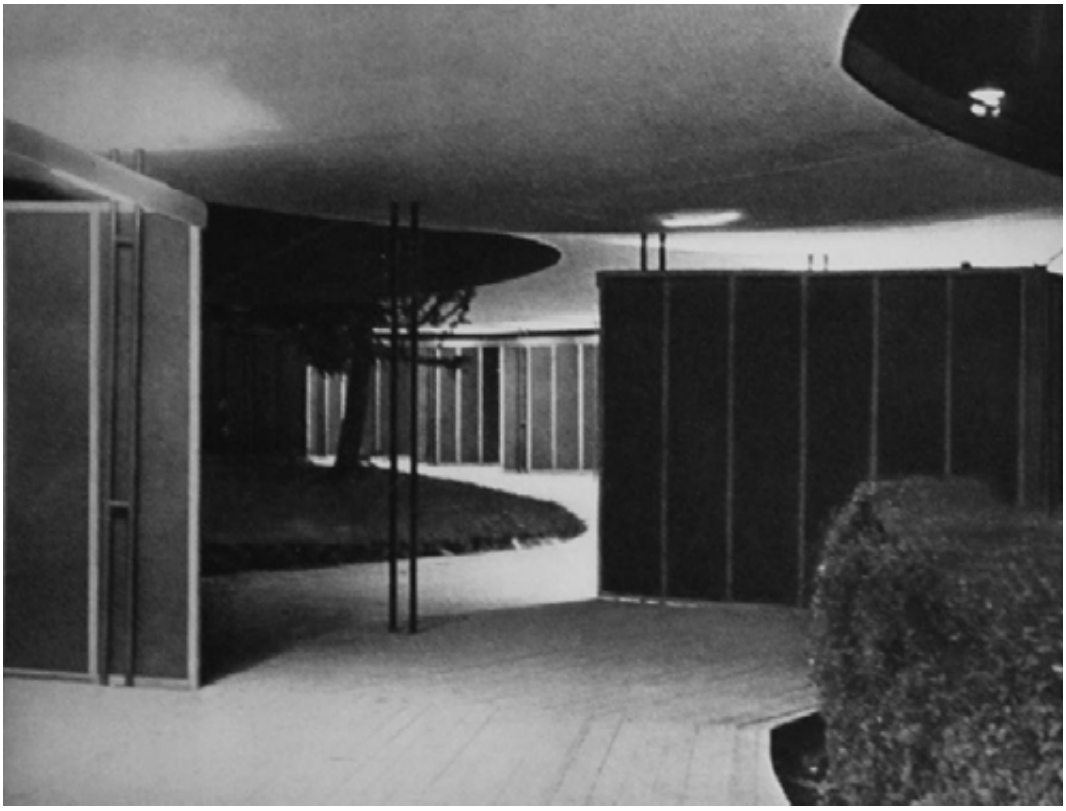


Fig.1 Novara Fair Handcraft Pavilion

Introduction

In 1953 Vittorio Gregotti, Lodovico Meneghetti and Giotto Stoppino founded the Architetti Associati studio in Novara. Despite the different background and personal interests, the architects shared a pure passion for the mixed up of different fields and a particular curiosity for the interna-tional experimentations. They also developed a specific rereading of the Modern Movement prin-ciples,

connecting the use of local traditional materials and techniques with new ones. In the book Le stagioni delle scelte, Lodovico Meneghetti states that integration between architecture and environment principles has always been a fundamental and original trait of their projects. Taking into account their works, starting from the Novara Fair up to the sixties villas as Fregonara house (Fig.2) and Mira house, it's easy to notice the deep research on this field.
The link between architecture and environment gave them the possibility to research not only the integration between natural an artificial elements but also the relation between historical preexistences and new architectures.

Fig.2 Villa Fregonara, La Sacca di Stresa (NO)

The years between 1951 and 1958 certainly mark an important turning point in the Italian architectural panorama. Gregotti, in 1969, will define this turning point as "aspire to reality", consider-ing reality, history and tradition strictly connected to Ernesto Nathan Rogers' theory of environ-mental preexistences. With this term he also wants to create a gap between this turning point and the neorealism movement typical of literature, art, theater and cinema.
The I.N.A. Casa Tiburtino III project in Rome, designed by Quaroni and Ridolfi together with a group of new graduates, represents, according to Gregotti, this tendency to aspire to reality. In this project the provincialism, the effort to give concrete form to social political hopes in terms of progress, the still confused push towards one renewal of the language and the desire for contex-tualization and narration that characterized the young Italian architects blend all together. All these inspirations will be better resolved in the Ridolfi project for the houses in Viale Etiopia in Rome, where he mixed the push toward popular values together with the Modern Movement principles.

Another important element connected to this approach could be defined as philological historicist, this aspect moves from the group of personalities that work with Ernesto Nathan Rogers in Casabella during those years. Rogers' theory involves awareness of the continuity between past and present, the role of memory and the relationship between natural and artificial environment. The new generation, formed around the magazine, used the architecture as a knowledge tool, the history as a project instrument and the environment not as a limit but as a factor for creativity development.

The Novara Fair Pavilions

In 1953 Vittorio Gregotti, Lodovico Meneghetti and Giotto Stoppino with Franco Buzzi Ceriani were in charge of the Novara Trade Fair masterplan and pavilions design. The project location was the castle park in Novara. The difficulty of the setting was not only the presence of the french castle garden but also the existence of the historical monuments themselves as the Visconti's Rocchetta and the walls. Clients request was to use only rent structures easy to assemble and disassemble. Despite pavilions are an emblem of transience and reversibility, the project has his roots in the site. The pavilion location, the relation between structures and natural elements and the technical realization leads the architects' project to be considered as a coherent settlement plan that harmonizes buildings and nature. The ephemeral logic typical of temporary installations is rejected by Architetti Associati not only in the Novara Fair project but in all their projects. Due to the synergy created between pavilions, natural environment and historical preexistences the ephemeral characteristic of the project could be seen as a committee desire and not as a project necessity. Another important commitment request was to use, for the pavilion construction, only rented prefabricated elements. Analyzing the drawings of the whole project we could notice that for all pavilions there're many different versions, the projects are represented using mainly plans and sections, axonometries aren't use by the architects, but there are some perspectives which underline the relationship be-tween the greenery and pavilions. In fact the Architetti Associati uses the axonometric drawings only in the furniture projects, for the architectural and interior design ones they limit the representations to perspective, plans and sections. They consider plans and sections as tools for the project devel-opment, while they see perspective as a communication tool for the clients. Indeed these kind of drawings are considered as a more "earthly" way to show the space. The entrance (Fig.3) is designed as a bridge for a new fantastic world, the ramp theme could also be associated to Baldessari entrance for the Breda pavilion for the Milano Fair in 1951. The structure is composed by five wood and aluminum suspended cylinder rotated and moved on three different axes painted in blue, orange and red colors and a footbridge that crosses all of them. In the first project the catwalk has an arc form both in plan and section, so it moves be-tween the trees, that don't follow a linear order. The perspective of this first project version em-phasizes the moving of the bridge among the trees and the environment is represented in detail to point out the balance between the structure and the park. The final version of the project pre-sents a straight bridge placed in a park tree-lined avenue, so the integration between the struc-ture and the trees is given by the cylinders scale, translation and rotation. The path follows the avenue direction. The cylinders movement allow the creation of fragmentary views on the park and surrounding environment for visitors that pass on the bridge.

Fig. 3 Novara Fair entrance perspective_CASVA concession

The Trade Pavilion (Fig.4) is the first structure of the Fair and it's located in a large area dived by three trees' rows. Considering the drawings of the first project version, the design challenge of the site is immediately clear: the pavilion should move among the trees connecting the space rectangular shapes created by the rows.

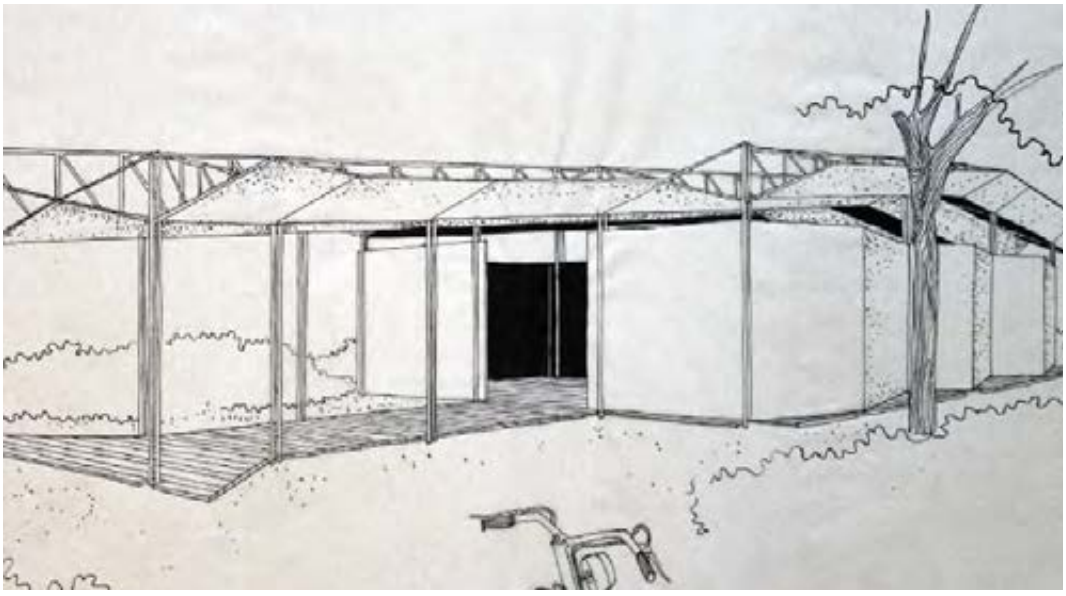


Fig.4 Novara Fair Trade Pavilion perspective_CASVA concession

In the first proposal the architects decide to create a wood catwalk that goes around the trees drawing some irregular hexagonal shapes, that harmonize and enhance the natural context (Fig.5). The stands' areas are placed in the void designed by the gangway and some not full-height panels are used to create the vertical partitions. The textile roof follows a different drawing (Fig.6) and it's the result of a composition of rectangles. In the first project the roof structure is suspended using metal ropes and the trees as pillars, in this way the existent rows are partially incorporated into pavilion interior spaces (Fig.7). These choices also allow the architects to integrate the huge pa-vilion structure design into the park.

In the later pavilion versions the roof is no more suspended and the catwalk design changes and follows the roof draw. A serie of rectangles is displayed in the areas delimited by the rows and some catwalks connect them (Fig.8). So the structure moves among the trees but there's no more the same integration with nature inside the interior spaces defined by the project.

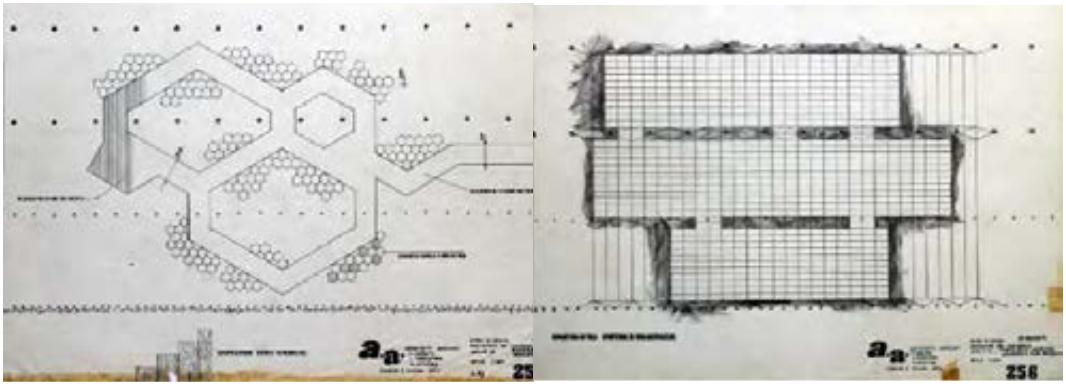


Fig.5-6 Trade Pavilion stands' plan and roof's plan, first solution_CASVA concession

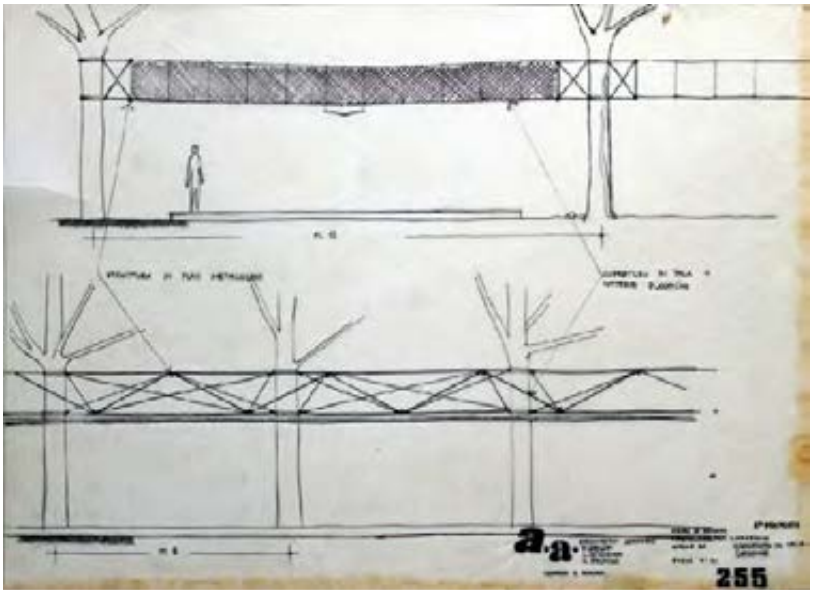


Fig.7 Trade Pavilion roof structure's section, first solution_CASVA concession

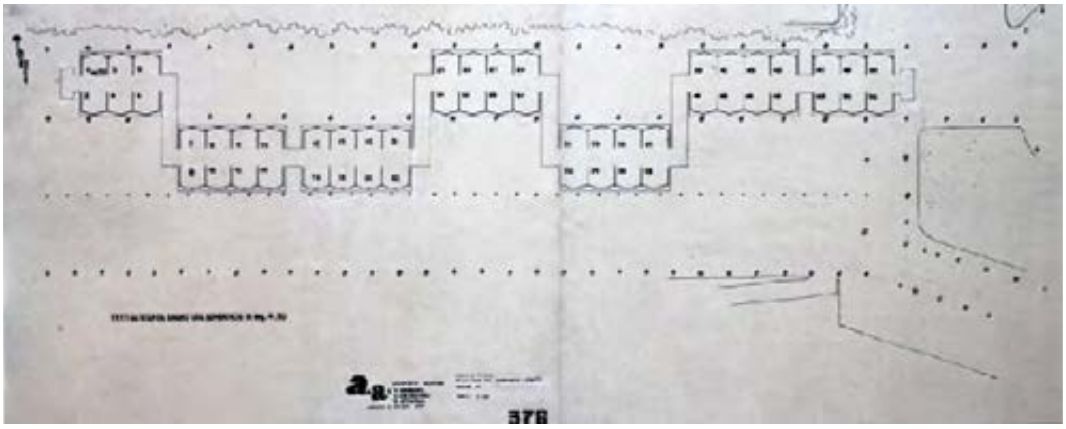


Fig.8 Trade Pavilion plan_CASVA concession

So, in the first solution proposed, the catwalk is like a path in the nature and the stands hexago-nal shapes allow a better integration with the natural elements and the environment, that is direct-ly in contact with the visitors. In the definitive solution the rectangular floors define different spac-es placed between the trees and the open catwalk assumes just the role of connection between the different "rooms".

Also the stands location influences the visitors' environment perception, indeed in the first project stands are located outside the wood catwalk on a hexagonal pomice concrete floor, in the sec-ond case they are grouped on rectangular floor of the rooms.

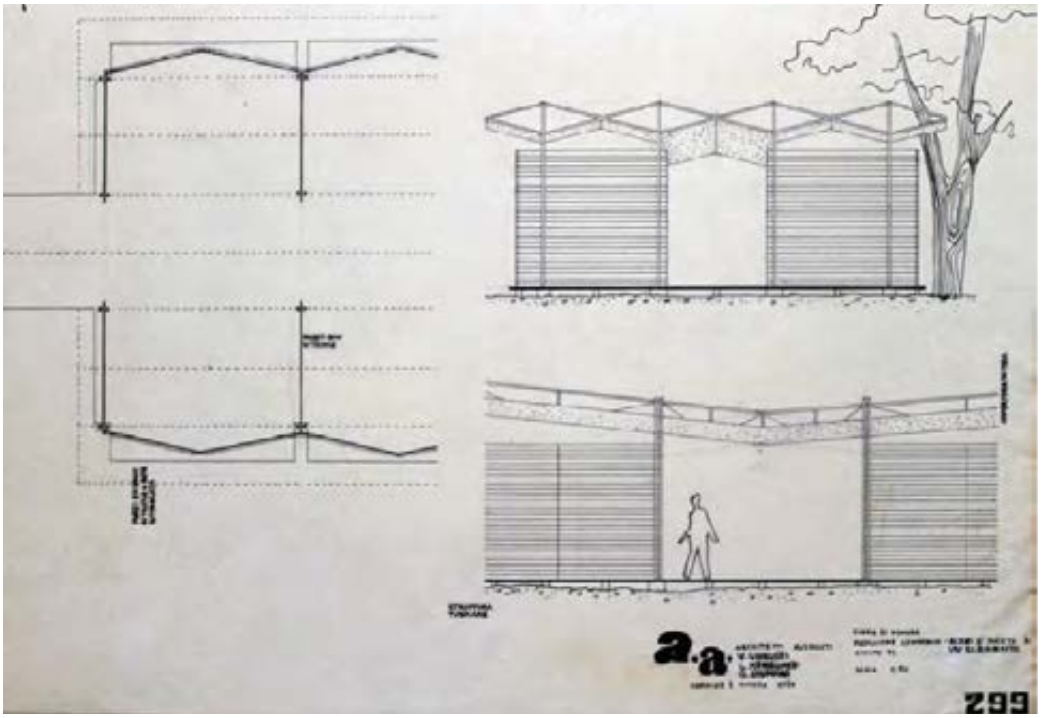


Fig.9 Trade Pavilion plan and section of one element_CASVA concession

Moreover the vertical partitions of the stands create not full heigh walls on the rectangles' perimeter, that hiding only partially the environment (Fig.09). In their drawings the architects always rep-resent the trees or other natural elements and a human reference to underline the scale relation between man, pavilion and nature. Moreover in the final pavilion version perspective (Fig.04) they also draw a scooter: a symbol of the contemporary culture, that frequently returns in their perspectives for different kind of projects.

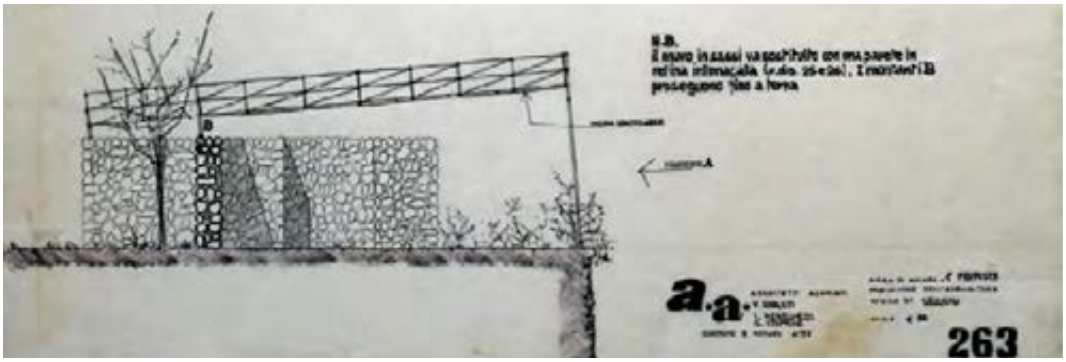


Fig.10 Novara Fair Agricolture Pavilion first solution_CASVA concession

The Agriculture pavilion "dominates with its light structures the massif top of the ancient ramparts[2]" . The drawing of this pavilion is strongly influence not only by the presence of the natural environment and the location, in the upper part of the park, but also from the ramparts that represent the historical preexistence. In the first pavilion project (Fig.10), the architects design a stone wall addressed to the park upper part. In plan the wall follows a composition of segments rotated in relation to the trees' position. The creation of the new wall generates, in this first version, a strong contraposition between the exiting ramparts and the pavilion wall. The pavilion hasn't got partition in the lower park side, so the visitors could appreciate the totality of the panorama, that is only partially interrupted by the thin uprights of the cover.

Fig.11 Novara Fair Agricolture Pavilion

[2] F. Buzzi Ceriani, V. Gregotti, L. Meneghetti, G. Stoppino, Padiglioni in un parco, "Domus", 289, dicembre 1953, pp. 8-13.

In the final version the pavilion is completely open on its perimeter and has a light structure to contrast the solid nature of the preexistent walls (Fig.11).
The white, yellow, black and purple cover seems to float on the ramparts, suspended on the structure designed by red tubes. The floor is made of pine wood and it's totally independent from the cover. There are only two opaque horizontal plane and the pavilion hasn't real vertical walls, there're only some vertical partitions between the private stands under the "floating" roof.
In the final plan the broken line (Fig.13) that defines the first solution's stone wall changes becoming more regular. The reference used to define the stands location is a hexagonal grid, but in the final version the architects interpret the theme of modularity in a lighter and more free way (Fig.12). Furthermore the vertical partitions are moved in plan toward the lower park side and they be-come not full-heigh dividers instead of a real wall. The studio also decides to create some voids between the vertical partitions, breaking the hexagonal grid in the plan. Moreover the use of different scale hexagons' parts moves the composition. Furthermore, in this way, the architects cre-ate many views on the lower part of the Novara historical park, they also allow visitors to enjoy the panorama and let them use the pavilion as a terrace on the lower park.

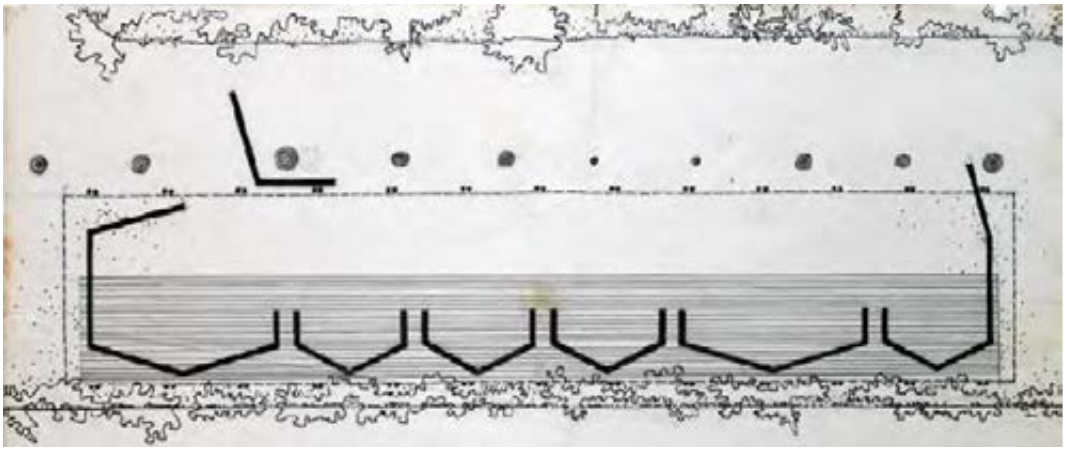


Fig.12_Novara Fair Agricolture Pavilion definitive plan_CASVA concession

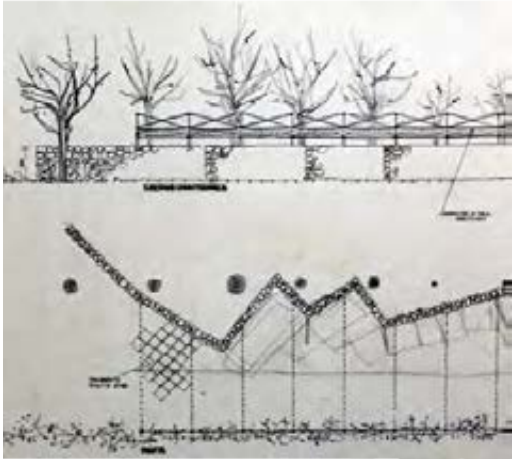


Fig.13 Novara Fair Agricolture Pavilion detail of first solution plan_CASVA concession

The environment influence on the pavilions design is also particularly evident in the Handcraft pavilion (Fig.14). The ribbon shape is suggested by the free spaces between park flowers beds. Stands are displayed sometimes on the visitors right and other times on their left, so they could always enjoy the alternating view of green outdoor landscape. A similar research could be found in Serpentine Pavilion design by SANAA in 2009. They both try to use the organic drawing of the roof to create concave and convex shapes able to integrate the park's element with the installa-tion. In the Architetti Associati's Handcraft pavilion the formal organicity, closed in the ribbon logic with a prevalent longitudinal distribution, is only outlined, on the opposite in the SANAA project it finds greater completeness. The Serpentine roof is developed in three-dimensional space and the use of mirrored surfaces creates a more effective relationship with the horizontal planes. So the design of the Architetti Associati pavilion presents a starting and an ending point, on the op-posite in the Serpentine pavilion the accesses from the park are multiplied. This comparison doesn't want to point up a specific influence relationship between this two projects, but it's interesting to underline the contemporaneity of the solution presented here for the relation between architecture and context. Therefore the Handcraft pavilion embodies the research that the three young architects were conducting in the architectural field during the 50's. Indeed in the same year they design the project for the Rosetta house, a villa in the countryside that embodies their experimentation of different ways to solve the issue of contact between nature and architecture on one side and between interior and exterior space on the other. The project is an evident return to the patio house theme, developed also by Mies Van Der Rohe during the '30s. In the Rosetta House they design, inside a square lot delimited by a perimeter wall, three different courts connected to the interior spaces by huge windows. A similar approach is also used in the project for villa Castelli, where the architects design a huge hexagonal central patio connected to the living space by an openable glass wall. Starting from these projects they expand the research on the issue, designing the 60's villas immersed in the natural environment as the already mentioned villa Fregonara e villa Mira.
Moreover they decide to introduce natural elements also inside the residential apartment field using greenhouses, which became a recurring theme in their project at the turn of the 50s and 60s.
Once inside the exposition, the Industry pavilion extends into the park as an encampment. The shape, designed from the different colored triangles juxtaposition, is made through a metal frame structure and it's articulated through closures and openings. The cover of the light metal frame is made of white, purple and orange plastic material. The use of triangular compositions also continues inside the pavilion giving unity to the building and connecting internal and external spaces. Even the stands placement comes from a geometrical study that starts from the hexagons juxtaposition. So, in this pavilion, the bond to geometry is extremely clear: the architects want to use regular shapes that could interact with nature and environment. For these reason they choose, in many cases, triangles and hexagons rather that square, searching for a better integration be-tween geometry and natural elements. The regular succession of geometrical figures, in the In-dustry pavilion, follows the step of the main avenue trees and the use of transparent and opaque plastic coating for the different triangles sometimes reveals, other times hides the landscape out-side the tunnel. So from pavilion interior space the visitors could appreciate different views of sur-rounding that are mixed up like in a collage.

In the design of the Tourism pavilion, located inside one large flower bend of the park, the architects completely replace the structural elements with the natural ones, indeed the trees around the pavilion turn into supports for the roof. The first version (Fig.18) has a plane suspended roof made of aluminum plates displayed on a wood structure. The footboard and the roof shapes are designed starting from a modular grid. The presence of natural elements influences the design of full and empty spaces in the structure incorporating the trees inside the floor and the roof. Following the ground movement the architects also decide to draw different height platforms in-stead of a unique height footboard. In the last version they decide to modify a little bit the element, so they create an inclined sus-pended plane rotated with respect to the flooring.

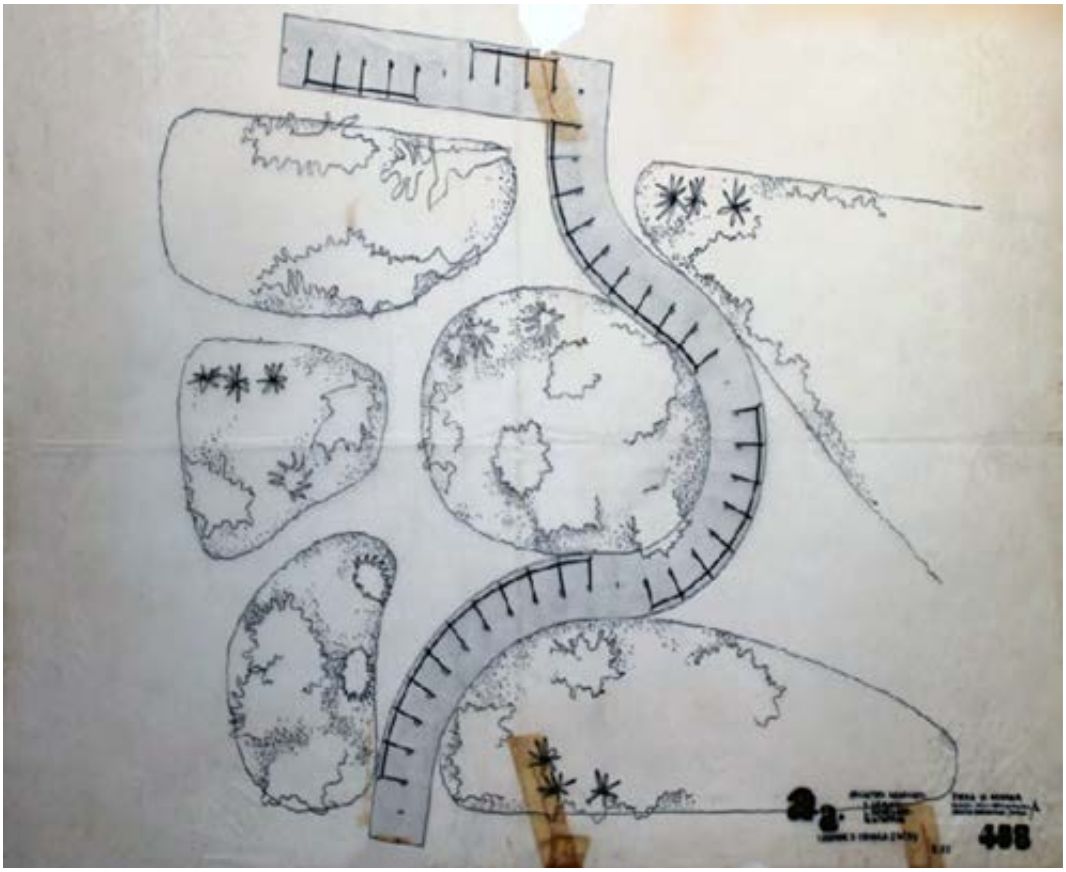


Fig.14_Novara Fair Handcraft Pavilion_CASVA concession

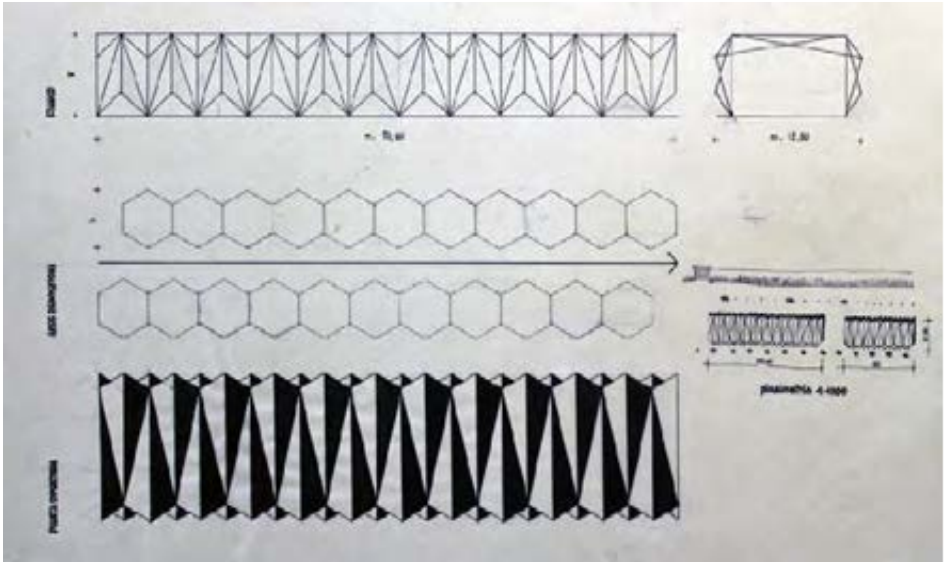


Fig.15 Novara Fair Industry Pavilion studies for interior space and cover_CASVA concession

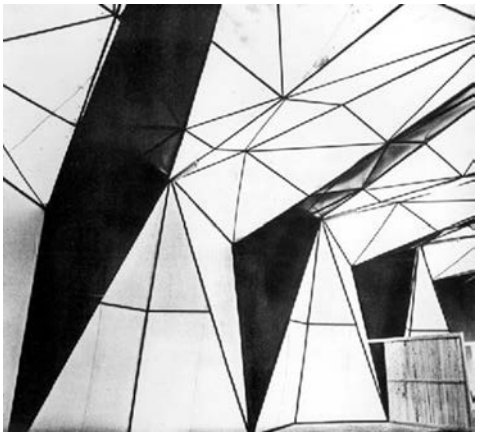


Fig.16-17 Novara Fair Industry Pavilion

Fig.18 Novara Fair Trade Pavilion first solution_CASVA concession

They also simplify the floor reducing the differ-ences in levels of the raised floor. So they design only two different height areas. The footboard and the cover become smaller and they don't incorporate the trees inside them. In this way the pavilion occupies the interstitial spaces between the pre-existing natural elements.

All the vertical closures, partitions and connections disappear and become incorporate in the natural surrounding, which became not only a background of the interior space but the real vertical partition. This choice is also enhanced in the last section (Fig.20), where the trees are drawn not as a frame, but as structural elements, stylizing their organic forms and eliminating the leafy foliage of the first drawings. Instead the background role is more evident in the colored section (Fig.18), where the trees are represented in a more pictorial way but the structural cables disap-pear underlining the floating roof, the role of nature and the pavilion immersive atmosphere.

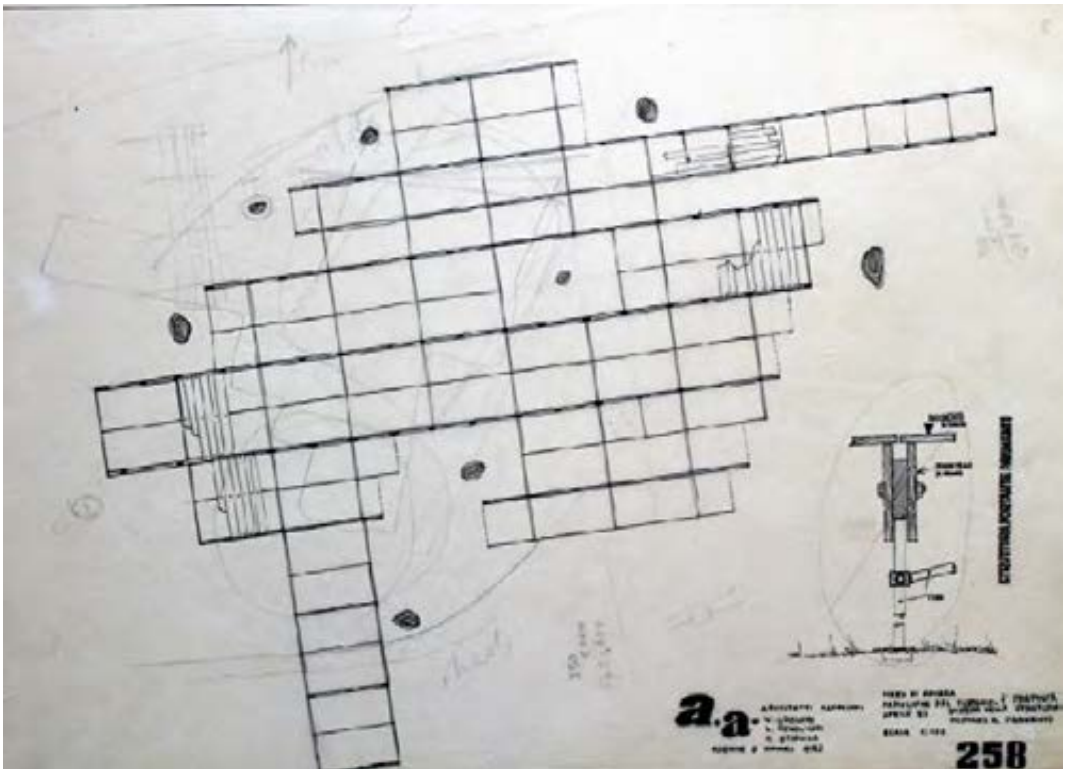


Fig.19 Novara Fair Trade Pavilion first solution_CASVA concession

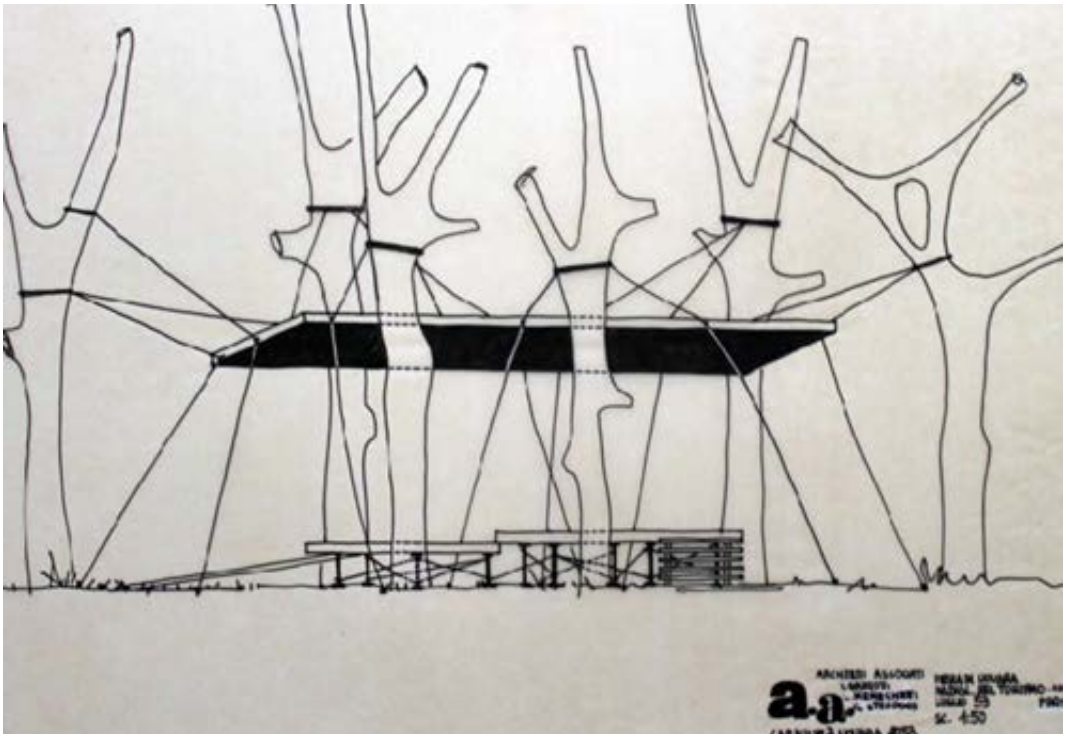


Fig.20 Novara Fair Trade Pavilion definitive solution_CASVA concession

Conclusion

In this paper we re-read the project for the Novara Fair, focusing not only on the final achieve-ments, but also deepening the genesis of the pavilions through the design drawings. In several cases the various design steps were analyzed in order to understand the changes made to the project and the influence of the latter on the relationship between pavilions and environments. It is certainly evident that the search for a balance, implemented through the study of a non-mimetic equilibrium between constructions and nature, is more or less successful in the different cases. Despite this, the results achieved could be considered interesting in the discussion on the relationship between design and context. The formal research is also particularly interesting: in-deed they try to find a relationship with the natural elements not only by using the organic shapes, as in the Handcraft pavilion, but also by drawing regular geometries able to enhance the environment itself. From the analysis of the unpublished drawings, we can also clearly catch the use of plan and section as a tool for the design process and the perspectives as a communica-tion medium. They always use a human point of view and they integrate in the drawing the natu-ral elements as well as the artificial ones.

Finally what emerges from this analysis is the actuality component of the Architetti Associati's work, for whom a project is never just the put into practice of a contract or the fulfillment of the re-quired requisites, but it is the result of a thought declined through a sometimes rigid design meth-od that allows, however, to reach the goal. As also Tentori says: "Their method always consists in the preliminary discussion and choice of a well defined image. From this it proceeds progres-sively to the technical and functional identification of the organism: through the analysis of every detail,

every nodal issue. Anyway at this point the process is almost irreversible: the chosen im-age can't be modified but only qualified. Such image is realized and the project is abandoned and started again from new and different premises. This compositive rigor, this will to erase from the design and realization every indefiniteness , every spurious and accidental component [...] is an highly positive element and, at the same time, sometimes a dangerous limit. […].[3]" In addition to that, from the discussion emerges an image that completes the analysis and the mainly archi-tectural research already carried out on the Novara Fair, where only few pavilions were analyzed, and more in general on their work, where the relationship with the environment and the historical preexistences are fundamental principles always researched through the drawings study.

References

Periodicals

F. Buzzi Ceriani, V. Gregotti, L. Meneghetti, G. Stoppino, *Quattro architetti progettano una fiera in collaborazione,* in CCIA (Camera di commercio, industria e agricoltura di Novara), 3° Fiera mercato. Rassegna delle attività economiche della provincia, Novara 1953, pp. 51-55.

F. Buzzi Ceriani, V. Gregotti, L. Meneghetti, G. Stoppino, *Padiglioni in un parco, "Domus",* 289, dicembre 1953, pp. 8-13.

F. Tentori, *Quindici anni di architettura in Italia, "Casabella Continuità"* 253, luglio 1961.

Monographs

V. Gregotti, *Il territorio dell'architettura*, Feltrinelli, Milano, 1980.

V. Marchetti, *Gli Architetti Associati: Vittorio Gregotti, Lodovico Meneghetti, Giotto Stoppino.* Interni ed Allesti-menti 1951-1969, Tesi di Laurea, Dipartimento Interior Design, Politecnico di Milano, 2016.

L. Meneghetti, *Architettura e paesaggio: memoria e pensieri*, UNICOPLI, Milano, 2000.

L. Meneghetti, *La partecipazione in urbanistica e architettura: scritti e interviste*, UNICOPLI, Milano, 2003.

G. Morpurgo, *Gregotti associati: 1953-2003*, Rizzoli: Skira, Milano, 2004.

G. Morpurgo, *Gregotti & Associati: L'architettura del disegno urbano*, Rizzoli, Milano, 2008.

J. Rykwert, *Gregotti associati*, Rizzoli, Milano, 1995.

D. Vitale, *Le stagioni delle scelte: Lodovico Meneghetti, architettura e scuola*, Il poligrafo, Padova, 2011.

[3] F. Tentori, Quindici anni di architettura in Italia, "Casabella Continuità" 253, luglio 1961

Digital Culture -The Role of Architects in Reversing the Cultural Erosion Resulting from the Digital Culture

Maria Elisa Marini
Department Architecture and Design DAD (University of the Study of Genoa)
email: memarini.arch@gmail.com

Abstract

Knowing that the internet is a powerful source of the dissemination of knowledge to people, in this paper, I will focus on the impact that computation and emergent (or emerged) social media are having on cultural life. I will start from the critical point of view of Turkle. She refers to the progressive alienation that adults, teenagers and children are experiencing. I start my reasoning around a question Sherry Turkle asks at the end of her TED talk: 'are there ways technology can lead us back to our real lives, our own bodies, our own communities, our own politics, our own planet?'. To answer this question, firstly I'm going to talk about the early assumptions of 'Digital Places' to understand if the theories are still valid. Then, I will try to understand the use of (digital) networks as a strategy in architecture and design in community projects. Thereafter, I will continue the discussion around the evolved role of participation in the design process.

In the conclusion of the paper, I will confirm that technology (computation and social media) can be used by designers to bring communities back to their real lives and enhance social commitment and social cohesion.

Abstract

Sapendo che Internet è una potente fonte di diffusione delle conoscenze verso le persone, in questo articolo mi concentrerò sull'impatto che i social media computazionali e emergenti (o emersi) stanno avendo sulla vita culturale. Inizierò dal punto di vista critico di Turkle che si riferisce alla progressiva alienazione che stanno vivendo adulti, adolescenti e bambini. Inizio il mio ragionamento su una domanda che Sherry Turkle si chiede alla fine del discorso fatto su TED: 'ci sono modi in cui la tecnologia può riportarci alle nostre vite reali, ai nostri corpi, alle nostre comunità, alla nostra politica, al nostro pianeta?'. Per rispondere a questa domanda, in primo luogo parlerò delle ipotesi iniziali di "luoghi digitali" per capire se le teorie sono ancora valide.

Quindi, cercherò di capire l'uso delle reti (digitali) come una strategia in architettura e design nei

progetti comunitari. Successivamente, continuerò la discussione sul ruolo della partecipazione nel processo di progettazione.
Nella conclusione del documento, confermo che la tecnologia (computazione e social media) può essere utilizzata dai progettisti per riportare le comunità nella loro vita reale e migliorare l'impegno e la coesione sociale.

