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08
APR 2023

Imaging and Imagery in Architecture

ISSUE 08
04/2023
IMAGING AND IMAGERY IN ARCHITECTURE

EDITED BY
Alessandro Luigini

ISSN 2724-2463
ISBN 9788899586362
DOI 10.6092/issn.2724-2463/v4-n8-2023

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PUBLISHERS
> on line version:
Department of Education studies "Giovanni Maria Bertin"
http://www.edu.unibo.it/

> print version:
PUBLICA. Sharing Knowledge
www.publicapress.it

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Imaging and Imagery in Architecture

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EDITORIAL

ISSUE 08 APRIL 2023
Imaging and Imagery in Architecture

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The language of representing architecture is composed of drawings and images, and already in the first treatises of the 15th century –although it is in the preceding centuries that architectural drawing takes on the connotation of a discipline– it is clear that the act of drawing coincides with the action of designing. Leon Battista Alberti called it '*designare*'. He indicated the skilful use of the graphic medium to define how the parts of the building could be arranged to meet the demands of Renaissance beauty. To design, from this point on, means to imagine and image architecture, to construct imaginaries of architecture. The post-World War II years –which this issue investigates– is ideally the period from which, with the continuity of a social development that no longer saw catastrophic global events, >

DOI: 10.6092/issn.2724-2463/18374

the foundations were laid for what in the following decades would be the evolution of expressive modes in representing and designing architecture up to the present day. Post-war reconstruction, economic development, the growing awareness of the unsustainability of our impact on the planet, and the succession of new visions of the future have, from time to time, given drive to the development of new architectural languages and, therefore, new graphic languages to express –before describing and communicating– architecture.

As various scholars have observed, the continuity of this symbiosis between drawing and design, between manual action and conception –magnified in its perspective elaboration– continued undisturbed until the last decades of the 20th century, when the computer paradigm joined the analogue paradigm. The symbiosis between thinking and drawing was bound –certainly not replaced– by a triad in which the computer medium became a mediation between hand and mind, substantially modifying the conceptual process that was thus able to explore new conceptual paradigms.

The path of hermeneutic circularity that characterises the design process –which descends from the general to the particular and then back to the general– is enriched by an information subject that from time to time influences the result and thus the process of self-understanding that the drawer-designer carries out, and so the circular path becomes a spiral path.

In addition, digital representation has profoundly altered graphic processing procedures, definitively

influencing conceptual elaboration processes as well: innovative methods for defining forms have radically expanded the imaginative possibilities previously developed within the domain of descriptive geometry. Between the 1990s and the early 2000s, this innovation made possible a heroic season in which several architects explored experimental and unusual eidetic processes. The drawing of architecture and its digital representation has once again established a phase of explicit symbiosis in which it is impossible to distinguish the design phase from the representational stage. As in manual drawing and computer-aided drawing, the paths of the creative process and the final technical representation are substantially distinct and represent two ways of proceeding with drawings and images –information and visual models– that start, develop and complete the process of architectural design and communication. This inescapable character of architecture is as valid in the eidetic process of design as it is in the archaeological process of the survey and graphic analysis of architecture: drawing and image, mediated by computer models, remain the primary way in which architecture is designed, studied and communicated, both to a specialist and a generalist audience.
As anticipated, this paradigm flanks the analogue paradigm but only partially replaces it because some peculiarities of analogue design seem irreplaceable. As much as neuroplasticity allows adaptation to any tool, the greater the mediation phase between mind and product, the more demanding it is. Thus adapting to a mouse and keyboard –and operating with them once our brain has adapted– is undoubtedly more challenging than adapting to a more

basic pencil, besides the fact that the adaptation phase to this elementary tool takes place at a stage of our lives when neuroplasticity is much faster and therefore generates a more in-depth result. The success of touch interfaces also depends in part on the natural need for the reduction of the mediation phase, and in drawing, the use of digital pens has certainly reduced this gap, albeit with some limitations. But the fact remains that many architects continue to use traditional drawing tools for the elaboration and design phases. This establishes a line of continuity that, from the legacy of the Modern Movement fostered in the 1950s and 1960s, develops into postmodernism between the 1970s and 1980s and into the long tradition of Italian drawing, which in those years saw a flourishing production of 'drawn architectures' that found their raison d'*être* in their graphic elaboration. It is a world of drawings and images that speak of the evolution of thinking in architecture, its diversity, and the myriad possibilities of using graphic and visual languages to work out architectural space.

The contributions collected through the call for papers develop some points of view that can arise from this context. The digital paradigm in architecture is investigated by Domenico Mediati, presenting some of the expressive possibilities that some architects at the turn of the 1990s and early 2000s were able to develop thanks to innovative computer tools. Asma Mehan emphasises how visual representation can document and trigger urban changes through bottom-up participatory processes. Fabio Colonnese presents a study of a museum project by James Stirling through the analysis of the designer's drawings –with particular

attention to the recurring use of axonometry– and through his drawings. Pieter Greyvensteyn analyses the representation of architecture, which, like every other field that passes through the image, undergoes remediation due to the proliferation of social networks and declines the previous triad hand-mind-pencil into hand-mind-smartphone. Gaia Leandri tells us about the expressive possibilities of the representation of architecture for communication, where the draughtsman is a professional figure distinct from the designer, and how there are preferential graphic languages in certain circumstances. Roberto Gigliotti presents a field experiment of staging and disseminating the design elaborations presented at ar/ge kunst in Bolzano, containing an exploration of the architectural imaginary. Anna Sanseverino, Victoria Ferraris, and Carla Ferreyra offer some critical reflections arising from the didactic activity of international cooperation between Italy and South Africa, with which, together with the students, they investigated the possible declinations of the language of communication in contemporary architecture. Salvatore Damiano presents a commentary of six drawings by one of the great masters of Italian design of the second half of the 20th century: Vico Magistretti. Michela De Domenico, Paola Raffa and Fabio Testaì investigate the representation of architecture and three major cities in contemporary comics. Michela Rossi and Luca Armellino explore the eidetic possibilities of digital tools, especially in the composition of visual images that allude to architectonic spaces.
While for the composite section, Giancarlo Gola investigates an innovative field of intersection between research

in the visual field and the field of education: VRMs (Visual Research Methods) make it possible to make visible what is not visible and thus allow educational and social access to more significant parts of our experience, Sandro Parrinello, Justyna Borucka, Jakub Szczepański, and Francesca Picchio show some outcomes of a European project aimed at the development of innovative methodologies for the knowledge of the urban environment and historical heritage. Also, for the composite section.

THE KÖLN MUSEUM
IMAGERY AND IMAGING IN THE ARCHITECTURE OF JAMES STIRLING

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ESSAY 124/08

JAMES STIRLING
WALLRAF RICHARTZ MUSEUM
COLOGNE
AXONOMETRIC VIEW
COLLAGE

The 1970s museum projects of James Stirling provide the opportunity to explore a design process intended to design a building as a combination of fragments that quote historical buildings or typologies along a route. While the collection of spaces of the unbuilt museum for Cologne indirectly reveals Stirling's own architectural imagery almost in a chronological sense, the drawings produced to present the competition entry in 1974 are anything but explicit and ask the reader to collaborate to decipher the architectural contents. This apparent contradiction is here analyzed and discussed in the key provided by Stirling's peculiar interest in drawing, his office organization, and the agency Leon Krier had in it while preparing the drawings for the first monograph on the Scottish architect.

INTRODUCTION

In the early 19th century, the architect Luigi Canina was asked to design the land purchased in Rome by the Borghese family between via Flaminia and their villa and garden. He designed three propylaea in a linear sequence – Greek-Doric at the entrance, Egyptian, and Roman. Built with simple stuccoed walls, the propylaea appear as full-scale models that recall the tradition of the 'architectural collection' inaugurated by the Emperor Adriano. Such an archaeological program is unusual for the Roman context, where ancient ruins and marbles were rather reused and resemantised and severs the relationship with the garden, which results a sort of architectural park inspired by the English picturesque taste (Consoli & Pasquali, 2005). Moreover, the chronological sequence of the pavilions built along a route and the archaeological interests of Canina reveal an explicit historiographical and didactic intent that indirectly materialises a part of the architects' imagery that was generally confined to books and drawings.

More than a century later, the 'revisionary modernist' James Stirling (1926-1992), together with his associated Michael Wilford, designed three museums in Germany in which he dispensed his personal historical and architectural imagery. Stirling has been a worldwide known Scottish architect, awarded with a Pritzker Price in 1981. His architectural projects and buildings were widely celebrated and the subject of endless studies. In particular, the Wallraf Richartz Museum for Cologne, designed in 1974 and here analysed, has been described and discussed in journals (Un museo per Colonia, 1976; Stirling in Germany, 1976; Kreis, 1977) and monographs (Arnell & Bickford, 1984; Dal Co & Muirhead, 1990) that were triggered by the subsequent win of the Stuttgart museum competition.

After his death in 1992, scholars have focused on his archive (Vidler, 2010), the memories of partners and collaborators (Jim and I, 1992; Baker, 2011), and the hidden potential of his unrealized projects[1]. Such a research promoted an ex-

ploration of his cultural background, partially revealed by his famous *Black Notebook*, and personality (Grafe et al., 2009; Reeser Lawrence, 2013), eventually remarking the centrality of Leon Krier's agency in Stirling's office in the early 1970s.

A central element of his architecture is the architectural promenade. Stirling's attention to the functional and narrative potential of circulation, possibly triggered also by his love for cinema (Stirling & Morteo, 1992), can already be traced in the Civic Centre he had designed as a degree thesis, whose plans are enriched with marks that establish preferential itineraries, perspective views, and travel times (Vidler, 2010); and in the competition entry for the University of Sheffield (1953), which externalises the volumes of the circulation system. After the Constructivist-inspired university buildings of the 1960s, Stirling gave the circulation a more intimate and human dimension, adopting the picturesque curved perspectives that reveal the destination little by little, both in the Derby Civic Center (1970) and the Olivetti buildings (1969-1972). Most of these projects reveal a deep interest in Le Corbusier, to whom he had dedicated travels and articles (Stirling, 1955; 1956), in his concept of *promenade architecturale*, but also in the mechanical analogy of the *machine-à-habiter* and the combinatorial logic of the competition for the United Nations Building in Geneva. Some of the architectural pieces devoted to human circulation he designed –the glass-wall, the lift, the ramp broken into two opposing flights, the stairs, the entrance portal, the corrugated counter, the canopy, the mushroom pillar, the blowholes and many others– come directly from Le Corbusier's projects, from la Citè de Refuge to La Tourette monastery's chapel – while others from engineering buildings or some of Buckminster Fuller's proposals. This heterogeneous equipment reaches a maturity in the three German museums where it combines with an –intertextual– path connecting fragments of architectural typologies from the past.

These architectural quotations testify to Stirling's growing interest in the forms of the past and their semantic role,

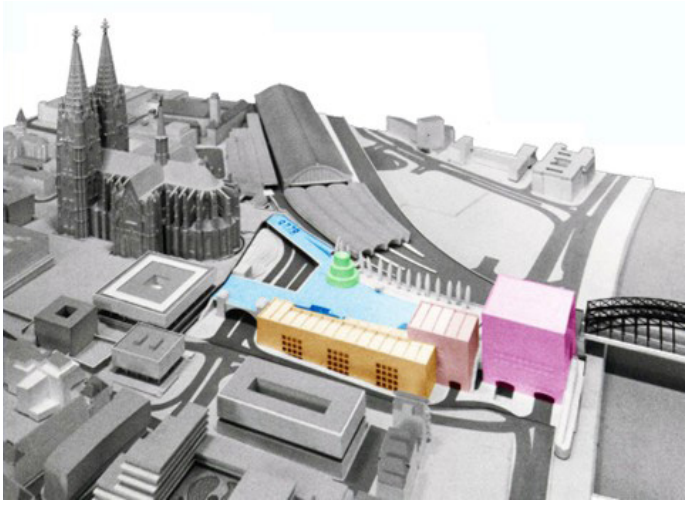

Fig. 1 James Stirling's Wallraf Richartz Museum in Cologne as a combination of five pieces: the Piazza, in blue, the Ziggurat, in green, the Gallery, in orange, the Entrance box, in pink and the Theatre box, in fuchsia, by the bridge (elaboration by the author).

which he discussed in public first in 1974[2]. In Cologne, they serve to answer the contradictory questions of sites complicated by infrastructures and monuments and, in general, of a national cultural identity under reconstruction. However, neither the breadth of the architectural imagery involved, nor the attention to the spatial experience of the visitors seems to find an echo in the project drawings of the museum for Cologne. Orthogonal projections and axonometric views prevail; the use of perspective, which is expected when a promenade is designed, is occasional, while the model is rather conventional. Stirling's drawings are essential, purely linear, achromatic. As Banham wrote, they lack of "ingratiating qualities – colour, texture, atmosphere, anecdote" (Stirling, 1974b, p. 14). They rather show a neoclassical ascendance that leaves much of the task of interpreting the architectural contents to the reader. Though an explicit reference to the historical references involved in the museum project is missing, the intention to explicit the design process emerges as an innovative communication key. These apparent contradictions fuelled the research behind this article. Through the Cologne museum drawings, some interviews and secondary literature, it investigates Stirling's architectural images and

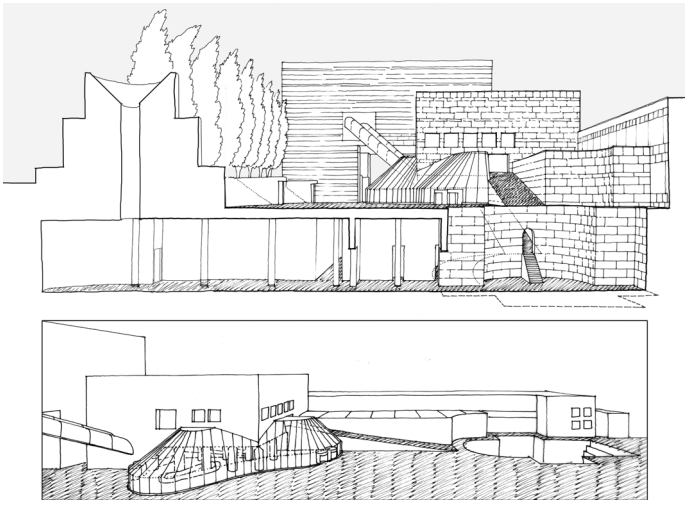

Fig. 2 James Stirling's Wallraf Richartz Museum in Cologne. From top to bottom: Perspective section on the Ziggurat and the church-shape courtyard; perspective view of the Piazza with the Entrance box and the Gallery (sketches by author).

imagery by relating them to the work that Leon Krier carried out in the studio for the preparation of the so-called 'Black Book' (Stirling, 1974a), at a time when a brilliant new phase of Stirling's career and the controversial era of the Postmodern were about to start.

A MUSEUM FOR COLOGNE

Stirling organized the opaque boxes of the Wallraf Richartz Museum as a geometric landscape to be perceived in speed from the roads and railways that split the articulated site between the Rhine and the huge cathedral somehow survived to the Allies' massive bombing. Some eccentric elements –the external escalators inserted in inclined transparent cylinders, a Ziggurat masking an electrical substation, a waving glass-wall and a long slope– feature the two main boxes –the Entrance and the Theatre, one of the two Propylaea by the Hohenzollernbrücke– and the long body of the Gallery, flanking the Piazza (Figures 1, 2). Unlike the coeval museums for Düsseldorf and Stuttgart, no rotunda here marks the centre of this centrifugal composition.

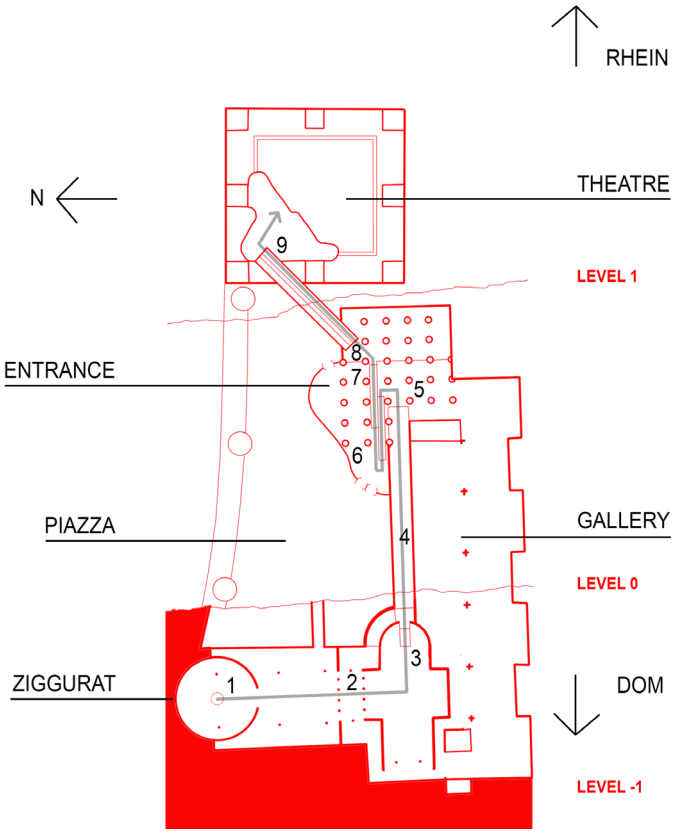

Fig. 3 James Stirling's Wallraf Richartz Museum in Cologne. Diagram plan of the museum with the main route in grey along the three main levels. Numbering referring to Figure 4 (drawing by the author).

The main route (Figure 3) starts from the underground car park to access the art gallery from below. After a cylindrical hall beneath the Ziggurat, marked by a light-well, visitors are attracted by light coming from the sculpture courtyard carved into the upper square. Two rows of four free columns modulate the access to the cross church-shaped court. A staircase in the 'apse' leads us to a 50 meters long straight ramp raising between two stone walls up to the vast hypostyle foyer in the Entrance box. Thirty-two massive circular columns are here arranged on a square grid. As distant as twice their 120 centimetres wide diameter, they impose exclusive orthogonal views and disorient us. On the left, we hardly find the second ramp, which leads us towards the light coming from the upper level. Here the corner of the box opens outwards

through a weaving glazed veranda, which allows access from the main urban level, in direct connection with the public square on the rear of the cathedral. From here a third ramp, flanked by the second, leads to the upper foyer. In general, the sequence of ramps reminds Le Corbusier's Casa Curutchet where the first ramp is enclosed between two walls, the second is leaning against one of the walls and the third seems to

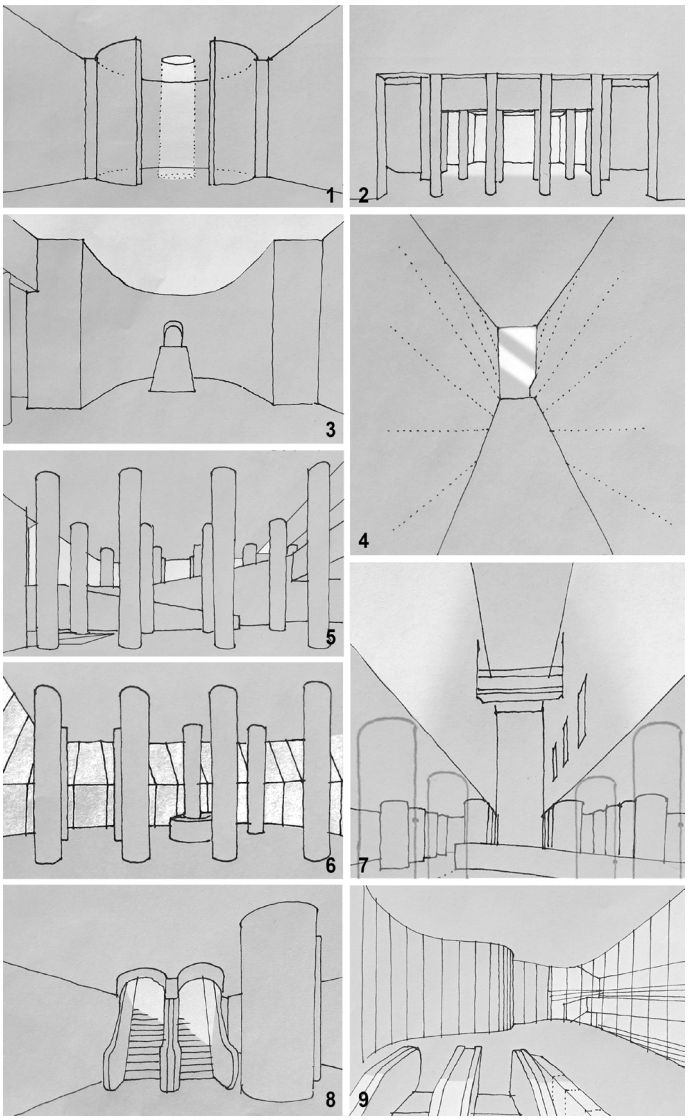

Fig. 4 James Stirling's Wallraf Richartz Museum in Cologne. Views of the events along the architectural promenade. 1, Tholos; 2, Temple; 3, Church, 4 Dromos; 5, Hypostile Hall; 6, Crystal Palace; 7, Cistern; 8, Tubular Escalators; 9, Informal Panorama. Numbering referring to Figure 3 (reconstructive sketches by the author).

float in the void and allows us to overlook both the atrium on the left and the hypostyle hall on the right. Halfway up, we discover that the oppressive ceiling of the foyer here rises and creates a sort of full-height internal canyon, which also cuts the upper offices into two blocks connected by a suspended metal walkway. Like a section, this view reveals all the internal floors in a sort of Piranesian engraving. While ascending, we understand that lifts and ramps are devices for moving not only in space but also in time, from the darkness of the rupestrian habitat to the light of skyscrapers. After an archaic Tholos, a Greek Temple, a cross-shape Church, an Etruscan *dromos*, an Egyptian hypostyle hall, a Roman cistern suggested by the full-height glimpse, we find glimpses of modernity with the glass-and-iron wall beyond the second foyer on the upper gallery. Encapsulated in translucent tubes quoting the Centre Pompidou or Paul Andreu's Terminal of Paris Airport, a pair of escalators connect the cubes and offer us a sudden view of the city skyline. They lead us into an informal hall closed by curved walls and watching over the belly of the theatre, suspended over a round public square open to the river, where the gaze is finally free to wander (Figure 4).

The museum composition follows an additive and combinatorial process that reflects the picturesque 19th century culture, the practice of industrial assembly and also the surrealist approach of the historical avant-gardes. While the coeval museums for Düsseldorf and Stuttgart had irregular sites and historical layers that could orient Stirling's picturesque approach, in the case of Cologne he arranged a sort of artificial historical layering. The result may recall Disneyland or Colin Rowe's Collage City seen through the surrealistic gaze of the *cadavre exquis*. Yet, the historical pieces find their place in a modest and cultured way. The fragments are subject of a careful process of connection, homogenization and formal reinterpretation and result as colonised and refunctionalised ruins, like Diocletian's palace in Split. These are not fragments framed and cited to evoke noble origins –Renaissance– or to be historicised –18th century– nor are

they combinations of pieces useful for constructing original eclectic forms – 19th century. Stirling is rather addressed to a didactic interpretation of architecture in a figurative and phenomenological key, useful for linking and updating spatial experiences inherited from the past or to access the semantic reservoir of forms censored by the Modern Movement. This makes it possible to stage the fiction of a layered architecture built in different eras, which basically belongs to the DNA of Cologne – and of Rome, of course.

COMMUNICATING PROJECT AND PROCESS

Most of the original drawings of Stirling's project for the Wallraf Richartz Museum are today conserved at Montreal[3]. Among the 167 survived drawings, there are two master plans –one with the shadows– 11 general plans, at least 7 sections, three general axonometric views, three axonometric sections, an axonometric detail. Added to these, some doodles and a curious axonometric sketch show the volumetric elements of the circulation. The promenade above mentioned has been reconstructed mainly by studying plans and sections drawings, which describe the architecture in a rather consistent and exhaustive way (Figure 5), and comparing the solutions with Stirling's built works. Drawings also reveal, for example, that the columns of the hypostyle hall perform no structural function and result to have been added at a later time –they are missing in the sections– for narrative, didactic or anti-perspectival reasons. Nevertheless, figuring out the imaginary walk through the museum after the drawings is quite difficult. Orthogonal and axonometric projections prevail, useful for understanding the extent of the spaces but certainly not for anticipating their experience. There are almost no perspectives; after all, in this convoluted concatenation of volumes, there is neither an enfilade connecting all the spatial events, nor a real focus onto which to organize any panoramic view. Only a partial axonometric view of the circulation sys-

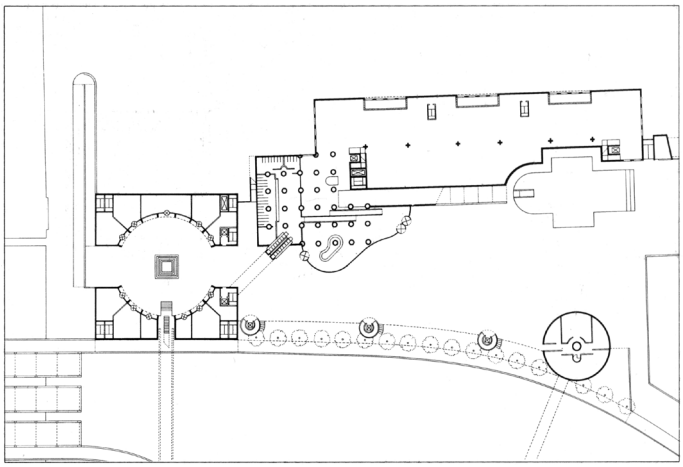

Fig. 5 James Stirling, Wallraf Richartz Museum in Cologne, 1974. General plan of the Piazza level. Ink on transparent paper (Arnell & Bickford, 1984, p. 210).

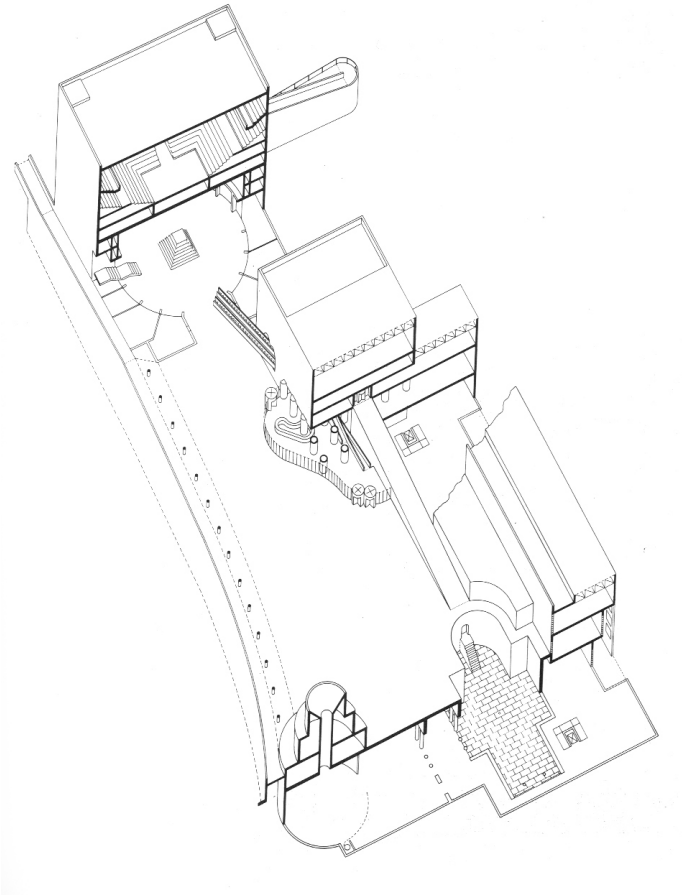

Fig. 6 James Stirling, Wallraf Richartz Museum in Cologne, 1974. Axonometric section Ink on transparent paper (Arnell & Bickford, 1984, p. 209).

tem is present and also the usual axonometric details of the circulation are here missing, presumably because the urban and infrastructural issues took most of the resources. Despite these are images designed for a competition, they are but explicative or seducing. Materials and colour, which are so central in Stirling's architecture (Colonnese, 2012), are completely missing; effects of light and shadows appear only in the photographs of the grey model inside and outside the urban context; the presentation text simply describes how the building works. Indeed, much of the design communication is entrusted on the curiosity of the reader to explore patiently the axonometric sections, the only drawings that explain –partially– the hierarchy and concatenation of spaces (Figure 6). In this sense, the drawings metaphorically represent the opacity of the museum boxes, which do not reveal much of the internal spaces. Unlike the scientific research centre he would design in Berlin in the 1980s, where "diagrammatic forms of historic types [that work] as compositional elements" (Vidler 2010, p. 195) eventually shape the external volumes, too, this sort of geometric still-life makes the internal promenade unpredictable and surprising. According to James Gowan the search for surprise was fundamental for Stirling.

> [He] worked visually, using his eye rather than his intelligence. He would fumble his way through in an exploratory manner, an artistic manner, and basically he didn't know what the outcome was going to be except that he wanted it to be a surprise. (Woodman, 2009, p. 74)

Besides an element of surprise, this ontological distance between appearance and experience is somehow a consequence of the design process, which is partially clarified by a series of interviews with Stirling and his collaborators. As Baker summarizes:

> Stirling, at the early stages of design liked to work with small sketches, of a manageable size. These would be done by many people –including Stirling– then revised by his selecting the most promising idea, sometimes circling it and giving a thick. Larger drawings, *under drawings* as

> they were called, would follow. From initial rough sketches an idea is progressively refined until the final drawings emerge. These take the form of working drawings and presentation drawings. (2011, p. 10)

The design process was divided into two main stages (Woodman, 2009). Initially, Stirling envisioned the project in organizational terms, to fit the program through purely functional logic. Neither structure nor circulation issues had to condition the project organization at this stage. This phase was developed through small doodles on tiny scraps of paper or napkins on the train that he shared with his collaborators, beginning a sort of 'tennis match'. He asked everyone to propose general organizational solutions which were then discussed, also because he found easier to work on the drawings of others and bring the most of the ideas out of them. The second phase, in which he returned to producing sketches and formal hypotheses, consisted instead in geometrising the structure through modules and grids and giving volumes and interiors an iconographic guise, which often served to contradict the initial premises. The route through was designed at the very end. As Russell Bevington reminds about Stirling's approach, "whatever you do, don't worry about the route through the building. […] Get the building and then we'll see how we can lay a route through the building" (quoted in Baker, 2011, pp. 15-16). According to these sources, Stirling's design process had a rational approach but translated into a stratified and ambiguous architecture, in which the circulation mostly resulted from the space in-between the major forms. In such a scenario, illustrating the process to make it part of the design communication was an opportunity to stress the distance between appearance and experience. To this scope, he developed the so-called 'Stirling cocktail', a combination of sketches and other drawings that aim to produce what Goldschmidt and Klevitsky defined "reconstructive memory" (2004, p. 41), or the story of the project. The autographed design sketches, which were originally intended to encourage exchange with collaborators, were selected to be a part of a

heterogeneous graphic system intended to communicate the process. Such a 'cocktail' became a standard in Stirling's competition entries that was imitated by both some of his colleagues and the academies, in virtue of the growing prominence of process over product and the emerging figure of the architect-philosopher (Mitrović, 2021).

ISOMETRIC STIRLING

In the drawings' visual negotiation between appearance and experience of the building –and between the Stirling's imagery and the reader's expectations– a particular agency is performed by the axonometric views, like the sophisticated view of the hall (Figure 7). This is a peculiar typology of architectural drawings Stirling was celebrated for. Actually, most of his interest in axonometric views, in illustrating the design process or in exclusive linear drawing can be referred to the role that Leon Krier played in Stirling's office in the years before the German museums. Around 1968, Stirling had commissioned Krier to redesign his works for the publication of the so-called 'Black Book' (Stirling, 1974a), which was widely inspired by Le Corbusier's *Oeuvre Complete*. Like Le Corbusier's sketches, Krier's perspective views of Stirling's projects often show peculiar elements, borrowing feelings and ideas from the everyday life in the office, too. In this sense, while the human figures of Derby Civic Centre may reveal Krier's passion for Otto Wagner's drawings (Colonnese, 2016), the views of the Olivetti Headquarters present the figures of Stirling himself and his beloved 18th century furnishings[5]. As Krier was producing a large number of drawings after old projects, Stirling was reworking his own old sketches and redrawing some of the lost ones. Such a retrospective practice on previous projects surely complicates the historiographical issue but provided Stirling with a new awareness about the design process and the single projects, whose latent potential is revealed by Krier's axonometric views.

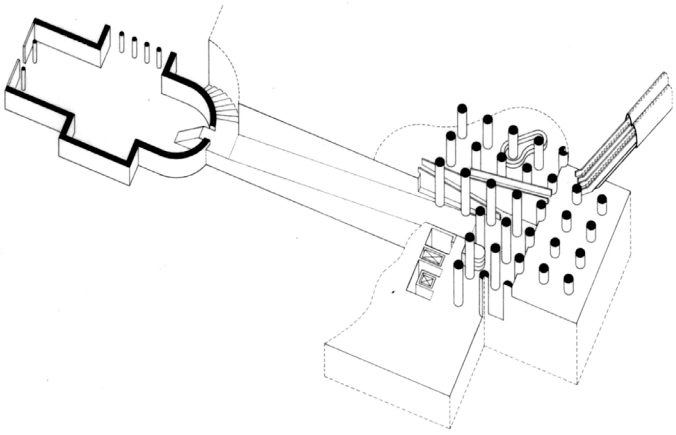

Fig. 7 James Stirling, Wallraf Richartz Museum in Cologne, 1974. Axonometric detail of main components of circulation. Ink on transparent paper (Arnell & Bickford, 1984, p. 213).

The *Isometric Stirling* exhibition at the Royal Institute of British Architects' –RIBA– Heinz Gallery, London, in 1973, certified the expressive potential linked to the ambiguity and paradoxes of linear drawing, and the axonometric views in particular[5]. Before featuring Le Corbusier's design communication, such a graphical model had been used by the French historian Auguste Choisy (1899) to design demonstration figures of ancient monuments:

> In this system, a single image, agitated [*mouvementée*] and animated like the building itself, replaces the abstract figuration fractioned in plan, section, and elevation. The reader has in front of his eyes, simultaneously, the ground plan, the exterior of the building, its section, and its interior disposition. (Choisy quoted in Bois, 1989, p. 114)

According to Yve-Alain Bois, Choisy intended an axonometric view as a graphic device capable of inducing a virtual movement:

> The perfect tool for expressing the temporality of the construction process with the utmost clarity, showing the different phases on a single figure (as in *L'art de batir chez le Romains*), or for restoring the historical mutations of a building typology (as in *L'Histoire*) [...] but it also serves as a substitute for the storyboard to declare the temporality of perception, precisely because it does not refer to a fixed point of view. (Bois, 1989, p. 114)

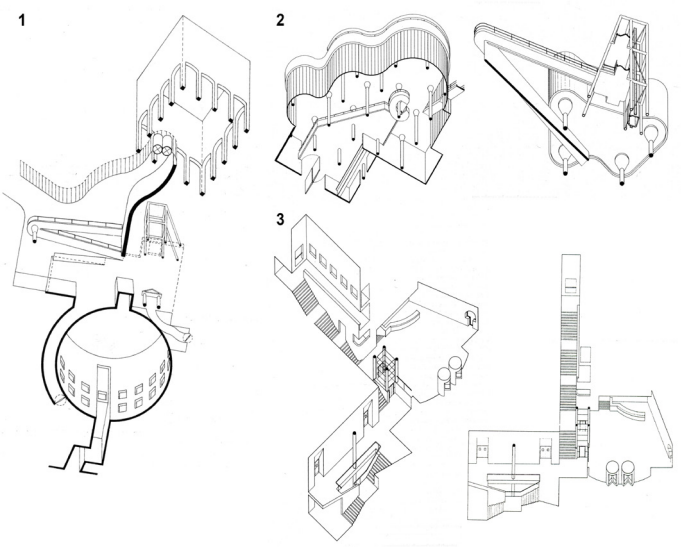

Fig. 8 A collection of James Stirling's axonometric views of elements of circulation. Ink on transparent paper. 1, Design for the Nordrhein Westfalen Museum at Düsseldorf from below, 1974 (Dal Co & Muirhead, 1990, p. 84); 2, Conference room and Restaurant from below, Olivetti Headquarters in Milton Keynes, 1971 (Stirling, 1974, pp. 176-177); 3. Two alternative abstract views of the hall of the Music School and Theatre Academy, an extension of his Staatsgalerie, in Stuttgart, 1987-1995 (Stirling & Wilford, 1993, p. 62).

Like Choisy's, Stirling's axonometric views are complex and composite drawings that demand for the collaboration –and the virtual movement– of the reader. Exploded views, sections and cross-sections are generally composed of several section planes and enriched by a refined repertoire of conventional marks useful for indicating parts that are sectioned, hidden, transparent or obliterated (Figure 8). They are not drawings to be shown to the client but belong to the author's universe. As Reyner Banham wrote at the end of his introduction to the catalogue of the RIBA's exhibition, "a Stirling drawing is lucid in itself and explicit in its content. Appropriately enough, they are drawn always on tracing stock, and the light comes through them, much as the mind passes through and illuminates their intellectual transparency" (1974b, p. 14), an implicit invitation for the reader to explore them. The from-below-to-above axonometric views –or 'worm's-eye-view'– inherited from Choisy owe much to Leon Krier's contribution. Updating a visual typology inspired by both Mantegna's and Giulio Romano's illusionistic quadrature in Mantua and manuals of mechanical engineering, they amplify the machine analogy inherited by Le Corbusier through their inhuman and impossible point of view. Stirling used to ask Krier to simplify

the drawing and to obtain an abstract, ambiguous and anti-naturalistic image, which reveals nothing of its material, tactile and light properties. As Krier recalls, "I had sketchbooks full of doodles and he [Stirling] always chose the ones which would be the most mechanical" (quoted in Baker, 2011, p. 184).

Like those traditionally used to illustrate "the inner parts of mechanisms, the sections of the tissues, the articulations of organisms" (Di Napoli, 2004, p. 293), Stirling's isometrics "were clear, sharp, unshaded, uncoloured and above all unsentimental. Not unlike the surgeon's knife, they cut into the fabric to reveal the essential organs" (Jones, as cited in Jim and I, 1992, p. 69). Leonardo da Vinci was among the first to address this issue systematically. In his depiction of the human body, he reports the procedure to distinguish in the "very great confusion that must result from the combination of tissues, with veins, arteries, nerves, sinews, muscles, bones, and blood which, of itself, tinges every part the same colour" (Richter, 1883, p. 110). He states that at least three drawings, like those combined by Choisy in his axonometric views, are needed to understand an organ, "everything else being destroyed with greatest care" (Richter, 1883, p. 110). Stirling also 'destroys' all the matter that would compromise the visibility of the circulation pieces: "every drawing has to be designed in such a way that all surplus information and that the stance or viewpoint in the projection is essential" (1974b, p. 16). The caption 'floating objects' in a sketch for the Düsseldorf museum (Dal Co & Muirhead, 1990, p. 37), addressed to his collaborators, testifies to Stirling's awareness of the visual power of these fragments. Like components extracted from Buckminster Fuller's prefabrication experiments, their formal autonomy seems to reflect, and somehow reveal, the fragments of historical typologies that feature the promenade of the Cologne museum. At the same time, they echo the artistic autonomy the architectural drawing was acquiring in parallel in the same years, when the so-called 'paper architects' were contributing to lead architectural drawings into galleries and collections. Isolated from their architectural context, these architectural fragments

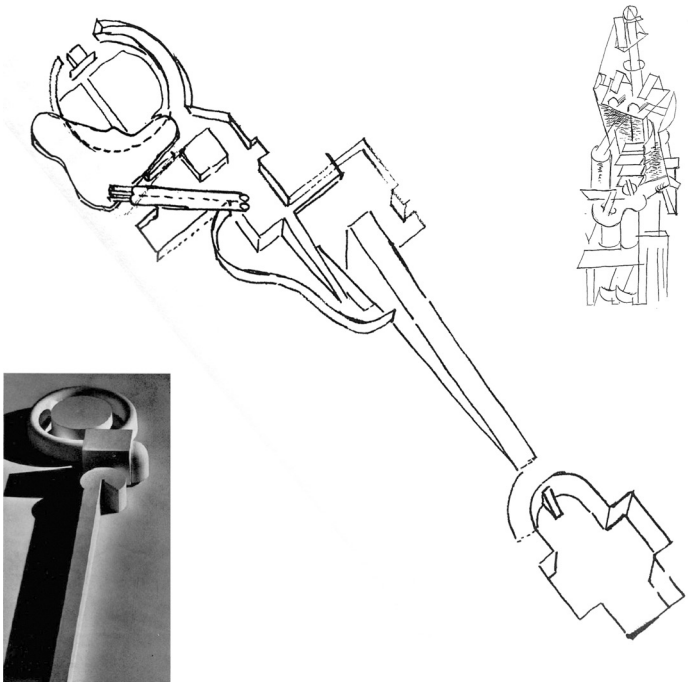

Fig. 9 James Stirling, Wallraf Richartz Museum in Cologne, 1974. Axonometric detail of circulation (Dal Co & Muihead, 1990, p. 101) compared to Picasso's sketch (Scalbert, 2009, p. 38) and Luigi Moretti's (1953, p. 10) solidified space model of a part of Villa Adriana at Tivoli.

also promote comparison with other artistic products. In this sense, Irénée Scalbert (2009) associated the axonometric sketch of the circulation of the Cologne museum (Figure 9) with a cubist work such as Picasso's *The Guitar Player*; Amanda Reeser Lawrence (2013) compared it with the solidified space models of Luigi Moretti (1953), whom Stirling considered the third most important architect of his generation, after Giuseppe Terragni and Gunnar Asplund (Crinson, 2010).

CONSIDERATIONS

Composing and representing architecture design through fragments implies a specific conception of space and time pivoting on the role of montage. Stirling's graphical practice testifies a specific interest in montage. In the 1950s, he had frequented Team 10 meetings and was a member of the Independent Group, which organized exhibitions with an innova-

tive approach to images. Besides being remembered as "the man who introduced 'zip-a-tone' to Britain" (Stirling, 1974b, p. 5), he had experimented the collage of photographic figures onto his drawings in the project form the Churchill College at Cambridge (1958) and photomontage in the residential expansion of St. Andrews University (1964), with also an axonometric view of the building montage of prefabricated components, or the Hotel in Meineke St., Berlin (1976). Such a familiarity with the practice of montage in the production of images, which is implicit already in his variegated use of transparent paper (Colonnese, 2021), intertwines with his interest in the picturesque tradition of experiencing space along a route Le Corbusier had formalised in the *promenade architecturale*. This reveals the importance of time in architecture in its several acceptations, which shapes all of his work as a system of negotiation between the artist's imagery and the world.

The first component is the time of the architectural experience. This is ruled by the *promenade architecturale*, the physical –and visual– trajectory that guides the visitors through the spaces in a certain sequence, not necessarily unique. Approached in the second stage of the design process, the circulation has the role of surprising visitors presenting unpredictable spatial events produced by its interstitial nature and hiddenness from the outside.

The second component is the time of history. This is expressed by a number of architectural models of the past, "forms and shapes which everyday public can associate with and be familiar with" (Stirling, 1975, p. 275). Never explicit, they are generally oriented to the sensory and phenomenological dimension of the architectural experience. Krier's neoclassical linear drawing, presumably echoed by success of the *ligne claire* in the Francophone comic art, helps to indirectly evoke an era in which architects aspired to accord and assemble the most of the formal heritage of the past, eventually through a grid.

The third component is the time of the project development. Stirling develops an original and heterogeneous com-

bination of images to stage the design process, or rather to illustrate the project as a factory or a machine that organizes the program into elementary forms.

The fourth component is the time of the reader that orient his or her individual reception of the project through the architectural drawings and models. Presenting the iconographic superstructure of building, they enounce the implicit distance between the appearance of the building and its experience. Of course, reading a perspective view takes a shorter time than interpreting an axonometric view of a piece of circulation or deriving the whole *promenade architecturale* from plans and sections. In this sense, while the orthogonal projections and the model present the measured form, three-dimensional drawings perform two complementary roles. On the one hand, perspective views add the human factor and a narrative that reveals functional and social dynamics, some of which are internal to the office itself; on the other, the axonometric views introduce a narrative inspired by the efficiency and rationality of a machine assembling fragments from different sources. Associated with the image of circulation devices, the public space where relational and physical activities are more stimulated, they also refer to a collective and social dimension of architecture that metaphorically requires a direct participation and virtual movement of the visitor which is parallel to the reader's 'active cooperation' in interpreting their graphic ambiguities.

As this modus operandi reached a maturity in the German museums, it seems plausible that Stirling consolidated this methodology through the work he had been carrying out on his own heritage of projects with Krier the years before. Somehow, such a process of rereading, interpreting, rewriting and redrawing lost fragments might have metaphorically triggered his interest in the history of architecture and the way memory and imagination can contribute to translate the architect's imagery into images, eventually experiencing the German museum designs as a catalyst. This surrealistic approach was to become particularly clear and aware in his

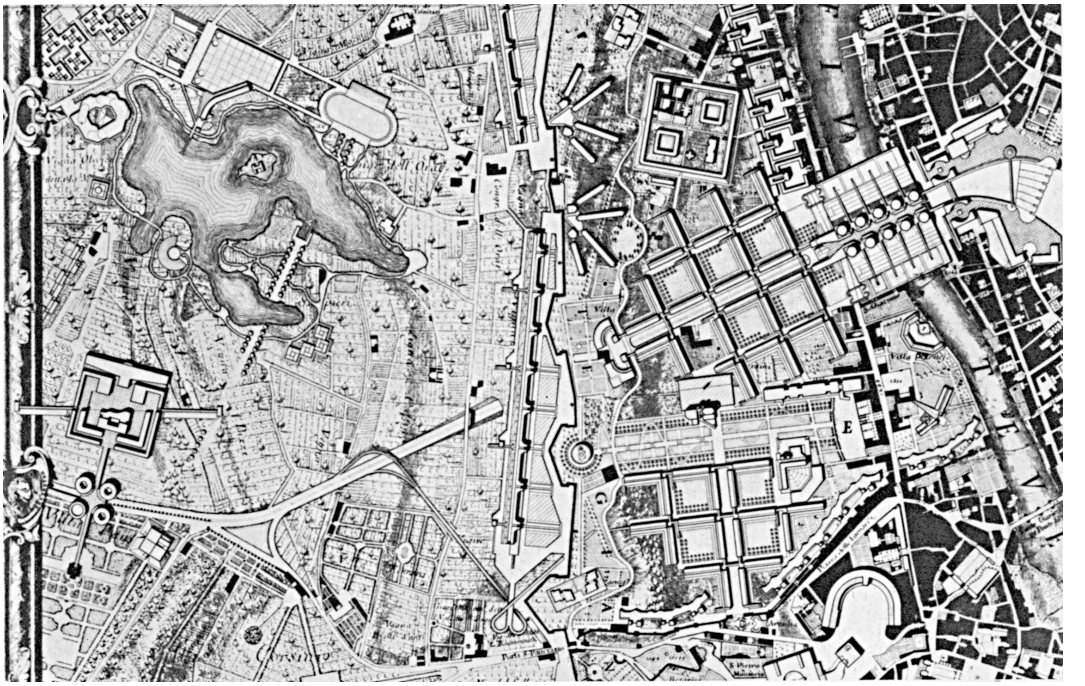

Fig. 10 James Stirling, *Roma Interrotta*, 1977. Ink on radex.

work for *Roma Interrotta* in 1977 (Figure 10), in which he filled the Trastevere portion of the Nolli's map with a selection of his own projects, both built and unbuilt, connected by new streets to work as an urban scale *promenade architecturale*.

EPILOGUE

In 1978, the competition already won and contracted, James Stirling is still representing the Stuttgart Staatsgalerie. To communicate the colour of the metal elements and the stone cladding, he produces six large 1:20 drawings on transparent paper. Coloured with pencils, these frontal axonometric views from below state a new stage of Stirling's curiosity for the architectural image. They look like autonomous works of art, freed from their presumed pragmatic goal. It is no coincidence that they have been included in the collection of the Museum of Modern Art of New York. They are elegant

and abstract views of architectural pieces that, despite the colour, are hard to understand in the three-dimensions. At the same time, the colour of surfaces and sky demonstrate that they are oriented to the senses of the readers, not only to their mind. In this sense, they indirectly reveal an evolution in Stirling's approach to architectural project –and his whole life– presumably triggered by the world-wide success of his museum design. This kind of drawings are going to partially replace the black-ink linear drawings, featuring the representation of other important museum buildings, like the Sackler Gallery at Harvard (1979-1984) or the Clore Gallery at London (1980-1986) as well as the competition entry for London National Gallery extension (1985), where the shadows make their appearance, almost prefiguring the bitter win of Robert Venturi and Denise Scott Brown's project.