Introduction

One of the advantages that has resulted from the growth of the internet is its ability to help people overcome their loneliness by meeting and interacting with other people on social media. This is because it provides a platform where someone will always be heard by others and in doing so it creates the perception that someone is never alone. However, the ease with which a person can feel connected to others has led to the loss of the ability of people to withdraw into solitude. Solitude enables a person to gather themselves but technology has created the idea that to be alone is to be lonely as loneliness is a problem which can only be solved by technology. Social media has managed to integrate itself into the lives of many particularly teenagers and they find it difficult to unplug as it is now a key element of their social life. This social life is as a result of the virtual communities that are formed on the internet and as a result, the internet can be said to be eroding cultural life as people seem to prefer interacting with their visual communities rather than their real life ones (Turkle, 2011).
Turkle is, however, optimistic about the potential benefits of the computation as it can be used to connect people in a way that will bring them together as a community. Unfortunately, this is dependent on how the particular user uses the computer. Social media has particularly had a mixed impact on politics as it is difficult to develop empathy for a community via the computer yet this would easily be developed by visiting and interacting with the community physically. The satisfaction of being heard by others tends to stop people from taking real action and they fail to realize that what would be an even bigger feeling is their participation in the real world by going to the streets. However, this is not to say that the internet cannot connect people as a community. Manuel Castells (2015) in his book Networks of Outrage and Hope, documents a number of social movements from all over the world that began and were supported on the internet. They brought together strangers into a virtual community online for different causes and later on these became real life communities as the people jointly took to the streets to advocate for various changes. Examples include; The Arab Spring, Occupy Wall Street, and the Egyptian Revolution.
Because of the challenges posed by the internet in eroding cultural life by reducing sociability, it is now necessary to provide places where people can socialize without the aid of a digital device. Such places already exist in the real world such as parks and cafes but they have failed to adapt to the expectations of the current generation. These are expectations which have been influenced by the Digital Age and the internet still remains the best place for socialization since it meets these expectations albeit its virtual nature. Architects can provide the solutions to this problem by redesigning these community socialization areas to encourage more socialization by integrating digital networks as a design strategy as well as involving the community in the design process. The use of technology by designers should be able to bring back communities to their real life and

enhance social commitment and social cohesion.

Connected, But Alone?

Sherry Turkle (2012) concludes her presentation by questioning whether there are means through which technology can reconnect people with their real lives, bodies, communities, politics and the planet. Her question is derived from her talk where she points out the adverse effects that have resulted from people's increasing reliance on devices. These devices have been instrumental and successful in providing increased opportunities for people to connect that were not possible before. However, this increased connection is also increasing the levels of loneliness experienced by people. She raises a number of points to explain the cause of this feeling of loneliness. One of the main points is that people are afraid of intimacy and as a result, technology appeals to them as one can derive a sense of companionship that does not come with the demands of friendships through interactions on digital platforms. The appeal to the online world when seeking for a companionship results from three factors:

- A person can customize their digital experience to suit them and, therefore, the person can focus their attention on only what interests them.
- The online world presents a forum where the person is assured of an audience.
- The online world creates the perception that the person will never be alone.

When Turkle asks the question, she is acknowledging that the integration of these devices into people's lives has altered how they view their bodies, real lives, communities, politics, and the planet. Before the diffusion of the internet, the public perception of beauty was drawn from the media. Then, the pressure to conform to these standards was not great as people interacted with limited a number of people. Nowadays, social media provides a platform where people expose themselves to the world through photos, they post online, and invite criticism from a large number of people that they probably does not know. People have developed a trend where they tend to seek out comments on their looks from their social media followers and in order to please them so as to get positive comments. As a result, they tend to digitally alter their photos to conform to the set standards of beauty. The growth in this trend can be seen in how smartphone manufacturers are now including a wide range of filters to their cameras which hide the flaws a person perceives to have before they post their photos online. As a result, there is an increase in the incidences of body anxiety as more people attempt to attain the one body type which is perceived as the most beautiful (Roxy, 2014).

Turkle also notes that technology has become increasingly integrated into people's lives to the point where things which were unacceptable within communities are now the norm. She provides examples of people checking their emails during meetings or friends who meet up but rather opt to spend their time on their phones. Communities tend to develop out of a sense of togetherness such as being related leading to a family or living in the same area leading to a village. As a result, communities in the offline world tend to be imposed on a person and members of a community may not share similar opinions or values. The internet has led to the development of virtual communities that have changed the perception of how communities work. Fuchs (2008) notes that virtual online communities are founded on shared values, togetherness, unity, solidarity, and shared

identity and understanding. They differ from traditional communities as their members are able to maintain their anonymity to various levels and consequently they can build different identities of themselves that differ from their real ones. Relationships develop faster in these communities due to the increase in projection, people have increased opportunities to reflect on their reactions, there is increased expression, and the membership of the community is flexible as people can join or leave at their pleasure.

Technology is also changing how politics works as average citizens are now finding themselves with more power to influence policy changes from the government. This is through the formation of social movements that seek to connect their supports to the real world by involving them in decision making processes as well as overcoming and obstacles that may inhibit the participation of their targeted members such as poverty of time-constraints. The social movements unite people who share a common cause and maintain this unity by avoiding controversial issues. Through the internet, they are able to disseminate the idea that they are comprised of ordinary citizens who are stepping up to the elite Washington insiders (Rohlinger, Bunnage, & Klein, 2014). In their research, Kruikemeier, Noort, Vliegenthart, & Vreese, (2014) find that political internet use tends to positively influence political interest and voter turnout particularly among people who have lower levels of political interest. This change is occurring because technology is providing people who previously felt politically marginalized with the opportunity to meet and form communities with similar-minded people and through their unity they are encouraged to take action politically for what they believe in.

It is evident that technology is changing the nature of social interactions. The past few decades have seen the rapid development of technology such as the internet and this in turn has rapidly changed the manner through which people interact socially thus making it seem as though there is an ongoing erosion of sociability. While technology has rapidly developed, the other structures that support social interactions within communities have been slow to accommodate these recent developments. In previous technological developments such as the development of electricity, structures such as homes have been modified to integrate these developments into them and enhance social interactions. The next sections will, therefore, be looking into the possibility of whether designers can modify their understanding of how structures work by integrating recent technological developments so as to enhance their capacity for enabling real life social interactions within communities.

Early Assumptions of 'Digital Places'

Thomas A. Horan in his book, Digital Places: Building Our City of Bits, provides an early interpretation of how society is affected by technology and the effect it has on the built environment. He is particularly interested in the rise of the cyberspace and inquires how it is connected to the physical world of brick and mortar. He also asks how digital environments can transform, facilitate, and change the interactions between people and the built environment (Horan, 2000). This book was written at an early stage of the Digital Age and in it Horan presents a number of theories on how the physical world can be redesigned to enhance the ability of the digital world to connect communities.

Horan begins to develop his argument from William Mitchell's (1999) argument that the revolution

result from digital networks will lead to the recreation of places and surrounding by people as well as the strengthening of communities at both the local and regional levels. He then reviews some dystopian views which suggest that there is a growing detachment between public spaces and social life. He notes that the emerging virtual spaces at the time such as digital forums and chat rooms have been occupying a passive observance role in the design process and he moves forward to provide an early key approach to ensure they have an active role in the design and development of digital places. By writing about this, Horan suggests that technology does not foster isolation but instead it is an element that encourages development. Therefore, digital networks should be considered to be a new dimension of public space and can cooperate and be utilized to support physical space.

Horan also considers the quality of architectural surroundings in defining the sense of the environment. The surroundings in addition to the ability to move through space are defined as elements which affect the person's experience in an environment. These are the elements that give a space its social power and Horan argues that they are being replayed in technology's domain. He also points to placemaking which is an interactive and deliberative process whereby communities, settings, and cities undergo constant reinvention based on a complex interweaving of culture, economics, technology, and circumstance (Horan, 2000). He concludes the discussion of this point by asking how technology can be incorporated into the various placemaking activities.

Manuel Castells (1999) developed a theory on the Fluidity of Space which assumes that in a technology society, spatial form reflects social practice. This is acknowledged by Horan in his book as he determines that the correspondence between building function and building typology is continually becoming looser. This is contrary to Lewis Mumford's (1961) that the setting of a space should serve to reinforce the activities that occur within it. Castell believed that in the future, places and flows would no longer be separated and instead, the geography would result from the interface between flows and spaces, social interests and cultures, the space of places and the space of flows (Castells, 1999).

Another point that Horan argues in his book is that as the digital age advances, the need for meaningful well designed places will gain even more importance. He notes that digital technology is encouraging workers to combine their work and living spaces in one structure. This is a return to what was the norm in the 19th century where a person may have dedicated the lower floor of their home as their work space while the upper floor would be their residence. He then reflects on Ray Oldenburg's (1999) point of view that "third places" such as parks, barber shops, and cafes are the site of vital social relationships as these augment the work and home settings and their importance arises from enabling people to have a real-time personal exchange in the absence of digital devices. He, therefore, theorizes that successful digital places require to have a strong and parallel link to the local and physical communities.

In the final chapter of his book, Horan begins by summarizing his arguments and then suggests a series of practical actions to build communities through the use of physical connectivity. His seven-point plan of action centers on e-commerce, government accessibility, working from home, and connected learning communities. He calls for institutions not to be treated as stand-alone entities. He also foresees digital activities and technologies leading to the evolution of physical

space and human activities and he acknowledges the importance of physical design in creating the circumstances that will facilitate various social and community connections.

Since 2000, there have been further technological developments and their greater integration into people's lives thus creating a different reality from when Horan first postulated his theories. Despite this, his theories can easily be modified to today's realities therefore making them valid as the concerns he raised initially still remain actual in this time. There is the need to integrate technology into our physical spaces so that it no longer fosters isolation but is an agent for development, to incorporate technology into the process of placemaking, to integrate the digital space with the physical space, and to design spaces where people can have personal interactions outside their home and work spaces.

The Use of Digital Networks as a Strategy in Architecture and Design in Community Projects

Digital networks have been influential in transforming the cultural life of societies because they offer people increased opportunities to connect with others. This is in comparison to the "third spaces" which do not appeal to everyone as they tend to be rooted in territorial, historical, and cultural contexts in what is referred to as the space of places. The space of flows, on the other hand, advocates for globalization and this requires territorial, cultural, and historical contexts to be uprooted from the places (Castells, The Rise of The Network Society, 2000).

In our societies, power is currently organized in the space of flows and those in power seek to develop a networked and ahistorical space of flows that seeks to impose its logic over unrelated, segmented, and scattered places that are unable to share cultural codes. However, people still live in places and the space of places is in direct confrontation to the space of flows due to its advocacy for localization. The resilience of the space of places from the pressure imposed on it by the space of flows can be seen from case study of the city of Tokyo following its urban restructuring in the 1980s. This was done with the aim of transforming Tokyo into a "global city" and this included to the loss of the Japanese identity the city previously held. However, the first cracks in this move began to emerge when the city government opened a historical museum in 1993 celebrating the virtues of the pre-globalized Tokyo. The citizens of Tokyo began to complain about the reduction of their everyday spaces to conform to the logic of the global city and they actively campaigned for the "Japanization" of what they now considered to be Western city. The city government planned the celebration of a World City Fair in 1997 that was to be commemorated with the construction of another major business complex in land that had been reclaimed in Tokyo Harbor. The corporate elite expressed satisfaction with this as they were the ones to most benefit from the Fair based on them being awarded the construction contracts of the complex. However, the locals showed their dissatisfaction with the project by electing to be the governor of Tokyo Mr. Aoshima, a comedian and an independent candidate with no backing from financial circles or political parties, based on his single agenda of cancelling the World City Fair. A few weeks following his inauguration he followed up on his campaign promise by cancelling the World City Fair, a move which shocked the global elite (Castells, The Rise of The Network Society, 2000).

What this case shows is that the space of flows should not be utilized to disconnect the local communities from their place by disconnecting them from their culture. Doing this will create a conflict between the space of flows and the space of places and this has the risk of either fully

eroding the cultures of communities. It will also decrease social cohesion as it will lead to two irreconcilable parallel universes comprised of these two forms of spaces.

Despite the increasing levels of digitization in people's lives, it is unlikely that digital networks will come to replace physical structures even where the activities which are conducted in a physical location can be conducted virtually. Education is a field that has faced an immense integration of digital networks into its operations and now it is possible for students to receive their education virtually aware from the physical schools and universities. It may seem that this will lead to a demise of the importance of schools and universities but current trends show a paradox where the physical nature of the schools and universities remain unchallenged by the allure of online education. Schools serve a greater purpose than being learning centers as they are also children centers that allow parents to gain some freedom each day from their children. Distance learning would be frustrating on the parents who would now have to supervise their children all day without any breaks. At the university level, distance learning has faced mixed reviews but it always falls short of the face-to-face education that is conducted at a physical university because face-to-face education is regarded as being more intense (Castells, The Rise of The Network Society, 2000).

It is therefore evident that digital networks cannot replace the space of places as the main point of social interaction. Designers and architects can, therefore, draw lessons from the university example on how to reinterpret the nature of community projects and design them in a manner that integrates both the space of flows with the space of places. The future of the university does not solely lie within the space of flows (online learning) nor within the space of places (traditional classrooms) rather it lies in the delicate interaction of the two that involves networks of classrooms' sites, nodes of information, and student's individual locations. Even as the digital networks gain increasing significance in community life, it will be necessary to use the space of places to deliberately build physical, cultural, and political bridges between the networks. This is the role bestowed upon architects as it is their role to design community projects which serve as these bridges.

Robert Atkinson (1998) researches further on how technology can be utilized to improve urban conditions. He recognizes that the IT revolution has a huge part to play in revitalizing disadvantaged communities in America. As history has shown, failing to adapt to various epochs of technological developments usually leads to the stagnation or failure of cities while cities that choose to adapt often end up growing and prospering. The influence of the internet in eroding cultural life is already a sign of the disconnection that is occurring as a result of community structures no longer catering for the needs of the community. Some possible strategies that Atkinson suggests to integrate digital networks into the design of communities include the electronic delivery of public services, intelligent transportation systems, video surveillance for public safety, and telemedicine. All of this have the potential to enhance social cohesion and commitment in the community if utilized by architects. A public park which serves as an intermediate as a "third place" from the work and living places provides opportunities for social interactions yet it may also inhibit this when ridden with insecurity as parks also serve a prime locations for criminals. The integration of video surveillance in the design of such public places that is reliant on digital networks to transmit information from the park to law enforcement agencies will boost public confidence to utilize the facility. Hospitals in disadvantaged communities may not have access to be best trained

personnel and the local community may end up losing faith in the abilities of the facility to cater for their needs. For architects, integrating digital networks into the designs of hospitals will enable telemedicine to occur where an experienced surgeon in a remote location will be able to guide his less experienced colleague in performing a surgery thus improving the success rates within the hospital. The integration of digital networks into the functioning of this and other community projects is necessary in this digital age if architects are to help prevent the cultural erosion that results when the space of flows is allowed to run parallel without being bridged to the space of places.

The Evolved Role of Participation in the Design Process

So far, this paper has established the importance of the architect in designing community projects that seeks to reconnect communities to their real lives and enhance social commitment and social cohesion. To do so, architects require to understand the community in depth so that the solutions they develop in their designs become applicable to the community. as a result, the design process has changed over time from a point where the architect's focus was on the function and nature of the building, to its usability which was determined in different ways of testing the users, studying various ways in which the users use the facilities, and getting input from potential users by involving them in the design process (Telier & ATELIER (Project), 2011). Some of the approaches used in getting input from the potential users include:

- User-centered design: This approach focuses on the usability and use of the building.
- Contextual design: This approach focuses on the situatedness of use.
- Experience design: This approach seeks to create some form of experience for the user.
- Participatory design: This approach seeks to include potential users in the design process as co-designers (Telier & ATELIER (Project), 2011).

Participatory design is an interest as it believes that the users of a facility have the right to be involved in its development and their inclusion into the design process helps to foster a senses of ownership and commitment towards guaranteeing its success while also promoting social cohesion as the members of the communities work together towards building the project. This approach is useful to architect as they are able to anticipate the different effects the completed project will have on the local community and, therefore, they are able to minimize the possibility of its failure while seeking to maximize the potential positive effects wit will have on the community.

Conclusion

The onset of the Digital age led to a disconnect between people and their real lives as the virtual world became more enticing due to various factors such as offering people the freedom to choose their communities, to be heard at all times and to never feel alone. It is, however, necessary to stop the erosion of human culture and encourage sociability but since technology cannot be scrapped away from people, it is necessary to develop ways through which architect can integrate it into their designs. Human socialization depends on spaces that encourage it to occur, for this reason, integrating digital networks into their designs can improve them to the point where they will provide similar qualities to facilitate social interactions that people have come to expect from the internet.

The importance of integrating the real world with digital networks is to ensure there is harmony between the two so people can gain the best of both world rather than have a situation where there is a complete erosion of cultural life as we know it and the loss of social cohesion due to the development of two irreconcilable parallel universes comprised of these two forms of spaces.
It is evident that these "third spaces" such as parks and cafes which facilitate socialization are here to stay and it is up to architects and designers to determine how to maximize their effectiveness in promoting human socialization. An effective way of doing this is incorporating the potential users into the design process. Just as technology has the capacity to erode culture, it can also facilitate and improve the existing cultures if properly integrated into it. Designers, therefore, have a crucial role in integrating technology (computation and social media) into their designs to reconnect communities to their real lives and enhance both social commitment and social cohesion.

References

R.D. Atkinson, *Technological Change and Cities,* in *Citiscape: A Journal of Policy Development and Research, 3*(3), 129- 170, 1998

M. Castells, Grassrooting the Space of Flows. *Urban Geography, 20*(4), 294- 302, 1999.

M. Castells, *The Rise of The Network Society.* Oxford; Malden, MA: Blackwell Publishers, 2000.

M. Castells, *Networks of Outrage and Hope: Social movements in the internet age.* Cambridge; Malden, MA: Polity Press, 2015.

C. Fuchs, *Internet and Society. Social Theory in the Information Age.* New York: Routledge, 2008

T.A. Horan, *Digital Places: Building Our City of Bits.* Washington, D.C.: ULI, 2000
- the Urban Land Institute.

S. Kruikemeier, G.V. Noort, R. Vliegenthart, & C.H. Vreese, Unraveling the effects of active and passive forms of political internet use: Does it affect citizens' political involvment? *New Media & Society, 16*(6), 903-920, 2014

W.J. Mitchell, *E-topia: 'Urban Life, Jim--but Not as We Know It.',* 1999 Retrieved from http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S 978026227963

L. Mumford, *The City History: Its Origins, Its Transformations, and Its Prospects.* New York: Harcout, Brace & World, 1961

R. Oldenburg, *The Great Good Place: Cafes,Coffee Shops, Bookstores,Bars, Hair Salons, and Other Hangouts at the Heart of a Community.* New York; Berkeley, Calif: Marlowe; Distributed by Publishers Group West, 1999

D.A. Rohlinger, L.A. Bunnage, & J. Klein, Virtual Power Plays: Social Movements, Internet Communication Technology, and Political Parties. In B. Grofman, A. H. Trechsel, & M. Franklin, *The Internet and Democracy in Global Perspective* (pp. 83-109). New York: Springer, 2014

P. Roxy. *Does social media impact on body image?* Retrieved from BBC: http://www.bbc.com/news/health-29569473, 2014

A.Telier, & ATELIER (Project). (2011). *Design Things.* Cambridge, MA: MIT Press.

S.Turkle, *Alone together: why we expect more from technology and less from each other.* New York, NY: Basic Books, 2011

S.Turkle, *Sherry Turkle: Connected, but alone?* Retrieved from: https://www.ted.com/talks/sherry_turkle_alone_together, 2012

The story of a construction site, the recovery of an Identity. The case of "QUARTIERE GALATA" in Genoa

Daniela Pittaluga
Department Architecture and Design DAD (University of the Study of Genoa)
email: daniela.pittaluga@arch.unige.it

Abstract

How much historical material traces of architectural artefacts and / or infrastructures help in the perception of the identity of a place? How material data must be supported by an adequate storytelling in order to be understood and respected? How much a single artifact conservation event can help in a wider scope process, creating a positive impact on a territorial scale? How should this information be transferred in multiple channels and approaches to be understood by everyone?These are some of the questions we will try to answer in the article proposed for the conference. "Quartiere Galata", now home to "MUMA, "Sea and Navigation Museum", is a section of the historic arsenal of the Republic of Genoa, a seventeenth century expansion of pre-existing masonry arsenal named "Arcate Vecchie" ("Ancient Archs"), transformed and modified over the centuries. In the 2000s, when the area was transformed into a museum pole, there were no more visible traces of the historical arsenal, and everybody thought it had been lost. On the contrary, a wise diagnostic analysis prior to intervention and a tight control during the construction itself, performed by the writer with the collaboration of the students of the School of Specialization in Architectural Heritage and Landscape, have found that more than half of the current volume originates from the seventeenth-century arsenal. The container therefore becomes highly significant for the role it had been chosen for, the new Sea and Navigation Museum. Therefore placing this museum exhibition in a structure where historically boats were built and repaired has a unique value, unique even compared to the many Sea Museums scattered in different countries.Today, after several years from Sea and Navigation Museo opening, a discussion is ongoing about its central role in the port and its relationship with other surrounding historical artifacts closely linked to it, like the "Commenda di Prè". This brought us to reconsider how the history of this building has been communicated, with a new vision that is based on the restoration yard image.

Abstract

Quanto le tracce materiali storiche di manufatti architettonici e/o di infrastrutture possano aiutare nella percezione dell'identità di un luogo? Quanto il dato materiale debba essere supportato da una adeguata narrazione al fine di poter essere compreso e rispettato? Questi sono alcuni degli interrogativi a cui si cercherà di dare risposta nell'articolo che si propone per il Convegno.

Il Quartiere Galata, ora sede del Museo del Mare e della Navigazione è, di fatto, una parte dello storico arsenale della Repubblica di Genova. Costruito nel XVII secolo venne nei secoli più volte trasformato e modificato. Una sapiente analisi diagnostica preliminare all'intervento del restauro degli anni 2000 ed un serrato controllo durante il cantiere stesso, eseguito da chi scrive con la collaborazione degli studenti della Scuola di Specializzazione in Beni Architettonici e del Paesaggio, hanno rilevato che più della metà del volume attuale è costituito dall'arsenale seicentesco.

Il contenitore dunque diventa altamente significativo per ciò che vi è contenuto: nel complesso infatti si era stabilito che vi dovesse essere posto il Nuovo Museo del Mare e della Navigazione. Posizionare dunque tale esposizione museale in una struttura in cui storicamente le imbarcazioni venivano costruite e riparate ha un valore unico (unico anche rispetto ai molteplici Musei del Mare sparsi in diversi paesi). Oggi, a distanza di diversi anni, dall'apertura del Museo del Mare e della Navigazione si sta ripensando al suo ruolo centrale nell'arco portuale e alla sua relazione con altri manufatti storici dell'intorno strettamente legati ad esso (un esempio per tutti la Commenda di Prè). In quest'ottica, dunque, si sta ripensando ad una più efficace comunicazione di tale complesso partendo proprio dalla narrazione del cantiere di restauro.

Introduction

The "Quartiere Galata", now Sea and Shipping Museum site, is in fact a part of the historical Arsenal of the Republic of Genoa. Built in the XVIII century as an expansion of the Arcate Vecchie (the first Genoese masonry arsenal), it was transformed and modified over the centuries. In the 2000s, when the area was transformed into a museum pole, it was thought that there were no more material traces of the historical arsenal. On the opposite, a thorough preliminary diagnostic analysis on the intervention and a tight control during the construction itself, performed by the writer with the collaboration of the students of the School of Specialization in Architectural Heritage and Landscape, have found that more than half of the current volume part of the XVIII century arsenal.

The analysis, before and during the construction, allowed to trace the whole history of this building: built as an Arsenal to build ships for the Genoese Republic (but not only)[1], it then became the Freeport and currently the Museum. Its history, therefore, is emblematic of the city itself: a city first projected on navigation, then on trade and which now discovers a tourist vocation.

[1] "*Dal secondo Cinquecento la costruzione di Galee Pubbliche, che generalmente riguardava almeno due scafi contemporaneamente, fu concentrata nell'Arsenale di Genova, che lavorava anche per privati genovesi e per committenti stranieri: il pontefice, il duca di Savoia, la Spagna. L'Arsenale secentesco [il Galata, n.d.r.] disponeva di un capo-maestro fisso, di un responsabile organizzativo ("soprastante") e di un magazzino per i legnami, rifornito sia attraverso acquisti all'estero sia con prelievi periodici dai boschi liguri"* Cfr. VARALDO GROTTIN 1996, pp.46-47.

Fig. 1 The "Galata" today

Fig. 2 The "Galata" in 1910

Methodology

Galata: the storytelling of a construction site.

In November 1999, an international competition for the recovery of the "Quartiere Galata" was launched: it was intended to make it the new MUSEUM OF THE SEA AND NAVIGATION. The Spanish architect Guillermo Vàsquez Consuegra was the winner. The architect Consuegra immediately imposed a diagnostic knowledge campaign[2].

In this phase, stratigraphic analyzes was started, where visibility conditions allowed. A careful observation of the US (stratigraphical units) present allowed to discover on the west walls the presence of brick arches that are associated with the primitive XVII century structure. These first indications were incorporated in the drafting of the restoration project of the complex.

When the site was opened, there was an additional research[3] task to monitor and a "built-up archaeological study" to be carried out at the same time as the progress of the works on site. Thanks to a careful study carried out throughout the year 2002 and 2003 it was possible to have a precise picture of all the historical transformations of this impressive structure. *" E' proprio durante questa fase che un'analisi particolarmente accurata, che ha a disposizione tutti i dati delle precedenti campagne di studi, che segue con assiduità ogni ritrovamento che emerge dal cantiere, riesce a mettere a confronto i dati desunti dalle fonti iconografiche e scritte con quelli derivati dall'analisi diretta. E' da questa visione "allargata" che emerge, nella sua completezza, la struttura seicentesca dell'Arsenale, fino ad allora ritenuta scomparsa"*[4].

The archaeological analysis of the elevated building revealed the original XVII century structure of the shipyard, called "Arcate Nuove" (i.e. New Arcades), as it was described in ancient documents. The pillar and arch structure was completely hidden by later parts of the building and it was presumed completely lost. There are 45 pillars (70x150 cm wide, 8 metres tall) in marly limestone blocks, in 5 rows of 9 pillars each. Each pillar is connected to the next by a 4 m. wide brick

[2] The writer took part in this campaign as a scientific director for the part of "built-up archeology".

[3] The scientific director of this research is Daniela Pittaluga, collaborators Andrea Canziani, Lorenza Comino, Roberto Ricci. There is also the continuous support of ISCUM (Institute of History of Material Culture) for the analysis of ceramic fragments and woods (in particular the dendrochronological and the dendrological analyzes).

[4] Cfr. Pittaluga, Canziani 2005, p.127.

arch, and to the facing one by a wider 9 metres one. The structure is similar to other shipyards from the same period. This structure was absorbed in the second half of the XVIII century by a continuous one: stone and brick walls with barrel vaults in stone splinters; giving rise to four levels of large galleries, more than 50 metres long with large stone vaults, 9 metres wide. Archaeological investigation revealed the building transformations, through a rigorous survey of the structure and scientific analysis (mensio-chronology, walling techniques, dendrology, dendrochronology, mortar mineralogy and petrography)[5]. Precise interpretative hypotheses were made, by intuition, on structural systems over the centuries; however, these hypotheses were later supported by the results of a structural model of the building.[6]

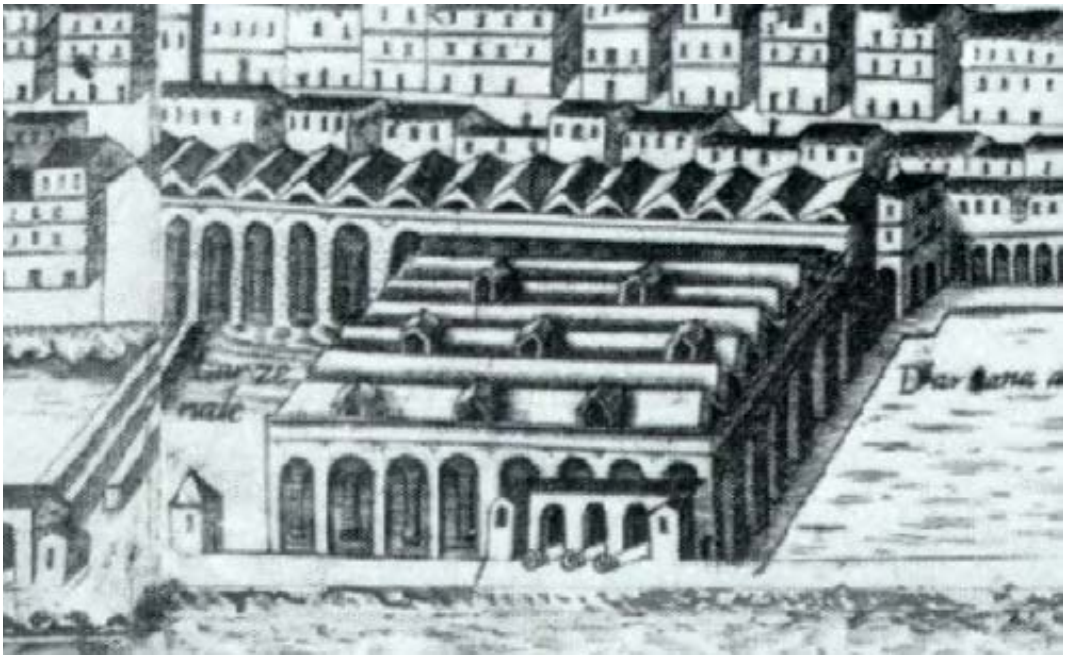


Fig. 3 The "arcate nuove" (foreground), and the "arcate vecchie" (background) in a copper engraving by Baratta, 1637

This is the story of the construction site; this is what we have acknowledged through the construction site. Following these results also the designer, the architect Consuegra modified in part the project of the Museum: he realized that also the "container", in this area, was highly meaningful (in fact the volume of the XVII century Arsenal of the Genoese Republic was found). The new project left some walls still visible, in particular those of the main room in which the 1: 1 model of a historical "galera" (historical Genoese boat) was planned for the museum layout. In his intention the sight of this wall with all the historical traces would have allowed to understand the complex life of this building. The objectives were achieved but only partially. The simple sight of the wall does not automatically let people understand the meaning of this story; this story can be understood, however, very well if in front of this wall someone explains the meaning of these traces. Therefore, a series of different ways are being studied to increase this communication, extending it to different age groups.

[5] Cfr. Pittaluga 2009 a e Pittaluga 2009 b

[6] Cfr. Calderini, Canziani, Lagomarsino, Pittaluga 2006

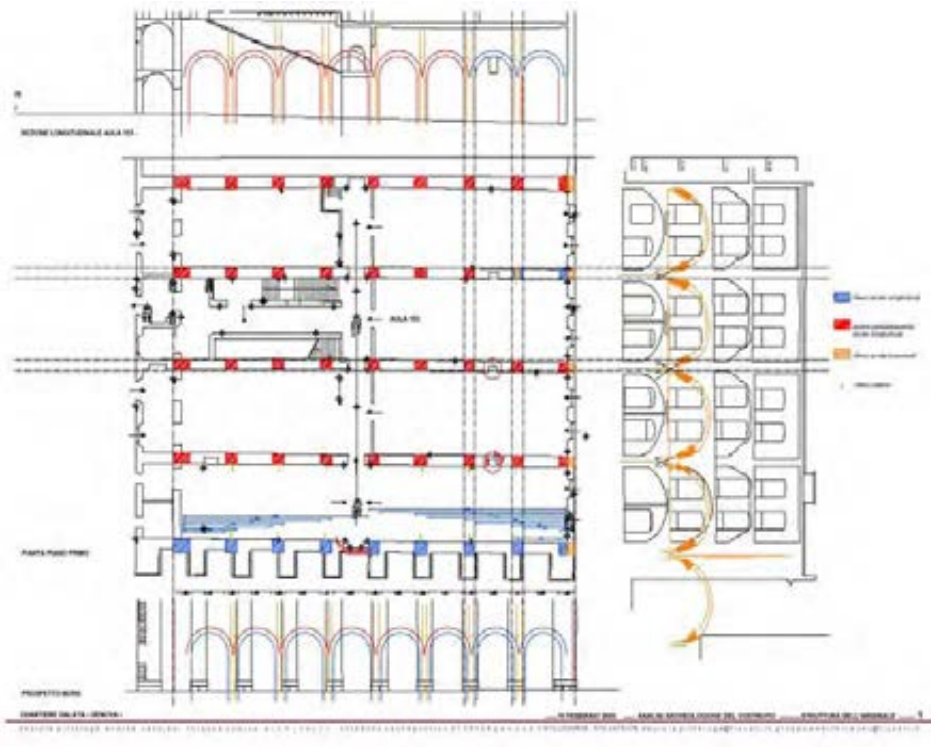


Fig. 4 The "arches-and-pillars structure detected during restoration yard in early 2000s.

Figg. 5 - 6 The "arches-and-pillars structure in current museum set-up.

Beyond the Galata Museum: Genoa, a medieval port city with three highly specialized Poles

There are traces of the port of Genoa; there is not only the " Quartiere Galata" but it can also became the fulcrum of a wider narrative.

Alexander Gardini and Danilo Cabona[7] write "The port was the main engine of economic life and already at the end of the XVIII century the Magistrate" Salvatores Portus et Moduli ", was established, they were in charge of the construction and improvement of piers and ports for the landing of ships ... .The "Salvatores Portus et Moduli", with a vision that far exceeded their reality for some centuries, planned the exploitation of the port territory and of the adjacent city by dividing it into three large specialized poles that would have characterized the port arch to this day ..."[8]

Fig. 7 Traces of ancient piers, difficult to be understood today

1) Pole related to commerce, from the "Molo Vecchio" to the city gate of Santa Fede ("Porta dei Vacca") with wooden piers on the sea and warehouses of goods ("emboli", "vaults", "rebe") in houses overlooking the sea,

2) Pole for "Riparazioni Navali", from the City Gate of Santa Fede to the Acquaverde creek (the area in front of the village of Pré) with the "Arsenale" plant[9]. This arrangement lasted until 1881 when the military Arsenal was transferred to the Gulf of La Spezia; in the area left vacant, the municipal dock was built at the end of the 19th century, using the only preserved building of the

[7] Both members of ISCUM and collaborators of Tiziano Mannoni actively collaborated in the seventies on studies on the Genoese port

[8] Cfr. VARALDO GROTTIN 1996, p. 102

[9] "…*La scelta di costruire le darsene del vino e delle galee e l'impianto dell'Arsenale nella zona antistante il borgo di Pré fu forse motivata da due fattori: 1) era un'area fuori della città fortificata non molto urbanizzata e perciò non consigliabile per le strutture di un porto commerciale che aveva bisogno di aree attrezzate, sicure e ben protette; 2) come periferia era più adatta per impiantarvi uno "stabilimento militare" difeso da mura e torri"* Cfr. VARALDO GROTTIN 1996, p.104.

ancient Arsenal, the so-called “Galata”,

3) Beyond the Acquaverde creek there was the third port, the one that today is called “cruise terminal” and that in the medieval period was used by crusaders and/or pilgrims. The Commenda, a hospice for pilgrims heading to the Holy Land run by the Gerosolimitani, dates back to the 12th century. The COMMENDA was on a precise road axis that led from the coast to the Po Valley (from the city gate of Santa Fede it went to the ascent of the Angels and from there to Tortona through the pass of Crocetta d’Orero). The Commenda included the hospice on the ground floor and a landing place for pilgrims seeking boarding for the Holy Land; the pilgrims housed inside the Commenda through a special tunnel, located in a corner of the hall located in a corner of the living room on the ground floor, they could access a subterranean gallery through for which they arrived at a drop placed in front of the Commenda itself and here they could embark on the ships that would carry them to the Holy Land.

The “first Port Pole” is actually the one that has undergone more transformations than the others; fragments of the ancient piers are still visible today in the underground parking lots.

Even in the “second Port Pole”, underwent which changes: for example, the “Arcate Vecchie”, are no longer visible, but the New Arcades still are.

Testimony of the “Third Port Pole” is the Commenda, a building restored years ago, which now houses several functions and events.

Fig. 8 The “ancient arches”, not visible any more today

Fig. 9: The “Commenda di Pré”today

Conclusion

So we now try to answer the initial questions:

How much do the historical material traces of artefacts and / or infrastructures help in the perception of a place? How much the material data must be supported by an adequate narration in order to be understood and preserved?

How much can a single event of conservation of an artifact help in a process of wider scope and can create a positive impact on a territorial scale?

How should the transmission of information be conveyed in different ways and approaches to be understood by everyone?

The experience made at the "Quartiere Galata", even if susceptible to improvements, provided a precious teaching: often the material traces are there but we must know how to identify and understand them. Only in this way are can they be preserved. It is necessary, however, that this understanding is not limited to a few experts but that it is available within everyone's reach. Everyone must be able to understand the different meanings of this story written in the stones. It is clear that more and more designers and administrators have to make the effort to adapt messages to different users. Technology can be a big help. Another lesson that has been drawn is this: it is possible that the "Quartiere Galata" as the current Museum Pole becomes the engine for a wider territorial range. It could indeed be a good thing to make people understand, through the " Quartiere Galata", the THREE PORT POLES organization mentioned above. The traces of the different structures, scattered here and there, would then acquire meaning and value ... and they would also be more respected than we do today. To do all this is not only a matter of financial resources but also of will, creativity and knowledge how to intercept the potential that are already present at all levels but that must be coordinated and put into a system. We, therefore, hope that in the near future we can move from the story of a construction site to the story of a meaningful part of the city.

At this point we can say that yes, the historical material traces of both artefacts and structures can be helpful in the perception of a place; however, it is necessary that this understanding to be possible, there must be elements to help in this understanding.

References

C. Calderini, A. Canziani, S. Lagomarsino, D. Pittaluga, Structural Framework from the Seventeenth to the Twentieth Century in the Genoa Republic's Shipyard. Architectural Archaeology Investigates the Layers of the Structure, in "Proceedings of the Second International Congress on Construction History", Queens' College, Cambridge University 29th March-2th April 2006, Construction History Society, Cambridge 2006, pp.473-491

A.Canziani, T.Mannoni, D.Pittaluga, Dati storico-archeologici dell'arsenale di Genova. Dal sottosuolo all'elevato, in D.J.Blackman, M.C.Lentini, "Ricoveri per navi militari del Mediterraneo antico e medievale", Edipuglia, Bari 2010, pp.163-184

D.Pittaluga, Questioni di archeologia dell'Architettura e Restauro, ECIG, Genova 2009 (Pittaluga 2009 a)

D.Pittaluga, La mensiocronologia dei mattoni. Per datare, per conoscere e per comprendere le strutture storiche, ECIG , Genova 2009 (Pittaluga 2009 b)

D.Pittaluga, A.Canziani, L'arsenale seicentesco della repubblica genovese. L'impianto e le prime trasformazioni, in "Archeologia dell'Architettura", n. X, All'Insegna del Giglio, Firenze 2005, pp. 125-151

F.Varaldo Grottin (a cura di), Archeologia del commercio. Porti antichi, Sagep, Genova 1996

From crusades to regattas the representation of the four maritime republics: between historical event and communication

Martina Capurro
Department Architecture and Design DAD (University of the Study of Genoa)
email: capurro.martina@gmail.com

Abstract

"... The famous city-states that, with their deeds, broke the darkness of the so-called *dark ages"*
Gino Benvenuti

Genoa, Amalfi, Pisa and Venice: from the medieval maritime traffic to the event that for a day the year recalls the history, the deeds and the conquests of the main Italian maritime republics. The event, held annually and in rotation in the four republics since 1955, has two main focus: the historical re-enactment realized through the staging of a historical parade composed of about 300 participants from the various delegations, able to show the habits and customs and the prominent figures typical of the period of maximum splendor of the four cities; and the sporting competition, carried out by professional athletes on four galleons - reference to the ancient boats on which the republics used to challenge each other by sea, in decidedly more warlike contexts.

The research aims to deepen the methodologies of representation of the event in question, focusing on the theme of forms of visual communication used during the event - from graphics on paper and online media, to the coordinated image that each republic proposes from year to year - with emphasis on strengths and weaknesses that the communication apparatus proposes, focusing mainly on the visual communication apparatus proposed in the last decade**.**

Abstract

"...Le celebri città stato che con le loro gesta squartarono le tenebre dei cosiddetti secoli bui" (Gino Benvenuti)

Genova, Amalfi, Pisa e Venezia: dai traffici marittimi medievali alla manifestazione che per un giorno l'anno rievoca la storia, le gesta e le conquiste delle principali repubbliche marinare italiane. La manifestazione, a cadenza annuale, tenuta a rotazione nelle quattro repubbliche a partire dal 1955, ha due focus principali: la rievocazione storica realizzata attraverso la messa in scena di un

corteo storico composto da circa 300 figuranti provenienti dalle varie delegazioni, atto a mostrare gli usi e costumi e le figure di spicco tipiche del periodo di massimo splendore delle quattro città; e la competizione sportiva, svolta da atleti professionisti su quattro galeoni -richiamo alle antiche imbarcazioni su cui le repubbliche erano solite sfidarsi via mare, in contesti decisamente maggiormente bellicosi. La ricerca intende approfondire le metodologie di rappresentazione dell'evento in oggetto, incentrandosi sul tema delle forme di comunicazione visiva utilizzate nel corso della manifestazione- dalle grafiche su supporti cartacei e online, all'immagine coordinata che ogni repubblica propone di anno in anno-, ponendo l'accento sui punti di forza e le carenze che l'apparato comunicativo propone, focalizzandosi principalmente sull'apparato di comunicazione visiva proposta nell'ultimo decennio.

Introduction

The research, developed in the context of events and cultural communication, aims to highlight the great historical and cultural heritage on which one of the main traditional Italian manifestations is based, the Regatta of the Ancient Maritime Republics, particularly interesting both for the double value of sport / historical event, both for the strong characterization given from time to time by the territorial context in which it takes note. Specifically, we intend to analyze, in addition to the historical component, the basis of the event, the communicative component, showing its strengths and margins for improvement.

The cultural event: from exhibitions to live art

In a panorama in which the society itself is organized "in the form of a show", citing Abruzzese[1], and where everything is spectacularized and made "an event", it is not at all easy to identify the concept of event, and therefore specify the cultural values; but at the same time this ambiguity turns out to be a fascinating terrain, "because it is increasingly evident to the observers of post-modernity that in the construction of an active metropolitan life the space of cultural events is resoundingly and undoubtedly growing[2]".

Starting from the origins, from Greek tragedy, to the games of imperial Rome, from medieval religious feasts, to the events of totalitarian regimes, "there are strong lines of continuity between the ancient event and the modern event. For example, the persistence of renewal of the citizenship contract, both in the Athenian aristocrat and in the Parisian "sanculotto", sanctioned by the power of representation. Or the exhibition of the nobles through strategic positioning within the choreography of the event. Passing through the unleashing of the fusion between pagan rituals and Christian liturgies in the Middle Ages, the cultural event comes baroque and opulent on the threshold of modernity. The French revolution links the cultural event to the ideals of equality, rewriting the social contract with the signing of new masses of workers[3]". The next step is the result of the Universal Expositions, secular temples, perfect stages in which to showcase technology, goods and entertainment, to which the masses responded by inventing

[1] cit. Abruzzese, pag 123, in: S. Cristante, N.Barile, "Breve storia degli eventi culturali", Bevivino Editore, Milano 2004
[2] pag 10, S. Cristante, N.Barile, "Breve storia degli eventi culturali", Bevivino Editore, Milano 2004
[3] pag 11, S. Cristante, N.Barile, "Breve storia degli eventi culturali", Bevivino Editore, Milano 2004

consumption.

"The cultural event is also a re-invention of society, a proposal and institution of new rules, new rituals, new utopian horizons[4]". [...] Contemporary takes on the value of a productive event, not a festivity but a festival, not a Universal Exposition but a Biennial of Arts, then a shift from space to time takes place, from the physical place to the temporal location.

Directly attributable to the generative matrix of the Greek tragedy mentioned above, the events developed as "live art" festivals, "are inserted in a problematic field, which differentiating itself from the exhibition and the musical field, induces to reason on a type of live expressivity in which the construction of values and imaginaries to be shared assumes a strong community connotation, essential for their own survival[5]". In this vein of representation, we can insert the event linked to the Regatta of the Ancient Italian Maritime Republics, referring particularly to its re-enactment component.

Methodology "A.R.M.I." regatta: analysis of the event

A re-invented tradition

In a context like today's, characterized by an infinite facet of elements and stimuli of different nature, the essential nature of the human species is covered by the memory of its own past:

"we can say that the present and the future are different expressions of a past that is unique, unrepeatable, but at the base of any other time[6]".The study and the anchorage to a past-more or less recent- and itself representation, are fundamental points that are exalted and deepened in all those that are called "recurrences", usually expressed in religious or civic feasts, proper to the modern culture.

"The regatta of the maritime republics belongs to these important manifestations: in it four cities, once archenemies, seek and often find the vital roots not only of the power and greatness of the past, that is the historical motivation of what was, but also the reason to be men, from time to time products and producers of history, which are characterized as rational and thinking beings […]

In this sense, some historical re-enactments are not to be defined "simple acts of folklore", but necessary returns to the passed to regain the necessary vigor in order to project ourselves towards the future: a future that will be great only if it is nourished by a strong cultural awareness[7].

Although the event in question is strongly characterized by its relationship with the past, the origin of the event dates back to quite recent times and can be counted among the "invented traditions". By "*invented tradition*" we mean a set of practices, generally regulated by rules, implicitly or explicitly accepted, and endowed with a ritual or symbolic nature, which aim to mediate and promote certain values of behavior in continuity with the past. Among the primary reasons for the introduction of this new type of event, there is both an intention to create - or rediscover - strong national identities, and a marketing operation on the territory. The creation of a tradition is therefore a process of re-use and formalization, characterized by references to the past, and by the imposition of a certain repetitiveness. This kind of traditions deliberately built entirely or partially by a single promoter are partly developed by private groups or in any case by superior entrants with the aim of creating consensus among the community

[4] pag 12, S. Cristante, N.Barile, "Breve storia degli eventi culturali", Bevivino Editore, Milano 2004
[5] pag 188, S. Cristante, N.Barile, "Breve storia degli eventi culturali", Bevivino Editore, Milano 2004
[6] pag 5, S. Gianfaldoni, "Breve storia delle Repubbliche Marinare e della Regata", Libreria Goliardica, Pisa 1995
[7] pag 5, S. Gianfaldoni, "Breve storia delle Repubbliche Marinare e della Regata", Libreria Goliardica, Pisa 1995

and promoting new moments of entertainment, while ancient traditions still exist because they were born of popular customs passed down through the generations.