NOTES

1 Stefen Lauf's early digital explorations of James Stirling's unbuilt projects can be found in www.quondam.com.

2 His presentation at the 1974 International Congress of Architects at Persepolis, Iran, during which he associated his designs with buildings of the past, is summarised in Stirling 1975.

3 Montreal Canadian Centre of Architecture, James Stirling and Michael Wilford fonds, professional papers, architectural projects, Wallraf-Richartz Museum Competition, Cologne, Germany, 1974-1976, AP140.S2.SS1.D44.

4 Such a narrative function of perspective views became part of Stirling's design communication, as testified by the view of the Chandler North Building of Columbia University collapsing to the ground to express the frustration for a lost commission (Maxwell & Muirhead, 1994).

5 The catalogue collects 27 axonometries, 14 perspectives, 14 orthogonal views, one photograph and one sheet of sketches (Stirling, 1974a).

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Article available at
DOI: 10.6092/issn.2724-2463/16110

How to cite
as article
Colonnese, F. (2023). The Köln Museum. Imagery and imaging in the architecture of James Stirling. *img journal*, *8*, 14-37.
as contribution in book
Colonnese, F. (2023). The Köln Museum. Imagery and imaging in the architecture of James Stirling. In A. Luigini (Ed.), *img journal 08/2023 Imaging and Imagery in Architecture* (pp. 14-37). Alghero, IT: Publica. ISBN 9788899586362

DRAWING ARCHITECTURE OF THE ITALIAN ECONOMIC MIRACLE
THE SKETCHES OF VICO MAGISTRETTI

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ESSAY 125/08

ITALIAN ECONOMIC MIRACLE
VICO MAGISTRETTI
ARCHITECTURE
DRAWING
DESIGNING

How was architecture drawn in Italy during the years of the economic boom?
The case of Vico Magistretti, a born in Milan architect and pupil of Ernesto Nathan Rogers, as well as a designer of international renown, could provide insight into the evolution of ways of representing architecture, especially during the conceptual stages of the project. The critical re-reading of a selection of six design sketches, dating from the period between the beginning of the 1950s and the end of the 1960s, outlines a cognitive and communicative path of architectural values. But drawing is also a moment of verification of architecture's perceptive, relational, and spatial datum, which Magistretti would decline throughout his long career convincingly and constantly in one way to achieve progressively different results.

INTRODUCTION

Drawing means transposing an evanescent, uncertain, or imperfect thought into graphic signs. The graphic act is by its very nature a moment of verification of our ideas, which precisely through drawing become a legible, interpretable, and evaluable form. But drawing, as a subjective exegesis par excellence, can also be a snapshot ascribable to a precise moment, of an existing reality, or of something only found in our imagination. It follows that several interrelated drawings may be able to iconically describe a period, or implicitly reconstruct a story. In this essay, through re-reading a limited selection of drawings by a protagonist of Italian architecture in the second half of the 20th century, we attempt to evoke a happy period for Italy, the economic miracle. By this expression, we mean the period between the early 1950s and the end of the 1960s characterised by considerable growth in the economy of a country reduced to rubble by five years of war and twenty years of fascist dictatorship. Parallel to this phase of economic expansion there was a marked technological-industrial progress and a general improvement in the social and cultural conditions of the Italian people. Probably completely unaware, the first to notice this wave of change were architects and urban planners, who knew how to interpret the favourable situation, designing skyscrapers, tower, architecture for mobility or housing complexes of all sizes (Mieli, 2021): all buildings that went down in history and that, with their charge of modernity, became the iconic symbols of the boom. Architects such as Figini and Pollini, Giuseppe Samonà, Mario Ridolfi, Giovanni Michelucci, Ludovico Quaroni or Franco Albini and Franca Helg were some of the protagonists of the economic miracle in architecture, while the most emblematic building of the period is probably the Pirelli tower, built in Milan to a design by Gio Ponti and Pier Luigi Nervi. Concerning the main city in northern Italy, the figure of Vico Magistretti: born in 1920 and a pupil of Ernesto Nathan Rogers, in the boom period he designed some of the most important buildings in

modern Milan, making a decisive contribution to the renewal of the overall image of Italy's second metropolis. Probably best known as an industrial designer, he boasts a truly significant architectural production that corresponds to an equally impressive quantity of graphic material now preserved in the foundation-museum named after him.

Vico's drawings express a precise way of thinking about things, albeit based on a holistic approach: the graphic translations in sketch form of his projects constitute "the putting into form of a concept" (Pavoni, 2021, pp. 18-20), i.e. a modus operandi through which the architect was already attempting to reveal –or explore– relationships between forms, the genesis of the conceived space and the expected perceptive results. This dissertation, rather than attesting to Vico Magistretti's graphic-manual skills, primarily intends to operate decoding of his way of seeing or imagining reality. To do this, we chose to analyse six architectural sketches drawn by the designer during the two decades of the 1950s and 1960s: these drawings concern five architectures for collective housing built in Milan and a villa built in Arenzano (Figure 7), a small coastal town in western Liguria.

THE 1950S

The decade between 1951 and 1960 represents the beginning of the rebirth of the nation: Lombardy and its capital city will play a propulsive role that will lead the entire country towards a season of prosperity; throughout Italy reconstruction is underway but there is no lack of ex-Novo constructions; in Milan, among the many new buildings erected there is certainly the residential tower in Via Revere designed by Vico Magistretti –in collaboration with Franco Longoni– starting in 1953. The building is significant both for its disruptive visual impact on Milan's skyline and for its immediate proximity to the city's most important green area, Parco Sempione. The building we see today is the result of a complex gestational

process, in which the design choices had to be mediated by the requests received from the city and the client (Irace & Pasca, 1999). In fact, in the two perspective sketches made on the same support (Figure 1), Magistretti draws a twenty-stories building with a floor plan that seems to refer more to a 'wide V' shape than to the 'L' with which it will be realized. The differences with the final version are many, starting with the two façades that define the concave part, initially imagined as a large system of loggias covering the entire vertical dimension of the front but enclosed within a pair of blind walls placed at the extremes that materialize two corners with more urban than architectural ambitions.

Both perspective sketches communicate precise design intentions: the forty-five-degree hatching executed in hard pencil for the back wall of the loggia system through the uniform lightness of the stroke indicates the choice of a transparent yet reflective material – glass; the partitions are represented with a fine felt-tip pen flanked by a softer pencil, in such a way as to simultaneously mark the edges and the *chiaroscuro* of the intrados of the corbels; these elements, in the second sketch on the right below, are instead treated indistinctly with a felt-tip pen, perhaps to emphasize the choice of a particular cladding material for the loggia system; the latter, compared to the other drawing, in fact appears more autonomous from a figurative point of view, referring more specifically to the concept of a frame; the two perspective drawings also explore the south-east front, which reiterates the theme of the loggia obtained as an overlapping of balconies; this time the continuity is interrupted by the presence of glass-enclosed volumes arranged according to a staggered criterion that always leaves the east end free, in which the overlapping of the projecting planes defines an immaterial vertical edge; this volumetric articulation is overhanging in the first drawing while it is coplanar to the façade in the second drawing. The representation of the base denotes certain design attention to the integration of greenery with architecture: the building appears to be

Fig. 1 Vico Magistretti, design sketches of Torre in Via Revere, 1953. Freehand drawing in pencil and felt-tip pen on paper. *Fondazione studio museo Vico Magistretti*, Milan <archivio.vicomagistretti.it>.

hoisted on a podium –which would later be the internal car park– drawn as an overlapping of horizontal lines drawn with felt-tip pens of various thicknesses interspersed with short flights of stairs; the ground floor appears to be represented with 'pilotis', through which Magistretti draws, using thick felt-tip pens, the vegetation placed on the back of the part of the lot destined to be a garden. Using a probably identical technique, the Magistretti creates, in both cases, a hint of background with a compact forty-five-degree hatching, with the probable intention of further emphasizing the architecture and in particular its top crowning system, the canopies with different material for the two solutions, to which the designer seems to want to assign a linguistic role that is not secondary to the overall perception of the building. Again playing on the contrasts between background and figure, in 1955 Vico Magistretti, during the design gestation of his multifunctional building in Corso Europa in Milan, draws a perspective sketch of the only publicly visible façade (Figure 2). The designer elaborates a perspective construction that protrudes from the sheet of paper and for which it is safe to as-

sume that an additional, larger support may have been used. The perspective construction lines, as well as the elevation draft, were drawn with a hard pencil; the subsequent drawing of the façade was done freehand with an Indian ink pen. Through the modulation of the latter, the overall image of the front is defined as a warp of several overlapping textures: the pillars, drawn as split starting from the second elevation, play the primary role of governing the overall composition, also through the use of a more marked stroke; to a later level seems to belong the modular partition between opaque and transparent walls; the latter is extended to the entire surface area available between beams and pillars in the first three elevations, while all the subsequent floors –except for the last– are based on the reiteration of a module composed of a transparent part and an opaque part acting as a parapet, the latter interspersed with a vertical-axis hole for the entire useful height. Vico Magistretti this time characterizes the transparent surfaces with a faint colouring done with blue pencils, a graphic expedient that could be the result of a twofold intention: firstly to determine a clear visual contrast with the opaque parts and secondly to connote the reflective character of the glass, which thus becomes the mirror of the clear sky over the city of Milan. In fact, Magistretti, using a deep blue felt-tip pen, draws a hint of the sky above the particular top crowning part represented by a canopy coloured in a compact black as well as inclined as an eave. This sky-blue background, which only insists in the above-mentioned area, not only gives greater prominence to the represented architecture but also underlines a fundamental characteristic of the building: that is, to participate in the construction of a metropolitan curtain defining the entire south-eastern street frontage of Corso Europa. The sketch contains some indications in block letters regarding the materials to be used for the façade, in particular the white granite cladding of the curtain walls, the types of glass for the window and door frames, and the lower canopy and copper for the upper eaves system.

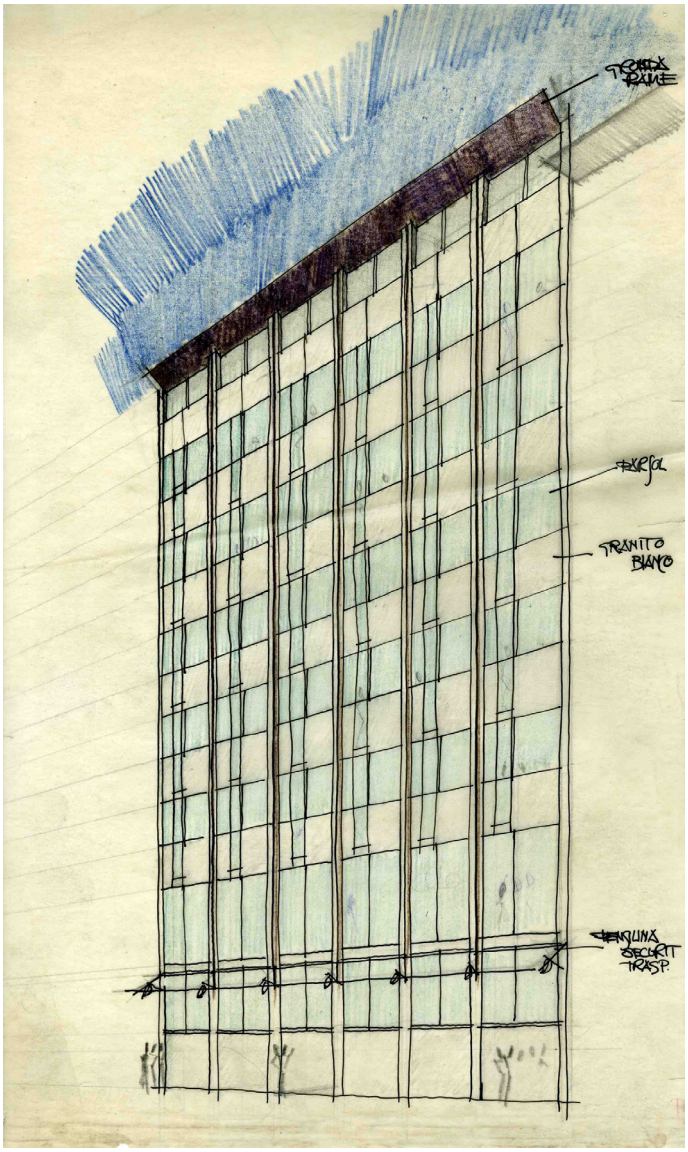

Fig. 2 Vico Magistretti, design sketches of polyfunctional buildings in Corso Europa, 1955. Freehand drawing in pencil, china ink pen, and felt-tip pen on paper. *Fondazione studio museo Vico Magistretti*, Milan <archivio.vicomagistretti.it>.

Magistretti does not neglect the relationship with the human dimension, drawing in pencil silhouettes at the ground floor openings. In contrast to the use of advanced technologies and materials is the project for the Arosio house of 1956, which also marks the differences between the two previous cases in terms of location: the agro-coastal landscape of the

village of Arenzano, a few kilometers west of Genoa, is, in fact, the place for this house conceived as a juxtaposition of compact stereometries. The project sketch we chose to analyze concerns the south front of the house (Figure 3), which Magistretti represented freehand using the orthogonal projection method. Using a technique that involves the combined use of Indian ink pens and pencils, the architect uses the former to sketch the building and its context, i.e. volumes, openings, their edges, and the orography of the terrain; graphite, on the other hand, is reserved mainly for the creation of chiaroscuro effects to distinguish between glass and opaque surfaces or to simulate an ideal sky, shaded and partly sampled at forty-five degrees, to emphasize the building. Again in pencil and with the same support, Magistretti elaborates further notes that are true graphic reflections on the project, starting with the drawing of the homologous but scaled-down elevation in the lower left-hand corner, which looks like a preparatory sketch; again in pencil, on the left-hand side of the house, a flight of steps reaching the roof plane is represented; there is also an attempt to explore the relationship between architecture and vegetation perceptible in the transparent drawings of hedges, creepers, shrubs, and small trees; the representation of a human silhouette, again in pencil, on the left-hand side of the elevation, testifies to the desire to place the person who uses the architecture at the centre of the architectural project. At the bottom right, the autograph inscription 'Fronte Sud' and the designer's stamp complete and identify the drawing. The complexity of the orography is declared by the two contrasting land profiles, one marked in red pencil and placed lower down –this could be a section line– and the other at a higher elevation, in which the house is positioned: the sloping site can thus be considered the fundamental practical reason for the complex volumetric articulation of this house. About the drawing of the sills, especially concerning the crowning part, which Magistretti had envisaged in slate, are distinguished by the execution of unusual hatching with narrow 'zig-zag' lines made with an Indian ink pen. In short, the drawing of the

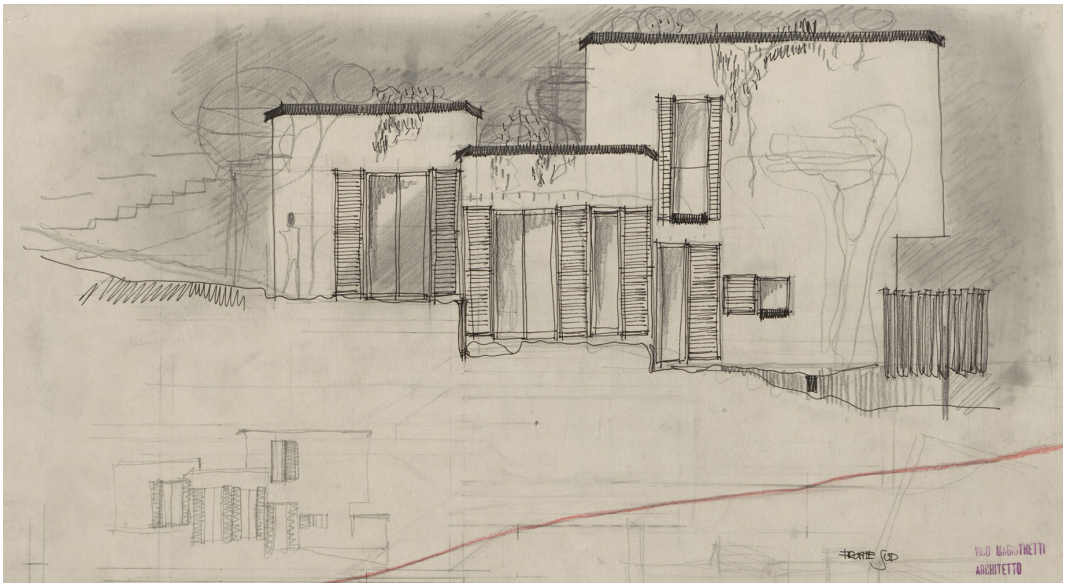

Fig. 3 Vico Magistretti, design sketch of the south elevation of Villa Arosio in Arenzano, 1956. Freehand drawing in pencil and china ink pen on paper. *Fondazione studio museo Vico Magistretti*, Milan <archivio.vicomagistretti.it>.

south front of the Arosio house as a whole communicates to the observer a certain attention of the designer towards certain specific themes that were to characterize Italian architecture in the 1960s, such as the relationship with the surrounding environment, respect for the traditions of the places and references to the architecture of the past (Irace & Pasca, 1999).

THE 1960S

During the 1960s, the economic miracle reached its peak: the misery of the war now seemed to be a memory and prosperity pervaded the homes of Italians. It was during this decade that Vico Magistretti became an important architect, also establishing himself in the field of product design, with revolutionary objects such as the *Eclisse* and *Dalù* lamps and the Selene chair. In architecture, there was no shortage of commissions for housing complexes that were to become symbolic of the areas of Milan where they were to be built. This is the case of the two buildings in Piazzale Aquileia in 1962, of which a design sketch of only the residential tower

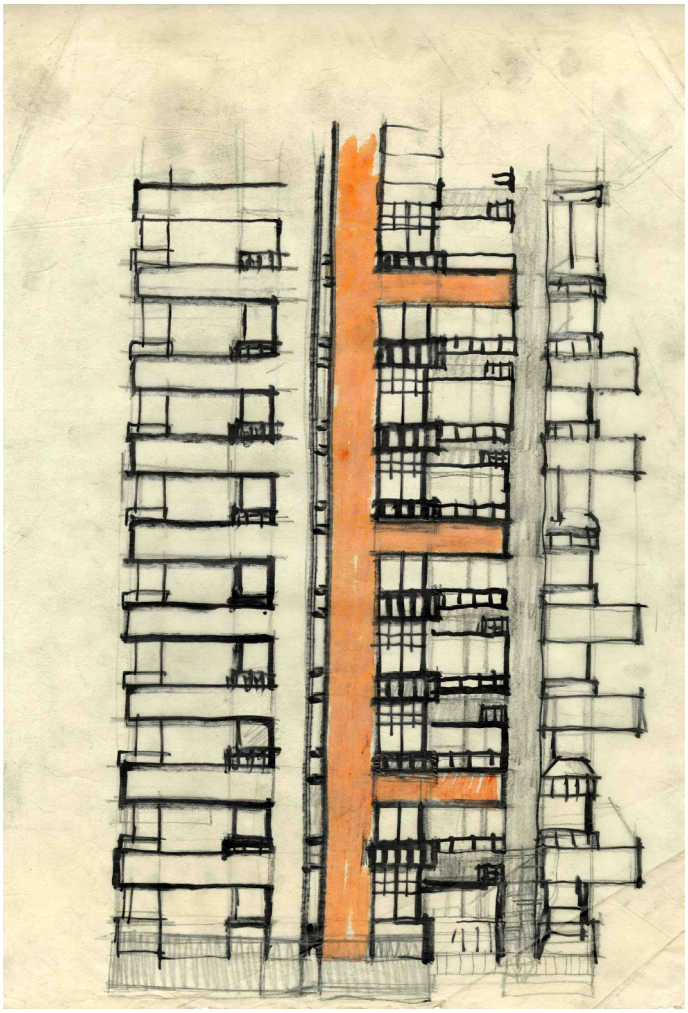

Fig. 4 Vico Magistretti, design sketch of the tower of the residential complex in Piazzale Aquileia, 1962. Freehand drawing in pencil and felt-tip pen on paper. *Fondazione studio museo Vico Magistretti*, Milan <archivio. vicomagistretti.it>.

(Figure 4), built in a position behind the square, within the large condominium garden, will be explored. This tower has an 'L'-shaped floor plan like the building in Via Revere, mentioned in the previous lines; the purity of primary stereometry is replaced here by a strong articulation of exteriors, which can already be seen in the plan, where the living quarters are organized in a 'fan-like' arrangement, in which the 'pivot' is represented by the barycentric spatial nucleus composed of the stairwell and its hallways. The design sketch, which probably concerns the north-west elevation towards Via Lipari

–later realized in a slightly different way– seems to denote a hierarchy of elements positioned at different depths, each of which has a linguistic function as a frame: in this sense, the primary role is played by the solid parts –which are then made of concrete– one of which is distinguished by a colouring created with a felt-tip pen and mixed between orange and

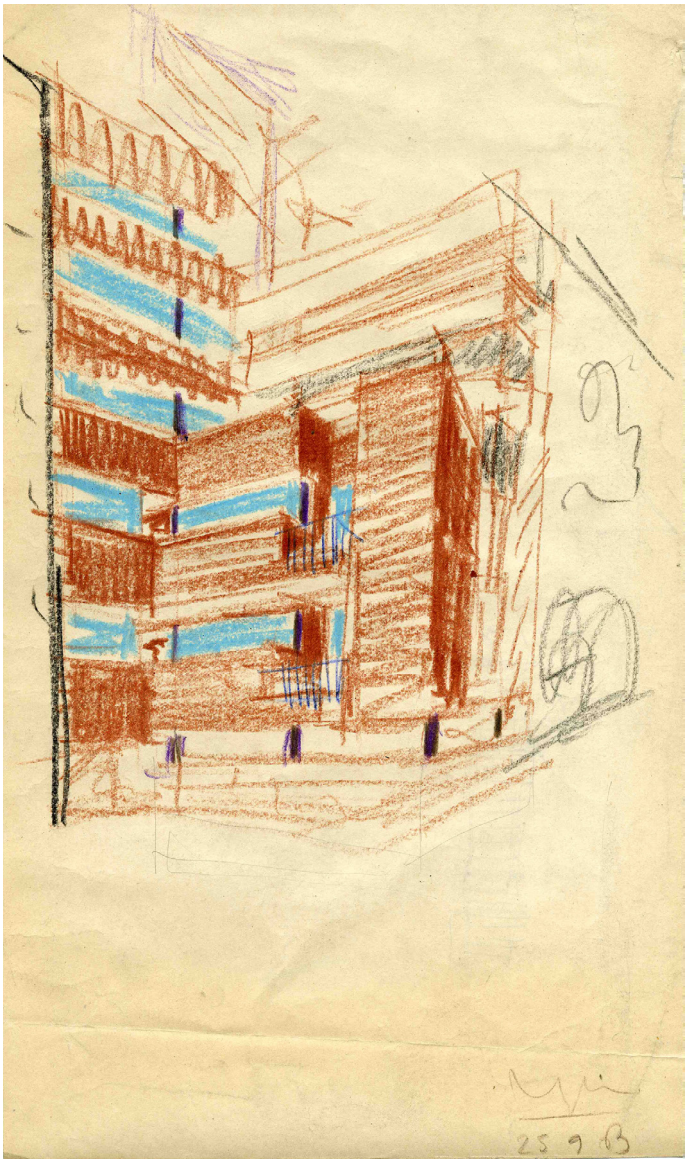

Fig. 5 Vico Magistretti, design sketch of the building in Via Conservatorio, 1965. Freehand drawing in pencil on paper. *Fondazione studio museo Vico Magistretti*, Milan <archivio.vicomagistretti.it>.

brown; using identical techniques, but in black, the outlines of the other architectural elements are represented, modulating the stroke depending on whether they are walls and parapets –thicker– or fixtures and railings – thinner. Like the other drawings shown, it seems that Magistretti had previously prepared a pencil sketch over which he only then traced the visible strokes and the corresponding fields with a black felt-tip pen. Some of these are made in pencil, perhaps to indicate precise design choices regarding the cladding materials to be adopted. Although the drawing, executed freehand, appears to have been done with the orthogonal projection method, on the right side, at some of the balconies there are hints of perspective construction, which would lend legitimacy to the hypothesis that the sketch, in Magistretti's initial intentions, might have been a central perspective, later disregarded. The considerable height of the building and the repetitiveness of the module lead the designer to represent the building without a crowning part, as if the architecture ideally had no altimetric end, extending into the infinite sky, thus reinforcing the concept of the tower.

In the project for the multifunctional building in Via Conservatorio in Milan, dating back to the mid-1960s, the themes no longer concern isolated architecture, devoid of adjacencies and developed in height, but the relationship with the consolidated historical city and how the contemporary can become an element of continuity in spaces of caesura while maintaining its recognisability. The sketch (Figure 5) examined is carried out with a single technique using coloured pastel pencils, while the method is an empirical perspective. The existing wings are depicted in black, while the planned building is drawn in a reddish colour –quite similar to the colour with which it will be realized– the stroke of which is skilfully modulated according to the orientation of the walls: those facing north present a horizontal and rarefied hatching, while the surfaces facing west have a more compact and vertically executed colouring. The use of intense blue for the windows and purple for the visible parts of the pillars is rather unusual.

The drawing as a whole emphasizes the building's role as a 'link' between two pre-existing but staggered historical urban curtains: the designer is careful to harmonize the connection both in the plan, with the 'corner' loggias, and in elevation, through the balconies and the 'stepped' overlooks that progressively recede as the height increases. Moreover, with his drawing Magistretti returns to graphically reiterate the concept of architectural edge that becomes urban, this time not materializing it with a pencil stroke but by placing two coloured surfaces with the same colour but different intensities side by side. At the end of the 1960s, when the themes of confrontation with the antique began to monopolize the Italian debate on architecture, Vico Magistretti was called upon to design a multifunctional complex in Piazza San Marco in Milan. In this case, the theme of the tower gives way to the marked horizontal character of a series of volumes with heights similar to those of the surrounding 19th century buildings – on average five stories above ground. The elevation drawing analyzed relates to the façade on Via Solferino: made with a mixed technique using Indian ink pens for the strokes and coloured felt-tip pens for the areas sampled, it is realized freehand by the orthogonal projections method.

Magistretti emphasizes several design issues through his sketch: the use of the dark red colour and the repeated

Fig. 6 Vico Magistretti, design sketch of the complex in Piazza San Marco (elevation in Via Solferino), 1962. Freehand drawing in Indian ink pen and felt-tip pen on paper. *Fondazione studio museo Vico Magistretti*, Milan <archivio. vicomagistretti.it>.

small openings can refer to the typical vernacular architecture clad in red brick of the Milanese hinterland; the drawing of the projecting sloping roof can also be read as a homage to the past; the references to history and context are, however, counterbalanced by the interruptions in the chromatic compactness of the facing made with 'gashes' that show the linguistic modernity of the structural frame, that is, the 'machine' of the building, made legible as it is marked –or unmarked, it would be better to say– with a white colour that strongly contrasts with the red of the walls; to communicate a relationship of continuity, the same load-bearing frame is visible in the pillars between the pairs of openings on the first floor and as pilotis on the ground floor; although the drawing is in orthogonal projection, there is an attempt to accentuate the plastic-*chiaroscuro* depth through the creation of shadows that reveal the presence of projections, recesses and setbacks; for example, on the ground floor several of the shadows drawn reveal the oblique position of some of the glazed areas with respect to the façade plane, while the greater extensions of the non-illuminated parts on the top two floors in the areas where the frame is visible suggest the presence of loggias; finally, the glazed surfaces are distinguished from the opaque ones by a slight pencil shading that simulates their translucency.

In general, the sketch, through a hierarchical superimposition of elements –frame, facings, transparencies– already

Fig. 7 Collage of images of five buildings by Vico Magistretti in Milan. From left to right: residential tower in Via Revere; multifunctional building in Corso Europa; residential tower in Piazzale Aquileia; building in Via Conservatorio; multifunctional building in Piazza San Marco, facades on Via Solferino and Via Ancona (Photos by the author).

noted in some of the previous cases, communicates Magistretti's attempt to contemplate tradition and innovation in the design of a fully contemporary architecture that is nevertheless tailored to the site.

CONCLUSIONS

The six sketches discussed here have been chosen because they outline a complete phenomenology of architectural design for Magistretti in relation to the *genius loci*: from the vertical building overlooking urban greenery to the fragment that completes a modern metropolitan curtain; from the exception of a restrained condominium tower among a horizontal multitude of residential architectures to the connecting building between staggered wings in the 'Novecento' style; continuing with the summer holiday home, conceived in compact volumes, in the agro-coastal landscape of Liguria, to end with the ex-novo construction of a block as a real new piece of city in a historically consolidated urban context.

The architecture of the economic miracle for Vico Magistretti is also participating in the definition of a new concept of public space, in which, like his furnishings and lamps, the buildings facing it belong not only to those who live in them but also to those who observe them: a new vision of the city that supplants the rigid dictates of the Littorio style and rationalism in favour of a scenographic construction implemented by compositions of different figures, taking into account the cultures of the places and the suggestions offered by the Italian landscape far from urbanised areas (Irace, 2021).

From the point of view of the History of Representation, each of the six sketches recounts the evolution of Vico Magistretti's approach to design in the first part of his career, the part coinciding with the Italian economic miracle: if the representations of the 1950s, those of the immediate post-war period of a country coming to terms with reconstruction, show a questioning of the pragmatic reasons for drawing

that rediscovers the dimension of a genuine instrument of control and verification of human and non-magniloquent architecture, the sketches of the 1960s instead denote a growing attention to the themes of the relationship with places and their history (Sacchi, 2003).

Just as Magistretti imagines architecture as a simple organism, possibly made up of technically complex elements, his sketches, if critically observed and placed in their historical context, can be considered expressive systems organized by overlapping semantic levels: in a single drawing, the use of several techniques –and sometimes even several methods– of representation denotes the designer-draftsman's desire to describe all the characteristics and peculiarities that he considered indispensable to the understanding of architecture, which until then had only been imagined.

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Article available at
DOI: 10.6092/issn.2724-2463/16139

How to cite
as article
Damiano, S. (2023). Drawing architecture of the Italian economic miracle: the sketches of Vico Magistretti. *img journal*, *8*, 38-55.
as contribution in book
Damiano, S. (2023). Drawing architecture of the Italian economic miracle: the sketches of Vico Magistretti. In A. Luigini (Ed.), *img journal 08/2023 Imaging and Imagery in Architecture* (pp. 38-55). Alghero, IT: Publica. ISBN 9788899586362

COM(IC)ONIC
ARCHITECTURE IN THE COMICS

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ESSAY 126/08

COMICS
ARCHITECTURE
DRAWING
SKYSCRAPER
NEW MEDIA

The city and architecture are often the protagonists of drawn narratives in which spatial connotation wants to be an element of contextualization and recognizability, but also of externalization of existential places. They appear in comics reshaped on real and fantastic lifestyles that combine narrative invention and architectural representation.
The research takes into consideration three large stylistic/expressive groupings of comics, to then carry out a parallel analysis of three large cities, coinciding with the same contexts of origin of the comics. To identify new scenarios in the field of architectural representation and visual communication.
In the narrative layout of comics, architecture assumes the role of iconic figure, whose meaning is expressed through the separation and cohesion of the sign and refers to a place understood as a defined space-time element.

INTRODUCTION

There is a close correspondence between architecture and comics, this relationship goes through the mediation of the sign, a privileged communication tool. Because of their visual rapidity, comics have always been considered an exceptional vehicle of communication, for complex themes and concepts, for social, political or simply fantastic messages, aimed at a large and diversified audience.

In his essay *Comics and sequential art* (1985), the creator of the graphic novel, Will Eisner, defines comic as 'sequential art' meaning it as the medium that uses the proper apposition of image and text in an ordered sequence. The comic thus becomes an expression of concepts, abstract and not, that through graphic representation make tangible the narrative dimension of the sequences and the introspective of the author.

The topic of architectural representation in comics is widely treated in various disciplinary fields, in particular it concerns the fields of semiotics and visual communication. The aim of this work is to identify future scenarios in the field of architectural representation and communication. In consideration of the evolution of new immersive media, through the analysis of the structure of comics, which the drawing phase has in common with architecture, how it is possible to propose new ways of representing architecture to make it, through visual codes more expressive and understandable than the comic strip more understandable to its users.

The city and architecture appear in comics reshaped on real or imaginary lifestyles, moving between narrative and representation of an invention. Since comics are a very common *medium*, they make the language of architecture more accessible and sometimes charge it with iconic meanings and dreamlike seductions. The detail of a famous architecture or an urban view is enough to make a city recognizable, whether they are fantastic, utopian or impossible stories, or tales about existing places.

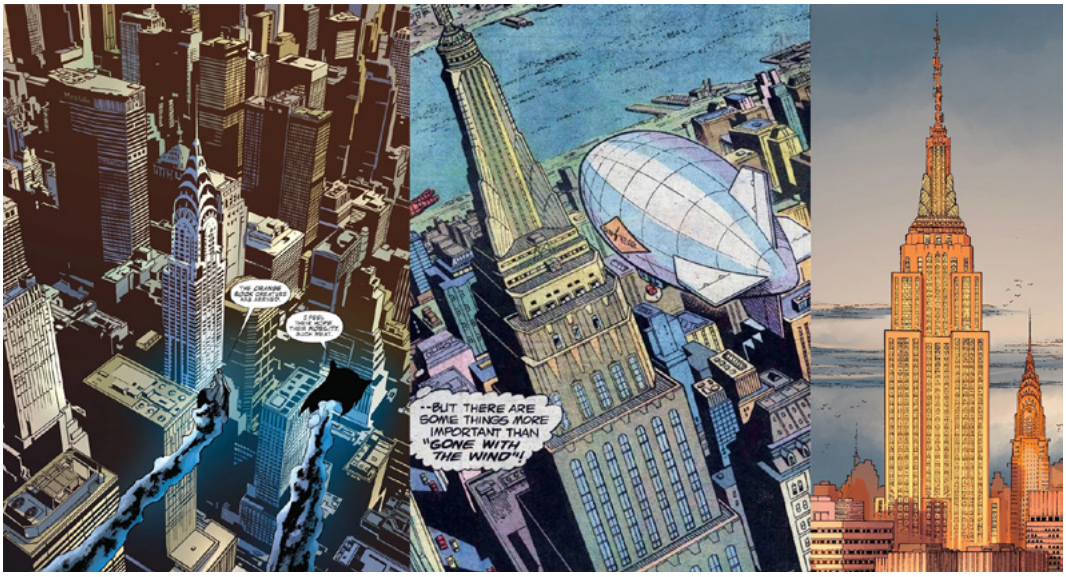

Fig. 1 Millar M. and Ahearne J. (writers), Hitch B. and Edwards N. (pencilers), Currie A. and Smith C. (inkers), Mounts P. and Sotomayor C. (colourists), Wooton R. (letterer), Chrysler Building, New York, 2009 (in: *Fantastic Four*, Vol. 1 #568); Conway G. (writer), Andru R. (penciler), Giordano D. (inker), Serpe J. (colourist), Saladino G. (letterer), Empire State Building, 1976, New York. (*Superman vs. The Amazing Spider-Man*, Vol. 1 #1); Williams R. (writer), Walker B. (penciler), Livesay J. (inker), Sotomayor C. (colourist), Caramagna J. (letterer), Empire State Building, 2012, New York. (*Avenging Spider-Man Annual*, Vol. 1 #1).

The city and architecture are often the protagonists of drawn narratives, in which the spatial connotation wants to be an element of contextualization and recognizability, but also of externalization of existential places.

The identity of a place passes, among other things, through the recognition of its figurative characteristics and architecture represents an important point among all. "The operation of symbolization does not require that the city be physically known: it is the point of view that determines the physiognomy of the object described" (Corti, 1987, p. 52) [1]. It is the collective memory that attributes a meaning to reality and defines its symbolic value.

Skyscrapers and the tallest buildings in cities represent a significant symbolic-figurative element in urban space. Their considerable size ratio between the base and height makes them easily identifiable and recognizable; from a distance, they become landmarks for cities; from interior, the view dominates large parts of the panorama.

In comics, they play an identifying role for real places and evocative fantastic locations that are nonetheless connected to the real world (Figure 1).

FROM CONCEPT TO THE ARCHITECTURE IN THE COMICS

The process of drawing is an act of translating the visual world that surrounds us, codified in shapes, lines, surfaces, colours, but also an expression of an inner world through which a new vision is created, whose roots lie in the imaginary.

For Vasari (Vasari, 1991) the drawing originates in the mind and then passes to the hand, it is the expression of an intellectual fact that clarifies an idea and then deliver it. In the drawing, as in art, the representation of a scene or object reflects the research for an abstraction of the essential characteristics and qualities of the objects, which unconsciously mimics the function of the visual brain. Artists such as Cezanne, Mondrian and Kandinskij, in their artistic research, they look for translation codes to identify the essential elements of the forms, using mechanisms similar to our visual brain.

Even in architectural representation, drawing is expressed through a codified language, that orders lines, surfaces, colours in conventional views such as plans, elevations, sections, axonometric views, perspectives to define otherwise invisible places that become architectural substance through drawing.

The recent evolution of architectural language towards a semantic form that is close to the language of communication has also shifted the research for the representation of architecture towards new forms of contamination with other media, such as music, design, virtual reality, cinema, comics and the visual arts in general, a link that the progress of digitalization is becoming more and more distinct. Among these media codes, architecture and comics have a strong attraction, not only because they share the language of the 'pencil' but also because both are interested in the city in all its representations, realistic or dreamlike.

BETWEEN DESIGN AND COMIC

Architects' interest in comics developed simultaneously with Pop-Art trends, beginning with the English group Archi-

gram which in the 1960s to express a radical image of architecture, they contaminate their utopian visions with graphic codes from science fiction comics.

Rem Koolhaas has also repeatedly drawn on the codes of comics, among others the magazine Content 1996, or Euralille project for the city of Lille in France, illustrated as a novel to make it more understandable to its users.

In 2005 Jean Nouvel set up the exhibition *Louisiana Manifesto* at the Louisiana Museum, Copenhagen, in which he chose to dematerialize his work, narrating it through printed paper and drawings on the wall. The exhibition catalogs are piled up like sheets of newspaper on the ground floor, and in the other rooms a sequence of drawings and comics along the entire length of the walls tell the author's manifesto.

Afterwards, with mainly communicative values, archicomics are developed; real comic books useful to show future users of the project how the transformation of places, uses and habits will happen.

These include the work of the architects Jaques Herzog and Pierre de Meuron, who publish the *Metrobasel* (De Meuron & Herzog, 2009) mixing the visual codes of comic strips with montages on maps and photographs, or those of the Danish group *BIG*, which uses the image of its founder, Bjarke Ingels, in the book *Yes is more* (Ingels, 2009), to represent the birth and development of their pragmatic-utopian projects, through renderings, photos, infographics, schemes and balloons, thus mixing the codes of the comic with those of the rapresentation of architecture (Figure 2).

Other architects have tried to renew the conventional language of architectural representation, through contamination with styles, colours, point of view, and the same presence of characters from comics, to encourage greater interaction with the user. also through the use of a semantic code typically of comics, such as the closure, i.e the interactive mechanism activated in the reader's mind to reorganise the missing elements between one strip and another, according to a space-time reconstruction proposed by the author but

Fig. 2 Avril F., de Loustal J., Juillart A., Gotting J-C., *La Maison de Verre*, 2007-2008; Ingels B., *Yes is more*, 2009, pp. 26-27; de Meuron, P., Herzog, J., *Metrobasel*, 2009, cover.

implemented by the reader: "space is to a comic what time is to a movie" (McCloud, 2006, p. 15), which brings the representation of architecture closer to the realm of storytelling.

These include the experiments carried out in 1995 by Joost Swarte, Danish illustrator and comic artist, for the integrated design of the *Toneelshuur Theater* building in Harlem, near Amsterdam, together with the architect Henk Döll of the Dutch group Mecanoo, or those of Rem Koolhass, who uses the codes of comics in some of his projects, such as the Euralille, or the Chinese CCTV Tower, with the aim of making it easier for the citizens who will use it, the understanding of the city on the net, still very conceptual and abstract.

The interest of architects in comics is contrasted with the presence of architecture in comics, which has been an essential element since its birth. It assumes different functions and roles both at the compositional level, and according to the type of stories. It is interesting to observe how, in these contexts, the representation of architecture assumes 'narrative' contents, thanks to the presence of two elements usually excluded from the conventional figuration of architecture: man and time.

Many authors have been fascinated by architecture and often, in their works, the settings, from a simple background to the stories, become the undisputed protagonists.

Just to name a few, the Japanese Katsuhiro Ōtomo, creator of Akira and Domu; the American David Mazzucchelli, author of the graphic novel *Asterios Polyp* and of the transposition into graphic novel of *Glass City*, taken from the New York trilogy by Paul Auster; the Belgian Francois Schuiten, together with Benoit Peeters is the author of the series of *Les Cites Obscures*; Jean Giraud Moebius, starting from the Incal and Meta-baron sagas, is able to influencing much of the imagination of science fiction cinema; Jimenez Ai, creator of Citizens of no place. An architectural graphic novel; the Dutch Johan Swarte, author of *Is that all there is?*; Milo Manara, author of *Escape from Piranesi*, inspired by Giovanni Battista Piranesi architectural atmospheres.

To give some examples of comic works in which architecture becomes iconic within the narrative, between 2007 and 2008 the French illustrators François Avril, Jacques de Loustal, Andre Juillard and Jean-Claude Götting published *La Maison de Verre*, a collection of serigraphs with which they illustrate the building built between 1928 and 1931 designed by Pierre Chareau.

All the rooms are animated by the presence of characters, placed in the middle of the frame, but distant from the interest of the designer and from the eye of the observer. In the narrative scheme of comics, architecture assumes the role of an iconic figure that refers to a place understood as a defined space-time element. It is the 'cultural-mental' imagination, not direct knowledge, that determines the role of the figure. The framing plane, the result of the narrative invention of the comic strip, transcribes the figure, and therefore the architecture, in scenic settings in which the reproduction of real space becomes a representative and interpretative model, not only functional, but also emotional and cultural (Figure 3).

The importance of some well known buildings in comics and the construction of stories that take place outside or inside them reveal a remarkable process of unveiling the potential of those spaces over time. The building returns several times in the same story, in different shots, in some fragments

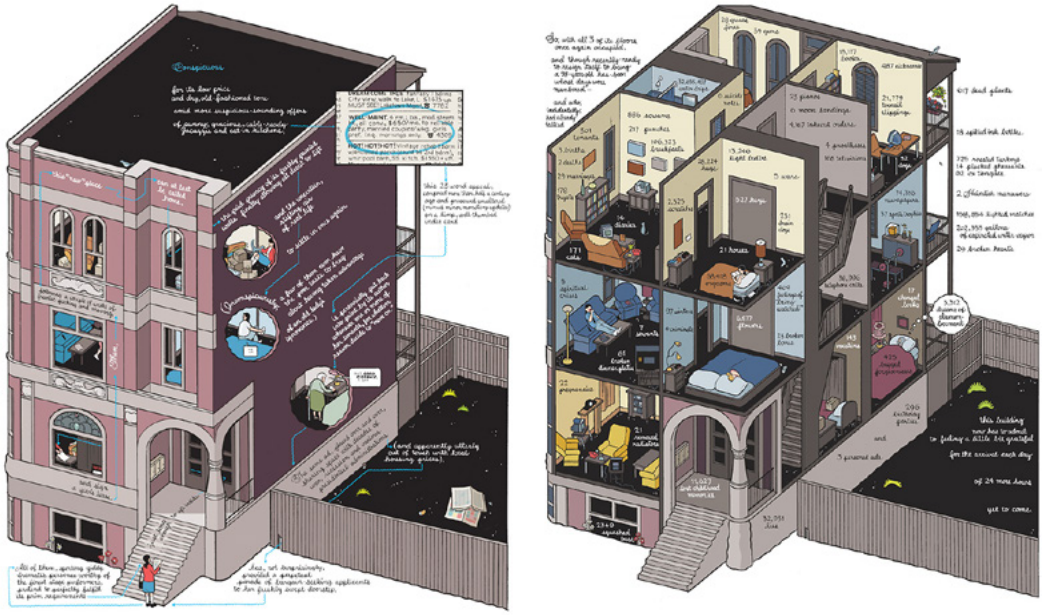

Fig. 3 Ware C., *Building Stories*, 2012.

is shown each time from new point of view, in different moments and scenarios. The comic thus becomes an expedient to put the buildings into action and to get out of the immobility of the single image. The strip give back to architecture the possibility of expressing itself in hyper-reality, enhanced by the possibility of overwriting the images with more times and more spaces.

Building Stories, by Chris Ware published in 2012 is a cardboard box which, once opened, takes the reader into the complex story of an apartment building. Books, booklets, posters, billboards and newspapers make up the fourteen different devices that the author chooses to intertwine the stories of the protagonists, leaving each element autonomous and at the same time complementary to the others.

The complexity of the reading kit is reflected in the pages of the story fragments themselves. The building is almost represented from the same point of view, an axonometry outlining its prospectus, sometimes without walls, exposing the internal life, wanting to imitate an axonometric cross-section.

In Ware multiple stories are stratified, set in different times and spaces and portrayed with different ways: scenes glimpsed from the windows are added to the image of the building seen from the outside; they spy on the interiors through holes in the walls and, again, to all this is added the story of short text extracts that seem to reproduce, in their path, the typical design of water pipes.

ICONIC ARCHITECTURES IN DRAWN NARRATIVES

It was considered useful to identify three major stylistic/expressive groups of comics, and then carry out a parallel analysis of three metropolis, coinciding with the same contexts of origin of the comics, and in particular to identify the most iconic elements of the skylines of these cities, the skyscrapers.

American comics represent one of the highest expressions of this graphic art; born at the end of the 19th century, it recognizes Yellow Kid by Richard Outcalt (1894) as the first example of modern American comics.

In the years following the World War I, superheroes are the undisputed protagonists of the main comic publishers such as *Marvel Comics* and *DC Comics*. The city of New York, since the 1960s, has become the favorite place for the heroes of the *House of Ideas*, including Spiderman, the Fantastic Four and Captain America. *DC Comics*, on the other hand, even if the settings in not in the real cities, they refer to the urban configuration of the emerging American metropolises: Gotham City for Batman, Metropolis for Superman and Central City for Flash.

The new skyscrapers of Manhattan become the preferred location of the drawn scene. Each hero has a direct relationship to the skyscraper which becomes a means to a purpose, a place of interest, a home that transcends his classic global vision. The vision of the skyscraper is expressed in the pages of American comics through the use of scenarios contextualized with the rest of the city, where everything is bigger and every-

Fig. 4 Bendis B. M. (writer), Bagley M. (penciler), Hanna S. (inker), Ponsor J. (colourist), Petit C. (letterer), Empire State Building, 2015, New York. (*Ultimate End*, Vol. 1 #5); Smith K. (writer), Quesada J. (penciler), Palmiotti J. (inker), Studios A. (colourist), Agraphiotis L. (letterer), Chrysler Building, New York, 1998 (in: *Daredevil*, Vol. 2 #2); Slott D. (writer), Caselli S. (penciler and inker), Martin Jr. F. (colourist), Caramagna J. (letterer), Empire State Building, 2011, New York. (*Amazing Spider-Man*, Vol. 1 #673).

thing is virtually possible; almost a migration of the American dream on paper-and-ink, revealing a desire for redemption on the part of the protagonist of the work and the reader himself.

The Chrysler Building (1929-1930), designed by William Van Alen in the Art Deco style and the Empire State Building (1930-1931) which, at 443.2 meters, stands out over the New York skyline, are the undisputed protagonists of the narrative concept (Figure 4). The extraordinary heights see them as the scenes of fantastic aerial battles above real city.

In *The Boys* (2006-2012) by Garth Ennis and Darick Robertson, a group of anti-heroes paid by CIA are tasked to combat the world's worst threat: Superheroes. The operational base of the investigation is Buckminster Fuller's Flatiron Building (1902), whose neo-Renaissance features are represented in the smallest details to indicate exact location in which the story takes place.

In Japanese comics, the *manga*, the city and the architecture are often the protagonists of graphic stories. The ability of the Japanese people to globally understand a narrative based on drawn, probably inherited from the ideogram writing system, leads the *mangaka* (manga authors) to structure the scene through a dynamic method of narration with balloons, onomatopoeia and drawings that come out of their frame.

Fig. 5 From left to right: CLAMP (writers and pencilers), Tokyo Tower, 1993, Tokyo. (*Magic Knight Rayearth*, Vol. 1, page 10); Kagami T. (writer), Yamamoto Y. (penciler), Tokyo Tower, 2022, Tokyo. (*Seraph of the End: Vampire Reign*, Vol. 29, p. 1); Ray Y. (writer and penciler), Tokyo Tower, 2018, Tokyo. (*Tamamo-chan's a Fox!*, Vol. 1, p. 76).

In *The Quest for the Missing Girl* (1999), the Japanese capital's most famous neighborhoods, Akihabara, Shinjuku, and Shibuya, are depicted chaotically and without a soul where perspectives place the reader in state of crushing compared to buildings. The alleys and skyscrapers of Tokyo, the crowded Shibuya Station, the Shopping Centre Shibuya109, designed by architect Takeyama Minoru in the 1970s are representated in perspectives from below to accentuate the protagonist's sense of sorrow

The saga of Araki Hirohiko *Jojo's Bizarre Adventure* (since 1987) tells the stories of the Joestar family over a period of more than a hundred years, reconstructing different places and settings. In the third part (the saga currently consists of eight part) titled *Stardust Crusaders*, the Tokyo Tower is shown in the opening scene as an unmistakable sign of the spatial location of the narrative. Designed by Naitō Tachū at the beginning of the second half of the 20th century, the building, is represented with a perspective from below that emphasises its upward sweep and affirms its role as the city's main symbol.

The Tokyo Tower (Figure 5) is chosen by CLAMP as the real-life setting in Magic Knight Rayearth (1993-1995). The three Japanese students are on a trip to Tokyo and, near the Tower, are catapulted into the mysterious world of Cephiro. The

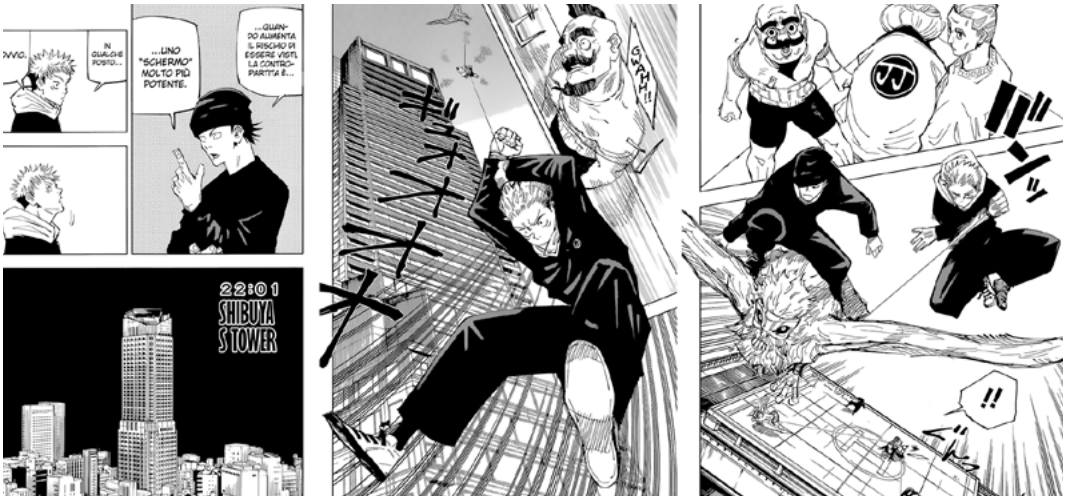

Fig. 6 From left to right: Akutami G. (writer and penciler), Shibuya Scramble Square, 2020, Tokyo. (*Jujutsu Kaisen*, Vol. 11, p. 113); Akutami G. (writer and penciler), East side of the Shibuya Scramble Square, 2020, Tokyo. (*Jujutsu Kaisen*, Vol. 11, page 120); Akutami G. (writer and penciler), top view of the Shibuya Scramble Square, 2020, Tokyo. (*Jujutsu Kaisen*, Vol. 11, p. 116).

futuristic architecture becomes a turning point between a real present and a fantastic future. The building is illustrated with perspective from below or in the distance wich merge with the flashing of the sun.

In Akutami Gege's latest work *Jujutsu Kaisen* (since 2018) by the story revolves around the protagonist Yuji Itadori, who accidentally swallow a cursed artifact and becomes possessed by the curse inside of it.

In one of the narratives, titled The *Shibuya Incident*, the well-known Tokyo district becomes the scene of clashes and action, where the representation of the Shibuya Scramble Square, whose east tower was completed in 2019, make possible a greater immersion and a sense of realism for the reader (Figure 6).

Starting with an initial view into the distance, in which the building stands out from all the others, the flight is then shifted to its top; the bird's eye perspective allows a view of Shibuya district and the top of the skyscraper, revealing a part that would not normally be seen.

In Italy, in the page of *Commissario Spada*, Milan is presented as a noir city, with streets, buildings and views that introduce the reader to a gloomy atmosphere, a mirror of a troubled time. The character was born on the pages of *Il Giornalino*

in 1970 by Gianluigi Gonano and the artist Gianni De Luca, a revolutionary author due to the continuous graphic research for innovative solutions for the composition of the page, such as the sequence of narrative movements on a single board.

The Torre Velasca appears in *Il commissario Spada. Il mondo di Sgrinfia*, from the 1975, with a rarefied vision in the fog, that reduces an image anchored to daily life, to a melanchonic sense of solitude.

Paolo Bacilieri's comics, including *Tramezzino* (2018), *Fun* (2014), and *More Fun* (2016), are also set in Milan, where the city itself becomes the protagonist through its architecture. In *Tramezzino* and *More Fun*, the metropolis is represented by the well-known architectures designed by famous architects of the early 20th century: the residential building in Via Ippolito Nievo by Luigi Caccia Dominioni, built between 1955 and 1957; the Torre al Parco by Vico Magistretti and Franco Longoni built in 1953; the Torre Velasca built between 1955 and 1957 designed by the BBPR team; the Pirelli Skyscraper by Gio Ponti and Pier Luigi Nervi from 1965. These urban icons are characterized by the defined sign of the architectural technical drawings, like those included in the project board.

Even though the story of *Fun* and the following *More Fun*, focuses exclusively on the creation a dissemination of the crossword puzzle and freely inspired by Stefano Bartezzaghi's work *L'orizzonte verticale*, it is already clear from the title how the architectures of Milan or those of New York are equivalent with the narrative concept as they cause its events.

BETWEEN ARCHITECTURE AND COMICS

The meeting point between comics and architecture lies mainly in the drawing, i.e. in the form of representation of events.

The drawings for a *Città Futurista* (1914) by Antonio Sant'Elia (1888-1916), the *Plan Voisin* (1922-1925) or the *Ville Contemporaine* (1922) by Le Corbusier (1887-1965) can be considered experiences in which architectural representation

seems to escape from a formal technical-descriptive dimension to open up towards a narrative component (Figure 7).

The use of clear and fast lines, with few verbal notes, translate the creative process into an immediate, non-technical and easily understandable communication tool. The act of drawing arises as a translation of the visual world, codified in shapes, lines, surfaces and colors, but also as an expression of an inner world that generates a new vision whose origins are rooted in the imagination.

Between 1960 and the mid-1970s, *Archigram*, *Superstudio* and *Archizoom*, among others, started a process of reviewing design practice. Starting from the graphic experiments of the archi-comics, to show the future users the transformation of places and new ways of living.

Archigram publish the *Amazing Archigram* series and Archizooms, to present the AEO chair by Cassina (1973), make a comic in which the protagonisti s the chair itself.

The perspective views and the axonometries, in the construction of the pages of a comic relate the architecture to the design phase. Comic drawing becomes precise, almost technical, when it has to build settings of real architecture and cities, but also when dealing with imaginary worlds.

Comics as a ways of communicating architecture has the ability to simulate real spatial experiences. The codes of representation of architecture appear to be too restrictive for a social dissemination.

The well know letter to Madame Meyer by Le Corbusier (1925), is a comic page, with strips arranged in two columns and five lines. Each cartoon has a short written commentary in the form of a caption or ballon (Figure 8).

The layout is a further aspect that unites the communication of architecture and that of comics. The board of architectural project present boxes within plants, elevations, sections, views and geometric schemes are arranged with metric scales, captions and legends; in the comic the strip delimits the cartoons but not the content as what happens outside has the same intensity as what happens inside.

Fig. 7 Sant'Elia A., *Casamenti con ascensori*, 1914; Sant'Elia A., *Studio per una centrale elettrica*, 1914; Sant'Elia A., *Progetto per stazione a Milano*, 1914.

DRAWN VISIONS

The comics use signs and symbols as the preferred means of communication: graphic signs are combined with verbal signs to create an original figurative language. Sign recognition becomes the basic means of communication: the reader accepts the visual message and attributes meaning to the sign through a mnemonic and cultural process.

For Groensteen, a scholar of contemporary comics, the comic is a linguistic form based on the relationship of a multiplicity of images whose meaning is expressed through the separation and cohesion of the sign units (Groesnsteen, 2012).

Without going into the structural semiotics of Greimas (1974) or Eco (2002), the recognition of the images produced by the sign and the meaning that they convey becomes the main condition of narrative communication.

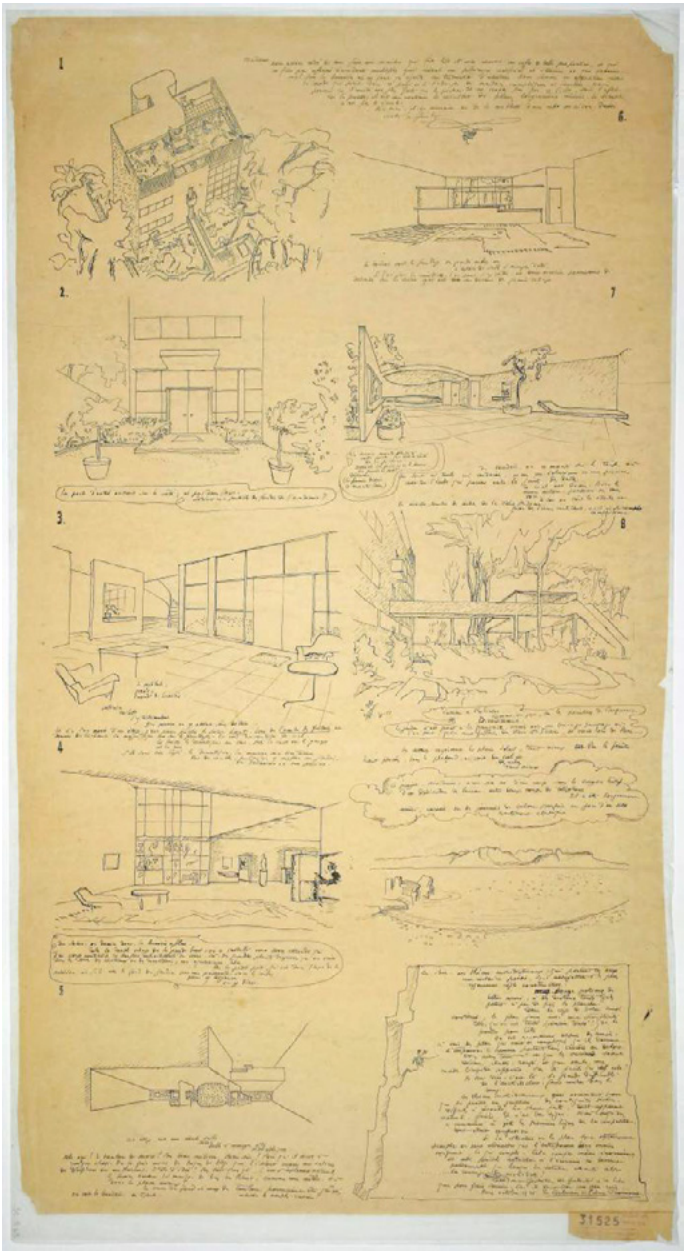

Fig. 8 Le Corbusier, *Letter to Madame Meyer*, 1925.

Moreover:

> cultural interfaces in ther turn inherit the principles of text organization [...]. One of this principles is a page, a rectanguolar surface containing a limited amount of information, designed to be accessed in some order, and having a particular relationship to other pages (Manovich, 2001, p. 74)

The bond that holds together the signs of the represented object and the verbal expressions, or rather the interaction between verbal codes and visual codes in comics, is linked to the linear or translinear sequence of the strip.

In the narrative layout of comics, architecture takes on the role of an iconic figure that refers to a place understood as a defined space-time element.

> One wonders what affects the imagination collective so as to transform the real space of a city in place of the mind [...] A symbolizing operation it does not necessarily require the city to be physically known (Corti, 1987, p. 52)

It is the cultural-mindly imaginary, not direct knowledge, that determines the role of the figure.

The framing plane, outcome of the narrative invention of the comic, transcribes the figure and thus, the architecture, to the scenic settings in which the reproduction of the real space becomes a representative and interpretative model, not only functional, but also and especially emotional and cultural.

Scott McCloud identifies the basic steps for properly drawing a comic in six famous panels (McCloud, 2006, p. 10): the narrative 'choice of moment'; the 'choice of frame' in which he suggests "choose the right distance and angle to view those moment [...] and where to trim them"; the 'choice of image' which must necessarily fit in the frame; the 'choice of word' that must be connected to the representation; the 'choice of flow' of reading in the sequence of panel; the last frame schematically summarizes the five moments and warns of the effectiveness of method from which deviating would lead to a 'confusing mess'.

Expressive communication takes place through a rigid grid in which the combinations of text and figure determine the spatial field of the scene, whether it is declined in single frame,

in a series, or in a more extensive combination. The frames are concatenated into a sequence of images that has at least two orders of reading: the linear sequence between images and the one in which actions take place in non-sequential areas of the page that are simultaneously made accessible to the gaze (Floch, 1977, p. 190) and in which acts of interaction take place between the narrative and the graphic medium.

The creative model, to quote Ernest Gombrich (2008) does not spring directly from one's own imagination, rather it refers to models from 'countless centers of culture', from which creativity and originality spring (Barthes, 1984).

In the reader's imaginary, the recognition of the architecture refers to a real place, that is tranformed into the creation of a new one, while the temporal place is perceived through the stylistic features of the author.

The Chrysler Building in New York plays a role in the fantastic narratives of the superheroes not only as a scenic backdrop to the urban setting, as in the case of *Daredevil* or in the more abstract axonometric form of the Manhattan of the Fantastic Four, but lends itself to fantastic manipulations becoming protagonist of the scene. Like Rem Khoolhaas's *Delirious New York*, whose first edition dates back to 1978, the city of skyscrapers even if manipulated and altered, manages to express the culture of overload and the technology of the fantastic. The physical deformation of the character also underlines the communicative/emotional value of the narrative.

More related to the technical representation of architecture are the draw of the Empire State Building in *Amazing Spider-Man* and *Avenging Spider-man* whose elevation shows the exact dimensions and architectural details of the famous skyscraper. Even when the perspective is heavily distorted like in *Gold a Treasure Hunt Through Time*, the skyscraper remains a meticulous and defined graphic detail.

An important aspect assumes the meaning of the architecture within the narrative. Akutami's Shibuya Scramble Square, for example, has an evocative meaning, changing from a real place to the scene of an imaginary battle.

On the other hand, the Tokyo Tower by Yuuki Ray or by the team CLAMP acquires an identifying meaning, also through the indication of its colours. The use of perspective, where depth gives a more realistic configuration of the urban environment, allows for a realistic and immersive mimesis of the reader. Views from such a distance that they can be viewed in their entirety lead to a memory process in which the figure becomes the visual reference of a partuicular context.

The two-dimensional representation shifts the level of narration towards a symbolic interpretation, in particular of architecture. The Torre Velasca in Bacilieri's Milan becomes the chest in which events take place. Always portrayed within a defined frame, it is represented on the projection plane parallel to the facades, even when these are representated foreshortened or in urban perspectives with a raised point of view. The graphic style recalls that of the architects of Italian rationalism and each scene seems to originate from the BBPR project board.

The architecture is presented in figuration, in which the type of representation and the technique used become functional to the narrative communication, even the characters are flattened on the representation plane and respect the rules of visual composition between figure and background, foreground and background, horizon line, etc.

The understanding process is ensured by the sequential drawing which visually concretizes the narrative, through the succession of shots, in which the architecture is recognizable through the conventional codes of representation.

Architecture represents the part of the lived world, of inhabited places, of everyday life. It becomes the element of the research for an identity that requires a recognizable connection with the memory of the real world especially when the narrative becomes dreamlike.

The graphic forms, not only the line and the technique, the underlying grids and the verbal forms constitute the composition of the narrative message of the frames. Generally the scene is presented as a descriptive system, whether the representation refers to a real or invented place, in any

case, being a representation it does not coincide with reality but re-proposes itself in the reader's imaginary as a possibility of reality (Dotto, 2020, p. 156).

Comic scenes, the result from connection between text and image, visual and linguistic codes, are formed on several levels of communication: the citation of elements which leads to a mnemonic connection with other events (physical, literary, etc.) outside the history; graphic information, which belongs to different categories (balloons, drawings or onomatopoeic expressions) and which must be decoded by the reader; the type of representation that stimulates concentration on some elements placed according to a careful hierarchy and which refer to the communicative paradigms of visual perception; the contextualization of the story; the repetition of the scene in which the change of some details leads to an increase in the expressiveness (Figure 9).

POV: POINTS OF VIEW AND COMPOSITIVE PROCESSES

The study and analysis of some comic has allowed to implement a synoptic and comparative vision of the architecture figuration.

The criteria for choosing the example was that of the exclusion of similar elements, of the type of color spot representation and buildings that no longer exist.

The comic page is intended as an architectural representation sheet. The building and the city, extracted from the narrative context, were analyzed using methods and tools of architectural representation (Figure 10).

The first analysis concerns the architectural figure and how this is represented in the graphic context. It has widely emerged that the design of the strip evokes situations that can be found in real life, to allow for greater identification of the reader within the narrative plot. The perspective view, with more or less balanced points of view, seems to be the type of representation most used by comic artists. It is precisely the

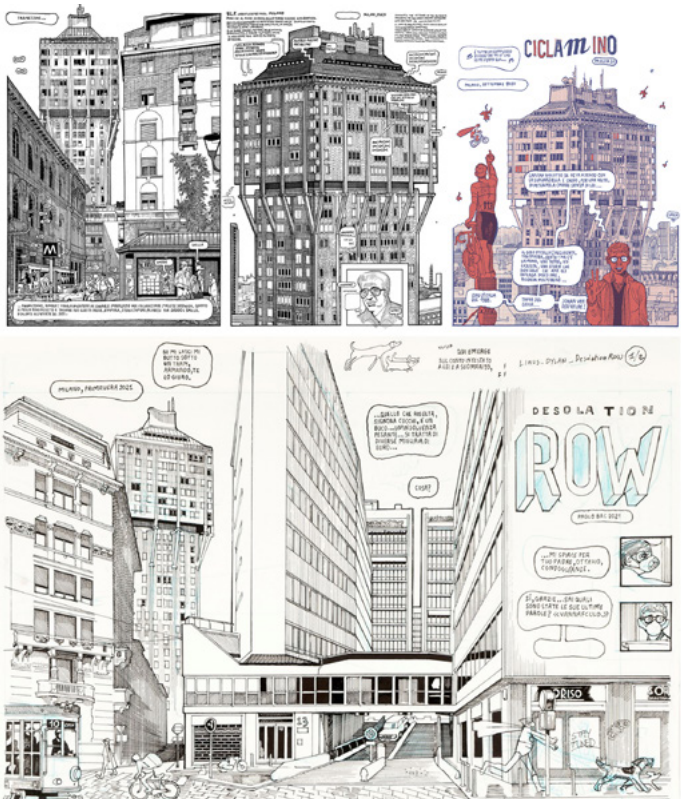

Fig. 9 From left to right: Bacilieri P. (writer and penciler), Velasca Tower, 2018, Milan. (*Tramezzino*, p. 1); Bacilieri P. (writer and penciler), Velasca Tower, 2007, Milan. (*La Magnifica Desolazione*); Bacilieri P. (writer and penciler), Velasca Tower, 2020, Milan. (*Ciclamino*, short story inside the December issue of *Linus Extra - Speciale Giro d'Italia 2020*); Bacilieri P., (writer and penciler), *Desolation Row*, 2021.

Fig. 10 Bacilieri P., *Tramezzino*, 2019, p. 32; Milan, Via Ippolito Nievo 28/a; *Fun*, 2017, p. 5; Gillender Building, 1900, photo.

perspective view that camouflages the setting of places and spaces as perceived by an observer. By superimposing the comic drawing, the positions of the horizontal and vertical axes and the angle of rotation were established. The width of the focal length in the camera settings makes it possible to determine the position in three-dimensional space in agreement and coherence with the view represented in the comic. Once the points of view were identified and fixed, the high quality

renderings were made. Two types of drawing were generated: one with realistic textures applied to the elevations of the buildings, to make a visual correspondence between the drawing and the model; a further monochromatic model takes up the urban context in which the building is inserted. It was thus possible to proceed to determine the position in real space of the architecture represented in the comic. A further analysis was conducted by marking the axes of perspective, from which the perspective vanishing lines and the horizon line.

These elaborations highlighted some details in the construction of the space of each comic representation. The research of the point of view has provided some relevant information: the position of the observer, the figurative composition of the sheet and also the graphic techniques. Two types of settings have been detected: a static view and a dynamic one.

When the point of view is fixed, the representation of the architecture is accurate, proportions and dimensions are respected, and particular attention is paid to the representation of the detail of openings, mouldings, spiers, etc. In the case of a dynamic point of view, the figure lends itself to communicating the sense of movement even by modifying or distorting some features.

Furthermore, the choice of point of view establishes the perception of the scene, a tall building is even more slender if represented from a lowered point of view, on the contrary the point of view from above tends to compress the real dimensions.

The Empire State Building, in *Ultimate End* Vol. 1 #5 (Figure 11) is represented through an exaggerated perspective aberration from above; in the composition with imaginary skyscrapers we note the presence of *One World Trade Center,* however located in a different position from the real one. The Empire State Building in *Spiderman vs. the Amazing Spider-Man* Vol. 1 #1, we can see a rotation of the observation point with respect to the horizon line; the perspective from

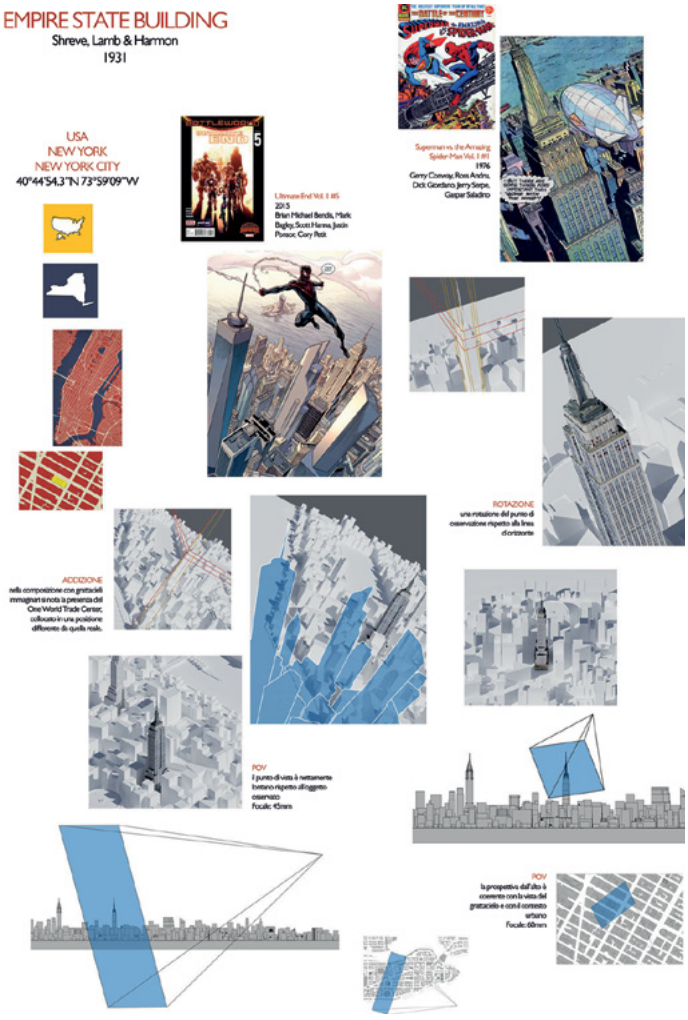

Fig. 11 *Empire State Building, New York City: analysis and visual reconstruction* (digital elaboration by Fabio Testaì).

above is congruous and coherent with the view of the skyscraper and with the urban context.

In *More Fun* (Figure 12) the first the representation of the Torre Velasca shows a two-point perspective coherent for the height of the point of view and the perspective view.

Another representation shows the view from below, it is characterized by three different vanishing points, revealing how in the comic it was decided to represent the vertical lines in a straight manner, abolishing the third vanishing and modifying the correct graphic restitution.

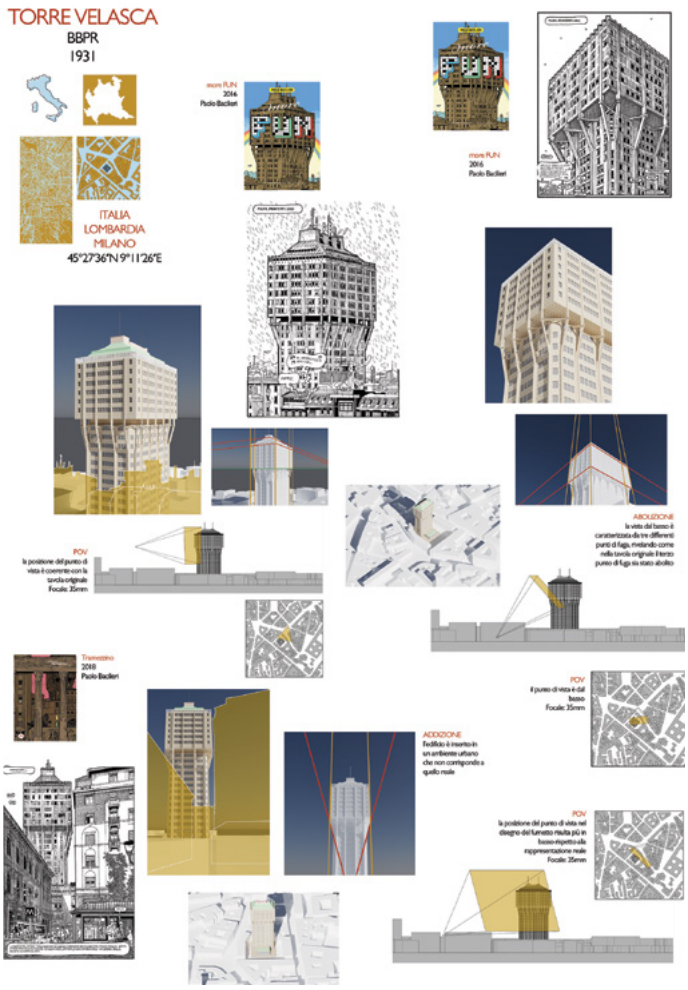

Fig. 12 *Torre Velasca, Milan: analysis and visual reconstruction* (digital elaboration by Fabio Testai).

CONCLUSIONS

In comics, tall urban buildings and skyscrapers are generally inserted for the recognition of the narrative contexts. Their inclusion in the stories represents not only the real context but the identification with imaginative and emotional contexts.

The representation of the architecture, in addition to the stylistic code of the author, depends on the cultural context in which it is inserted.

In the *manga*, even if Japan is launched towards technological advancement and overcoming, however, the sense of traditionality persists in the collective imagination, architecture appears as an element of difference between the two worlds.

In Europe, and especially in Italy, being rooted in art forms makes it possible to weave narrative interweavings between museums, historic cities and ancient architecture.

The trend is that of a faithful representation of reality in which the language of architecture participates in the graphic composition of the scene. It is the architecture itself that orders the graphic register of the comics.

In the United States the inclination is that of the 'great' and 'all is possible'; the scenes take place on the upper floors of the skyscrapers and when they are placed at ground level show themselves feeding an inexorable feeling of oppression.

The comic reads the architecture of the city in its essence, adapting it to the sense of narrative and graphic culture of the country of origin and bringing it into the reader's imagination, through the use of *closure*.

The forms of architecture thus assume the value of representations of a semantic nature, becoming graphic icons. These peculiarities have aroused the interest of some architects more inclined to innovation in the language of representation, who through the use of comics codes have attributed narrative contents to their projects, or have used the popular qualities of this pop language, through *arci-comics*.

NOTES

1 "Una operazione simbolizzante non richiede di necessità che la città sia fisicamente conosciuta: è il punto di vista che determina la fisiognomica dell'oggetto descritto" (Corti, 1987, p. 52).

2 "Vien fatto di domandarsi che cosa agisce sull'immaginario collettivo così da trasformare lo spazio reale di una città in luogo della mente [...] Una operazione simbolizzante non richiede di necessità che la città sia fisicamente conosciuta" (Corti, 1987, p. 52).

ACKNOWLEDGEMENTS

This paper is the result of a joint project and is fully shared between the authors; the manuscript was drawn up as follows: the paragraphs 'Introduction' and 'Conclusions' by Michela De Domenico, Paola Raffa, Fabio Testaì; 'From concept to the architecture in the comics' and 'Between design and cominc' by Michela De Domenico; 'Iconic architectures in drawn narratives' and 'POV: points of view and compositive processes (Fabio)by Fabio Testaì; 'Between archirecture and comic' and 'Drawn Visions' by Paola Raffa.

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Article available at

DOI: 10.6092/issn.2724-2463/16246

How to cite

as article

De Domenico, M., Raffa, P. & Testaì, F. (2023). Com(ic)onic. Architecture in the comics. *img journal*, *8*, 56-85.

as contribution in book

De Domenico, M., Raffa, P. & Testaì, F. (2023). Com(ic)onic. Architecture in the comics. In Luigini, A. (Ed.), *img journal 08/2022 Imaging and Imagery in Architecture* (pp. 56-85). Alghero, IT: Publica. ISBN 978-88-99586-36-2

THE PRODUCTION OF ARCHITECTURAL IMAGERY VIA EXHIBITIONS

THREE SCHOLARS SHOW THEIR WORK AT AR/GE KUNST, BOLZANO

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ARCHITECTURE EXHIBITIONS
ARCHITECTURAL IMAGERY
SPATIAL PRACTICES

Both the so-called academic research and the field research related to the production of an exhibition might have a relevant influence not only on the discourse around architecture but also on the production of an architectural imagery and on architecture itself. Starting from the position of the three scholars/artists/architects that conducted their research at ar/ge kunst in Bolzano –on the border between speculative and spatial production– between 2016 and 2018, the aim of this paper is to investigate their proposals in order to bring to light the undeniable relationship between academic assumptions and explorations concerned with the production of an architectural imagery via an exhibition.

> Most of the exhibitions I've done in the last years are always steps into something else: not exhibiting research but sites for collective research, action and for intervention (Antonelli, 2021, p. 271)[1].

EXPOSED ARCHITECTURE

The showing of visual art is based on the immediate exposure of the work, while the exhibition of architecture depends on a series of mediation processes intended at communicating via artefacts that have not necessarily been realised with the purpose of being exhibited (Watson, 2021, p. 15). Architecture exhibitions can represent a peculiar case in terms of spatial design capable not only of producing architecture, but also of expanding the imagery about it. The act of exhibiting architecture is often connected with the absence of the very object of the addressed matter, but this is true only if we aim to reduce the exhibition of architecture to the presentation (or representation) of built realm. This would be too restrictive since, as stated by Thordis Arrhenius, "in the exhibition space the idea of architecture as *bricks* and *mortars* is hard to maintain and the notion and border of architectural *work* comes under discussion" (Arrhenius, 2014, p. 7). When the work presented in an architecture exhibition produces –in turn– a new spatiality, the border between exhibit design and architecture project *per se* blurs and the exhibition itself, together with the imagery it creates, becomes subject. An architecture exhibition can produce space every time that the show *per se* is not only supporting structure for the exhibited work but starts producing an own set of images and an own spatiality. The same when its spatiality has such a strong meaning, that it does not even necessitate a support, but it becomes object of the exhibition. Or also in the opposite case, when the work does not need a supporting structure, because it autonomously finds a way to appear, it becomes space and erases any form of sustaining element.

The production of space in the context of the exhibition has always been connected to experimentation and it is acknowledged that "the most extreme and influential proposals in the history of modern architecture were made in the context of temporary exhibitions" (Colomina, 2008, p. 58).

Important exhibitions have marked the history of architecture and the architecture exhibition has become an established and consolidated format in the dissemination of knowledge around architecture: an integral part of the discipline[2]. Together with books and journals, the exhibition has reached the role of barometer, not only for the presentation of architecture but actively fuelling the debate around architecture. Exhibitions are not *about* but *for* architecture (Zardini, 2010; Borasi, 2015). This shift transforms the exhibition from a documentary, retrospective apparatus into an active tool capable not only of producing architecture but also of influencing the architectural imagery and production to come and the understanding from the users about the built environment and its meanings. If every exhibition can be described as an immersive space characterised by a clear narrative component, an architecture exhibition assumes a peculiar meaning if compared to other forms of shows, above all because of the often-mentioned condition of showing in presence not architecture, but instead "indices of something [...] out there" (Bois et al., 1999, p. 6). Starting from this intrinsic apparent contradiction, the nature of the architecture exhibition space as one organised to generate communication, leads to an addition of value to the general imagery of architecture and knowledge on it diffused via the exhibition. As in a field of action, images and reproductions interact with space. Real scale interventions and further artefacts, in many cases, render the space of the exhibition inhabitable, while photography can become an instrument of enquiry instead of a representational tool and spatial reproductions, as models or 1:1 intervention, can supply answers and help the visitors to concentrate on focuses completely different from the ones that address their attention in presence of a realised building. Furthermore –in many

emblematic cases– the traces left in form of catalogues, images, reviews, and ephemera have stronger influence on the shared imagery and on the culture and history of architecture than the exhibitions, since "like all exhibitions, they live a life of say a week or four weeks in reality, then they go on and on forever. Like the Barcelona Pavilion before it was reconstructed" (Colomina & Smithson, 2000, p.24).

AR/GE KUNST AND ITS SPACES

ar/ge kunst was founded in 1985 as exhibition space for the production of culture in Bolzano, a bilingual town close to the border between Italy and Austria. In the official description of the exhibition space one can read that:

> the name is an abbreviation of the German word *Arbeitsgemeinschaft* (working group) [...] chosen to promote the idea of collective work on the language of contemporary art and on its relationship with disciplines such as architecture, design, performance and cinema[3].

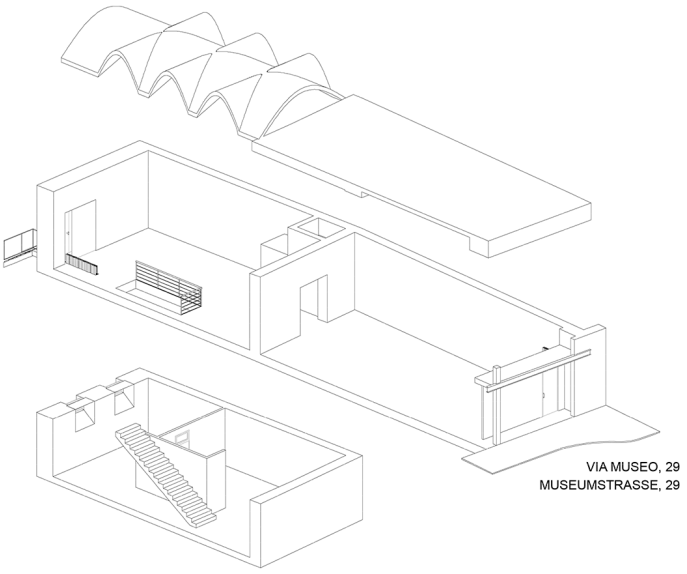

Figure 1 ar/ge kunst, isometric view (courtesy ar/ge kunst).

Figure 2 Gianni Pettena, *La Mia Scuola di Architettura*, exhibition view, photo Annelie Bortolotti, 2011 (courtesy ar/ge kunst).

Eventually, the translation from the German of the two words *arge* and *Kunst* is uncomfortable art.

As far as it concerns architecture, the focus of the different artistic directors of the space moved throughout the years from traditional architectural exhibitions to the show of interventions that understand the relation with space in a more extended way.

In the past, next to the artists, the rooms of ar/ge kunst also hosted the shows of nowadays extremely well-known architects as Peter Zumthor, David Chipperfield, Jean Nouvel or Steven Holl, just to name a few. After a break at the beginning of the 2000s, with the mandate of Emanuele Guidi as artistic director, and in subtly reinterpreted meaning in its enlarged role as so-called spatial practice, architecture takes prominence again. The photographic series *La mia scuola di architettura* [My school of architecture], in which Gianni Pettena portrays the peaks of the Dolomites in twelve photographs, has found its prominent role in an exhibition, while long term activities called *One Year-Long Research Project* have been initiated in which space, architecture, culture, and society meet in the production of exhibitions that let the borders between art and architecture blur. Some of the ar/ge kunst's exhibitions can be taken as examples to address issues as architecture, the spaces of its narration and the way it can be

Figure 3 David Chipperfield, *Architetture 1985-1990 Architektur*, 1992. Installation view (courtesy ar/ge kunst).

communicated through visual artefacts. The activities of the gallery offer useful case studies for intersecting a genealogy of recent architecture exhibitions and allowing to explore a phenomenon, which is broad and elusive at the same time, through the study of examples that are concrete and comparable since they are hosted by the same institution.

EXHIBITIONS AT AR/GE KUNST: FROM ARCHITECTURE TO SPATIAL PRACTICES

From 1986 to 2000 ar/ge kunst presented fifteen architecture exhibitions[4]. Some of the shows were imported, some were co-curated and organised in collaboration with prestigious venues as *Arc en Rêve* in Bordeaux, *deSingel* in Antwerp, *Canadian Centre of Architecture* in Montreal and *Architekturzentrum* in Luzern. In most of the cases the shows contained images of architecture, as original drawings and models, nevertheless, some of them became also an opportunity to experiment with the construction of the exhibition space through the articulation of the display. If exhibiting architecture means to show space in/through space, these displays positioned themselves somewhere between the content presented through the exhibition (that talks about

the construction of space) and the production of space itself. Without being buildings, they gave the possibility to observe in a 1:1 scale some of the architecture principles that the exhibition was talking about.

So called spatial practices have been extensively examined by scholars as Jane Rendell (2006) who, on her turn, bases her arguments on the legacy, among others, of the seminal text by Rosalynd Krauss *Sculpture in the expanded field* (1979). Krauss assumes that in a well-defined historical moment, a very special kind of spatial interventions were being developed that could neither be described entirely as art nor as architecture. These could be seen as practices that followed the need of the artists of leaving the art space of the gallery and to position themself outside: there, where other issues, as the social or relational relevance of their work, could become integrating part of the work itself. But today –in a moment of huge explosion of architecture shows and institutions devoted to them– many architects deliberately abandon the space of the very building and decide to act in the spaces of the galleries instead. We could provocatively refer to a 'compressed' field instead of to an 'expanded' one.

The presentation within an exhibition produces architecture that draws its own reason for existing from the very exhibition space though.

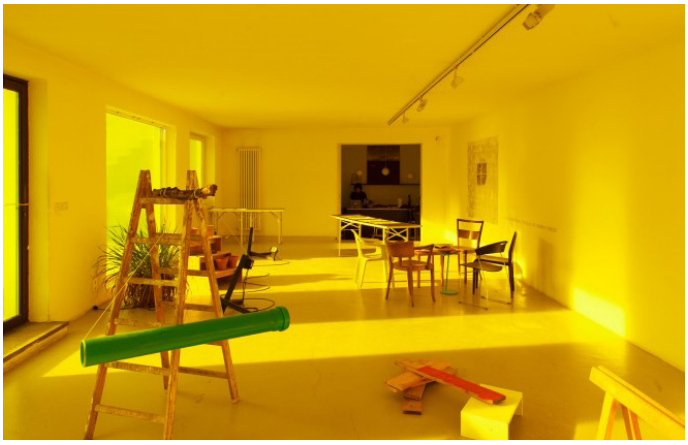

Figure 4 Can Altay, *VFI – Virgolo Future Institute (such claims on territory transform spatial imagination into obscure anticipations of repartition)*. Extemporary exhibition at Lungomare, installation view (courtesy Lungomare).

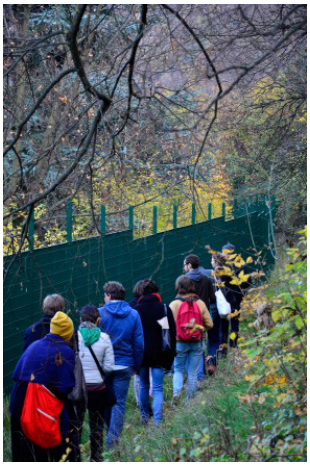

Figure 5 Can Altay, *VFI – Virgolo Future Institute (such claims on territory transform spatial imagination into obscure anticipations of repartition)*. Performative walk (courtesy Lungomare).

This is already a major challenge: architecture exhibits/performs outside the museum. The building is just not there when the exhibition is on place. The very expensive and complex way of creating architecture inside a museum space remains a challenge and removes architecture from its everyday life and context (Casciato, 2017).

When we refer to the more recent exhibitions at the Bolzano gallery, we can talk about an architecture which has been expressly produced for the exhibition, an architecture that exists when it is shown in an exhibition context.

Can Altay, Matilde Cassani and Lorenzo Pezzani are three artists/architects who have been invited to deal for a year with the region where ar/ge kunst is located in the frame of the *One Year-Long Research Project* series. The process usually starts with an opening lecture as a generative moment of exchange with the public and is then concluded by a presentation of the results in the form of an exhibition. This represents a quite unique model, as in the presented case studies the exhibition becomes the research method, the device orienting it and not the final moment collecting the gathered knowledge.

AN EXHIBITION AS A SUPPORTING STRUCTURE

Can Altay: *VFI – Virgolo Future Institute (such claims on territory transform spatial imagination into obscure anticipations of repartition)* (2016)

Altay's project starts from the request of dealing with issues collected under the title of *Radical Hospitality* (i.e., What happens when the ritual/gesture of hospitality is brought to its extreme? Who hosts and who is hosted and what happens between the two parties?). After his first visit the artist orients the focus of his research on the mount Virgolo which stands in the municipal territory of the city of Bolzano and attracts his attention because of a specific episode. After WWII some citizens of Bolzano whose houses had been bombed and de-

Figure 6 Can Altay, *VFI – Virgolo Future Institute (such claims on territory transform spatial imagination into obscure anticipations of repartition)*. Billboard space (courtesy Lungomare).

stroyed –due to the scarce availability of dwellings– started living in a non-finished road tunnel that was being built under the mountain.

This episode, witnessed by an old journal article[5], represented the initial input for keeping and collecting images and unknown stories about the mountain. The final show in the spaces of ar/ge kunst is the last episode of a series scattered along a timespan of one year. A short-lasting exhibition represents the first moment of a durational experiment in making and showing work. A visual campaign in the public space of the city of Bolzano that occupies billboard spaces of the city with a series of posters focussing on neglected desires and unfulfilled promises. Like advertisements for an imaginary tourism, the posters function as a campaign on episodes from the history of the mountain that mix up with issues to be discussed in a public conversation. A performative walk titled *Limited Experience* culminating in the choreographed movement of a dozen of participants along the fence of the former social club on the Virgolo. This action is a score that gives all the necessary indications to make a performative encounter happen and reflects on the meaning and function of boundaries. *Split Horizon,* a viewing apparatus positioned in different parts of the city, is oriented towards the mountain but it in fact enables different views[6].

Figure 7 Can Altay, *VFI – Virgolo Future Institute (such claims on territory transform spatial imagination into obscure anticipations of repartition)*. Viewing apparatus (courtesy Lungomare).

The mountain is always in the centre of the attention. All the gathered impressions are eventually collected in the spaces of the gallery and tell a story that starts from Bolzano but possess a meaning that includes other episodes, other people, and other times. Inspired by the double idea of the tunnel and of the shelter, Can Altay literally translates the concept of the exhibition into an inhabitable timber structure that supports a phantasmagoria of material coming from the research and documenting the interventions at the same time[7]. The show is the production of contents and their translation into an aesthetic artefact which is the very structure supporting the material selected to narrate the story of a place, which is not the mountain in itself, but all the spatial considerations that its stories contain (in social, historical, anthropological sense) and should have a mean that affects other places too.

AN INSTALLATION THAT TRANSLATES BEHAVIOURS (OF THE COMMUNITIES LIVING AT THE BORDER BETWEEN ITALY AND AUSTRIA).

Matilde Cassani: *It's just not cricket* (2018)

After a year of research at the Brennero border between Italy and Austria, Matilde Cassani positioned in the gallery

Figure 8 Can Altay, *VFI – Virgolo Future Institute (such claims on territory transform spatial imagination into obscure anticipations of repartition)*. Installation view (courtesy ar/ge kunst).

symbolic objects that refer to the cricket game, but don't represent themselves. The cricket game is used as a double metaphor here: What happens to the traditions of a community when this is displaced elsewhere? *It's just not cricket* is an English way of saying meaning that not everything is going well, that it is not completely right. And so, one of the rooms of the ar/ge kunst is occupied by an imaginary cricket field that doesn't fit within the walls of the exhibition space. In the same way that the cricket player belonging to the Pakistan, Afghanistan, India and Sri Lanka communities living at the Brennero border and in other territories of the North and South Tyrol adapt the rules of the game to the few places where they are allowed to play, Matilde Cassani's cricket field is compressed and deformed in the exhibition space: the surface is reduced, the gates are oversized, the two bats are tied to a rope that reminds the constriction to which the player are forced and limits the posture of the visitor that wants to try them. The game enacted in the exhibition is described as an interrupted one, a suspended match pending the coming back of the players.

The *mise-en-scène* of an imaginary cricket match in the spaces of the gallery represents the opportunity to introduce a thought about contemporary geographies, the use of the territory and other categories of time, entertain-

Figure 9 Matilde Cassani, *It's just not cricket*, 2018. Installation view (courtesy ar/ge kunst).

ment, and spectatorship. In fact, the cricket game reached Asia during the English colonization and comes back today with the displaced communities that embodied that tradition. Nowadays, in South Tyrol, Cricket is often a forbidden sport. Matilde Cassani –whose aim is to assemble structures capable of hosting a show about to begin (Cassani, 2018)[8]– fills the space of the gallery and activates it through her intervention that possess both a sculptural and an architectural strength.

> I design small celebrations and people is part of the piece, without audience the project is incomplete. The design ends when people arrive. I explore a very specific context, register collective habits, individual behaviours and then propose a something not always meant to be used, sometimes just to be observed (Cassani, 2018).

AN EXHIBITION AS A MEAN ORIENTING A RESEARCH.

Lorenzo Pezzani: *Hostile Environment(s)* (2018)

The exhibition *Hostile Environment(s)* consists of documents as proofs of how an environment, no matter if natural or urban, can be designed and transformed into a hostile one, as an effect of political decisions. Documents, cartographies, essays and visual analysis are displayed on different coloured metal structures as islands in an archipelago.

Figure 10 Matilde Cassani *It's just not cricket*, 2018. Installation view (courtesy ar/ge kunst).

Strolling through the exhibition the visitor is confronted with a carefully composed geography of diverse border-environments that produces a continuous movement from the local to faraway environments and vice versa.

Lorenzo Pezzani, scholar at Goldmiths University of London within the *Forensic Architecture* group, is founder of the spin-off *Forensic Oceanography*. His work has been exhibited in various venues: the European Parliament, museums, periodical events as *Manifesta 12* and *Broken Nature* at the Milan Triennale. The title of Pezzani's project is a quote from one of Theresa May's speeches during her term as Home Secretary. A series of laws (the so-called immigration acts) meant with the specific and declared goal of transforming Britain in a "really hostile environment for migrants and asylum seekers". Primary services (medical care, education) would have been negated to those who did not have a residency permit. This delineates the idea of a border that dematerialises from being a physic boundary and permeates the substance of the very social fabric. From this perspective the idea of environment expands to nations and cities and has little to deal with the shared idea of environment as something natural. In this sense also the Mediterranean Sea, the Alps or the desert can be understood as hostile environments. With his project at ar/ge kunst Pezzani tries to demonstrate that these borders are not natural and have been artificially transformed in boundaries through a series of laws, political decisions, practices, and discourses. This consid-

Figure 11 Lorenzo Pezzani, *Hostile Environment(s)*, 2018. Installation view (courtesy ar/ge kunst).

eration represents a conceptual challenge: to think about the UK laws, the Mediterranean and other environments in order not only to highlight a design process but also to think about the urban space as an environment and at the natural environment as a space determined by laws and practices just as the city. In Pezzani's project specific cases are used as optical prisms to investigate bigger phenomena submitted to more structural forces. If the environment has been transformed into something hostile, *Hostile Environment(s)* has tried to transform it also into a witness of an occurring violence.