History and development of the event

The history of the event is a reference to the Medieval period and to the most important maritime republics that in that period have reached the peak of their success, those that have gone down in history for the particular contribution given to the development of the Italian economy and navigation techniques: Amalfi, Pisa, Genoa and Venice.

The prominence achieved by the four republics is mainly due to maritime trade, source of their wealth, greater for importance and speed, compared to land traffic.

The story of the evocative manifestation, which proposes again the glory and the greatness of these ancient seafaring communes with a sporting and folkloristic formula, is much more recent: it is in fact in 1948 the proposal received by the Provincial Agency for Tourism of Pisa, by the Pisan Mimmo Chiaverini, a prominent figure in the city's traditions, with the aim of organizing a rowing race to dispute each year, in rotation, in one of the four ancient rival cities.

The proposal was welcomed with enthusiasm by the competent bodies, despite the initial doubts coming from the Republic of Venice, concerned both to compromise the reputation of the oldest and most famous Regatta on the Grand Canal, both to not being able to better express its potential on boats as well different from those typical of the lagoon. Concerns, which after decades can be safely stored, given the supremacy that the Venetian Republic holds in the roll of honor of victories.

After initial doubts, in 1949 the representatives of the four republics met at the Municipality of Pisa and drafted a plan for the realization of the project: the promoters of the initiative took care of the deed of incorporation for the organization of the Regatta, of the technical regulation, of the costumes problem -detected on indications of frescoes and lithographs of the time-, and of the boats, to which give a certain sense of continuity with respect to the ancient galleys of the era. The impressive work saw its epilogue in December 1955, when, after a general rehearsal held in Genoa on gozzi to four rowers, the Ente Regata was established in Amalfi.

"On June 9, 1956 the boats built by the master carpenters of the Cooperative gondoliers of San Marco in Venice were launched and were blessed by Cardinal Angelo Roncalli who two years later became Pope Giovanni XXIII. The boats, blue for Amalfi, white for Genoa, red for Pisa and green for Venice, were immediately delivered to their respective cities, and on July 1st of that year the first edition was finally held in the waters of the Arno, ending the great work lavished by the city for the event. It was immediately an event that catalyzed the city and public opinion with international prominence even if the media were certainly not of a high technical level, the lungarni were invaded by a historical procession of 320 costumed figures (80 for each delegation) who represented -and still today represent- important events in the history of each city, even if in slightly different times, but always inherent the glories of the Ancient Maritime Republics (from 900 to 1400, approximately)[8]". The manifestation of 1956, supported by a wise propaganda and by the press, aroused much enthusiasm both among the public, estimated at 90,000 people, and

[8] pag 17, A. Giuntini, "Galeone Rosso", Felici Editore, Pisa 2007

between the Italian and foreign authorities present, including the Head of State Giovanni Gronchi. "Since then, every year in the waters of one of the four cities, the Regatta takes place and in the historic center the parade of vintage costumes parades, amid two wings of enthusiastic crowd that applauds. Suggestive scenery and remarkable historical-artistic interest are the setting for the choreographic manifestation with the colors of its costumes: Amalfi with the Cathedral and the picturesque gulf, Venice with the lagoon and the elegance of its palaces, Genoa with the Port - and the alleys of the historic center - Pisa with the charm of the Lungarni[9]".

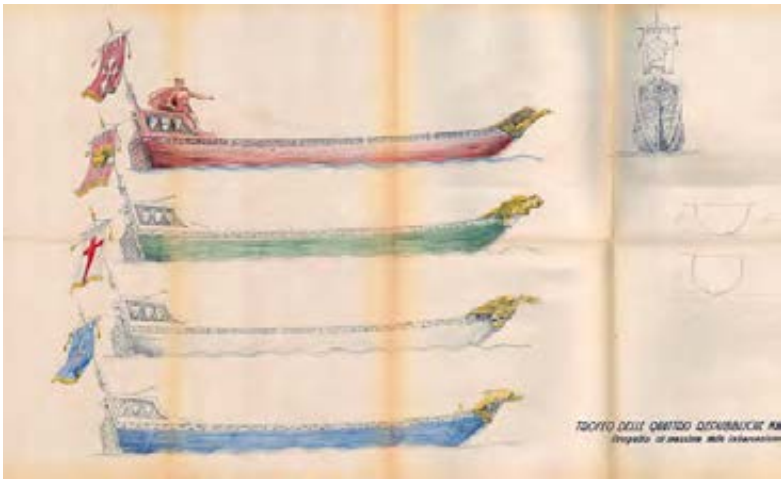


Fig. 1 Draft of the galleons, 1955 (Archive of the Municipality of Pisa)

Fig.2 Drawing of the first manifestation, with notes from the designers (Archive of the Municipality of Pisa)

The historical parade: between history and spectacle

"The parade is the most beautiful choreographic part of the event, each city is busy with about 80 participants parading preparing the public for the climate of the race. The costumes are vintage reproductions and often have become, over time, unique pieces so as to be used only in static museum exhibitions: the over 320 participants interpret at best events and events of the time and flow in the parade with the help of horses and bearers at the time marked by tympanists, tambourines and trumpeters[10]".

Each delegation has "main" characters, which recall episodes and particularly important moments of the republican phase of their city.

"**Amalfi** relives, with the figurants, the splendor of the eleventh century, a period that sees the town of Campania at the apex of its businesses and its conquests; the costumes have an Arab-Byzantine influence and represent all the social classes of the time: Magistrates, Judges, Consuls, Military, Rowers and the People. Central moment of the procession is the marriage, "the marriage of power", of Duke Sergio III with the noblewoman of Lombard origins, the Ducissa and Patricissa Maria[11]". The costumes for the Amalfi procession were designed in the fifties by the scenographer Roberto

[9] pag 7, S. Gianfaldoni, "Breve storia delle Repubbliche Marinare e della Regata", Libreria Goliardica, Pisa 1995
[10] pag 19, A. Giuntini, "Galeone Rosso", Felici Editore, Pisa 2007
[11] pag 19, A. Giuntini, "Galeone Rosso", Felici Editore, Pisa 2007

Scielzo, through analysis of historical sources. The realization boards, as well as the clothes, are still exhibited in the Civic Museum of the Amalfi Town Hall.

The analogy between the costumes worn by the Amalfi ladies and the variety of Byzantine mosaics present in Ravenna is particularly interesting - in particular the procession of maids depicted along the nave of the basilica of Sant'Apollinare Nuovo testifying to the very strong Byzantine influences in the customs and traditions of the Amalfi people.

"**Genoa** in particular reiterates its participation in the first Crusade, where its glorious leader Guglielmo Embriaco of the Spinola family and lord of Gibeletto (a Lebanese town) called "Testa di Maglio"(1080-1130) - a warrior also described by Tasso in Jerusalem Liberata- led the siege on Jerusalem and Caesarea with the "war machines" that he himself had designed[12]" recovering the wood of the boats used to sail the foreign lands and reusing it to build towers, allowing the break-in of the crusaders from the top of the walls. Tradition has it that it brought as a gift to Genoa from Palestine a relic, the Holy Catino of the Last Supper (we can find a faithful reproduction of this sacred object, carried in triumph during the parade by an armed man). Another crusader appears in the Genoese delegation: Caffaro di Caschifellone, historian and consul of the Republic of Genoa, who fought in Caesarea alongside the Embriaco and who narrated his deeds in the famous Annales. In the parade there are also alfieri, with the banners of the Genoese families, captains, armed and a representation of the social classes: ladies and patricians, commoners, fishermen and sailors; all accompanied by a representation of trumpeters and tambourines.

The main character of the parade in **Pisa** is Kinzica dè Sismondi, a young woman considered by tradition to be a Pisan heroine. It is said that one night at the beginning of the century "the young Kinzica, in love, looked at the horizon from the tower of her house, one of the few located north of the Arno, outside the town and near the port. She was thus able to notice the landing of the Saracens[13]". The girl gave the alarm by ringing the bells of all the churches, waking up the Pisans who succeeded in defeating their enemies. The character of Kinzica parades on horseback, with her parade bearers and ladies, Captains and Consuls.

Venice relives events of the 1500s with the most representative figures of the time, among which the Venetian Caterina Cornaro stands out, married to the king of Cyprus only at the age of 14. "The procession recalls the great feasts organized in his honor, when in 1488 he returned a widow, in his republic, to whom he donated the fertile island of which for 20 years had been appreciated queen. In the historical parade, the queen sits on an elegant fifteenth-century sedan chair, whose weight rests on the shoulders of four Moors. Another important figure that appears in the historic parade of Venice is that of the Doge, the highest office of the republic, which thrives solemnly[14]", followed by Senators, Ambassadors and a representative of ladies of the time.

[12] pag 20, A. Giuntini, "Galeone Rosso", Felici Editore, Pisa 2007
[13] pag 28, S. Gianfaldoni, "Breve storia delle Repubbliche Marinare e della Regata", Libreria Goliardica, Pisa 1995
[14] pag 37, S. Gianfaldoni, "Breve storia delle Repubbliche Marinare e della Regata", Libreria Goliardica, Pisa 1995

Fig.3 images taken from the historical parades of the four Republics

The regatta: four cities, an eternal competition

The race is the fulcrum of the event, where tradition and sporting agonism come together and give life to an exciting show. The boats on which the four republics challenge each other were designed in 1956 by the shipwrights of the yards of the Gondolieri Cooperative of Venice: the chosen hull, among the many proposed, was considered the most relevant to the historical re-enactments and the line of the ancient "Galere" "Or" Representative Feluche". The first wooden boats, difficult to maintain and with little possibility of modification in favor of the set of athletes, were then replaced in 1983 by fiberglass boats, and later in 1994 with lighter hulls in Kevlar and carbon. The boats, with a fixed seat, reach the length of about 15 meters and for regulation must have the same structure and differ only for the color: blue Amalfi, white Genoa, red Pisa, green Venice.

"In addition to the colors, a special feature of these boats is undoubtedly the figurehead, an appendage in the bow that recalls the signs of the city and that until the mid-80s was a real wooden sculpture. […] Currently, the Figureheads are made of fiberglass, while the originals - designed in the Fifties by Professor Alvio Vaglini - now constitute a museum heritage[15]"; the four boats are thus distinguished: winged horse for Amalfi; winged dragon for Genoa, referring to the dragon of San Giorgio; eagle for Pisa, to symbolize the ancient link between the Pisan Republic and the Holy Roman Empire; winged lion for Venice, reference to St. Mark the Evangelist, patron saint of the city.

The crews, consisting of eight rowers and a helmsman, are generally chosen in each city by annual

[15] pag 23, A. Giuntini, "Galeone Rosso", Felici Editore, Pisa 2007

selective races and often among them are athletes of national importance.
The competition takes place on a course of 2000 meters, on different race fields: the Arno in Pisa, the Venice lagoon, the open sea for Amalfi and the port, with arrival at Calata Zingari, in Genoa - in 2018 the event will take place for the first time in the Canale di Calma of Genoa Pra; the lanes of competition, usually drawn a few minutes before the event, in recent years are chosen following the positioning obtained in the race of goiters, a competition that takes place shortly before (or the day before) of the official regatta and usually participated by the reserves of crews of their respective galleons. At the award ceremony the winning crew takes delivery of the event trophy, a reproduction of a galleon in silver and gold of Brazil, to be returned to the next edition.

Development of visual communication: from 1956 to today

A fundamental component of the event is the communication apparatus, which over the years has encouraged participation and highlighted the event, showing it and making it known to the general public through the use of different media, languages and images.
Specifically, we find for each edition of the regatta the focus on the creation of a poster containing information about the event; the paper communication system also consists of brochures with details of the event and the events annexed to it, information leaflets and ticket printing to attend the event in a privileged position. Over the years, the paper-based communication component has been enriched with postcards, philately stamps and special edition stamps.
Traces of the communication apparatus can be found starting from the first official regatta, held in Pisa in 1956: the massive communication carried out managed to involve an estimated audience of 90000 people. The poster created for the occasion, probably still one of the most interesting, is characterized by an illustrative image component, symbolizing the figure of a rower, surrounded by the banners of the four republics; to complete the manifesto, the textual component characterized by a font with serif that goes well with the style of the image. The image was also re-proposed the following year for the Amalfi regatta of 1957, with the necessary modifications as regards the section dedicated to information. Another image that was repeated several times during the event, was the one used in the posters of 1962: the image also in this case is illustrative, characterized by a high figurativity, and brings in the foreground the figure of a boat -specifically, the ancient figurehead with the winged eagle, used by the galleon of Pisa - to complete the image we find an oar and the four banners. We find the same image also on the occasion of the regattas of 1967 and 1973: on these occasions we can see differences from the different fonts used for the information part.
Moving in the 90s, we are losing the figurative illustrations of previous decades in favor of illustrations with fewer details: the poster of the 42nd edition of 1997 is characterized by a white background on which you can see a slight illustration of the Amalfi landscape, with focus on details of the cathedral; the poster is then completed by an illustration of a galleon centrally located, and to complete the whole -with a central composition- the text with serif font.
In 1999, while maintaining a low figuration with regard to the component of the image, we find a poster of strong character: on a blue background stand the illustrations of a tambourine and the lion of San Marco, in reference to the host Republic, while the component textual is relegated to the upper right part of the poster; the poster is of impact and, although characterized by simple images,

manages to involve the spectators, who on that occasion are estimated around 50,000.
With the new century it changes course and the style of the posters changes drastically: in 2000, on the occasion of the regatta held in Genoa, the image component of the poster is photographic, modified in post production through the use of "noise filters", and highlights both the historical component - with the image of the historical procession of the town, represented by a gonfalonier regent the banner of the Genoese republic - that the sports component - with the image of Genoa galleon taken up at the flag-raising stage.
For the 50 years of the event, in 2005, we have a return to a simple and linear image, a few strokes and a few colors have been used to the master Ernesto Tatafiore to realize the sketch that will then go on the poster of the Amalfi edition. The image develops an oblique horizon, characterized by the contrast of flat colors - orange and red - on which one goes to place the black shape of a galleon.
The poster is then completed by the text component, also oblique, made with a hand-drawn font, characterized by simple lines and a contrast of full and empty spaces.
In 2009, the event returns to Pisa after only 3 years, because included in the celebrations of the Galileian year and also the communicative component is affected by this influence, we find a manifesto characterized by a potpourri of elements: we have the figure of Galileo, from a painting of the era, the photographic image of the planets of the solar system, the photographic image of the trophy put up for grabs every year and an illustrative image depicting the paddles of the four republics, all placed on a pattern with a marine theme.
The image, in itself chaotic, is accompanied by a textual component with a two-tone serif font - yellow and white that certainly does not help the whole.
Even in recent times, as in the past, certain images are reused for different editions of the event: in 2011, 2012 and 2014, respectively Pisa, Amalfi and Genoa, we find the same image revisited with only changes to the font (with serif in 2011 and 2012 and without serif in 2014) and the background (white in 2011 and 2014, antiqued in 2012); the image shown is extremely synthetic and depicts the Italian map, created with the only use of color bands, surmounted by the illustrations of the four banners.
In 2016, for the 61st regatta, the town of Amalfi relies on the study Salernitano AboutLab for the creation of the whole coordinated image of the event: from the posters, to the event program we find a basic graphic characterized by a white background and a vector image that recalls the wave of the sea, all accompanied by a font without serif that goes well with the whole composition.
From the rigor and cleanliness of 2016, to the overabundance that characterized the communication in the last race taken under scrutiny, that of Pisa in 2017: the white background gives way to a background characterized by a bright red on which you can see a map of the Italian territory, the geographical map is dominated by the illustration of a rower - taken from the first poster of 1956 - accompanied by the words "Pisa" with vertical letters, made with a serif font and characterized by the presence, next to each letter, of the banner of the different republics.

Fig. 4 Advertising posters of the event, from 1956 to 2017

Conclusions

Possibility and development of an integrated communication for the advancement of cultural heritage

As can be seen from what was written, the event, created ex novo by the desire to rediscover an ancient reality, over time has gone so far as to go from being a challenge rowing among seafarers, fishermen, gondoliers and remaioli, to be a felt competition in which Olympic athletes participate. It is interesting to note that, despite the competition is in continuous development and specialization, it still manages to maintain the genuine character and healthy rivalry present since the first editions. The event turns out to be particularly interesting for the combination of sport -practiced to high levels- and tradition, a combination appreciated by the multitude of fans who every year follow the event with interest; the historical regatta, in fact, is realized as a valid promotional vehicle for the territory, both for the large numbers of spectators that manages to produce in the host city, and for the interest that can manifest through the national direct on Rai2, that every year accompany the regatta. However, it should be noted that although the event is of national importance and is an interesting promotional vehicle for culture and territory, the promotional component - mainly in its form of visual communication - can be improved.

As far as the communication apparatus is concerned, one of the first deficits is the absence of a web reference: to date, in fact, there is no official website to look for detailed information about

the event, or the history from which it was stretch; we can in fact find some information on the individual web sites of the four cities taken as reference, but they are fragmentary and in-depth notions, what is missing is a single container.

Specifically, it would be interesting to analyze in detail the various components that characterize the event: from the history of maritime republics, to the specific history of the four historical parades, from the costumes used in the parade, to the sporting component, and still have a section dedicated to the visual component, both as regards the posters, and the interesting sketches of figureheads or banners, evidence of craftsmanship to be preserved.

To remain in the web, another important lack is the absence of official social pages managed by representatives of all 4 republics, only in recent years has seen the creation of a Facebook page dedicated to the event (Regata Storica della Antiche Repubbliche Marinare d'Italia) unfortunately unknown to most people and with a low participation and inclusion of content concerning the republics of Genoa, Pisa and Venice (it is worth praising the efforts made by Amalfi people, always marked for attachment to the event).

As for visual communication, focusing on the paper component in its main form of manifesto, as can be seen from the examples shown in the previous chapter, over the years the care for the visual component was fluctuating, even coming to use for several editions the same image, with the only change of the textual component, when instead it would be interesting to propose from time to time a communication campaign created ad hoc, so as to enhance the event using contemporary and impact languages. It would also be necessary to focus on a coordinated promotional campaign on several fronts: a shift from traditional communication to a communication created specifically for social media, going no longer to simply translate a visual component (poster, flyer, etc.) from a support to the other, but rethinking it in terms of graphic composition, languages and signs to be used, depending on the chosen support.

Expanding the range of action, from the field of visual communication, to the more general sphere of cultural communication, it would be interesting to compare the different methodologies adopted by the 4 republics to enhance the historical heritage of material nature: from original boats to wood carved figureheads; from the first costumes to the pennants of the awards. The four cities act differently, as far as Genoa is concerned, it is interesting to point out the presence of the ancient galleon with the original figure representing the dragon of San Giorgio, preserved at the Maritime Station, in an area not accessible to the public; or again, the presence of the original Sacro Catino, relic fulcrum of the Genoese historical parade, preserved in the Museo del Tesoro of the Cathedral of San Lorenzo. To be counted, in the field of communication in the field of cultural heritage, the exhibition held in 2016 at the Museum Complex of Sant'Agostino "Genova nel Medioevo. Una capitale del Mediterraneo al tempo degli embriaci", dedicated to the important figure of Guglielmo Embriaco, the main character of the parade, with an in-depth study of the customs and traditions of the time. On the other hand, the Republic of Amalfi dedicates an outdoor courtyard to the old galleon, making it accessible to the public, but exposing it to the elements; always in Amalfi, however, we find the Museum of the Asernale where the ancient relics are gathered and valued, from the first clothes made by the scenographer Roberto Scielzo, to the ancient wooden winged horse.

What emerges from this research process is therefore a manifestation characterized by a communication - both on the visual level and in the sphere of cultural heritage - so fragmented and partly missing, but rich in hints and material to be explored and organized in to allow greater usability to the general public both in terms of the theoretical component, through web supports, and on the level of accessibility to these cultural heritage directly on the territory.

Image properties: G. Gargano, M. Raffa, E. Anastasio, R.Russo
A special thanks for the photographic material to: A. Giuntini, technician of the Italian Rowing Federation, author of the book "Galeone Rosso"; M.A. Guido, employed in tailoring of the Historic Parade of Genoa.

References

S. Cristante, N. Barile, *"Breve storia degli eventi culturali"*, Francesco Bevivino Editore, Milano 2004
F. Vigato, *"L'architettura dell'effimero. Progettare gli eventi di spettacolo",* Libreriauniversitaria.it Edizioni, Padova 2010
M. Falsitta, "*Allestimenti, eventi fiere mostre"*, Federico Motta Editore, Milano 2002
M. Vitale, D. Scafoglio, "*La piazza nella storia: eventi, liturgie, rappresentazioni*", Edizioni Scientifiche Italiane, Napoli 1995
G. Benvenuti, *"Le Repubbliche Marinare. Amalfi, Pisa, Genova e Venezia"*, Newton & Compton Editori, Roma 2001
S. Gianfaldoni, *"Breve storia delle Repubbliche Marinare e della Regata",* Libreria Goliardica, Pisa 1995
A. Giuntini, *"Galeone Rosso. Le Regate delle Repubbliche Marinare - 50 anni di storia",* Felici Editore, Pisa 2007
C. Di Fabio, P. Melli, L. Pessa, *"Genova nel Medioevo. Una capitale del Mediterraneo al tempo degli Embriaci"*, Sagep Editori, Genova 2016

Signs, dreams and drawings. Piero della Francesca and the “talk to images” between dreams and rebus. Impressions from the dream of constantine.

Mario Caraffini

email: mario.caraffini@fastwebnet.it

Abstract

The episode is inserted in a complex, and still unexplored, three-dimensional geometric structure defined by a set of three spheres intersected with each other so that the center of the median sphere is the point of tangency between the extremes. These two delimit the interior space of the tent and the space immediately outside it; in the first space the emperor, in the second the armed, between the two the servant who calls us with his gaze, He is seated within the central sphere coinciding with the luminous globe brought by the angel. Here are immediately highlighted two closely related reading plans: the narration, understood as the coherent unfolding of facts acted out by the characters of the story, and their ability to occupy a virtual space from three-dimensional appearances. The intersection of these two levels generates, in a chain, and in some ways even exceeding the explicit will of the author, an uncontrolled sequence of possible interpretations. The balance between the vehicle of the message and the message itself appears, in Piero's work, extremely delicate. The vehicle consists of the rigorous composition governed on one side by descriptive geometry and on the other by the presence of the characters and objects that silently occupy the scene. The apparent product of this interweaving is the staging of a suspended reality that silences us and forces us to listen in an attempt to pick up an unlikely signal that reveals, finally, the message, the meaning of this complex construction.

Abstract

Enigma. Questo è il sostantivo che forse meglio d’altri riesce a contenere la complessità dell’opera di Piero. Un enigma bicefalo che invita alla sua risoluzione attraverso l’interpretazione di segni affatto espliciti: una delle due teste ci suggerisce di cercare nei reticoli logici della geometria, l’altra nei rimandi all’infinito della metafora.

Qui, però, non proponiamo l’impegnativa interpretazione di un particolare testo, ma vorremmo,

assai più modestamente, condividere una personale suggestione nata dal rinnovato stupore che l'opera di Piero induce ad ogni osservazione.
Il tentativo di individuare un fondamento razionale a tale impressione è la giustificazione delle poche righe che seguiranno e che necessariamente partono dalla descrizione di un'opera-testo.

Introduction

Enigma. This is the noun that perhaps better than others manages to contain the complexity of Piero's work. A two-headed enigma that invites to its resolution through the interpretation of signs at all explicit: one of the two heads suggests us to search in the logical lattices of geometry, the other in references to the infinity of metaphor. Here, however, we do not propose the demanding interpretation of a particular text, but we would like, much more modestly, to share a personal suggestion born of the renewed amazement that Piero's work induces at every observation.
The attempt to identify a rational basis for this impression is the justification of the few lines that will follow and which necessarily start from the description of a work-text.
In the legend of the True Cross, Jacopo da Varagine tells us that Constantine the Victor dreamed and Piero told it on the walls of Arezzo.
The Cross, a sign; Jacopo binds his story to those of Lactantius and Eusebius di Caesarea and draws from the two a third version that takes part from the two and comes back in a new narration. Lactantius speaks of a dream, Eusebius of a collective vision.
Lactantius, author of culture and Latin language, writes immediately after the battle of the Milvio bridge the De mortibus persecutorum, in which the terrible deaths of the Caesars who persecuted the Christians are told. Here appears for the first time the episode of the battle of the Milvian bridge and, among the persecutors, Maxentius torn by ambition and cowardice. Lactantius recounts that Constantine was encamped outside Rome, near the Milvio bridge, and in the night he dreamed of an angel. He does not mention any cross in the sky but he speaks of the angelic announcement that imposed a sign on the shields of the armies: he was warned in the dream of putting the sign of God on the shields and therefore on the shields the name of Christ was written (Cristum in scutis notam), commonly interpreted not as a cross but as the Cristogramma.
Eusebius of Caesarea, this time an oriental author of Greek language and culture, writes an important History of the Church immediately after the battle of the Milvio bridge that tells without however hinting to any dream and any miracle. Twenty years after the battle, after the death of Constantine, he published the Life of Constantine. Here he relates that the Christian emperor, a few days before the battle, when awake, while praying, had an apparition. Eusebio himself tells us this story as incredible, a story that Constantine himself personally told him in secret, swearing that it really happened, such that if it were another to tell it would not be easy to believe (paradoxotáte). He saw with his eyes a trophy in the shape of a cross, all of light, and a writing, not the Latin in hoc signo vinces, to the future, but obviously the Greek, toûto nika, imperative, therefore an order, and not a prediction . Then he specifies that everyone saw in the sky, during the day, this vision, all the army, and everyone was stunned, contradicting the exclusivity of the news received. So immediately after the battle Lattanzio knew of a dream and Eusebio had never heard of it. Twenty years later Eusebio tells of a vision, a new thing that Lattanzio did not know.

But did Constantine really dream? Obviously we will never know it. It is very likely that he came out of the tent and said I had a dream! In ancient times it happens incredibly often that in the night before the battle the leader has a dream and, in all cases, the soldiers so apprehensively waiting for a favorable omen, it was appropriate to announce the long-awaited dream. Constantine therefore dreamed. Lactantius, on the other hand, was a rhetor, and on the rhetorical manuals we have come to say: When one must glorify an emperor one must invent premonitory dreams.
Finally, it is interesting to note that these signs that have been announced or dreamed of have no image. There are many depictions of the soldiers of Constantine at the time of the battle of the Milvio bridge, the shields are ostentatious and so are the labors of the legions. It happens on the Arch of Constantine, inaugurated in 315 by the Senate of Rome, or on the numerous coinage but never appears the least Christian symbol. We will have to wait for the reign of the sons of Constantine to finally be able to find the first images of this dream or if we want this vision.

Constantine's dream[1]

The emperor Constantine, painted by Piero, sleeps in the darkness of the church of San Francesco d'Arezzo. Around him his guard, alert and armed; at his bedside the most trusted servant who assists his sleep; in the sky, still dark but already dawning, an angel bursts in with its light that illuminates everything. The light, in the form of an immaterial globe, springs from the small cross that the angel carries in hand and invading the empty space between the characters produces shadows, makes the steel of the armor and helmets shine, announces the Cross to the emperor. No one is aware of this sudden glare, neither the servant nor the armed ones; not even Constantine who actually sleeps; he sleeps and dreams. He dreams what we are seeing, dreams of himself, dreams of the armed, dreams the servant who sadly welcomes his face in the hollow of his hand. In the sky of October 27, 312, the constellations of Cassiopeia, Cepheo, Drago, Ursa Major and Ursa Minor appear clearly in the mirror, that is how an observer would see them outside the celestial spheres and how they were then represented on the Ptolemaic astronomical atlases.
The episode is inserted in a complex, and still unexplored, three-dimensional geometric structure defined by a set of three spheres intersected with each other so that the center of the median sphere is the point of tangency between the extremes. These two delimit the interior space of the tent and the space immediately outside it; in the first space the emperor, in the second the armed, between the two the servant, seated inside the central sphere coinciding with the luminous globe. Here are immediately highlighted two closely related reading plans: the narration, understood as the coherent unfolding of facts acted out by the characters of the story, and their ability to occupy a virtual space from three-dimensional appearances. The intersection of these two levels generates, in a chain, and in some ways even exceeding the explicit will of the author, an uncontrolled sequence of possible interpretations. The balance between the vehicle of the message and the message itself appears, in Piero's work, extremely delicate. The vehicle consists of the rigorous composition governed on one side by descriptive geometry and on the other by the presence of the characters and objects that silently occupy the scene. The apparent product of this interweaving is the staging of a suspended

[1] Piero della Francesca, il sogno di Costantino, dal ciclo di affreschi, La leggenda della Vera Croce in San Francesco di Arezzo, 1452-1466.

reality that silences us and forces us to listen in an attempt to pick up an unlikely signal that reveals, finally, the message, the meaning of this complex construction.
But let's go with order, and let's define a possible logical path that puts order among all these elements: first of all Piero is a "geometra" (wise in geometry). This, at least, is the famous portrait of Giorgio Vasari in Le vine[2]: "He was very studio in the art, and in the perspective it was worth so much, that no one more than he was admirable in the things of Euclid's knowledge, and all the best laps tugs or regular bodies he is better than the other geometer understood, and the main lights of such things are there of his own [...][3]"

The commensuratio and the drawing

In his treatise, De Prospectiva Pingendi[4], Piero identifies in the "design", in the "commensuratio" and in the "color", the three fundamental moments of the pictorial realization[5]. But although it is precisely the commensuratio, that is the geometrical and perspective measurement, to govern the compositional schemes of his works, the figure of the surveyor, like the one who, with the measure, knows the space, does not respond sufficiently to the questions that the work of Piero seems to raise.[6] The correct perspective projection of the world, and therefore the apparent realism of the represented scene, seems only necessarily propaedeutic to a reading revealing other meanings that, as in an enigmatic game, clearly ask to be unveiled.
At this point we must define another fundamental element of the plot: the design, understood as a fundamental tool of the commensuratio. For artists of the time of Piero the activity of drawing is a central question that defines the role and meaning of their doing.
Piero's theoretical vision is derived from the more complex and extensive theoretical work of Alberti[7], for whom drawing is an eminently intellectual activity.
The painter who detaches himself from the exclusive representation of the real arrogates the right to represent ideas, establishing an almost total identity between the painter and the man of letters[8].
From this it follows that defining, with the tools of the painter, the outline of the surface of an image is an action quite comparable to that of writing a letter of the alphabet: the two actions are necessary for the drafting of a text. The image, therefore, is a sort of figurative writing and, despite the similarities identified, it is decidedly superior to that which uses words. In fact, these are based only on an abstract convention, while, on the contrary, figurative writing is based on the universal and timeless character of the image that prevents the loss of the code, the fall of the convention. So while the writing will be forgotten or undergo such a metamorphosis that it can no longer be decoded, the image will retain its communicative power.

---

[2] Giorgio Vasari, Le vite dè più eccellenti architetti, pittori, et scultori italiani, da Cimabue insino a' tempi nostri, ed. Lorenzo Torrentino, Firenze, 1550, (a c. di) Luciano Bellosi, Aldo Rossi, Einaudi, Torino, 1991.
[3] Ibid. pag.342.
[4] Piero della Francesca, De prospectiva pingendi, (a c.d.) G. Nicco Fasola, Firenze, Le lettere, 1984.
[5] Elisabetta Di Stefano, L'altro sapere. Bello, Arte, Immagine in Leon Battista Alberti, in, Aesthetica Preprint, Centro Internazionale Studi di Estetica, Supplementa, 4 Aprile 2000.
[6] Silvia Ronchey, L'enigma di Piero, Rizzoli, Milano, 2006.
[7] Leon Battista Alberti, De re aedificatoria, Firenze, 1485, (a c.d.) paolo Portoghesi, Polifilo, Milano, 1966.
[8] Ibid, I libro.

An "image" speech

But the images have a double fundamental importance. On the one hand, the perspective precision, the descriptive evidentia, on the other the role of metaphor and of the allegory able to "see" one image through the other. In both cases the sense of sight is revealed as the main cognitive tool of man. A fundamental means of our intellect in the knowledge of the world.

Here then we could distinguish in Piero's work two components: the geometrical one, that is what we see, the phenomenon, in combination with what could not be seen, that is the idea.

The image uses the phenomenon to refer to the idea and the reality that derives from it is inevitably emended by all those elements, although real, but which would be useless, if not harmful, to the correct transmission of the message, the content, the idea.

So the images of Piero, while describing the real in an extremely exact way, produce a reality of an instrumental type, bent to a specific purpose, a reality that is not generally credible. This cold, motionless, silent accuracy describes the world as an enigma that must be solved and for whose resolution everything is set up. The reality that emerges takes on the enigmatic, metaphysical and dreamlike appearance of a puzzle. The image becomes speech, a talk by images.

The dream

During the waking state we share the phenomenal world. In the dream, characterized by the perception of apparently real images and sounds, the perceptions are not related to the phenomena and, for this reason, they can also not present any apparent linearity: this enigmatic reality is also the reality of the puzzle.

Piero's figures, paradoxically, have the appearance of those in the newspapers of the riddles are engaged in normal and absurd, real and dream-like activities: he sleeps, prays, loves, dares, fears, stands, laughs, plows, always topped with letters alphabets or other symbols.

The result is that the reality that Piero sets up in his works appears to coincide with a reality that does not set itself the objective of describing the phenomenon despite not renouncing the rigor of the geometric instrument. The enigma extends along the narration through images and inevitably takes the form that is proper to it, the one to which it can not renounce, that is, the articulation of the dream. A result not pursued, perhaps, but undeniably evident and that enriches the image of the rigorous geometra that Vasari already outlined.

The landscapes, meticulously described, stretch unperturbed, where every detail, shaped by an entomological accuracy, appears to be the bearer of substantial information; still waters from the reflecting capacities of a mirror; bright blue skies, clear, that ward off any meteorological complexity. Characters moving and yet motionless; potentially overwhelming actions set in their eternal moment; limbs raised and rotated by an external motor, the origin of a motion accomplished in a remote past; faces with indecipherable expressions capable of opening a mouth, almost mechanical, from which no sound can come out; eyes that scan the perspective space (generative points of view of many perspectives?), which perhaps look at us, without the real sensation of being seen.

Silence; the silence of the table of the ideal city where only a few tiny details, a flower vase, an open door, suggest an unlikely possibility of life.

Fig. 1 The "Dream of Constantine" is a fresco painted between 1458 and 1466 by the Italian painter Piero della Francesca, and is part of the cycle of frescoes "Stories of the True Cross", preserved in the main chapel of the Basilica of San Francesco in Arezzo.

References

Alessandro Barbero, *Costantino il vincitore*, Salerno Editrice, Roma, 2016.

Silvia Ronchey, *L'enigma di Piero*, Rizzoli, Milano, 2006.

Elisabetta Di Stefano, *L'altro sapere. Bello, Arte, Immagine in Leon Battista Alberti*, in, Aesthetica Preprint, Centro Internazionale Studi di Estetica, Supplementa, 4 Aprile 2000.

Giorgio Vasari, *Le vite dè più eccellenti architetti, pittori, et scultori italiani, da Cimabue insino a' tempi nostri*, ed. Lorenzo Torrentino, Firenze, 1550, (a c. di) Luciano Bellosi, Aldo Rossi, Einaudi, Torino, 1991.

Piero della Francesca, *De prospectiva pingendi*, (a c.d.) G. Nicco Fasola, Firenze, Le lettere, 1984.

Leon Battista Alberti, *De re aedificatoria*, Firenze, 1485, (a c.d.) paolo Portoghesi, Polifilo, Milano, 1966.

For your pleasure only

Luisa Chimenz,
Department Architecture and Design DAD (University of the Study of Genoa)
email: luisachimenz@arch.unige.it;
Nicoletta Sorrentino
Department Architecture and Design DAD (University of the Study of Genoa)
email: nicoletta.sorrentino@hotmail.it

Abstract

In the beginning of the Industrial Era, the reasons for encompassing in the design process as a final outcome machine-made vs. hand-made products were a matter of debates, and of course of choice. The era of considering craftsmanship far from the design discipline is now gone, and with the design thinking ruling almost every act of our day-lives, we are all designers. Makers are seen as the innovative tradition and while we search for the maximum in performance in the hi-tech items, often properly accompanied by sleek design, nonetheless we tend to more appreciate quality and handcrafted attributes.

Does this attitude depend only on the authentic features of the objects, or is it indeed a dyscrasic behaviour, somehow tied with our background, our personal and social experiences and inner feelings?

Design process seems, in some case, to be closer to a tailor-made solution, for custom satisfaction and diversification. Is it true or is it instead a trick that companies and design studios do activate to recall our uniqueness, in some way orienting us to the final purchase?

In this essay we wish to discuss which is in the contemporary era the value of handmade work and all its related historical position and issues. We aim to argument which and when has been the turning point for being craftsmanship from something dated and old, to something desirable and that is worth of its price. Can we really say that there has been a time in which the handwork expertise has lost its attractiveness to customers and consumers?

Abstract

Agli albori dell'era industriale le ragioni favorevoli all'inclusione nel processo di ideazione del prodotto di design del lavoro 'fatto a macchina' contro quello 'fatto a mano' furono argomento di dibattito, e chiaramente di scelta. L'epoca nella quale l'artigianato veniva considerato lontano e 'altro' rispetto alla disciplina del design è ormai conclusa, e con il design thinking a organizzare

quasi ogni atto della nostra vita quotidiana, potremmo dire di essere tutti designer. I makers vengono considerati come l'innovazione della tradizione e mentre ci aspettiamo il massimo della performance nei prodotti di alta tecnologia, spesso opportunamente accompagnato da un aspetto asciutto ed elegante , nondimeno tendiamo ad apprezzare maggiormente la qualità e le caratteristiche di artigianalità.
Tale atteggiamento dipende soltanto dalle reali proprietà degli oggetti, o è piuttosto dato da un comportamento discrasico, in qualche modo legato al nostro background, alle nostre esperienze personali e sociali pregresse e a sentimenti interiori?
Il processo di design sembra in alcuni casi essere più vicino a una soluzione su misura, finalizzato alla soddisfazione del e diversificazione del costume. È dunque realmente così o è piuttosto uno stratagemma che le aziende e gli studi di design impiegano per ricollegarsi alla nostra unicità, indirizzandoci così all'acquisto finale?
In questo saggio auspichiamo di dibattere su quale sia nell'era contemporanea il valore del lavoro artigianale con riferimento a posizioni e problemi storicamente inquadrati. È veramente possibile affermare che ci sia stato un tempo nel quale l'abilità tecnica manuale aveva perso la sua capacità attrattiva nei riguardi di consumatori e clienti?

Introduction

by Luisa Chimenz

In the beginning of the Industrial Era the reasons for encompassing in the design process as a final outcome machine-made vs. hand-made products were a matter of debates, and of course of choice. For a certain time, we might say, there have been solid argumentation upon the inner properties and the out-coming performances of industrial produced objects versus handcrafted ones.
Actually, from an historical point of view could not be correct to say that this phase seemed to be passed soon, but that is. Even if, from time to time, the issue and its connected reasoning arise again and again, being sustained in one case or another by well-known designers or productions, we may say that nowadays we live in an iper-designed society.
As said in fact by Alberto Bassi, «It seems to be ongoing a designification process, featured by a diffused extension of the term and a presumed omnipresent practice. […] The borders are such widened so potentially comprising everything, that is to say nothing: therefore is design what I decide it to be.»[1] The era of considering craftsmanship far from the design discipline is now gone, and with the design-thinking ruling almost every act of our day-lives, we are all designers.
We are used to find ourselves in the position of choosing, as our own personal taste is definitely the doubtless one. Even if we may tend to close quickly the issue, actually it's proper to observe how many studies and scholars have threated the problem, wishing to explain and pursue a scientific debate on the differences between design and craftsmanship, above all Renato De Fusco.
Especially, De Fusco, offers an interesting overview on the relation between craft and design, explaining how it is far from proposing a definitive solution to the issue:

[1] Cf. A. Bassi, *Design contemporaneo. Istruzioni per l'uso*, il Mulino, Bologna, 2017, p.49.

«Anyhow it would be, the relation between handmade work and architecture, notably design, is one of the many never sufficiently clarified e definitively passed without judgment.»[2]

De Fusco here, interestingly, threats the specific subject of 'cultural material', exactly asking how much of 'material' has remained; alongside, the scholar debates about the use of models, for the serial production comparing this phase to the craft work. This, indeed, immediately can be referred to Bruno Munari, providing a very close thought about the use of models as a design tool for the comprehension of the project itself and a phase to be considered necessarily with the design work and before the production.

Accordingly, for what is said, if we may propose a single evidence of the presence of design, the project itself, definitely presenting as a solution for further possible questions: the project, the design properly, thus the condition in which every single phase is thought and expected. Hence it is not the mass production or the serial one to define a design product, not the use of traditional materials instead of 'innovative' ones, but the idea before and beyond the product itself, the value that the project expects to convey through its existence. In this sense tailor-made design, single production, production upon request should find a new ground and novel reasoning for their relevant meaning. There are connected to the contemporary and coexistent display of personal individuality and taste, capability to choose within a wider and tailored range. In the end, it could be said, we are in a niche production that is doubtless linked with heritage and feelings: territorial and personal ones.

Makers are seen as the innovative tradition, because often nowadays they encompass the hoped connection between art and technic. In addition they use the up-to-date technology with the most ancient approach of emphasizing the sense of touch. In the thought of Newson, Suggett, and Sudjic correctly we observe that:

«The invention of design in the modern sense was a product of the Industrial Revolution in the eighteenth century. Mass production severed the connection between the craftsman maker and the consumer […] Digital manufacturing is radically different, and can be understood as either additive or subtractive. […] It offers the designer a wider range of formal possibilities than the constraints of more conventional production will allow.»[3]

Consumers do appreciate the meticulous work beside the aesthetic qualities of the artefact and do tend to think it is worth the requested price due to the intangible merits.

In our contemporary society, subsists a dyscrasic behaving: while we search for the maximum in performance in the hi-tech items, often properly accompanied by sleek design, nonetheless we tend to more appreciate quality and handcrafted attributes.

But, this way of acting, this disposition may be seen on two sides: on one hand design has ever learnt and looked at the handicraft world, offering its fundaments for rationalizing the production and so reaching a wider public - in this case it could be correct to say there is nothing to look at for technologic devices; on the other side, artisanship could be often connected with an idea of naïveté[4], that is gladly left apart in the design outcome.

---

[2] R. De Fusco, *Il gusto come convenzione storica in arte architettura e design*, Altralinea Edizioni, Firenze, 2016, p.63.

[3] Cf. A. Newson A., E. Suggett, D. Sudjic, *Designer Maker User*, Phaidon Press Limited, London 2016, p.105.

[4] This very interesting opinion has been offered by Oliva Rucellai in a discussion within the activities of the ADI Thematic Commission Handmade in Italy. Cf. http://www.adi-design.org//comm-handmade.html.

So finally, the hypothetic dichotomy does not really exist: logically, in the more literally sense, the sleekest device can be compared in terms of high quality, refinement and carefulness only to properly made artefacts. Thus, the brands who do include variety and diversification in the initial process of their production, are learning from other market segments: it has always been offered and made when purchasing a higher-ranked computer, a motorbike or a car, in order to better accomplish and satisfy customers' desires.

Methodology

by Nicoletta Sorrentino

The relationship between the craft production and the design activity exists since the start of the Industrial Revolution, and it assumed different features from time to time, depending on the historic moment or the geographic area. It is doubtless, indeed, that from the beginning of the industrial era the diverse politic, economic and social conditions affected the progress of the European countries, contributing to uneven development and growth patterns.

As a result, especially in the countries of Southern Europe, the manufacturing production has maintained for a long time strong links with craftsmanship and traditional know-how.

This aspect was somehow unavoidable at the beginning, but despite of the appearance, it was not only due to the adverse conditions to the establishment of industries. In fact, there were also well-known ideological reasons, thoroughly debated, underlying the opposition to industry and mechanical production.

Now, more or less the gap in terms of industrial structures has been bridged, nevertheless in several geographic and cultural contexts the manufactures keep on preserving a special relationship with craftsmanship, particularly for what concerns the production of furniture and ornaments. Namely, of all that products that are capable of generating emotions and affection, because are strongly related to one's personal life. According to Ciftci and Walker (2017):

«Traditional handicrafts are products that arose from people's needs, and they are practised over many generations. With the so-called technological and scientific advancements, handicrafts started to fade away due to the pressure of competitive global markets. Keeping up-to-date is another reason for their disappearance since contemporary taste in clothing, furnishing, and well-being changes very rapidly and the craft products are regarded as old-fashioned.»[5]

But, can we really say that there has been a time in which the handwork expertise has lost its attractiveness to customers and consumers?

To paraphrase Claudio Gambardella, moreover it could be said that: «[Handmade design] as a karst river, passed through the whole Short Century to reach us at the right time with its powerful, innovative strength, in the era of the global crisis […].»[6] For historical reasons, this attitude is particularly evident in Italy, where the long tradition of craftsmanship and applied arts has originated

[5] Cf. H. Gumus Ciftci & S. Walker, "Design for Grassroots Production in Eastern Turkey through the Revival of Traditional Handicrafts". in L. Di Lucchio, L. Imbesi, P. Atkinson (eds) *The Design Journal*, 20: sup1, *Design for Next. Proceedings of the 12th European Academy of Design Conference*. *Sapienza University of Rome, 12-14 April 2017*, Routledge - Taylor & Francis Group, Abingdon-on-Thames, 2017S2991-S3004.

[6] Cf. C. Gambardella, "Handmade in Italy. Il design dei territori italiani", in L. Chimenz, R. Fagnoni, M.B. Spadolini (eds) *Design su Misura*, Società italiana di Design, Venezia, 2018.

in the decades a unique approach to this issue, that somehow led to the contemporary way to conceive and practise design, as the followings show.

Riva 1920[7], for example, which is one of the leading Italian companies for woodwork and furnishing, bases its successful philosophy on using natural, solid wood and on the integration of craftsmen's know-how with advanced technologies, that allow to obtain high quality products, easily adjustable and customized. Emphasizing features such as luxury, vocation to Made in Italy and possibility of tailor-made solutions of high quality, the brand Visionnaire[8] instead, doesn't offer simple design furnishings, rather it wishes to suggest a whole lifestyle. Its proposals, in fact, leverage the desire of uniqueness of its customers, be they private buyers or public.