CONCLUSIONS

To exhibit does not only mean to transfer the results of research into an exhibition context, but also offers the pos-

sibility to build a narration capable of resonating with the present and negotiating the interpretations of the past in an ever-changing cultural heterogeneous society. In this sense, the exhibition, as a device, can acquire a double meaning: on one hand it can be understood as a research instrument, capable of focusing on certain topics in an explicit way and unveiling intersectional paths, on the other hand it represents a powerful device for the communication and dissemination of contents through a lively relationship with the public. The specific lens represented by the 'exhibition device' can be used as a mediator of complex and layered contents.

Free from the constraints of the academia, the exhibition becomes a research method. As argued by Mirko Zardini:

> the development of a given project within a museum typically follows a traditional, linear sequence from collecting through exhibiting, often followed by the publication of a catalogue. We might instead consider another model in which acquisitions, exhibitions, publications, research, and public programs become synchronised lines of investigation and begin to permeate one another. (Zardini, 2010, p.82)

Academic research has entered the field of the exhibition as confirmed, for example, by the contributions selected for the last Architecture Biennale in Venice *How will we live together?* curated in 2021 by Hashim Sarkis, architect, educator, researcher and dean of the School of Architecture and Planning at the Massachusetts Institute of Technology (MIT). An exhibition should not be considered solely as a device aimed at collecting, ordering, and making accessible to the public artefacts and documents of the past or of the present. An exhibition represents rather the opportunity to deal in a critical way with the topics that it tackles. Additionally, exhibition design practices should not be understood as mere design of the surface and of the impression, but rather as meaningful apparatus, as part of a series of media in which all the parts contribute to the generation of

significance and of a shared imagery. Due to its performative agency, the architecture exhibition possesses, beyond other meanings, the capability of literally influencing the behaviour of its actors. In the ephemeral character of the exhibition lies one of its more powerful strengths. It concentrates an enormous amount of energy in a certain place at a certain moment and this phenomenon has tremendous transformative potential. The device represented by the exhibition, as a form of architecture, possesses the strength of the synthesis and the capacity to communicate and build narratives across disciplines. Several exhibitions collecting a variety of materials, meanings and media can be included in the field of architectural production thanks to their propositive character able to bring into the discipline topics, objects, works and unknown reflections and thus to expand its fields of action.

The summoned projects demonstrate that architecture exhibitions are nowadays not only exhibition of or about architecture but increasingly exhibitions for architecture, to quote Giovanna Borasi (2015). The exhibitions by Altay, Cassani and Pezzani enable us to add some more episodes to an ongoing narration and to argue that an increasing number of architecture exhibitions today concentrate on spatial practices generating a certain autonomy of the exhibited architecture. We are witnessing the growing proliferation of 'exhibitionist' architects and architectures, and the architecture show has become to all intents and purposes an accepted and shared tool in the international debate. Under deeper scrutiny, one could argue that it is possible to trace a path leading from more retrospective exhibitions to the exhibition of artefacts that are recognized for all intents and purposes as architecture per se and deliberately take a distance from the contingency of the building. They become spatialization of an architectonic thought instead. This does not come to terms with the needs of the construction and takes advantage of the licenses allowed by the exhibition context which is an artificial place and allows a wide range of experimen-

tation even in constructive terms. The exhibitions described in this paper are spatial translations of stories, episodes and narrations. They are useful examples to amplify the meaning of the term architecture and at the same time they seem to be antennas capable of providing a very clear picture of what is happening in the moment in which the exhibition is no longer to be considered only the context that hosts, but the very place of the production of the space.

NOTES

1 Performing and exhibiting 'design ideas' Paola Antonelli in conversation with Fleur Watson in The New Curator.

2 Museums dedicated to the presentation of architecture had started appearing worldwide at the end of the 70s. Due to their activities, the architecture show had become a consolidated medium within the end of the last century. With its start with the Venice Architecture Biennale in 1980 the format of the exhibition expanded in the early 2000s reaching its highest point of diffusion in the very last years. The architecture exhibition has become subject of study and observation in the terms formalised in this paper at the beginning of the 21st century. One of the first extensive volumes on the topic is the journal *Log20*, *Curating Architecture* edited by Tina Di Carlo in 2010.

3 https://www.argekunst.it/info/ (last visited 29.12.2022)

4 The architecture exhibitions at ar/ge kunst between 1986 and 2000 were: Peter Cook (1986), Raymund Abraham (1986), Carlo Mollino (1989), Peter Zumthor (1990), Behnisch and Partner (1991), David Chipperfield (1992), Steven Holl (1993), Juan Navarro Baldeweg (1994), Hans Kollhoff and Helga Timmermann (1994), Gonçalo Sousa Byrne, Joao Luis Carrilho Da Graca, Eduardo Souto De Moura (1995), Antonio Cruz and Antonio Ortiz (1996), Luigi Ghirri on Aldo Rossi (1997), Jean Nouvel (1999), Florian Beigel and Tony Fretton (2000)

5 Ettore Frangipane, "Uomini come le talpe. Campionario della miseria sotto la galleria del Virgolo. Dormono in piccole nicchie scavate entro il tunnel. Il gelido soffio del vento del nord canta loro la ninnananna.", in Alto Adige 07.12.1948

6 For a detailed description of the episodes preceding the exhibition in the spaces of ar/ge kunst see http://www.lungomare.org/project/lungomare-residency-radical-hospitality-can-altay/ (last visited 04.09.2020)

7 Also in his display intervention for "The way beyond art" (2017-2021) at the Van Abbemuseum in Maastricht, Can and Asli Altay produce an artistic work which is support for works of the collection presented in the semi-permanent exhibition.

8 http://atpdiary.com/extreme-land-matilde-cassani/ (last visited 29.12.2022)

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Article available at

DOI: 10.6092/issn.2724-2463/16116

How to cite

as article

Gigliotti, R. (2023). The production of architectural imagery via exhibitions.Three scholars show their work at ar/ge kunst, Bolzano. *img journal*, *08*, 86-105.

as contribution in book

Gigliotti, R. (2023). The production of architectural imagery via exhibitions.Three scholars show their work at ar/ge kunst, Bolzano. In A. Luigini (Ed.), *img journal 08/2023 Imaging and Imagery in Architecture* (pp. 86-105) Alghero, IT: Publica. ISBN 9788899586362

TRACING ZEITGEIST:
THE *CYBERFLÂNEUR* AND THEIR SMARTPHONE

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ARCHITECTURAL REPRESENTATION
CYBERFLÂNEUR
DIGITAL COLLAGE
SMARTPHONE
ZEITGEIST

This essay investigates the way in which architecture is communicated in the post-digital era. Digital collages, created from photographs taken by so-called *cyber-flâneurs* with their smartphones and re-interpreted through current smartphone applications, were the architectural representations under the spotlight. Generation Z architecture students were assigned the role of the *cyberflâneur*; a *flâneur* being defined as someone experiencing urban space on their own terms, 'cyber' referring to the *flâneur*'s instrument, the smartphone. Drawing and design are explored through the triad of hand, mind and smartphone. The visual artefacts being communicated are buildings in central Pretoria and Johannesburg, South Africa and in Maputo, Mozambique, from a list based on a compact urban typology built either 50- or 100-year-ago. The imagery on the screen of the smartphone becomes the lens through which we experience reality. The quality and complexity of the digital collages are telling of our zeitgeist; patterns and algorithms can be traced. Technology provide us with the tools to connect us to a synchrony that is the pulse of global culture. The graphic analysis of the visual material produced by the *cyberflâneurs* propagates zeitgeist as a major contributor to architectural expression by tracing a universal synchronicity.

INTRODUCTION

Time is experienced as an abstract concept. Real time, the actual time it takes for an event to occur, consists of quantifiable units –seconds and hours, days and millennia. Our own perception is subjective –stretching or concentrating hours or days, or even years, making it a qualitative experience. Physically we can only experience the now –the present. It is a particularly challenging task to talk about time in the context of today, the post-digital era. Cueto & Hendrikz describe the post-digital era as one "which no longer distinguishes between on- and offline, and which embeds and normalizes digital technology in almost every personal relation, labour condition or aesthetic practise" (2017, p. 10).

Dalcinkaya quotes MIT Media Lab founder Nicholas Negroponte saying that "cyberspace has no seasons and no night and day. Internet time is absolute time for everybody. Internet time is not geopolitical. It is global. In the future, for many people, real time will be Internet Time" (2022, p. 86).

Today we are relating to the past in a different way. Dalcinkaya continues that "with all of history available to us online, the vast archive of the internet has flattened the past. Information is simultaneously ephemeral and eternal, appearing one moment and disappearing the next. Social media feeds refresh by the second" (2022, p. 86).

Höner and Schankweiler highlight how crucial the image became in our relationship with social media and information "In the era of Facebook, Instagram, Twitter and Co., the way people deal with images have undergone fundamental changes. Images, circulating in digital networks, have become an essential personal means of expression for a broad public" (2017, p. 14).

Images are omnipresent. Theis notes that "images can be repeated and reproduced, while in the world of space and time it is impossible to reproduce the same action at the same time again" (2012, p. 3).

Our relation to these images changed; from traditionally passively viewed, to an interaction now via the use of an elec-

tronic device. Images are now the primary vehicle of communication, on the social web, in near real time. Because of the speed with which these images are produced and circulated, Höner and Schankweiler believe that "the frequency of this dialogue tends to accelerate rapidly. In view of their great affective potential, images ingeniously impact the entire gamut of emotions and thus trigger spontaneous responses in their recipients" (2017, p. 14).

Similarly, architectural representation has a history of evolving as new technologies emerge. The relationship between architecture and photography has been researched by Vassallo who refers to the work of the team of Venturi and Scott Brown, 50-years-ago in our timeline, "[…] they open the text (in *Learning from Las Vegas*) by declaring their interest in 'image', that is, the image of the buildings, as the primary means by which architecture is received and understood." (2019, p.137)
Vassallo talks about them starting to work with film and photography "[…] traditional architectural representation had become an obstacle in understanding and explaining the new urban phenomena at play in Las Vegas, and new representation techniques were required in order to 'handle' this new reality" (2019, p. 143).

Today architecture has a double presence. We inhabit the physical world –the city and space contracting and expanding as the recent pandemic demonstrated. And when our physical space becomes contracted, virtual space expands. The digital representation of architecture becomes also the backdrop for our avatars. Our current encounter with virtual space is either a smartphone screen or a computer monitor –the size dictated by your profession, or economic status. For most of the participating *cyberflâneurs*, known as Gen Z, an online presence is obligatory (the participant with the highest count, listed 14 hours online a day), still others live their lives online, and make a living out of it. There is a popular hashtag called #sleepstream where someone is asleep on camera, mostly livestreaming themselves, as others watch and comment in the

chat box (McNeil, 2021, p. 132). In *Wired* magazine D'Anastasio (2020) wrote that the obvious reason would be they're genuinely tired; they spend all day gaming and entertaining people online, and it is better to always be 'live' than 'offline'.

THE PHOTOGRAPH AND ITS 24-HOUR SHELF LIFE

Nat Sloan, cultural theorist and meme admin behind the Instagram account @vitruviangrimace, is quoted by Dalcinkaya "We reinterpret the past through the lens of the present. The culture is the same, but different when rehashed because of a new awareness that comes from our forward progress in time" (2022, p. 87).

Professional photographer Nicholas Muellner talks about our fast-forward progress in time:

> this last paragraph is already as out of date as an iPhone. These days, the present refreshes as fast as we can type. The present of the text that I just received has been replaced by the present in which I am typing my response. And the photograph seems to serve this god of the endless, tedious, anxious present more readily than the old gods of nostalgia and procrastination. We now willingly assign our images a 24-hour shelf life. (2019, p. 11)

Today the photograph is the artefact of our existence. Muellner discusses the photograph's maturity from physical artefact to digital data: "At most it was a thin piece of paper, now a density of dots on a screen for a moment that is instantly replaced by another" (2019, p. 18).

How we relate to the world seem like it is not through first-hand experience, but through the image that only comes into being the moment we have already experienced and thus also the archive of our past; how we remember. For Muellner (2019, pp. 4, 5) our relationship with photography is similar to Dostoevsky's *The Double* (1846). This image we create becomes the preferred persona where our own lives are like the hapless clerk in the story who creates this character

to cope with his live and becomes the more successful at this than the clerk; with the result that "the submitting double supplants the actual stubborn self".

The photograph is not any more about remembering the past by documenting the present. According to Muellner this is how our temporal association with photography has shifted, we all are exclaiming:

> I am here; I am taking pictures; I am analysing, editing, and enjoying them!" He is sure that we are expressed as a future commodity of the self, registering and recalibrating at electronic speed. It is exhilarating and hypnotic, but it is not the same as being there. (2019, p. 118)

Vassallo writes "that the conversation between architecture and photography through the years was in fact reflective of the larger process according to which a culture consistently reassigns value to the material reality in which it exists" (2019, p. 19).

For us it is now continuously disposable and renewable. Vassallo sees the temporary condition as one with "the absence of a clear dominant cultural paradigm" (2019, p. 317) .He argues that "the internet, in its massive capacity to archive without discrimination, has generated a horizontal tsunami of inclusion that has blurred if not collapsed previous cultural categories and hierarchies" (2019, p. 317).

TRIAD

The traditional analogue way of documenting and conceptualizing architecture through drawing has today been taken over by digital formats and altered the triad between hand, mind and replacing the drawing instrument with an electronic device –a smartphone– which acts as a camera and video camera; plus a variety of editing possibilities, that can produce realistic; or augmented representations of architecture.

Mind

The students cast as *cyberflâneurs* represent a very specific demographic. Schneider (2022) produces the statistics of this new generation in the United States; by 2025 a total of 27 percent of their workforce will by Generation Z. She also confirms the oldest of Gen Z was born in 1997, making them 26 years of age in 2023. Many of them graduated during the pandemic and are only now going to a physical workplace. Their preferences include the right balance of in-person and digital experiences. The *cyberflâneurs* don't only navigate the city on foot, they also have their hands on their device, accessing the digital –more than just a city– now called the *Metaverse*. The *cyberflâneur* lives in *metareality*, defined by Ots:

> It is a reality that is inclusive, embracing the cyber universe, the inner life, as well as the physical existence we have been conditioned to regard as our only trustworthy reality. *Metareality* is the reality of our combined consciousness as a networked planet. For the generation that has come of age in the Internet age, *metareality* is more real than overt 'see and touch' reality. (2011, p. 148)

Never before has any generation been bombarded with so much information –some edited and fact-checked, and others not. McNeil (2021) states that compared to there being over seven and a halve billion people on earth; there are over one and a halve billion websites. Internet users are about 40% of the world's population, with the third billion reached in 2014[1]. All cultural history is suddenly available all at once. Dalcinkaya quotes internet researcher and trend forecaster Sean Monahan "As a young person, you weren't only looking at what was being marketed to you. You could literally download any music that had ever been created for free" (2022, p. 90). Dalcinkaya continues that "this not only made objects harder to date, it blurred the lines between eras and, by extension, our perception of time as a whole" (2022, p. 90). Cultural moments get distorted, and specific trends become harder to date. The lines get blurred between an experience and its digital retelling.

Hand

Rose highlights how interactive digital images are: "Digital images very often invite not contemplation, but action—navigation into the larger mass of images of which they are a part" (2016, p. 13). Verhoeff explains that it is in order to "keeping an eye out for where to move or what to do next" (2012, p. 13). Rose relays how physically searching on a printed map was completely different "[…] in a Google map we move from map to satellite view, zoom in and scale back, look at a photo of a street and return […]" (2016, p. 13). Similarly, she continues "in an online archive we scroll, zoom, crop, download, follow links, share" (2016, p. 13).

Bucknell (2022, p. 66) sees gaming as one of the key influences of our current reality. Gaming has matured during Gen Z's upbringing. Games, years before, referred to as video-, or computer-games, and how they evolved to the immersive and social practice they are today, is a natural evolution from novel to cinema to television, and now to gamespace. The remote control issued with televisions started the hand's involvement. Galloway talks about this progression "What used to be primarily the domain of eyes and looking is now more likely that of muscles and doing, thumbs, to be sure, and what used to be the act of reading is now the act of doing, or just 'the act'" (2006, p. 3). Gaming is about taking action. Bucknell comments on the design possibilities inherent in gaming: "the increasing accessibility of game engines like Unity and Unreal, as well as their ever-advancing rendering quality, facilitate the production of total environments, or unreal architectures, to prototype and critique many possible futures as they unfold in real time" (2022, p. 66).

Smartphone

The act of holding a smartphone when taking a picture is different from using a traditional camera, the viewfinder originally needed to be close to the eye to gaze through. Today the smartphone displays the image on a screen, plus it can alter it in real time with a series of filters, adjusting the

original. The body adapts to a different pose, Muellner (2019, p. 105) calls it "the awkward gesture of holding a camera up to the space in front of one's face." He continues that the 10 to 38 centimetres between the *cyberflâneur*'s eyes and the screen of a digital camera "constitute a new interval in the word."
Renowned photographer Wolfgang Tillmans ventured into music and produced amongst others the techno track, *Device Control* (2016). The lyrics were later used by Frank Ocean on his album Endless. It is an anthem to our current situation. An extract from the lyrics reads:

> Streaming life in this device is possible
> It's in your palm, streams of pleasure in your hand
> The device in your hand, streaming life in streams of pleasure
> Blurred, still and motion, audio
> To one interactive stream of life.
> (Marcoci & Taylor, 2021, p. 241)

Yet Yalcinkaya warns that we have to be aware that:

> Building a new society within the metaverse needs tech, the same tech that's being built by corporations to assert growing control over its users. […] Utopian or not, our existence within the metaverse depends on the power of this nascent technology to create deeper and more sophisticated virtual experiences, which will only divide society into those who have access and those who don't. (2022, p. 93)

DIGITAL COLLAGES: REAL VERSUS VIRTUAL

Methodology & Data

The participants were exit-level architecture students, four groups between 2019 and 2022, each just over thirty students from very different cultures, represented by the eleven official languages of South Africa, and including students from central Africa. They share being Gen Z with an urban upbringing in the presence of the internet. Here described as *cyberflâneurs*, they were tasked to produce representations of

a curated list of built artefacts with a similar urban typology dated 50- and 100-years-old using only their smartphones. The images were then abstracted, the degree of choice given to the user dictated by the device. The contexts were Pretoria and Johannesburg CBD, in Gauteng (population 13.4 million[2]) in South Africa and Maputo (population 1.14 million[3]) in Mozambique. The sites of investigation were central business districts. The building elevations were documented within the urban street scene. The data equalled over one thousand manipulated images.[4] Each *cyberflâneur* produced nine collages of one of the thirty-four curated buildings. Their viewpoint, and by extension their hand in capturing and adjusting the world on their device, becomes the measure through which time and architecture's relationship is revealed.

Results

The data gathered in the archive was analysed and studied by the author and the final (2022) group of *cyberflâneurs*. Two different iterations will be discussed below. The first are the manipulated photographs; called digital collages, which are 3D in almost all cases. The results reveal how the *cyberflâneur*'s experience is defined by two concepts: algorithms and typologies. The second are 2D line drawings; which are superimposed elevations of two or more buildings from the curated list, in order to trace repeating patterns and subsequently design corresponding wallpapers. These drawings illustrate how the latest computer software facilitates discovering patterns in existing architectures and becoming tools to design.

Both iterations want to highlight how the tools, or applications, provided by the smartphone, equalize the creativity of the participants. The primary objective of the study, based on the analysis of the archived visual material, is the extrapolation of information about synonymous concepts such as: concurrent, contemporariness, nowness, parallel, sameness, similarity, 'spirit of the time', synchronicity, synergy, universal and zeitgeist.

Fig. 1 Trent Haantjes, *State Library (1918-1919)*, digital collages, Pretoria, South Africa, TUT Department of Architecture and Industrial Design, 2021.

3D IMAGERY: HOW WE EXPERIENCE ARCHITECTURE

The digital collages started as photographs –densities of dots. Theis (2012) sums up the abstraction of images as philosopher Flusser (2000, 2008) presented five stages in a cultural historical context. The third stage is drawing, painting and sculpture –"based on the abstraction of an object and this being projected back into space and time." The fourth stage is represented by the invention of writing. The fifth stage is where we are at –the 'technical image', which is about calculation and computation, produced with the help of a machine; a computer. Flusser does not see the human imagination being engaged, but purely the "automatism of an apparatus". For him the evolution of society includes a process of abstraction of the image towards the zero-dimension, which he describes as the universe of the technical image. For him the characteristics of this universe include widely spread knowledge, and access for everyone

Fig. 2 Katlego Ramokoka, *Municipal Council Building (1941-1947)*, digital collages, Maputo, Mozambique, TUT Department of Architecture and Industrial Design, 2022.

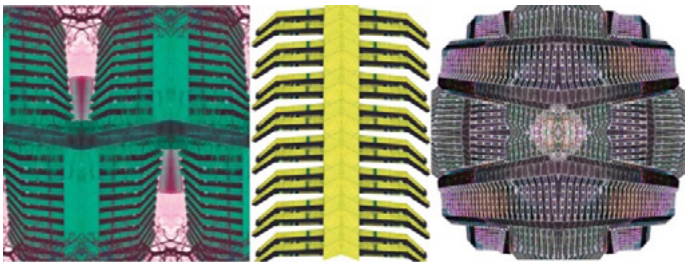

Fig. 3 Jason Bowes, *Kruger Park apartments (1970s)*, digital collages, Pretoria, South Africa, TUT Department of Architecture and Industrial Design, 2022.

to manipulate, as well as no copyright which means open access to information everywhere.

Representative of the *cyberflâneurs*' so-called technical images created with current smartphone technologies includes the work produced by Trent Haantjes (Figure 1), documenting the 100-years-old State Library in Pretoria, and Katlego Ramokoka (Figure 2), documenting the Municipal Council building in Maputo. They used a variety of applications, or filters, to adjust the original photographs. Similarly, Jason Bowes (Figure 3) documented the 50-years-old, 33-storey brutalist tower *Kruger Park Apartments*, in Pretoria CBD, empty for at least the last 10 years, becoming a kaleidoscopic study through his eyes. The distortion is so radical that the individual buildings become hardly recognizable. Patterns, mostly found in the proportions and shapes, have a sense of familiarity. The transformation of the built artefacts range from cutting a silhouette by removing the background; to radial mirroring; to distortion or warping; to –and the most often employed– recolouring the footage to create an almost unnatural environment. Both the brutalist and the classical buildings are reinterpreted as something unreal, yet playful, reminiscent of gamespace. The imagery col-

lected in the archive provide minimal information of the local contexts; the locations are very different, especially the political histories of South Africa and Mozambique if you consider the last 50 to 100 years, not to mention the topography and climate. Van Alphen (2017, p. 84) argues that images circulating on social media lack contexts that would provide background and meaning to what these images display. He is certain that in our 'post-truth' (proclaimed the word of the year in 2016 by the Oxford dictionary) era, the meaning of a social media image is more about personal beliefs and emotions than about objective facts.

Gamespace and algorithms

Wark's *Gamer Theory* (2007) shone light on how gamespace challenges and involves the user more than just with a storyline like in a traditional novel or the mise-en-scene or cinematic montage. An algorithm is now included. Wark explains that "an algorithm –for present purposes– is a finite set of instructions for accomplishing some task, which transforms an initial starting condition into a recognizable end condition" (2007, p. 22). The task of the game is to discover this recognizable logic that will further their game. Galloway states that playing is not just historical simulation and lists the facilities that the gamer acquires:

> The gamer is instead learning, internalizing, and becoming intimate with a massive, multipart, global algorithm. To play the game means to play the code of the game. To win means to know the system. And thus to interpret a game means to interpret its algorithm. (2006, p. 90-91)

The similarity of the effects produced in the digital collages points to this recognizable end condition. The algorithm becomes the factor that brings the technology to an audience larger than the Gen Z gamer. Schnetkamp and Röttger-Rössler relay how the term, social media, first featured in print in the German dictionary, Duden, in 2013, and that "together with Web 2.0, it stands for the further development of the Internet, which simplified and accelerated

the communication between users" (2017, p. 6). They state that "the digital revolution forced the development of new, computer-based algorithms, which have since enabled user production of content and its uploading to the net without specific expert knowledge" (2017, p. 6) .

Typology

The end condition can be traced in this instance to the typology of filters. The architectural representations –the digital collages– can be ordered according to the type of filter that was used. The types that were recorded include: 'remove background', 'mirror', 'radial mirror', 'recolour', 'distort', 'highlighter pen', 'ghost image', 'fade', 'collage', 'animate', 'repetition', 'spherical panorama', 'texturize', 'stickers'. All of these are very relatable ideas to Gen Z. The algorithm gets recognized. So although it is abstracted until it appears unreal it is set in a certain logic, similar to the logic of architectural typology.

The typology found in the subject matter, the building type, is not only a formal and geometric expression, but also a product of zeitgeist, the reason why the same typology looks different 50 years apart. Here the typologies are found in architectural representations; for example, all the (radially) mirrored photographs are of the same type (see Fig. 1 - 3). Vassallo (2019, pp. 208-209) writes that by the mid-1960s the term typology was not new, but became popular as a way "to make sense of the repetition of anonymous architecture in the city" and "like documentary photography, typology offered a promise of scientific knowledge about an opaque reality, and ultimately, the possibility of a way forward according to that knowledge."

2D PATTERN: HOW WE ANALYSE AND DESIGN ARCHITECTURE

The abstracted patterns created by superimposing two or more elevations are telling in a number of ways. Van Staden

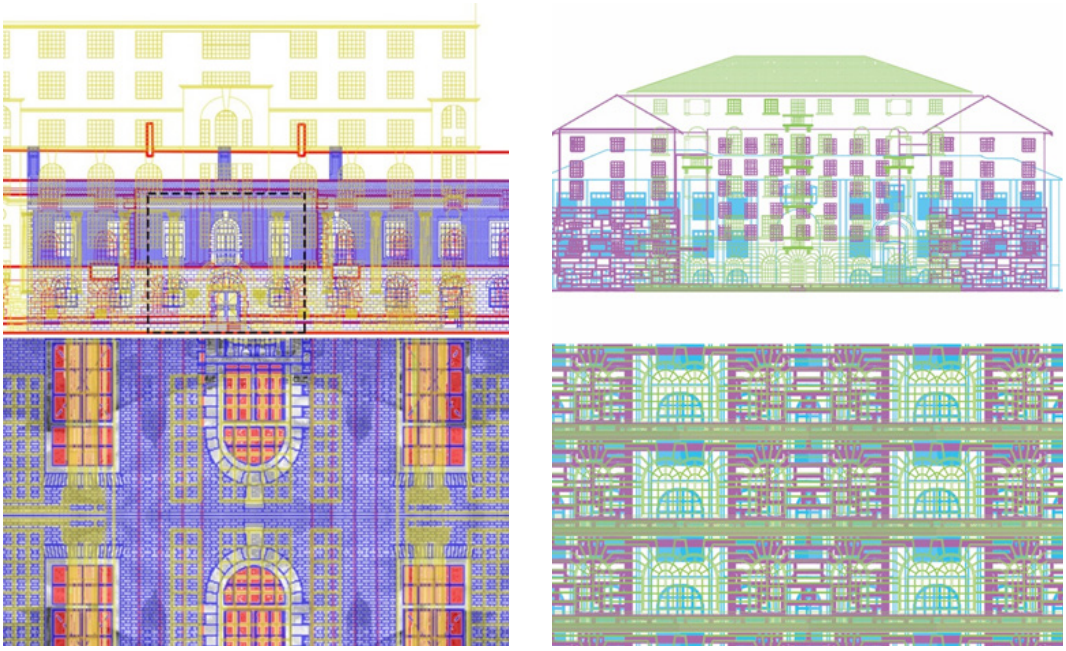

Fig. 4 Roard van Staden, *Elephant Trading Company (1919-1923), Somerset House (1927) and TUT Administration (1928) elevations superimposed*, Gauteng , South Africa, TUT Department of Architecture and Industrial Design, 2022.

Fig. 5 Katlego Ramokoka, *Gainsborough Mansions (1933), Park Station (1928-1932) and Hanya House (1915) elevations superimposed*, Gauteng , South Africa, TUT Department of Architecture and Industrial Design, 2022.

and Ramokoka both re-drew three different 100-year-old building elevations (Figures 4, 5) and superimposed them as per the brief. Even though the zoomed-in abstracted patterns are on different scales, the mere presence of arched openings immediately places them in a classical idiom. Similarly the studies by Van der Bank and Kleynhans of 50-year-old building elevations (Figures 6, 7) share trademarks. The presence of circular elements, in this case not an arch but a full circle, do not have classical, but modernist qualities.

Abstraction

If you zoom-out you can easily consider all four wallpaper studies as iterations by the same author or a series of similar patterns. More even than spotting the difference between classical and modernist, or two periods fifty-years-apart, the way these patterns are digitally created and represented as architectural elements are imbued with a contemporaryness –a technical image. Yet the universality of the geometries is not even generational if you compare it to *The Gram-*

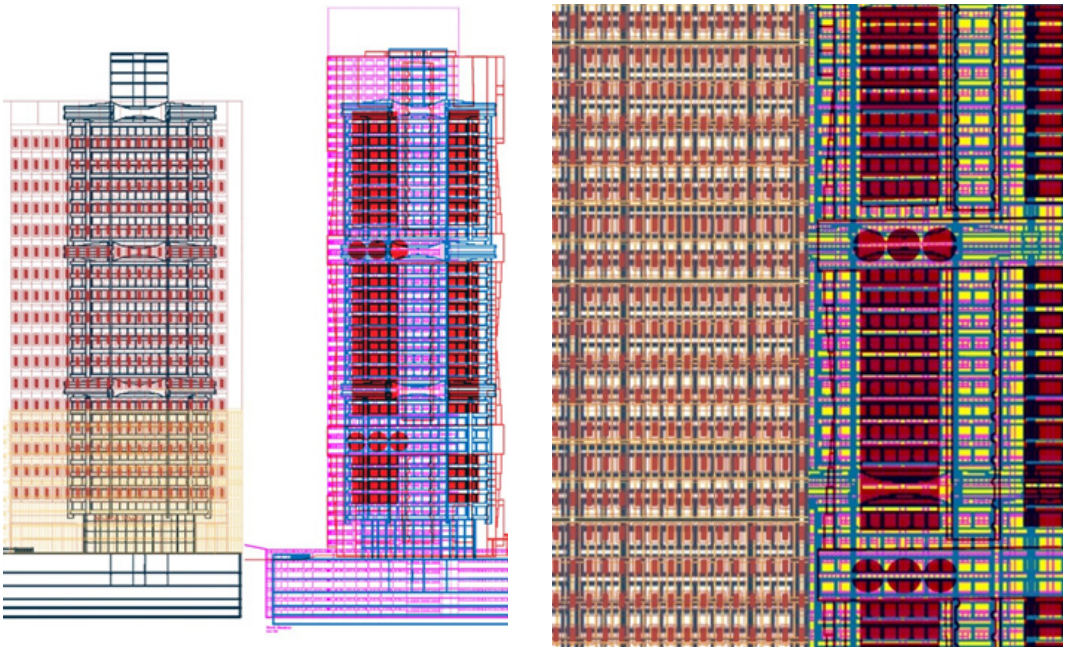

Fig. 6 Marco van der Bank, Standard Bank (1970), Unisa Building (1968) and Penmor Tower (1974) elevations superimposed, Gauteng , South Africa, TUT Department of Architecture and Industrial Design, 2022.

Fig. 7 Bradley Kleynhans, *Ponte City Apartments (1972), Standard Bank (1970) and ABSA Building (1976) elevations superimposed*, Gauteng , South Africa, TUT Department of Architecture and Industrial Design, 2022.

mar of Ornament by Owen Jones (1856), where 2D coloured patterns, completed by hand, are organized by culture, for example Chinese or Egyptian. We propose organizing pattern by date, that is for example 1920s or 1970s. Weil's hypothesis is that there is an archeological constant from the beginning of time, from the earliest ornamented artefacts found in Southern Africa dating from 70, 000 BCE, all patterns globally share the same proto-ornaments: "My New *Grammar of Ornament* builds upon this knowledge starting from these four original ornament types. Ornaments are based on the arrangement or correlation of shapes that are identical or similar" (2021, pp. 4-5).

The idea of abstraction in architecture is concerned not only in geometries or shapes arranged in particular patterns, or becoming the technical image to borrow from Flesser (2000, 2008). Industrialization first allowed construction based on replicability of products and artefacts and a reduced materiality. Vassallo (2019, p. 23), in his search for the shared characteristics of architecture and photogra-

phy, identifies two ways to look at abstraction: 'intransitive or pictorial abstraction', dealing in geometries, as seen in the superimposed elevations, revealing the synergy between architecture and abstract painting and 'transitive or materialist abstraction', dealing with the parts and modular construction. The available construction technology was in play in the construction of the 50- and 100-year-old buildings, and the reason for their visual similarities.

Superficiality

Superficiality relates to what Vassallo (2019, pp. 251-254) calls the 'intersecting interpretations of the concept of surface'; he calls it 'opaque', or 'facadedness'. He traces 'facadedness' to the artist Edward Ruscha's work in the 1960s; "particularly his depiction of Californian superficiality in Every Building on the Sunset Strip", in his book presented as a continuous street elevation.

Another instance, in the 1990s, was photographer Thomas Ruff collaborating with Herzog and de Meuron. The architects asked Ruff to portray one of their buildings for an upcoming Biennale. The 2D elevational photograph produced by Ruff, Haus Nr. 4 II, Ricola Laufen (1991) appeared unnatural, more like a computer render than a photograph – two shots of the main façade was stitched together on a computer to allow a full-frontal shot. Ruff is quoted about the flatness of his architectural photography "Reality can be as deep as it wants. I make pictures on the surface" (Vassallo, 2019, p. 253). According to Vassallo, Herzog and de Meuron believe that in our current civilization "there is a tendency to reduce the dimensions of space to the image of space, that is, two-dimensions, as a consequence of the development of the technical image […]" (2019, p. 254)
They borrow here from philosopher Vilem Flusser (2000, 2008) suggesting that our current images are abstracted to a zero-dimension facilitated by the computer that generate these images. The architects realize "that the world is now understood through a new visual paradigm based on floating virtual images which contain only limited amounts

of meaning" (Vassallo, 2019, p. 254), and that the profession needs to learn to work within this new framework.

CONCLUSION

Regardless of the background of the *cyberflâneurs*, the price of their smartphone, or if their subject matter was 50- or 100-years-old, local or foreign, the representation of the architecture becomes a recognizable pattern. The recognizable pattern is complex, the new technologies use pixels and algorithms, but on the surface it contracts to become another iteration of the same pattern, or application or smartphone technology. Sloan is quoted by Dalcinkaya "Culture is not moving forward but technology is" (2022, p. 87). Dalcinkaya adds: "[…] we consume culture, but do not produce it" (2022, p. 87).

A hero and spokesperson for the Gen Z crowd is the late Virgil Abloh, who reimagined heritage luxury brand *Louis Vuitton* menswear for the new generation, fusing street culture, music and his own architectural background into it. Alemoru relays how Bone Soda, described as a collective-cum-creative agency and label (who bonded with Virgil Abloh over their shared love of music) learned from their time together:

> The big lesson […] relates back to Abloh's cheat code, the 3%. 'Whereby,' asserted Abloh, a creative only has to add a 3% tweak to a pre-existing concept in order to generate a cultural contribution deemed innovative –for instance, a DJ only needs to make small edits to innovate a song. Likewise, a designer would only need to add holes to an iconic handbag to leave his mark. […] Some things are iconic already, you just wanna upgrade it to give it a little bit of oomph. (2022, p. 140)

Zeitgeist enables a synchrony that produces sameness which is driven by technology rather than culture. Iconic architectural concepts and imagery need only be tweaked by the image creator using available technology to become culturally relevant.

NOTES

1 https://www.internetlivestats.com/
2 Gauteng was listed by De la Porte & Zamboni (2017) as the second largest metropolitan area in Africa with a population of 13.4 million people, just below Lagos with 14 million. Note that Gauteng is historically made up of Johannesburg, Pretoria and surrounding townships as originally planned by the apartheid government.
3 https://worldpopulationreview.com/world-cities/maputo-population
4 https://flaneurxruin.com/

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Article available at

DOI: 10.6092/issn.2724-2463/16111

How to cite

as article

Greyvensteyn, P. (2023). Tracing zeitgeist: the cyberflâneur and their smartphone. *img journal*, *8*, 106-125.

as contribution in book

Greyvensteyn, P. (2023). Tracing zeitgeist: the cyberflâneur and their smartphone. In Luigini, A. (Ed.), *img journal 08/2022 Imaging and Imagery in Architecture* (pp. 106-125). Alghero, IT: Publica. ISBN 978-88-99586-36-2

THE ARCHITECTURAL ILLUSTRATOR: A KEY FIGURE IN VISUAL COMMUNICATION

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ESSAY 129/08

ARCHITECTURAL ILLUSTRATION
COMMUNICATION
DRAWING
RENDER
SURVEY

In contemporary architectural practice a key role in visual communication is performed by the illustrator. This professional shares the expertise of the architect, master of a strictly technical-engineering language, and the artist in the broadest sense of the term. For an architect drawing is a means, for the illustrator an end in itself. As a mediator between the designer and the general public, he must be able to deeply understand the architect's thoughts, translate his ideas into images and convey the correct message to the audience. Sometimes visual messages, though obvious to the illustrator, can be unclear for the observer and generate misleading responses. In these cases the type of image has great importance being a sort of language more or less understandable. This paper reports on a survey that was created in order to assess some of the fundamental elements that characterize the visual products. It was carried out at the Department of Architecture and Design, University of Genoa, and its results support the thesis that the architect's idea and creative spirit can best be conveyed by a hand drawn image, whether traditionally or digitally executed, rather than a computer-generated image such as a photorealistic render.

INTRODUCTION

The illustrator, the architect, and the digital world

Visual representation can be considered as a form of figurative language that translates the initial mental speculations of the design process into images. The literature on the subject reveals the difficulty in labelling a graphic work that, owing to its very nature as a mental product, can hardly be codified. However scholars have brought their attention to the relationship between image, drawing and visual perception (Arnheim, 1974; Guillerme, 1982); in particular, some of them studied architectural imagery focusing on its role in communication between designers and audience (de la Fuente Suárez, 2016; Hardenne, 1994; Meisenheimer, 1987; Oechslin, 1987).

The communication and artistic relevance of architectural imagery has always been paramount, so much that a specific professional figure has traditionally been devoted to that end. Architectural illustrator, illustration artist, visualization artist, visualizer are some of the names used to connote the role of the professional dealing with images in an international studio. The nomenclature is actually rather confused and not univocal even in the most acclaimed companies involved in worldwide business. This uncertainty about the definition of a professional role that has been paramount in architectural practice for such a long time, and which is timidly returning to appear in the contemporary world of design, is perhaps one of the many consequences of the drastic change that has taken place in the conception and representation of the architectural project due to the intensive use of the computer. The architect is also a draftsman and for a long-time drawing skill have been necessary to perform his job (Jarvis, 2018). Architects used to draw to assimilate, learn, study and remember (Fisher, 2014). For this reason, since the sixteenth century, a good practice in the training of a young architect was to travel, possibly on the *Grand Tour*, and return home

with sketches, drawings, and notes (Lever & Richardson, 1984). Today this preliminary work is almost entirely replaced by digital images that are closer to a visual memory rather than a process of perception and awareness. The contemporary architect's graphic production has found technological devices to be an excellent tool to make work easier and faster.

The possibility of creating settings perfectly adherent to reality and the advantages of a computer system that can easily create, modify, share, and store images, quickly fascinated the design professionals who, in the last twenty years, encouraged training in architectural and engineering software (Amoruso, 2008). However, questions have lately arisen about the effectiveness of communication by computer-generated images. The architects themselves have noticed a progressive 'standardization' of their work and discovered faulty control over the message conveyed by the final visual product (Carrillo de Albornoz & Calatrava, 2018; Pallasmaa, 2009). In the collective imagination freehand drawing remains anchored to pen and paper, with the obvious limitations of the time and personal skills required by the medium used. Some major international studios, such as the one founded by Nikken Sekkei in Japan, make of hand drawn images their distinctive strength (Yamada, 2022). An entire team of draftsmen and watercolourists, under the direction of Masaki Yamada, is dedicated to the manual rendering of large-scale projects, and the drawings, often used in public expositions, in presentations to jury committees or to clients, are preferred to digital images for their communicative and imaginative imprint.

As asserted by Yamada (2008):

> The strength of a hand-drawn illustration is its ability to convey inspiration intuitively, exuding charm and warmth to spark the imagination. And it's the fastest way to visualize thoughts and feelings, to create a picture with minimal information while also showing the process. (p. 8)

Another renown international studio which makes wide use of hand drawing with watercolour is Steven Holl's. He himself has the habit of sketching projects by hand and had started with pencil drawings, but later said,

as reported by Keskeys (2023):

> Around 1979, I streamlined it to five-by seven-inch watercolors. With the watercolor, in the quickest way, I can shape a volume, cast a shadow, indicate the direction of the sun in a very small format.

No doubt, the fast swirl of watercolour could match in speed the flow of ideas and even serve as a new inspiration. Not every architectural practice may have the resources and the time required to create ink and watercolour illustrations. Fortunately, these difficulties can be overcome by modern hardware and software, which allow drawing and painting with similar visual and haptic perception in a digital environment, where erasing, corrections, superimpositions, changes of brushes and colours are as easily done with a click. This way digital freehand drawing is not an oxymoron (Richards, 2013), but a reality brought to us by the graphic tablets and sophisticated raster software, which is being exploited by some, perhaps still too few architectural studies (Jacob, 2017; Leandri et al., 2022) (Figure 1).

The return of hand drawn images

The use of hand drawings makes it easier to characterise the crafts coming out from a studio, more or less as much as it is possible to recognise the style of a painter, whilst it would be hard to assign authorship by just looking at a photograph or a photographic render. Firms like Foster + Partners, Zaha Hadid Architects, RPBW and others have been able to use the 'graphic sign' as a branding strategy for their company. The recognition of the architectural studio is of vital importance, as it is for any company willing to be competitive in the market. Therefore, drawing is not only a means to provoke emotional re-

Fig. 1 Gaia Leandri, 2022. Handmade digital illustration on a Wacom tablet..

sponses in the observer, but its adaptability and communicative strength become powerful tools in defining the brand identity (Figure 2).

The use of hand drawn images has historically proved to be a winning strategy. Frank Lloyd Wright is most remembered both for his designs and for the original drawings that combined the technique of monochrome geometry for the projected building with the appealing atmosphere of the surroundings, a kind of composition which is now recognized as the first board of the modern presentation of a project. The outstanding drawings, protagonists of many exhibitions and books, were mostly made by Marion Mahony Griffin, one of the first female architects in America at the beginning of the last century, whose great communication skill Wright so much appreciated that he

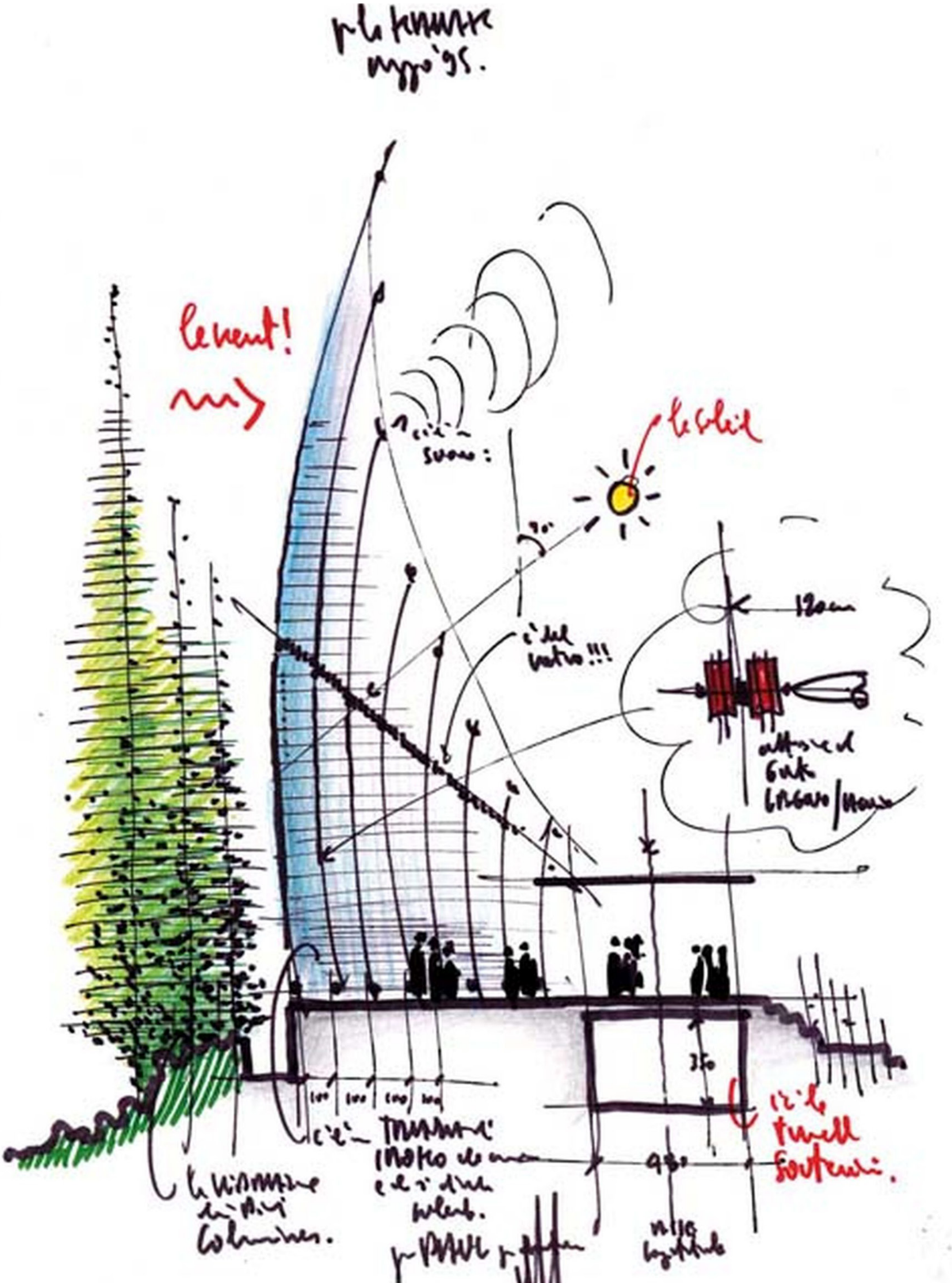
le vent!

Fig. 2 Renzo Piano (RPBW) 2013. *Diagram of a case at Jean-Marie Tjibaou Cultural Centre*. Retrieved December 10th, 2022, from <https://commons.wikimedia.org/wiki>. The typical style of the studio with pale yellows and azure colours is well blended here with characterising pencil strokes. Licensed under Creative Commons Attribution.

wanted her as the leading member of his staff to illustrate some of his projects (Allaback, 2008; Pregliasco, 1995).

In more recent times, the drawings of Helmut Jacoby, an architect who devoted himself exclusively to architectural illustrations, proved to be successful in international competitions, in the United States and in Europe (Jacoby et al., 2001). His deceptively simple drawing, where the accurate depiction of buildings is mingled with the presence of human figures acting in everyday situations, became a paradigm for other illustrators. Even today his style is a mark for Norman Foster's illustrations with whom Jacoby worked for many years.

In the contemporary scenario, where digital tools are more and more affordable, the quality of photorealistic renders is no longer discriminating for the recognition of the architect. The purpose of the render is to portray reality as accurately as possible, and this limits the identification of the author. The final product is not only a work created using a computer but does not present any element of graphic recognition. This is why many studios today require the creation of a unique and easily identifiable style, in order to gain more visibility for their products in a now crowded and globalized panorama. The purposes are multiple: from advertising, exhibitions, to publications meant to become momentous.

Freehand drawing –on paper or tablet– is therefore returning to be a protagonist in the world of architecture, combining the lines and preparatory sketches with the artistic repertoire of textures, colours, lights, and shadows, to cover the whole process of the architectural project, from its genesis to the final presentation.

METHODOLOGY

Aims of the research

The aim of the investigation was to assess if a hand drawn image would better be suited than a photorealistic render to transmit the architect's message. The brief research

reported here was performed as a preliminary proof of concept to assess the feasibility and reliability of a simple questionnaire that could be answered quickly and easily.

Subjects

For this first investigation, a limited sample of subjects was chosen from the Department of Architecture and Design of the University of Genoa. The experiment was run in November 2022 during two seminars held by the author at Department of Architecture and Design, tackling the issue of the effectiveness of visual communication. All participants attending the seminar took part in the test, for a total of 39 test takers including 4 teachers, 8 PhD students and 27 first-year students. Taking the test required approximately 15 minutes and was followed by the discussion of the results. Age ranges of participants are summarised in Table 1.

age	number	%
<=19	1	2.6
20-29	29	74.4
30-39	4	10.3
40-49	1	2.6
50-59	3	7.7
>=60	1	2.6

Table 1. Age ranges of participants.

A performance based questionnaire

A simple questionnaire was created, whose results were meant to be based upon performance of the test takers rather than on their personal judgement (with the exception of the engagement section). No psychometric assessment was required, as it would inevitably be strongly subjective, a characteristic that flaws the large majority of investigations on architectural imagery. The test was structured so that in future research it could be submitted to a large audience of both educated and uneducated takers, on the web. The questionnaire was created on *Typeform*©, a platform that allows to combine images and text. It was a one-stem multiple-choice type with correct answer scored 1 and wrong answer scored 0 (Ng & Chan, 2009). The position of correct answer in each question was randomised by the Typeform© platform. All questions, with the exception of the engagement section, were automatically randomized by Typeform and presented to each participant in a different order. The questionnaire was articulated in three

main sections based on previous experience (Leandri et al., 2022): communication, recognizability and engagement.

Communication section

It is not unusual that in an urban planning image –an overall view with the insertion of the project in the context– the observer may not know where to look or, even worse, could focus on the wrong building. This uncertainty is a sign of weak communicating ability by the image. This section, containing questions 1 and 2 was named 'communication', meaning that it was aimed at assessing how much the visual message (vignettes) would communicate to the observer its meaning as novelty and originality of a newly designed project, to be recognized among others already existent. The comparison was between hand drawn illustrations versus photorealistic renders: which of the two would best communicate to the onlooker. Question 1 showed a vignette with a hand drawn image which illustrated a new project among other already existing city buildings. Four vignettes with already marked different buildings were offered as possible solutions. Only one marked the correct new project. Question 2 was analogous to 1 but now photorealistic renders showed the project. The test takers were asked to choose the correct vignette which highlighted the architectural project, so the answer would only be linked to the ability of the subject to read the communication of the vignette, which can be considered as an objective parameter.

Recognisability section

In a world of increasingly standardised projects, recognition of the image style at the first glance can be of crucial importance. So, in this part of the test, the participants were asked to recognise the images based on a set of drawings and renders of the same architectural practice (Figure 3). The goal was to assess how much the 'sign' of the project's author could be recognised in hand drawn illustrations compared to photorealistic renders. The test takers were

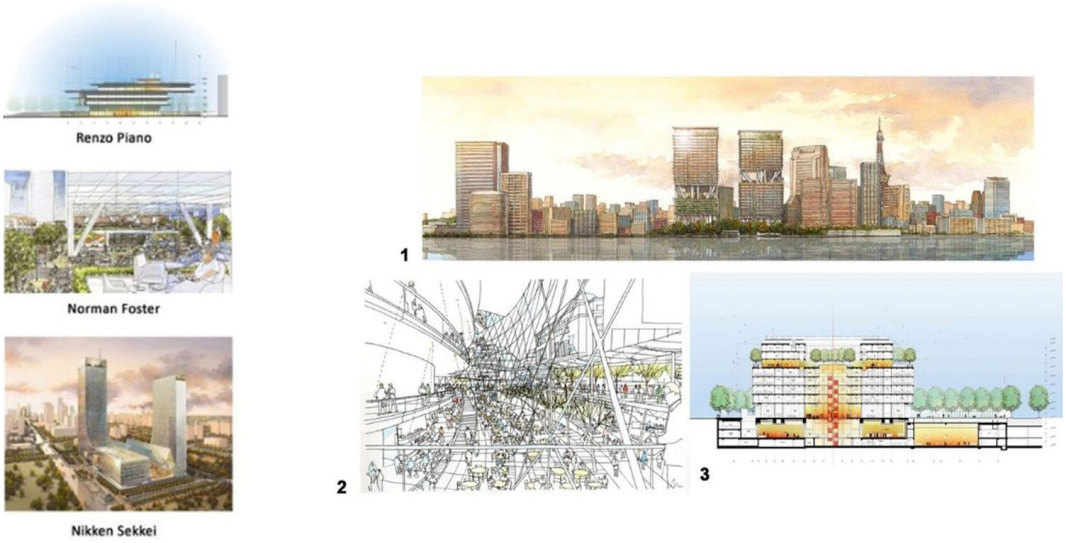

Fig. 3 Gaia Leandri, 2022. *Recognisability section of the questionnaire*. The set of reference drawings and the three images to match with the correct architectural studio. In the left set: *Whittle School*, USA, Renzo Piano. Retrieved December 10th 2022 from <http://www.rpbw.com>; *Haknook Headquarters*, Korea, Foster&Partners. Retrieved December 10th 2022 from <https://www.fosterandpartners.com>; *Botanic Garden*, Russia, Nikken Sekkei. Retrieved December 10th 2022 from <https://www.nikken.co.jp/ja>. In the right set: 1 *Undefined*, Nikken Sekkei, Retrieved December 10th 2022 from <https://www.nikken.co.jp/ja>; 2 *Swiss Re House*, UK, Foster+Partners. Retrieved January 7th 2023 from <https://www.pinterest.it>; 3 *Whitney Museum*, Renzo Piano. Retrieved December 10th 2022 <from http://www.rpbw.com>.

first shown 3 hand drawn images authored by as many famous architectural companies, and 3 photorealistic renders from the same, in order to familiarise themselves with each company style. In question 3 a set of 3 new images by the same companies was shown, unlabelled: the test takers had to pick up the correct combination of authorship just recognizing the style of the illustrations among 6 possibilities. Question 4 was analogous to 3, but this time the images were photorealistic renders. As much as in the first section, here the subject's answers would be linked to the ability to match image styles, providing an objective result.

Engagement section

Differently from the first two sections, characterised by performance driven answers, this was intentionally meant to record the subjective opinion of each subject on hand drawn versus photographically rendered images. Here the test takers were asked to express a preference between two images illustrating the same interior project, in questions 5 and 6. They were not asked to justify the choice, nor to give a qualitative assessment of the image, but only a spontaneous

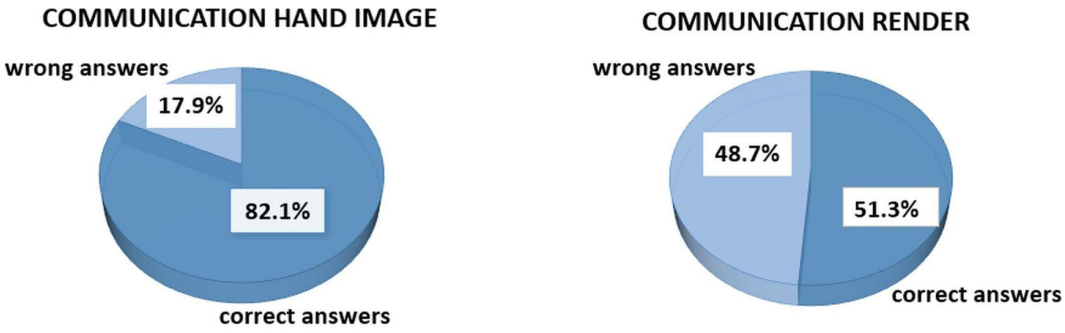

Fig. 4 Gaia Leandri, 2022. *Communication section*. The test on communication detected a very significant difference between the performance on hand drawn images compared to the photographic renders.

preference. The test was a one stem, two choice type (Ng & Chan, 2009). The aim of this section was to detect possible differences between a choice based upon an objective performance and an aesthetical preference, and to demonstrate, if possible, the robustness of the first two sections (communication and recognisability) of the test.

Statistical analysis

Comparisons between the results of correct and wrong answers (classified as categories) to hand drawn images and photorealistic renders (classified as groups) were performed with a chi-square test and a 2x2 contingency table, setting the significance threshold at $p<0.05$.

RESULTS

Communication

The first two tests were aimed at evaluating the ability of the images to convey a specific message. In questions n. 1 and n. 2 (recognizing the correct building in 2 different hand drawing images) the test takers scored an average of 82.1% of correct answers (Figure 4, on the left), compared to the 51.3% of correct answers in the photorealistic render questions (Figure 4, on the right). The difference between correct and wrong answers for the hand drawn

image versus the photographic render performance was very significant, with a chi-square statistic of 8.3077 and p-value of 0.003948.

Recognisability

In questions n. 3 and n. 4 (matching each image with the correct designer) the test takers scored a total of 69.2% correct answers for the hand illustrations (Figure 5, on the left), and 23.1% correct answers for the renders (Figure 5, on the right). The chi square test statistic for the contingency table gave a result of 16.7143 and a p-value is 0.000043, indicating a very high significancy.

The difference between correct and wrong answers for the hand drawn image versus the photographic render performance was very significant, with a chi-square statistic of 8.3077 and p-value of 0.003948.

Both in communication and recognizability, the hand drawn images scored significantly better than the computer-generated images, a clear sign of the greater effectiveness of those images.

Engagement

The last part of the questionnaire, engagement, investigated preference. It was obviously based upon a subjective judgement and provided quite different results from the two previous tests based on the performance of subjects.

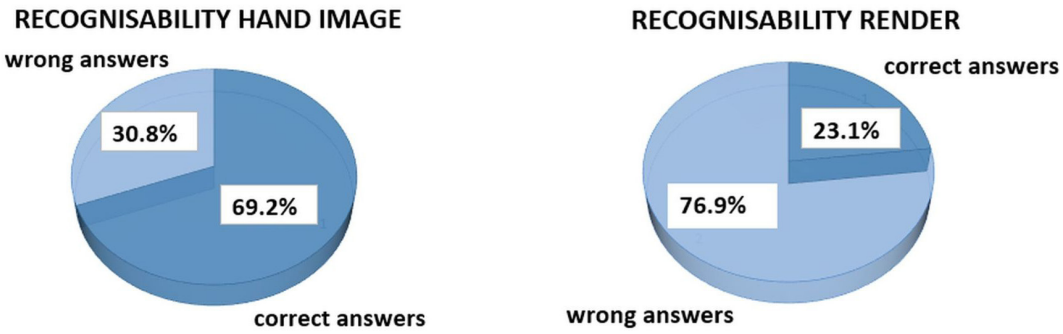

Fig. 5 Gaia Leandri, 2022. *Recognisability section*. The performance in recognisability confirmed the trend seen in communication, with the hand drawn image scoring much better than the photographic renders.

It showed an almost identical percentage (no statistically significant difference) of preference between render and illustration with a slightly better score for illustration (59%) compared to the rendered image (41%) (Figure 6).

DISCUSSION

Hand drawn and photographic rendered architectural images in previous investigations

Dichotomy between digital and hand drawn images has been the object of studies enquiring whether digital images could better be perceived especially as communication of the architect's intents (Bates-Brkljac, 2009, Iñarra Abad et al., 2013). The results were partially dependent on the background of the audience, mainly whether they were architects or other professionals. Computer generated images were generally perceived as more accurate and realistic than traditional illustrations, a characteristic mainly appraised by the non architects (Bates-Brkljac, 2009). Architects preferred artistic images and paid attention to attributes as innovation and functionality, whereas non-architects preferred photorealistic images and paid attention to the wellbeing feeling conveyed by the digital image (Bates-Brkljac, 2011). One more important issue is represented by meeting the consumer's preferences and needs, as already occurs in the field of industrial design (Iñarra Abad et al., 2013; Llinares Millan & Iñarra Abad, 2014) and where digital images are perceived as definitely more realistic, though there might be some reservation as to the consumer's attention not being driven towards the object as much as in a hand drawn image. It is worth noting that in competition juries and even in the academic environment, when architectural or design students are involved, digital imagery are often preferred (Basa & Şenyapih, 2005; Şenyapili & Basa, 2006).

The unreal reality of simulation and the biological ambiguity

No doubt, the production of an image which depicts in all living details and shades of light something yet (or ever) not existing may appeal the general public and apparently make an architectural project more convincing. The likeness of a photorealistic render with an actual photograph, including detailed specific stereotypes of the daily life, makes the simulation hidden and creates in the public extremely positive expectations, not matching with the future more trivial reality.

According to Bernath (2007):

> The co-existence of both the realistic view and the fictional vision as a new simulated reality problematises the distinction between experiences of natural reality and experiences of artificial photo-reality. Rendering cuts through the naïve trust we have instilled in photographic images because our perceptual framework is confused by conflicting messages: 'This must be real!' and 'This cannot be real!' (p. 57)

The permeating advancement of artificial intelligence applied to imagery will permit an ever more exasperated commixture of real and unreal worlds, with ever more undefined boundaries between utopian and dystopian visions. All these are artificial environments creating a com-

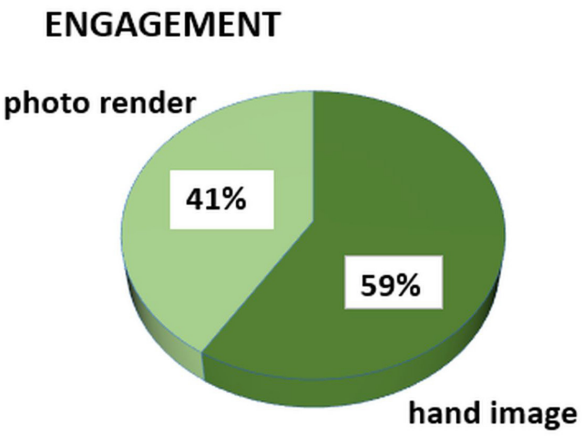

Fig. 6 Gaia Leandri, 2022. *Engagement section*. Test on engagement, which was aimed at recording the subjective preference.

pletely controlled and predictable experience. Such characteristics make the simulation of reality a provider of well being feeling, where the individuality, creativity and ambiguity are ruled out (Scheer, 2014). Although the property of ambiguity in an image may at first be regarded as undesirable, this is a paramount requirement to understand art as it matches the multistable behaviour of the human brain (Yevin, 2006). So, we may surmise that an ambiguous image, like the hand drawn one, will attract attention, will be watched, in contrast to a well defined photorealistic render, where nothing is left to imagination and which will only superficially be looked at. This is why a hand drawn image might better convey the feeling of the author who will permeate it with biological ambiguity and unconscious messages. Such messages, reflecting his creative spirit, can only be received through a handcraft, since no such properties, by definition, can be found in digital systems.

The answers, performance versus preference and the biological basis

The questions were proposed to an educated public, mostly would be architects and designers. It was reasonable to expect that the large majority of them would have provided correct answers whether confronted with hand drawn or photographically rendered images. Nevertheless, the results showed that there were very definite difficulties in detecting the elements that should have singled out each image in the photographic renders of section 1, whilst a large majority of correct answers were scored with hand drawn vignettes. The same result was attained in section 2, where studio styles were easily recognised in hand drawn vignettes but not in renders. We have to assume that the performance of the test takers was dependent on several factors, most of them probably acting below the level of visual conscious perception and leading the decisional process for the correct answer, completely disjointed from aesthetical judgement. On the other hand, the section 3

on engagement asked a preference which demanded an opinion only based upon aesthetical features. Here most subjects that had previously scored better with handmade images, declared to prefer photographic renders. It may be supposed that in this latter case the brain processing of the visual information went through different channels linked to a greater awareness by the subject, mainly based upon "visual primitives" that provide just a selective aesthetical information of the image, without exploring the more hidden messages (Gilbert, 2013). Hence the same individuals could provide two different types of answers: hand drawn images are felt to be less glamorous but carry more relevant information for a business-like decision.

The neural mechanisms of the above process have just started to be understood, and we are still a long way to fully comprehend them. Nevertheless, at a more practical level, it often happens that the architectural illustrator is asked to redraw by hand very realistic photographic renders, that the architect feels do not convey the correct message to the observer. The hand illustration allows a 'control' of the attention of the observer through some graphic tricks –colour, saturation, contrast, detail, and a few others– that might then be processed consciously and unconsciously by the user. By the same token, the illustrator, either consciously or unconsciously characterises the images with a definite personal style, usually identified with the one of the studios. Such elements of communication and identification are lost in a photorealistic image. In this case, the final user can only rely on his/her knowledge of the design style of the architectural object, a knowledge that only specialists share, leaving to the lay public just the chance of a lucky intuition and, so, making things difficult for a correct overall understanding (Bistagnino, 2020). On the contrary, the sign, the signature style of the designer, seems to lead to a more distinguishable and noticeable product, contributing to "selling" the architectural brand (Bardola, 2021; Malagugini, 2018). There is probably an unconscious emo-

tional connection to the personal style of the hand drawn image. Whether in a positive or negative way, it is still recognized as a 'work of art' and not as a digital product of a computerized process where empathy gets lost in the artificial perfection of the image.

Weaknesses of the investigation

The results of the tests can be influenced by the images chosen, so there might be a bias on the side of the test maker. Such drawback, anyway, is present in all tests based upon images and is independent from the test modality. In our case, extra care has been used in choosing images with similar contrast, brightness and possibly style. No instrumental assessment of image qualities has been performed in our investigation; in future research this could better ensure equivalence between image sets.

Recruitment of test takers is another potential distorting factor of test results in general. Of course, the reported investigation was very limited, and it would be interesting to extend the research to wider audiences, also involving people with no architectural experience.

CONCLUSIONS

The architectural imagery is a feature of major importance today as it was in the past centuries. The advent of digital technologies has brought attention to new kind of illustrations, without dwarfing the traditional drawing. Digital drawing tablets are easily available as almost perfect replicas of traditional drawing tools as pencil and paper. Even the haptic sensation of handling the pencil and running its tip on a coarse sheet of paper can be imitated, leaving apart the pressure, inclination, rotation of the drawing instrument. Recently architects and scholars have reassessed manual skill for a better visual communication. Previous investigations had shown that

photorealistic images were judged by observers as more adherent to reality (Bates-Brkljac, 2009; Iñarra Abad, 2014). For this reason, these types of images have widely been used for final presentations of projects. Photorealistic rendering though, while necessary in some circumstances to provide detailed information on future results, may lack qualities that are still relevant in visual communication. This questionnaire, amongst other recent studies, has shown that the freehand illustration, so often discharged in favour of the render, is still the only way for the designer to have full control of the image and its communication ability. Therefore, the two methods should coexist as each of them pursues a different but complementary purpose.

ACKNOWLEDGEMENTS

The investigation reported here is part of the research framework of the Department of Architecture and Design dedicated to the visual language in collaboration with the *Interdepartmental Centre for Visualisation* of the University of Genoa. The tests were run during the seminars held by the author as part of the joint lectures for the *Doctorate in Architecture and Design*, *Doctorate in Digital Humanities* and the teaching programme of the Sea Centre at the University of Genoa.

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Article available at

DOI: 10.6092/issn.2724-2463/16115

How to cite

as article

Leandri, G. (2023). The Architectural Illustrator: A Key Figure in Visual Communication. *img journal*, *8*, 124-145.

as contribution in book

Leandri, G. (2023). The Architectural Illustrator: A Key Figure in Visual Communication. In A. Luigini (Ed.), *img journal 08/2023 Imaging and imagery in architecture* (pp. 124-145). Alghero, IT: Publica. ISBN 9788899586362

WISE DESIGNS FROM UNCERTAIN HANDWRITING AND NEW COMMUNICATIONS

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ARCHIVE
MODEL
INTERPRETATION
COMMUNICATION

This brief study investigates some undated drawings by Eileen Gray, which are kept at the *Victoria and Albert Museum* in London. Uncertain graphic clues, verbal notes and similarities of sign, may lead us to assume that some of the representations were produced close to the end of the Second World War while others, and this is confirmed, just after 1950. However, the extraordinary compositional strength, the indecision of the sign but not of the idea, the unfinishedness that suggests an aftermath, make these drawings timeless and, likewise, waiting for a future. For these reasons, going beyond the fences of a defined and circumscribed temporality, Eileen Gray's representations refer to a digital reading that can highlight the contemporary characteristics of her architectures; on the other hand, the idea of living inherent in the Irish artist's most famous house, the E1027 of 1926, in which container and content make up the uniqueness of the image, is still a reference for many designers today.

Through the graphical investigation of some of Eileen Gray's drawings, the outcome of a hermeneutic process, this contribution attempts to link apparently uncertain patterns to new images that may make it possible to overcome both an enigmatic reading of these projects and the temporal limits within which they are contained. The digital models produced will help to bring these projects back to life and make them real.

INTRODUCTION

Eileen Gray was one of the most important figures of the Modern Movement who worked until the 1960s in deliberate isolation. She was rediscovered more as a designer than as an architect in the late 1970s, soon after her death. A figure who remained in oblivion for about thirty years because she was overwhelmed by a spectacularity that did not belong to her.

His architectural production, at least the one known in glossy magazines, is essentially limited to the house in Roquebrune-Cap-Martin, built between 1926 and 1929, which represented a *unicum* in the panorama of the Modern Movement and at the same time an extraordinary case study for research on architectural criticism, which elevated the building to an exemplary model.

There are many architectural projects in the archive that were never realised by Gray, covering a period of time between 1926 and 1961.

After 1932, the year of the end of her relationship with Jean Badovici, her life partner with whom she lived in the house in Roquebrune, Eileen Gray led a very reserved life almost as if she wanted to disappear from the scene. During this period, she devoted herself to a number of works includ-

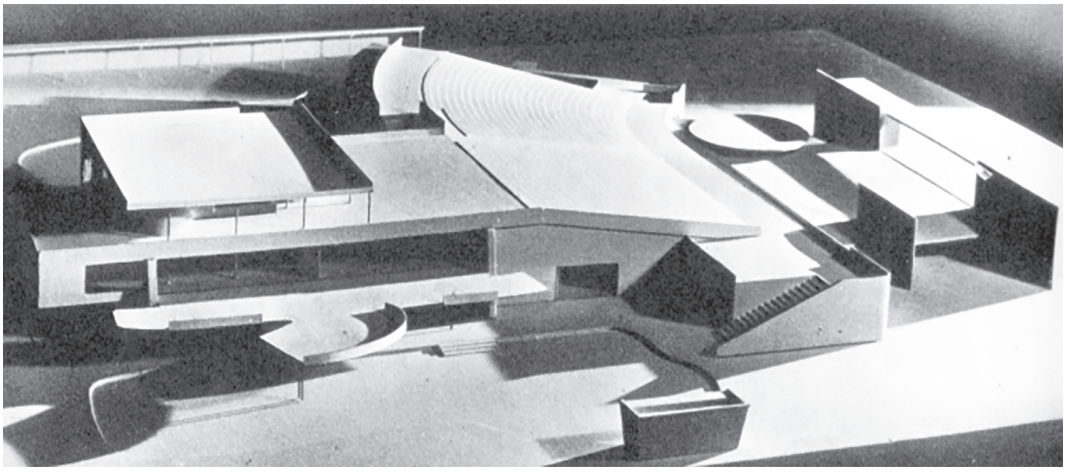


Fig. 1 Eileen Gray. Project for a Social and Cultural Centre. Model photo. London, V&A Museum.

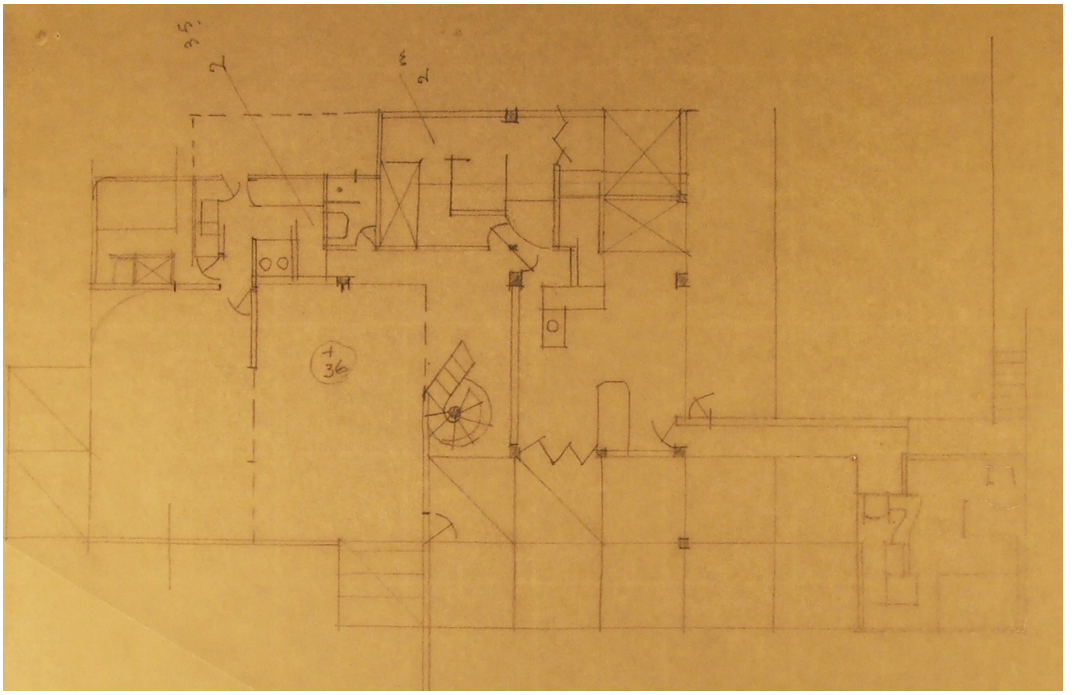
ing the *Two-storey House*, which was certainly drawn up during the Second Great War, the proposal for a *Social and Cultural Centre* (Figure 1), the revisitation of some previous projects and others for hypothetical clients.

After 1956, the Anglo-Irish artist decided to build her own portfolio by collecting the projects to which she was most attached. This date is very significant because in the same year Badovici died and the UAM decided to organise an exhibition in his honour; on this occasion E1027 was attributed to Jean Badovici with the collaboration of Eileen Gray for the furniture. Probably this unfortunate episode induced Eileen to collect some of her work in a systematic way, to try to remedy the macroscopic attribution error: Eileen's portfolio represents a kind of architectural autobiography.

THE *TWO-STOREY HOUSE*

The design drawings for the *Two-storey house* were drawn up as early as 1942. This date can be traced from the only biography on the Irish artist, and Parisian by adoption, written by Peter Adam in 1987, in which the author states that in 1942, Jean Badovici sent Eileen a letter with a plan attached; it concerned a plot of land purchased by the Romanian architect, probably in Casablanca, for which Badovici asked Eileen to draw up a plan.

The archives of the *Victoria and Albert Museum* only hold three sheets relating to the project. Peter Adam claims that Gray produced many drawings and even a model for this project, material that was lost when German troops destroyed the flat in Saint-Tropez in 1944, where Eileen found refuge during the war and where she continued to work.It is not possible to know how many designs Eileen produced, whether Badovici wanted to build a house for himself where he could spend his future holidays or whether he took a commission and asked Eileen for help, as was often the case. One can only speculate, however plausible.



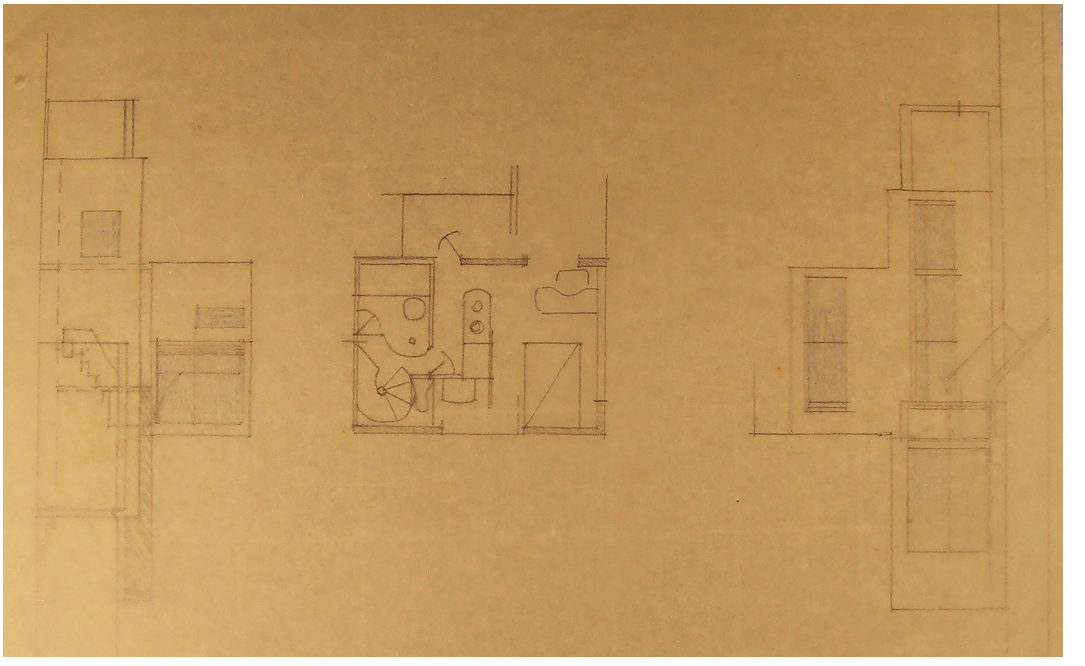


Fig. 2 Eileen Gray. Project for a *Two-storey house*, 1942. Ground floor plan. London, V&A Museum.

Fig. 3 Eileen Gray. Project for a *Two-storey house*, 1942. First floor plan and fronts. London, V&A Museum.

The representations received are orthogonal projections regarding plans and elevations (Figures 2, 3). They are drawings that seem incomplete and appear uncertain if one refers to a canonical representation; the reading of the spaces is not immediate and one must observe them carefully to understand the articulation of the project.

Most probably, due to some uncertainties of the stroke, the transparent support and the presence of a modular repetitiveness, it seems evident that Eileen used graph paper for the drafting of these drawings. Their apparent uncertainty disappears when a closer reading is made.

The drawings relating to E1027, which are kept in the archive, also contain the same uncertain handwriting as the *Two-storey House;* the ink drawings relating to it are posthumous to its construction and were made for dissemination and not for its actual construction.

The relationship between drawing and design in Eileen is evident; her handwriting coincides with her imagination and the building site is the shaping of her idea.

This concept was wisely expressed by Alvaro Siza in a his paper:

> speaking in general terms, those who choose to do architecture do not need to 'know how to draw', let alone 'draw well'. Drawing, understood as an autonomous language, is not indispensable to design. Much and good architecture has been and is done in bengal [...] However, as far as drawing is concerned, any child expresses himself with freshness and rigour; as do misfits and madmen. Drawing is a form of communication with the self. (Siza, 1997, p. 17)

The few uncertain representations that have survived induce an attentive reader to enter the interstices of the project and imagine a possible spatial articulation. Gray's drawings are thus images that solicit the construction of new images and in this sense their communicative power lies in the solicitation of an imaginative journey.

Representations such as those of the *Two-storey House*, destined to remain in drawers, find their meaning today thanks to

the work of those who keep the archives; these drawings are not only testimonies of a way of drawing but are above all images of a way of thinking that is absolutely current.

Eileen Gray's thinking in fact anticipated many themes in architecture and design, making her one of the pioneers of contemporary architecture.

In this sense, in 1968 Joseph Rykwert wrote in the pages of Domus about the E1027 "such a total intervention of the designer in the creation of the environment today is not an exception, but in the 1920s it could be said to be an anticipation". (Rykwert, 1968, p. 33)

The *rediscovery* of Gray's work after his death leads to a number of considerations: firstly, it concerns his production, the characteristics of his work demonstrated a modernity that was unusual for his time; secondly, it should not be understood as a homage to historiography but as an indication of the modes of design; thirdly, finally, it is that his way of looking forward to an uncertain future takes on contemporary connotations. This last consideration explains the extent to which the designs of the *Two-storey House* are to be understood as suspended in time, a character of timelessness is to be attributed to them.

All of Eileen's projects are different from each other, although some procedural similarities can be traced. The design of the ground floor of the *Two-storey House* informs us of flexible spaces in which interior and exterior merge into a spatial unicum through large angular openings in the servant spaces.

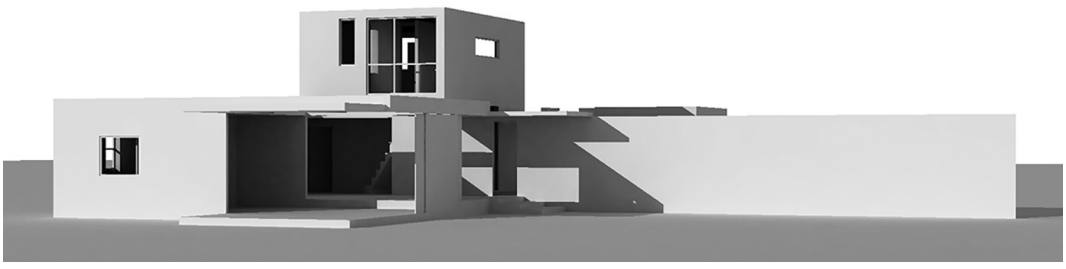


Fig. 4 Eileen Gray. Project for a *Two-storey house*. Redrawing.

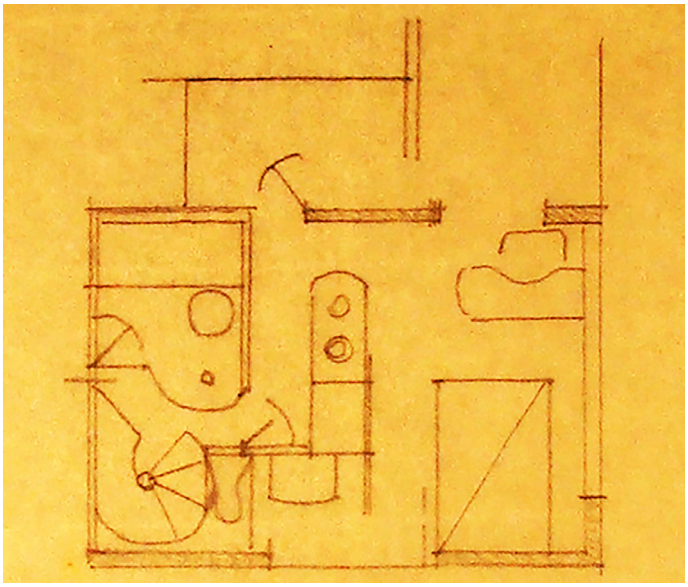


Fig. 5 : Eileen Gray. Project for a *Two-storey house*, 1942. First floor plan. Bedroom and bathroom. Detail. London, V&A Museum.

Eileen, knowing Badovici's way of life, who liked to surround himself with friends and artists, designs a house in the image and likeness of the Romanian architect (Figure 4)

For Eileen Gray, living comes before building, borrowing Martin Heidegger's famous essay; and again, contradicting Le Corbusier, she states that "a house is not a machine to be inhabited, it is a man's shell, his extension, his liberation, his spiritual emanation". (Gray, 1929, p. 16) Observing the plans of the two-storey house, it is evident how Gray, albeit in an apparently schematic manner, pays particular attention to the furnishings of the rooms (Figure 5); container and content are designed together, his architecture is to be understood as a 'work of art in everything'.

SMALL HOUSE FOR AN ENGINEER

The drafting of her own portfolio was an opportunity for Eileen Gray to review a number of projects and rework them. Among these was the *Small House for an Engineer*, which Ste-

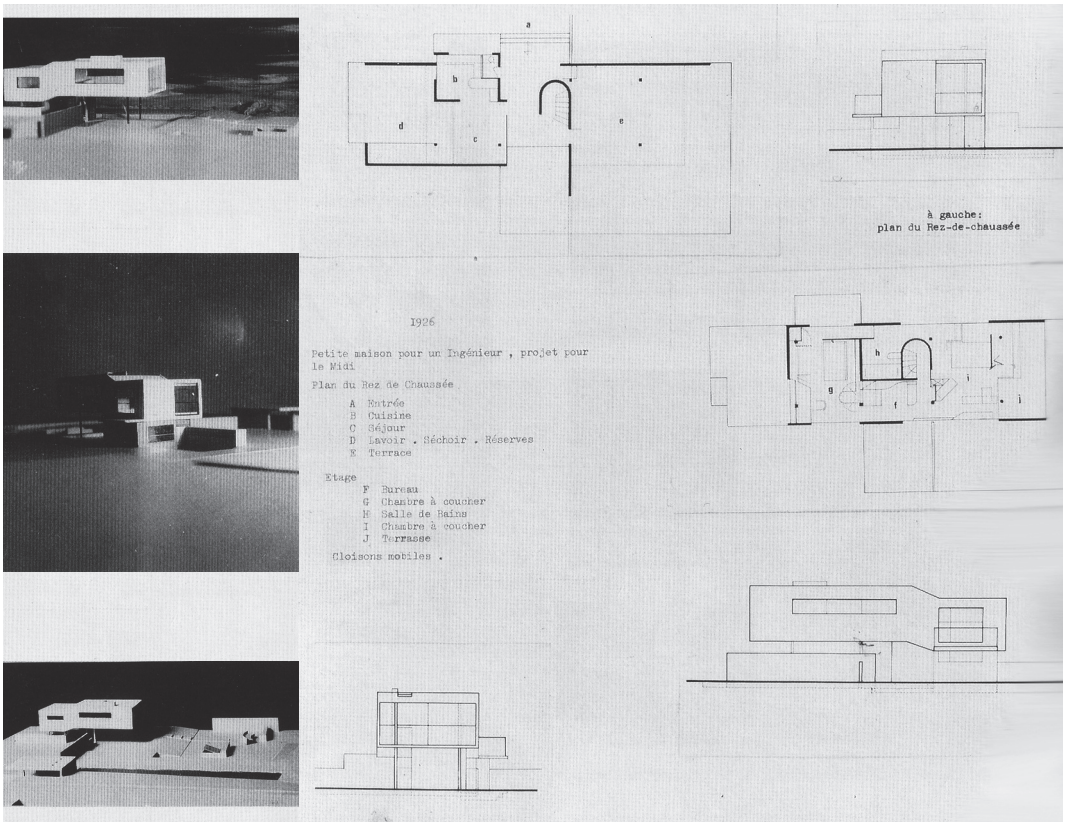


Fig. 6 Eileen Gray. *Small House for an Engineer*, 1926, revised 1952. Portfolio table.

fan Hecker and Christian Muller (1993) date to 1926 and which was redesigned and redesigned by Eileen after 1956. The thirty years between the two design solutions suggest that the Anglo-Irish artist's way of doing architecture was essentially a research on herself and that the project was never considered definitively finished for her. This project can be interpreted as her model house, a kind of theoretical project. It cannot be excluded that some projects associated with hypothetical clients such as *engineer, professor, F.G.*, were exercises on his idea of living, a sort of small graphic and imaginative poems.

The archives of the *Victoria and Albert Museum* hold six design drawings for the *Small House for an Engineer* that deviate, apart from the prominent rectangular footprint, from the layout reworked for the portfolio.

The time lapse between the different elaborations suggests that this project cannot be dated, although paradoxically it could be placed in the 1926-1956 time frame.

The archive drawings concern a general plan drawn in pencil and coloured pencils, a ground floor plan with the upper floor indicated, an ink version of which exists, and three sheets containing three elevations. On the other hand, the 'portfolio table' (Figure 6) contains three photos of the model, two floor plans that are completely different from those in the archive, the three elevations that are identical to those in the V&A and a legend.

The portfolio represents Gray's only way of communicating architecture, orthogonal projections and physical models are the only representations deemed suitable for disseminating his ideas; like the *Small House for an Engineer*, other projects in the portfolio are also shown in the same way, such as the *Elliptical House*, also of extraordinary modernity, and the *Project for a Cultural Centre*. Three-dimensional drawings are not part of Eileen's graphic repertoire, the perspective sketches traced in the archive are in fact very meagre but nonetheless full of meaning; two study drawings concerning the design of a *Four-storey house* are emblematic in this respect (Figures 7, 8).

Gray tried in every way to fill his own gaps in drawing and his knowledge of architectural practice. In this sense Peter Adam recounts that

> Eileen had set up a library containing also specific works on architectural problems such as *Manuel de Perspective et tracé des Ombres à l'Usage des Architectes et Ingenieurs et des Eleves des Ecole Speciales by Planat and Ad Quadratum, Etude des bases Geometriques de l'Architecture religieuse dans l'Antiquite et au Moyen Age decouvertes dans la cathedral de Nidaros* by Fredrik Macody Lund. The subjects of these books show how tenaciously she pursued her studies and recognised the need to learn the codes of representation. Eileen had been, in her student years, interested in architecture, but entirely self-taught; she had no architectural training. (Adam, 2000, p. 172)

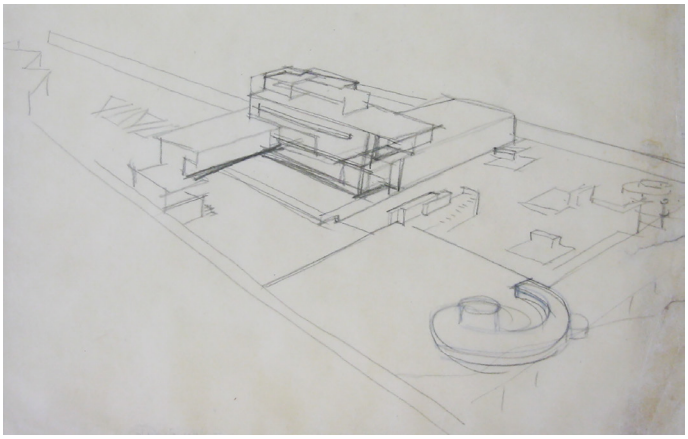


Fig. 7 Eileen Gray. Project for a *Four-storey house*, 1934. Perspective. London, V&A Museum.

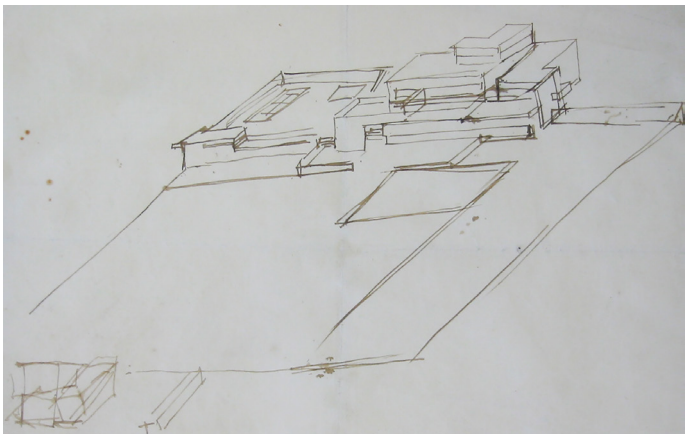


Fig. 8 Eileen Gray. Project for a *Four-storey house*, 1934. Perspective. London, V&A Museum.

However, Eileen had had the opportunity to approach practical issues related to drawing codes. Badovici introduced her to a young architect, Adrienne Gorska, born in Russia in 1898 to a Polish family. Adrienne had met Badovici at the *École Supérieure d'Architecture*, where they had both been students; she had just graduated and was designing a building. Adrienne involved Eileen in the project and taught her the first steps in the direction of architectural design. However, Eileen had to feel like an amateur as she continued to study in secret. She realised the importance of drawing practice, but her character would not allow her to ask for help from the architects

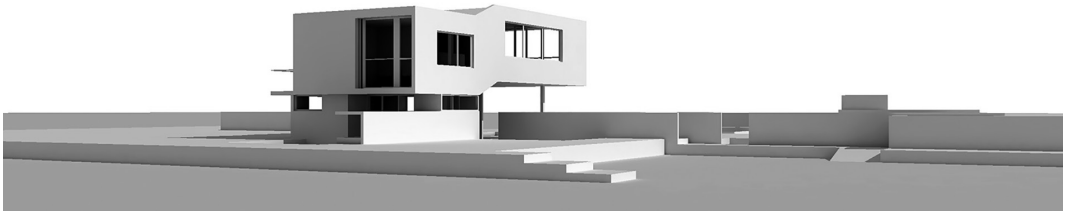
she knew. Perhaps she could have confronted Mallet Stevens or Pierre Legrain, who had asked her to collaborate together, but –probably– the fact that she was both a woman and an amateur architect led her to get closer to small professionals, always remaining distant from the lights of the architectural scene. "I regret that I did not learn a lot about façades, but there are not many people I could have learned from" (Adam, 2000, p. 172), Eileen must have felt lonely, perhaps she would have liked to go back to her De Stijl friends but she did not dare, and continued to make plans for imaginary houses, such as the adaptation of Adolf Loos' house

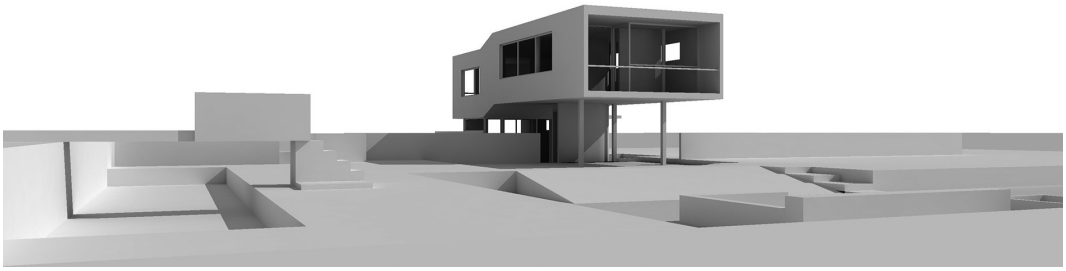
COMMUNICATING UNCERTAIN SPELLINGS

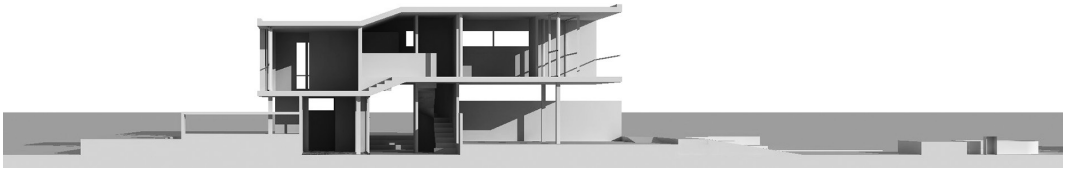
Eileen Gray's projects, those that have remained in the drawers of the archives and are little known, such as the *Two-storey House* or the *House in Boulevard des Madaleine,* require a contemporary graphic reading like the projects themselves. Investigating Eileen's works through new three-dimensional representations is not only a tribute to the artist but also an offering to architectural historiography and to that part of history that has deliberately isolated Eileen in her extraordinary limbo, made up of continuous artistic research on herself.

To communicate the uncertain handwriting of some of his projects, the three-dimensional model was chosen as the method of restitution of Gray's thought; this may seem a banal and in some ways obvious choice, but it is not so. It is well known that the three-dimensional model is not an outcome but a starting point. In the case of the restitution of Eileen's designs, images were produced in a style that Eileen would certainly have appreciated, that of her *maquettes* (Figures 9-12).

Only if a close relationship is established between the I-investigator (the draughtsman), the object investigated (the project) and the subject investigated (Eileen Gray) can new







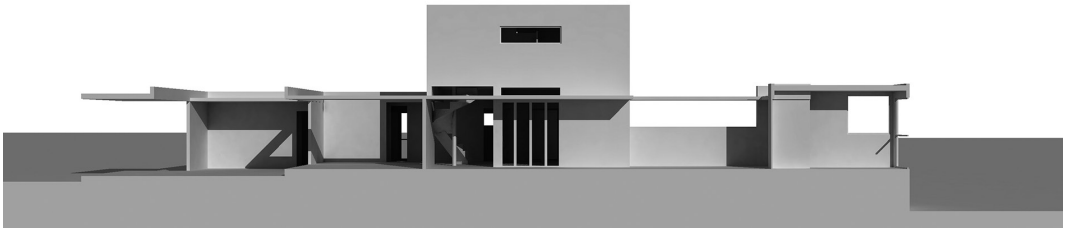


Fig. 9 Eileen Gray. Project for a *Small house for an Engineer*, 1926 revised 1952. Perspective. Redrawing.

Fig. 10 Eileen Gray. Project for a *Small house for an Engineer*, 1926 revised 1952. Perspective. Redrawing.

Fig. 11 Eileen Gray. Project for a *Small house for an Engineer*, 1926 revised 1952. Perspective section. Redrawing.

Fig. 12 Eileen Gray. Project for a *Small house for an Engineer*, 1926 revised 1952. Perspective section. Redrawing.

communicative images be produced, which are not merely virtual but the only existential reality of the project.

The images are deliberately monochromatic not only because perhaps Eileen, had she still been alive, would have produced them this way, but also because, as Riccardo Migliari (2008) writes:

> the synthesis images, in fact, are in addition to the archive images, which are all old black and white photographs. Let us imagine for a moment what a jarring contrast these old photographs of today's lost works would have generated, if compared with a cloying and colourful digital hyperrealism! [...] The digital image, saturated with colours and materials, would have revealed all its extraneousness: extraneous to the poetics of less is more, extraneous to memory, extraneous to the intentions of the designers and, above all, extraneous to the revolutionary message that those architectures carried, in their time, and still carry, in our time. (Migliari, 2008, p. 11)

CONCLUSIONS

Evaluating the data at our disposal, we could say that Eileen Gray could not draw, but as is well known, this is explicitly a matter of technique, because the line between drawing and design is very thin and blurred.