In the way these company propose themselves on the market, it appears a common thread: the emphasis on the attention to customers' tastes, the construction of a narrative that allows them to feel part of a greater story, so that buying a product is no longer only a purchase, but it becomes something that has to do with one's own way of feeling, an expression of personality.

It is what happens also for Baxter, once more an Italian company: it started to produce upholstered furniture in 1990, and now it offers a full range of décor inspired to classic English style, but looking back at the entrepreneurial tradition of Brianza, once targeted to «[…] aristocracy first and middle class after, and that today pursues in its creations for all the beauty lovers.»[9]

Thus, choosing products of this company should let customers feel part of an élite, awakening in them a sort of increasing awareness of their own individuality and the belief of being different, not conformed to the common trends, but able to recognize and select exclusive products of high quality.

Moreover, Danilo Ramazzotti – Italian Housefloors[10] meets perfectly all these issues, offering a range of ceramic tiles for wall and floor that combine the highest quality of handmade, craft products with the utmost opportunity to customize projects, no matter how small. As a result, the philosophy of the company is summed up in the concept of Dynamic Design, opposed to the industrial production.

It is easy to point up how the examples presented above all refer to Italian companies, surely for the close connections, previously cited, with the economic and cultural milieu. Nonetheless, this does not mean that it's an attitude existing only in our country, as several other recent projects demonstrate. It is the case of the Spanish GAN, interior division of the brand for outdoor furnishing GANDIABLASCO.

The new brand, born in 2004, produces rugs and other fabric products, according to the philosophy of Mapi Millet, first director of this firm: «[…]an interior design concept based around handmade objects, with its own identity, and at the same time very close to GANDIABLASCO, since both share a tireless curiosity to explore new techniques and designs.»[11]

[7] Cf. the company website https://www.riva1920.it/en/about-us/our-history/, last accessed April 14th, 2018.
[8] Cf. the company website http://www.visionnaire-home.com/company-profile-0, last accessed April 14th, 2018.
[9] Cf. the company website https://www.baxter.it/en/not-story-about-company, last accessed April 14th, 2018.
[10] Cf. the company website http://www.daniloramazzotti.com/en/, last accessed April 14th, 2018.
[11] Cf. the company website https://www.gan-rugs.com/en/company/, last accessed April 14th, 2018.

Fig.1 Danilo Ramazzotti – Italian Housefloor: the concept of Dynamic Design explained in a single image

For this company, Patricia Urquiola designed in 2014 the full range of rugs, upholstered furniture and poufs called Bandas; the collection is characterized by the modularity of the components, that allows customers to adapt them according to space availability, as well as to the desire of changing the appearance of the space itself.

Moreover, the project has originated in line with the approach of the firm, that aims to propose products made by hand but rooted in the design culture, with an attention to the quality of the materials (only natural fibres), and to the social impact of their work with the experienced Indian craftsmen.

In this sense, this project hopes to qualify itself as good design, just like the designer herself wrote in 2016: «Good Design is not only a matter of solving utilitarian problems. Good Design is a challenge. Good Design is breaking prejudices and being open-minded towards opportunities and challenges of your time. Good Design is taking risks and following a series of juxtapositions, unexpected connections between familiar and unexplored territories. Good Design is establishing empathic relationships with people, objects and contexts you have been in touch with. Good design is intimately connecting yourself with the culture, society and environment around you, which are in a state of constant changes. Good Design is building a story and being able to destroy it, reinvent it, evolve it – as you are doing with your inner self.»[12]

Nevertheless, it could be said that the shown examples has been usefully selected to emphasize an attitude that actually is a minority trend, in the wider economic and market scenario.

Maybe: however, as the last editions of important exhibitions demonstrate, it is undisputable how even companies that until recently were not used to refer their work to traditional features, are now starting to recall unprecedented appearances. It is the case of the well-known company Kartell, producer of objects and furniture made of plastics since 1949, that just presented the new collection Woody[13], designed by Philippe Starck: it is a series of seats made of plastics and wood. The aim of the company is to offer objects finished in a variety of ways, in a potentially endless possibility of combinations.

[12]Cf. A. Newson A., E. Suggett, D. Sudjic, *Designer Maker User*, Phaidon Press Limited, London 2016, p.85.
[13] Cf. the company website http://salone2018.kartell.com/progetti/wood/. Last accessed April 19th, 2018.

As explained by Claudio Luti, president of Kartell: «They are really part of our world, where industrial production has an artisanal quality to it. This is what we do: we're all about technology, quality, emotion.»[14]

A real wish to pay attention to customers, offering tailor-made solutions to satisfy their desire of diversification, or rather a trick, activated by companies and design studios to recall our sense of uniqueness and so orienting us to the final purchase?

Conclusion

by Luisa Chimenz

In the thought of Benedetta Spaodolini tailor-made means something that concerns more and in a definitive way what is before the project and the product, but still in the design activities. Tailor-made does not recall in her thought something close to the tailoring process, or the 'old fashioned' on-demand artisanship, but indeed the studio of the "personas", the final users, in order to better accomplish their needs and desires, by knowing them in advance through the possibility of studying properly constructed data. Through this path, it passes comprehension of the problems as well as diversifications of the solutions offered, that in the end might even create unification, a single transversal answer, enlightening the nearness between different targets of consumers expected to be afar.[15]

Claudio Gambardella, indeed talks about handmade in Italy as something that is not translatable elsewhere in geographical terms, or either wishing to use a neologism not 'relocatable', strictly linked to the territories because of their own inherited meanings and the profound belonging to a rooted cultural heritage. This latter only in the place where it is born can utter itself strength at its best in productions and artefacts, enriching every single actor and process touched.[16]

Elsewhere, often, on demand, tailor made and custom made are linked to the manifestation of a creator's personal feeling alongside the articulation of a special care devoted to the customer.

Hence, it could be correct to say that the attitude of searching for tailor-made possibilities and custom-made design do not depend only on the authentic features of the objects, but is somehow tied with a general background beyond them, the personal and social experiences and last but not least the inner feelings.

When finding the opportunity to choose within a very little range, when the possibility of being part of the most constructive part of a design process is tendered we feel cared, cocooned, demanded: we have as a tangible sign in response to an unsaid wish a possibility and a variety, and it seems to be there only for us. We feel relevant. Newson, Suggett, and Sudjic say «Even those object that can be understood as simply utilitarian can still be designed in such a way that they trigger an emotional response. It is a quality that might be seen as being an aspect of their function.»[17]

---

[14] Cf. S. Botti, "The technology of curves". In *Abitare* 573, April 2018, Milan, p. 152.

[15] Cf. M.B. Spadolini, "Introduzione", in L. Chimenz L., R. Fagnoni, M.B. Spadolini, *Design su Misura. Atti dell'Assemblea annuale della Società italiana di Design*, SID Società Italiana di Design, Venezia, 2018, p. 13-18.

[16] Cf. C. Gambardella, "HANDMADE IN ITALY. Il design dei territori italiani", in L. Chimenz L., R. Fagnoni, M.B. Spadolini, *Design su Misura. Atti dell'Assemblea annuale della Società italiana di Design*, SID Società Italiana di Design, Venezia, 2018, p. 131-144.

[17] Cf. A. Newson, E. Suggett, D. Sudjic, *Designer Maker User*, Phaidon Press Limited, London 2016, p.15.

As we have already questioned, when design process and outcomes seem to be closer to a tailor-made solution for custom pleasure's satisfaction, we could argue if this disposition is true to itself or it is instead a trick that companies and design studios do activate to recall our uniqueness, in some way getting us used and ready to the ultimate buying.

«The world of goods has moved towards a more articulated response to emotions and desires because this seems to strive for the evolved consumer ("virtuous hedonist" has been called) who already owns everything and does not seek (only) the superfluous but new symbolic qualities in everyday objects.»[18]

Thus we may say objects, products, visual design encompassing what we demand for and at the same time offering the possibility to better tailor and adapt them on our personal feeling and identity, let us perceiving ourselves as important, relevant to the brand; as it is not only our choice to pursue the final purchase, but a mutual encounter on the consumption action. It becomes a matter of trust and maybe - we might say in very emphatic way - of love.

As in the thought of Alberto Bassi, «Actual society presents itself as immersed in a situation of diffused aestheticization, of attention to the quality of the appearance of artefacts, with tangible consequences on economy and culture»[19]: then it could be evident that in the contemporary era the value of handmade work, beyond being linked to a deep historical background and cultural heritage, is felt as - expressing it in very simple words – more beautiful and imbued with higher quality.

No way this could be the truth in every case, but by thinking to be different from the mass, getting objects that accomplishes our search of being unique, in an individualistic-based massified world, we find definitely a new additional value to the traditional production, a turning point that actually perfectly displays our hedonistic way of looking at things. It is necessary, it is not and not only about trends, it is about choices, narratives, feelings.

This is why, when craftsmanship meets design, from something dated and old, it turns out to be something desirable and that is always worth of its price.

Author Contributions: Within the work here presented Luisa Chimenz wrote "Introduction" and "Conclusion", while Nicoletta Sorrentino wrote the "Methodology" section. The research here presented and the concept beyond this work is directly and equally divided between the two authors.

[18] Cf. A. Bassi, *Design contemporaneo. Istruzioni per l'uso*, il Mulino, Bologna, 2017, p.31.
[19] Cf. A. Bassi, *Design contemporaneo. Istruzioni per l'uso*, il Mulino, Bologna, 2017, p.48.

References

AIS/Design, *Il Design e la sua storia, Primo Convegno dell'Associazione italiana degli storici del design*, Lupetti – Editori di Comunicazione, Milano, 2013.

A. Bassi, *Design contemporaneo. Istruzioni per l'uso*, il Mulino, Bologna, 2017.

S. Botti, "The technology of curves". In *Abitare* 573, April 2018, Milano.

G. D'Amato, *Storia del design*, Bruno Mondadori, Milano, 2005.

De Fusco Renato, *Storia del design*, Editori Laterza, Roma-Bari 2005.

R. De Fusco, *Il gusto come convenzione storica in arte architettura e design*, Altralinea Edizioni, Firenze, 2016.

R. Falcinelli, *Critica portatile al Visual Design. Da Gutenberg ai social network*, Einaudi, Torino, 2014.

C. & P. Fiell (Eds), *domus 1928-1939*, Taschen, Kohln, 2017.

C. Gambardella, "HANDMADE IN ITALY. Il design dei territori italiani", in L. Chimenz, R. Fagnoni, M.B. Spadolini (Eds), *Design su Misura*, Società italiana di Design, Venezia, 2018.

H. Gumus Ciftci & S. Walker, S. "Design for Grassroots Production in Eastern Turkey through the Revival of Traditional Handicrafts". In L. Di Lucchio, L. Imbesi, P. Atkinson (Eds) *The Design Journal*, 20: sup1, *Design for Next. Proceedings of the 12th European Academy of Design Conference*. *Sapienza University of Rome, 12-14 April 2017*, Routledge - Taylor & Francis Group, Abingdon-on-Thames, 2017.

J. Heskett, *Design: A Very Short Introduction*, Oxford University Press, Oxford, 2005.

G. Lees-Maffei; R. Houze (Eds), *The design history reader*, Bloomsbury Academic, London - New York, 2010.

T. Maldonado, *Disegno Industriale: un riesame*, Feltrinelli, Milano, 1976.

T. Maldonado, T., H.U. Obrist, *Arte e artefatti*, Feltrinelli, Milano, 2010.

B. Munari, *Da cosa nasce cosa. Appunti per una metodologia progettuale*, Editori Laterza, Roma-Bari 2007.

A. Newson A., E. Suggett, D. Sudjic, *Designer Maker User*, Phaidon Press Limited, London 2016.

D. Russo, *Il lato oscuro del design*, Lupetti – Editori di Comunicazione, Milano, 2013.

F. Trabucco, *Design*, Bollati Boringhieri, Torino, 2015.

D. Sudjic, *B is for Bauhaus: An A-Z of the Modern World*, Penguin Books, London, 2014.

F. Trabucco, *Design*, Bollati Boringhieri, Torino, 2015.

C. Vannicola, *Il progetto scomposto*, Alinea Editrice, Firenze, 2012.

Heritage and museums for intercultural competence

Sara Eriche
Department Architecture and Design DAD (University of the Study of Genoa)
email: eriche@arch.unige.it

Abstract

As Eileen Hooper-Greenhill observes, "museums are active in building knowledge: through collections, they develop cultural narratives that produce a certain way of seeing the past and therefore the present."
Cultural broadcasting always requires active work on reworking, selecting and communication. It involves a multiplicity of actors in each community and is central to the functioning of the entire social order because it is intimately linked to the survival of a social identity.
The term Anglo-Saxon heritage studies indicate commonly on field of interest, its field of study that collects research and theories that deal with various kinds of assets as a complex phenomenon.
In the last decades of the 20th century, the field of investigation of heritage studies has undergone a transformation of scale and generalized address, driven by technological evolution.
The digital revolution in particular has greatly increased the storage, classification, elaboration and presentation of any given material and immaterial.
The definition of "sustainability" introduced in 1987 by the World Commission on Environment and Development, we can talk about "cultural sustainability" when actions or strategies adopted in heritage management meet the needs of the present without compromising the enjoyment of cultural and natural assets for future generations.
Cultural sustainability is therefore a participatory construction of a vision of staying together on a territory and perceiving it between the past and the future.

Abstract

Come osserva Eileen Hooper-Greenhill, «i musei sono soggetti attivi nella costruzione della conoscenza: attraverso le collezioni, essi sviluppano narrazioni culturali che producono un certo modo di vedere il passato e quindi il presente».

L'attività di trasmissione culturale richiede sempre un lavoro attivo di rielaborazione, selezione e comunicazione: coinvolge in ogni comunità una molteplicità di attori ed è centrale nel funzionamento dell'intero ordine sociale poiché intimamente legata alla sopravvivenza di una identità sociale.
Con l'espressione anglosassone heritage studies si indica comunemente il campo di interesse, il settore di studio che raccoglie le ricerche e le teorie che si occupano a vario titolo del patrimonio come fenomeno complesso. Negli ultimi decenni del XX secolo il campo di indagine degli heritage studies ha attraversato una trasformazione di scala e indirizzo generalizzata, sospinta dall'evoluzione tecnologica. La rivoluzione digitale in particolare ha enormemente aumentato le capacità di archiviazione (storage), categorizzazione (classification), interpretazione (elaboration) e presentazione di qualsiasi dato materiale e immateriale.
Interpretando la definizione di "sostenibilità" introdotta nel 1987 dalla World Commission on Environment and Development (Our Common future. The Bruntland Report, Oxford University Press), possiamo parlare di "sostenibilità culturale" quando le azioni o le strategie adottate nella gestione del patrimonio soddisfano i bisogni del presente senza compromettere la fruizione dei beni culturali e naturali per le future generazioni. Sostenibilità culturale è dunque costruzione partecipata di una visione dello stare assieme su un territorio e di percepirlo tra passato e futuro.

Introduction

For more than a decade, museum studies have been undergoing intense development; new reflections on the different ways of exhibiting and narrating museum objects are intertwined with suggestions from "Cultural Studies" and research on "Tourism Studies" . Museums are now at the center of a reflection that tends to review the meaning, conveyed by the way in which the collections are organized, made available and communicated; at the same time, it reflects on the ways in which it is possible to write modern museums, understood no longer as mere containers that store, preserve and exhibit objects, but as spaces for democratic and inclusive confrontation for different categories of users. In contemporary multicultural societies, museums are called upon to renew their relationship with their visitors and interlocutors, and to become centers of cultural elaboration of and in the territories, the engine for the development of a new culture of social inclusion and participation in the cultural life of society, especially with regard to that public that still has difficulties in accessing and enjoying the cultural heritage, and therefore requires more targeted and inclusive approaches. Some categories of users who can benefit from such a start are:
- young people and the very young, who often suffer from the lack of a sufficiently new, attractive and stimulating museum "learning";
- migrants, still too often relegated to the role of passive recipients of socio-cultural initiatives and policies, but in practice deprived of the dignity and role of producers and interpreters of cultural meanings;
- the disabled, who due to the barriers in communication (lack of adequate support/track for the use of the contents of the museum, as in the case of the visually impaired and deaf) are unable to physically access the places of culture;
- adults, who often demand innovative forms of communication and multisensory to make better use of the heritage to meet the expectations of the communication society and the new media they

propose. These and other stakeholders may be involved in a way that new in the process of fruition, but also of design and interpretation of assets. Visitors to contemporary museums, especially when these museums are dedicated to the representation of the cultures and the other civilizations, can no longer be considered as passive receptors of cultural messages, and it is not by chance that "Museum Studies" always aim at more to actively involve the public and the territories in a process of constant dialogue, interpretation of messages and cultural content that museums intend to convey.
With a view to dynamizing the role and the very meaning of the institutions more important than ever is the active involvement of the community of users, functional to the birth of a museum conceived by the as a place of meeting and exchange between social actors and between different cultures for knowledge, the participation of even marginal social groups, the inclusion and rapprochement of local communities with their heritage, and to the cultural heritage.

Methodology

The idea of cultural heritage in the world is changing and expanding more and more in relation to the growing awareness of its importance in the contemporary world.
The English term heritage, etymologically connected with the concept of "inheritance" - that is, something that is received from others with the aim of being handed down for the future - makes the "dynamic" idea of "receiving and preserving in order to be able to pass on" better.
In Italian culture, on the other hand, the concept of cultural heritage has only recently joined, without replacing it, the now historic concept of "cultural heritage", consolidated in the 1970s with the establishment of the Ministry of Cultural Heritage and adopted in current legislation; this term retains in its meaning the etymological link with "material heritage", and therefore with the "static" idea of conservation alone.
One of the main aspects of the social role of the museum is that the cultural heritage is consciously internalized by people as a value and is then, precisely, preserved and handed down.
The identity value of the cultural heritage, which develops a deep sense of
belonging to places, stories and memories, is also a resource for knowing, understanding and accept similarities and differences, developing a relationship that is attentive to "diversity"[1] .
Salvatore Settis has strongly argued that "what we understand as heritage cultural is the fulcrum of our national identity and our historical memory"[2].
The museum must therefore contribute to the creation of the concept of education to the
cultural heritage: "as a place of creation, the museum does not elaborate meanings objective but subjective meanings, does not communicate absolute but relative truths. It becomes thus a real place for the creation of cultural heritage and a means of communication of the meanings of that heritage[3].
Heritage is not a static fact but should be seen in a "procedural perspective": a museum can have an invaluable collection, but if there is no mediation towards the public and therefore enhancement, remains sterile. Paola Pacetti found that in Italy "for museums, to stand in front of their own public

[1] see UNESCO Universal Declaration on Cultural Diversity 2001
[2] C.f. S. Settis, *Italia S.p.A. L'assalto al patrimonio culturale*, Einaudi, 2002, Torino
[3] C.f. Pinna G., Sutera S., *Per una nuova museologia*. Icom Italia, 2000, Milano.

as a place where they can find again traces of a common identity are only rarely a priority objective of their cultural action'.

Enlarging the objective, Mascheroni, focuses on some essential principles:

- the procedural perspective of the heritage that lives and changes thanks to the continuous conceptualisation and interpretation;
- to experience each testimony and the whole of the heritage as a complex, intricate and intriguing way of proceeding to discover, know and appropriate a good common;
- heritage as a generative element, which sets in motion knowledge and relationships;
- the adoption of an enlarged and intercultural planning with the sharing of knowledge and storytelling, as well as the assumption of complex strategies.

The word "heritage" in the common sense indicates a set of objects, of knowledge and memories that have some preferential importance for an individual or for a group. Anything can become heritage in joint speeches as long as its value is evident, under the eyes of all, provided that there is a link between this thing and a subject of the type affective.

Thus, for the social communities, there are symbolic places, sites and points of reference for the of which the peoples are even willing to fight, to go to war against enemies who they put them at risk. What preceded us is identified as the cause, the motivation for who we are; or in less deterministic terms we can say that the past and tradition influences (more or less directly) our way of thinking, of seeing things. Yet to consider exclusively this 'retrospective' point of view hides the other aspect (certainly fundamental, for some, main) of heritage: that of being to all intents and purposes a human creation, a cultural construction resulting from precise choices, will and social decisions. In addition to shaping the human being, heritage is in turn shaped by the human being, and is in no way something 'natural', obvious and incontrovertible.

"The museum is a cultural structure, a physical space, a system of elaboration and diffusion of knowledge, a system of objects, an order of concepts, an order of things, a mirror of social identity, a service rendered to citizens. In short, in the museum, the immaterial and material dimensions, theory and practice, study and organization constantly coexist.

The 2004 Code of Cultural and Landscape Heritage, in listing the institutions and places of culture, defines the museum as "a permanent structure that acquires, preserves, orders and exhibits cultural assets for educational and study purposes", underlining that "the protection and enhancement of cultural heritage contributes to preserving the memory of the national community and its territory and to promoting the development of culture "[4]. Finally, a further important specification underlines that the institutions "belonging to public bodies are intended for public use and carry out a public service", while those "belonging to private bodies and open to the public carry out a private service of social utility".

[4]The museum can also be described as an environment in which different expressive manifestations correspond to a single plan of content. In fact, a museum consists not only of the goods on display, but also of an architectural envelope, an exhibition, catalogues and visitors. All these elements combine to create a homogeneous and coherent whole. As far as the architectural aspect of the museum installations is concerned, two main trends can be found in the various cases: the first is that which uses structures specially created, very complex and innovative, created by renowned architects; the second is that which reuses historical buildings (with originally different functions) and adapts them for exhibition purposes.

The most complete definition of a museum is that proposed by ICOM[5], adopted at the General Assembly in Seoul in October 2004:

"A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment".

The conviction that museums represent an extraordinary opportunity to offer culture and education is now widely shared but, especially in our country, the popular and especially the educational function of the collections are, in daily practice, still underdeveloped compared to the right expectations that are placed in them. Of course, we must consider that the other specific task of museums, namely the conservation of "material evidence of man and his environment ", requires a huge amount of resources and that, if we want to draw a hierarchy between the various duties of museums, this is certainly before all others, since the damage to the collections or their loss are events that irreparably impoverish our cultural memory.

Museums, in fact, are perhaps the only places, outside of school and university, where it is possible to do teaching at the institutional level, but compared to the school world they are aimed at a very diverse audience, both in terms of age and expectations. This fact, if on the one hand it makes their educational task very complex, on the other it makes them emerge as organizations of great importance for an "educational society", a society that sees in the cultural growth of citizens, throughout all phases of their lives, a great resource and that therefore creates, organizes and feeds a dense network of educational agencies. In this perspective of lifelong learning, museums and their educational activities are undoubtedly some of the most important issues.

By starting to reflect on heritage as a possible field of intercultural dialogue, one immediately realizes how this process requires "action-research" experiences based on a contextual development of theory and practice.

This contribute aims to provide an overview of some of the paths that museums have taken so far in an attempt to respond to the opportunities and challenges of a multicultural society.

Richard Sandell[6] identifies three main areas of intervention: access, participation and representation.

The first area, access, focuses on ethnic minorities as traditionally under-represented publics among museum visitors/users, and on the processes by which museum users have attempted to overcome their low attendance.

An example of activities that fall within the scope of access is the so-called "culturally specific programming", i.e. the development of temporary exhibitions and events around objects that have a particular meaning to a given community. At best, these initiatives are driven by the interests of the community itself, rather than by "institutional" or curatorial interests.

These processes generally involve the removal of the main barriers to entry to a museum (be

[5] The International Council of Museums (ICOM) is the leading international organisation representing museums and their professionals. The organization assists the museum community in its mission to preserve, preserve and share the present and future cultural heritage, both material and immaterial.
The organisation brings together a network of 40,860 museum members and professionals in 138 countries and territories.

[6] C.f. Sandell Richard, Museums and the combating of social inequality: roles, responsibilities, resistance, in Sandell R., New York: Routledge, 2002.

they physical, intellectual, cultural/attitudinal or financial) and/or the development of activities and programmes specifically aimed at "new citizens". This increased focus on accessibility has been increasingly recognised and is now, at least in some countries, part of the "ordinary" functions of many museums. The second area - participation - is the involvement of the relevant public in an effective process of consultation and participatory planning. For example, museums that are committed to participation use temporary exhibitions and permanent exhibitions to promote understanding and appreciation of different cultures.

The third area - representation - concerns the way in which museums have begun to counterbalance the lack of or distorted representation of certain groups and cultures in their collections and arrangements, questioning dominant values and contributing to the construction and dissemination of alternative narratives. (fig.1)

Fig.1 Castello D'Albertis - Museum of World Cultures in Genoa, house-museum that collects the ethnographic, archaeological and marine collections assembled between the nineteenth and twentieth centuries by Captain Enrico Alberto D'Albertis, and later supplemented by other donations to the City.

Conclusion

The concept of heritage, today widely used for its significance and importance, is strongly connected with that of territory and community.

In order for heritage to continue to have a real value in modern societies, it is necessary to give it a new value, both social and cultural, by strongly linking it to the identities of the communities and places in which it is found that human communities live in.

The methods of participatory inclusion of territorial communities and certain social groups seem to be moving in this direction, set up to create routes for visiting cultural heritage, museums and others, and therefore for a choral interpretation of them.

These innovative and still very experimental approaches, although originating in the context of museums, can usefully be applied to territorial contexts through the mediation of small local museums; these are often linked to identities, cultures and economies of well-defined communities and contexts, therefore they can become driving centres for the development of original forms of cultural tourism, to lead visitors and tourists from museums to territories, accompanying them to the discovery of a past represented by museum objects and local cultural traditions still alive on the territories. This can allow the mediation of the meanings of heritage, creating a bridge between territories, subjects and interlocutors who find it difficult to find common spaces for comparison, for a more democratic and inclusive access to culture and for the growth of forms of shared heritage.

References:

AA.VV: *Tangible and Intangible Heritage. "Museum Iternational"* vol. 56, n.1-2. , 2004, Paris: ICOM.

Antinucci, F., Comunicare nel museo, Laterza, 2004, Roma - Bari,

Baldacci, V., Gli itinerari culturali. Progettazione e comunicazione, Guaraldi, 2006, Rimini

Bodo S, Cantu S., Mascheroni S., *Progettare insieme per un patrimonio interculturale, Quaderni ISMU 1/2007*, Fondazione ISMU; 2007, Milano

Bodo S., *Il Museo relazionale: riflessioni ed esperienze europee,* Edizioni Fondazione Giovanni Agnelli, 2003, Torino.

Bodo S., Mascheroni S., *Educare al patrimonio in chiave interculturale*, Fondazione Ismu, 2012

Bodo S., Gibbs K., Sani M., *MAP for ID. I musei come luoghi di dialogo interculturale: esperienze dall'Europa*, 2009.

Bollo A., *Nuovi scenari e vecchie liturgie del consumo culturale. Che cosa accade e perché è così difficile prevedere il presen*te.In De Biase F., Franco Angeli, 2008.

Callari Galli M., *Antropologia culturale e processi educativi*, La Nuova Italia, Venezia, 1999.

De Luca, M., *Comunicare la cultura*, Franco Angeli, 2007, Milano

Franco B., *Regional Museums and Economic Sustainability.* In International Council of Museums, ICOM, 2012, Paris

Pecci, A.M., *Patrimoni in migrazione. Accessibilità, partecipazione, mediazione nei musei*, Franco Angeli, 2009, Milano

Sandell R. (a cura di), *Museums, Society, Inequality, Routledge*, 2002, London

Sandell R., *Rappresentare la differenza. Strategie espositive nei musei e promozione dell'uguaglianza*, in "Economia della Cultura", n. 4/2004 cit., pp. 539-546.

Sandell R., *Misurarsi con la diversità e l'uguaglianza: il ruolo dei musei,* in Bodo S. e Cifarelli M. R. (a cura di), Quando la cultura fa la differenza cit., pp. 136-148.

Satta, N., *Partecipare al patrimonio. Riflessioni su nuove modalità di rapporto tra pubblico, patrimonio culturale e territorio*, 2005,http://www.mondilocali.it/wp-content/uploads/2011/03/2005-Satta-Partecipare-al-patrimonio.pdf.

Jalla D., *Il museo contemporaneo. Introduzione al nuovo sistema museale italiano*, UTET Università, Torino, 2003.

Visual arts, images and culture for the contemporary yacht-design's diffusion

Maria Elisabetta Ruggiero
Department Architecture and Design DAD (University of the Study of Genoa)
email: ruggiero@arch.unige.it

Abstract

After the glories and the search for perfection of the Renaissance, for everything that was spectacular, new and symbol of wealth and power began to spread giving life to forms of architecture and art never seen before. These new expressive languages constituted a sort of "manifesto" in which the new spirit was declared conditioned by specific social arrangements, geographical and scientific discoveries and were marked by the will to amaze, to show wealth and power, distancing itself from the past.

Today, in the yacht design world we are witnessing what we could call a formal neo-Baroque, similar to the one just described.

If until yesterday it was sufficient, to explain the current trends, to recognize the evident tendency towards gigantism, now this reality is no longer effective in expressing what it is happening.

The formal solutions that follow one another, most of the times only virtually, appear ever more distant from the iconography and the classic forms of the yacht.

On one side, this would like to experiment with new ways of managing space, on the other, it would like to propose something that will amaze even if far away from normal practices of the naval tradition.

We could say that, in many aspects, the image is going to replace the true consistency, triggering extremely varied visual and design culture phenomena. The here proposed study intends to evaluate what are the trends in terms of visual culture and what are the factors that determine their development[1].

[1]This work was supported by *Fondi di Ricerca di Ateneo*, (FRA 2017), University of Genoa, focused on a research entitled "Arti visive e immagini: la comunicazione nel panorama dei grandi yacht"

Abstract

Dopo i fasti e la ricerca di perfezione ed armonia del rinascimento, la ricerca per tutto ciò che fosse spettacolare, nuovo e simbolo di ricchezza e potenza iniziò a diffondersi dando vita a forme di architettura e arte mai viste prima. Questi nuovi linguaggi espressivi costituivano una sorta di "manifesto" in cui si dichiarava il nuovo spirito condizionato da specifici assetti politici, scoperte geografiche e scientifiche ed erano improntati alla volontà di stupire, di dimostrare ricchezza, potenza e supremazia, prendendo le distanze dal passato e dai rigidi schemi degli stili precedenti dando così forma allo stile Manierista prima e Barocco successivamente. Oggi, nel mondo del design degli yacht stiamo assistendo a quello che potremmo definire un neo-Barocco formale.

Se fino a ieri le tendenze in atto prevalenti erano riconducibili alla evidente tendenza al gigantismo, ora questa notazione non è più efficace ad esprimere quello che sta accadendo.

Le soluzioni formali che si susseguono, il più delle volte solo virtualmente, appaiono sempre più lontane dall'iconografia classica dello yacht. Questo quasi vorrebbe da un lato sperimentare, in maniera assolutamente lecita, nuovi modi di gestione dello spazio, dall'altra, la sensazione che si evince, è quella di voler proporre qualche cosa che stupisca, sempre di più, anche a dispetto talvolta di buon senso e normali pratiche della tradizione navale.

Si potrebbe quindi asserire che l'immagine stia prendendo il posto della reale consistenza dei progetti, dando vita ad una estrema varietà di fenomeni legati alla cultura visiva.

Lo studio qui proposto intende valutare quali siano le tendenze in atto in termini di cultura visiva e quali siano i fattori che determinano il loro sviluppo.

Introduction

The splendour and the magnificent compositional harmony of many Renaissance works, in which the rule and the proportion determined the forms of architecture, were followed by a new stylistic expression. The will to amaze, to overcome the rules, to propose something completely different from the usual, became crucial. In the post-Renaissance period, what is called Mannerism and later Baroque, the imagination and the spectacularity are the protagonists of the great achievements.

We think of the Palace of Versailles, and all the repertoire of villas, palaces and gardens that, in the same spirit, defined a kind of race that proposed something amazing and innovative for both forms and materials and adopted formal languages. Although the Baroque is seen by many critics as the beginning of a crisis that will lead in the centuries following the profound change brought about by the modern era, today, in the world of yacht design we are witnessing what we might call a formal neo-Baroque.

If until yesterday the prevailing trends were attributable to the obvious tendency to gigantism, now this notation is no longer effective in expressing what is happening

The formal solutions that follow one another, most of the time only theoretical, appear more and more distant from the classic iconography of the yacht. This would almost want to experience, in an absolutely lawful way, new ways of managing space, on the other hand, the feeling that is evident, is that of wanting to propose something that is astonishing, more and more, even in spite sometimes of common sense and Normal practices of the naval tradition.

It is permissible that the desire of the designers, or rather would be to say of the man, to experiment and to overcome consolidated limits constitutes the first engine of the evolution and the growth,

however, the acceleration and the hyperbolicity of certain solutions can, and perhaps must, make us reflect on the significance of this trend.

The yacht/ship, as known for centuries, constitutes a symbol of affirmation, power, and prestige, and, today, this valence is even more evident. However, in an equally obvious way, the only "substance" of the yacht seems to be no longer sufficient and the reasons perhaps are many and the study presented here intends to investigate the trends of this evolution.

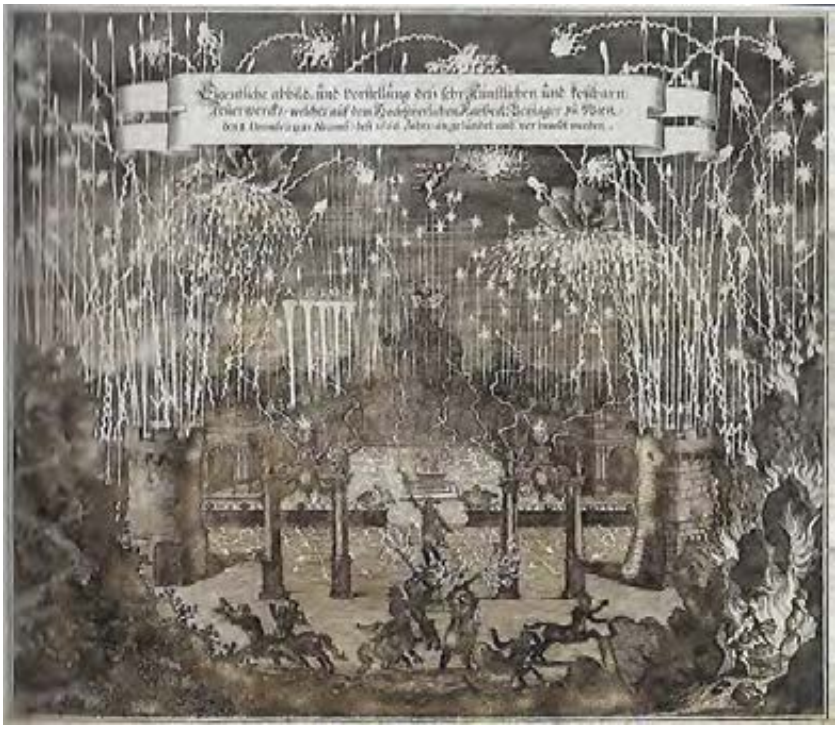


Fig.1 Feuerwerk zur Hochzeit Kaiser Leopolds 1 mit der Infantib Margarita Teresa am 8 12 1666. Anonynous Wien, theatermuseum, Inv.-Nr. GS_GFeU27: Theatricality and technical expertise in the Baroque era in which ephemeral and architecture merge together.

Methodology and analysis

Fig.2 Boats outside Monte Carlo's harbor during the annual Boat Show. A Special landscape taken from a "far away" distance, not only physical ma also conceptual.

Fig.3 An original concept for a Monte Carlo inspired super yacht: utopia and gigantism.

Fig.4 Hyperdecorativism and new models of luxury.

Fig.5 Icon-Selazzio 95 sea palace: exteriors and interiors cooperate at the same spectacular effect.

To define what makes possible the current trends encountered necessitates a progressive analysis of the contexts in which this culture develops and what it produces.

A first analysis is based on the fact that, although there is a great deal of interest in these boats, in reality the experience of them is very rare, and in the majority of cases the only knowledge that one has of them is through the Magazines and therefore through the only observation of images. This phenomenon introduces the awareness that the image becomes the prevailing vector of a world of suggestions, styles and identities that is, precisely because of its ephemerical substance, far from tangible and concrete. To this consideration it is added that in recent years fleets of shipowners are forming from cultural areas whose artistic sensibility is characterized by a hyperdecorativism and, duly, they feel the necessity to express this cultural identity. At the same time, the targeting of images, coming from every sector such as cinema, fashion, design and car-design in particular, lead to the search for proposals that will fulfill the desire to concretize certain atmospheres. And all this is considered, if not possible, at least plausible by the opportunity to create virtual images, with absolutely realistic resolutions, which delude to be able to make really certain proposals... with the excuse... when they are really excessive... that is just a “Concept”.

Another analysis, necessary although less aulic than the recognition of a certain desire for stylistic utopia, is that in the vast array of designers who now overlook the world of yacht design the only way to try to be noticed and stand out both Just to show up with proposals, sometimes bordering on the absurd, but that thanks to the likelihood of certain renders appear as real. These have, however, as a potential result the diffusion of the illusion that everything is possible and that certain solutions are now completely outdated, generating expectations unfortunately in many cases not materiable. What makes the world of yachts unique is that as Le Corbusier said “in the steamboat (the architect will find) the liberation from the cursed secular servitude... The House of the inhabitants of the Earth is the expression of a decayed world with small dimensions. The steamboat is the first step towards the creation of an organized world with a new Spirit (1921). “ or a yacht/steamer can and must actually create the opportunity to experience unusual solutions in which creativity, technology and know how to achieve the qualitative optimum, and the sea is fortunately rich in certain examples. However, the paroxysmal research of the unusual, devoid of a conscious orchestration of design, can lead to the formulation of empty expressions and completely unachievable, with the only result of producing a visual cacophony in the variegated world of Yacht Design.

Fig.6 The language of some images proposes rhetorical styles typical of a certain emphasis. This kind of language can be independent from the subject and is focused to create a theatrical effect.

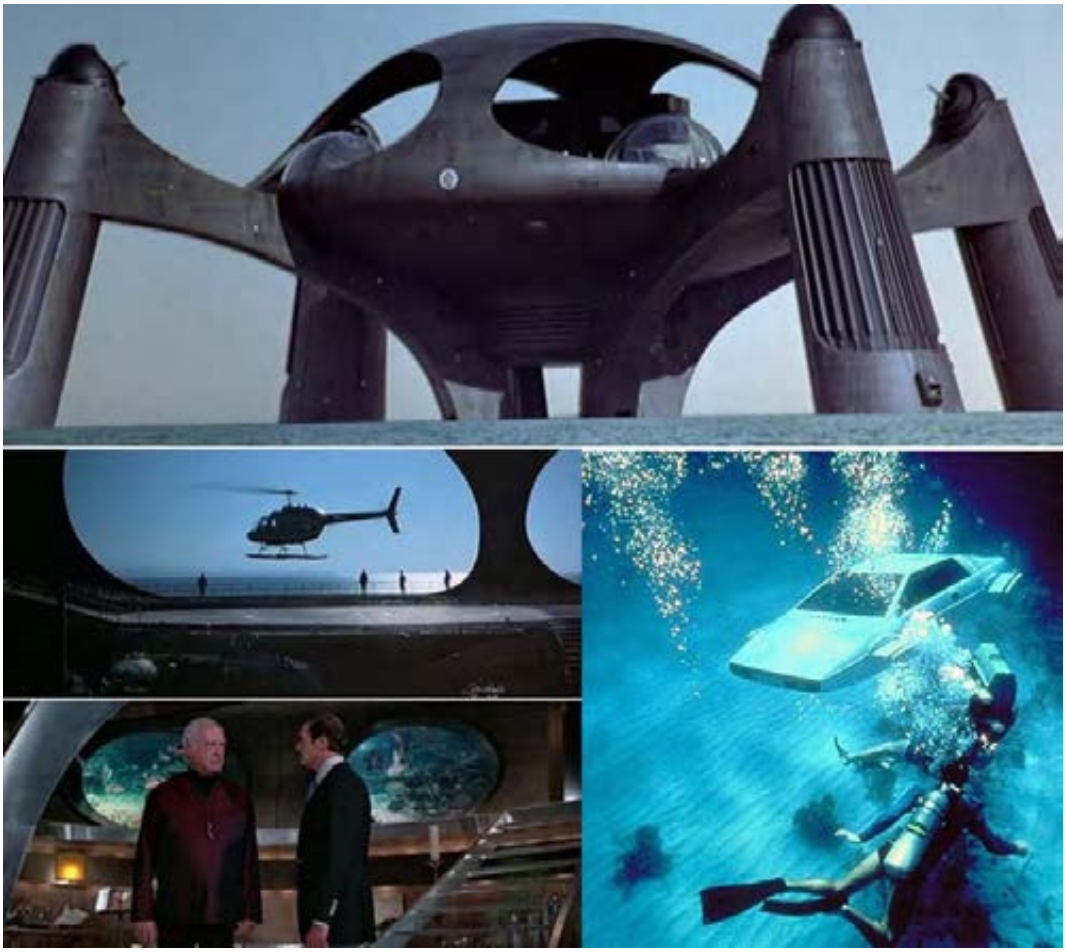


Fig.7 James Bond adventures and special naval models from the movie Octopussy, 1983

In particular the world of visual languages, today, refers not only to images created ad hoc for magazines or brochures dedicated to a shipyard or a boat in particular, but also for example to the image that proposes the stereotype of the "yacht" in Cinematography for example. Vessels/ spaceships presented in many films in the James Bond series, for example, identify with places where innovation and spectacularity are part of the scenography and theatricality in the narrative. Similarly, the videos, mostly deduced from digital models, for the presentation of prototypes, rely on a communication geared to emphasize aspects such as the grandeur and theatricality of some solutions. Passages from the detail to the general, progressive Zoom out, light games and perspectives specially studied contribute to the definition of an image traceable to values of exclusivity, elegance and grandeur, gathering in a certain sense, also part 'f the first '900 tradition when the first affiches for the great transatlantic liners were spread. Perspectives from the base upwards, with a perfect symmetry and narrative emphasis still today are the language with which to tell certain suggestions.

Conclusions

The role of the designer or who will have to deal with the real construction becomes increasingly complex, having to be in the condition of wanting/having to combine their professionalism and willingness to try new challenges. This complexity of scenarios introduces the need to be able to explain that certain ideas, unfortunately, would lead to difficulties and risks that prove unachievable... and not because they are not technically possible in the absolute sense... but because they would introduce in the project variables and unknowns that ill fit the delicate and complex world of a yacht, not to mention any additional costs.

It is easy to overcome the limits in a theoretical and utopian way, and from a certain point of view is also right, but the ability of a good designer is also to know how to orient the course of their flights by reinterpreting and not ignoring constraints sometimes indispensable. If the representation is an exceptional tool to be able to give a first concrete form to what initially is just an idea, it is also true that it is an extraordinary method of research of the consistency, technique, size and material of a project, a method to analyze the feasibility of a concept. To stand out and overcome what others have done is the basis of our made in Italy, in particular, but at the same time this process must have assumptions of knowledge and awareness of the rules without transforming the design evolution into a sterile race Within a kaleidoscope of utopian images.

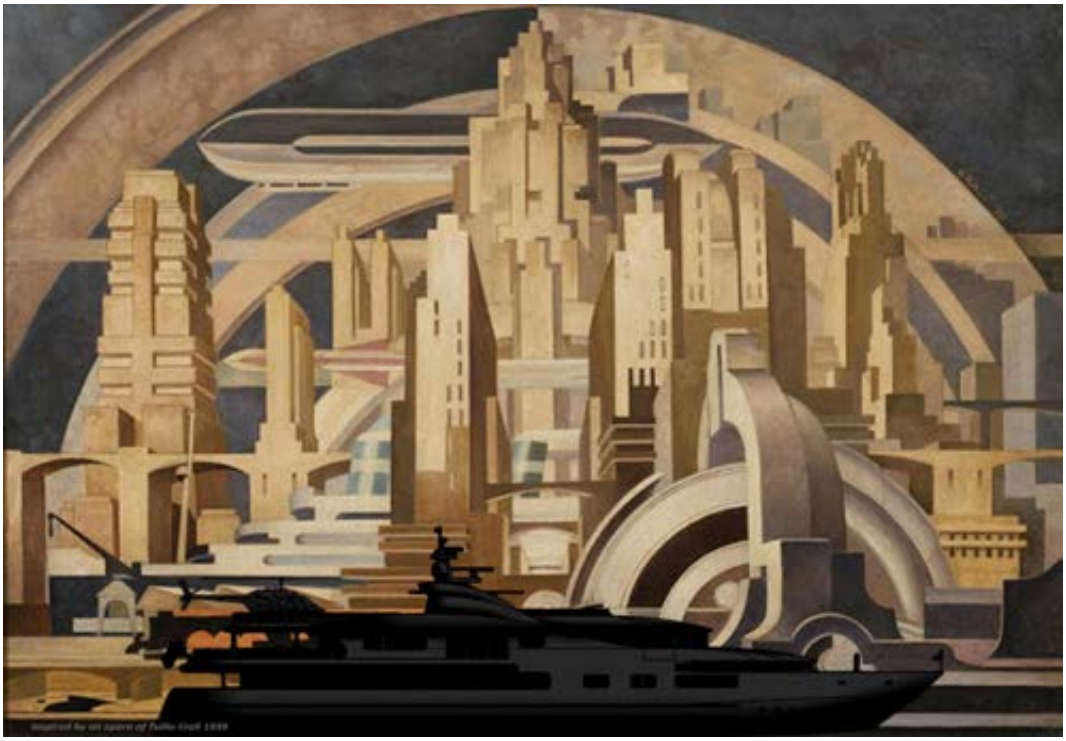


Fig.8 A yacht and a utopic landscape as a prevision of future design evilutions. Image realized by E.R by interpretation of an opera by Tullio Crali 1939

References

Ruggiero V., *Changes in design approach for large yachts*, Proceedings book, Book 4 Volume II, III International Multidisciplinary scientific conference on social sciences & arts - SGEM 2016, Wien, 2016.

Harris T., *The superyachts*, London (UK), vol. 28, 2015.