There are drawings that by their expressiveness, their handwriting and the content to which they refer have made history and have become true icons of architecture. On the other hand, there are extraordinary drawings that are personal expressions, small fragments of desire and memory that become manifestos of one's own position regarding the practice of architecture; others, in the case of unrealised projects, contain instead the pure idea of the author, becoming admirable images of an architectural principle that remains unknown with respect to its realisation (Gregotti, 2014).

To the drawings of the former type belong the sketches by Le Corbusier, to the latter and to the former the sketches by Alvaro Siza, with which the reader associates his constructions and photos of his completed architecture rather than orthogonal projection drawings of his projects.

Eileen Gray's sketches cannot be associated with a construction; the construction is the three-dimensional interpretative model that enters into the interstices of the project to communicate it in the way that suited Eileen best, the model. Today, the model is no longer static but dynamic, it is dissected into several parts, analysed, through a more attentive reading of the spaces it allows us to enter into the interstices of the project and return the idea of its author.

Yet those sketches are Eileen Gray's voice, the word of her design, she who in life had no need to write about her idea of architecture. The models are her posthumous word, they are her way of communicating today if she were still alive. They keep her alive by expressing the contemporary essence of her designs. Drawing has this power: through new images it holds the threads of memory and, in this case, induces new reflections on the project.

ACKNOWLEDGEMENTS

In sharing the positions expressed, the result of common elaborations on a research that takes on the character of a non-finite like Eileen Gray's projects, the paragraphs Introduction, House for an engineer and Conclusions are to be attributed to Francesco Maggio, while the paragraphs The Two-storey House and Communicating uncertain spellings are to be attributed to Alessia Garozzo.

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Article available at

DOI: 10.6092/issn.2724-2463/16704

How to cite

as article

Maggio F. & Garozzo A. (2023). Wise designs from uncertain handwriting and new communications. *img journal*, *8*, 148-163.

as contribution in book

Maggio F. & Garozzo A. (2023). Wise designs from uncertain handwriting and new communications. In A. Luigini (Ed.), *img journal 08/2022 Wordless Images* (pp. 148-163). Alghero, IT: Publica. ISBN 9788899586362

THE DIGITAL PARADIGM IN CONTEMPORARY ARCHITECTURE

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DIGITAL REPRESENTATION
CONTEMPORARY ARCHITECTURE
CYBERSPACE
FOURTH DIMENSION
NON-EUCLIDEAN GEOMETRIES

The architecture of the 20th century has been largely affected by changes in the field of technology. In particular, the evolution of digital representation has led to new visions of contemporary architectural space. Expressive freedoms, which in the pre-digital era stemmed from visionary approaches, now become feasible thanks to modern modelling technologies.

They determine a mutation of working processes and creative elaboration, proving to be more than just a mechanical tool without theoretical-speculative implications. Transformation of reality into updatable and modifiable data flows leads towards a new *weltanschauung*, characterised by the modern paradigms of precariousness and flexibility. Digital world, based on processing of algorithms and information, becomes a link between art and mathematics. The theoretical universe based on the fourth dimension and non-Euclidean geometries, which had produced interesting artistic effects in the *avant-garde* movements of the 20th century, now finds a means of expression in the field of architecture.

The paper explores the assumptions of contemporary architectural expressions and the implications that digital technologies have had on changes in architecture since the 1990s: from the fluid a nd deconstructed shapes linked to multidimensional experiments to the most recent experiences, placed at the border between art and architecture, that are experimenting with the transfer of digital language into the real world.

INTRODUCTION

The progress of technology, both constructional and representational, has always affected the evolution of forms of expression. This influence is most evident in twentieth-century architecture. Gillo Dorfles affirms:

> while for the other [arts] progress over time and consumption through the years is only given by the changing estrus of taste, fashion, and perceptive attitude, for architecture the becoming is intimately linked to progress or, in any case, to the transformations undergone by technological and scientific development. (Dorfles, 1998-2002, p. 137)[1]

Reinforced concrete technology has decisively influenced the development of the Modern Movement, just as the use of new techniques and 'malleable' materials have enabled the realisation of 'fluid' architecture such as that of Gehry. Among the technologies that have determined the evolution of contemporary architectural space, a key role is played by digital representation techniques. In fact, with them a radical mutation of the processes adopted by those who assume a creative role in the production chain has taken place. Therefore, digital representation is not a simple mechanical tool without theoretical-speculative implications.

Luigi Prestinenza Puglisi defines the computer as a "machine that performs even complicated transformations very quickly" (Prestinenza Puglisi, 1998, p. 51)[2]. Through these transformations, objects lose their consistency, becoming immaterial information: electric fields that generate a universe parallel to the real one, based on information flows. In 1964, Marshall McLuhan sensed that this transformation of informational processes would produce a radical mutation of thought and language. Prestinenza Puglisi notes:

> an illustrious precedent was the invention of alphabetical writing: this not only produced books, but forced us to structure thought by organising it into words, sentences, chapters; it broke down the boundaries of municipal realities by favouring the exchange of information; it facilitated

> the rise of individualism and free will; it privileged sight over the other senses and mortified the role of hearing and the oral word; it favoured the birth of the scientific spirit and experimental observation. (Prestinenza Puglisi, 1998, p. 57)[3]

Similarly, the transformation of reality into updatable and modifiable data flows leads towards a new *weltanschauung*, characterised by the modern paradigms of precariousness and flexibility.

This tool, based on the processing of algorithms and information, soon became a link between art and mathematics. This has allowed for the expression of a theoretical universe based on the fourth dimension and non-Euclidean geometries, which have been established on a theoretical level since the 19th century and have had interesting repercussions in the field of art, but with rare attempts at application in architecture.

CYBERSPACE AND UTOPIAN FORMS

In 1978 Thomas Banchoff and Charles Strauss made the first colour film with computer graphics, entitled *Hypercube: Projection and Slicing*. It showed a hypercube in motion (Figure 1). The film won the 1979 International Scientific Film Festival and

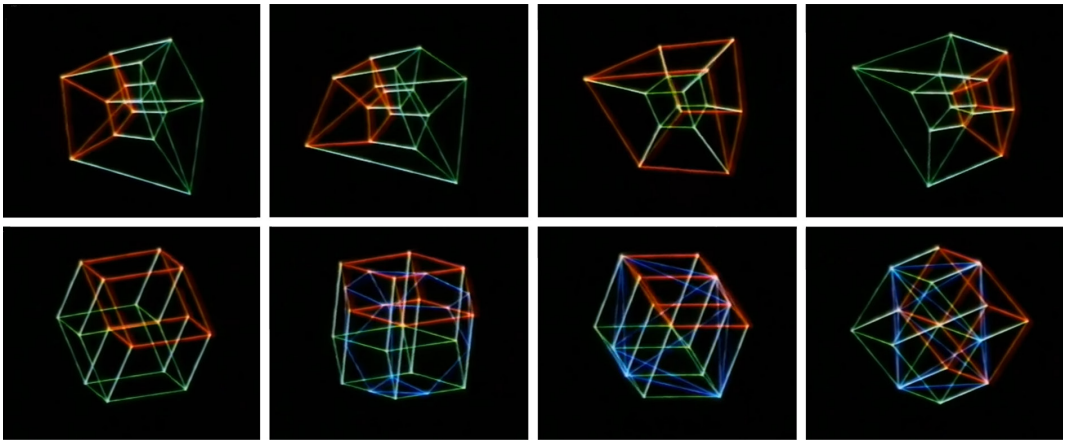


Figure 1 Thomas Banchoff, Charles Strauss, images of a moving hypercube from the film *Hypercube: Projection and Slicing*, 1978.

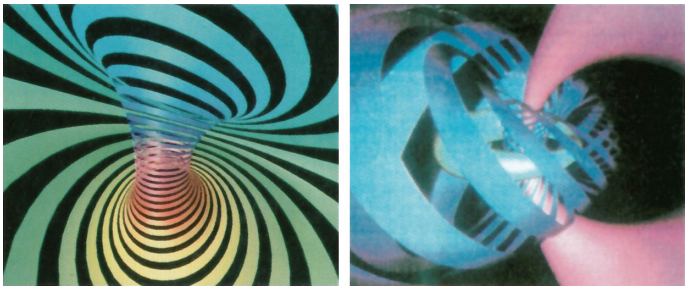


Figure 2 Thomas Banchoff, images from the film *Hypersphere*, 1987 (Emmer, 2006, p. 147).

was admitted to the 1986 Venice Biennale. Its sequences fully express the potential of the computer. The 'algorithmic space' of the digital world makes it possible to represent the forms of an abstract universe, which cannot be perceived in empirical space. In 1987, Banchoff, together with his colleagues at Brown University, made the film *Hypersphere*, an essential premise for later experiments with hypersurface architecture (Figure 2).

Since the 1990s, Marcos Novak has been a pioneer of *cyberspace*[4] architecture. He is the inventor of some concepts related to digital culture, such as 'liquid architecture', 'transmodernity', 'transarchitecture'. His digital images are the expression of precise theoretical conceptions and involve the emotional sphere. They represent virtual objects immersed in a metaphysical and surreal cyberspace. They are shapes that can only be experienced in a digital space and assume an 'antagonistic' role in relation to official architectural culture (Figures 3, 4).

As Maurizio Unali states, such experiments are comparable to the utopias of the historical avant-garde in the first decades of the 20th century and the cultural phenomenon of Architectural Design in Italy in the 1970s and 1980s (Unali, 2003, p. 238; Emili & Ilardi, 2003, pp. 39,40). Conceptual analogies can also be found in the 1960s, with the experiments of the Archigrams and Buckminster Fuller (Figure 5).

Thus, Novak's 'digital architectures' represent a new front of utopia that contributes to radically changing the contemporary architectural context, a "conceptual bridge between the solid architecture of the modern era and the ephemeral architecture of the virtual" (Emmer, 2003, p. 55)[5].

Figures 3,4 Marcos Novak, digital graphic elaborations (Sacchi & Unali 2003, pp. 148-150).

Thus, there is a transition from the mechanical paradigm of traditional architecture to the electronic paradigm of contemporary. As Livio Sacchi states:

> the grid of the Western perspective tradition evolves into a network, into the oxymoron of a "three-dimensional surface", into a soft or 'wet' grid, something that leads back to the liquid states of matter, incoherent, unstable, variable, susceptible to continuous transformations. It is a kind of updated theory of *Einfühlung*, in which the sensibility proper to curved lines in motion and their ability to interact by attraction or repulsion is achieved using a computer instead of the variable stroke of the drawer's pen. (Sacchi, 2001, p. 14)[6]

Such formal 'vitality' cannot be compatible with the rigid functionalist schemes of *Existenzminimum* and requires a mutation of parameters and compositional references. Between the late 1980s and the 1990s, Peter Eisenman's *Aronoff Center*, Frank Gehry's *Guggenheim Museum* in Bilbao, and Daniel Libeskind's *Jewish Museum* in Berlin manifest the beginning of a search towards organic shapes, topological geometries, fractals and 'flexible' geometries, better suited to express the fluidity of natural space.

The new tools of digital representation allow concepts of non-linear geometry and multidimensional space to enter powerfully into creative processes, generating a subversion of the solid Euclidean order (Figure 6).

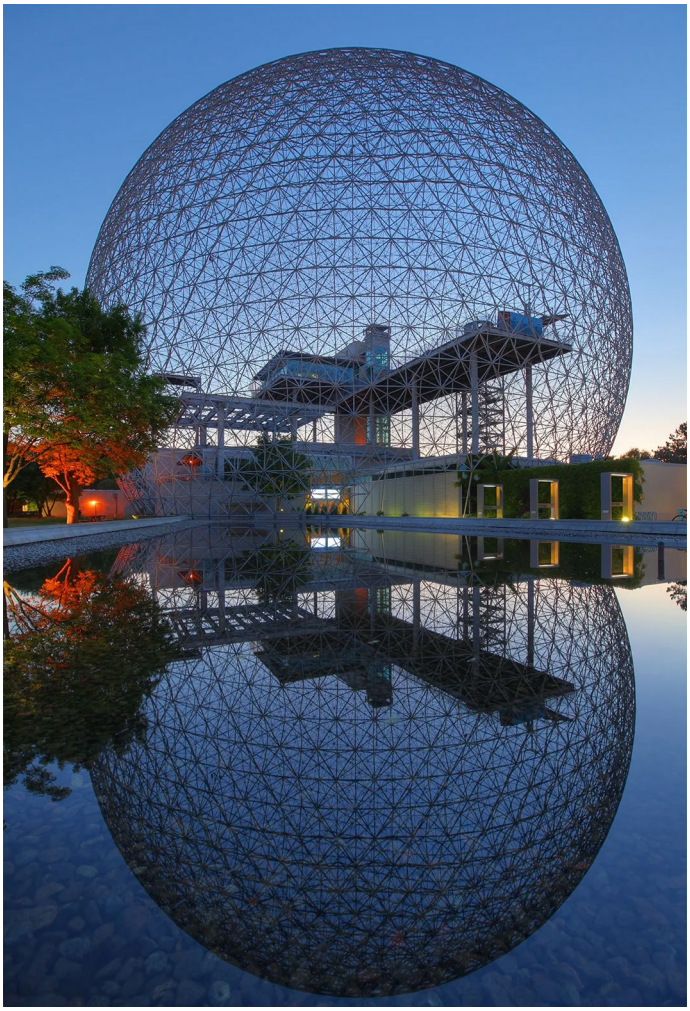


Figure 5 Buckminster Fuller, *U.S. exhibition dome*, 1967 International and Universal Exposition, Montréal. Encyclopædia Britannica. Retrieved December, 7, 2022 from <https://www.britannica.com/biography/R-Buckminster-Fuller#/media/1/221902/15928>

ORGANIC SHAPES IN EUCLIDEAN SPACE

Beyond the suggestions that the mathematical discoveries on multidimensionality have exerted on the formation of a new 'semantic universe' of architecture, it is interesting to investigate what the actual spatial dimension linked to the shapes of contemporary architecture is.

In the early 19th century, Carl Friedrich Gauss fixed the vertices of a triangle on the tops of three mountains and mea-

Figure 6 Frank Gehry, *Guggenheim Museum*, Bilbao, 1997. Photo by Tony Hisgett. Retrieved December, 7, 2022 from <https://commons.wikimedia.org/wiki/File:Guggenheim_4_%283798488142%29.jpg>

sured their internal angles[7]. By doing so, he intended to verify whether the sum of these angles was equal to 180 degrees, as required by Euclidean geometry, or whether it would result in a different value, as would be the case with a 'curved' space, the result of non-Euclidean geometry. Subject to the limitations of experimental errors, the results were close to a flat angle. The experiment did not prove that physical space should necessarily be considered Euclidean, but it did place limits on the application of theoretical-mathematical concepts related to metageometry in the empirical world (Pirenne, 1991, p. 72).

Even Albert Einstein's researches on the theory of relativity will only be perceptible in the presence of entities moving at close to the speed of light. The aberrations due to 'Euclidean flatness' in sensory experience are completely irrelevant (Pirenne, 1991, p. 72, 73).

As Ernst Cassirer states:

> from the point of view of our present knowledge [...] our claim that physical space 'is positively to be regarded as Euclidean' is justified. Only we must not preclude ourselves from bringing about, perhaps in the distant future, a change in this field as well. (Cassirer, 1999, p. 152)[8]

While not shutting the door on the innovative implications of a multidimensional space, Cassirer emphasises the undeniable three-dimensionality of empirical space, with

which creative and productive processes must relate. However, the hypotheses of metageometric space and the Euclidean universe should not be considered antithetical, but both useful and possible.

The new formal expressions inspired by non-linear geometries have disrupted the rigid volumetric and perspective schemes that have dominated architecture for centuries, but with them the way of relating between man and physical space has not changed. Digital instruments can accelerate and facilitate the processes of mutation in the creative universe, but they cannot force them.

Therefore, fluid forms are not exclusive to digital space. Erich Mendelsohn's formal experiments, Antoni Gaudi's original forms, the irregular softness of Le Corbusier's Ronchamp Chapel, the organic conformations of Wright or the more recent free formal expressions of Vittorio Giorgini, are complex and unusual shapes, far removed from the stereometric conformations of coeval architecture, but are nevertheless the result of 'Euclidean thinking'.

In 1977, during the Summer University at Pratt Institute, Vittorio Giorgini designed a rural community for city youths in Parksville, near New York, adopting a building system based on the use of wire mesh and concrete. It was evocatively named *Liberty* and proposed a structural system with continuous curved beams. In fact, it represented an evolution of his theoretical, geometric and technological research path begun with Casa Saldarini. The shell-like conformation of the structures, with variable curves, ensures stability and allows expressive freedom otherwise unattainable with traditional techniques. The building was never completed but only the electrowelded wire mesh of the structure was made. Nevertheless, the images of the construction site still represent a visionary projection into a world dominated by an astonishing formal freedom originating from extreme creativity, even before the most advanced consequences of the digital era became apparent (Figures 7, 8).

ARCHITECTURE AND MULTIDIMENSIONALITY

The essential characteristics of Euclidean space –continuity, homogeneity, limitlessness– define it as something abstract, suitable for theoretical formulations of methods of representation but not perfectly overlapping to real-world experience. In actual fact, empirical space is discontinuous, anisotropic and perceptually limited. Euclidean, and later Cartesian, space is a 'virtual', three-dimensional space with zero curvature, conceptually distant from the real characteristics of empirical space. However, it coincides with the mathematical model of any digital environment used for solid modelling. Thus, paradoxically, only today we can conceive of architectural shapes with clear conceptual relationships to non-linear geometries, thanks to digital tools that instead make theoretical Euclidean space usable, even if only virtually: continuous, homogeneous, unlimited and with zero curvature. To these characteristics, three-dimensional modelling software adds the peculiarities of immediacy and flexibility, closely linked to contemporaneity. Thus, in order to become a factual product, any complex shape requires adaptation to rigid Cartesian meshes. This process does not detract from the fluidity of contemporary architecture but allows us to state that topological space can be considered part of Euclidean geometry (Emmer, 2003, p. 17). Rather than a topological matrix, modern digital tools make certain

Figures 7,8 Vittorio Giorgini, *Liberty* community centre, Parkville, New York, 1976-77. Construction site photos. Retrieved December, 7, 2022 from <https://www.artribune.com/progettazione/architettura/2019/04/vittorio-giorgini-storia-italia/>

multidimensional potentials available to creative processes that are worthy of further investigation.

Florensky's considerations on physiological space and multidimensionality are useful in this regard, highlighting potentials little explored by pre-digital forms of representation. He hypothesises multiple types of space: visual, tactile, acoustic, olfactory, gustatory, and organic sense in general (Florensky, 2003, p. 127). Neglecting the ongoing experiments on the reproduction of organic sensations, digital instruments already make four-dimensional spaces available, in which the temporal variable introduces movement into the formation of creative processes and the representation of objects. It is a path that the avant-gardes of the early 20th century had explored, whether with the decomposition of form and multiplication of viewpoints of Cubism, or with the accelerations of the Futurist movement. However, this approach only began to manifest itself in architectural genesis after the introduction of the computer. The spatio-temporal dimension of the digital world also introduces the concept of 'duration' and rhythmic-temporal scansion into architecture (Dorfles, 1998-2002, p. 135). This leads to an exaltation of the emotional component, with inevitable repercussions on the conformation of architecture. As Livio Sacchi states:

> the body of man in architectural space is no longer a Cartesian abstraction, condemned to move on horizontal planes and whose kinematic sphere is rigidly separated from the visual one, while the latter continues to measure itself against a fixed and infinitely distant horizon. It is rather a body for which motor and sensory experience are one, for which there is no vision without movement and no movement without vision: perception and action are articulated as modes of structural deformation, whose synthesis is constituted by the constructive process. (Sacchi, 2003, p. 214)[9]

Traditional representations are no longer sufficient to express the complexity of contemporary architectural shapes, but new projective and perceptual approaches are required.

The point of view no longer has a fixed position, but can move, rotate, shift from the finite to the infinite. Luigi Prestinenza Puglisi states: "we can experience reality from ten, a hundred different points of view, all simultaneous, and we suffer as a limitation being forced to settle for a single point of observation" (Prestinenza Puglisi, 2003, p. 82).[10] These are the contemporary paradigms of precariousness and plurality. The consequences lead to a fluid and flexible architecture that replaces the Lecorbusierian model of the 'free façade' with the 'free form' (Pongratz & Perbellini, 2000, p. 31). Thus, the new digital approach undermines the solid consistency of architecture. "As it defines reality through media and simulation", notes Peter Eisenman, "it privileges appearance over existence, what is seen over what is. The media call into question how and what we see" (Garofalo, 1999, p. 70).[11]

Real and virtual become confused, leading to a mutation of the relationship between man and reality. Shape becomes complicated and establishes relationships with the context that surprise the observer and project him into a dreamlike dimension. Suggestion prevails over function while the resulting metaphysical space and the apparent malleability of the surfaces reduce the boundary between real and virtual.

CONCLUSIONS

In an iconic context, such as the one that surrounds us, it becomes increasingly difficult to distinguish the true from the false: one seems to take the place of the other.

> Alongside efforts to make representations of reality ever closer to the real (and thus make the virtual more real), the opposite attempt is underway, that is, to make the real more virtual by questioning the very materiality of the materials of which objects are made. In other words, a virtualisation that takes the form of a dematerialisation of materials. (Maldonado, 2005, p. 79)[12]

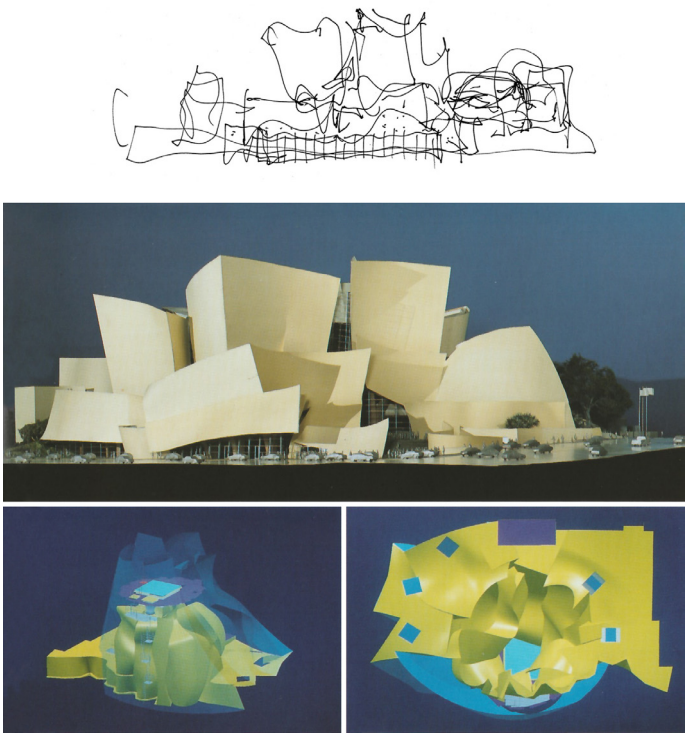


Figure 9 Frank O. Gehry, *Walt Disney Concert Hall*, Los Angeles, California, 1987.
Top: autograph sketch. Retrieved December, 7, 2022 from <http://wdch10.laphil.com/wdch/process.html>.
Middle: analogue 3D model.
Bottom: digital 3D model (Gehry et al., 2002, pp. 115-119).

Frank O. Gehry's creative process starts from an analogical universe, through sketches that fix its formal characteristics. The subsequent realisation of three-dimensional physical models allows an initial morphological verification and lays the foundation for the production of a digital model through advanced solid modelling programmes. The process begins in real space and then transfers and refines itself in the digital universe (Figure 9). The architectural language is decisively affected by this, but maintains its own autonomy, comparable to the imaginative utopian visions of the 1960s and 1970s.

The most recent experiments go further. Rather than dealing with transferring the real into the digital, an inverse intention seems to manifest itself, namely the attempt to transfer the languages of the virtual universe into the empirical world. It is a crucial step in which the language of the machine is not simply an aid to creativity but becomes

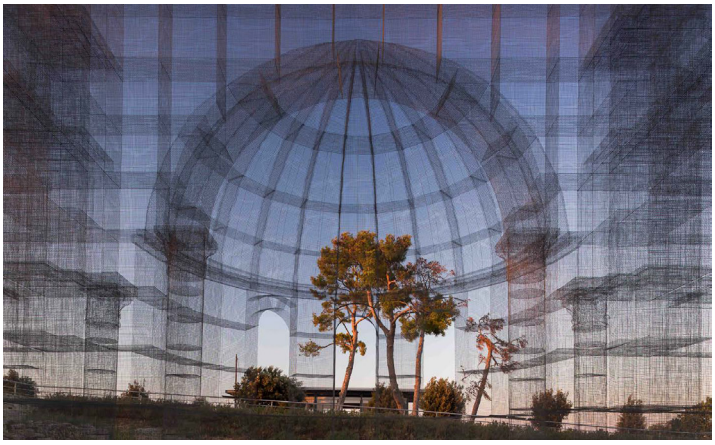
compositional syntax. The constitutive paradigms of digital space –lightness, precariousness, flexibility– are pushed to the extreme in a dichotomy between material and immaterial that today can "be reduced to two different states of the same informational substrate" (Floridi, 2014/2017, p. 80).[13]

This is the expressive line drawn by the young Milanese artist Edoardo Tresoldi, who marks a process of 'digitisation of reality' in his works, on the borderline between art and architecture. He states:

> I chose wire mesh not because I liked the material itself but because it stems from an exploration of transparency, that is, of the absence of matter, of the concept of the ghost, which was entirely intrinsic to the experience of that material. It is a path I arrived at through an entirely analogical study. (Ezechieli, 2019, p. 62)[14]

However, this analogical process leads him to outcomes in which the influence of the languages of digital space is evident. Transparency and the absence of matter result in dense steel wire meshes that recall wireframe visualizations of 3D models: digital ghosts transferred to the real world (Figures 10-13).

His works also seem to recall the suggestive perceptual evocations that Vittorio Giorgini had manifested in the work Liberty in Parksville in 1977. The common trait is the same ethereal lightness expressed in the site photos of the work



Figures 10,11 Edoardo Tresoldi, *Basilica di Siponto*, Archaeological Park of Siponto, Manfredonia (FG), Italy, 2016. Wire mesh transparent sculpture, permanent installation. Retrieved March, 28, 2023 from <http://www.edoardotresoldi.com/wp-content/uploads/2018/05/CATALOGO-DIGITALE_150518.pdf>

Figures 10,11 Edoardo Tresoldi, *Opera*, Falcomatà Seafront, Reggio Calabria, Italy, 2020. Wire mesh transparent sculpture, permanent installation. Photos by the author.

that the Florentine artist left unfinished. For both it is an analogical path but for Giorgini, the result is just an 'accident' along the way due to the work stoppage. Instead, Tresoldi seeks transparency with an expressive force that reveals a reworking of digital language. He rejects the deceptive mimesis of computer tools but prefers his synthetic language, attributing it an emotional function. The tectonics of matter gives way to allusion. These are incorporeal formal references that solicit immersive suggestions, backward paths from the digital to the real that transfer the lightness and transparency of the digital universe, isotropic, continuous and unlimited, to the concrete and usable space of the real world.

NOTES

1 Original text: "Mentre per le altre [arti] il progresso nel tempo e il consumo attraverso gli anni è dato solo dai mutevoli estri del gusto, della moda, dell'attitudine percettiva; per l'architettura il divenire è intimamente legato ai progressi o comunque alle trasformazioni subite dallo sviluppo tecnologico e scientifico".

2 Original text: "macchina che opera trasformazioni anche complicate e in tempi rapidissimi".

3 Original text: "Precedente illustre l'invenzione della scrittura alfabetica: questa non ha solo prodotto i libri, ma ci ha costretti a strutturare il pensiero

organizzandolo per parole, frasi, capitoli; ha rotto i confini delle realtà comunali favorendo lo scambio dell'informazione; ha facilitato il sorgere dell'individualismo e del libero arbitrio; ha privilegiato la vista sugli altri sensi e ha mortificato il ruolo dell'udito e della parola orale; ha favorito il nascere dello spirito scientifico e dell'osservazione sperimentale".

4 The term *cyberspace* was coined by William Ford Gibson for his novel *The Night We Burned Chrome*, published in 1982 in "Omni" magazine, and later became known through his novel *Neuromancer* (1984).

5 Original text: "ponte concettuale tra l'architettura solida dell'epoca moderna e quella effimera del virtuale".

6 Original text: "La griglia della tradizione prospettica occidentale – afferma Livio Sacchi (2001) – si evolve in una rete, nell'ossimoro di una "superficie tridimensionale", in una griglia morbida o "bagnata", qualcosa che riconduce agli stati liquidi della materia, incoerenti, instabili, variabili, suscettibili di continue trasformazioni. Una sorta di aggiornata teoria dell'*Einfühlung*, in cui la sensibilità propria delle linee curve in movimento e la loro capacità di interagire per attrazione o repulsione è ottenuta, invece che mediante il tratto variabile della penna del disegnatore, utilizzando un computer".

7 The sides of the triangle measured 65.85 and 107 km.

8 Original text: "Dal punto di vista delle nostre attuali conoscenze [...] si giustifica la nostra affermazione secondo cui la spazio fisico 'è positivamente da considerarsi euclideo'. Solo non ci dobbiamo precludere la possibilità di fare intervenire, forse per un lontano futuro, un cambiamento anche in questo campo".

9 Original text: "Il corpo dell'uomo nello spazio architettonico non è più un'astrazione cartesiana, condannato a muoversi su piani orizzontali e la cui sfera cinematica è rigidamente separata da quella visiva, mentre quest'ultima continua a misurarsi contro un orizzonte fisso e infinitamente lontano. È piuttosto un corpo per il quale l'esperienza motoria e quella sensoria sono una cosa sola, per il quale non c'è visione senza movimento e non c'è movimento senza visione: percezione e azione si articolano come modalità della de-formazione strutturale, la cui sintesi è costituita dal processo costruttivo".

10 Original text: "noi possiamo vivere la realtà da dieci, cento punti di vista diversi, tutti simultanei, e subiamo come una limitazione l'essere costretti ad accontentarci di un punto di osservazione univoco".

11 Original text: "In quanto definisce la realtà attraverso i media e la simulazione privilegia l'apparenza rispetto all'esistenza, ciò che si vede rispetto a ciò che è. I media mettono in forse il come e il cosa noi vediamo".

12 Original text: "Accanto agli sforzi per rendere sempre più vicine al vero le rappresentazioni della realtà (e quindi rendere più *reale* il *virtuale*), è in atto il tentativo opposto, quello cioè di rendere più *virtuale* il *reale*, mettendo in discussione la stessa materialità dei materiali di cui gli oggetti sono costituiti. In altre parole, una virtualizzazione che assume le forme di una dematerializzazione dei materiali".

13 Original text: "essere ridotta a due diversi stati del medesimo sostrato informazionale".

14 Original text: "ho scelto la rete metallica non perché mi piacesse il materiale in sé ma perché deriva da un'esplorazione sulla trasparenza, ovvero sull'assenza di materia, sul concetto di fantasma, che era del tutto intrinseca all'esperienza di quel materiale. È un percorso al quale sono arrivato attraverso uno studio del tutto analogico".

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Article available at

DOI: 10.6092/issn.2724-2463/16076

How to cite

as article

Mediati, D. (2023). The Digital Paradigm in Contemporary Architecture. *img journal*, *08*, 164-181.

as contribution in book

Mediati, D. (2023). The Digital Paradigm in Contemporary Architecture. In A. Luigini (Ed.), *img journal 08/2023 Imaging and Imagery in Architecture* (pp. 164-181) Alghero, IT: Publica. ISBN 9788899586362

VISUALIZING CHANGE IN RADICAL CITIES AND POWER OF IMAGERY IN URBAN TRANSFORMATION

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IMAGINING
RADICAL CITIES
VISUAL NARRATIVES
ARCHITECTURAL VISUALIZATION
ARCHITECTURAL PEDAGOGY

Cities have consistently served as fertile grounds for the emergence and growth of radical ideas, political transformations, and social movements, with urban landscapes nurturing visionary concepts, idealism, and revolutionary ideologies. This research delves into the captivating world of radical cities, exploring the power of image and visual narratives to communicate and comprehend urban activism within diverse contexts. By analyzing various case studies and student works, we aim to create, study, and reimagine vivid portrayals of urban activism, radical urbanism, and future socio-spatial developments. The focus lies on developing innovative visual modalities and collaborative critical pedagogical approaches that engage with the complexities of radical cities across North America, Latin America, Asia, Europe, and beyond. In this study, we explore the potential of image and visual narratives to decode and understand pivotal societal transitions in radical cities. By employing imaginative and critical pedagogy, we aspire to foster a more profound comprehension of urban activism and its impact on shaping the cities of the future.

INTRODUCTION

Cities have consistently served as fertile grounds for the emergence and growth of radical ideas, political transformations, and social movements (Swyngedouw, 2014). Their urban landscapes have nurtured visionary concepts, idealism, and revolutionary ideologies that have shaped the cities of the future (Lukas, 2019). This research delves into the fascinating world of radical cities, exploring the power of imagery and visual narratives to comprehend and communicate urban activism within diverse contexts (Mehan, 2023a; 2023b). By analyzing various case studies and student works (McPeek & Morthland 2010), our aim is to create, study, and reimagine vivid portrayals of urban activism, radical urbanism, and future socio-spatial developments (Mehan, 2022; Zamani & Mehan, 2019). The focus lies on developing innovative visual modalities and collaborative critical pedagogical approaches that engage with the complexities of radical cities across North America, Latin America, Africa, Europe, and beyond (Mehan and Mostafavi, 2023). In this study, we examine the potential of image and visual narratives to decode and understand pivotal societal transitions in radical cities (McGuirk, 2014). By employing imaginative and critical pedagogy, we aspire to foster a deeper comprehension of urban activism and its impact on the transformation of urban landscapes (Mostafavi & Mehan, 2023; Novak et al., 2023). As we navi-

a) b) c)

Fig. 1 a) Olivares, *Cuban Immigration*, 2022, Poster using the image trace tool in Adobe Illustrator; b) Rodriguez, *Utopian Forth Worth*, 2022, AI-generated photo using words such as gentrification, culture, Hispanic, displacement, Mexican, history, and Forth Worth; c) Khatiwada, *Environmental Crisis in Kathmandu, Nepal*, 2022, collaging technique.

gate the captivating realm of radical cities, we recognize the importance of visual narratives in illuminating the intricacies of urban activism (Mehan & Mostafavi, 2022; Mehan, 2020). Through this research, we seek to contribute to the ongoing discourse on urban transformation by harnessing the power of imagery and employing critical pedagogy to engage with the dynamic evolution of our cities (Mehan & Mehan, 2022).

MATERIALS AND METHODS

This research, rooted in the media elective course *Radical Cities over Time and through Space: Re-narrating Urban Activism* taught at Huckabee College of Architecture, Texas Tech University in the Fall of 2022, explores the captivating world of radical cities and the power of image and visual narratives to communicate comprehend urban activism within diverse contexts. The course encourages students to delve into various case studies and create, study, and reimagine vivid portrayals of urban activism, radical urbanism, and future socio-spatial developments (Varış Husar et al., 2023).

The course structure is centred around several assignments related to each student's chosen radical city, focusing on developing innovative visual modalities and collaborative critical pedagogical approaches. Students use various methods and approaches to engage with the complexities of radical cities across North America, Latin America, Asia, Africa, Europe, and beyond. These include visualization techniques, illustrative tools, collaborative manifesto writings, creative expression, AI-generated images, educational and community-building events, online virtual platforms, and social media (Bina et al., 2020) (Figure 1). Throughout the course, students compile their assignments in a portfolio, part of the final deliverable. Additionally, students are asked to reflect on their portfolios by writing an opinion-based narration text, elaborating on their selected radical cities and the reasoning behind their choices. This process enables students to

employ imaginative and critical pedagogy, fostering a more profound comprehension of urban activism and its impact on shaping the cities of the future.

By analyzing various case studies and student works, this research explores the potential of image and visual narratives to decode and understand pivotal societal transitions in radical cities, contributing to a more profound comprehension of urban activism and its role in urban transformation.

VISUALIZING NARRATIVES AND DIGITAL STORYTELLING IN URBAN STUDIES PEDAGOGY

In contemporary architecture and urban studies, imagery and visual representation are essential tools for conveying information, promoting projects, and creating visual impact and meaning in the built environment (Carrasco Hortal et al., 2022; Schuster, 2021). To explore and represent the experiences and perspectives of urban activists, pedagogical practices employ educational and learning-based approaches that engage others in understanding these issues (Yip et al., 2019). A critical method in this process involves visual narratives and digital storytelling techniques, which empower participants to craft engaging multimedia representations of their experiences, ideas, and viewpoints on urban activism and radical cities (Lambert, 2013; Ohler, 2013).

At the beginning of the course, students identified and presented their radical city, delving into the histories and stories of specific cities, places, or neighborhoods concerning broader urban activism and social change. Using visual narratives and digital storytelling, students addressed essential questions related to their case studies, such as the reasons for their selection, the catalysts for change, the moments of change, the key individuals involved, connections to other radical cities, and the visualization of utopia, dystopia, and heterotopia themes (Harvey, 2000; Soja, 1996). Various sources, including blogs, newspapers, historical archives,

articles, and social media, supported their selections, with some students even incorporating personal experiences with their chosen radical cities (Jenkins et al., 2016).

Throughout the course, students participated in group critiques, writing workshops, theory seminars, invited lectures, presentations, and desk critiques to refine their understanding and representations of radical cities (Kvan, 2001; Pallasmaa, 2009). They submitted posters visualizing their selected radical cities using their preferred visualization methods and crafted short manifestos to support their visual presentations (Borden, 2001; Fraser, 2019). By engaging in visual narratives and digital storytelling, students connected with the complexities of urban activism and radical cities, fostering a deeper understanding of these issues through collaborative and imaginative approaches (Robin, 2008).

In the final part of the course, the focus shifted to selected radical city projects, thematically clustered into various groups. Each project began with a short manifesto or narration describing the radical city, addressing the six previously mentioned questions, and accompanied by posters visualizing the selected radical cities from different perspectives (Thompson, 2012). Students also collaborated on a group poster submission, comparing radical cities across different contexts and geographies based on related themes and clusters (Fainstein & Markusen, 2012). The course's case studies section will highlight selected students' manifestos and individual and group posters, focusing on three different projects across various contexts and geographies, such as Feminist Radical Cities, Latin American Radical Megapolises, Revolutionary Radical Cities, and North American Urban Activism (Moss, 2017; Mercer, 1994). By emphasizing visual narratives and digital storytelling techniques in architectural pedagogy, students actively understand and represent the complexities of urban activism and radical cities in a contemporary context (McLellan, 2006; Sandercock, 2003).

The next section presents a diverse range of case studies that exemplify the application of visual narratives and

digital storytelling techniques in understanding and representing radical cities. These case studies encompass various geographical locations and thematic focuses, illustrating the versatility and impact of such pedagogical practices in urban studies (Luigini & Menchetelli, 2021; Luigini & Panciroli, 2019). The selected case studies include Rio de Janeiro, Brazil, as a Latin American Radical Megapolis; Kathmandu, Nepal, as a Radical Spiritual City; Barcelona, Spain, as a Feminist Radical City; and Havana, Cuba, as a Revolutionary Radical City. Each case study delves into the complexities of the respective city, highlighting urban activism, social issues, historical context, and unique cultural aspects through visual narratives and manifestos. The case studies demonstrate the potential of employing visual narratives and digital storytelling techniques in architectural pedagogy to foster a deeper understanding and representation of urban activism and radical cities in a contemporary context.

CASE STUDIES: MANIFESTOS AND POSTERS.

Latin American Radical Megapolis: Rio de Janeiro, Brazil

Rio de Janeiro is well-known for its vibrant culture, yet it is also home to a hidden city within the city that stands apart from the norm. Emma Sheets, a student, has learned that Rio's dazzling lights and lively celebrations cast a shadow over this hidden city. In these slums, people live in favelas and face daily oppression due to the lack of governmental support. The government is aware of these social oppressions but has yet to implement practical solutions, with some measures even worsening the situation and causing increased distress, anger, and rebellion.

In her manifestos and poster visualizations, Emma delves into the origin of oppression in the favelas, the mega-events that sparked outrage among the community, and the feelings of worthlessness experienced by the residents. She also discusses the challenges the younger generation faces

Fig. 2 Emma Sheets, *Fame vs Civilians: Which is more Valuable in Rio De Janeiro, Brazil*, 2021. a) *Radical Rio Poster;* b) *Origin of Oppression;* c) *Mega-Events;* d) *Left in the Dark;* e) *City Within City;* f) *The Worth of the Younger Generation.*

growing up in favelas, highlighting the importance of raising awareness and advocating for change. By examining the complex dynamics within Rio de Janeiro, Emma brings attention to the need for a more inclusive and compassionate approach to urban development that benefits all members of society, especially the marginalized and oppressed living in the favelas.

In Poster 2a, titled *Radical Rio,* the student Emma Sheet highlights the contrasts within Rio de Janeiro, a city famous for its vibrant culture, yet simultaneously overshadowing a hidden city of slums. These slums, known as favelas, are home to people who face daily oppression due to the lack of government assistance. Although the government is aware of the social oppressions, it has not taken effective action to address them. In fact, some measures that superficially appear helpful worsen the situation, causing distress, anger, and in-

creased rebellion. The favela life is plagued by crime, drugs, and unsafe living conditions, including a lack of running water, abandoned public transit, and littered streets. These circumstances lead the residents to believe they are not worthy of the assistance they desperately need (Figure 2a).

In Poster 2b, *Origins of Oppression*, the reasons behind the dismal conditions in favelas are explored. Factors such as heritage, architecture, and challenges faced by the community provide insight into the situation. Rio's heritage began with the reconstruction of mountains and beaches, which led to the development of a metropolis around existing neighborhoods. These neighborhoods eventually deteriorated and became the slums known today. The outdated architecture and engineering systems failed, leaving behind rusted pipes and crumbling walls that contribute to the ongoing challenges.

During the preparations for the 2016 Rio Olympics, civilians started protesting the government's prioritization of the event over the welfare of favela residents. The oppression continued to manifest as visitors were catered to with new stadiums and stages, while those living in the favelas remained in squalid conditions (Figure 2b).

In Poster 2c, *Mega-events*, the impact of large-scale events such as the Olympic Games and the World Cup on the community is examined. While these events are typically associated with celebration, they have caused outrage among the locals. President Bolsonaro's leadership has consistently caused distress, but the mega-events brought about different frustration. Government funds were spent on stadiums and advertising for tourists, while the needs of the local people were largely ignored. Mega-events often draw attention to only certain aspects of the host city, obscuring its underlying issues. In the case of the Rio Olympics, stadiums and fields were built at the expense of demolishing favelas and relocating families. Although the relocation may seem kind, the affected families were forced out of their homes and placed in similar living situations. The government's actions made it clear that the mega-events took precedence over the local

population's well-being. Consequently, the global audience was directed to focus on a false reality, leaving them unaware of the social oppressions faced by the community (Figure 2c).

In Poster 2d, *Left in the Dark*, the plight of those living in the favelas of Rio De Janeiro is explored. These individuals, who have long felt unworthy and overlooked, now find themselves truly left in the dark, making do with what little they have. The daily challenges they face merely scratch the surface of their oppression. Their cries for help have gone unheard for years, but they finally gained some visibility during the 2016 Olympic Games. As new stadiums and fields attracted people worldwide, those living in the favelas seized the opportunity to make their voices heard. They silently protested within the stadiums, expressing their thoughts and emotions through signs. However, no meaningful action was taken to address the underlying issues once the games concluded and the tourists departed. Frustrated and still grappling with ongoing oppression, the civilians returned to the stadiums, but their protests were no longer silent this time. Stadium chairs were torn from the ground, signs were destroyed, and litter was strewn about. This destruction was a response to past oppression and a reflection of their growing discontent. These stadiums and fields, once symbols of grandeur and international attention, were left purposeless and abandoned, serving as a stark reminder of the community's unmet promises and unaddressed struggles (Figure 2d).

Poster 2e, *City within a City*, explores the challenges faced in the favelas of Rio De Janeiro. These impoverished neighborhoods are often referred to as a city within a city characterized by widespread poverty, inadequate infrastructure, and high crime rates. While police presence is intended to provide protection, the actions of a few officers have eroded trust within the community. The younger generation is particularly vulnerable, with children being lured into the drug trade and young women facing objectification and exploitation. The pervasive favela funk music further perpetuates harmful stereotypes. Despite these challenges, there is a

growing awareness through various media forms, shedding light on the undesirability of favela life and the need for more significant support and intervention (Figure 2e).

Poster 2f, *The Worth of the Younger Generation*, highlights the impact of favela life on the current community and future generations. The younger generation is particularly vulnerable, being drawn into the drug trade and facing worse objectification. These children deserve to grow up knowing they are seen, meaningful, and worthy. However, their families are caught between low-paying jobs and a desire for a better life for their children. With limited access to transportation and clean water, their daily struggles persist. While awareness of favela life has increased since the Rio Olympics, more action is needed. The government holds the key to change, with the ability to allocate resources, reinstate transit routes in the favelas, and provide the necessary support for these children to live free from fear and oppression. Rio De Janeiro must transform for the sake of its future generation (Figure 2f).

Radical Spiritual City: Kathmandu, Nepal

Nishan Khatwida, a student born and raised next to the Bagmati River, recalls a time when its waters were pure and used for everyday activities like cooking, bathing, and drinking. However, that seems like a distant dream now, as the river has become heavily polluted due to human waste and trash dumping. Despite efforts by volunteers and the government to clean up the river over the past seven years, the pollution persists. Nishan firmly believes that people are the main problem, as they continue to dirty the river despite cleaning campaigns. Engineering and construction alone cannot address this issue. During these challenges, a ray of hope emerges with the election of Balen Shah, a 32-year-old rapper who has become the first independent candidate to win in Kathmandu Metropolitan City. With a background in civil engineering and experience in various projects, Balen aims to make Kathmandu great again. His election manifesto outlines critical priorities, including improving infrastructure,

prioritizing technical education, providing comprehensive ambulance services, conducting free health check-ups for the elderly, repairing roads and drainage systems, implementing GPS tracking in public transportation, reviving old water resources, installing CCTV for security, establishing public toilets, promoting employment and entrepreneurship, and launching a tree planting campaign.

Balen's mission is to bring about positive change in Kathmandu, and he acknowledges that the road ahead will take work. He seeks guidance, support, and suggestions from the community, promising to stay connected and adjust if necessary. Determined, he embarks on a journey to change the face of Kathmandu and restore the Bagmati River to its past glory. Nishan shares the hope that the river will flow clear in the next five years and the banks will be clean, adorned with greenery, reclaiming its holiness once again.

Nishan's first poster highlights the sacredness of Nepal's holiest river, the Bagmati, originating from the Himalayas. It emphasizes the religious significance of the river, believed to possess purifying qualities. However, the poster also confronts the harsh reality of the Bagmati's heavy pollution, showcasing its journey from a pristine source to a polluted state. This visual representation underscores the urgent need for immediate action to restore the river's purity (Figure 3a).

Nishan's second poster focuses on the environmental challenges the Bagmati River faces. It visually portrays the

a) b) c)

Fig. 3 Nishan Khatiwada, *Radical Spiritual City, Kathmandu, Nepal,* 2022. a) *Nepal's cultural Diversity;* b) *Nepal's Mountains and Rivers;* c) *Pollution and Environmental Justice in Nepal.*

sources of pollution, including solid waste, untreated sewage, and industrial effluent, which transform the river into a dark, polluted sludge. The poster also highlights the detrimental effects of unplanned urbanization, road construction, and the dwindling of natural springs due to insufficient rainwater infiltration. By contrasting the river's condition during the monsoon season with its state during the dry season, the poster emphasizes the pressing need for conservation efforts (Figure 3b).

Nishan's third poster offers a personal perspective as a local resident who grew up near the Bagmati river. Through heartfelt storytelling, Nishan shares cherished memories of utilizing the river's water for everyday activities such as cooking, bathing, and drinking. However, the poster confronts the unfortunate reality of human waste and trash being dumped into the river, shattering the dream of a clean and pure water source. While acknowledging the commendable efforts of volunteers and the government to clean the river, Nishan expresses concern about the ongoing pollution resulting from human actions (Figure 3c).

These three posters by Nishan shed light on the pollution and degradation plaguing the Bagmati River in Nepal. They also offer a glimmer of hope by showcasing the efforts of individuals like Balen Shah and advocating for community support. These posters aim to drive positive change and restore the Bagmati River to its former glory by raising awareness, inspiring action, and emphasizing preserving its purity and sacredness.

Feminist Radical City: Barcelona, Spain

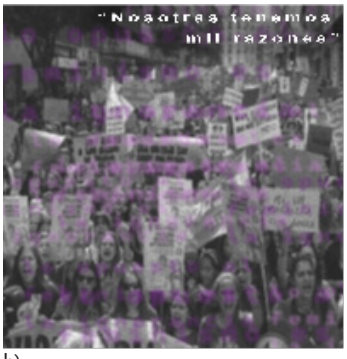
In Barcelona, the chant of "Nosotras Tenemos mil razones!" resonates as thousands gather to demand an end to the silence and ignorance surrounding women's rights. The fight against gender inequality, violence, and disparity is shaping the stories of both women and men. It questions why violence is often overlooked and how a government claiming democracy dismisses such issues. The stark statistics on intimate partner violence and the infamous "Wolf Pack Case"

reveal the urgency for change. Workplace disparities, from the gender pay gap to vertical and horizontal segregation, persist. The protests and movements in Spain challenge biases, norms, and ignorance. It is crucial to listen, understand, and act to create a just and equitable society. Spain has made strides towards equality but lacks effective policies. Gender units are being implemented, but more reforms are needed. Despite challenges, there is hope for progress through listening and courageous voices.

In this impactful poster 4a created by Maci Morris, the power of collective voices is vividly depicted. It showcases a collage of signs from various marches in Barcelona, Spain, each representing a unique story and history. These signs carry powerful messages, demands, and calls for change, highlighting the diverse range of issues and experiences faced by women. The poster serves as a testament to the resilience and determination of those who refuse to be silenced. It emphasizes that these voices cannot be ignored any longer and that their stories deserve to be heard and acted upon. Through this poster, the strength and unity of the movement for women's rights shine brightly, inspiring others to stand up, speak out, and join the fight for equality (Figure 4a).

In this powerful poster 4b, titled *A Million Reasons*, Maci Morris captures the unity and determination of the women's rights movement in Barcelona, Spain. The poster displays a multitude of signs from different marches, symbolizing the

a)



b)


c)

Fig. 4 Maci Morris, *Feminist Radical City, Barcelona, Spain*, 2022. a) *Voices that cannot be ignored*; b) *A million reasons*; c) *The Future of Hope*.

diverse voices and stories of the people involved. Each sign carries its own unique message and represents the history and experiences of those who have fought for women's rights and freedom. Overlaying the photographs are quotes and cheers that have resonated throughout the movement for years. These powerful words serve as a reminder of the collective strength and determination of the people who have come together to demand equality and justice. The poster showcases the immense support and unity that exists within the movement, with thousands of people standing together in the name of women's rights. It captures the passion and energy of these gatherings, serving as a visual representation of the countless reasons why individuals are fighting for change. Through this poster, Maci Morris highlights the power of collective action and the importance of amplifying the voices of those who have been silenced for far too long. It is a call to action, inspiring viewers to join the movement and contribute their own voices to the cause of women's rights and freedom (Figure 4b).

The Future of Hope: Barcelona in All Its Glory is a captivating poster that embodies the essence of hope and transformation. It showcases Barcelona as a city that embraces change and learns from its past. The poster emphasizes the importance of listening to stories and the power they must bring about meaningful change. It represents the hopeful future that awaits when voices are heard, and action is taken (Figure 4c).

CONCLUDING NOTES

Visualizing change in radical cities and harnessing the power of imagery in urban transformation involves understanding the complexities of the built and natural environment and the social, political, and economic factors that shape these spaces.

By integrating multi-disciplinary perspectives, pedagogical approaches, and visualization techniques, urban scholars,

educators, students, and local communities can work together to foster a deeper understanding of the challenges and possibilities of creating more just and equitable urban spaces (Fischer-Nebmaier et al. 2015).

The case studies of Rio de Janeiro, Kathmandu, and Barcelona offer valuable insights into the struggles and aspirations of different cities and the movements that have emerged to address social issues and advocate for change. Each city has unique challenges and contexts, but the common thread is the power of collective voices and the urgency to transform.

In Rio de Janeiro, Emma Sheets sheds light on the hidden city within the city, the favelas, where marginalized communities face oppression and neglect. Through her manifestos and posters, she exposes the origins of oppression, mega-events impact, and the voices of those left in the dark. Emma's work emphasizes the need for inclusive urban development and compassionate approaches to address social disparities.

Nishan Khatwida, in Kathmandu, focuses on the pollution and degradation of the Bagmati River, emphasizing the responsibility of individuals and the importance of community efforts. Through his posters, he highlights the river's religious significance, environmental challenges, and personal memories that remind us of its past purity. Nishan's work inspires the restoration of the river and underscores the role of elected officials like Balen Shah in bringing positive change to the city.

Maci Morris captures the spirit of the women's rights movement in Barcelona through influential manifestos and posters. Her work amplifies the voices of thousands of people demanding equality and justice (Mehan & Tafrata, 2022). The posters showcase the diversity of experiences and the unity of the movement, inspiring others to join the fight for change. Maci's work underscores the importance of listening, understanding, and taking action to create a more equitable society.

These case studies demonstrate the power of art, activism, and imagery in raising awareness, fostering dialogue, and advocating for social justice. They remind us that change is possible when voices are heard, stories are shared, and

communities come together (Valentino, 2021). By exploring themes critical to local communities and engaging with diverse voices, actors, and stakeholders, urban living labs can be developed to educate and empower students as urban activists and critical thinkers skilled in using the power of imagery to shape the future of cities ((Mehan & Abdul Razak, 2022).

As urban scholars, educators, and activists, engaging in ongoing dialogue, exploration, and collaboration is essential to ensure that imagery's power is harnessed effectively in the quest for more inclusive, just, and equitable urban spaces. By embracing the power of collective voices, diverse perspectives, and shared visions, we can work together to build more inclusive, just, and equitable urban spaces for generations to come, using the power of imagery and visual narratives to inspire and enact transformative change in radical cities.

ACKNOWLEDGEMENTS

I would like to express my gratitude to all of the students who worked tirelessly in the course 'Radical Cities over Time and through Space: Re-narrating Urban Activism' at the Huckabee College of Architecture, Texas Tech University in Fall 2022, for their exceptional effort in creating both individual and group manifestos and posters.

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Article available at

DOI: 10.6092/issn.2724-2463/16093

How to cite

as article

Mehan, A. (2023). Visualizing Change in Radical Cities and Power of Imagery in Urban Transformation. *img journal*, *8*, 182-201.

as contribution in book

Mehan, A. (2023). Visualizing Change in Radical Cities and Power of Imagery in Urban Transformation. In A. Luigini (Ed.), *img journal 08/2022 Wordless Images* (pp. 182-201). Alghero, IT: Publica. ISBN 9788899586362

THE RETHORIC OF SPACE REPRESENTATION: FROM DRAWING HERITAGE TO VISUAL COMPUTING

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ARTIFICIAL ARCHITECTURE
DRAWING HERITAGE
DREAMSCAPE
VISUAL COMPUTING
VISUAL RHETORIC

Digital technology connects people in digital space focusing the attention on images, which create and introduce you into artificial spaces. The development of digital technology offers the possibility of living immersive experiences in suitable activities to improve real skills in digital 'room'. That means the possibility of exploring otherwise impossible space, opening to new applications of visual arts. Digital reality explores imaginary worlds through senses, first of all the sight. Hybrid reality becomes actual through visual images. Because of that the imaging requires first of all the management of visual space.

Perspective makes believable the space visualization, and the drawing tradition becomes the main reference to the design of suitable space, as well in the rhetoric of impossible world.

The architectural drawing enhances the perspective by light and shadow, more than color. Besides the unreal architecture, the graphic art shows interesting representations of abstract mathematical spaces, referred to the concepts of Not Euclidean Geometry.

Some considerations open a further research comparing the drawing tradition with last trends in contemporary imagery, starting with Utopia's imaginary architecture. Today images confirm the role of the perspective, thus the relationship between the eye and the room.

INTRODUCTION

The technology conditions the possibility of visualizing things in the digital space. It helps direct communication between people, and between men and things. It creates new connection spaces, introducing impossible worlds, which are suitable thanks to suitable images. The *Metaverse* promises to be a parallel universe of hybrid realities. Digital simulation makes it possible living immersive experiences in a new dimension of blended realities. Therefore, the digital representation goes towards new dimensions, affecting professional training as well other opportunities in connecting people, performing arts and digital therapy[1]. *Visual Computing* has a decisive role. It allows experiential spaces that are different from physical spaces.

The *Metaverse* presents itself as a hybrid relationship world. It overcomes the dichotomy between digital reality and the concreteness of the physical world in a possible utopia. Digital reality can create hybrid spaces parallel to physical reality. They take shape through 'suitable' images, because the digital space may be credible form also in unreal configuration.

We wonder how the multimedia universe will be in the close future, and how it may 'change' our relation space. We only know that it requires artificial images creating new space of relationship between different worlds. While Artificial Intelligence demonstrates its skill in gathering images to build suitable scenes, we search for reference in the drawing heritage, which offers several examples of unreal architecture, both in Utopia representation and in hybridization of building and image (architectural perspective). In fact, the representation of space through plane projection and real scale perspective can simulate architecture (photorealistic render) or create illusory effects (*Quadratura*). Drawing heritage fixes the rules of imaging and the reference is valid as well for digital representation and AI. 3D models of imaginary spaces appear 'actual' because the output image is a perspective projection, and room and shapes look true even

when they are impossible. AI creates visual spaces gathering images in a suitable perspective. Therefore, the key to 'realistic' representation is the respect for the perspective rule that summarizes the geometry of vision from a fixed point of view. This has to be 'external' to the scene, and far enough away to avoid the marginal distortions that Leonardo already underlined. The immersive simulation reverses the paradigms of drawing in the construction of the space's image. 3D modelling changes the management of artificial space image. A projective system displays the space on the monitor's flat surface. The image does not interact with spatial concept and its construction, even orbiting model according to infinite points of view. The image is the linear perspective of a digital reality. It faces the observer, who remains out of the model, even when he can navigate it.

Immersive devices allow experiencing intermediate spaces between the digital and physical worlds. They move the observer into a different room without continuity solution[2]. The visual relationship between individual and image changes. Therefor the images management requires new design parameters. Their definition is tied to the running development of digital tools, without any direct reference but those of drawing and visual art.

The aim of this work is to define formal canons and control parameters in digital spaces, from the analogical experience of drawing and the suggestions of artistic avant-gardes. They combined the complexity of the imaginary space with the immediacy of the Drawing's 2D concept.

Meaningful, even if not exhaustive, references are the unbuilt architecture and Escher's impossible spaces. Imaginary architecture created spaces that live through images. Illusory and utopian ideas come to life from joining representation codes with drawing rhetoric that shows innovative solutions in the image layout.

Preliminary considerations about the representation of unreal spaces in architecture follow the comparison of the space-eye relationship in analogic and digital imaging. The

perspective rule is the starting point for defining the control parameters for space representation. It refers the image's composition to the observer. Comparing possible variants and their effects on the perceptive connotation of immersive images, may help understanding the space's characters and constraints in the new digital reality.

THE DIGITAL SPACE BETWEEN ARCHITECTURE AND IMAGINE

The Architecture heritage shows different ways to merge reality and imagination through visual images capable of distorting the visual perception in hybrid spaces. The first exemple is the fake choir in Santa Maria presso San Satiro (1482), the Milanese church where Bramante simulated a central room (Buratti et al., 2022). The wooden perspective visualizes a greek cross plan in a Tau plan basilica. A double perspective creates an immersive experience of a space that is different from the very architecture.

After that, the *Quadratura* enlarge the room in painted space[3]. The perspective representation is correct in its geometry but only sometimes coherent with the architecture (Rossi, 2017). Anyway, the projective choice demonstrates an architecture-perspective project focused on images' ambiguity. That confirms that their importance goes far beyond the realistic representation, simulating different architecture in respect of the built room. The modern simulations were born from the relationship between reality and perspective, anticipating virtual images' contemporary role. Utopian architecture lives in drawing, assigning a favoured role to perspective.

Significant examples are the majestic utopian architecture of Boullée and Ledoux (Kaufmann, 1966) with its impressive out-of-scales (Figure 1) and Piranesi's *Imaginary Prisons*, where the correct perspective gives a natural appearance to uncommon architecture or spaces[4].

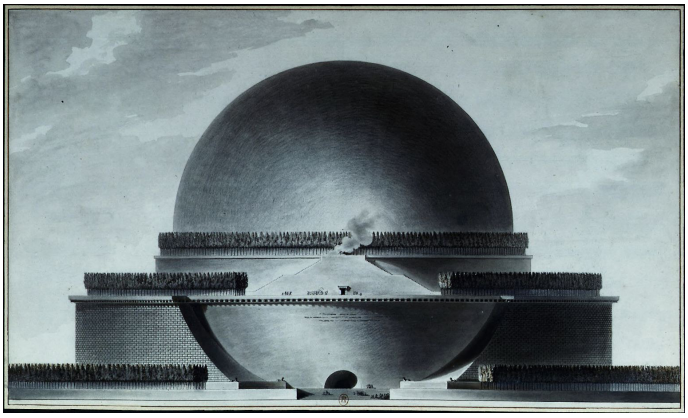


Fig. 1 Étienne-Louis Boullée, 1784, *Newton's Cénotaphe*. Retrieved December, 21, 2022 from <https:commons.wikimedia.org/wiki/File:Étienne-Louis_Boullée_Memorial_Newton>.

The contrast of lights and shadows enhances the perspective emphasis that stresses the buildings' dimensions (Figure 2). Perspective and light are the two primary rhetorical tool, also in the suggestions of the historical avant-gardes, in which the 'perspective rendering' is the only project document. The massive dimension of futuristic buildings does not contravene the 'terrestrial' rule of the force of gravity or the architectural composition rule.

The same happens with Historical Avant-Gard. Italian Futurist architects (Godoli, 1983) and German Expressionists, such as Fritz Höger and Eric Mendelsohn (Borsi & Koenig, 1967; Bucciarelli, 1991 exalt the myth of modernity in imposing buildings perspectives.

Along time, the representation adapted the style and its graphic techniques to contemporary taste without modifying the perspectival relationship between man and image.

Close points of view stress the perspective, but it still follows the Alberti's concept: the picture is a frame between the observer and the scene facing him. The observer's involvement remains limited and he faces the pictures, which represent rather than simulating, as in Piranesi's 'shots' and in the 'backlighting' rendering of Expressionism architecture.

Futurist air painting relativized the point of view with the vertical rotation of the optical axis enhancing the observer's flight movement. The rational perspective adds new

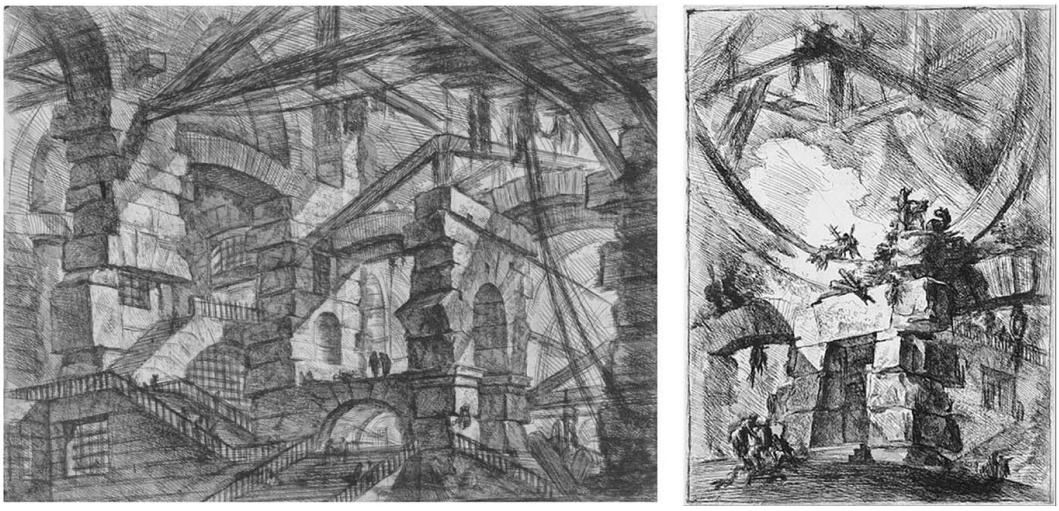


Fig. 2 G.B. Piranesi, 1749, *The Prisons: A perspective of colonnades with zig-zag staircases*, The Giant Wheel. Retrieved December, 21, 2022 from <https:openartimages.com/search/giovanni-battista-piranesi>.

potential to representation, but the exaltation of movement does not change the nature of the representation and its graphic description. The observer stays 'outside' the image.

Other interesting suggestions in space and architecture representation refers to Non-Euclidean Geometries.

The related formal research offers other models to immersive tools of augmented reality in the configuration of hybrid space (Ferrero et al., 2009). Gravity conditions architecture also in imaginary projects, while mathematicians can imagine spaces with other rules. Arts visualize their abstract concepts, which inspired even the architecture, forcing the complex shapes of contemporary geometries into the Euclidean space. The sculpture Attilio Pierelli experimented with spaces that are different from the canonical one (Joray at al., 1983). The digital sphere can simulate Pierelli's Euclidean interpretation of the tesseract. The sculptor's mock-up (Figure 3) demonstrates a simple reduction in three-dimensional space. The second shaped the hypercube in the sculptural architecture of a church, in which the geometric reference takes on a solid charge of rhetorical figures. Both have reworked abstract concepts into visible form, using analogical representation techniques.

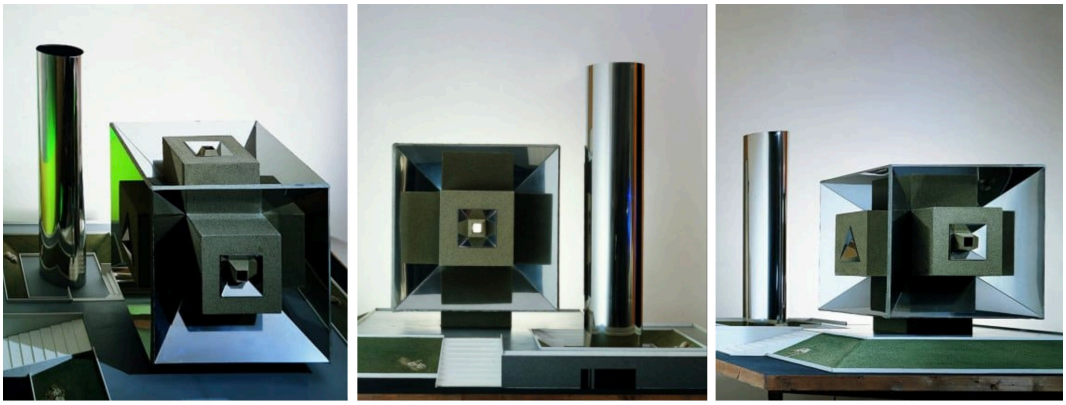


Fig. 3 Attilio Pierelli, 1983, proposal for a church inspired by the geometry of hyperspaces, sculpture in steinless steel and concrete, the cube is 60x60x60 cm. Retrieved December, 21, 2022 from <https://www.attiliopierelli.it/ita/chiesa_iperspaziale#&gid=1&pid=2>.

Escher's graphic research about the visual space applies both Non-Euclidean and perspective suggestions. He deals with curved spaces and interconnected surfaces in two-dimensional images, playing with the projective relationships between reality and image. The two-dimensional space representation derives from unusual and skilful applications of linear perspective, combined with multiple simultaneous points of view. Pictures visualize spaces that are improbable in the Euclidean dimension but not impossible in a digital simulation (Figure 4).

In virtual space, can you build unreal spaces like those of M.C. Escher's prints? Spaces that are not directly attributable to our physical world, such as those inspired by the Penrose tribar, Up and Down or Print Gallery (Locher, 1992)?

Video games hint to a positive answer in the sudden move from one place to another. Otherwise the digital modelling of immersive impossible or non-Euclidean spaces is more complex than their drawing.

Esher's impossible images demonstrate that a drawing may hide visual tricks, while 3D surrounding models do not. The space of architecture is, by definition, a 3D space. Digital space is not, but modelling tools are, because they help just this. Contemporary architecture pursued different models, fitting formal concepts mediated by Mathematics into the 3D space.

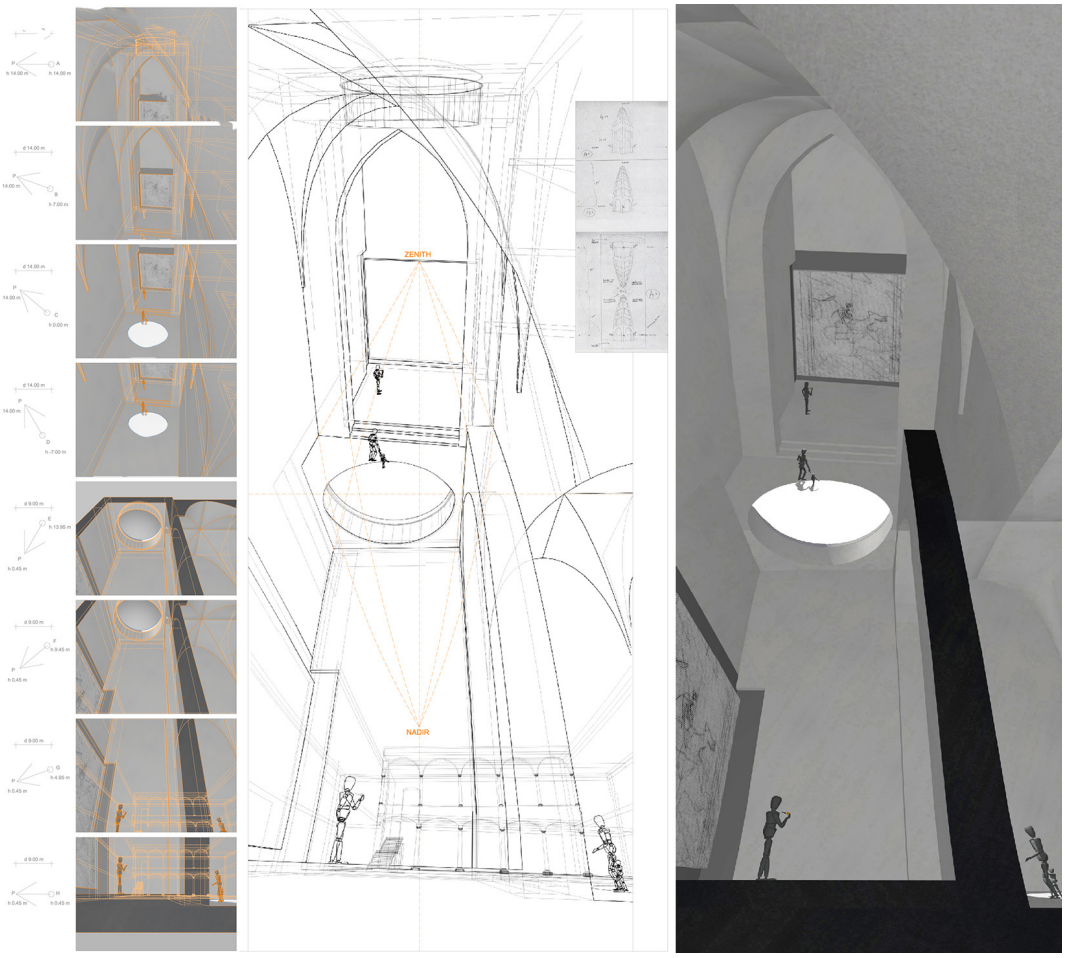


Fig. 4 Mauro Lazzarotto, a.a. 2002-03, *Palazzo Abatellis perspective inspired by Escher's print 'Up and down'*. University of Parma, School of Architecture.

Before being illusion, linear perspective has been the first step to a mathematical representation of space. It is not surprising that it gained a primary role in design as well in architecture rhetoric. However, only a few authors could overcome the limit of the canonical pattern by experimenting with immersive solutions such as Bramante's virtual space of Santa Maria near San Satiro in Milan.

Before digital representation made available simulation techniques, Bramante applied the perspective as a tool, controlling the visual space in a virtual reality. In

his masterpieces, a double perspective projection simulated the immersive fruition of a space different from the detectable one (Buratti et al., 2022). Along the nave, it is difficult to distinguish the 'measurable architecture' from the simulation. This dynamic fruition of virtual and space anticipates the concept of 'phygital', coined about the double component of augmented reality. The virtual image makes itself real in the immaterial room of the conceptual building.

Bramante's perspective device is not a simple deception but a virtual simulation that materializes an immersive experience around the visitor. It is something more than a solid perspective, and suggests the effectiveness of digital experimentation with 'different' spaces.

The digital simulation requires framing the spatial representation in several projective solutions, as Escher sometimes did. From there, it is possible to reconstruct the geometry representing it in the digital universe. Here it is possible connecting unstable situations with sudden passages, and to conceal any inconsistencies.

NEW LANGUAGES OF VISUAL SPACE, FROM COMPUTATIONAL SIMULATION TO SENSORY EXPERIENCE

Up here the imaging heritage. Further suggestion came from the survey of imaging trends in late digital art.

By drawing, artists and designers sketch out their ideas in visual scenarios. Then they refine and develope through digital manipulation techniques, modelling, rendering and animation. All applications the Euclidean space. Despite that, they create spaces going over the realistic, lifelike illusion of rendering because of their recognizability as 'imagination'. They do not search for imitation but they follow human creativity. Because of that they are more captivating than AI products.

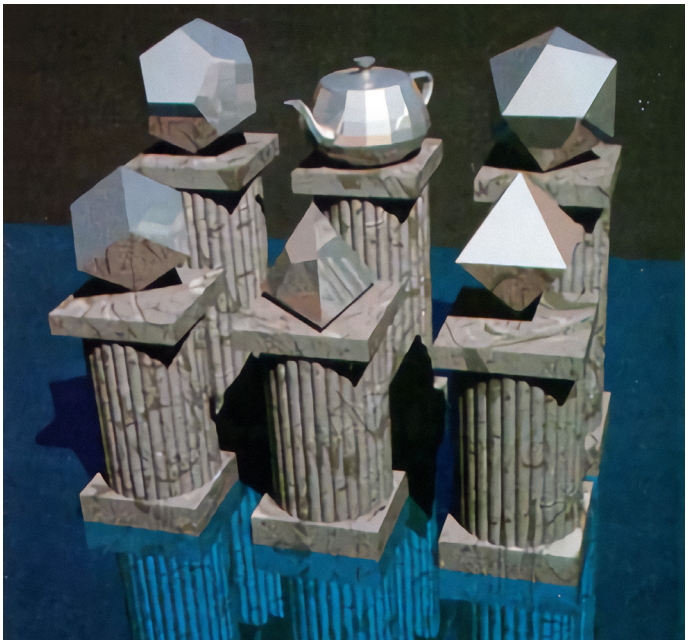


Fig. 5 Arvo, J. & Kirk, D., 1987, *The Six Platonic Solids CGI*. Retrieved December, 20, 2022 from <https://thereaderwiki.com/en/Utah_Teapot>. Journals cover. The image humorously adds the Utah teapot to the five standard Platonic solids.

Digital renderings have long served architects, interior designers and others to help visualize spaces before their construction begins. Over the past few years, the increased performance of computer components, coupled with the exploration of new software and mathematics, has allowed the establishment of new language formulas and design methods. In this case, two new modes of expression, independent of each other but with many common features at their base, have come into being: artificial architecture and dreamscapes.

Artificial architecture is a bold new emerging direction in computer-aided design that is concerned with developing computational methodologies and algorithms that create natural-looking forms. It allows meaningful solutions to architectural design problems to be generated, and the computer is seen as a collaborative entity in the design process, rather than merely an assisting tool. Disciplines as diverse as computer science, artificial intelligence, architecture, and computer graphics intersect in this area (Sandhana, 2022).

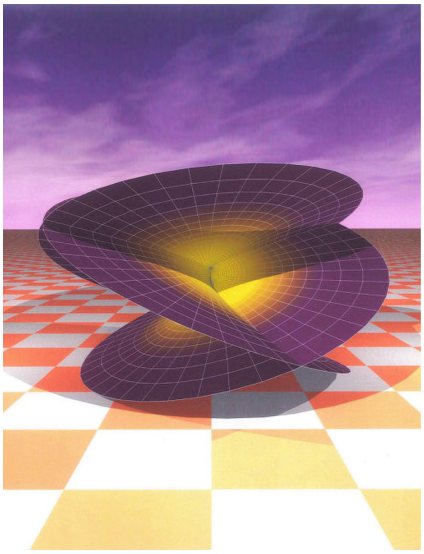


Fig. 6 Regge, T. *Viola del Pensiero Debole*, 2001; *Coffee Liberty*, 2002, CGI. Retrieved December, 20, 2022 from <http://www.facendoaltro.it/2019/04/14/tullio_regge/>.

In the beginning, CAD software was used to better visualize design concepts in the designer's mind. Since their inception, punctuated by such notable personalities as those of William Fetter[5] and Martin Newell[6], they have been automating an increasing number of repetitive tasks and have been used as assisted tools (Figure 5).

It is no coincidence that this potential was immediately investigated by mathematicians and physicists; Tullio Regge[7] himself, with his 'bricolarte', expresses his passion for the world of numbers by entering the design discipline using it as an interface (Figure 6).

These are the stages in which CAD, while performing complicated calculations, merely visualizes, stores and modifies designs or processes in the designer's mind. To date, the machine can replace the more abstract preparatory stage normally assigned to drawing. It defines the structure, which specifies elements such as possible configurations, types of elements to be used, and the modularity of the overall design. Arturo Tedeschi[8] investigates how currently the use of these digital technologies blurs the boundary between disciplines and emphasizes the

Fig. 7 Tedeschi, A. *AI Visual Merchandising, AI Architecture*, 2022, Midjourney. Retrieved December, 20, 2022 from <https://www.arturotedeschi.com/aiarchitecturemidjourney>.

semantic and emotional values of objects through their morphology. He adds a level of complexity beyond human manual skill through the use of digital processes such as *Algorithms-Aided Design* (AAD), artificial intelligence and virtual reality (Figure 7).

In the realisation of the two previous images, Tedeschi employed *Midjourney*, one of the most innovative *Deep Learning* platforms at the moment: by means of a textual command input, descriptive of the scene to be visualised, the artificial intelligence recodes the text to export it in different versions through images. From these it is then possible to create further variants and modifications. Many visual artists exploit similar experiments to sketch out their initial idea. It is a tool for outlining an initial form of a personal vision that will then be translated into a finished work using their main creation methods.

Artificial architecture creates completely new structures by simulating complex iteration phenomena or by using generative processes. Scripting languages are innovatively integrated into CAD software, allowing algorithms to actively participate. Algorithms become collaborators in

the design process and use genetic systems, formal grammars and mathematical models to design unpredictable and unique structures. Artificial Architecture thus refers to the design and construction of structures, buildings and other physical spaces created with artificial materials and techniques. This can include anything from skyscrapers and office buildings to houses, bridges and even entire cities. The constant is the reference to Cartesian space.

Dreamscape, on the other hand, is the term used to describe imaginary landscapes and settings that explore the imperceptible dimension of dreams. These dreamscapes can consist of a variety of elements, including people, animals, buildings, and natural landscapes. They often reflect the creator's subconscious thoughts, feelings, and desires. In general, the relationship with drawing is one of mutual support and interdependence, as drawing is often used as a tool to create and represent the crucial first steps of creation, the act of externalizing the idea. Ultimately it supports the goal of dreamscape creation, which is to create an immersive and imaginative environment that captures the viewer's attention and transports him or her to a different world. This end can be achieved through a variety of techniques and approaches, depending on the specific goals and needs of the project, as well as the personal style and vision of the artist or designer.

DREAMSCAPES: POSSIBLE, IMPOSSIBLE OR UNREAL SPACES

Dreamscapes and *Artificial Architecture* intersect in the use of virtual or augmented reality, which allows people to experience and interact with digital environments looking like real physical spaces. This technology is often used in game engines, but it has also been used for other purposes as well, such as creating immersive simulations or allowing people to explore and experience virtual worlds. They

are used in art, film, corporate image and other forms of media to create immersive and visually interesting environments for the viewer or player to explore.

A new generation of digital artists is trending with dreamscapes that cannot, or will not, be built in the physical world. An aesthetic vanguard that explores the infinite ways of conceptualizing and expressing utopian oases and dystopian scenarios. Some artists may use more realistic styles, using detailed lines and lighting to create a sense of depth and verisimilitude. Others may use more stylized or abstract approaches, using simplified shapes and aberrated perspectives. The work combines several disciplines: 3D, of course, as well as architecture, design, still-life, and landscape.

Observing the evolving phenomenon on social media channels, Elli Stuhler presented emerging authors in *Dreamscapes & Artificial Architecture* (Levy, 2022) at a time when spatial modeling and visualization software "has the potential to be immensely liberating". The curator states that:

> we have never before had such capacity to render the world as we would like it to be […] Modeling software is not industry-specific; you don't have to be an architect to design a building, or an interior designer to render a space. (Levy, 2022)

According to Deyan Sudjic, director emeritus of the Design Museum in London:

> today if you walk into an architectural firm or one where video games are designed, you don't see much difference. Pen and paper have disappeared from the designer's work, and visualization technologies have, so to speak, taken power out of his hands: the realism of renderings has greatly increased the interaction with the client, who previously could not spatially understand the plan of a building while now he can have more say. These software programs give realistic shape to any vision: the Art Nouveau period comes to mind,

Fig. 8 Six N. Five, *Cycles*, 2022, CGI animation on screen, W1 Curates, London. Photo of the gallery. Retrieved December, 20, 2022 from <https://www.w1curates.com/current-and-upcoming-events/six-n.five>.

> an explosion of possibilities. But also the visionary work of Superstudio, which was already going in this direction in the 1960s. (Modigliani, 2021)

On the occasion of the Milan 2022 *Triennale* with the generic theme *Unknown Unknowns*, comes one more hit: the Czech Republic pavilion curated by Studio Okolo of Prague. In the installation, some *dreamscapes* are printed on large panels, backlit in order to not lose the relationship with their conception in digital light. It is told how the new movement has become prominent on the web not only because of the recent pandemic era, but also because of the uncertainty of war and its impact on daily life and global security. Crisis, as is recurrent in history, leads to new interpretations of the world we live in in order to escape from it, ideas that become places to find shelter and plan possible future solutions.

A review of artists with different goals thus emerges. Fame has led Ezequiel Pini's *Six N. Five studio*, an award-winning Argentine designer and digital artist based in Barcelona, to collaborate with names such as *Apple*, *Burberry*, *Cartier*, *Cassina*, *Facebook*, *Microsoft*, *Nike*, and *Samsung*. The latest work commissioned from the studio in 2022 was for the *W1 Curates gallery* in London, titled *Cycles* (Figure 8) to approach the passage of time as a visual poetic metaphor.

Fig. 9 Reisinger, A. & Hades, A. & RAC, *Arcadia* (2021). CGI. Single frame from the opera. Single frame from the opera. Retrieved December, 20, 2022 <from https://vimeo.com/639528236>.

In addition to the interesting dynamic façade as an attraction from the outside, the immersive interior space consists of perimeter walls of 63 linear meters covered entirely with high-definition LED panels that allow the actual boundaries of the architecture to be transcended.

A perceptual breakthrough that surely harks back to the illusion of pictorial *trompe-l'oeil*. The words used by the gallery as a description quote:

> the scenic architecture plays with the perception of depth and the extension of the physical world to an infinite and untouchable reality, while setting the stage for multiple situations occurring simultaneously. Natural lights emphasize a timeline that tints a static environment as character elements evolve and interact with the space in a performance that becomes inherently chaotic in time. (www.w1curates. com/current-and-upcoming-events/six)

Widening the field of research, not from a spatial point of view but of the interconnectedness of the arts, is Andrés Reisinger. Of Argentine origin as well, and based in Barcelona, he has found a novel way to conquer design territories, moving from the digital to the real world. With the 2021 narrative short film *Arcadia* (Figure 9), the result of an interdisciplinary collaboration between artist Andrés Reisinger, musician RAC and poet Arch Hades, a journey

through our collective existential crisis of the 21st century is undertaken. Hades' narrative voice takes us through the five chapters, each of which pays homage to a particular philosopher, while also referencing dozens of poets, artists, authors and thinkers who have shaped contemporary human psychology and culture.

Central becomes the definition of simulacrum, which is investigated repeatedly highlighting the fine line between fiction, simulation and reality. Christie's auction house introduces the work to the public with a fitting explanation:

> Arcadia explores the anguish of our modern loneliness, alienation, status anxiety, and depression [...] all brought on by our pervasive consumerist phantasmagoria of a culture. It urges us to overcome this nihilism by refining our individuality in solitude and nature, before adopting a mood of rebellion and questioning that seeks to bring about change in society, while on an individual level encourages us to bring meaning to our struggle by embracing passion, self-ownership, beauty, and art. (aorist.art/program/ collaborations/christies-arcadia)

Once we enter the ethereal world of these visions we meet other recurring protagonists on the *dreamscapes* scene-Joe Mortell, Visual Citizens, Alexis Christodoulou, and Hugo Fournier to name a few, associated with dreams of disarming clarity due to the quality and lucidity of the production process (Figure 10). Dreams in high resolution and usable outside the subconscious, conveniently from any digital device. They transport viewers into worlds that blend different artistic movements and design history through time. Worlds that often include references to famous figures, blurring the lines between what is visionary and what is trendy. This freedom of representation is particularly useful for advertising purposes, as it allows people to virtually browse and experience products in unique and unconventional places. They invite people to reconsider the emotional role of design and reflect on how the built environment affects the psyche (Stone, 2021)

Fig. 10 Fournier, H. *Desert Pit*, 2022, CGI. Retrieved December,20, 2022 from <https://www.instagram.com/p/CNe-ZCaMUcx/?hl=it b)>. Visual Citizens, *Digital Cover*, 2022, CGI, Elle Decoration NL. Retrieved December, 20, 2022 from <https://www.instagram.com/p/CNe-ZCaMUcx/?hl=it>.

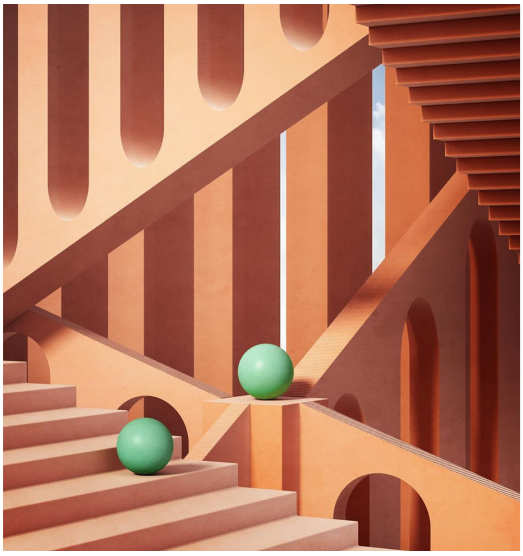
The influence of past culture through direct references is particularly pronounced among Italian artists: Enrico Capanni, Massimo Colonna, Riccardo Fornoni, Stefano Giacomello, and Notoo Studio gain international fame with hybrid projects between historical research and set design (Figure 11).

As Adam Štech suggests:

> The historical context of the projects is expressed in many examples of visionary and imaginative work from the past, visions of neoclassical architects, surrealist painters, ad contemporary digital artists reveal a chronicle of research into the unknown and the dream.(Štech, 2022)

From this incipit spring projects with references to artists such as Escher and De Chirico, to avant-gardes such as *Superstudio* and *Archizoom*, and to local landscapes such as that of the Scala dei Turchi in the province of Agrigento.

Using two-dimensional representation, it is London-based architect Charlotte Taylor who coordinates many of the collaborations with artists from around the world. Illus-




tration for her is a way of testing ideas, exploring colors and shapes, imagining spaces that other professionals can then help shape into digital reality (Figure 12). As she states:

> my work is a sum of many outputs. Be it architecture, photography or illustration, all of these mediums play a part in each other's process. (https://www.des-

ignandlive.pub/ interviews/scaling-it-back-to-reality-with-charlotte-taylor)

CONCLUSIONS

The cases cited above demonstrate that there are different approaches to creating a dreamscape environment. The specific techniques and methods used depend on the medium and objectives. Some common techniques that can be used to create visualizations include:

- combination of real-world elements with fictional or imaginary elements can create a sense of familiarity and grounding within the dreamscape while allowing for the introduction of more fantastic or surreal elements;
- use of distorted or exaggerated perspectives can create a sense of disorientation and facilitate the introduction of illusionistic effects;
- play of light and color, the use of unusual or exaggerated color schemes and lighting effects can help create an atmosphere untethered from reality;
- use of rhetorical figures such as symbolism and metaphor, the inclusion of symbolic or metaphorical elements can help convey deeper meanings or themes within the work;
- experimentation with forms: distorting or abstracting the shapes of objects and environments can create a sense of unreality and help to alienate the viewer.

Ultimately, paraphrasing André Reisinger, to create an ideal world it is enough to visually delineate an imaginary space, because beyond a tendency creating dreamscapes is a necessity.

NOTES

1 Digital Therapy opens to new interesting applications with the experience of dystopian spaces in mental disease care.

Fig. 11 Capanni, E. *Up is Down II*, 2021. Retrieved December, 20, 2022 from <https://www.instagram.com/p/CNe-ZCaMUcx/. b)>; Notoo Studio, *Inside Art*, 2018, CGI. Retrieved December,20, 2022 from <https://www.notoostudio.com/it/works/inside-art/. c)>; Fornoni, R. & Taylor, C. *Villa Saraceni at Scala dei Turchi*, 2020, CGI. Retrieved December,20, 2022 from <https://www.archilovers.com/projects/271533/villa-saraceni-alla-scala-dei-turchi.html>; Colonna, M. *Digital advertising*, 2021, CGI, Antonio Lupi Design. Retrieved December,20, 2022 from <https://www.archdaily.com/982382/let-the-light-in-the-lightness-of-translucent-baths-and-sinks>.

Fig. 12 Taylor, C. *Fictive Pool*, 2018. and C. Sottsass *Composition II*, 2018. Digital paintings. Retrieved December,20, 2022 from <https://www.ignant.com/2018/06/18/charlotte-taylors-architecturally-inspired-paintings/>.

2 About that it is interesting the parody of the film Everything everywhere all at once by Daniel Kwan and Daniel Scheinert (2022).
3 A wide research focused on Architectural Perspective verified the role of real scale images in interior space configuration (Valenti, 2017)
4 The second edition of 1761 collects 16 engravings between 1745 and 1760. The engravings depict interiors with robust structures with a complex and imposing space, full of stairs and lifting machines; they present recurring characteristics, such as the light coming from the right and the lack of recognition of the main elements of the perspective system, in particular, the horizon and the landline.
5 In 1964 William A. Fetter, art director of the *Boeing Company* in Seattle, Washington, oversaw the development of a computer program that enabled him to create the first three-dimensional images of the human body through computer graphics. Using this program, Fetter and his team produced the first computer model of a human figure for use in studying the design of aircraft cockpits. It was called the *First Man* or *Boeing Man*.
6 In 1975 Martin Newell, a computer graphics researcher at the University of Utah, created the *Utah Teapot* or *Newell Teapot*, a mathematical model of a common teapot with a rather simple shape that became a standard reference object and something of an icon in the computer graphics community.

7 Tullio Eugenio Regge was an Italian theoretical physicist. He also tried his hand as a designer in the 1970s, achieving great success with the Detecma armchair, produced by the *Gufram company*.
8 Arturo Tedeschi is an Italian architect, computational designer and researcher. He is the founder of *A>T studio*, which promotes a new kind of algorithm-based design.

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Article available at

DOI: 10.6092/issn.2724-2463/16260

How to cite

as article

Rossi, M., Armellino, L. (2023). The Rethoric of Space Representation: from Drawing heritage to Visual Computing. *img journal*, *8*, 202-225.

as contribution in book

Rossi, M., Armellino, L. (2023). The Rethoric of Space Representation: from Drawing heritage to Visual Computing. In A. Luigini (Eds.), *img journal 08/2023 Imaging and imagery in architecture* (pp. 202-225). Alghero, IT: Publica. ISBN 9788899586362

WANDERING ARCHITECTURE THROUGH THE LOOKING GLASS OF DIGITAL REPRESENTATION

AN EXPEDITIOUS TEACHING EXPERIENCE IN UNDERSTANDING AND MODELLING MODERN ARCHITECTURE

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LE CORBUSIER
COROMANDEL ESTATE
CURUTCHET HOUSE
JOOSTE HOUSE
RENDERING

The present work focuses on an expeditious teaching experience of Architecture and 3D modelling aimed at the 'Architectural Drawing II' and 'Computer Graphics'students of the Building Engineering-Architecture Degree Programme of the University of Salerno, Italy.

The students, involved in the 'Italy-South Africa Joint Research Programme, ISARP 2018-2020 – A Social e spatial investigation at the Moxomatsi village, Mpumalanga' (SSIMM), were supported in the digital reconstruction of three iconic examples of modern architecture located in South America and South Africa, i.e., the *Curutchet House* (La Plata, Argentina), the *Coromandel Estate Manor House* (Mpumalanga, South Africa) and the *Jooste House* (Pretoria, South Africa).

Through an Alice-in-wonderland-type of voyage, they had the chance to first analyse the complex inner space of these architectural assets that both emerge from and fade into the landscape and then propose their own interpretation through rendered and post-processed imagery.

INTRODUCTION

Nowadays, much like the prisoners of the cave of the well-known Plato's allegory[1], we are every day more convinced that the digital reproduction of the phenomenal world can become itself the reality. If not, at the very least, it can flawlessly mirror it. Consequently, it is not to forget that the whole experience of the world is just not equal to the objective reality, may this even exist, but a version of it mediated by our observation, thus a discretisation of it, no matter how faithful it may come to be, should never propose as the absolute truth. Borrowing Werner Heisenberg's words "We have to remember that what we observe is not nature in itself but nature exposed to our method of questioning"[2] (Heisenberg, 1958, p. 38). Especially newer generations, such as the digital natives, are exposed to digital content without having the proper tools to discern truth from well-packed lies. Thus, the role of educators is to provide them with the tools to understand and thoroughly analyse the physical world before adding their layer of imagination. Narrowing down the issue to Architecture, the best way to understand it is by being able to read the flux and the balance of the space it creates (Docci et al., 2019). And what better way to understand a place than wandering around?

In the past, architects travelled around Europe with a sketchbook in hand, documenting ancient ruins, details, objects, and the people that inhabited them to find inspiration. Le Corbusier was one of these innovative architects that understood the value of history and tradition in order to become a better designer, founding a connection between history and contemporary architecture. Indeed, many architects still use the act of drawing –via schematisation and geometrical representations– as an exercise to understand an architectural asset or, rather, an urban space to break it down into its elemental components, i.e., its lemmas (Docci et al., 2019; Ferraris et al., 2014).

Here the concepts of 'drawing' and 'design' starting as synonyms, become antonyms; while the former present itself

as a means to analyse architecture, the latter represents the act of creating it (Barba et al., 2012), as Norman Foster stated in 2007 (Santo, 2005), "architects design for the present, with an awareness of the past, for a future which is essentially unknown"[3]. It is then mandatory to reconcile this dichotomy by leading the students through a process of awareness by rediscovering the past in order to build a solid foundation for their future work life. Unfortunately, not all students have the opportunity to walk the buildings they study in books, therefore, new pedagogical strategies need to be thought of in order to achieve this ideal learning experience.

Particularly during the last couple of years, having physical access to cultural heritage was not always an option; thus, both innovative methods of digital surveying (Barba et al., 2022; Palestini & Basso, 2021) from a distance and experimental reconstruction techniques (Apollonio et al., 2017; Picchio & Galasso, 2022) have been tested, which have led to the engagement of academic communities and research institutions in the creation of knowledge. Moreover, it fostered a democratisation process that hopefully will reconcile the scientific community and the vast majority of end-users, through digital storytelling (Lo Turco et al., 2021).

Within this general framework, then spurred the idea of involving both second-year (*Architectural Drawing II*) and third-year (*Computer Graphics*) students of the Building Engineering-Architecture Degree Programme at the University of Salerno (UNISA), into an immersive *Alice-in-the-Wonderland-type of approach* (Ibañez, 2011) to reconstructing an architecture from scratch while also learning how to use different pieces of software for 3D modelling (Garagnani & Cattoli, 2015). Seeking to simplify their work, the students realised that, albeit time-consuming at first, the most effective way of approaching the task was to break the asset down into elementary units, the so-called architectural generators, thoroughly studying their typological nature and the constructive relationship between them, and then synthesising them into a *not-so-empty b-rep* (boundary

representation) volume (Brusaporci et al., 2021; Calvano et al., 2020). Although the students mainly worked with Trimble *SketchUp* they were faced with collaborative work and object-oriented modelling by defining components and piecing them together by performing simple Boolean operations. They aimed to develop a model based on shared knowledge for the subsequent post-processing phase.