Multidisciplinary scientific conference on social sciences & arts - SGEM 2017, Wien, 2017

Unali M. *Atlante dell'abitare virtuale,* Gangemi, Roma, 2014

Delusive surfaces: the art of mimicry and dissimulation in design and architecture

Enrico Carassale
Department Architecture and Design DAD (University of the Study of Genoa)
email: carassale@arch.unige.it

Abstract

The camouflage, or the ability of an organism to modify its exterior features in order to conceal its appearance through an illusory apparatus, is a typical prerogative of the natural world, but it is also applied in different fields of design in the variety of solutions aimed at dissimulating the wrapping surfaces; in particular, the need to conceal the intelligibility of a built volume can have different purposes: environmental, strategic or purely aesthetic. It is worth considering, therefore, the historical aspects that led to the birth and evolution of this particular "aesthetic definition" in the different fields of design.

This excursus cannot therefore ignore the origins of certain aesthetic artifices such as the "Dazzles" which, despite their rigorous strategic purpose, reveal important links with the art world and are also a source of inspiration for contemporary design.

The theme of architectural camouflage appears today more and more current, especially considering the relationship between the designed object and its context, which is increasingly articulated and diversified in the overlap of heterogeneous aesthetic codes, increasingly saturated and, therefore, increasingly sensitive to the introduction of new "settlements" (whether they are buildings, infrastructures, means of transport, or simple objects of daily use). It also outlines - beyond the figurative expressions - the impulse for the research on new adaptive surface coatings, able to modify the characteristics of the casing in relation to the different variables in the environmental reference.

Abstract

Il mimetismo -ovvero la capacità di un organismo di modificare i propri connotati, al fine di celarne l'apparenza, attraverso un apparato illusorio- è una prerogativa tipica del mondo naturale, ma è altresì applicato nei differenti ambiti del design, nella varietà di soluzioni progettuali volte alla

dissimulazione delle superfici d'involucro; nello specifico, la necessità di celare l'intellegibilità di un volume costruito può sottendere finalità di ordine differente: ambientale, strategico o prettamente estetico. Sono indicativi, quindi, alcuni aspetti storici che hanno determinato la nascita e l'evoluzione di questa particolare "definizione estetica", quale espressione progettuale, e la relativa specializzazione nelle molteplici particolarità applicative.
Tale excursus non può pertanto trascurare le origini di certi artifici illusori, quali i Dazzle che -pur nella loro rigorosa finalità strategica- rivelano importanti contaminazioni con il mondo dell'arte: divenuti, perciò, motivo ispiratore del design contemporaneo.
Il tema del mimetismo architettonico appare, inoltre, significativo in virtù dell'interrelazione tra l'oggetto progettuale ed il contesto ambientale, che appare oggi sempre più articolato e multiforme -nella sovrapposizione di codici estetici eterogenei-, sempre più saturo e, quindi, sempre più sensibile all'introduzione di nuovi "insediamenti": siano essi edifici, infrastrutture, mezzi di trasporto, od altre dotazioni d'utilità quotidiana; prefigura altresì delle connessioni tra l'espressione
figurativa e la ricerca tecnologica: nella sperimentazione, per esempio, dei nuovi rivestimenti "adattivi", capaci di assecondare, dinamicamente, le variazioni dell' ambiente di riferimento.

Introduction

The relationship between form and function is the main foundation of the design work and therefore the characterizing connotation for any design product, at different scales: be it a building, a means of locomotion, an electrical appliance, a tool, a device or a simple container.
It is based on the precise correspondence in formal terms between the operational characteristics of the finished work and the proportionate complex determined by the expressive code through which such functional contents take place and are conveyed to the user of that particular object: it is therefore a relationship based on a completely perceptive process that establishes the connection, more or less mediated, of the intrinsic characteristics with the external ones. The formal apparatus is therefore the instrument through which the object transmits information aimed at its use and its functionality.
The formal apparatus is therefore the instrument through which the object transmits information aimed at its use and its functionality. Alongside this purpose we can identify those additional to the functional connotation, such as for example those that contemplate the form built in relation to the environmental context of reference.
This feature is common to most of the project categories related to Design: from architectural artifacts to industrial products, automotive, boating. Each object is not only perceived by virtue exclusively of its own form - in an avulsed way - but by virtue of that complex multiform system - and differently structured by information of various nature - which constitutes the reference context: according to the precise mechanisms of perception, these aesthetic contents are not objectively immutable but, in fact, subjective, dependent on the determining conditions, that is: from the complex of environmental characteristics, relevant for a given object in a given condition of use, which can therefore be considered the decisive variable in the aesthetic definition of the design object.

The architectural envelope: a system of aesthetic connection with the environment

In relation to the physical, landscape and climatic characteristics, the environment primarily influences the functional properties of a product, and therefore, consequently, the perception of the formal ones.

The part of any Design object more connected to the perceptive aspect is generally the external surface: this defines the expressive terms, ie, the connection mode between the design content and the context variables. The casing is therefore the element of the project that tends to be dependent on the particularities of the reference scenarios that influence the conditions of use, and therefore the relationship with the user, of the object.

This, in general terms, can be applied to the totality of the design works that characterize the built world, in that articulated and multiform variety of possible configurations of the landscape in the landscape conformation through the continuous evolution of the anthropized environments.

In a variegated multiformity of the possible urban scenarios the characteristics of the casing of an architectural object (broadly extending this definition to any identifiable object in the Vitruvian triad and equipped with a habitable cell, whether fixed or moving, therefore also to the products of automotive and ship design) are differently configurable in relation to these variables.

The functional characteristics of the designed object find expression in the ever more varied articulation of possible configurations of its casing.

The wrapping surface appears to be more and more defined by an expressive variability, in the surface finish, in the relationship between solids and voids, between opacity and transparency, in the transformability of the parts that compose it, as a consequence of a functional order increasingly aimed at adaptability to multiple conditions of use, in the differentiated configuration of the landscape, environmental and climatic characteristics.

The coating is therefore the connective system between the architectural organism and the environment: in an inhabitable cell it regulates the transpiration, the transparency, the panoramic view, the lighting, and from the aesthetic point of view, the ability to conform to the surrounding context , providing formal information about its intrinsic characteristics, also determining the reference code that is identified in the intelligibility, the language through which any project object exchanges information with the surrounding world. Communications medium, a vehicle for formal information, interaction, in order to find -with different ways, affinity or contrast- a dialogue with the context. The intelligibility of a design object depends on the more or less accentuated linearity of this exchange of information and therefore its level of interaction with the surrounding world. Its expressive immediacy is sometimes ensured through a series of measures, both aesthetic and technical. It may happen that, for certain design purposes of a different order, this continuity is artificially altered through distorsive mechanisms: that is, capable of modifying the intelligibility, for which the reading of a design object occurs and, therefore, the relative identification of contents and functions. The complex of devices, of an aesthetic-formal order aimed at creating a visual interference field, to create a perceptive disorientation of the real forms of objects, becomes a real design practice identifiable precisely in mimicry.

Mimicry, a graphic apparatus applied to the architectural surface

The mimicry is applied to the world built for multiple purposes of use, from the aesthetic to the purely utilitarian, they are all in the first place united by the use of the illusory system. This takes shape, from its first applications, through the adoption of particular graphisms, that is, artifices deriving from the figurative field of graphic arts referred primarily to the current of Abstractionism. The first applications in the field of illusory systems are to be ascribed to a work of surface decoration, a fixed apparatus that, however, changes its characteristics depending on the different observation points. At the beginning of the twentieth century, the graphic artifice based on a decorative illusory apparatus becomes a utilitarian tool, thus finding its strategic purpose, thanks to the intuition of a British artist Norman Wilkinson, enlisted in the First World War with the rank of lieutenant commander of the English Royal Navy. In the war operations that involved the United Kingdom in defense of the Gallipoli peninsula, in the Dardanelles area against the Ottoman armies, the officer developed the idea of elaborating a graphic complex of geometric and wavy lines, combined with contrasting colors, variously intersected, in order to compose a polyhedral web able to alter the correct visual perception of the shape of the object to which this graphic system is applied. To this end he availed himself of the collaboration of the reservist Edward Wadsworth, a Yorkshire artist (Fig.1).

Fig.1. Graphic schemes: the art of Vorticism as the inspiring motif of Dazzle. From left: magazine cover Blast Vorticism (1915); Edward Wadsworth, Wiew of town (1914)

The ingeniousness of this astute as simple trick found the approval by the senior military summits that saw the effective possibility of applying this system of circumvention to its operating fleet, in order to influence the estimation, by enemy observers, of information about: type, tonnage, and, last but not least, the direction of advancement of the sighted ships.

At a time when the estimates regarding the position of the enemy fleet were only optical-visual, the invention of a graphic code capable of deceiving this series of information was undoubtedly a winning weapon with respect to the opposing front. Following subsequent studies conducted by military strategy analysts, it emerged that these measures - developed in the military for over twenty years, substantially until the advent of radar and reconnaissance aviation - were able to completely evade, as well as the information mentioned above, including those relating to the actual distance and the speed of advancement of the disguised ship, a device that allowed the latter to prevent first the correct tracking of the target by the enemy armament, and consequently the possibility of surprising this last with a close attack and therefore more effective.

The simple use of an apparently innocuous decorative graphic system, aesthetically strident with respect to the tragedy of the war context, turned out to be of an efficacy equal if not superior to that of the most sophisticated armament of that era. The actual elusive character and therefore the strategic value of that aesthetic artifice, at first dilapidated, appeared inexorable in its raw evidence in the statistical data: the enemy fleets had been deprived of their offensive potential significantly. So it was that in the space of a few years this extravagant decoration was revalued and applied by all the sea forces involved in the war scenario of the First World War (Fig.2).

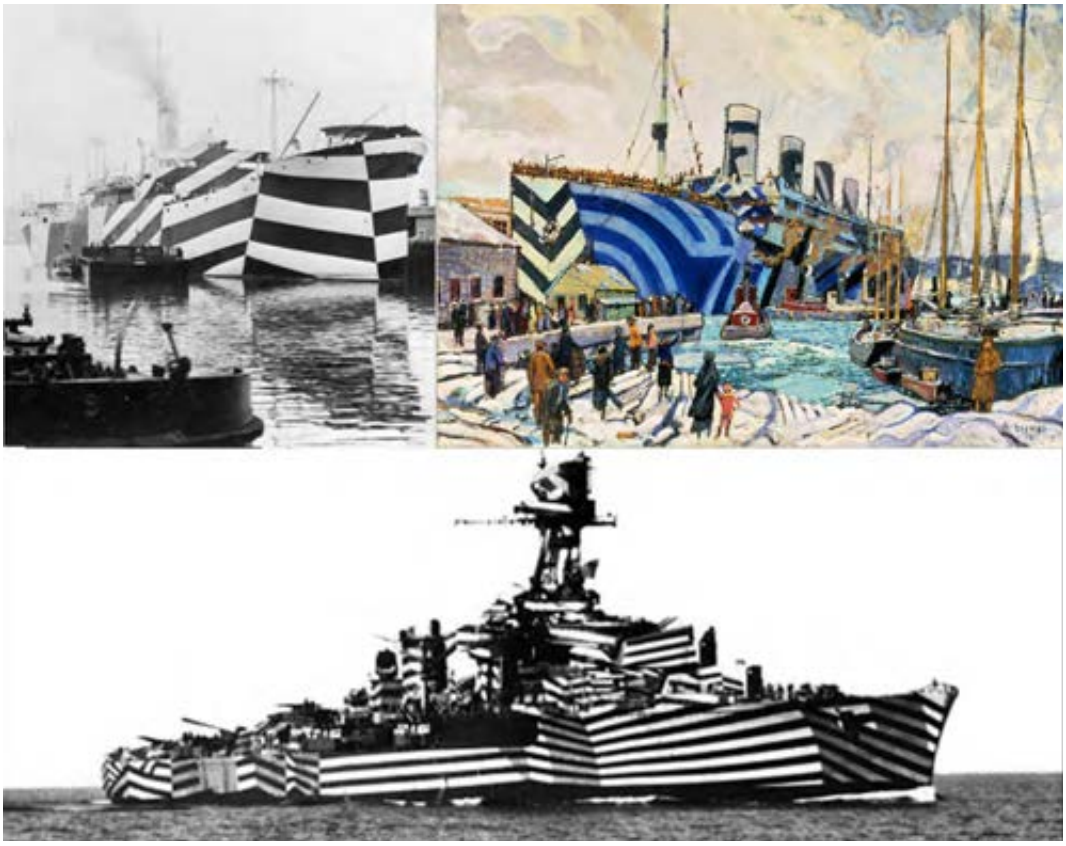


Fig.2. Camouflage equipment applied to military and civil shipping during the 1st World War. From above: Dazzle merchant ship; Arthur Lismer, Olympic with Returned Soldiers (1918); French Navy warship Glorie (1936)

In the time interval from 1915 to 1939, until the advent of radar tracking systems, the camouflage system evolved to meet the particular needs of combat strategies, acquiring configurations varied with respect to the original ones, with always new combinations of graphisms, which applied to the surfaces of the hulls and to the jagged frameworks of the superstructures gave rise to multi-faceted formal combinations particularly evocative; also appreciable in the aesthetic effect generated by the ship at berth, in the relationship with the articulated landscape context of the port structures and in general with the background of the urban scenario.

Dazzle: between Art and Design

The alteration, in the possible variations, of a repeated geometric motif is inspired by the graphisms that animated the artistic scene of the beginning of the twentieth century, in the reference to Abstractionism: Its visual language - which denies any link with the traditional expression of the form - thus becomes the privileged vehicle of this illusory instrument that figuratively connects to the typical themes of vorticism and, therefore, of Futurism and Cubism, typical expressions of the modernist avant-garde. This expedient, the result of the fusion between the abstraction of art and the pragmatic application to an unprecedented function, was not intended to conceal the presence of the object but to alter its contextualization: has been a strategic instrument wich constituted, from the figurative point of view, an inspiring motive that, after decades, generated reworkings of these devices, both in the artistic and Design field.

The Dazzle motif - enucleated of its primary utilitarian meaning, in the external aspect of decorative system applied to a boat - became a theme of study and application, at the base of the work of the artist Tobias Rehberger with the project of aesthetic reconfiguration of the HMS President (1918) realized in 2014, on the occasion of the "14-18 NOW World War 1st Centenary Art Commission"[1]. The artist addresses the issue of the perceived shape-shifting, in this case superstructure and bulwarks of a 1918 military ship, through the elaboration of a decorative apparatus that wants to recall precisely the strategic camouflage systems of the First World War. The idea of the repetition of the shapes is changed -variable and altered, in terms of dimensions and direction- that compared to the original models, are now changed through the insertion of new graphic motifs: the decorative complex here loses the original reference to the interweaving of the geometric lines, typical of Vorticism, to acquire a surrealist inspired graphicism based on a network of overlapping fittings and pipes in a boundless combination of possible ramifications; however, the chromatic contrast remains there, as a common characteristic of the two different decorative types. As for the original, even in this case the purpose of reinterpretation is the concealment, through a superficial apparatus that is able to subvert the order of correspondence between the shape of the external body and the functional parts of which it is composed; only that, in this case, the objective of the illusory apparatus is no longer strategic, in relation to the dynamic relationship between the observer and the target, but concerns the object's perception through the reading of its shape. Secondly, it alters the relationship between the object and the urban context, determined in a series of constructed volumes and natural elements that are clearly intelligible in their correspondence between form and function.

[1] HMS *President* painted by Tobias Rehberger in 2014 to commemorate the use of dazzle camouflage in World War I.

The insertion of a mimetic system in a structured context determines a point of discontinuity in the reading of the landscape and in the ordered perception of its environmental components. By virtue of this discontinuity, camouflage could be counted among the instruments used by contemporary architectural Design to alter not only the relationship between object and reference context but also between form and function of the object itself.

The aims of superficial disguise in modern Design

Also in the naval field, the Guilty, a 35-meter long motor yacht built in 2007 by Rizzardi shipyards, with the design of the installations by the architect Ivana Porfiri, appears to be significant. From a formal point of view, the boat subverts the aesthetic canons of traditional motoryachts generally characterized by classic external lines marked by dynamism, adopting - in this case - larger, more regular, geometrically shaped superstructure volumes. From the perceptive point of view the aesthetic impact of this design choice is eluded through a superficial aesthetic apparatus inspired by the dazzle, commissioned by the owner, the Cypriot art magnate and collector Dakis Joannu, to the American artist Jeff Koons. The decorative system, in this case, is based on a graphic apparatus in which the motifs of early twentieth century Vorticism merge with those of Pop Art, generating a multifaceted and articulated complex that, applied to the external shapes of the superstructure and the hull, completely alter the perception of disharmonic and disproportionate –heavy, in relation to the hull- deck volumes. (Fig.3)

The focus shifts, therefore, from the built object to the relationship between its forms and those of the context, in particular, given by the boats facing when the boat is moored.

The discontinuity in the reading of the built body is therefore evident, in the relative attribution of the functional parts, in relation to a traditional construction where this attribution is clearly identifiable. The object becomes dematerialized because its surface, in this case, does not appear as a combination of solids and voids, but thanks to the elusive figurative apparatus becomes a hermetic envelope, since it lacks the intelligibility of the architectural organism. In the contemporary era, therefore, the camouflage is covered by a new elusive purpose, no longer linked to strategic ends but rather to the expressiveness of the designed object: in relation to the correspondence between the form and the function of the designed object, in accordance with the new design trends; specifically, in consideration of the aesthetic versatility of the surface envelope in adaptability to the variables of a dynamic context.

Dazzles reconfigures, beyond the mimetic end, a new formal-functional balance in the correspondence between the architectural components: it reconfigures, that is, the mode of aesthetic characterization -partial and total- of the project.

Among the different applications of this important instrument of optical illusion, modern industrial design provides for an extensive use, even during the training process that leads to the finished product: that is a functional tool for production.

The theme of the recognizability of the form, in fact, can affect the field of design not necessarily in relation to the definitive aesthetics of the constructed object. It often becomes an illusory device applied in the intermediate stage of the product design process: is an example in this sense the practice of using camouflages in the automotive industry to products that, not yet technically

defined, must be tested in road behavior, but they must not be publicly disclosed in aesthetic details. The use of the Dazzles allows the car to be tested to remain invisible in its final form and, at the same time - compared to the traditional camouflage systems obtained through added parts applied to the car body - not to alter its performance content in terms of aerodynamic resistance. Also in this case there is a need for a functional order connected to aesthetics, in particular: the relationship between the shape of the object considered and its perception (Fig.4).

The formal perceptual relationship acquires a particular value in modern Design in relation to the general terms to which the object refers: that is, its operating conditions, understood as a complex of relationships, aesthetic, operational, functional, social that constitute the overall structure of the context.

Fig.3 Contemporary reinterpretations on the theme of Razzle Dazzle. From above: Snowdrop by Peter Blake (14-18 NOW); HMS President by Tobias Rehberger (14-18 NOW); Guilty by Jeff Koons (2007).

Fig.4. Modern superficial covering apparatuses aimed at dynamic mimicry. From the top: Brook Andrew Melbourne tram; Camouflage train Kazuyo Sejima (2018).

Conclusions

In the different applications of modern design, strongly characterized by the interrelation between the parts, the formal characteristics of the external surfaces of the designed object are characterized and influenced more and more by the mutability of the context and by its ever more articulated heterogeneous configuration. The relationship form function is no longer only used within the project object, but becomes “fluid”, namely relating to changes in the reference environment.

From this point of view, the camouflage process takes on new important implications as a design tool, a connection as well as formal communication: above all in consideration of the changeability of the reference scenarios to which particular categories of project subjects are related.
By means of this particular form of expression related to Design, the functional character of the application makes use of the typical properties of the figurative sphere to bind to the environmental aspect. Compared to traditional rules, the readability of the modern design object and therefore its external configuration is no longer self-referential in the exclusive dependence on functional reasons, but through these it becomes integrated into a single with the environmental characteristics of reference. A new type of mimicry applied to design, in which the object becomes an integral part of the environment that contains it. A new task of mimetic surfaces that find fields of application and research terrain in intelligent surfaces in consideration of a reference complex increasingly characterized by a sometimes dissonant overabundance of information: functional, figurative, constructive. A new combination of formal codes thus appears to be the last frontier of the aesthetics of the settlement system in general, from small design objects to large infrastructures. The formal characterization is projected therefore through the illusory apparatus, from the intrinsic contents of the object to the different modalities of correlation to the reference context, in the adaptability to the environmental variability.

References

Glyn L.E., *Dazzle-Painted Ships of World War I*, McCall, 2015
Taylor J., *Dazzle: Disguise & Disruption in War & Art*, London Press, 2016
https://www.adverta.co.uk/gallery/
ttps://www.artnewsportal.com/art-news
http://www.difesaonline.it/news-forze-armate/storia/il-camuffamento-dazzle
http://dazzle.risd.edu/
http://www.fupress.net/index.php/aisthesis/article/view/19415/17957
https://gizmodo.com/how-automakers-use-a-wwi-era-camo-technique
https://jamanetwork.com/journals
http://markedsforing.dk/artikler/pr-kommunikation/
http://www.mooch.org.uk/trips/london/yotb_001.html
http://www.navsource.org/archives
http://www.plataformadeartecontemporaneo.com
http://www.plataformadeartecontemporaneo.com/G. Alarcòn Ana, Estéticas de camuflaje, 2012.
http://totallythames.org/event/dazzle-ship-london
https://photosalmagundi.wordpress.com
http://temi.repubblica.it/casa-salone-del-mobile-2011/2011/04/07/tobias-rehberger
https://www.1418now.org.uk/dazzle/ships/snowdrop/
https://www.1418now.org.uk/dazzle/ships/hms-president-1918/

A Geometric Study of the BICA Handle

Paola Magnaghi-Delfino
Department of Mathematics DMAT, Polytechnic School of Milan
email : paola.magnaghi@polimi.it
Tullia Norando
Department of Mathematics DMAT, Polytechnic School of Milan
email: tullia.norando@polimi.it

Abstract

The Olivari's firm, founded in 1911 in Borgomanero (Novara, Italy), in 1947 resumed active collaboration with the exponents of the young Italian architecture and expand its market from traditional construction to big ships. The construction of the office building, the BICA complex in 1959, was the first collaboration with architects Augusto Magnaghi-Delfino and Mario Terzaghi. Magnaghi and Terzaghi designed also a handle called BICA for doors and windows that will be the first Olivari model and the first standard handle produced in Italy entirely in aluminium, material already experimented by Giò Ponti. The aluminium alloy represents the evolution in a decidedly more industrial sense of production: the feeling in the grip of the object is that of a solid lightness, connatural to the physical characteristics of the material accentuated by the design of the section that decreases and increases following the internal shape of the closed hand. The BICA, produced until 2004, is a happy solution to many issues of designing objects for living spaces. The handle gets an immediate commercial success, which lasts longer than that of many other models.

In this article, we analyse geometrically the handle looking for the equations of the curves that the two architects used to design it and reproduce it using software.

Abstract

La ditta Olivari fondata nel 1911 a Borgomanero (NO), nel 1947 riprende la collaborazione attiva con gli esponenti della giovane architettura italiana e ampia il suo mercato, dall'edilizia tradizionale alle grandi navi. L'occasione per la prima collaborazione degli architetti Augusto Magnaghi-Delfino e Mario Terzaghi con Olivari è l'edificio per gli uffici dell'azienda, il complesso BICA realizzato nel 1959.

Magnaghi e Terzaghi si dedicano al progetto di una maniglia, chiamata BICA, per i serramenti e le

porte che sarà il primo modello Olivari e la prima maniglia di serie prodotta in Italia interamente in alluminio, materiale già sperimentato da Giò Ponti.
La lega d'alluminio rappresenta l'evoluzione in senso decisamente più industriale della produzione: la sensazione nella presa dell'oggetto è quella di una solida leggerezza, connaturata alle caratteristiche fisiche del materiale e accentuata dal disegno della sezione che diminuisce e aumenta seguendo la forma interna della mano chiusa. La BICA, uscita di produzione nel 2004, rappresenta una soluzione felice a molte questioni della progettazione di oggetti per spazi da abitare. La maniglia ottiene un immediato successo commerciale, che dura più a lungo di quello di molti altri modelli. In questo articolo analizziamo geometricamente la maniglia, trovare le equazioni delle curve che i due architetti hanno usato per disegnarla e riprodurre, mediante software, la forma tridimensionale.

Introduction

Italian design refers to all forms of design in Italy, including interior, urban, fashion and architectural design. Italy is recognized as being a worldwide trendsetter and leader in design: Italian architect Achille e Pier Giacomo Castiglioni and Luigi Caccia claimed that "Quite simply, we are the best" and that "We have more imagination, more culture, and are better mediators between the past and the future". After World War II, however, Italy had a true avant-garde in interior design in a period. With the fall of Fascism, the rise of Socialism and the 1946 RIMA exhibition, Italian talents in interior decorating were made evident and, with the Italian economic miracle, Italy was a growth in industrial production and mass-made furniture. Yet, the 1960s and 1970s saw Italian interior design reach the top of stylishness and, from that time, the phrases "Bel Design" and "Linea Italiana" entered into the vocabulary of furniture design.
In 1958, Italian Line started making plans for large ships to operate in the Genoa-New York route. Commercial demands were not the only ones to effect the decision to build new ships: new ships would get new jobs for shipyards, dockers and sailors; hence, trade unions supported the construction of new ships. Therefore, the Italian line decided to construct the first true Italian superliners in more than twenty years. The names of the ships were inspired to famous historical figures: Michelangelo, Raffaello and Leonardo da Vinci.Italia Line decided that the new ships interiors, as their exterior, would be among the most beautiful and luxurious on the high seas. In the spirit of the times, the interior furniture were made in Art-Deco style. The designing of the interiors of the ships were commissioned to different architects. Since the ships took a southern route to New York, it meant that like the previous Italian liners, much emphasis was placed in the design of the outer decks. Unfortunately, there were no cabins with windows below the Main Deck. Concerning safety requirements Michelangelo was quite beyond the safety requirements of that time because all furniture were made in anti-burning materials. In the 60's, Olivari's firm extended its interests to the big ocean liners furniture. They asked to Augusto Magnaghi-Delfino and Mario Terzaghi to design handles for windows and doors of the luxury ships, which would be the first Olivari's handle model in aluminium and the first mass-produced handle in Italy. Aluminium alloy symbolically represents the shift to a decidedly more industrial approach to production: the feel of the object when gripped is that of a solid lightness, in keeping with the physical characteristics of

the material such that the specific weight one third that of the steel, high resistance to corrosion, accentuated further by the design of the sections. Magnaghi and Terzaghi did not specifically create these handles for one particular project, but just like an ideal model, according to the universally accepted formal and economic standards. Then the handles were put in the new Olivari's office building in Milano and were in production until 2004.

Career of the architect Augusto Magnaghi-Delfino

Augusto Magnaghi-Delfino, born in Milan in 1914, graduated in 1939 at the Faculty of Architecture of the Politecnico. During his studies, he knew Mario Terzaghi, with whom he started a lasting professional partnership and a solid friendship, and Luigi Comencini and Alberto Lattuada who later will became famous filmmakers. Still a student, he began to attend the study of Terragni and Lingeri, where he also brought his friend Terzaghi as a further practitioner to help the drafting of the contest project for the Palazzo del Littorio in Rome. In Terragni's architectural firm, he met Filippo Tommaso Marinetti, Lucio Fontana and Adone Asinari.

Fig.1 Augusto Magnaghi-Delfino

In 1939, the two young architects built the "Casa dei nidi" (house of the nests) in Fino Mornasco, a residential building with rationalist lines and they won, with Lingeri and Cattaneo, a competition for the Palace of Trade Unions in Como and in the 1941 participate in the primordial Futurist group Sant'Elia. From 1948 to 1952, Augusto worked for the firm SAFFA (Società Anonima Fabbriche Fiammiferi e Affini). The firm, that produces matches and derived from cellulose, asked to Magnaghi to draw the first modular kitchen. On 1954, he won the prize "Compasso d'Oro "for this kitchen.

Magnaghi-Delfino, very attentive to public relations, wrote some articles for the magazine Domus, on which, in the fifties, some of their projects of furniture and design objects appeared. They worked fruitfully together in all fields, separating themselves seldom to follow their own personal interests. Magnaghi-Delfino designed for the company Olivari the handles BICA that were then placed on the doors of the transatlantic Raffaello and Michelangelo and later exhibited at the Museum of Modern Art in New York. After almost 50 years, they are still in production.

The two architects dedicated themselves with particular commitment to public housing, school and

hospital. In 1947, they studied the application of prefabricated construction systems to the using popular building in some buildings in the QT8 district in Milan. In 1950, they signed together the Village for workers of the paper mill Vita & Mayer in Cairate and the small quarter in Lonate Pozzolo. They designed numerous complexes for the INA-CASA, in Gemonio and Orago in the 1951, in Magenta in 1953 and in Monza in 1955. After the happy realization of the elementary school in Jerago with Orago, followed interventions in the Feltre district and Comasina (Milan) and the INAM clinics of Laveno Mombello (1957-58), Cremona (1960) and Milan, among which the beautiful structure in Piazzale Accursio (1957-60). They collaborated with Ignazio Gardella at the design of the Ivrea Hospital and with Vittorio Gandolfi for the project of the new airport in Lagos (Nigeria) (1962). In 1959 they built the house in Caboto's street where Augusto Magnaghi-Delfino lived until 1963 when, undermined by a serious illness, get off. This closed the brilliant activity of a knit professional team.

The Olivari Company and the handle BICA

Battista Olivari founds the company in 1911 in Borgomanero (No). In 1926, Antonietta Ramelli, Battista's wife, succeeded to his husband and she was one of the few women directing a company in that time. In the 1930s, the first collaboration with architects begins with Giò Ponti. At the end of the Second World War, the level of devastation of Italy's building infrastructure was enormous.

Fig.2 Olivari catalog

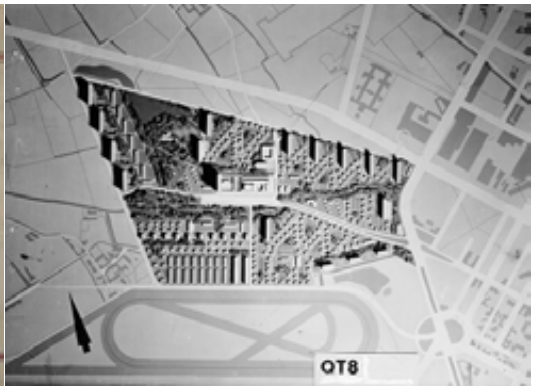


Fig.3 QT8, Milan

In 1946, Olivetti firm was able to actuate development plains that had been blocked under the fascist regime; in 1945 Brion (Brionvega after 1964) and in 1946 Kartell were founded.

By 1947, Olivari had already initiated an active collaboration with exponents of the new Italian architecture.

In Milan was built an entire urban housing scheme named QT8, coordinated by Piero Bottoni and Augusto Magnaghi and Mario Terzaghi worked there. In the 60s, the Olivari's company extended its interests from the traditional buildings to the big ocean liners Conte Grande, Leonardo da Vinci, Michelangelo and Raffaello. Olivari asked to Augusto Magnaghi and Mario Terzaghi to build a new production plant on a site with an area of 10,000 square metres, 3000 of them covered.

However, the occasion for the two architects first collaboration with Olivari was an office building

Fig.4 Michelangelo ship

Fig.5 Olivari establishment

Magnaghi and Terzaghi designed also a handle for windows and doors, which would be the first Olivari model, and the first mass-produced handle in Italy, entirely made out in aluminium. Aluminium alloy symbolically represents the shift to a decidedly more industrial approach to production. The feel of the object, when gripped, is that of a solid lightness, in keeping with the physical characteristics of the material, i.e. a specific weight one third that of steel, high resistance to corrosion. The design of the section decreases and increases to follow the internal shape of the closed hand and the handle become widely used, also proving extraordinarily profitable. It was not specifically created for one particular project, but as an "ideal model", according to the universally accepted formal and economic standards: consideration that hassled to becoming one of the most widely imitated in the world. [Casciani, 1992]

Fig.6 The BICA handle

In various way, the BICA, which went out of production only in 2004, provided an apt solution to many questions of the design of objects for living spaces.
It became a "universal model" thanks to a well-concerned standard form and cost. It is a compromise between the abstract position of Giò Ponti (for whom it was not the handle that should adapt to the hand, but the other way round) and the more organic represented by Mangiarotti's handle "Como". It represents an ideal synthesis between the purely formalist approach of many designers and the need to reinvent as soon as the development of technology made it possible, the appearance of household utensils. The BICA is a technical object but one that does not renounce the originality of invention. [Casciani, 2010]

Fig.7 The BICA handle

Fig.8 Giò Ponti handle

The handle BICA

The patent of the handle BICA was registered in Milan on January 1960 with the following description: a handle set for windows and doors, with rosettes without screw for the fixing, in four parts.

The pair of door handles, with a quick assembly system, has a particular shape with a square section hub with only two sharp edges rounded at the end. The handle has a rectangular section with edges and end extremities rounded and with larger sides arranged horizontally. The rosettes have a square or rectangular shape and they are fixed with pins in order not to see the screws. The handle for windows has section hub with only two sharp edges and rounded at the end filleted with large curves. For more details, see picture

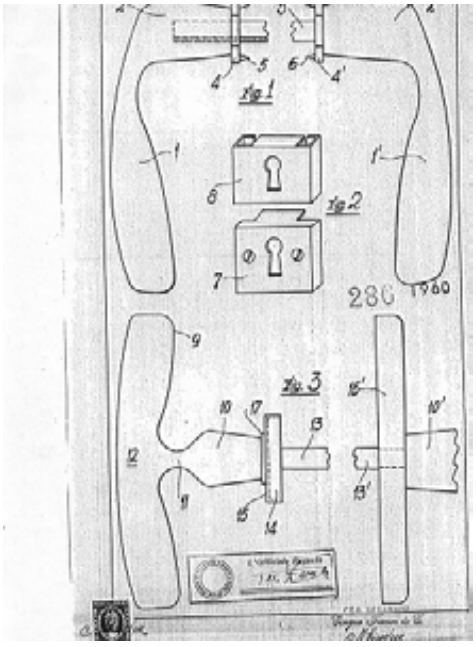


Fig.9 The BICA original design

The Geometric study

We have studied the geometry of the handle with two methods:

- Using the French curves
- Using the software GIMP

The study with French curves

In 60's the designers did not have computers or electronic devices but only French Curves.

French curve is a flat drafting instrument with curved edges and several scroll shaped cutouts, used as a guide in drawing curves. In the 20th century, among mathematicians and engineers, renewed interest in kinematics, the geometry of pure motion. Study of these mechanisms can be used as a way to show interconnections between mathematics and technology.

Descartes in the 17th Century considered only those curves that could be drawn with mechanical devices. Curves were constructed from geometrical actions, many of which were pictured as mechanical tools. After curves had been drawn, Descartes introduced coordinates and then analysed the curve-drawing actions in order to arrive at an equation that represented the curve. Equations did not create curves; curves gave rise to equations.

A common set of curves is the Burmester set displayed here. The first item is very handy for ellipses, the second very often fits large parts of parabolas and the third item is used most for hyperbolas.

(a) Ellipses (b) Parabolas (c) Hyperbolas

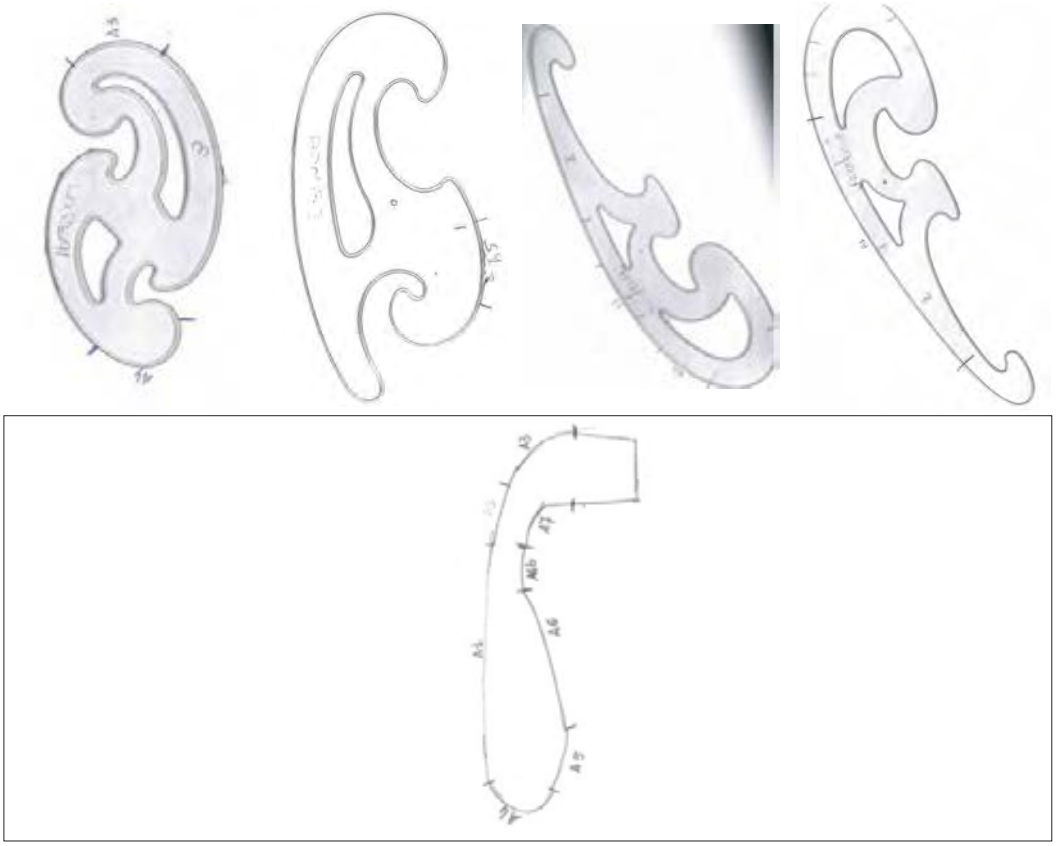
Fig.10 The French curves

French curves, that are flat drafting instruments with curved edges and several scroll shaped cutouts, were used in manual drafting to draw curves of various shapes. In general, you would plot various known points on the paper, and seek to join them up on the edge of a French curve. The one on the top left is meant to be good for hyperbolas, top right for ellipses, and the big one for parabolas (all the conic sections except the circle, which can be drawn easily anyway). They can make smooth complicated curves. If you have a bunch of points you want to fit a curve to you rather pick a piece of French curve that fits through the three points. You then pick another slice of curve that fits enough the adjacent points and so on.

There is no standard for French curve shapes. The complicated shapes are just a means to get all kinds of curves on one piece of plastic. Using French curves, we tried to reproduce the handle.

From the instrument that reproduces parabolas, we founded the pieces named A1, A2, A6, and A6bis.

From the instrument that reproduces hyperbolas, we founded the pieces named A3, A4 and A7.
From the ellipses, we founded A5.
In the following figures, one can see how the pieces can be recomposed to have the handle's shape.



The Bezier's curves

A Bézier curve is a parametric curve frequently used in computer graphics and related fields. Generalizations of Bézier curves to higher dimensions are called Bézier surfaces, of which the Bézier triangle is a special case. In vector graphics, Bézier curves are used to model smooth curves that can be scaled indefinitely. "Paths", as they are commonly referred to in image manipulation programs, are combinations of linked Bézier curves. Paths are not bound by the limits of rasterized images and are intuitive to modify.

The mathematical basis for Bézier curves - the Bernstein polynomial - had been known since 1912, but the polynomials were not applied to graphics until some 50 years later, when they were widely publicised by the French engineer Pierre Bézier, who used them to design automobile bodies at Renault. The study of these curves was however first developed in 1959 by mathematician Paul de Casteljau using de Casteljau's algorithm, a numerically stable method to evaluate Bézier curves at Citroën, another French automaker.

A Bézier curve is defined by a set of control points P_0 through P_n, where n is called its order (n = 1 for linear, 2 for quadratic, etc.). The first and last control points are always the end points of the curve; however, the intermediate control points (if any) generally do not lie on the curve. The sums in the following sections are to be understood as affine combinations, the coefficients sum to 1.

- Linear Bézier curves

Given distinct points $\mathbf{P_0}$ and $\mathbf{P_1}$, a linear Bézier curve is simply a straight line between those two points.

The curve is given by

$$B(t)=P_0+t(P_1-P_0)=(1-t)\,P_0+tP_1 \qquad 0\leq t\leq 1$$

in addition, is equivalent to linear interpolation.

- Quadratic Bézier curves

A quadratic Bézier curve is the path traced by the function B(t), given points P_0, P_1, and P_2,

$$B(t)=(1-t)[(1-t)\,P_0+tP_1\,]+t[(1-t)\,P_1+tP_2\,]=(1-t)^2\,)\,P_0+2(1-t)\,P_1\,+t^2 \qquad 0\leq t\leq 1$$

which can be interpreted as the linear interpolant of corresponding points on the linear Bézier curves from P_0 to P_1 and from P_1 to P_2 respectively. The derivative of the Bézier curve with respect to t is

$$B'(t)=2(1-t)(P_1-P_0)+2tP_2$$

from which it can be concluded that the tangents to the curve at P_0 and P_2 intersect at P_1. As t increases from 0 to 1, the curve departs from P0 in the direction of P_1, then bends to arrive at P_2 from the direction of P_1.

The study with Gimp

We have studied the handle with the free software Gimp; because the paths can be created using Bézier curves. We have reconstructed the geometry of the handle, putting several points on the original drawing, obtaining

Fig.12

Fig.13

Fig.14

A little history about the BICA handle

Between 1997 and 1998, the revue “Abitare” published eleven little histories of handles. Among these, there was one about the handle BICA

21 maggio 2997 Oggi, 21 maggio 2997, sono entrato alle nove precise, nell’atmosfera terrestre……. Il pianeta Terra è quasi disabitato…… Decido di atterrare nella zona glaciale, quella che mille anni fa veniva chiamato Continente Europeo……. Il computer di bordo mi dice: Alpi, Monte Rosa. Non lontano da me vedo un tetto, una strana costruzione, un rifugio alpino. Accanto all’ingresso una targa “Rifugio Margherita 4565”. Entro, tutto è intatto: tavoli, sedie, vecchie fotografie mostrano terrestri sorridenti. Sto per andarmene quando vengo attratto da … No, non ci posso credere. Davanti ai miei occhi una maniglia BICA, disegnata per Olivari da Augusto Magnaghi e Mario Terzaghi. La stacco e la deposito nel mio zaino di energia dopo averla smaterializzata. Vorrò proprio vedere come ci resteranno i miei colleghi archeologi quando la metterò sotto i loro occhi!!In un rifugio di montagna, sul periferico pianeta Terra, ho trovato una maniglia che sul nostro avanzatissimo pianeta è stata presentata la settimana scorsa al Salone Internazionale del Design! Come la metteranno con i diritti d’autore? W.O.M	May 21, 2997 Today, May 21, 2997, I entered exactly at nine o’clock in the Earth’s atmosphere… The Earth is almost uninhabited…. I decide to land in the glacial zone, the one that thousand years ago was named Europe… The computer tells me Alpes, Monte Rosa. Not far from me, I see a roof, a strange construction, an alpine refuge. Near the entrance there is a tablet “Rifugio Margherita 4565”. I enter, everything is unbroken: tables, chairs, old photos with smiling terrestrial beings. I am about to leave when I am attracted to…No, I cannot believe. In front of me a handle BICA, designed by Augusto Magnaghi and Mario Terzaghi for Olivari. I take it and I put it into my energy backpack after having dematerialized it. I will just want to see as my fellow archeologists will remain when I will put it under their eyes!!! In an alpine refuge, on the marginal planet Earth, I found a handle that on our highly advanced planet was presented last week at the International Design Exposition!! How will they put it with copyrights?

Conclusion

We have studied the handle BICA because it was the first Olivari's handle model in aluminium and the first mass-produced handle in Italy. This handle was exposed also at the MOMA Museum in New York; it represents an ideal synthesis between the purely formalist approach of many designers and the need to reinvent as soon as the development of technology made it possible, the appearance of household utensils. The BICA is a technical object but one that does not renounce the originality of invention

References

S. Casciani, L'architettura presa per mano. La maniglia moderna e la produzione Olivari
Olivari B. Spa, Borgomanero, 1992
S. Casciani, Macchina semplice Dall'architettura al design. 100 anni di maniglie Olivari
Skira Milano 2010
M. Ceccarelli, T. Koestier, Burmester and Allievi: A Theory and Its Applications for Mechanism Design at the End of 19th Century, in Journal of Mechanical Design, vol. 130, 2008, downloaded from https://mechanicaldesign.asmedigitalcollection.asme.org
S. Gronert Walter Gropius. Symbol der Moderne, in Türducker der Moderne. Eine Designgeschichte FSB Walter König, Brahel, Köln, 1991

Translator Design, from signs to experiences

Chiara Olivastri
Department Architecture and Design DAD (University of the Study of Genoa)
email: olivastrichiara@gmail.com

Abstract

Products become more like services, services are becoming more like experience.
Underlying this profound and inevitable evolution is an understanding of the importance of investing in systematic, designed-based innovation that engages people at the deepest level.
What kind of signs are the elements of interest for service design?
This paper describes the change of designers' space perception by observing new needs, placemaking activities and explaining how services can transform places into new 'experienced' spaces and vice versa spaces can become the touchpoints of experiences. As the semiotic of services, touchpoints are the signifier, the material form that the sign takes in services and they are the medium of immaterial signified, that is the value.
Using the power of storytelling designer have to mix all the ingredients of different signs in a believable experience developed in sequential order across time.
The new term 'sparvice' means the fusion between service and space in a new way to redefine a place capable of linking immaterial and material components in a dynamic system.
What happened in goods is happening in spaces.
The world is overbuilt. We have everything we need, but we need more, not more new products or spaces but we have to make things and places more efficient.

Abstract

I prodotti diventano sempre più dei servizi, i servizi stanno divenendo sempre più delle esperienze. Alla base di questa evoluzione profonda e inevitabile c'è la comprensione dell'importanza di investire in un'innovazione sistematica e progettata che coinvolga le persone ad un livello più profondo. Che tipo di segni costituiscono elementi d'interesse per il design dei servizi?

Il paper descrive il design dei servizi come un traduttore che deve leggere e comprendere segni e segnali di autoimprenditorialità, co-creazione, economia peer-to-peer, innovazione sociale, partecipazione per convertirli in nuovi processi accessibili e in comportamenti più sostenibili.
Inoltre, come i cicli storici insegnano, le tradizioni e i segni del passato ritornano dopo un lungo periodo con una nuova apparenza di novità, rinfrescati dalla tecnologia, per attirare un'ondata di successo ed interesse. Come la semiotica dei servizi, i touchpoints sono il significante, la forma materiale che il segno assume nei servizi e sono il veicolo del significato immateriale, ovvero il valore. Usando il potere dello storytelling, il designer deve mescolare tutti gli ingredienti dei diversi tipi di segni in un'esperienza credibile, sviluppata in ordine di tempo sequenziale, lasciando ai clienti l'opportunità di scrivere loro stessi l'ultimo capitolo della storia. Questa personalizzazione, infatti, è la risposta al crescente bisogno di flessibilità e adattamento dei cambiamenti del tempo e i servizi sono i generatori di esperienze su misura per le persone e i promotori d'innovazione.

From functions to experiences

All artefacts are material because they are made and produced by human beings.
They can be described by the five senses: touch, sight, hearing, smell and taste and every designer works to improve each feature which refers to the five senses using the best technologies.
Herbert Simon (1969) describes the artificial world of artefacts made by people. He distinguished two kinds of artefacts – physical and the immaterial. An example of the first one is buildings while meetings are an example of the second one: in addiction, there are natural objects such as trees.
The study of natural objects has been classified according to scientific disciplines; the study of physical artefacts has been categorised in engineering sciences, from architectural design to technology and the study of immaterial artefacts has been classified according to subject areas such as sociology. Nowadays, it is very reductive to consider only two typologies of artefacts and divide them into material and immaterial components. This kind of approach has been superseded, because people don't want to live through functions but they want to amplify functions into experiences.
The design of an experience may involve products, services, spaces and technology, an experience carries us beyond the confortable world of measurable utility into the hazy zone of emotional value (Brown, 2009) Services are based on the creation of expeiences as integration and development of products. Designing services is a combination of tangible and intangible mediums. In fact, they are immaterial interactions enriched by the sensory and physical experience we have while interacting with the real world. Experiences plasma perceptions, like an interpretation that varies with regards to context and space (Colonna, 2015). The holistic nature of perception tends to understand the meaning of things by assessing them on multiple levels. Synaesthesia occurs when shapes, colours, and materials contribute in transferring a unitary perception.
The term derives from the Greek "syn" (together) and "aisthanesthai" (perceive) and indicates a situation where different sensory impressions cooperate to reinforce a certain kind of perception.
The synesthetic project is characterized by a coherent relationship between sensations. A synesthetic environment is the result of a design process focused on relationships and the equilibrium between the various components (Riccò, 2008). Experience is like synaesthesia because it regards a system of perceptions within material space.

The intention should always be to see the wider context in which a service process takes place, working in a holistic way.
Services are holistic, like perceptions, because while working they consider every single aspect of the material and immaterial experience and the perception of the customer.

From performing space to sparvice

We spent a lot of time making performing spaces using technology to develop its functions.
Nowadays it is not so important that the space has a perfect shape but to design spaces capable of responding to user needs changes with flexible container that can be adapted to the content.
Charles Eams in 1972 claims that 'recognize the needs is the primary condition of design'.
Design responds to the emergence of new environmental and user needs creating places where experiences can give a meaning.
The famous definition of service design is "when you have two coffee shops right next to each other, and each sells the exact same coffee at the exact same price, service design is what makes you walk into one and not the other." (31 volts service design, 2008)
Places where experiences can make the difference. In this sense service design enriches material spaces through experiences in order to create or amplify possible contents.
Services are not tangible but are created through the interaction. Understanding the value and nature of relations between people and other people, between people and things, between people and places, between people and organisations are now understood to be central to designing services.
Services are immaterial till the experiences start and connect people to space and time. Design is arguably now focused on the interaction between people, spaces and technology, and products serve as platforms for experiences, functionality and service offerings (Buchanan, 2001).
Services can be referred to affordances then on the interaction between space and people.
Affordances are sensory characteristics of artefacts, but they are neither the object matter nor the subject matter, because they occur only in the relationship that is established between the individual and his environment. The term "affordance" was first coined by the perceptual psychologist J. J. Gibson in 1966 to describe the latent possibilities for action in features of the immediate environment presented to a sentient subject, or "actor."
Gibson's focus was predominantly on connecting the action potentiality of the environment and the action capabilities of the person. Affordances are constructed in contexts where the actor and the environment are mutually dependent.
In this description the environment plays an important role in experiencing services. The environment, like the product, is the natural extension of the service because it makes the experience concrete, so it influences the complex project of service.
The word affordance related to services includes "the possible" as tolerated factors in what we design. "The possible" is when the use and affect is revealed or produced by the way users engage with the designed products.
In fact, in designing services designers try to project the majority of experience "frames", but they cannot forecast everything because they are based on the interactions between subjects and places and so are unlimited.

In service design thinking about touchpoints means to fix some important moments of experience when customer get in touch with the service, creating multiple contacts like material artefacts, environments and interpersonal encounter.

As the semiotic of services, touchpoints are the signifier, the material form that the sign takes in services and they are the medium of immaterial signified, that is the value given by the users interactions. According to Greek etymology, aptic means "capable of getting in touch". Therefore aptic, derived from touch, thus constitutes the mutual contact between the users and their environment, both receptors and carriers of a communicative interface (Bruno, 2002). A sign can only be understood when the relationship between the two components that make up the sign are agreed upon. In the era of digitalization what does digitalizing spaces mean?

Digitalization is the process of substituting paper documents in order to optimize bureaucratic procedures while in spaces it regards the redefinition of spaces based on services.

Because the relationship is seen from both directions: the first, is space as a touchpoint in the environment for the creation of experiences which make services real; the second, is the development of services which develop the three-dimensional space by adding the fourth digital and intangible dimension.

We can define 'sparvice' as a space that cannot live without its own service.

A project of space with services is an incomplete space that is only completed when linked to its services.

In fact, when services begin to be delineated, the scenario tool is the most adapt.

Using the scenario a fictional story or sequence of events is created around a user or group of users, often based on a personas. The storytelling obviously has a setting, a scenario, that is not only imaginative but is a real environment that has to be designed.

Some examples are Ikea with its special Swedish restaurant and wonderful balls pit for children and Ham Holy Burger where people sit around tables and can use supplied ipad to order and also surf the net for pleasure.

It is not clear if people go there for what they need or for what their services offer.

The designers of retail spaces like Sephora or Nike are transforming their megastores into places where customers are engulfed in an atmosphere focused on images before making their purchases. 'Sensory retailing' is an English term used for defining the planning of a global retail experience by creating an atmosphere that has subconscious effects on the consumer. The objective of a multisensory project is therefore that to involve the client in the imagery of the space. (M.Trevisan & M.Pegoraro, 2016, p.54)

The spaces and services of Apple stores are inseparable: you cannot fully describe the store with a floor plan alone but need a calendar of events and list of services as well. This is because the stores were conceived as "public spaces" that support the "ownership experience" not just the "buying experience" (Johnson, 2004). This integration of space and services helps Apple build loyalty and community among its customers while helping them be more productive.

Not only, connecting services to spaces link the material and immaterial components in an amplified dimension that complete each other. Gartner (American research and advisory firm providing information technology related insight for IT and other business leaders) predicts over 20 Billion connected devices by 2020, and therefore the effort to make sense of technology for

people is growing. There has been a demand for connected experiences in recent years, but from rising expectations of the customers they are trying to serve. It's important to understand these changing needs and shape new experiences by bridging the gap between physical and digital. It's essential to optimize the user experience based on these interactions and understanding accordingly what motivates your customer, what their needs are, their hesitations and concerns. In their journey they may provide signals through various touchpoints and every interaction provides a sign of interest. People now expect their devices, spaces, and services to be in harmony (McConnell, 2017). And they want these experiences to directly improve how they're navigating a physical space. In our physical spaces, different design disciplines come together to define the experience. These designers might have backgrounds in architecture, interior design, environmental design, way finding, operations or service design. When these are all considered, the space and human experience are aligned.

From empty container to meaningful content

Rather than thinking of space as an inert container, we must consider space as a dynamic system of services that mediate between people and the environment (Felix, 2001).

Exemplary spaces have shown that services can build knowledge, skills, and community.

They can provide a more personalized experience that accommodates different learning styles.

In addition, they can enable better sharing of resources and ensure spaces are active and well-utilized, even as needs change.

When the space is conceived only as a mere container unable to adapt to need changes it becomes an empty place without function and content.

Personalization is achieved through customer data and predictive technology while customization is achieved when a user manually makes changes to achieve his preferred experience.

Recently we have observed an exponential growth of empty spaces in our cities, triggered by the economic crisis. Current scenarios propose the city as an experimental laboratory where informal actions and temporary reuse practices become innovative instruments to rethink vacant spaces. These spontaneous appropriations can be seen as an answer for the citizens to the decadence of disconnected cities. Design operates for social innovation by activating, sustaining, and orienting processes of social change toward sustainability.

It is a blend of different components: original ideas and visions, practical design tools within a framework of a design approach (Manzini, 2015). These elements can be structured in services capable of reinstalling the connection between space and people.

Employing service design for learning spaces means that we are not only designing space, but also time– conceiving the different activities and interactions that occur in spaces and how to holistically support people along their journey. These services are key ingredients for making places, not simply spaces.

Prompted by economic and environmental pressures and the habit of sharing on the web, we're moving from a culture of ownership to one of membership, as seen in services like co-working where members can use shared office space rather than having to rent or own one.

Even in a culture of migration, not only due to wars, but also for exchanging culture and knowledge,

places can be seen as an opportunity where different languages and actions can be experimented.

'What a Space' is a service that works as a marketplace to propose spaces for temporary shops, events and exhibitions which can be animated by a community of companies or creative and professional people to promote their businesses and products in the real world.

'What a Space' aims to revolutionize the way the B2B world manages its offline sales and promotion channels today. On 'What a Space' you can create an ad for your space in minutes, and get in touch with thousands of users looking for the ideal location every day. Through the platform you can explore hundreds of ads in just a few clicks. Whenever you find an interesting ad, you can directly contact the space owner free of charge.

Whereas, if the owner wants a space to be more alive and animated by different experiences he can quickly create an ad and make direct contact with thousands of space users looking for a space to realize ideas and projects. Thanks to the frequent use of this service a meaning is given to the empty container.

In Europe there are different agencies (Einfach –Mehrfach in Vienna, Zwishe nutzung Agentur in Berlin, ZZZ in Brema and Creative Space Agency in London) that provide a service which puts the owner of public or private spaces in touch with different stakeholders who are searching for the right place to start an activity or experiment.

Temporiuso in Milan is an association to promote temporary reuse projects in abandoned spaces. It started in 2008 thanks to an agreement between the University, associations and Public Administration, but it is different from others because it only concerns a few public properties and there is no urban strategy or planning by the Municipality.

From passive use to active co-designer space experiences

Cambridge dictionary defines experiences as 'the process of getting knowledge or skills from doing, seeing, or feeling things'. However 'seeing' or 'feeling' are passive actions while 'doing' is active. Therefore, experiences change places into active spaces by putting people at the heart of the process of knowledge. An important role of services is the total involvement of people both in design processes and in the utilisation of the services in spaces.

Customer process refers to the active participation of customers in the production process which Edvardsson and Olsson (1966) saw as a distinctive characteristic of services as opposed to goods. Customer process does not exist in a vacuum but depends on the prerequisites of the service which are the resources needed to make the service possible.

Service designers consciously generate an environment that facilitates the creation and evaluation of ideas within heterogeneous stakeholder groups, putting different subjects at the centre of the designing services and preferably co-designing with them.

The service has intentionally been designed to create a better user experience – one that is integral to the space and designed from the user perspective.

Bottom-up initiatives are transformed into an experimental "infrastructuring" process by using a set of design methods and tools deriving from service design research.

The starting point is a renewed activism on behalf of the citizens that has led to a variety of initiatives which can be understood as new forms of services between public and private, amateur

and professional, profit and non profit, and market and society.

'Creative communities' (Meroni, 2007), 'active citizens, 'social innovators' and other forms of activism are currently contributing to develop an alternative system of services which are characterised by being in between an amateur and professional organisation, the public and private sector, the market and society rules, and profit and non profit ventures.

The majority of these activities are characterised by transience and overlapping and need an infrastructuring process in order to avoid their weakening and ultimate failure (Selloni, 2015)

Placemaking should be observed as important fertile ground of development of the service design and an approach able to link communities, places and governments.

It differs from traditional planning in that it grows out of a place which is community driven.

Placemaking services form a link between activism and land use as a catalyst for community revitalization. It's important to understand the issue of establishing a "sense of place" for communities through the design and development of service infrastructure.

The approach, methods and tools from service design, co-design and design thinking used to support innovations produced by society (Cautela et al.2009) is a designerly way (Cross, 2001) of empowering people, making them feel able to influence decisions or actually enabling them to do so. The designer's job in social innovation is a mix of capacity building and professional consultancy for designing practices that can be equated with services (European Commission 2013).

Reagente is a research project originating from the national Prin Research "Re-Cycle Italy" in 2015. The idea is to focus on proximity and the everyday life of a creative community and support their activities through a set of methods and tools acquired from design research.

It is conceived as a system that recognizes the values of bottom-up actions and gives new meanings to vacant spaces. Reagente is a strategy to simplify policies, to embed reactivation in our cities and to enhance social innovation. Reagente aims to propose a tool conceived as a brand for testing inclusive and participatory processes to define guidelines and labelling requirements for activists in order to communicate their actions and spread shared values.

The concept takes a look at how service design, activities and branding/labelling are connected to each other, and how a better relationship could improve people experiences.

Design contributes to creating a brand/quality label in order to strengthen these different bottom-up initiatives. A label can be a tool to disseminate good practices and a certification system. At the same time it is a way to manage the process and transform actions into public-interest services from an environmental and social point of view. In this way the service transmits reliability, confidence, openness and assumes a role for spreading a different approach and reuses of vacant spaces (Fagnoni, Pericu, Olivastri 2017).

The participatory prototypes not only aim at simulating situations, but they also serve to build community awareness and consensus around public-interest issues. They are actual 'mises-en-scène' of possible ways of living, able to extend the conversation to the rest of the community; in addition, they also work as 'demonstration arenas' for institutions (Bjögvinsson et al., 2010, p.43).

Service design can enable institutions to respond to these changes and enhance the experiences.

A general gap appears between needs and time frames: the standardized procedures and the bureaucracy of government clash with the urgency of the specific aims of the citizens. The analysis

of emerging design practices based on sharing assets and bottom-up processes gives rise to social innovation attitudes experimenting forms of dialogue between citizens and policymakers.

Space as the material interface of service

In 'Breaking Free from Product Marketing', Shostack (1977) claimed that services are impalpable and non-corporeal and, therefore, "cannot be touched, tried on for size, or displayed on a shelf" and "consumers cannot experience them directly, but only through their peripheral tangible evidence". Peripheral evidence refers to the tangible elements consumers can possess, for example bag or bill in a shop, that have little independent value. In contrast, essential evidence, the retail space, has an important role in the evaluation of the services purchased but cannot be owned by consumers.
So service evidence is so important that it must be as carefully designed and managed as the service itself. If we compare products and services we notice that the product project includes design, industrial production and delivery that are invisible to the customer and so are in the back office, although they are indispensable for the realization of goods and controlled by designers who are not interested where the products will be sold.
However in the service project the place where the customer makes contact with the service is very important. According to Edvardsson and Olsson (1966) a service system should be designed to facilitate the engagement of customers in co-producing the outcome: "an ideal service process begins with input from customers and ends with visible output for them".

Conclusion

Space is a touchpoint so it is a field of research where designers can work.
Secomandi and Snelders (2011) focus on the difference between interface and infrastructure.
The interface focuses on the sociotechnical resources immediately associated with exchanges between providers and clients, and the infrastructure accounts for resources less directly related to that exchange. Shostack (1982), who introduced the concept of the line of visibility, separates what is tangibly evident (interface) to the bodily senses of consumers from what is hidden (infrastructure). Interface actualizes the co-production of the service and its goal is to influence customer perception of the service, and this perception is created at the interface. For this reason it becomes prominent as the end-point of all service design deliberations. Intangible resources must be actualized through an interface that is material and available for body perception (Secomandi and Snelders, 2011). It's more important to bring the attention back to the project of the material interface than to the service infrastructure. The distinctive characteristic that stands out in these cases is not intangibility, but the material heterogeneity of the service interface. In fact, heterogeneity depends on the perception of customer experience in the chain of activities. We have to rethink the city and its urban spaces as active entities that interact with, and adapt to, its citizens and environment. This is where the design of interface and space meets in service design: here is an opening for a new space-making interactive design discipline. Services can design scenarios making them experienced spaces while spaces can find new contents and roles by reinventing new dynamics and shapes through services. "Sparvice" can become a new way to rethink vacant space and a strategy to create new spaces.

References

Björgvinsson, E., Ehn, P., Hillgren, P.A. (2010). *Participatory Design and democratizing innovation.* Proceedings of Participatory Design Conference 2010

Bruno G. (2002) *Atlante delle emozioni. In viaggio tra arte, architetura e cinema*, Mondadori

Buchanan, R. (2001) *Design research and the new learning*, Design Issues, 17 (4), 3-23.

Cautela C., Rizzo F. & Zurlo F. (2009) *Service Design Logic: An approach based on the differenct service categories*. Proceedings of the International Association of Societies of Design Research, IASDR 2009, Seoul

Colonna A. (2015) *Genealogia del presente e storiografia dell'architettura*, Claebasse, Potenza

Cross, N. (2001). *Designerly ways of knowing: design discipline versus design science*. Design Issues, 17(3) pp. 49–55.

Earlhoff M. Marshall T. (eds.)(2008)*Design Dictionary. Perspectives on design terminology,* (to the definition of affordance), Birkhäuser

Edvardsson B. and Olsson J. (1996) *Key Concepts for New Service Development,* in The Service Industries Journal 16:2 p.140

Fagnoni R., Pericu S. and Olivastri C. (2017) *REAGENTE. A label for social innovation.* Paper presented at the Design for next Conference, Rome. Retrieved from: http://www.tandfonline.com/doi/abs/10.1080/14606925.2017.1352845

Felix E. (2001) *Learning Space Service Design, in Journal of learning spaces* available at http://libjournal.uncg.edu/jls/article/view/284/162

Gibson J. J. (1966) *The Senses Considered as Perceptual Systems.* Houghton Mifflin, Boston**.**

Simon H. (1969) *The science of artificial*, MIT Press

Trevisan M. & Pegoraro M. (2016) *Retail design. Progettare la shopping experience,* Franco Angeli

Manzini E. (2015) *Design when everybody designs,* MIT Press

McConnell P. (2017) *How Designers For Physical Spaces And Digital Services Can Create Better Experiences Together* available at https://www.psfk.com/2017/07/designers-physical-spaces-digital-services-can-create-better-experiences-together.html

Meroni, A. (ed.) (2007). *Creative Communities. People inventing sustainable ways of living*. Edizioni Polidesign, Milano

Meroni, A. and Sangiorgi, D. (2011) *Design for services.* Gowerpublishing, Farnham, UK;

Ramaswamy R. (1996) *Design and Management of Service Processes: Keeping Customers for Life,* Reading MA, Addison-Wesley

Riccò D. (2008) *Sentire il design. Sinestesie nel progetto di comunicazione*, Carocci, Roma

Sangiorgi D. and Prendiville S. (2017) *Designing for Service. New Issues and new directions*, Bloomsbury

Secomandi and Snelders (2011) *The object of Service Design* in Design Issues: Volume 27, n.3, MIT

Selloni D. (2015)*How Design can Contribute to Infrastructuring Bottom-Up Initiatives into Public-Interest Services.* Paper presented at the Cumulus Conference, Milan. Retrieved from: http://cumulusmilan2015.org/proceedings/articles/abs-063-Incubating/

Shostack G. L. (1977) *Breaking Free from Product Marketing* in Journal of Marketing 41:2 p.73-80

Shostack G. L. (1982) *How to Design Service* in European Journal of Marketing 16:1 p.49-63

Fontijn M. (2008) *31 volts service design*, One line of Service Design available at http://www.31v.nl/2008/03/one-line-of-servoice-design/

Stickdorn M. Schneider J. (2011) *This is service design thinking. Basics,Tools, Cases*. John Wiley & Sons, Inc. Canada

Study of the HBIM methodology based on the combination of photogrammetry and lasermetry techniques applied to the Belmonte de Campos castle (Palencia)

Mónica del Río Muñoz, Miguel Ángel Vela Oro, Marta Alonso Rodríguez
Escuela técnica superior de Arquitectura de Valladolid
monica.riomunoz@gmail.com,marta.alonso.rodriguez@uva.es

Abstract

The field of BIM (Building Information Modeling) is currently being implemented in the construction industry. It could be said that BIM is a collaborative work process between professionals, which works more efficiently than the traditional way. This is reflected in a cost savings in all phases of the construction process.

The research that wants to be discussed with this work is the application of the BIM work system to heritage, conservation and rehabilitation works. What is currently called HBIM (Historic Building Information Modellíng).

The work methodology of HBIM begins with obtaining precise measurements of historical building, a fact that we achieved through a cloud of points from the techniques of photogrammetry and terrestrial laser scanning. The next stage consists in passing the point cloud to a 3D of solid geometries with the help of computer programs: PointSense for Heritage in Autocad or PointSense for Revit, in Autodesk Revit. Finally, these modeled objects are provided with parametric information.

The final product is HBIM, 3D models complete with parametric data that can include numerous details about its surface: construction methods and materials used, pathologies and way of solving them, geometric shape and 3D visits, etc. In the same way, you can get from the model the 2D graphic documentation of plants, elevations and sections, and the 3D model with different textures and forms of visualization.

The HBIM is a field in which it is beginning to work and which has a high potential. Due to the complexity of the geometries of historic buildings, the first step is to obtain a 3D geometry faithful to reality, and for this we have the validated tools of photogrammetry and lasermetry. The difficulties are found in the transfer of the obtained geometry based on a cloud of points to solid volumes where to enter the parametric data or attributes required by the BIM work methodology.´

Abstract

La ricerca che vuole essere discussa con questo lavoro è l'applicazione del sistema di lavoro BIM alle opere di patrimonio, conservazione e recupero. Ciò che è attualmente chiamato HBIM (Historic Building Information Modellíng). La metodologia di lavoro di HBIM inizia con l'ottenimento di misurazioni precise dell'edificio storico, un fatto che abbiamo raggiunto attraverso una nuvola di punti dalle tecniche di fotogrammetria e scansione laser terrestre. La fase successiva consiste nel passare la nuvola di punti in un 3D di geometrie solide con l'aiuto di programmi per computer: PointSense per Heritage in Autocad o PointSense per Revit, in Autodesk Revit. Infine, questi oggetti modellati sono dotati di informazioni parametriche.

Il prodotto finale è HBIM, modelli 3D completi di dati parametrici che possono includere numerosi dettagli sulla sua superficie: metodi di costruzione e materiali utilizzati, patologie e modo di risolverli, forme geometriche e visite 3D, ecc. Allo stesso modo, è possibile ottenere dal modello la documentazione grafica 2D di piante, prospetti e sezioni, e il modello 3D con diverse trame e forme di visualizzazione. L'HBIM è un campo in cui sta iniziando a funzionare e che ha un alto potenziale. A causa della complessità delle geometrie degli edifici storici, il primo passo è ottenere una geometria 3D fedele alla realtà, e per questo abbiamo gli strumenti validati di fotogrammetria e lasermetria. Le difficoltà si riscontrano nel trasferimento della geometria ottenuta sulla base di una nuvola di punti su volumi solidi in cui immettere i dati parametrici o gli attributi richiesti dalla metodologia di lavoro BIM.

Object of work

The main objective is to apply the BIM technology, cutting edge technology that is so successful in the new construction, to the existing buildings, and more specifically to the Heritage Assets. It is about testing and validating a work methodology and applying the HBIM concept (Historic Building Information Modeling).

As secondary objectives we propose to know the difficulties that exist when working with an existing building. The requirements demanded for its realization in a parametrized 3D, whose construction systems and ornamental elements also present a total uniqueness.

We start with the use of the advantages of combined photogrammetric and lasermetric technology, to obtain a model true to reality. We use as a sign the tower of the Castle of Belmonte de Campos, in the province of Palencia. It is a building in state of semi-ruin included in the red list of Heritage, built in masonry, and dated in two phases, the first medieval, and the second Renaissance.

The aim is not to have an in-depth knowledge of the construction phases, nor of the different constructive systems of the sign. This is because there is not a high knowledge of the Asset, but the different most significant parts will be differentiated to demonstrate how different data could be showed in the parametric model.

Materials and methods

The documentation of the Cultural Heritage must be true to reality because it will facilitate a more effective analysis and an irrefutable transfer of it. For this reason, data from the Belmonte de Campos Castle are taken using photogrammetric techniques and laser scanning.

From the combination of these data, we obtain a countless numbers of points that will make up a dense cloud of points representative of the building.

Fig. 1 Aerial photography Torre del homenaje Homage Tower) Belmonte de Campos (Palencia)

Data collection

The methods used for the data collection are classic measurements with laser and tape measurers, RPAs, terrestrial laser scanners and photo cameras.

The tower of the Castillo de Belmonte (figure 1) is documented both in its internal zone and in its external zone. The high resolution is required to obtain a dense and homogeneous cloud of points throughout the castle.

The external zone combines both techniques, the laser scanner (Leica ScanStation C-10) that focuses on taking accurate data from the lower-middle division of the façade, thus avoiding altered data or lower resolution due to the obliquity of the scans due to its proximity to the monument; and the upper division is taken by laser scanner and digital photogrammetry with RPAs that allows obtaining a final result of the inaccessible areas (figure 2).

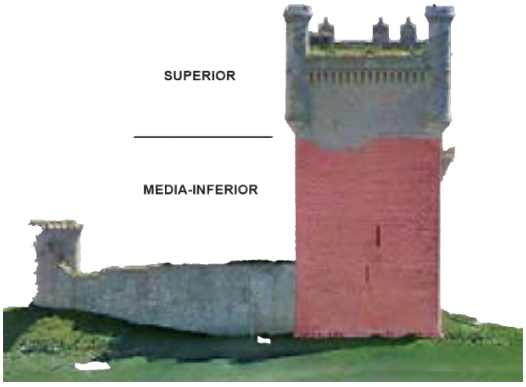


Fig. 2 Orthopedic North with the division of data collection in the castle tower. The internal area of the castle, due to its absence of light, is realized with a laser scanner (Faro Focus 3D).

Checkpoints

In order to record the point clouds resulting from laser scanning and photogrammetry in a local coordinate system, control points (targets) are distributed (Figure 3 and 4) along the target area. These targets allow to guide the independent data taking of each technique and combine / mix both in the same project.

Fig. 3 Location of control points around the castle. Figure 4 Control Points or targets.

Digital Aerial Photogrammetry based on RPAs (Remotely Piloted Aircraft Systems)

Obtaining data for Digital Photogrammetry is done by using RPAs (DJI Phantom 3) (figure 5) that provides an aerial overhead and oblique view of the castle, and therefore, 3D scene of the places difficult to access. For this, a flight plan or work mission (grid and orbital) is created, programming the flight (figure 6) on the area of interest and the photographs in 113 specific points, all taking into account that the base to be used facilitates a superposition of the images greater than 60%. The integrated GPS is responsible for the automatic flight and the shooting of the camera in their respective positions (figure 7).

The high-resolution digital images of the Castillo de Belmonte de Campos are obtained using a Sony Exmor R BSI 1 / 2.3 "camera of 12.4 Mp, a 35 mm lens and with a focus to ∞. The resolution of 4000 × 3000 allows to acquire texture and color of good quality.

In this photogrammetric stage, it is expected to obtain the positions of the points of support distributed throughout the scenario and to enable the option of taking point clouds to a common reference system, and thus combine the different data (photogrammetry and TLS) in a product final.

Fig. 5 and 6 Photographic RPAs next to the tower of the castle of Belmonte de Campos (Palencia), Orbital Flight Program of the RPA on the tower.

Fig. 7 Castle Cental Flight Program

Data capture with laser scanner Faro Focus 3D and Leica ScanStation C-10

The laser scanner provides a cloud of points through the measurement of distances and angles, by means laser light rays. The data takes are realized with terrestrial laser (TLS), Faro Focus 3D, which has a measurement principle by phase difference; and, Leica ScanStation C-10, by flight time. The laser scanner Faro Focus 3D has a range of 0.6m to 130m, a range error of 2mm, a measurement speed of 976,000 points per second and a color camera with 70 Megapixels. And the Leica Scanstation C-10 laser has a range of 0.1 m to 300 m, a precision of 2 mm, a speed of

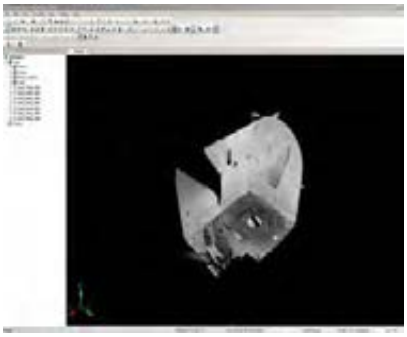
measurement, less than the Faro, of 50,000 points per second and a digital camera of 4 Megapixels. In total, 5 scans are performed with the Leica Scanstation laser on the outside, with the support of the targets; and 7 scans with the Faro Focus laser in the interior, in all its floors.

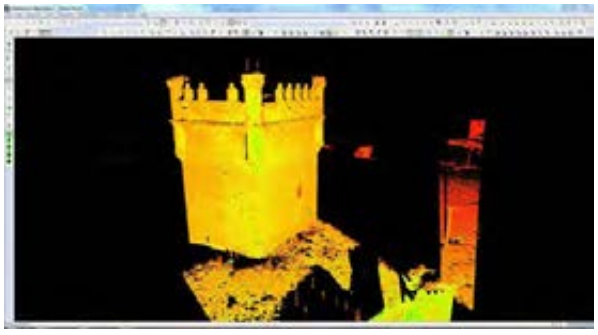
Data processing

The photographs taken with the RPA (figure 8) are used for the processing of the photogrammetric data by means of the commercial software Agisoft Photoscan for the generation of point cloud (figure 9). The Structure From Motion algorithm looks for characteristic points of each image, from which it obtains points of union with other images that present zones in common. In this way it is possible to know the positions of the 113 images in space and create a dense cloud of points with geometric and colorimetric information of the Castle (figure 10 and figure 11).

Fig. 8 Frames taken with the RPA and oriented in the Agisoft PhotoScan. Figure 9 Point cloud obtained by photogrammetry in PhotoScan

In contrast, the data from the laser scans are independent point clouds without coherence between them. The processing of these data consists of orienting and registering them using the software of each company: Cyclone for Leica and FaroScene for Faro. The control points help to fit each independent scan and generate a complete final product, that is, a point cloud that is homogeneous, detailed and faithful to the reality of the monument.





Figures 10 and 11. Indoor point cloud obtained by Faro Focus 3D laser scanner. External point cloud obtained by Leica ScanStation laser scanner

From cloud to points to solids 3d

With the dense cloud of points obtained (figure 10 and figure 11), it is optimized, filtered and divided according to the building components and relevant elements, for its subsequent modeling in 3D solids.

There are numerous computer tools, but during this work we will emphasize the PointSense for Heritage plugin installed in Autocad and the PointSense for Revit plugin installed in Revit, which belong to the Faro group.

PointSense for Heritage

It is a plugin incorporated to AutoCad software suitable for heritage documentation for both historical buildings and historical or archaeological research. The data is derived from laser scans and photos that generate aerial mosaics and 3D models.

PointSense for REVIT

Point Sense for Revit is a plugin installed in the Autodesk Revit software. The object is to be able to process the data from a point cloud obtained with the Faro 3D laser scanner, in the Autodesk Revit program. That is, tracing 3D models directly in Autodesk Revit from point clouds. A quick and easy workflow is the objetive.

For the first model, PointSense for Heritage is used, which recognizes the point clouds and obtains 3D solid objects, and then introduces them in the BIM workflow, providing them with parameters. It is installed as an AutoCad plugin and contains tools that allow you to work on the point cloud. In the Tower of the Castle the three basic geometries are used: plans for the walls and cylinders and cones for the turrets. For more complicated geometries, the cloud is divided into different dimensions to generate a simplified 3D solid by means of curve transitions (figures 12, 13 and 14).

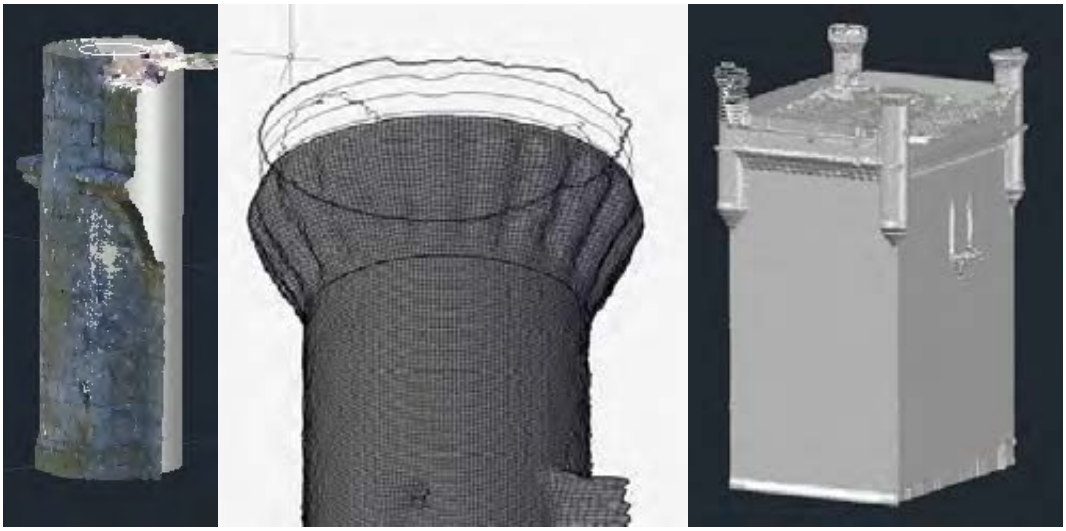
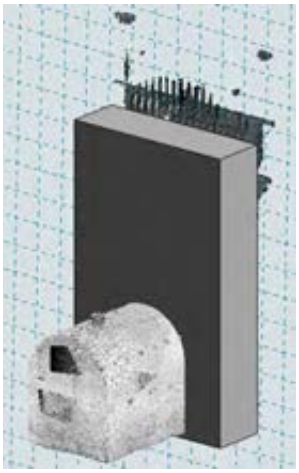


Fig. 12,13 and 14 Cloud of points turret tower and basic cylinder 3D. Solid model 3D sentry tower upper part obtained by PointSense for Heritage. 3D solid model castle tower of Belmonte de Campos (Palencia) obtained by PointSense for Heritage

In the second model we use the PointSense for REVIT plugin. The point cloud in the Revit program is linked and prepared with that plugin. The program recognizes the point cloud and on it you can draw plans, walls, windows or doors of the Revit library (figure 15 and 16). A very schematic model of a part of the tower is made because the geometries offered by the modeling are very rigid.



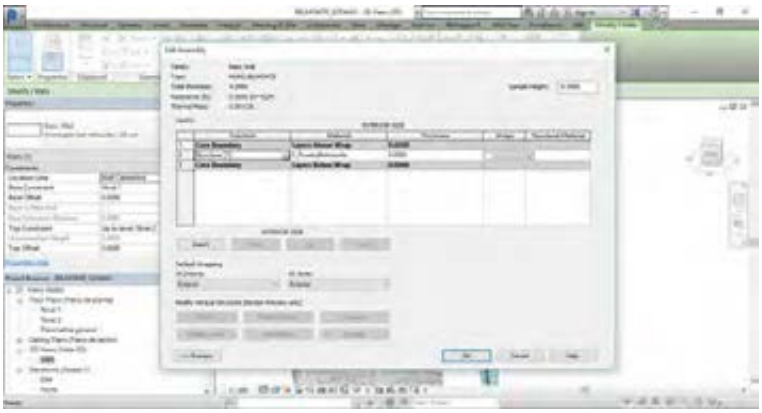


Figure 15 and 16. Basic wall modeled in Revit with the help of the PointSense for Revit plugin. Wall properties in Revit

Smart 3d model

When we speak of intelligent 3D model, we refer to the fact that geometry contains data or parameters, it is a design process based on an algorithmic scheme that allows expressing parameters and rules that define, codify and clarify the relationship between the design requirements and the resulting design.

The software that we used to create the parametric model was Autodesk Revit. We chose this one and not another because we had, as already mentioned, with the Point Sense for Revit plugin. There are other commercial companies in the market such as Archicad, Allplan, Edificius de Acca Software (free), etc.

Autodesk Revit is a Building Information Modeling (BIM) software developed by Autodesk. It allows the user to design with intelligent modeling and parametric drawing objects in three dimensions, 3D. Revit provides a complete associativity of bi-directional order. A change somewhere means a change in all places, instantly, without user intervention to manually change all views. It contains a relational database that is called a parametric change engine.

The 3D model, to be realistic and have the appropriate precision in a historic building, and thus be useful to the professionals involved in it, must be modeled according to the geometric laws of construction. The thickness of the walls must be correct, the materials, the organization of the elements and the different periods of construction of each part of the structure, the slants, the cracks, the degree of deterioration, etc.

Revit offers 3 ways to introduce the parameters to the model: with materials, with labels and with 2D annotations.

We have tried ways to create the smart model:

1. Importing from 3D Autocad the geometric 3D model (figure 17 and 18) previously made with the help of the PointSense Heritage plugin. This model had to contain different layers depending on the parameters that we would like to equip with Revit. That is, if you want to mark the historical phases, you must previously model them with different layers in Autocad. If we introduce the model in a single layer we can only put 2D annotations in Revit.
2. Creating the 3D model directly in Revit based on the previously linked point cloud (figure 19). Likewise, we have helped the PointSense for Revit plugin to create the walls or holes in a more schematic way.

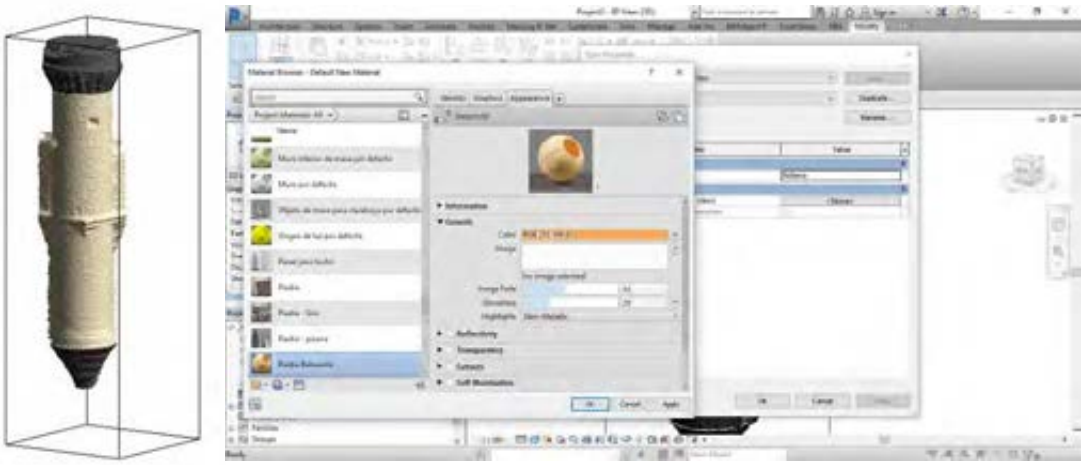


Figure 17 Moderated tower gatehouse with PointSense for Heritage imported to Revit.
Figure 18 Material attributes in Revit.

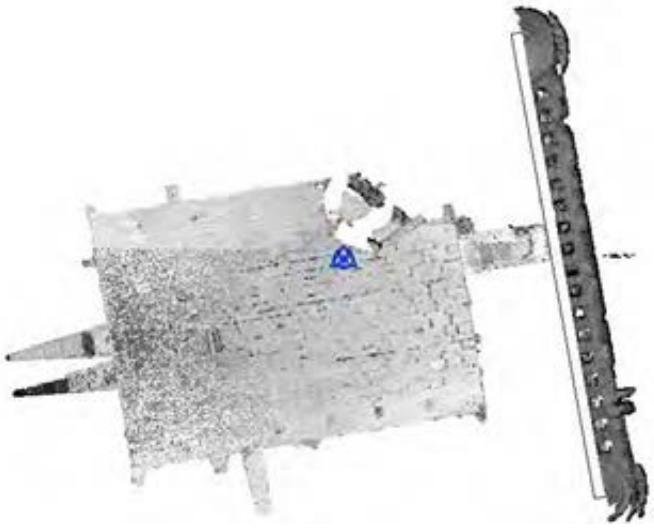


Figure 19 Modeling process south wall in Revit of the tower of the castle of Belmonte de Campos (Palencia)

With the complete model, among other things, we can extract classic documentation such as plans of floors, elevations, sections, elevations of walls, deformations, etc; we can also extract 3D views, renders and videos of routes, useful for the dissemination of heritage; and analysis of its thermal envelope.

Results

The knowledge of the RPAs technology, photogrammetry and the terrestrial laser scanner, have been applied to make a good data collection and a clear processing generating a final product of a combined cloud of points of great precision.In addition, we have worked with the Point Sense for Heritage plugin installed in Autocad to pass the point cloud to a volumetric 3D solid, maintaining the geometric characteristics of each piece. So, this tool, depending on the cutting geometry, will apply various modeling techniques: by adjusting basic volumes (cylinder and cone) to the irregularities of the product; through the recognition of the plans, mainly, type of walls; and, for more complex geometries, by means of sections of the point cloud to generate a simplified 3D solid through curve transition.

The virtual quartering of the monument by 3D solids allows to attribute information referring to the material, present pathologies, periods and constructive systems, and others.

Another plugin that we have tested is Point Sense for Revit, installed in the Autodesk Revit program. It has allowed us to model directly in Revit based on the previously linked point cloud and provide it with the parametric base.

To summarize, the main result has been to obtain two parametric 3D models:

• The first modeling in Autocad and equipped with the parametric base in Autodesk Revit. This parametric base consisted in entering the data of the supposed constructive phases.

• The second, modeled and endowed with a parametric base entirely in Autodesk Revit.

The following table shows the different parts of the castle that require geometries with different data or parameters. In the parameters we define the construction stages, the construction materials, the state of conservation, possible pathologies and the risk of collapse. The table serves as the basis for 3D modeling with differentiated geometries.

The above table also has a lot to do with the planning tables that are extracted from the BIM programs. These planning tables allow us to extract specific data from the 3D model, the parameters introduced relate them to the surfaces and their position.

The main limitation we have found has been the passage of the point cloud to a 3D volumetric model. Geometric modeling takes a lot of time and requires a meticulous and detailed work process, if the desired results we want to have these characteristics also.

Achievement of goals

From the results obtained we can indicate that we have achieved the objectives of the work, both the main objective and the secondary ones. The first thing we can indicate is the validity of the point cloud obtained by the RPA and the laser scanner for the erection of heritage buildings. The validity is guaranteed by a multitude of jobs that have been carried out since the rise of new technologies.

In addition, we have created a separate work methodology in two ways where we apply the philosophy and specific software HBIM. This double track has allowed us to demonstrate that we achieve greater precision if we perform the 3D geometric model from the point cloud first in Autocad with the Point Sense Heritage plugin, and then we pass it to a BIM program such as Autodesk Revit to equip it of data.

The other way, in which we introduce the point cloud directly into the BIM software and review its geometry to obtain the parametric 3D model, limits us to a greater extent. We do it through the Point Sense for Revit plugin, and this is more oriented to the recognition of non-heritage architectural elements, such as walls, pipes, windows, doors, etc.

The conclusions they draw are: 3D models can be capable of hosting both geometric and historical information, data on their evolution and data on their deterioration and degradation by different agents.

To carry out a wide-ranging library of heritage elements within the HBIM environment, a shared investigation is required, with common criteria on its preparation, drawings and interpretations.

Contribution in relation to the previous investigations:

The fundamental contribution we have achieved is associated with the greater level of detail we have achieved in the geometric 3D model. This has been due to the previous modeling in CAD with the Point Sense for Heritage plugin. Later, we have provided it with the parametric base in the Autodesk Revit program. Until now, the rest of the researches consulted traced the point cloud of the model directly in the Autodesk Revit or Archicad software, which meant a simplification of the surfaces with the consequent loss of detail in the model.

ELEMENT	ID		STAGE	MATERIAL	COMPOSITION	STATE OF CONSERVATION	PATHOLOGIES	RISK CHARACTER
SHELTER	GA_	GA-TOP	RENAISSANCE	LIMESTONE	SILLAREJO	CONSERVED	3. DIRT	MEDIUM
		GA-MID	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
		GA-BOT	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
	GB_	GB-TOP	RENAISSANCE	LIMESTONE	SILLAREJO	DEGRADED	2. DETACHMENT	HIGH
		GB-MID	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
		GB-BOT	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
	GC_	GC-TOP	RENAISSANCE	LIMESTONE	SILLAREJO	DEGRADED	2. DETACHMENT	HIGH
		GC-MID	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
		GC-BOT	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
	GD_	GD-TOP	RENAISSANCE	LIMESTONE	SILLAREJO	HALF-DEMOLISHED	2. DETACHMENT	HIGH
		GD-MID	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
		GD-BOT	RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
BATTLEMENT	AL_SUR		RENAISSANCE	LIMESTONE	SILLAREJO	HALF-DEMOLISHED	2. DETACHMENT	HIGH
	AL_ESTE		RENAISSANCE	LIMESTONE	SILLAREJO	HALF-DEMOLISHED	2. DETACHMENT	HIGH
	AL_NORTE		RENAISSANCE			DEMOLISHED		
	AL_OESTE		RENAISSANCE	LIMESTONE	SILLAR	HALF-DEMOLISHED	2. DETACHMENT	HIGH
UPPER WALL	MS_SUR		RENAISSANCE	LIMESTONE	SILLAR	CONSERVED	4. PATINA	MEDIUM
	MS_ESTE		RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
	MS_NORTE		RENAISSANCE	LIMESTONE	SILLAR	CONSERVED	4. PATINA	MEDIUM
	MS_OESTE		RENAISSANCE	LIMESTONE	SILLAR	CONSERVED		MEDIUM
LOWER WALL	MI_SUR		MEDIEVAL	LIMESTONE	SILLAR	CONSERVED		MEDIUM
	MI_ESTE		MEDIEVAL	LIMESTONE	SILLAR	CONSERVED	1. CRACKS	HIGH
	MI_NORTE		MEDIEVAL	LIMESTONE	SILLAR	CONSERVED	4. PATINA	MEDIUM
	MI_OESTE		MEDIEVAL	LIMESTONE	SILLAR	CONSERVED		MEDIUM
BALCONY	BAL_OESTE		RENAISSANCE	LIMESTONE	SILLAREJO	DEGRADED	2. DETACHMENT	HIGH
WINDOW	V_SUR		MEDIEVAL			HIDDEN		MEDIUM
	V-ESTE		MEDIEVAL	IRON	GRID	CONSERVED	5. CORROSION	MEDIUM
DOOR			MEDIEVAL	WOOD		DEGRADED		MEDIUM
FLOOR	PL_BAJA		MEDIEVAL	RAMMED EARTH		CONSERVED		MEDIUM
	PL-PRIMERA		MEDIEVAL			DEMOLISHED		
	PL-SEGUNDA		MEDIEVAL	LIMESTONE	STONE DOME	CONSERVED		MEDIUM
	PL-TERCERA		RENAISSANCE			DEMOLISHED		
	PL-CUBIERTA		RENAISSANCE	LIMESTONE	STONE DOME	DEGRADED	1. CRACKS	HIGH
STAIRS	ES_01		MEDIEVAL	LIMESTONE	SPIRAL STAIRCASE	DEGRADED	3. DIRT	MEDIUM
	ES_02		MEDIEVAL	LIMESTONE	SPIRAL STAIRCASE	DEGRADED	2. DETACHMENT	MEDIUM
	ES_03		RENAISSANCE	LIMESTONE	MALLORQUINA STAIRS	DEGRADED	3. DIRT	MEDIUM
CISTERN	AL_SOTANO		MEDIEVAL	LIMESTONE	STONE DOME		3. DIRT	MEDIUM
WATER WELL	P_BAJA		MEDIEVAL		HIDDEN			MEDIUM

Conclusions

The building mapping with a high precision three-dimensional model is of essential importance, in the case of buildings belonging to the built heritage, having a model that reproduces the building virtually and defines it completely, has a very interesting employability.

This employability can be framed in the environment of rehabilitation, conservation, maintenance, asset management, the degree of deterioration over time to compare with future situations, etc.

The mapping of buildings using a 3D point cloud is widely validated and computerized, but the transfer of this cloud to the parametric 3D model with BIM standards currently has a lot of manual work, which gives rise to many possible errors or definition errors. In this sense, the contribution we make is a geometric mapping of high precision using the Point Sense Heritage plugin in the Autocad environment to later pass it to a program with BIM environment, Autodesk Revit type.

The BIM work environment was initially thought and developed for new buildings, currently the process of adaptation to historic buildings is being developed, which is called HBIM. The software companies, or some private companies, such as PetroBIM are working on it, but there is still a way to go in several ways: building mapping in a 3D parametric model, entering the data desired in the model and creating libraries. The process of working in a heritage environment from a point cloud is not available to the general public, due to the cost of tools (gifts, laser scanners, high definition cameras) and computer programs. Therefore, the development and research in this field should be led by public institutions such as universities or research centers with state support.

The standardization and geometrization of patrimonial structures has revealed that it is very useful because it was built with great geometric awareness and because many reasons are repeated both in the same building and in other buildings. It is a normal fact since in antiquity they had a number of limited models and the master builders copied many motifs from nearby places. For this reason, the creation of standardized elements, a library of patrimonial materials and a library of theoretical typological families are very useful for the study and analysis of construction, where the concept of originality is more limited than in the present, where they are repeated multitude of patterns.

References

Murphy, M., McGovern, E., Pavia, S., 2009. *Historic building information modeling (HBIM).* Structural Survey 27 (4), 311–327.

Murphy, M., McGovern, E., & Pavia, S. (2013). *Historic Building Information Modelling–Adding intelligence to laser and image based surveys of European classical architecture.* ISPRS journal of photogrammetry and remote sensing,76, 89-102.

Oreni, D., Brumana, R., Georgopoulos, A., & Cuca, B. (2013). HBIM for conservation and management of built heritage: Towards a library of vaults and wooden bean floors. ISPRS Annals of Photogrammetry, Remote Sensing and Spatial Information Sciences, 5, W1.

Quattrini, R., Malinverni, E. S., Clini, P., Nespeca, R., & Orlietti, E. (2015). *From TLS to HBIM. High quality semantically-aware 3D modeling of complex architecture. The International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences*, 40(5), 367.

García Valldecabres, J.L; López González, M.C. e Jordán Palomar, I. (2016): *El estudio del patrimonio arquitectónico a partir de la metodología HBIM*. Un caso medieval. Actas del 16 Congreso Internacional de Expresión Gráfica Arquitectónica. 260-275. www.petrobim.com

Fai, S., Graham, K., Duckworth, T., Wood, N., Attar, R., 2011. *Building information modelling and heritage documentation*, In: 18th International Conference on Virtual Systems and Multimedia. XXIII CIPA Symposium – Prague, Czech Republic – 12–16 September

Eastman, C., 2007. *BIM Handbook: A Guide to Building Information Modelling for Owners, Managers, Designers, Engineers and Contractors*, first ed. Wiley, New Jersey.

www.accasoftware.com

www.faro3dsoftware.com

www.Autodesk.com

www.duraark.eu

www.agisoft.com

www.leica-geosystems.com

Multisensory integration and inclusivity in visual arts communication. Blind users and perception of perspectival painted spaces

Barbara Ansaldi
Department of Architecture DiArc (University of Naples Federico II)
email: barbara.ansaldi@unina.it

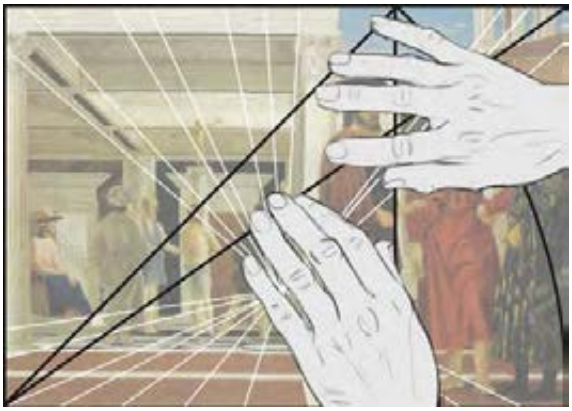


Fig. 1 Touching Art. Elaborazione dell'autore

Abstract

Ever since the Renaissance, most part of Western painting has been characterized by the application of linear perspective. However, the two-dimensional nature of paintings makes it impossible for blind individuals to truly appreciate such a unique heritage, as their visual impairment prevents them from experiencing perspectival illusions that are typical of vision. Is it possible to really understand the value of a painting by Piero Della Francesca without acknowledging the role played by perspective? Today, in a world that is trying to become more inclusive, it is unacceptable to deny an entire – though small - category of users the fruition of artworks in which the comprehension of how perspective's rules define space and composition is inextricably bound to the understanding of their profound meaning. The paper tries to reflect on the possibility to fill (at least partly) the existing fruition gap between the sighted and the blind that currently distinguishes the majority of visual arts communication strategies designed by museums. Descriptive geometry's traditional techniques, like photogrammetry and geometric restitution of perspective, combined with the use of new technologies, like 3D printing, can be crucial in the translation of 2D spaces in 3D models which can be experienced through touch.

Moreover, a multisensory approach represents an opportunity also for sighted users to enrich their knowledge: an alternative aesthetic experience that stimulates other senses is able to transmit new significances by avoiding the extremely crowded sense of vision.

Abstract

A partire dal Rinascimento, gran parte della pittura occidentale è stata caratterizzata dall'applicazione della prospettiva lineare. Tuttavia, la natura bidimensionale dell'opera pittorica esclude i non vedenti da un sincero apprezzamento di tale inestimabile patrimonio, soprattutto dal momento che essi non possono fare esperienza diretta delle illusioni percettive proprie della visione. È possibile cogliere il valore di un dipinto di Piero della Francesca senza comprendere il ruolo giocato dalla prospettiva? Oggi, in un mondo che cerca di diventare sempre più inclusivo, non si può negare ad un'intera – seppur ristretta – categoria di utenti la fruizione di opere per le quali la cognizione del modo in cui la prospettiva definisce spazio e composizione è imprescindibilmente legata alla comprensione del senso profondo dell'opera stessa. Avvalendosi anche di casi studio, il contributo intende indagare la possibilità di colmare (almeno in parte) il gap di fruizione tra vedenti e non vedenti che attualmente caratterizza la maggior parte delle strategie di comunicazione per le arti visive messe a punto dai musei.

Le tecniche tradizionali della geometria descrittiva, come la fotogrammetria e i procedimenti di restituzione prospettica, combinate all'uso delle nuove tecnologie, come la stampa 3D, diventano decisive nelle operazioni di traduzione di spazi 2D in modelli 3D fruibili tattilmente. Inoltre, l'approccio multisensoriale rappresenta un'occasione di arricchimento conoscitivo anche per il pubblico normo vedente: un'esperienza estetica alternativa che sollecita gli altri sensi è in grado di veicolare nuovi significati aggirando il sovraffollato senso della vista.

Introduction

In the last few years, the fields of knowledge, representation and communication of Cultural Heritage have witnessed an increasing use of ICT (Information and Communications Technology). Virtual Reality, Virtual Archaeology, Augmented Reality, Video Mapping, Laser Scanning, H-BIM, UAV Survey, 3D reconstruction etc. are the new research frontier[1] and the field has now reached full maturity, constantly providing new, more creative and innovative applications to involve a large audience. As far as divulgation and fruition of cultural heritage are concerned, ICTs can provide incredibly powerful means and their multimedia modalities to of accessing information have redefined times and spaces of both dissemination and fruition of knowledge[2]. ICTs allow an active, intense communication thanks to the use of a language that tends to emphasize the perceptual aspects of human comprehension by defining communication strategies based on images that aim at facilitating comprehension as well as clarifying complex aspects and making information more

[1] P. Paolucci, N. Di Blas, F. Alonzo, ICT per i Beni Culturali. Esempi di Applicazione, in Mondo digitale n. 3, AICA, 2005, pp. 44-61.

[2] A. Meschini, Digital technology in the communication of Cultural Heritage. State of the art and potential development, in DisegnareCON vol. 4, n. 8, Tecnologie per la comunicazione del patrimonio culturale, edited by E. Ippoliti e A. Meschini, 2011, p. 14.

explicit and easier to access[3]. Moreover, in recent years, these communication strategies have invaded the visual arts field and especially painting, whose products are solely bi-dimensional. However, these strategies presupposes the use of sight. What about people who cannot see? Today, these users are simply excluded from a real participation in such experiences, only being able to catch their faded reflections. Andrea Socrati points out the huge difficulties that visually impaired people still face when visiting a museum since they «too often must stick to the verbal description of a guide (...), without having the chance to directly experience artworks because of the strict ban: "please do not touch[4]"». In fact, art should not allow barriers, even if the term "visual arts[5]" apparently excludes a priori an entire category of users. Given the multisensory integration that new technologies permit, today it is impossible to avoid a social inclusion-driven research. We live in an era in which "inclusivity" is becoming more and more one of the main goals in all fields of human activities; the European Commission, in its Creative Europe programme 2014-2020[6], has highlighted for the first time among the programme's principles the need not to exclude anyone from the enjoyment of Cultural Heritage. An inclusion intended not just as mere integration but as "non-exclusion", meaning a «process of re-arrangement and re-organization of the context that, triggered by the request of someone who is "outside", "imposes" to those who are "inside" to re-negotiate lexicons, procedures, institutions[7]», in a perspective that benefits everyone. It is then necessary to start thinking in terms of "design for all", in order to meet the needs of different categories of users. In this way, special needs users can become aware of their own right to freely access culture, in all its manifestations. It is our compelling task to ensure that visually impaired people are not denied the opportunity to enjoy a profound aesthetic experience. It is an important issue because, as Rudolph Arnheim stated, «art is the evocation of life in all its completeness, purity and intensity. Art, therefore, is one of the most powerful instruments available to us for the fulfilment of life. To withhold this benefit from human beings is to deprive them indeed[8]».

If aesthetic enjoyment is a universal right, then we must «consider everyone's needs so that anyone is able to experience it[9]». Besides, an aesthetic experience that involves more senses - and not only sight - leads to an enrichment of sighted users' experience since it is capable of transmitting new significances by avoiding the extremely crowded sense of vision. This different approach to art triggers unexpected cognitive processes based on forms-recognition through other senses, adding value to the artistic experience and to everyone's relationship with art. Such a process outlines «almost a pervading action of visual denigration that triggers a synesthetic

[3] Ibidem.

[4] A. Socrati, Per una pedagogia speciale dell'arte, in L'arte a portata di mano. Verso una pedagogia di accesso ai Beni Culturali senza barriere, edited by del Museo Tattile Statale Omero, Armando Editore, 2006, p. 142.

[5] /vɪʒuəl/: from late Latin visivus, from videre «to see», meaning relating to seeing or sight..

[6] The Creative Europe programme (2014-2020) has been stablished by Regulation (UE) N. 1295/2013 of the European Parliament and the Council of 11 December 2013. In Article 3 we can read «to strengthen the competitiveness of the European cultural and creative sectors, in particular of the audiovisual sector, with a view to promoting smart, sustainable and inclusive growth».

[7] S. Oliverio, L'inclusione interculturale come frontiera educativa in Pratiche educative per l'inclusione sociale, edited by M. Striano, FrancoAngeli, Milano, 2010, pp. 52-79.

[8] R. Arnheim, To the Rescue of Art, University of California Press, Berkeley-Los Angeles, 1992, p. 76

[9] A. Grassini, Per un'estetica della tattilità. Ma esistono davvero le arti visive?, Armando Editore, Roma, 2016, p. 15.

perception, with the odd purpose of accentuating the perceptual capabilities of the subject itself[10]» who re-discovers things in a multisensory epiphany: «an apparent contradiction, however, resolves itself in a revelation: it makes us blind, for we can see better what surrounds us[11]». Similarly, Aldo Grassini believes that questioning the traditional way of enjoying a painting is a totally new cultural phenomenon that can subvert the usual user-artwork relationship[12]. Apparently, this matter belongs in the first place to art psychologists and educationalists' domain of expertise. However, features like perspective, proportion, identification of geometries, chiaroscuro, colour intensity, light and mastery of ICTs are constantly subject of study for architects and representation specialists. The main aim of such kind of research is, consequently, to work out solutions to fill – at least partly – the existing fruition gap between the sighted and the blind that currently distinguishes the majority of visual arts communication strategies designed by museums. More specifically, we refer to those paintings in which perspectiva arificialis plays a fundamental role. Can a blind individual understand the geometric and spatial values of bi-dimensional representations based on perspective that are typical of Western painting? Is it possible to "translate" a painting into a tactile representation to guide the construction of a mental image? In addition, are the remaining senses able to steer the haptic[13] exploration in order to comprehend the different values of an artwork? How modern technologies can be exploited to allow visually impaired people to live an "augmented" experience of a painting? To what extent sighted users can enrich their experience through such alternative modalities? For bi-dimensional objects like paintings – that clearly cannot be touched – the problem is quite complex, especially for artworks in which the comprehension of how perspective's rules define space and composition is inextricably bound to the understanding of their profound meaning. Panofsky views perspective as a "symbolic form", meaning that it isn't just a technical aspect of a painting but a central component of a Western "will to form," the expression of social, cognitive, psychological practices of a given culture that makes its spatial conception tangible[14]. Perspective imitates the functioning of vision allowing a representation of reality "as we see it". A fitting example are certainly artworks by artists like Paolo Uccello and Piero della Francesca, whose value and identity lie in the application of perspective itself in order to organize space "on a human scale". For these artists, a theme is only a pretext to arrange things in a rational order ruled by perspective and geometry. Such artworks are incredibly hard to understand for someone who cannot experience vision.

[10] A. De Rosa, Cecità del vedere. Sull'origine delle immagini, in La ricerca nell'ambito della geometria descrittiva. Due giornate di studio, edited by A. L. Carlevaris, Gangemi Editore, Roma, 2016, p. 47.
[11] Ibidem.
[12] Grassini A., 2016, op.cit., p. 13.
[13] From Greek, haptomai, meaning to grasp, to seize.
[14] Cfr. E. Panofsky, La prospettiva come "forma simbolica", 1925, reprint translated by E. Filippini, Abscondita, Milano, 2013.

Methodology

Then what is the role of representation? What means could it provide to support the development of solutions capable of involving users with special needs? Since the subject of study are those paintings in which perspective is essential for the representation of the space imagined by the artist, therefore descriptive geometry's traditional techniques, like photogrammetry and geometric restitution of perspective, can be crucial in the translation of 2D spaces in 3D models which can be experienced through touch. We can consider, for example, what has already been done in the study of all those artworks in which painters masterfully used perspective to create illusory spaces to "break down" the painted surface (a ceiling or a wall), a technique called quadratura. Thanks to reverse perspective techniques[15], it was possible to re-create the correspondent tri-dimensional configuration of such painted spaces, proving that perspective was perfectly applied by the artists[16]. It follows that the use of these research methodologies[17] can lead to the creation of 3D printable models, a translation of 2D images to "tactile language" which is able to guide visually impaired users' comprehension of bi-dimensional environment designs. This process can be helpful also for a normally sighted audience since hands-on approaches are among the most efficient educational strategies in general. However, a 3D plastic model alone is not enough to transmit all the values that make an artwork unique: can light, chiaroscuro and colours be somehow made accessible to a blind person? Is it possible to turn them into sounds, textures, smells, narrations or thermal sensations in order to provide an alternative but equally deep aesthetic experience?

First, we must keep in mind that the aesthetic experience is not exclusively bound to sight; the word "aesthetic" means, precisely, perception through a sense, which is not necessarily sight. The apparent minus habens condition of blindness actually does not stop the human ability to know the world: blind people state that they "see images", therefore we can say that it is possible to be blind but it is impossible to not to "see[18]". This means that research should reflect on all the potential sensations that a blind individual can experience through the other sensory channels, without uselessly expecting they would be the same compared to those perceivable through sight. Rudolph Arnheim also claimed that «the corresponding psychological approach is primarily geared not to

[15] We can mention a few examples like the works by the masters of Mannerism and Baroque Giorgio Vasari, Baldassarre Peruzzi, Cherubino and Giovanni Alberti and Andrea Pozzo. Their masterpieces were long studied to understand the construction of the illusory perspectival space and to eventually re-create a tri-dimensional model of it, as in the case of Sala Clementina in Vaticano. Cfr. A. Laura Carlevaris, La geometria della costruzione pittorica: dallo schema compositivo allo schema prospettico. Un'analisi delle procedure impiegate nella costruzione dell'architettura illusoria della parete nord della Sala Clementina in Vaticano, in R. Migliari, La Costruzione dell'architettura illusoria, Gangemi Editore, Roma, 1999, pp. 121-152.

[16] Another interesting case study is the work led by a research team of Università San Raffaele di Roma to set up a digital museum installation dedicated to drawings by architects and scenographers Galli da Bibiena: the idea is to re-create fragments of imaginary architectures in 3D starting from set design sketches. Again, thanks to the investigation based on representation's critical tools, it was possible to turn Bibiena's drawn architectures and spaces into virtual infographic 3D models. Cfr. A. R. D. Accardi, S. Chiarenza, R. Inglisa, N. Scarpato, Musei digitali dell'architettura immaginata: un approccio integrato per la definizione di percorsi di conoscenza del patrimonio culturale, in DisegnareCON, vol. 9 n. 17, Musei Virtuali dell'Architettura e della città, edited by P. Albisinni e E. Ippoliti, 2016.

[17] fr. A. De Rosa, A. Sgrosso, A. Giordano, La geometria nell'immagine. Storia dei metodi di rappresentazione. Vol. 2: Rinascimento e Barocco, Utet, 2001.

[18] De Rosa A., 2016, op. cit., p. 56.

what sightless people are missing; rather it conceives of the haptic world first of all in its own terms as an alternative to the world of vision[19]». At this point, we should remember that there is a clear distinction between hedonic pleasure and aesthetic pleasure: the first one is the immediate reaction to the contact with an object while the second is the result of a complex mental processing triggered by the sensory input. Simply, a sensation alone (both visual and tactile) has no aesthetic value but can undergo a mental elaboration that leads to the real aesthetic pleasure: «the image arises from the senses but it lights up with beauty in our mind[20]» .In Kant's words, the experience of beauty rests on the "free play" of the cognitive faculties of imagination and understanding operated on sensory data[21].

Just like tactile perception, visual perception is an active task that depends essentially on internal mental processing, as argued by Hermann von Helmholtz[22].

Consequently, to see is in the first place "to see with our mind" rather than with the eyes: regardless of the sense employed, perception and imagination meet in the intellect and give birth to a mental representation[23].

The image that a blind individual re-creates in his mind is completely intellectual and it is built through the sensory, objective data coming from tactile perception that interact with imagination. It is a process that requires a way more intense effort of memory and abstraction if compared to sight; the final destination, though, stays the same: an aesthetic experience which is not generated only by sensory inputs, but from an intellectual process influenced by a series of "subjective variables": cultural background, personality, past experience, sensivity etc.

Then, what is the "objective data" (for example, perspective) we should "administer" to the visually impaired in order to trigger the mental process that creates a "correct" representation of the painting? Touch and sight act in a very different way, though they can be both considered sequential when it comes to the construction of a mental image. What changes significantly is the process's duration: sight is infinitely faster than touch[24]. Sight is a synthetic sense; touch is instead an analytic sense that works though sequential stages. Sight easily collects a huge amount of data "at once" and sends it to our brain instantly. Tactile exploration requires a great amount of additional time to analyse everything and a huge effort of memory and abstraction to create a mental global image of the painting out of the sum of single adjacent parts. Sight can act at a distance; touch needs to remove any distance in order to function. "First look" and "at a glance" are expressions that means nothing for people who can know objects only through touch, since the only way to get an "overall view" is by adding up single parts in their mind. It is clear that in a tactile experience the role of intellect is preeminent[25]

[19] Arnheim R, 1990, op. cit., p. 57.
[20] A. Grassini, I valori estetici nella percezione tattile, in Museo Tattile Statale Omero, 2016, op. cit., p. 41.
[21] Immanuel Kant, Critica del Giudizio, 1790.
[22] Cfr. M. Meulders, Helmholtz. Dal secolo dei lumi alle neuroscienze, Bollati Boringhieri, Torino, 2005.
[23] Grassini A., 2016, op. cit., p. 19.
[24] L. Secchi, Percezione, cognizione e interpretazione dell'immagine dotata di valore estetico. Conoscere l'arte entro e oltre la disabilità visiva, in Museo Tattile Statale Omero, 2006, op. cit., p. 131. «Vi è un tempo della lettura ottica e tattile che possiamo definire tempo della costruzione dell'immagine in cui: percezione delle forme, riconoscimento degli elementi, significazione della composizione, concorrono a determinare il complesso fenomeno della visione».
[25] Y. Hatwell, Introduction. Touch and cognition in Touching for knowing: Cognitive Psychology of Haptic Manual Perception edited by Y. Hatwell, A. Streri and E. Gentaz, John Benjamins Pub Co, Amsterdam, 2003, p. 5.

if compared to the sense; in this statement lies the problem of the haptic translation of values that are usually known through the overall view that sight can instantly provide. To address this issue, it is necessary to reflect on the features that a multisensory representation should have in order to suit blind people's needs. Firstly, it is recommended to "impoverish" the initial stimulus in order to avoid a mental overload due to an excessive amount of detail[26], which would result in a failure. In his essay Perceptual Aspects of Art for the Blind, Rudolph Arnheim affirms that «intricate detail also is not easily traced by the fingers. In creating works of their own as well as in their appreciation of the works of others, the blind prefer symmetry and other simple form relations[27]». Keeping these assumptions in mind, a series of partial translations of the painting, each one providing a particular feature (perspective, outlines, lightning, colour juxtapositions etc.), could be a winning solution. In doing so, it is possible to indulge the sense of touch and the sequential way through which it proceeds in knowing reality.

Klatsky[28] and Lederman's[29] studies support this hypothesis; as a matter of fact, they argue that tactile perception needs to make specific hand movements (lateral rubbing, pinching, applying pressure, following contours, probing, static contact etc.) to grasp an object's various properties (size, shape, texture, hardness[30]). Yvette Hatwell explains that these exploratory procedures are not compatible motorically, meaning that they need to be performed successively and not simultaneously. «Therefore, haptic exploration is consistently more sequential and more time-consuming than visual exploration[31]». Tactile representations aimed at communicating values like perspective, light and colour (regarded as a prerogative of vision) would add to the traditional compensatory strategies still in use in museums, such as specialized audioguides and braille descriptions/supports in charge of divulgating information about style, historic and cultural context, iconology etc. (which are usually acquired similarly by the sighted). The final goal should not be a "tactile surrogate" of the painting, with the wrong pretence of trying – unsuccessfully – to incorporate all its features in one single object and to communicate them at once. On the contrary, the representation should synergistically employ partial tactile transpositions, verbal descriptions, sounds, smells, tastes, in an integrated system of perceptions, cognitions and significations[32].

[26] T. Lancioni, Toccare ma non guardare. La semiotica e il problema della trasposizione tattile delle arti visive, in Museo Tattile Statale Omero, 2006, op. cit., p. 57. «Sarà opportuno tendere a un impoverimento dello stimolo iniziale che renda dell'opera solo i tratti che possono essere colti in modo significativo anche dal tatto, invece che tentare una riproduzione integrale e sostitutiva dell'originale»,

[27] Arnheim R., 1990, op. cit., p. 62.

[28] Cfr. R. L. Klatzky, S. J. Lederman, The haptic identification of everyday life objects, in Touching for knowing. Cognitive psychology of haptic manual perception, a cura di Y. Hatwell., A. Streri, E. Gentaz, John Benjamins Publishers, Amsterdam, 2003, pp. 105-121

[29] Cfr. Lederman S.J., Klatzky R.L., Hand movements: a window into haptic recognition, in Cognitive Psychology n. 19, 1987, pp. 342-368.

[30] Y. Hatwell, Manual exploratory procedures in children and adults in Touching for knowing: Cognitive Psychology of Haptic Manual Perception edited by Y. Hatwell, A. Streri and E. Gentaz, John Benjamins Pub Co, Amsterdam, 2003, p. 78.

[31] Ibidem, p. 70.

[32] L. Secchi, P. Gualandi, Logiche di ideazione e realizzazione della pittura tridimensionale per una didattica speciale delle arti, in Museo Tattile Statale Omero, 2006, pp. 239-240. The authors refer to Panofsky's three levels approach that can be applied to both sight and touch: «Percezione, cognizione e significazione dell'immagine coincidono con i tre livelli di lettura, correlati e inscindibili, che vengono sempre rispettati ma praticati in proporzioni diverse. (…) Lettura preiconografica, analisi iconografica e interpretazione iconologica di un'opera d'arte sono passaggi che, integrati e contestualizzati, risultano funzi-

The purpose of this operation, that becomes highly educational, is to ease the transition from knowledge of reality to the related mental representation so that everyone can access the aesthetic experience. Thus, both the sighed and the blind improve the cognition process that leads to the formation of the mental re-construction of the composition[33].

In the particular case of perspective, a representation should aim at guiding blind users in the comprehension of how perspective works, having again a strong educational purpose. The visually impaired should be able to understand the transition from a tri-dimensional environment to its bi-dimensional representation and vice versa. It is not about making the artwork's perspective "knowable by touch", a useless operation for someone that cannot be deceived by the perspectival illusions typical of vision and, consequently, cannot naturally comprehend foreshortening and distortions. Instead, the goal is to make intelligible the geometrical and scientific procedure that imitates the functioning of sight which allowed - ever since the Renaissance - artists to represent reality "the way we see it" on a bi-dimensional support. The visually impaired, who know the world according to its tri-dimensional and volumetric nature, can eventually understand the distortions which take place in the process of the translation of a space to a plane and discover that they have a precise and valid significance. The representations supporting this knowledge path should be adequately designed by indulging the haptic exploration's modalities. Moreover, this tactile modality to experience reality is assisted by the remaining senses, like hearing, and it must be necessarily supported by an efficient kinaesthetic activity. The summation of stimuli provided by volume, weight, texture and hand movements forms the mental image that, for those who can't see, is the object itself[34]. Such operation brings undeniable benefits also for sighted users – children and young adults in particular – that often have issues in dealing with perspective, even if they basically experience it in everyday life.

State-of-art

"Just as water, gas, and electricity are brought into our houses from far off to satisfy our needs in response to a minimal effort, so we shall be supplied with visual- or auditory images, which will appear and disappear at a simple movement of the hand, hardly more than a sign" (P. Valery, The Conquest of Ubiquity). As evidenced at the beginning of this paper, the outcomes of research in the field of Cultural Heritage show how multisensory strategies and new technologies have been exploited for the communication and the "storytelling" of cultural content[35]. In the last two years, we witnessed the overflowing rise of "experiences", i.e. impossible immersive[36] exhibitions dedicated to some of

onali sia alle esigenze cognitive delle persone non vedenti congenite, tardive e ipovedenti, che alle esigenze cognitive delle persone normovedenti, per una ragione inequivocabile: la presa di coscienza dei processi con i quali apprendiamo la realtà e la sua rappresentazione trasfigurata e potenziata».

[33] L. Secchi, Percezione, cognizione e interpretazione dell'immagine dotata di valore estetico. Conoscere l'arte entro e oltre la disabilità visiva, in Museo Tattile Statale Omero, 2016, op. cit., p. 136.

[34] B. Piochi, M. Baldeschi, Sussidi didattici per l'introduzione della prospettiva e della geometria proiettiva con alunni non vedenti, in A. Davoli, R. Imperiale, B. Piochi e P. Sandri, Alunni, insegnanti, matematica. Progettare, animare, integrare. Conference Proceedings n. 14 Matematica e difficoltà, Pitagora Editrice, Bologna, 2005

[35] Meschini A., 2011, op. cit. p. 16

36 These exhibitions are commonly defined "impossible" because it would be inconceivable to bring together priceless masterpieces housed in museum from all over the world in the same location and/or in unusual contexts.

the greatest painters in the history of art: Van Gogh Alive - The Experience[37], Klimt Experience[38], Caravaggio Experience[39], Dalì Experience[40], Uffizi Virtual Experience[41] and Magister Giotto[42] are only a few examples of this kind of virtual exhibitions. These "experiences" have invaded the international art scene, significantly overturning and expanding the concept of museography. By relying on the visual emphasis of high-definition enlargements and massive video-projections, these exhibitions try to make the experience more involving and to stimulate other senses through a dynamic, refined art installations which had been already imagined and designed by Peter Greenway for Leonardo Da Vinci's Last Supper and for Paolo Veronese's Wedding at Cana, as well as "sensitive environments[43]" by Studio Azzurro. These art installations are based on new technologies that can be fully-fledged considered part of the edutainment[44], whose products define educational modalities that combine learning with a communicative system centred on amusement, emotions and entertainment[45]. Besides the total absence of the original paintings, which are entirely replaced by replicas lacking the hic et nunc, the artworks' aura, these exhibits appear – with few exceptions[46] – as an independent spectacle. It would be desirable that cultural sites themselves integrate these strategies in the museum educational devices. Moreover, they are once again mainly (if not exclusively) addressed to a sighted audience because their communicative power mainly lies in the spectacularity of projected images.

On the contrary, Tate Sensorium[47], staged by the Flying Object team at the Tate Britain in London, tried to integrate the stimulation of all possible senses in the art exhibition, thus reconnecting the multisensory experience to the authentic artwork. This was the first and only case study to experiment an art experience which was able to involve sight, hearing, touch, smell and taste. This idea earned its creators the 2015 Tate Britain IK Prize Award. For the first time in this field, the designers employed an avant-garde haptic technology called mid-air haptics. The exhibition was designed to welcome everyone, even users lacking one of the senses involved[48].

---

[37] Van Gogh Alive was curated by Rob Kirk of Grande Exhibitions.

[38] Klimt Experience was curated by C&T Crossmedia Group that also designed Monet Experience and Incredible Florence

[39] Caravaggio Experience was designed by Consorzio La Venaria Reale in cooperation with Medialart srls and Roma&Roma.

[40] Dalì Experience was designed by con-fine Art with the support of Comune di Bologna.

[41] Uffizi Virtual Experience was promoted by Ministero dei Beni e delle Attività Culturali e del Turismo, Comune di Milano and Comune di Firenze.

[42] Magister Giotto was curated by Alessandro Tomei, Full Professor of Medieval History at Università "G. D'Annunzio" Chieti-Pescara with Philologist and Art Historian Giuliano Pisani. Luca Mazzieri (Art Director) and Alessandra Costantini, (Executive Director) designed it.

[43] In Studio Azzurro's "sensitive environments" thanks to laser projections and human presence detection, visitors can interact with the surroundings by using their own gestures without intermediary interfaces like buttons or touchscreens

[44] The term edutainment was coined by Bob Heyman a National Geographic reporter, in 1973. The word comes from the crasis of two terms and perfectly condense the two principal aims of Cultural Heritage communication: education (the educational-learning phase) and entertainment (the recreational-amusing component).

[45] F. Cervellini, D. Rossi, Comunicare emozionando. L'edutainment per la comunicazione intorno al patrimonio culturale, in DisegnareCON vol. 4, n. 8, Tecnologie per la comunicazione del patrimonio culturale, edited by E. Ippoliti e A. Meschini, 2011, pp. 48-55.

[46] Peter Greenaway's Wedding at Cana was performed on the original fresco and the Dalì Experience had 200 artworks coming from The Dalí Universe collection.

[47] C. T. Vi, D. Ablart, E. Gatti, C. Velasco, M. Obrist, Not just seeing, but also feeling art: Mid-air haptic experiences integrated in a multisensory art exhibition, in International Journal of Human-Computer Studies Vol. 108, December 2017, Elsevier, pp. 1-14.

[48] Mid-air haptics technology was developed by London-based company Ultrahaptics and consists in the use of ultrasound that transmit sensations to the hand, as if there were interactive invisible buttons or interfaces.

Fig. 2 Van Gogh The Immersive Experience . Photo by Ludovico Brancaccio

Fig. 3 Tate Sensorium, John Latham's "Full Stop". Photo by Angie Kordic (www.widewalls.ch)

At this point, we should mention all initiatives and experiences - inside or outside museums - whose aim is to meet the needs of visually impaired users but that are too often relegated as niche, isolated phenomena. In the last few years, the problem of accessibility of museums by people with disabilities simply consisted in the elimination of architectural barriers because visual impairment, unlike motor disabilities, has long been considered a natural, inevitable impediment when relating to art. The main difficulty that can be observed in the relationship between visual artworks and the blind lies in the museum's main rule: "look but do not touch". In order to face this apparently unsolvable dualism, museums are taking action to develop solutions that would allow visually impaired people to enjoy some of their pictorial artworks, showing an increasing awareness towards the problem. As concerns painting, a tactile fruition of the original artworks remains, of course, impossible and the mere verbal description as a compensatory measure often proves to be insufficient; the accessibility problem, again, appears to be insurmountable.

Tactile museums are the exception: the Museo Tattile Statale Omero[49] in Ancona and the Museo Tattile Anteros in Bologna, for example, have been working in the field for a long time, overturning the typical museum interdiction (please DO touch) ever since their foundation. In particular, the Museo Tattile Anteros is specialized in handcrafted tactile bas-relief transpositions of famous paintings – such as The Birth of Venus by Sandro Botticelli –in which the figure's contours and volumes emerge from an undercut, making paintings haptically explorable by blind people and guiding them through a selective, gradual understanding based on privileged guidelines. The Museo Anteros's propedeutic perspective boards are one of a kind and very interesting: they are aimed at transmitting the rules and functioning of perspective to the blind in order to explain how the bi-dimensional image that simulates spatial depth is the formal translation of the intersection between the visual pyramid and a plane.

On the other hand, Touching the Prado is one of those initiatives that were born inside well-known museums or cultural sites, such as Museo del Prado.

[49] Founded in 1993 thanks to the cooperation between Unione Italiana Ciechi and Regione Marche, the Museo Omero was acknowledged as "national" by Italian Parliament in 1999 with L. 452 of November 25th, 1999. Neapolitan Sala DAI was highly inspired by this museum.

Fig. 4 Tactile bas-relief of Andrea Mantegna's "Lamentation over dead Christ". Photo by Museo Anteros

Fig. 5 A propedeutic perspective board. Photo by Museo Anteros

In this special exhibit, six artworks from the museum's collection - representative of different painting genres - were turned into 3D full colour resin-printed tactile bas-reliefs, in order to ease perception and mental reconstruction by non-sighted visitors along with traditional braille captions and audioguides. The exhibition fits into the path traced by the European project HELP[50], whose aim was, indeed, to allow blind people to enjoy some of the most beautiful paintings of all time. The problem of colour perception was faced by a couple of Italian experiments carried out by CNR (Consiglio Nazionale delle Ricerche) in 2006, first with a synesthetic tactile model prototype of "Il Ritratto di giovane donna con liocorno" by Raffaello, housed in the Galleria Borghese in Rome, and then in Pompeii with a second prototype of the Ercole Infante, a fresco located in the Casa dei Vettii. In both case studies, they tried to implement colour perception in the tactile bas-relief (made by a sculptor), through the use of synaesthesia. First, they mapped colours and their different tones and then they associated each one of them with a different sound, in accordance with specific parameters (hue-brightness-saturation/timbre-tone-volume).

Colours recognition happens thanks to a miniaturized tri-dimensional tracer that the blind user wears on the finger involved in tactile exploration of shapes. As a part of the project Musei da Toccare, a recent experience named Art for the Blind: Ara Pacis, although referring to the sculptural bas-reliefs of the well-known Augustan monument, saw the employment of Tooteko, a technology developed by Serena Ruffato and Fabio D'Agnano of IUAV University.

Tooteko is a sensory ring capable of recognizing sensors which are applied next to the artworks (or above them, if dealing with reproductions) that activate audio-descriptive information played by smartphones and tablets via an app connected to the ring in remote mode (Wi-Fi). Similarly, T-Vedo tried to deal specifically with paintings, developing a computer-based semi-automatic process aimed at turning a bi-dimensional image into a tri-dimensional bas-relief tactile model.

The resulting device has been tested with two relevant frescoes of Early Florentine Renaissance: The Healing of the Lame and the Resurrection of Tabita by Masolino da Panicale, located in the

[50] The European project HELP - Seeing a Work of Art by Visually Impaired People (2001-2003) promoted by Consorzio FORMA and Scuola Normale Superiore di Pisa was supervised by Benedetto Benedetti. The system was designed by Francesco Antinucci of CNR.

Brancacci Chapel in the Basilica of Santa Maria del Carmine, and the Annunciation painted by Fra Angelico on a wall of the Convent of San Marco, both in Florence. A more global and multisensory experience was provided by Dallas' Southern Methodist University's Meadows Museum through an art exhibition that allowed blind people to touch reproductions of paintings (emulating the original texture) to listen to the music of the period and place to which the artworks belong, to smell scents evoking the atmosphere of the painting as well as to taste typical food of each artwork's origin place. The philosophy behind this multisensory exhibition is to involve also sighted visitors by offering a different way of learning: «the more areas of our brains we engage, the more we can learn».

As regards the fruition of textures and brushstrokes, we can also mention the experience proposed by the Van Gogh Museum in Amsterdam that teamed up with Fuji to develop an high quality 3D printing technique named Relievo, which is able to reproduce with extreme precision and in detail the painted surface's colour and texture of the Dutch artist's masterpieces.

Relievo replicas are displayed next to the original artworks and allow visitors to touch Van Gogh's peculiar thick, lumpy, brutal and swirling brushstroke.

Fig. 6 A Relievo replica. Photo by Nina Albada Jelgersma.

Fig. 7 Tooteko. Photo by Art for the Blind - Museo Ara Pacis

Conclusion

In this paper, we investigated some strategies that could be helpful in facing the problem of pictorial art accessibility by visually impaired people. We can conclude that a winning approach should be based on multisensory integration as an inclusion strategy, which would allow to involve a large, heterogeneous audience with different needs. An installation should not be designed exclusively as a compensatory measure for an unfortunate elite that lacks the sense of sight; on the contrary, it should be imagined as an opportunity to enrich everyone's aesthetic experience. Sighted users would end up discovering a new, alternative way to approach and experience the artwork by exploiting solicitations coming from other senses – primarily from touch: it is a highly pedagogical operation for those that normally relate to art only through sight. Touch, in particular, can «facilitate imitative decoding and add "feeling" to the visual experience»[51].

Aldo Grassini argues that if the visually impaired experience art in an authentic way, albeit through different paths, it becomes essential to evaluate these paths from a new perspective. In other words, if an aesthetic of touch not only exists, but indeed allows even the visually impaired to enjoy the beauty of the visual arts, we cannot forget that touch is a skill which does not belong only to the blind. We are then facing a problem whose value is universal. Tactile and multisensorial fruition applies to art and all its possible fruitors[52]. In this complex and daring challenge, the design of installations aimed at communicating perspective-based paintings to the visually impaired should borrow its means from Descriptive Geometry's traditional techniques and combine them with the incredible potentialities offered by modern technologies, whose universe is now opening up to new, unexplored and inclusive scenarios. The main goal is to make perspective accessible to blind people who cannot directly experience it - by making its functioning explicit and haptically perceivable. In the end, research and experimentations aimed at satisfying the needs of a specific category of users turn out to bring concrete benefits to everyone, encouraging the moral and cultural growth of society as a whole, promoting reflection on the theme and allowing users to live something that would otherwise remain un-lived, obscure[53]. Finally, we discover new possibilities of reading and experiencing a work of art, which stimulate and integrate all our senses, from sight to touch, from smell to hearing. Our capability to see and feel the world is enhanced, so that we pay attention to certain aspects that we did not consider before; this allows us to be amazed and moved by the reality we live in[54].

[51] V. Ruggeri, *Per un'estetica dell'esperienza sensoriale tattile. Un approccio psicofisiologico* in Museo Tattile Statale Omero, 2016, op. cit., p. 47.

[52] Grassini A., 2016, op. cit., p. 14.

[53] Ibidem.

[54] Ibidem, p. 150.

References

Accardi A. R. D., Chiarenza S., Inglisa R., Scarpato N., *Musei digitali dell'architettura immaginata: un approccio integrato per la definizione di percorsi di conoscenza del patrimonio culturale* in *DisegnareCON*, vol. 9, n.17 *Musei Virtuali dell'Architettura e della città*, edited by Albisinni P. and Ippoliti E., 2016, pp. 15.1-15.11

Arnheim R., *To the Rescue of Art*, University of California Press, Berkeley-Los Angeles, 1992

Arnheim, R. *Perceptual Aspects of Art for the Blind*, in *The Journal of Aesthetic Education*, Vol. 24, No. 3, University of Illinois Press, Champaign (IL), 1990, pp. 57-65

Benjamin W., *L'opera d'arte nell'epoca della sua riproducibilità tecnica*, 1936, reprint with an introduction by Cacciari M., Einaudi, Torino, 2014.

Carfagni M., Furferi R., Governi L., Tennirelli G., Volpe Y., *T-Vedo: Ricostruzione Tridimensionale per non vedenti di opere d'arte pittoriche*, in *Strategie e Programmazione della Conservazione e Trasmissibilità del Patrimonio Culturale*, edited by Filipovic A. and Troiano W., Edizioni Scientifiche Fidei Signa, Roma, 2013, pp. 510-515

Cervellini F., Rossi D., *Comunicare emozionando. L'*edutainment *per la comunicazione intorno al patrimonio culturale*, in *DisegnareCON* vol. 4, n. 8, *Tecnologie per la comunicazione del patrimonio culturale*, edited by Ippoliti E. e Meschini A., 2011, pp. 48-55

De Rosa A., *Cecità del vedere. Sull'origine delle immagini*, in *La ricerca nell'ambito della geometria descrittiva. Due giornate di studio* edited by Carlevaris L., Gangemi Editore, Roma, 2016, pp. 45-76

De Rosa A., Sgrosso A., Giordano A., *La geometria nell'immagine. Storia dei metodi di rappresentazione. Vol. 2: Rinascimento e Barocco*, Utet, 2001.

F. D'Agnano, C. Balletti, F. Guerra, P. Vernier, *Tooteko: a case study of augmented reality for an accessible Cultural Heritage. Digitization, 3d printing and sensors for an audio-tactile experience*, in *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences Volume XL-5/W4*, Conference proceedings (*3D Virtual Reconstruction and Visualization of Complex Architectures* February 25-27, 2015, Avila, Spain), Copernicus, Gottinga, 2015, pp. 207-213

Grassini A., *Per un'estetica della tattilità. Ma esistono davvero le arti visive?*, Armando Editore, Roma, 2016

Hatwell Y., Streri A, Gentaz E. (Eds.), *Touching for knowing: Cognitive Psychology of Haptic Manual Perception*, John Benjamins Pub Co, Amsterdam, 2003

Mazzocut-Mis, M. *Voyeurismo tattile. Un'estetica dei valori tattili e visivi*, Il Nuovo Melangolo, Genova, 2002

Meschini A., *Digital technology in the communication of Cultural Heritage. State of the art and potential development*, in *DisegnareCON* vol. 4, n. 8, *Tecnologie per la comunicazione del patrimonio culturale* edited by Ippoliti E. e Meschini A., Università di Bologna, 2011, pp. 14-24

Migliari R. (Ed.), *La costruzione dell'architettura illusoria*, Gangemi Editore, Roma, 1999.

Museo Tattile Statale Omero (Ed.), *L'arte a portata di mano. Verso una pedagogia di accesso ai Beni Culturali senza barriere*, Armando Editore, Roma 2006

Panofsky E., *La prospettiva come "forma simbolica"*, 1925, reprint with a translation by Filippini E., Abscondita, Milano, 2013.

Paolucci P., Di Blas N., Alonzo, F., *ICT per i Beni Culturali. Esempi di Applicazione*, in *Mondo digitale* n. 3, AICA, Milano, 2005, pp. 44-61

Striano M. (ed.), *Pratiche educative per l'inclusione sociale*, FrancoAngeli, Milano, 2010

Vi C. T., Ablart D., Gatti E., Velasco C., Obrist M., *Not just seeing, but also feeling art: Mid-air haptic experiences integrated in a multisensory art exhibition* in *International Journal of Human-Computer Studies* Volume 108, Elsevier, Amsterdam, 2017, pp. 1-14

Design a virtual reality application: how the technology works for the digital worlds

Carlo Battini
DICCA, Dept. of Civil, Chemical and Environmental Engineering (University of Genova)
email: carlo.battini@unige.it

Abstract

Today we are witnessing a strong development of technological components capable of making these sensations of separation possible with natural reality and immersion in virtual reality. New smartphones, immersive glasses and high-resolution viewers are the technological tools that allow you to create these sensations and catapult us into a new experience never experienced. However, if on the one hand these highly technological tools allow us, through their sensors, to enter a virtual space, what are the main ingredients to make this experience unique and indispensable? What are the main components that the developer and the designer must consider to better design a virtual reality application? In the contribution will be analyzed the definition of Mixed Reality defined by Milgram and Kishino indicating which are the main differences of the various steps of transition from real to virtual. Subsequently, the main hardware components present in the most common virtual reality tools will be analyzed to better understand how they can interact with the final user. Finally, the main senses that are stimulated during virtual exploration and how to work to make the virtual reality experience optimal will be highlighted.

Abstract

Oggi stiamo assistendo ad un forte sviluppo di componenti tecnologici capaci di rendere possibile queste sensazioni di scollamento con la realtà naturale e l'immersione nella realtà virtuale. Nuovi smartphone, occhiali immersivi e visori ad altissima risoluzione, sono gli strumenti tecnologici che permettono di realizzare queste sensazioni e catapultarci in una nuova esperienza mai vissuta. Ma se da un lato questi strumenti altamente tecnologici ci permettono, tramite i loro sensori, di entrare in uno spazio virtuale, quali sono gli ingredienti principali per rendere questa esperienza unica ed indispensabile? Quali sono le componenti principali che lo sviluppatore e l'ideatore deve prendere in esame per meglio progettare una applicazione di realtà virtuale? Nel contributo verrà analizzata

la definizione di Mixed Reality definita da Milgram e Kishino indicando quali siano le differenze principali dei vari step di passaggio da reale a virtuale. Successivamente verranno analizzati i principali componenti hardware presenti nei più comuni strumenti di realtà virtuale per meglio comprendere come questi possano interagire con il fruitore finale. Infine saranno evidenziati quali sono i principali sensi che vengono stimolati durante l'esplorazione virtuale e come operare per rendere ottimale l'esperienza di realtà virtuale.

Introduction

The new virtual representation technologies are today the tools increasingly used in the fields of communication, learning and training. Virtual applications are used in the medical, industrial and cultural fields, creating a new way to interact with information and the birth of a new ecosystem[1]. Helmets, stereoscopic viewers, special gloves that allow interaction, are the tools necessary for the interaction and use of virtual reality applications, defined by Jaron Lanier in 1988 as "a technology used to synthesize a shared reality. Recreate our relationship with the physical world in a new plan. It does not affect the subjective world and has nothing to do directly with what is in the brain. It has to do only with what our sensory organs perceive" (Kelly 1989). It is therefore a tool through which the user is immersed in a virtual parallel manner, made from objects that can be used as if they were real. The immersion and presence in the virtual are the basic components to make the natural sensations within a virtual world.

In essence, virtual reality uses the physical body as an interface to communicate and manipulate the information available, thus filling the gap that exists between perceived reality and the innumerable information that can be connected.

From a technological point of view it is possible to distinguish two types of virtual reality: the immersive one and the non-immersive one.

In the first case, the user is catapulted into a virtual world through special viewers called Head Mounted Display (HMD) and special sensors convert the movements made in the real world into movements in the virtual world. The proven experience is that of a perfect sensorial absorption in the three-dimensionality generated by the computer.

For non-immersive reality, the user has a monitor that simulates a window in the virtual world. The interaction is managed by real or virtual joysticks able to move the point of view and interact with virtual objects. In the case, instead, virtual information such as texts, images and sounds are superimposed on the normal and real vision, we are faced with augmented reality (AR). This term first appeared in the work of Caudell and Mizell at Boeing, which sought to assist workers in an airplane factory by displaying wire bundle assembly schematics in a see-through HMD (Caudell and Mizell, 1992). The AR is therefore the technique that allows to increase the information deepening the knowledge of the real framing objects, images or texts, thus overcoming the limit of the five senses of the real world.

In the AR "real and virtual environment seem to coexist and the user can move freely in the scene,

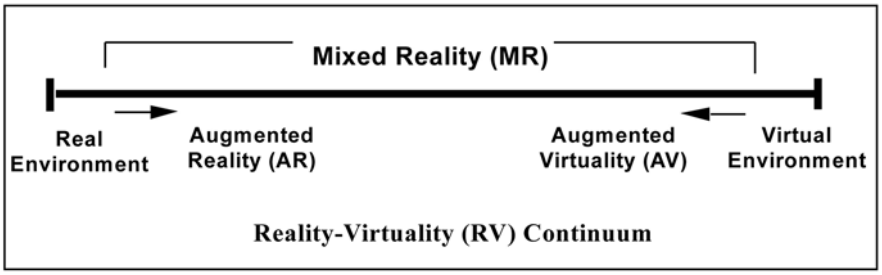
[1] "Goldman Sachs, Gartner and all the main observers of technological things identified in the new virtual reality" computing platform "comparable to that of mobile devices of the nineties. [...] If it were, we are witnessing the birth of a virtual reality industry, but to an ecosystem of applications that will invest all industries" (L. Tremolada 2016)

with the possibility, also, to interact with it. All this must obviously be processed in an optimal manner, ie in such a way that the user has the perception of a single scene in which the real and the virtual are two indistinguishable entities "(Aloisio and De Paolis, 2007).

Fig. 1: Researchers at Boing used a see-through HMD to guide the assembly of wire bundles for aircraft. Image of David Mizell.

Reality-Virtuality Continuum

Starting from the definitions previously given, it is possible to think that there is a transition from the real world to the virtual world, called a mixed Reality (MR), where, with various nuances, real objects and virtual objects can coexist. The term MR was coined by Milgram and Kishino in 1994, which hypothesized the transition from the real to the virtual as gradual and uninterrupted, defining a taxonomy of various factors that distinguish the various stages of reality (Reality-Virtuality Continuum).



Taking into account the proposed diagram, the far left is the reality, dominated by natural laws and

where the perception of things is only through the 5 senses. At the right side is located the VR space dedicated to all the intangible objects and products virtually.
The enclosed space between the two extremes, as previously mentioned, is the MR in which, in various forms, real and virtual mingle with each other defining new stadiums. Thus we have the Augmented Virtuality, defined as a virtual environment with the presence of some real elements, and Augmented Reality, where the physical reality are added virtual information.
The applications that are most created see the use of AR as a means of communication, leaving in this way much more action to the user, who can choose how to frame a given object and when to display the information associated with it.

Tools and applications

The development of augmented reality applications is closely related to the IT progress: the greater the increase in technology, the greater the possibility of user interaction.

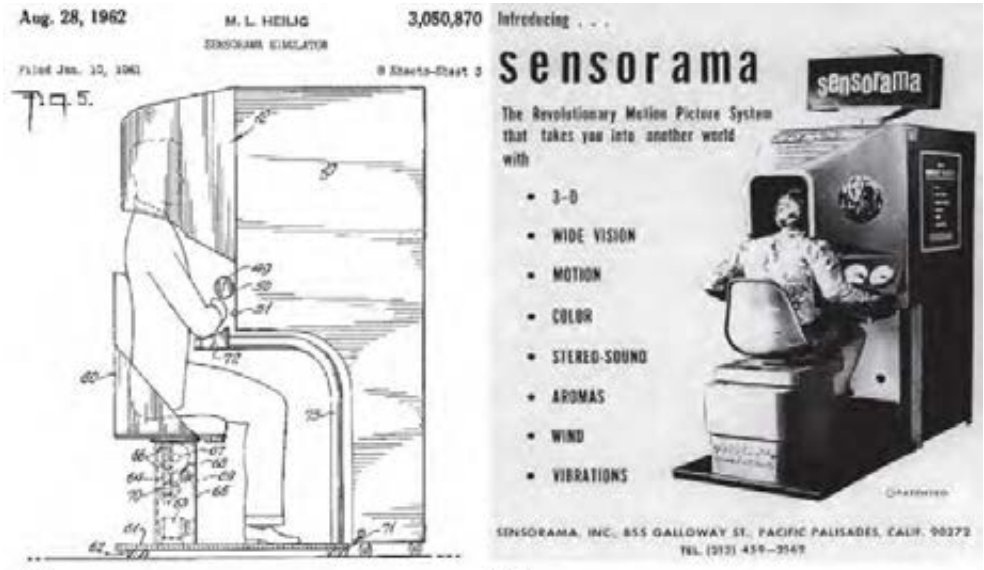
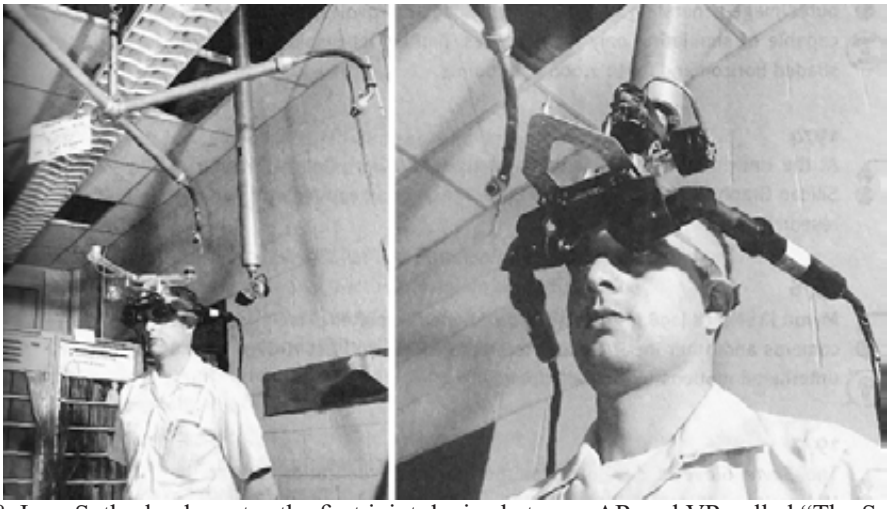


Fig. (a) (b)

The virtual history sees among the first Morton Hilig experiments with the mechanical device called “Sensorama” consisting of a cabin with stereoscopic screens, stereo speakers and a movable chair that also produced vibrations, wind and smells but that did not allow interaction.



In 1968, Ivan Sutherland creates the first joint device between AR and VR called “The Sword Of Damocles” (Sutherland 1968). Such a device is also considered a precursor of augmented reality as its lenses allowed a glimpse the surrounding environment.

In 1972, Atari developed Pong, a game that led to the public the first interactive graphical multi-user real-time.

In 1979, Eric Howlett developed the Large Expanse Enhanced Perspective (LEEP) system to implement the ability to show a broad visual horizon from a small display. This technology was then integrated into the first HMDs developed by NASA.

In 1984 Thomas Zimmerman and Jaron Lanier founded VPL Research Inc., the first company that

sold eyewear and gloves for the AR. In 1989, as previously mentioned, Lanier had the merit of popularizing the term “Virtual Reality”.

In the following years, continuous updates and patents bring the VR systems closer to the general public, until now, thanks to the internet connections getting faster and better performing hardware systems, even small developers can experiment with innovative ideas and contribute to the development of new representation systems. Today, in fact there are commercial financial solutions to accompany you into the world of VR. technological systems that guarantee high performance both in play and in the research.

Mainly, there are two types of devices:

- systems that require a connection to a main unit (eg a personal computer);
- mobile systems that take advantage of their own hardware potential.

The first category includes, for example, Oculus Rift (Oculus VR), HTC Lives (Valve and HTC) and Playstation VR (Sony), which need to be connected to a PC or a console to take advantage of special sensors to track the viewer movements in real world and reproduce them in the virtual world.

Fig.6. From left to right: HTC Lives, Oculus Rift, Playstation VR

The second type includes those devices that do not require connections to external equipment and, mainly, are represented by smartphones inserted in very cheap substrates such as Google Cardboard or more expensive as Samsung Gear VR.

These devices are now used for many sectors, from the playful to the specialized, creating new ways of interacting with reality, even artificial. The VR is in fact capable of simulating hostile or difficult environments recreated in the physical space. In this way, applications are created that see the AR as an indispensable tool to obtain information regarding a job to be carried out immediately without having to waste time in the search for information. Or with the MR it is possible to merge the real to the virtual where objects of one can interact with those of the other.

Some of these applications see the AR used for architecture and design where the user, through a tablet monitor, can be included in view of the virtual mobile camera. Other applications are in the field of cultural and archaeological heritage. Through the AR it is possible to view and request information that would otherwise be impossible to visualize, as in the case of the Ideal City and Ideal City AR Apps (Quattrini et al. 2015).

But what are the technologies that enable interaction with three-dimensional models and information using these tools? The creation of these new VR applications derives from the increasingly

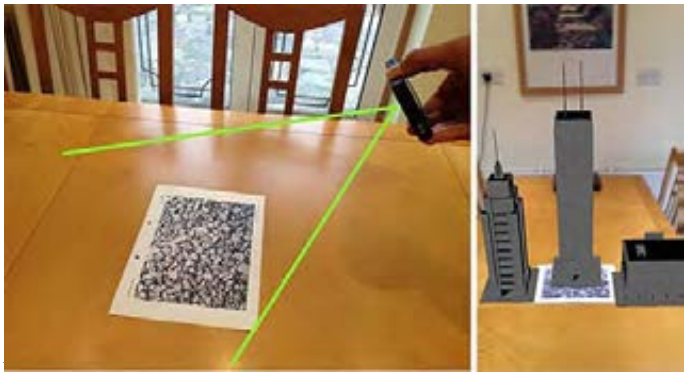
developed technology in the field of positioning and tracking. The sensors inserted in the common mobile tools or the more advanced ones present in the high-level viewers, guarantee the interaction between person and virtual world.

Camera, GPS, accelerometers and gyroscopes are the main sensors that create the connection between the virtual world and the real world. The variation of the information that these gather in fractions of a second guarantee the flow of information indispensable for the functioning of the algorithms associated with them. The user's orientation is thus detected by; sensors, fully visual approach; hybridization of the two techniques.

In the first case, the tracking is done by measuring the sensors: GPS, gyroscope and accelerometers provide the data that are combined to determine position, movement and spatial direction.

Fig. 7. Common sens

In the second case the movement is detected by analyzing the video stream coming from the camera based on two vision-based tracking techniques: Marker Based Tracking and Natural Feature Tracking. In the first, specific "markers" are positioned that are recognized by the algorithms used. They are transformed into virtual objects and, given their different geometry detected by the camera, determine the orientation of objects with respect to the actual vision.



In the second case, instead, computer graphics algorithms analyze the scene and extract known

features (for example lines, points, angles). Evidently, detect and compare features in real-time is complex, reason for which such tracking systems work under simplified assumptions and are therefore less robust and more prone to errors.
The hybrid tracking systems attempt to compensate for registration errors of the position of the other two systems and provide more reliable data.
The new systems of VR products from major manufacturers propose more and more hybrid systems able to process thousands of real-time information, thus providing more and more amazing experiences and encouraging a greater integration into the user's virtual world.

Conclusion

Knowing what are the available technologies and in which membership must be made a particular application appears to be the basis for the design of a new project. Make an application means not only design content classification, but also how they should be enjoyed by the user. The design is therefore the moment in which the interactions available are decided and at what time the required information must be displayed. Increasingly efficient algorithms are the key to making the user experience more realistic. This is the case, for example, of the new systems IMU (Inertial Measurement Unit), sensors compounds from accelerometers, gyroscopes and magnetometers capable of determining not only the spatial orientation of the HMD (Head-mounted display), but also the space translational motives (Madgwick et al., 2011).
New applications, with the discovery of new algorithms and the use of increasingly powerful hardware solutions, will always out-perform and provide new experiences, not only in video play the field, but also in that of knowledge.

References

Aloisio G., De Paolis L.T., *La realtà aumentata in chirurgia*, in Atti del VII Convegno nazionale Tecnico-Scientifico sulle Applicazioni della Modellizzazione, Simulazione e Realtà Virtuale, Roma 2007.

T. P. Caudell, D. W. Mizell, *Augmented Reality: An Application of Heads-Up Display Technology to Manual Manufacturing Processes*, Boeing Computer Services, Research and Technology, 1992

K. Kelly, A. Heilbrun and B. Stacks, *Virtual Reality; an Interview with Jaron Lanier,* in Whole Earth Review Fall, no. 64, pp. 108 (12), 1989

S. OH Madgwick , A. JL Harrison, R. Vaidyanathan, *Estimation of IMU and MARG orientation using a gradient descent algorithm,* in Rehabilitation Robotics (ICORR), 2011 IEEE International Conference on, IEEE, Zurich, Switzerland, 2011

P. Milgram, F. Kishino, *A Taxonomy of Mixed Reality Visual Displays,* in IEICE TRANSACTIONS on Information and Systems, vol. E77-D 12, pp. 1321-1329, 1994

I. Sutherland, *A Head-Mounted Three-Dimensional Display,* in American Federation of Information Processing Societies' AFIPS Fall Joint Computer Conference FJCC 33Pt:1:757-764, 1968

R. Quattrini, R. Pierdicca, E. Frontoni, P. Clini, *Mobile e realtà aumentata al Palazzo Ducale di Urbino: il Museo è digitale*, in ARCHEOMATICA, pp. 33-38, 2015

L. Tremolada, *Arriva la realtà virtuale ma non è come vi aspettate. Il materialismo dei mondi in tre dimensioni*, Sole24ore, 2016

Virtual & Augmented Reality representation. Experiencing the cultural heritage of a place.

Letizia Bollini
Department of Psychology (University of Milano-Bicocca)
email:letizia.bollini@unimib.it

Abstract

Virtual reality and augmented reality are, nowadays one of the most powerful ways to represent in a 3-dimensional way non-existing objects in a physical environment.

The mobile revolution and the introduction of wearable devices, such as Microsoft HoloLens, Google Card Board or the VR Oculus Rift, have made these technologies furthermore accessi-ble. Exhibit design, museography, and historical studies seem to be one of the most promising fields of application. Besides, a volumetric representation, able to convey visual, spatial and sensorial aspects of artifacts, although virtual, could be worth to explore as a way to approach historical identity of a place. A digital representation overlaid on the physical environment is a way to discover its historical evolution and to experience its cultural heritage.

The paper proposes, maps, compare different approaches, projects and best practices in the field, suggesting and discussing the role of VR/AR representation applied to landscape histori-cal identity and evolution.

Abstract

La realtà virtuale e la realtà aumentata sono uno dei modi più efficaci per rappresentare in 3D oggetto virtuali, appunti, in un ambiente fisico.

L'introduzione dei dispositivi mobile e dei wearable – come i Microsoft HoloLens, la Google Card Board o i VR Oculus Rift – hanno reso questa tecnologia più che mai accessibile. Il mondo degli allestimenti, della museografia e dei beni culturali sembrano esserne uno dei maggiori e più promettenti campi di applicazione.

Inoltre, una rappresentazione volumetrica è in grado di veicolare aspetti visivi, spaziali e sensoriali degli artefatti che, sebbene virtuali, possono essere un modo di approcciare ed esplorare l'identità storica di un luogo.

La rappresentazione digitale, sovrapposta all'ambiente reale diviene un modo per scoprirne l'evoluzione e l'eredità culturale. L'articolo propone, mappa e confronta diversi approcci, progetti e best practices nel settore, suggerendo e discutendo il ruolo e le potenzialità delle rappresentazioni VR/AR all'interno della narrazione dell'evoluzione storica di un territorio.

In the beginning, it was the stereoscopic viewer

Starting from the invention of the perspective, the issue of how to portray the physical space on a flat surface is central to the representation disciplines, both on a theoretical and a methodolog-ical level. On the opposite of this process, there is the will to give people the suggestion of a volumetric space starting from a 2D images of the world.

The first experiments to reproduce a 3D impression starting from images date back to 1838 when Charles Wheatstone, even before the photography invention, developed a mirror stereo-scope able to give the optical illusion of three-dimensional depth experiencing two-dimensional drawings.

Wheatstone himself started considering the primary studies and authors in the field.

He firstly looked at the work of Leonardo da Vinci – the Trattato della pittura – that he studied, reported and quoted through the secondary documental source the Smith's Complete System of Optics: "This great artist and ingenious philosopher observes, "that a painting, though conduct-ed with the greatest art and finished to the last perfection, both with regard to its contours, its lights, its shadows and its colours, can never show a relievo equal to that of the natural objects, unless these be viewed at a distance and with a single eye. For," says he, "if an object C (Plate X. fig. 1.) be viewed by a single eye at A, all objects in the space behind it, included as it were in a shadow E C F cast by a candle at A, are invisible to the eye at A; but when the other eye at B is opened, part of these objects become visible to it; those only being hid from both eyes that are included, as it were, in the double shadow C D, cast by two lights at A and B, and terminat-ed in D, the angular space E D G beyond D being always visible to both eyes. And the hidden space C D is so much the shorter, as the object C is smaller and nearer to the eyes. Thus the ob-ject C seen with both eyes becomes, as it were, transparent, according to the usual definition of a transparent thing; namely, that which hides nothing beyond it. But this cannot happen when an object, whose breadth is bigger than that of the pupil, is viewed by a single eye. The truth of this observation is therefore evident, because a painted figure intercepts all the space behind its apparent place, so as to preclude the eyes from the sight of every part of the imaginary ground behind it."

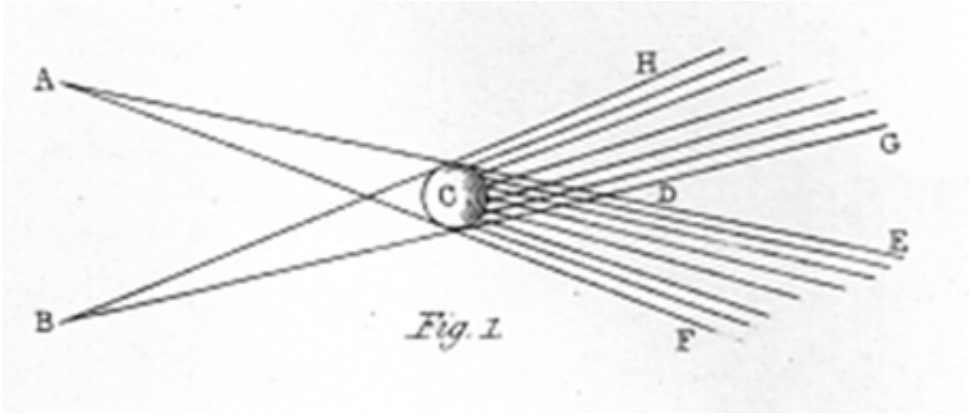


Fig . 1. The Da Vinci's picture mentioned by Wheatstone as reported in the online version of his essay (Image source: http://www.stereoscopy.com/library/wheatstone-paper1838.html)

The second reference he deeply acknowledge is Monge: "It is worthy of remark, that the pro-cess by which we thus become acquainted with the real forms of solid objects, is precisely that which is employed in descriptive geometry, an important science we owe to the genius of MONGE, but which is little studied or known in this country" (Wheatstone, 1838).
The Wheatstone invention had been developed and optimized over time. Photographs replaced the wireframe images, and the technology has been adopted and spread in many application fields: photogrammetry, video games, cinema, mobile phones and so on.

Sensorama an the multimodal interaction of a 3D experience

Heilig Morton – considered both immersive multimedia and virtual reality pioneer — approached the issue of spatial simulation according to a different perspective.
Fascinated by the Cinerama technique – based on three different cameras to shooting a movie to be displayed on an arced screen – in his The cinema of the future he was interested in foster the simulation of reality proposed by the 2D art forms, such as painting, photography, and cinema, beyond the sight sense.
Starting from human attention and sensory signals studies between 1957 and 1962 he had "built an individual console with a variety of inputs—stereoscopic images, motion chair, audio, tem-perature changes, odours, and blown air—that he patented in 1962 as the Sensorama Simulator, designed to "stimulate the senses of an individual to simulate an actual experience realistically." (Lowood).
Heilig aimed to develop a multisensory technology able to simulate and stimulate a multimodal interaction (Bollini, 2001, 2004) between the user and the dynamic images involving other senses such as touch, smell and so on, that he called the experience theater.
The Sensorama invention is the first attempt to move, not only from a 2D to 3D visual simula-tion but also to integrate it with multisensory and the physical involvement of the specta-tor/player. The short film created in the '50 about a bicycle ride through Brooklyn to experience this mixed technologies is still impressive today.

Furthermore, during the work on Sensorama, he also designed the Telesphere Mask, a head-mounted "stereoscopic 3-D TV display" that he patented in 1960 that looks like many of the wearable devices developed both in the '80 and nowadays. It was a "sort of head-mounted version of the Sensorama that would allow for wrap-around views, stereo sound, and air currents that could blow at different velocities or temperatures, and could carry smell. The Telesphere was the first patented head-mounted apparatus designed to convey virtual views to the user, predating Ivan Sutherland's influential 'Head-Mounted Three-Dimensional Display', nicknamed the 'Sword of Damocles' by half a decade. The mask was built as a prototype, but Rheingold surmised in 1991 that, 'If it had not been for the vicissitudes of research funding, Morton Heilig, rather than Ivan Sutherland, might be considered the founder of VR'." (Payatagool, 2008)

Fig . 2. The Heilig's Sensorama advertising and the Telesphere Mask (Image source: http://www.mortonheilig.com/InventorVR.html)

From cyberspace to the Second Life phenomena

Since 1982 when Willian Gibson introduced it– firstly in the Burning Chrome a fiction collection and then in one of his most cult novels: the Neuromancer – the concept of cyberspace, the relationship between the real and the virtual space is one of the leading issues in the social, technological and ethical debate.

Gibson describes it as "A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts… A graphic repre-sentation of data abstracted from banks of every computer in the human system. Unthinkable complexity.

Lines of light ranged in the nonspace of the mind, clusters and constellations of da-ta. Like city lights, receding" (Gibson, 1984).

The definition given by Gibson involves a notion well known in the field of art, architecture and urban planning, depicted in the Giovanni Battista Piranesi's Le carceri printed works, as mentioned by the main character of Johnny Mnemonic (Gibson, 1981) and rendered in the movie taken from the short story.

Fig . 3. Le Carceri by G. B. Piranesi, scenes and landscape view of the Nighttown in the Johnny Mne-monic movie directed by Robert Longo in 1995.

The virtual space that technologies allow us to think and inhabit is an abstract concept or, better to say, an Augé's non-lieu (Augé, 2009). But in this space the modality of interaction, represen-tation and self-representation are very different when compare to the physical world or its tradi-tional representation. The concept has been well described by the cyber librarian and activist John Perry Barlow, co-founder of the digital rights group Electronic Frontier Foundation, in his crucial essay Crime and Puzzlement: "In this silent world, all conversation is typed. To enter it, one forsakes both body and place and becomes a thing of words alone. You can see what your neighbors are say-ing (or recently said), but not what either they or their physical surroundings look like. Town meetings are continuous and discussions rage on everything from sexual kinks to depreciation schedules. (Barlow, 1990)

An excellent example of the dystopic experience between the real and the 3D simulation of the world is the parabolic path of Second Life.

This digital environment represents one of the most extreme evolutions of the MUD (Multi-User Dungeon) games developed and played since the late '1970.

The 3D simulated world and the relational net becomes a virtual elsewhere, shaped on an immersive tridimensional space. In these lands, people generate a living experience inside what Boccia-Artieri (2004) calls synthetic metaverses, in which living becomes an act of communication. Nevertheless, the lived life – according to Sherry Turkle (1995) – is not virtual, but rather an emotional and psychological experience. Second Life is a world of all effects, characterized by every cognitive, symbolic and perceptive-motor characteristics of a territory. It is, therefore, a perfect laboratory where to explore cognitive and perceptive principles the many ways of communication mediated both by technologies and spatial experiences.

Space is, indeed, built around the social relationships and their representation. The immersive metaphor of a reality simulacrum – both in hyper-realistic 3D renderings and in the symbolic ones – is reinterpreted according to a social-media key. It is the relationship between ava-tar/people and avatar/context that makes sense and the feeling of belonging to a community, a parallel social universe with values, rituals, languages, and hierarchies.

A research about social, spatial and digital maps – conducted between 2007 and 2010 about the territory of Rimini/Riccione and the East Mediterranean coast (Bollini, 2011a, 2001b) – focused on representations in the digital worlds and in particular on the Second Life Rimini's land.
What emerges as a evident result is a partial and stereotypical but at the same time emblematic of how this territory is perceived, processed, and rendered in its symbolic and real spatial identity.

Fig. 4. Real and virtual 3D in SeconLife: the Rimini's land. (Image source: Second Life application)

The environmental representation is based on the well-known dichotomy between the sea and the disco/entertainment nightlife. This partition well represents some of the social tribes that at-tend the city spaces: seaside tourist and clubbers.
Entering the virtual land avatars face few signs aimed to orientate between the beach and the clubs, place-topos of the space simulated in Second Life.
The results of the in-field representative tests part of the experimental research activities, conversely, show that the 3D model is not the cognitive representation nor the real experience that people have of this space.

The Dolphinarium, the seafront, the clubs along it, the boathouse are not mimetic or simulative rendering of the places, although the visual rendering engine of Second Life can depict, realistic or even hyperrealistic. The images are conventional, symbolic and social unbalanced on the emotional side of the recognizability of spaces. It is a sort of image/imaginary able to convey the surface rather than the genius loci of the environment. Its purpose is to let people identify them to build a sense of belonging.
The platform, namely, plays on a recognition mechanism based on a social universe made of shared languages, rituals, symbols and values, rather than on the virtual translation of the psy-chical shape.

The five dimensions of the cultural heritage.

Because of its capacity to simulate existing reality or to render entirely invented worlds, virtual reality, and the 3D visualization and reconstructive practices have been involved in the field of digital humanities, historical studies, and cultural heritage. Since the early ’90 museum’s websites and in-site exhibit have adopted QuickTime/VRML and other three-dimensional rendering technologies to let people experience the spatial display of rooms and objects (Bollini, 2009a; Bollini & Borsotti, 2009b; Trocchianesi, Bollini, Borsotti, & Pirola, 2017).
In this sense: “the relationship between heritage assets and the digital is much more profound, more intimate and more substantial with respect to the mere instrumentation of technologies used for preservation, popularization and fruition. Both share an atomic, fragmented nature, which assumes significance if associated with its context and other fragments, in order to re-compose, almost in a gestalt dimension, a senseful narration with an accomplished sense, ag-gregated through conceptual – nuclear – crossroads, reported in an associative manner, creating ulterior prospects for the construction of meanings. This is the hyper-mechanism imaginarily defined by Ted Nelson (1974) and outlined prior still by the visionary capacity of Vannevar Bush (1945) in As we may think and in the Memex project. Ideas which were then collected and developed in the great conceptual fresco by Douglas Engelbart (1962): Augmenting Human In-tellect. A Conceptual Framework.” (Bollini, 2013: 62)
On the other hand, the introduction of smartphones in 2007, the opportunity of geolocating information and another data on physical space, the possibility to connect and connect many different sources and type of content have enriched the way we explore and interact with other environment thanks to mobile technologies mediation.
Augmented Reality – as conceptualized by Engelbart – is the other opportunity given to explore the cultural heritage located in an open-air space, interacting with it on different layers.
If virtual reality or 3D rendering play the experience on 3-dimensional space and the user, with the interaction introduce the 4th dimension, digital layer represents the fifth, able to boost it to a higher level, or – better to say – at a hyper one. (Bollini, De Palma & Nota, 2013; Bollini, De Palma, Nota & Pietra; 2014; Bollini, Busdon & Mazzola, 2015, Bollini & Borsotti, 2016; Be-gotti & Bollini, 2017).
The Surfin’City-Treasure Hunt and Street Event mobile-devices-mediated-tour (our definition in a lack of proper and shared classification) developed by Mimulus – an Italian web agency – based on the Foursquare geolocalization check-in process and info-tips and/or Augmented Real-ity applied to historical data – are a clear and interesting example of how to design digital media to introduce

and guide users in discovering details, curiosity, social or historical story-telling to really catch the genius loci the inner and intimate dimension of a place.

Fig. 5. Surfin'Viterbo on FourSquare 2013. Viterbo e il grande cinema, by Mimulus (Image source: Mimulu's Pinterest account)

Rendering, simulating, overlaying

Other interesting early applications in the field are the Eli Horowitz's "The Silence History," the Faragola website realized by the University of Foggia within the Itinera Research Project, the time tour of the Chichen Itza Project: a best practice of iPad's interactive app for tourism.

In an ideal scale, ranging from the most physical to the most virtual, we could, therefore, identify a path of exponential growth in the exhibition events and in the museum displays that include experiences such as those of Peter Greenaway at Venaria Reale (2007), the projects of Studio Azzuro and N3! 0 (Belvedere, 2013) or the prossemic-choreographic research of Canal View in Venice developed by NuovoStudio Factory, Officine Panottiche Wetoo Group, the unexpected reports of the ephemeral installations by Kossmann-De Jong in 2010, to the very absence of the objects exposed in the vacuum of I Saloni of 2012 by Italo Rota, which become visible and only experienced in the presence and mediation of digital technology, in this case a tablet app.

These cases study well represent a dual approach to the use of AR/VR in heritage field evolving thanks to the new technologies of wearable devices – mainly head visors similar to the Heilig's Telesphere Mask already mentioned – such as Microsoft HoloLens, Google Card Board or the VR Oculus Rift. Furthermore, the technological development goes, now, hand in hand with the growth and the progress of expressive languages sewed both on devices potentials and on peo-ple involvement and participation.

The rendering or simulation approach is well represented by some project developed by ARt-Glass company in 2017. In the San Giminiano-Castle, the wall paintings have been tri-dimensionalized and animated. Pictorial elements of the frescoes have been animated, and the of history scholars and medieval archeology have become virtual guides for the public. The first took the appearance the of the painter Lippo Memmi and the second plays the role and the sec-ond dresses virtual columns of a palace armiger.

Another project has been developed in the Archeological area of Tremona Castle near Mendrisio about the Swiss Middle Ages (https://www.ticino.ch/it/commons/details/Parco-archeologico-a-Tremona-Castello/109635.html). The design concept is based on the overlap be-tween the real environment and three-dimensional rendering to simulate historical aspects or re-construction of the remains present in the archeological park. In this case, the Virtual Reality experienced with ArtGlass based on MS Ololens can bring back to life and our sensorial experi-ence buildings, streets, huts, and fireside as if they were still there. The digital experience offers to the sight and to the proxemic perception the historical traces that have been lost over time. On the one hand, this solution preserves the remains without intervening with non-philological restorations of the ancient ruins. On the other, the simulation means that they return to be inter-esting for a broad audience that has the opportunity to understand its evolution over time.

Another approach is offered by the recent implementation of an AR project developed to com-memorate the centenary of the Great War in the North East of Italy, Veneto Region. Now it's our turn – proposed by Hive Division – arises from the need to move a greater awareness to-day, not only concerning what was our past but above all so that an individual memory and col-lective can become a tool for a change in the present. Cities, infrastructures, and people return to being virtually what they were 100 years ago to dialogue with our daily life, with the aim of trying to identify with, in that historical era with places with people.

The territory of this regions does represent no more the context where grandparents and great-grandparents lived the war. Many of the buildings were adapted to specific functions (e.g., vil-las and churches became shelters, hospitals, stores), on the war lines the forts were built in stra-tegic positions because visually controllable the one with the other (today there is thick vegeta-tion to prevent this view), entire buildings were destroyed and mountain walls were detonated, special settlements such as the "city of ice" were set up (today they are no longer existing).

Of these all these profound changes of the space transformation there is a substantial documen-tary and photographic patrimony of military and civil type which allows its reconstruction. Through the use of interactive temporal montages, it is possible superimpose the image of the most important places in the region today with those of 100 years ago for finding out what was the vision of those places or buildings that presented itself to the people who lived there war.

The installation and online site Inside the Great War (http://www.oratoccanoi.it/panorami) have been developed a multidisciplinary group of practitioners, researchers and designers.

The -100/+100 concept: Marco Luitprandi, Chiara Masiero Sgrinzatto, Michail Paschalidis, Filippo Petrecca, Luca-Nicolò Vascon, Emanuela Zilio in particular the panoramic views have been de-veloped by Chiara Masiero Sgrinzatto (concept and design), Luca-Nicolò Vascon (photos and editing), Marco Luitprandi (interface design).

The realization of the interactive panoramas with the overlapping of the view of 100 years ago to the present one began with the study of the funds of the Military Historical Studies Center on the Great War "Piero Pieri" and Photographic Archive of the Italian Touring Club. "The photo-graphic campaign took place between March and April, making 5 panoramas at 360 ° high def-inition (between 100 and 200 Megapixel each). Then we moved on to the processing phase: as-sembly of photographs, post-production of images and visualization software. Particular atten-tion was paid to the interaction and the user experience, a graphical interface was designed and created to visualize the current panorama superimposed on historical photography and to easily switch to the historical document or to the panorama of the present day both from a computer desktop both from mobile devices (tablets and phones)" Chiara Masiero Sgrinzatto, one of the authors, reports in the project presentation.

The installation based on the overlap between historical photographs and the nowadays real places offers the possibility to navigate back in time, discovering the territory and inviting users to visit it in person.

Fig. 6. Now it's our turn / Inside the Great War: t, the making off (Images: C. Masiero Sgrinzatto, : N. Vascon, M. Luitprandi, Officine Panottiche + Nuovostudio)

Fig. 7. Now it's our turn / Inside the Great War: the virtual interface (Images: C. Masiero Sgrinzatto, : N. Vascon, M. Luitprandi, Officine Panottiche + Nuovostudio)

Conclusions

From the early years of the cyberspace mythology to the dystopic future, possible worlds de-picted by The Lawnmower Man or the Cell, from heavy head visors and data glove to the Ho-lolens and the Tesla suit Virtual Reality is now a mature filed and tool to adopt in cultural field such as in cultural heritage and museum exhibits.

Its potentiality is not only in the technical support and infrastructure offered to historical studies but rather in the experience offered to people willing to discover and feel disappeared or spoiled evidence witnessing our past and cultural evolution. AR/VR can either be used to bring back to life thing that does not exist anymore using 3D sim-ulation and virtual reconstruction. On the other hand, they can enrich and involve the user in a participative and multimodal act of knowledge.

With their technological support, people can use almost all their senses to interact with both real and digital spaces to be emotionally activated and fully participate to the digital heritage discovery, knowledge and preservation.

References

B. Aterini, *Introduzione ai metodi di rappresentazione della geometria descrittiva*, Firenze, Alinea, 1997

M. Augé, *Nonluoghi. Introduzione a una antropologia della surmodernit*à, Elèuthera, Milano, 2009

G. Boccia-Artieri, *I media-mondo. Forme e linguaggi dell'esperienza contemporanea*, Meltemi, Roma, 2004

P. Barlow, Crime and Puzzlement, June 8, 1990

https://w2.eff.org/Misc/Publications/John_Perry_Barlow/HTML/crime_and_puzzlement_1.html

D. Begotti & L. Bollini, *The time machine. Cultural heritage and the geo-referenced storytelling of ur-ban historical metamorphose*. In B. Murgante et al. (Eds.). ICCSA 2017, Part III, LNCS 10406 (p. 239-251), Springer-Verlag, Berlin Heidelberg, 2017

L. Bollini, *Multimodalità vs. Multimedialità*, in "Il Verri", n. 16, Milano, 2001, pp. 144-148

L. Bollini, *Registica multimodal. Il design dei new media.* CLUP, Milano, 2004

L. Bollini, *Dall'ipertesto alla performance multimodale: Forme di rappresentazione digitale dell'allestimento*, in M. Borsotti & G. Sartori (Eds.), *Il progetto di allestimento e la sua officina. Luo-go, memoria ed evento: Mostre alle Fruttiere di Palazzo te, Mantova.* (pp. 33-35). Skirà, Milano, 2009a

L. Bollini & M. Borsotti, *Reshaping exhibition & museum design through digital technologies: A mul-timodal approach*, in "The International Journal of Virtual Reality", n. 8 (3), 25-31, 2009b

L. Bollini, *Territorio e rappresentazione. Paesaggi urbani. Paesaggi sociali. Paesaggi digitali. Rimini e l'altro mediterraneo,* in M. Giovannini e F. Prampolini (Eds.), Spazi e culture del Mediterraneo (Vol. 3, pp. 28-42), Edizioni Centro Stampa di Ateneo, Reggio Calabria, 2011a

L. Bollini, *Territories of digital communities. Representing the social landscape of web relationships.* In Murgante, B; Gervasi, O; Iglesias, A; Taniar, D; Apduhan, BO (Eds.), Lecture Notes in Computer Science, ICCSA 2011 (Vol. 6782, pp. 501-511), Springer-Verlag, Berlin Heidelberg, 2011b

L. Bollini, *Lo spazio digitale del sapere: dalla forma archivio alle knowledge-base culturali. Aggrega-zioni, narrazioni e migrazioni*, In R. Trocchianesi & E. Lupo (Eds.), Progetto e memoria del tempora-neo (Vol. 3, pp. 53-67), Electa, Milano, 2013

L. Bollini & M. Borsotti, *Strategies of Commutation in Exhibition Design, in "The International Jour-nal of Architectonic, Spatial, and Environmental Design"*, Volume 10, Issue 1, pp.13-21, 2016a

L. Bollini, R. De Palma & R. Nota, *Walking into the past: Design Mobile App for the Geo-referred and the Multimodal User Experience in the Context of Cultural Heritage.* In B. Murgante, O. Gervasi, S. Misra, N. Nedjah, A. M. A. C. Rocha, D. Taniar & B. O. Apduhan (Eds.), Computational science com-putational science and its applications – ICCSA 2013 (Vol. 3, pp. 481-492), Springer-Verlag, Berlin Heidelberg, 2013

L. Bollini, De Palma, R., Nota, R. & Pietra, R. (2014). *User experience & Usability for mobile geo-referenced apps. A case study applied to cultural heritage field.* In B. Murgante et al. (Eds.), Computa-tional science computational science and its applications – ICCSA 2014 (pp. 652–662) Part II, LNCS 8580, Springer-Verlag, Berlin Heidelberg, 2014
L. Bollini, G. Busdon, G. & A. Mazzola, GeoLapse. *A digital space-based and memory-related time-capsule app.* In O. Gervasi et al. (Eds.), Computational science computational science and its applica-tions – ICCSA 2015 (pp. 675–685) Part II, LNCS 9156, Springer-Verlag, Berlin Heidelberg, 2015
L. Bollini, *Large, small, medium. Progettare la comunicazione nell'ecosistema digitale.* Maggioli Edi-tore, Rimini, 2016
V. Bush, *As we may think*, in "The Atlantic Monthly", 1945
https://www.google.it/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwi SpLeix6raAhWCr6QKHRRxBzoQFggrMAA&url=https%3A%2F%2Fwww.theatlantic.com%2Fmaga-zine%2Farchive%2F1945%2F07%2Fas-we-may-think%2F303881%2F&usg=AOvVaw2xHnppW-TwN-pnda-jjgNhU
D. Engelbart, *Augmenting Human Intellect: A Conceptual Framework*, 1962
http://www.invisiblerevolution.net/engelbart/full_62_paper_augm_hum_int.html
W. Gibson, *Johnny Mnemonic*, in "Omni", May 1981
http://wintermute10.tripod.com/Gibson.htm
W. Gibson, *Burning Chrome*, s.e., s.l. 1982
W. Gibson, *The Neuromancer*, Ace, New York, 1984
M. Heilig, *The cinema of the future*, s.e. 1955
https://www.google.it/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiUw7mHoKXaAh XRe8AKHUinCTYQFggoMAA&url=https%3A%2F%2Fgametechdms.files.word-press.com%2F2014%2F08%2Fw6_thecinemaoffuture_morton.pdf&usg=AOv-Vaw2pEOC3Ww6tyhnHGzCEwZ3W
H. E. Lowood, *Virtual reality,* in Enciclopedia Britannica, s.d.
https://www.britannica.com/technology/virtual-reality#ref884304
G. Monge, *Géométrie descriptive*, Paris, Baudouin, 1798
https://archive.org/details/bub_gb_JXf7u-7KacoC
M. Neale, William Gisbson. *No Maps for These Territories*, Docurama, New York, 2000
https://youtu.be/pSnPa1mWgK0
T. Nelson, *Computer Lib / Dream Machine*, 1974/1980
C. Payatagool, T*heory and Research in HCI: Morton Heilig, Pioneer in Virtual Reality Research, in "The Telepresence Options"*, September 19, 2008
http://www.telepresenceoptions.com/2008/09/theory_and_research_in_hci_mor/
R. Smith, *The Elementary Parts Of Dr. Smith's Complete System Of Optics*, vol. ii. r. 244, 1778, Whitefish, Montana, Stati Uniti, Kessinger Publishing, LLC (September 10, 2010)
R. Trocchianesi; L. Bollini; M. Borsotti & M. Pirola, *Metaphorical exhibitions between art and design: a mutual relationship beyond borders.* In E. Duarte; S. Gonzaga & A. Nolasco (Eds.) Senses & Sensibility: Design Beyond Borders and its affiliated conference Rhizomes (pp. 174-182). UNIDCOM/IADE, Lisbon, 2017
S. Turkle, *Life on the Screen: Identity in the Age of the Internet*, Simon & Schuster, New York, 1995
C. Wheatstone, *Contributions to the Physiology of Vision.*—Part the First. On some remarkable, and hitherto unobserved, Phenomena of Binocular Vision, London June 21, 1838.
http://www.stereoscopy.com/library/wheatstone-paper1838.html