MATERIALS AND METHODS

As Marcel Proust said, "the real voyage of discovery consists not in seeking new landscapes, but having new eyes" (Proust, 2002, p. 236). Therefore, second and third-year students of the 2020-21 and 2021-22 academic years—involved in the *Italy-South Africa Joint Research Programme, ISARP 2018-2020 – A Social e spatial investigation at the Moxomatsi village, Mpumalanga* (SSIMM) (Ferreyra et al., 2020)– virtually explored some iconic examples of modern architecture located in Argentina and South Africa and all having Le Corbusier as underlining connection: the *Curutchet house* (La Plata, Argentine) (Almeida Curth, 2003; Broadbent, 2014; Conenna, 2014; Massini & Rodriguez, 2012), the *Coromandel Estate Manor House* (Mpumalanga, South Africa) (Peres, 2013) and the *Jooste House* (Pretoria, South Africa) ("House Jooste Waterkloof Ridge, Pretoria, Gauteng," n.d.; "Karl Jooste: House Jooste, 1965D-1967," n.d.; Swart & Proust, 2019).

In joint collaboration with the team from the *Laboratorio Modelli* of UNISA, professors from the Tshwane University of Technology (TUT), South Africa and the Universidad Nacional de Córdoba (UNC), Argentina, we worked together to study and understand how European architects influenced the design process of South African and Latin American architects. After a brief theoretical introduction, the first steps into the analysis of the proposed artworks were taken together by directly jumping into the rabbit hole (Carroll, 1993b). In a collaborative way, we faced the realistic three-

dimensional reconstruction from the available material, which was mainly composed of 2D drawings, photographs and the personal experience of the places by the teachers involved. Indeed, we tried to convey our first-hand knowledge by helping the students to analyse the shapes (geometry, size, spatial position), then the appearance (surface features), and, finally, defining the constitutive elements (physical form, stratification of building/manufacturing systems) (Apollonio et al., 2017). Once they had mastered the tools and understood the built heritage, we invited them to cross the 'looking glass' (Carroll, 1993a) and feel free to experiment with objects, textures, and graphic effects employing real-time rendering plug-in (*Chaos Enscape* for *SketchUp*) and 2D and 3D post-production tools, with the sole clue of finding the best way to communicate the modelled architecture (Parrinello, 2021; Parrinello et al., 2017).

RESULTS

For the 2020-2021 academic year, the *Coromandel Estate House* was chosen as part of a shared experience between the involved universities. During the sanitary emergency that took place, distance learning as well as the impossibility of physically visiting the buildings became the perfect opportunity to work as a team in a project for a new teaching experience within the *Computer Graphics* of the Building Engineering-Architecture Degree programme. After studying the work of Marco Zanuso, and the concepts of Critical Regionalism (Peres, 2013), a cooperative model in *SketchUp* was built, that was followed by a rendering phase developed by each student with the *Enscape* plug-in (Barba et al., 2022; Sanseverino et al., 2021) (Figure 1).

After the successful experience of 2020, for the academic year 2021-2022, we decided to involve both *Computer Graphics* and *Architectural Drawing II*'s students. This time the courses took place in presence during professor Victoria Ferraris


PIANTA TERRA SCALA 1:150
PIANTA PRIMA SCALA 1:
PIANTA SECONDA SCALA 1:150
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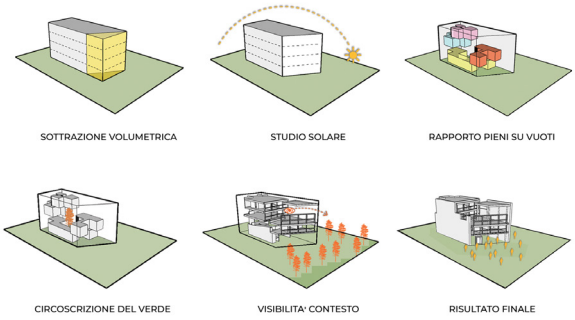


Fig. 1 Sanseverino, Ferraris, and Ferreyra, *Rendered images of the Coromandel Estate produced by 2020-21 Computer graphics students*, 2021.

Fig. 2 Sanseverino, Ferraris, and Ferreyra, *Plan views and elevation of a realistic representation of the Curutchet House produced by 2021-22 Architectural Drawing II student Francisco Zubiaurre*, 2022.

Fig. 3 Sanseverino, Ferraris, and Ferreyra, *Analysis of the design process of the Curutchet House produced by 2021-22 Architectural Drawing II student Nella Pagano*, 2022.

of the Universidad Nacional de Córdoba visit at UNISA. In this opportunity, as a continuation of our projects on both South African and South American architecture and in order to relate it with other parts of the world we introduced different case studies, with a focus on Critical Regionalism. As part of this new exercise, Arch. Marinda Bolt gave a seminar in which she briefly summarised the 5 points of new architecture design by Le Corbusier in 1928 and further explained the way they influenced architecture around the world (Azpiazu, 2003).

During the first part of the course, the concepts of modernism and the theory behind the design process of the new age of architecture were introduced and served as starting point for the students to understand the construction mechanism of the proposed case studies before giving them

Fig. 4 Sanseverino, Ferraris, and Ferreyra, *Re-imagining the Curutchet House with 2021-22 Architectural Drawing II student Palmira Montella*, 2021.

Fig. 5 Sanseverino, Ferraris, and Ferreyra, *Storytelling of the Jooste House by 2021-22 Computer Graphics students Iolanda Sepe, Giuseppe Ruggiero, and Salvatore Giugliano*, 2021.

Fig. 6 Sanseverino, Ferraris, and Ferreyra, *Storytelling of the Jooste House by 2021-22 Computer Graphics students Antonella D'Ambrosio, Ilaria Di Nucci, and Emanuela Santoro*, 2021.

Fig. 7 Sanseverino, Ferraris, and Ferreyra, *Storytelling of the Jooste House by 2021-22 Computer Graphics students Mariafrancesca D'Andria, Del Valentino Vecchio, and Rosa Maria Pierri*, 2021.

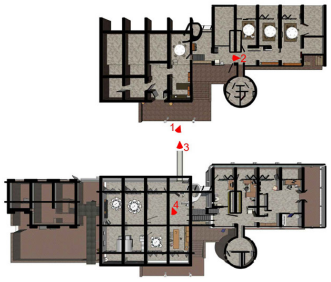
a digital life. In particular, second-year students verified their ideas upon the *Casa Curuchet*, designed by Le Corbusier in La Plata, Argentina (Figures 2, 3, 4). At the same time, third-year students worked with the South African *Jooste House* (Figures 5, 6, 7). Students managed not only to learn how to model a house from scratch but also to understand the theory behind

AFRICA - SOUTH AFRICA - PRETORIA - JOOSTE HOUSE

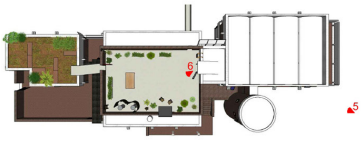
La Jooste House, che è stato uno degli ultimi progetti di Karl Jooste, è un eccellente esempio di architettura modernista ed è ampiamente considerata uno dei progetti più innovativi di Pretoria. Essa nasce dal design meticoloso ed è influenzata dal lavoro di Le Corbusier ma, subisce una forte influenza di stile africano e fa ampio uso di materiali e artigianato locali. Camminando per la casa, si è incuriositi dagli archi creati da intricati lavori in mattoni e dall'uso di cemento, vetro e pietra per creare un'estetica attraente e sorprendente.

Karl Jooste

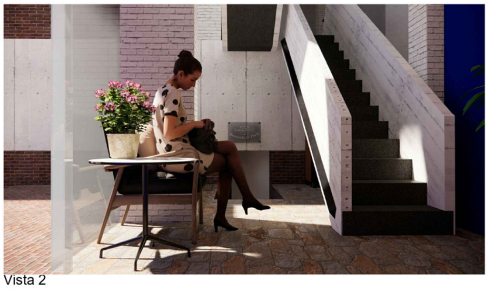
Jooste House, Pretoria (Africa) | 1965/1967



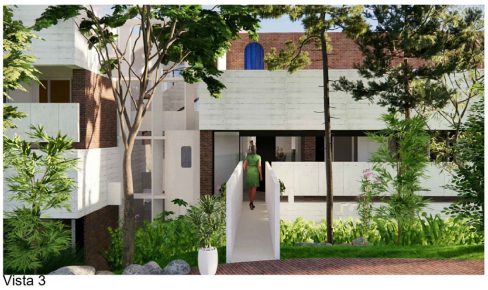
La casa Jooste è situata nella parte alberata della città di Pretoria, in Sud Africa. Con questa struttura Jooste vuole allontanarsi dall'interpretazione purista del movimento moderno, preferendo un design profondamente radicato al contesto nel quale la casa sorge. Inoltre, l'architetto si ispira anche alla figura di Le Corbusier per la realizzazione dell'edificio. L'abitazione è rimasta per molti anni nelle mani della famiglia Jooste, ma ad oggi ospita uno studio di architettura al primo livello, appartenente ad uno dei figli del progettista, mentre un ristorante – La Brasserie de Paris - occupa il resto dell'edificio.



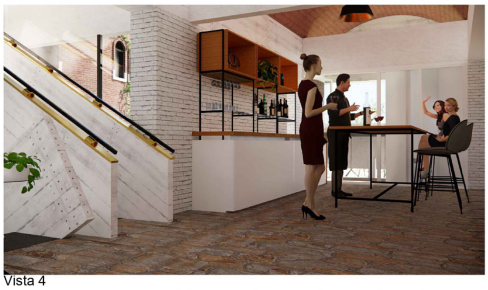
Vista 1



Vista 2

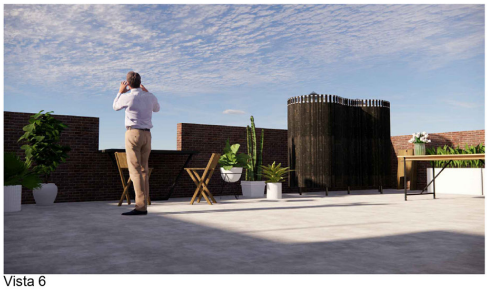


Vista 3



Vista 4

Vista 5



Vista 6

UNIVERSITÀ DEGLI STUDI DI SALERNO

DIPARTIMENTO DI INGEGNERIA CIVILE
CORSO DI LAUREA IN INGEGNERIA
EDILE-ARCHITETTURA

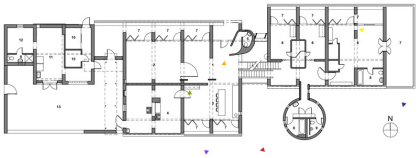
Corso di Informatica Grafica
A.A. 2021 / 2022
Docente: Ferraris Victoria
Tutor: Ing. Anna Sanseverino
Ing. Caterina Gabriella Guida

Modellazione in ambiente SketchUP

Tavola 1

Gruppo 4:
D'Ambrosio Antonella - 0660100837
Di Nucci Ilaria - 0660100826
Santoro Emanuela - 0660100833

JOOSTE HOUSE



Proggettista: Karl Jooste

Tipologia: Edificio residenziale, poi pubblico esercizio 'Brasserie De Paris'

Luogo: 381 Aries Street, Waterkloof Ridge, Pretoria, 0181, Sudafrica

Progetto e realizzazione: 1965 - 1967

La casa è uno degli ultimi progetti elaborati e realizzati da Karl Jooste. Ha progettato la casa nel 1965 e ha completato il progetto nel 1967. Lui e sua moglie vissero nella casa fino alla sua morte.
Il design della casa imita il lavoro di Le Corbusier nel contesto regionale africano. Possiamo notare l'uso di grandi sporgenze per creare ombre profonde per moderare il sole africano; l'uso di materiali locali; proporzioni modulari; il predominio della griglia in muratura.
Infine gli archi curvi in mattoni creano un'esperienza spaziale e architettonica unica.

Università degli Studi di Salerno
Dipartimento di Ingegneria Civile
Corso di Laurea in Ingegneria Edile-Architettura

Corso di Informatica Grafica
A.A 2021/2022

Docente: Dott. Ing. Davide Barbato
Victoria Ferraris
Tutor: Ing. Anna Sanseverino
Ing. Caterina Gabriella Guida

Gruppo n° 6
Mariafrancesca D'Andria 0660100828
Valentino Del Vecchio 0660100834
Marta Rosa Pierri 0660100844

Fig. 8 Sanseverino, Ferraris, and Ferreyra, *Perspective sections of the Curutchet House and the Jooste House, respectively produced by second-year student Palmira Montella and third-year student Piersabato Bruno, explaining the complexity of interior space*, 2022.

its design, the relationship with the urban context, and the construction methods. In the second part of the course, once the students had gained the know-how to model in *SketchUp* and managed to use all the tools, they once again had to work in groups to build a cooperative model, texturise it and reimage the Houses. In the final renders produced by the students, we were able to verify not only the skills acquired in terms of a model building but also their ability to work in teams, share knowledge and understand the importance of the cultural context in architecture (Parrinello et al., 2016). The renders show the impact of orientation in the design process, the responses to climate, culture, and local construction methods, as well as the influence of European architects all over the world (Parrinello, 2015).

DISCUSSIONS

The houses posed unexpected challenges for the modellers working with two-dimensional drawings; in fact, although seeming diametrically opposite, both case studies proposed have remarkable similarities based on the complexity of inner space and the adaptations required to fit within the environment (Figure 8).

While the original design of the *Curutchet House* belongs to Le Corbusier, it was the Argentinian architect Amancio Williams who translated it into the local lemmas (Carbonari et al., 2022) to suit the client's desires. He performed so many changes that, among the many of the reported blueprints of the house, none corresponds one hundred per cent to the actual configuration. On the other hand, upon building his own house, the Architect Karl Jooste never really had the necessity to publish the original design, and the only one available correspond to later modifications. This South African architect, friends with Le Corbusier took the principals and ideas of *Villa Sarabhai* and applied them in his own house in Pretoria, South Africa. His house, the way materials were used, and how he adapted the design to the site, context and weather is a clear example of Critical Regionalism and the influence of European architects in other latitudes.

To quote what Winston Churchill said in 1943 (Volchenkov, 2018): "We shape our buildings: thereafter they shape us"[4]. Both houses are built for the man and his necessities (the Modulor), then both revolve around an internal staircase that shapes the space and the structure itself. In fact, they seem to be the results of a sincere dialogue between the opposite: Mathematics and Perception, Reason (the objective) and Psychological Experience (the subjective), Geometry and Plastic Irregularity, Restriction and Freedom, Unity (assemblage) and Breakage (dematerialisation and detachment), Fullness and Emptiness, Opaque and Transparent, Luminosity and Shadows, Open and Closed, Structural Order and Visual Variety, Orthogonality and

Obliquity, Dynamism and Staticity, Real and Virtual, Expressive and Phenomenal (Conenna, 2014). On a deeper level, the very discovery of these examples of architecture represented for the students a voyage across the wonderland, experimenting with odd shapes, unconventional proportions, and even unusual textures.

CONCLUSIONS

The possibilities offered by digital practice, from virtual reconstruction to the three-dimensional environments and the interaction with digitised heritage, constitute new frontiers for digital design (Parrinello & Dell'Amico, 2019). It is crucial to study digital narrative methods to involve the end users and thus bridge the gap between academia and the community, also in light of the current challenges posed by the European and international goals of inclusiveness and educational quality. Among the priorities of the *Digital Agenda for Europe*, the digitisation of public information and cultural assets highlights the urgency of designing innovative solutions also for remote use and education (NEMO Report, 2021) (Parrinello et al., 2022).

In *Vers une architecture* Le Corbusier said.

> But all of a sudden, you touch my heart, you make me feel good, I am happy, I say: this is beautiful. This is the architecture. The art is here. [my translation from French[5]] (Le Corbusier, 1925, p. 123)

As architects and engineers, we have the chance to constantly create new scenarios, imagine new futures and develop images to represent them, using digital drawing tools. It is, therefore, our responsibility to build this awareness in the next generations and the presented experience showed us how (Luigini & Panciroli, 2018). Upon understanding the past, the students produced new imagery, recreating the sketches that Le Corbusier once did during his travels using novel methods of representations

and finding a new way to visit and experience buildings and different cultures.

This experience was part of a series of workshops and exchanges between the universities and opened once again new possibilities for research and teamwork. The interaction between lectures and students and the cultural exchange became the foundation for the construction of shared knowledge and further strengthened the collaboration and understanding between the different countries that were involved in this experience.

ACKNOWLEDGEMENTS

We would like to thank Professor Salvatore Barba in the role of scientific coordinator of the *ISARP 2018-2020 - SSIMM* project, who is also responsible, together with professor Barbara Messina, for the teaching and research activities of the *Laboratorio Modelli* of the Department of Civil Engineering (DICIV) at the University of Salerno. A due thank goes to professors Jacques Laubscher, Mostert Van Schoor, and Marinda Bolt of the Tshwane University of Technology of Pretoria for their cooperation and the prompt sharing of the documents in their possession and for their participation in the joint research activities developed in the framework of the intercollegiate collaboration between South of Italy – South America – South Africa. Furthermore, it is important to acknowledge the contribution of PhD Students Caterina Gabriella Guida and Lorena Centarti for their commitment to the work and the students attending the 2020-21 *Computer Graphics* and 2021-22 *Computer Graphics* and *Architectural Drawing II* courses of the Building Engineering-Architecture Degree Programme at the University of Salerno in making this a successful experience.

NOTES

1 An Athenian philosopher living in ancient Greece, Plato is famous in part for penning the Socratic dialogue The Allegory of the Cave, one of the most significant pieces of work in literary history (Gill, 2021).
2 The quote arose in a series of lectures delivered at University of St. Andrews, Scotland in the 1955-1956 academic year and published in *Physics and Philosophy: The Revolution in Modern Science* (Heisenberg, 1958).
3 In this TED Talk originally delivered at the DLD 2007 Conference, Norman Foster delves into the topic of green architecture and how his own work has

utilized computer modelling to create green and essentially 'pollution-free' buildings (Santos, 2015).

4 Excerpt of Sir Winston Churchill's speech held at the meeting in the House of Lords, October 28, 1943, requesting that the *House of Commons* bombed out in May 1941 be rebuilt exactly as before (Volchenkov, 2018).

5 The original text of the quotation is as follows: "Mais tout á coup, vous me preñez au coeur, vous me faites du bien, je suis heureux, je dis: c'est beau. Voilà l'architecture. L'art est ici" (Le Corbusier, 1925, p. 123).

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Article available at

DOI: 10.6092/issn.2724-2463/16121

How to cite

as article

Sanseverino, A., Ferraris, V., Ferreyra, C. (2023). Wandering architecture through the looking glass of digital representation. An expeditious teaching experience in understanding and modelling modern architecture. *img journal*, *8*, 226-245.

as contribution in book

Sanseverino, A., Ferraris, V., Ferreyra, C. (2023). Wandering architecture through the looking glass of digital representation. An expeditious teaching experience in understanding and modelling modern architecture. In A. Luigini (Ed.), *img journal 08/2022 Wordless Images* (pp. 226-245). Alghero, IT: Publica. ISBN 9788899586362

VISUAL RESEARCH METHODS TO IMPROVE TEACHING

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VIDEO ANALYSIS
EDUCATIONAL RESEARCH
TEACHER EDUCATION

Visual research focuses primarily on human behaviour and on culture as subjects/objects that inform visual representations, embodying the values and norms of a given society, organisation or group. However, research strands are also emerging, aided by increasingly sophisticated technologies, which make use of elements that are not necessarily related to a visual reference present in the real world, as relational and comparative constructs of non-visual data and conceptual representations of ideas.

The expansion of data that are not purely visual constitutes a new and fascinating aspect of research, a transformation of the non-visual object into a visual object.

Some recent research and systematic reviews that draw on Visual Research Method approaches offer a reflective basis for an analysis of the method that can be applied to teaching and learning processes.

VRM is, in fact, a window onto social and educational interactions, such as those that take place in a school classroom and it can be a pro-active method in educational research. Research based on video analysis provokes reflection and deepens awareness of the visual elements under scientific analysis.

VISUAL RESEARCH METHOD: ORIGINS AND INFLUENCES

VRM and Methodological Approaches

There are various approaches to research that make use of visual data, particularly in view of the multiplicity of collected data that constitute the empirical source. Research using video adheres to different approaches, depending on aims, epistemologies and hypotheses. In the social and educational sciences, video technology has been used in research for decades, in particular to record interactions and learning and teaching situations in the classroom. The analysis technique used often involves coding the material, so methods differ depending on whether they tend to be more content-analytical and category-based or more oriented towards interpretation and hermeneutic analysis. A first methodological distinction might consider visual data in standardised or interpretative logics.

Standardised video analysis is commonly used in many research areas. In many fields, there is a strong tendency to classify, and even automate, data analysis. In standardised approaches, the analytical procedure consists of coding video segments according to predetermined patterns deduced from more or less explicit theoretical assumptions. Associated with this typology is, for instance, video content analysis.

Interpretive video analysis, categorised within a non-standard research matrix, makes use of or is juxtaposed with numerous methodological approaches that make use of this form of data collection and analysis: from ethnography, videography, web-based analysis to video content analysis, iconography, visual semiotics, eye-tracking, video photo elicitation and photo diaries.

In the case of research on visual data that interprets existing representations, or produces new data on what is captured, a solid theoretical basis is required, consistent with the aims of the study. Without theory, our vision may be clouded, or based on implicit views and assumptions, of which we may

not even be fully aware. It is quite naïve to expect that video research will enable us to collect large amounts of data. Theory is needed to give direction to scientific research.

VRM is to be understood as a method that can be associated with a visual subject-object, it advocates a predominance of the seeing with knowing relationship but in a way that interacts with and is not alternative to other cognitive relationships.

In VRM it is possible to focus attention on issues which at first glance may not be of much significance, but a specific position, hypothesis or idea can help relevant scientific information to emerge.

Researchers approaching Visual Research adhere to different theoretical and epistemological frameworks, which have changed and been adapted over time to the specific visual analysis such as: semiotics, rhetoric, sociology, psychology, cultural studies. Recently, the juxtaposition of research based on visual perception and neurobiological theories makes extensive use of sophisticated techniques and tools that also draw on visual evidence.

Some theoretical frameworks that can be used for VRM offer concrete and widely recognised methodological tools, others do not seem to suggest any method of investigation and leave researchers with wide margins of action, including less systematic ones, where qualitative and/or quantitative or mixed data are not consistent with analytical processes. Not all theories seem to work as anchors that allow an in-depth analysis of visual representation. The theoretical foundation of a project not only involves micro level analysis of the video data, such as forms and contents of the collected data, but also includes a thematic focus around which VRM can respond. A first distinction that seems to frame the vastness of research based on visual methods, pertaining to the social and educational field, categorises VRM according to three dimensions: origin and nature of the visualisation, research methodologies and designs, and formats and research objectives.

The classification is not intended to provide a synthesis of existing methods and techniques in the VRM panorama, but rather to highlight the complexity and richness of the research that adheres to the various methodological approaches. There is still the risk of artificially attributing more importance to the visual data and, consequently, to the method, than to the research itself and to the question it is intended to answer. Social and educational research (but really all scientific research) must always be interpreted beyond the mere contingency of the data.

Another way of deciphering visual research within an epistemological interpretationist framework assumes that visual data represent meanings that have to be understood by the actors themselves. The research aims are pursued on the basis of the meaning of the actions and images for the participants involved.

Of particular relevance in defining the visual approach to images is the theoretical construct of visual framing, as a process linked to the choice of the visual episode and of the image, that best represents the event itself. Visual framing theory appears to be linked to the decision to represent the event. Although this perspective is anchored to static images taken from photos, not videos, it opens up the idea that they can be contextualised, decontextualised, and reconstructed according to the lens of the person who processed them, created them, and took them. Framing is the connecting element between the empirical (the image, the visual data) and the interpretative (the categorisation).

Visual Perception

Seeing the world always also means looking at the world in order to understand it. Our visual experience is the result of processes of multimodal integration (Gallese & Guerra, 2015, p. 16). In order for images to be encoded, the brain needs to engage in acts of selective abstraction of the images (e.g., while observing a portrait, but also a video frame, certain parts of the cortex are activated, which is a marker that

reflects the individual's ability to categorise the image on the basis of perceptual characteristics or judgements about them). Studies on perception show that subjects do not always pay attention to certain elements, especially when the gaze does not observe what it does not expect to see.

A second form of abstraction is called identity; it is a recognition by the brain of recurrent perceptions (perceptual constancy). It is imperative for the brain to eliminate everything that it does not need in order to identify objects and situations, so as to concentrate on essential and constant features of the perceptual event.

On an operational level, for example, some research conducted using video analysis on teaching has accompanied the process of identifying and selecting images through the dimension of selective attention, as the first phase of highlighting events. Selective attention means a situation (an event, a discourse, but also an element) to which a research participant, teacher or researcher, decides to pay attention at a certain moment. This is an operationalisation of the analysis of visual data, which must be accompanied by processes of reasoning and reflection in order to allow a real awareness of the video analysis. The ability to highlight and select a video frame is conditioned by numerous factors related to perceptions, influenced by the expectations of those who observe and analyse.

VISUAL RESEARCH METHOD TO IMPROVE TEACHING

Multiple studies have shown that the use of video is very effective for the professional development of teachers. Indeed, there is some general consensus on the benefits of using video and visual data in education, particularly for teacher training, to improve professional practices to gain for a reflective posture on experiences (Gola, 2021).

Visual data, and videos in particular, as compared to other types of data, offer teachers the ability to capture, edit,

annotate, review and share evidence of personal teaching practice in an authentic format. Video can capture the richness and complexity of classroom activity, learning from it can occur through analysis, discussion, and deconstruction of recorded events.

Studies that address the topic of video-mediated learning and how it is actually implemented and applied in teaching require a thoughtful process within a research strategy, a true video-based pedagogy (Baecher, 2020).

Video analysis, for trainee, novice and expert teachers, is a tool for learning to observe, reflect and think critically about one's teaching strategies. From a didactic point of view, the video, through the recording of teaching actions, provides permanent images and favours a 'removed' analysis of the events themselves.

Based on the literature review by Cyrille Gaudin and Sébastien Chaliès (2015), there seem to be some reasons that contribute to the increasing use of videos in teacher education and professional development. Firstly, videos offer a wider range of observation of classroom events as compared to classical observation, thereby maintaining an authentic adherence to teaching events. The video-analysis method is an artefact of didactic, educational practice, fostering a relationship between theory and practice. There are several purposes and strategies behind the visual approach: from selective attention, reasoning, analysis of practices, acquisition of new knowledge, selection and organisation of videos specifically dedicated to learning objectives and contexts. Many of these studies have been carried out in collaborative environments, through visualisation systems in teams, or professional learning communities, with the aim of jointly watching and analysing videos of classroom lessons, postgraduate lessons or actual lectures.

In the review conducted by Brian Marsh and Nick Mitchell (2014), the active construction of theoretical perspectives and of the analysis of practices requires the design or set-up of environments that foster a shared language

between novice and experienced teachers. This common factor seems to support definite advantages in the use of video for teacher learning. Video analysis is an avenue for enhancing teachers' reflective capacity and for developing annotation skills and awareness of classroom interactions so that they move from an initial superficial level of attention to the ability to discern more substantively significant interactions, particularly in classroom activities and with students.

In a similar and subsequent review proposed by Christine Hamel and Anabelle Viau-Guay (2019) on the use of video for the professional development of both newly qualified (66%) and experienced teachers (28%), 89 studies were analysed, highlighting how teachers, through the use of video tools, approach teaching experiences, analyse practices and try to reflect on alternative actions. The results show, on the one hand, a discrete improvement in the participants' reflective capacity over time when supported by video-analysis, but also show that the subjects were frequently focused on the technical aspects of the profession, or centred on themselves, without succeeding in the practice of balanced observational distancing that would allow conscious awareness and a meta-reflective level. The low aptitude for reflection requires video-analysis paths directed towards acts of awareness and improvement (not only measurement) 'designed' within specific frameworks, in order to avoid deviations from or poor success of the same interventions (Gola, 2021).

Julianne Moss (2013) poses the question of how VRM approaches are used in educational research. The researcher urges that by becoming more familiar with research methods, through practice, an understanding of them is developed. It means the possibility of exercising a 'mature stance' of being in research.

Not only researchers, but also those involved in teacher training and development, agree that video analysis has many pedagogical implications and potential for teaching

and learning, but the methods of using video can vary, depending on teaching objectives and contexts.

According to Laura Baecher (2020) visual documents allow one to learn how to observe teaching and learning, specific practices, what the teacher and students observe, as well as how one observes one's own experiences. Several studies have shown that the ability to annotate and analyse elements of teaching reflects the skills of an experienced teacher, but there is still little research that focuses on analysing video to promote real-life transformations of teachers in classroom activities with a consequent impact on effectiveness towards students.

In order to raise awareness of the teaching experience and the potential of using video, particularly in teacher training, attention should be focused on different attitudes, which also have a specific methodological value in considering visual data:

- videos for learning to teach - videos of the classroom and of teaching situations takes on the dimension of an artefact, of an exemplary case, which is enriched by other information;
- videos as a retrieval of past teaching experiences - the retrieval of past teaching experiences enables teachers to make sense of teaching situations, with a direct reference to their own practice;
- videos as a direct connection to the observed experiences - teachers' immersion in their own or others' experiences is facilitated by the observation of authentic and plausible lessons.

Laura Baecher (2020) proposes some scenarios for the use of video analysis in teaching contexts: the use of video for learning in teacher training contexts, the use of video for learning in further education contexts, such as individual learning or peer learning, and finally, video analysis for supporting supervisors or school leaders.

David Clarke and Man Ching Esther Chan (2019) offer four possible concepts for characterising the role of video in educational research:

- videos as a window through which to see the classroom;
- videos as a lens to focus attention on specific and micro aspects of classroom activity;
- videos as a mirror that catalyses teachers' and students' reflection on their practice and learning;
- videos as a distorted mirror in which the researcher sees a representation of his or her own values and perspectives reconstituted through visual data retrieved from classroom experiences.

The VRM approach to teacher education and professional development supports the possibility of learning specific teaching skills, of analysing practices, of reconsidering self-image and of verbalising one's experiences. To be effective trust in and openness to one's own and others' experiences are required.

CONCLUSION

VRM, with the different approaches and methods used alongside it, takes on the contours of mainly empirical research, which makes use of visual data often collected in the field. It draws on research processes that can become systematic, to investigate educational and social realities on the level of reflexivity, or to measure knowledge and learning, to monitor processes and to check reactions and behaviour.

Visual data can be an exceptionally rich method for educational and social research. VRM challenges certain assumptions, it stretches our thinking and it deepens our awareness of ourselves or of the visual elements themselves that are subject to scientific analysis (Baecher, 2020; Gola, 2021).

The methods and tools associated with VRM seem promising for observing, analysing, studying and immersing oneself through suitable views in educational and social settings, such as a classroom.

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Article available at

DOI: 10.6092/issn.2724-2463/16901

How to cite

as article

Gola, G. (2023). Visual Research Methods to Improve Teaching. *img journal*, *8*, 246-257.

as contribution in book

Gola, G. (2023). Visual Research Methods to Improve Teaching. In A. Luigini (Ed.), *img journal 08/2023. Imaging and Imagery in Architecture* (pp. 246-257). Alghero, IT: Publica. ISBN 9788899586362

PERSISTENCES
ANALYSIS OF THE IMAGE OF GDAŃSK AND ITS CULTURAL IDENTITY THROUGH SURVEY PROCESSES AND DIGITAL ARCHITECTURAL REPRESENTATION

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ESSAY 16360/08

CULTURAL HERITAGE
URBAN LANDSCAPE
CITY IMAGE
DIGITAL DOCUMENTATION
GDAŃSK FORTIFICATIONS

The aim of the research was to analyse the historical legacy/heritage of the city of Gdańsk in order to characterise the narrative tools which can be used to promote the cultural identity of the urban landscape. The main focus was on the city's defence system – a cultural route that is spatially limited to a relatively small area, but temporally spanning almost a millennium. The fortifications demarcate a spatial boundary, limiting the urban layout, which has remained distinguishable over the centuries, however changing its image. The research activities have been carried out by a multidisciplinary group of scholars participating in the H2020 PROMETHEUS European project aimed at developing innovative methodologies for digitising architecture with the integration of multidisciplinary data and information models, leading to specialised figures capable of operating on heritage built assets. The image of the city and the urban landscape is transforming in an attempt to strengthen its historical identity. In each century, new architectural and formal models are introduced, which become integrated with the structural characteristics of the urban layout, altering the urban space. Today, in the digital age, it is becoming strategic not only to convert architecture and its models, but also to make the urban image more explicit, trying to translate the invariants of the landscape into the 3D digital databases.

A LANDSCAPE MADE OF SIGNS

Walking through the streets of Gdańsk is like leaping into history. The atmosphere of a magical city evokes the past at every glimpse in every alley. The gloomy ambiance of the lanes contrast with the broad perspective along the waterways, where the bright northern light is mirrored in the water. The architecture and the façades of the buildings, with their wide vertical glazed windows, resemble countless soldiers standing in ranks. The façades end with shaped and decorated tympana that outline the regular pattern of the sky. The prominent tympana are the final elements in a colourful chessboard that intersperses the hue of the sky reflected in the broad windows. The rules and proportions that regulate the urban façades show a masterful cohesion between tradition and innovation, creating a formal language that appears to be able to indulge in any experimentation without losing its own territorial identity. Like many Polish cities, Gdańsk, or at least its historic centre, has been largely rebuilt. However, regardless of the transformation and reconstruction processes, this city displays an open-air architectural heritage that still retains traces of the past.

Through the distinctive building features, technologies, masonry walls, and the use of colour, the city offers a fine collection of experiences for each element of urban decoration. When crossing the streets of the city centre, a desire to record every detail of such a rich articulation of signs and architectural elements comes almost as a matter of course. Out of the many stories that are engraved on the walls and stones emerge countless images where each visitor or inhabitant can find room for their own contribution to this fairytale cityscape. Everyone can elaborate on their individual story, i.e., their personal adventure, from a walk around the historic city centre and find a way to interpret the city's myth over the centuries, starting from the Amber Road through the Prussian domination to the post-World War II reconstruction.

Figure 1 Impressions of the city of Gdańsk; the city structure main axis (streets connecting the eastern and western entrances to the city) - Długa street (top left:), the second city structure axis - Motława River (bottom left), Mariacka street: day and night (bottom right), waterlands surrounding the city (top right). Photos by S. Parrinello.

In an attempt to amend one of the many narratives of the city, the study of fortifications is capable of tracing lines that can help understand the city's evolution. Through a census of urban fortifications, it is possible to piece together those city fringes, those margins and limits, that either disappeared or were altered over time or merged into other buildings.

Here, the fortifications represent a tangible cultural route that finds both a physical dimension, being scattered throughout the territory along the waterways, and up to the sea, and a temporal dimension. The secular interpretation spans the eras, displaying a palimpsest of defence techniques that have changed over time as offensive techniques and artillery evolved. Thus the fortresses, towers, bastions, and networks of defensive walls nowadays comprise a mul-

tilayered pattern of signs that followed one another within this cultural fabric and eventually settled down, seamlessly mingling with the landscape.

In this landscape made up of signs it therefore becomes useful to compare the real image with the ideal and imaginary one. As in John Cage's *Imaginary landscape*[1], we are immersed in the space of the city. Cage stated:

> for living takes place each instant and that instant is always changing. The wisest thing to do is to open one's ears immediately and hear a sound suddenly before one's thinking has a chance to turn it into something logical, abstract or symbolical. (Nyman, 1999, p. 1)

By transposing the message, conceived for a sound investigation, some fragments remain in the world of the visual image, useful as starting points for an investigation methodology of the space. It is therefore important to create a parallel in which the digital can give space to free visual interpretations, to the development of renewed forms of belonging that, through the digital, can engage people.

The creation of digital signs that stitch together the historical and identity fabric of the city can give rise to new texts, as if they were new pieces of music or new stories. A complicated musical score in which the same elements of an orchestral score can be found. Pauses, syncopations, silences, monuments and different characters in which all participate in the symphony of the city.

In order to characterise the narrative tools used to promote the cultural identity of the urban landscape, it is necessary to analyse the historical remains of the city.

What makes Gdańsk so particular in terms of urban landscape is the special atmosphere and image of the city centre. It consists of several parts:

- the Main Town (*Rechtstadt*), with its magnificent buildings of the Gothic and Renaissance eras, shaped from the 14th to the 17th century, during the heyday of the Hanseatic League, demolished during the Second World War, but rebuilt with amazing diligence and knowledge of craftsmanship;

- the Old Town (*Altstadt*) with an 800-year-old watermill, numerous churches, and its own town hall;
- suburbs with preserved bastions from the 17th century and modern housing estates by the water;
- Granary Island (*Speicherinsel*), which is experiencing its renaissance, where modern buildings were built, all surrounded by fortifications located on Bishop's Hill (*Bischofsberg*) and Gradowa Hill/Grodzisko (*Hagelsberg*), among others.

Here we can see a unique spectrum of construction history, 'landscape made of signs', from the Gothic style to the Prussian relics of the Schinkel era and the new order of the western part of the city centre built in the metropolitan manner around 1900. The architects also record here the intervention of the post-war period: reducing the density of the Main Town, carefully introducing buildings into the 1950s and with great intuition, the placement of newly built structures after the political change. The picture is completed by new architecture icons: Shakespeare Theatre, *Museum of the Second World War,* and the *European Solidarity Centre*. In the Old Town, less attention was paid to the old structures of the city, and the plan of modern Gdańsk was implemented: with hotel highrises and office buildings, point towers, and multistorey, detached residential buildings. Due to the wetlands on the southern side (Żuławy Gdańskie - *Danziger Werder*), the expansion of the city proceeded to the North.

Looking at the structure of Gdańsk, we immediately notice two important characteristics. Firstly, the original structure of the city protected by the bastions is still clearly visible. On the other hand, we recognize three distinct centres: the northern one known as the Old Town (*Altstadt*), the central Main Town (*Rechtstadt*) and the southern one called the Old Suburb (*Vorstadt*). Thus, the city centre of Gdańsk includes: the Old Town and the Main Town, but also Old Suburb, Granary Island (*Speicherinsel*) and Ołowianka Island (*Bleihof*), as well as areas located further to the east, within the former city fortifications, whose historical names are Long Gardens

(*Langgarten*) and Lower Town (*Niederstad*). However, the present image of the city has been shaped by over a thousand years of history.

TRANSFORMATIONS OF THE URBAN LAYOUT

Gdańsk was founded in the first half of the 10th century (Stankiewicz, 1959). The earliest architectural shape of the city remains to be established. It is known that early mediaeval Gdańsk was surrounded by a wooden and earthfilled embankment. It consisted of a trade and craft

Figure 2 Anton Möller (1563-1611), Axonometric view of Gdańsk (military axonometry) around 1600, so-called: 'The Stockholm Plan of Gdańsk', National Archives of Sweden (Krigsarkivet).

Figure 3 Büttner, *Map of Gdańsk in May 1809*, State Archives in Gdańsk (*Archiwum Państwowe w Gdańsku*).

settlement, a port and a stronghold on an island at the mouth of the Motława River to the Vistula River. Between 1308 and 1309 the city was almost completely destroyed by the Teutonic Knights. In the 1320s, the reconstruction of Gdańsk began following a completely different spatial arrangement. Several independent units were established, separated from each other by the defensive walls and moats: the castle, the Main Town with its port and the houses of wealthy merchants, the artisan Old Town, the Old Suburb and huge warehouse complexes on Granary Island and other smaller islands. In the 14th century, to the north of this complex, another, competitive unit was established: the Young City. The existence of two or more politically independent cities next to each other was typical in mediaeval Poland, Germany and neighbouring countries.

During the Thirteen Years' War (1454-1466), the castle and the Young Town were destroyed as a result of the decision of the Main Town authorities. A gradual process of merging the urban organism and blurring the boundaries between its mediaeval parts began. In the 16th and 17th centuries, the Main Town, Old Town, Old Suburb, storage islands and new eastern districts named Lower Town were already surrounded by common bastion fortifications (Bukal, 2012). The urban system shaped in this way had two main axes. One of them was a series of streets connecting

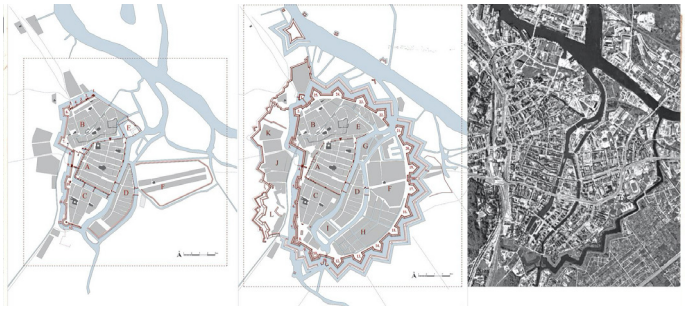

Figure 4 City development schemes of the city of Gdańsk including the fortification city centre system from 1600, 1710 (graphic elaboration: Sz. Kowalski) and current state (source: *Google Maps*).

the eastern and western entrances to the city. The most important, representative buildings of Gdańsk were concentrated along this axis. The second axis was the Motława River with the port quays.

The political and economic crisis that affected the city in the 18th and 19th centuries meant that until 1945 little investments were made in the historic downtown area. Until the end of the 19th century, Gdańsk was a fortress enclosed within the boundaries of huge embankments. Suburbs such as Wrzeszcz (*Langfuhr*) and New Port (*Neufahrwasser*) developed outside of this fortified urban system.

The most important change in the centre of Gdańsk at the turn of the 19th and 20th century was the partial demolition of the north and west fortifications. The land that was released this way was used to develop the main railway station and a large shipyard complex. Due to the lack of funds and investment needs, plans to build a green ring with representative buildings around the historic city centre were not implemented (Szczepański & Dymnicka, 2016).

POST-WAR RECONSTRUCTION AND THE NEW HISTORICIZED IMAGE

Gdańsk, with its historic centre of the Hanseatic city (*Hansestadt Danzig*), significantly destroyed after the Second World War and then rebuilt within the borders of the Polish state, is a clear example of reconstruction carried out in Poland.

The Second World War affected the urban fabric of Gdańsk's downtown quite late. In 1942, only a single British air raid took place, without much damage to the historic buildings of the city. However, the raid became an impulse to evacuate and secure important cultural assets from churches, museums, and the city library. The actual destruction of the city took place in 1945 with the departure of the German troops, who were ordered to leave 'scorched earth', and the entry of the Soviet troops, which in turn shelled the city and ravaged it with fires. In the post-war years, decisions concerning the city were made in Warsaw and only later were implemented on the spot. The decision to rebuild the city was made in 1948. Finally, the concept of rebuilding the Main Town in its historical shape was negotiated politically, combining it with the creation of a housing base for shipyard workers, who enjoyed significant privileges at that time. Near the main streets, 'false' rows of houses were created, the projections of which did not match the façade. Thanks to financial support and craftsmanship, extraordinary things were created. The Old Town and Old Suburb were built 'modernly' (Friedrich, 2015).

The structure of the Main Town in terms of architecture contains many interesting and unusual elements, such as houses, with their most important decorative elements such as decorative gables, portals, and porches (extensions combining the functions of a descent to the basement and a representative terrace) and 'city walls' with water gates on the eastern side and partly preserved or restored brick walls and towers.

Typical for the image of the city of Gdańsk is the so-called 'Gdańsk house', a tenement house with narrow façade crowned with gables or attics, richly decorated (gable house). Individual houses compete with each other and outdo each other in decorations and form (Szczepański, 2019). The Main Town regained its historical identity thanks to the aforementioned careful reconstruction after the Second World War, preserving the original gables. The shape of the top –this applies primarily to the Main Town– has become a showcase

Figure 5 Structure of the urban layout in the Main Town (*Rechtstadt*) before 1939 (left) and around 1956 (right) (according to Stankiewicz and Szermer), Uphagen's house is marked on both plans[2]. Graphic elaboration: Russbeh Naggary (Borucka & Gatterman, 2016).

of the patricians. Sometimes they were also renewed and adapted to the current fashion. In this way, interesting versions of the façade were created, which today form the core of the Main Town. This can be seen in Długi Targ (*Langemarkt*) (Figure 1), but the buildings do not represent their original state from the pre-war period. It is not easy to determine what is the original, because even before the war, the façades of the houses were continuously being rebuilt. For this reason, the role of rebuilders in the 1950s was not easy. The City decided to recreate the main setpieces of the golden age (from the 14th to the 18th century) first, and to give the façades, for which there were no relevant historical sources, a very simple form. Then, in the 1950s, the reconstruction efforts were extended to also include those façade that consciously did not refer to history at all, or, for political reasons, featured ornaments and motifs of Polish history. Many of the post-war façades were also unrelated to the apartments behind them. The apartments were often planned in such a way that the ceilings in the levels spanned the width of several adjacent houses and not every façade had its own entrance. Nevertheless, it is in the Main Town, and also in other parts of the city centre, that the 'gable house' has become an element defining the identity of the city, sometimes even to a fault. Hardly any architect dared to design a new building without the classic gable motif. Therefore, already in 2005, the city announced a competition, the aim of which

was to push through new ideas regarding the contemporary tenement house in Gdańsk. More and more designs of new buildings were being created, which were simply a mixture of historicising variations of a tenement house with a gable that was characteristic of Gdańsk (Borucka & Gatermann, 2016).

Comparing the urban structure of the Main Town from 1959 with the pre-war plan from 1939, apart from a few plots of land still undeveloped (Św. Ducha street), the inner courtyards of individual quarters of the buildings are noteworthy, lushly green backyards of residential buildings created during the post-war reconstruction period (Figure 5) (Friedrich, 2010). The idea behind the post-war rebuilding was to abandon the reconstruction of outbuildings and to introduce more vegetation to the area, as well as to reduce the density of buildings. It was important for the residents, and allowed to create green areas between the houses. However, large unused areas were also created, and their potential for redevelopment was only recognized and acted upon after the year 2000 (Borucka & Gatterman, 2016).

In the reconstructed spaces of the city, however, there are many historical remnants of Gdańsk architecture, such as fortification systems. In this study, we propose to analyse this historical legacy/heritage of the city of Gdańsk in order to characterise the narrative tools, which can be used to promote the cultural identity of the urban landscape. In particular, the activities focused on the study of the cultural route, which is spatially articulated in a relatively small area, but spans almost a millennium in time and concerns the city's defence systems.

CONNECT THE PAST: A CENSUS OF FORTIFIED ARCHITECTURES

The fortifications determine a spatial boundary, limiting the urban layout, which has remained distinguishable over the centuries, although changing its image. Their diverse ty-

Figure 6 The historical remnants of the fortification systems of the city of Gdańsk: The water gates (top, photo by: H. Gatermann), Stągiewna tower (bottom left, photo by J. Bo-rucka), city wall remains (bottom right, photo by D. Bursic, G. Porcheddu).

pology closely reflects the history, metamorphoses and the development of the city. The fortifications of Gdańsk can be systematised into three main groups.

Fortifications in the line from mediaeval period

The earliest fortifications of the city, built in the 10th-13th centuries, are only known from the remains found in archaeological sites and from the laconic mentions in the chronicles.

From 1343, the construction of a system of fortifications began, surrounding the independent parts of the city, which included: the Main Town, the Old Town, the Old Suburb, and the Granary Island. A substantial part of this system has survived to this day. Mediaeval fortifications consisted of brick

Figure 7 The historical remnants of the fortification systems of the city of Gdańsk: The early modern fortifications of 16th century and first half of 17th century general view (bottom left, photo by: W. Stępień, source: <https://www.gdanskstrefa.com>) and stone sluice (top left and bottom), (photos by F. Picchio).

defensive walls with moats, towers and gates. In some places they were supplemented with wood and earth ramparts.

In 1482, a cylindrical defensive tower, used as a lighthouse, was erected on the seashore at the mouth of the Vistula River, about 5 km from the city (Samól et al., 2021). In the 16th century, the mediaeval fortifications lost their military significance. They were partially dismantled and large parts were adapted for other purposes.

Early modern fortifications: 16th century and first half of 17th century

In the second half of the 16th century, a new line of bastion, brick fortifications was erected to defend the entire city organism from the west. The fortifications of the lighthouse were also expanded. The Wisłoujście fortress was built (Samól et al., 2022). In the years 1622-1625, the largest undertaking in the history of the construction of Gdańsk fortifications was carried out. The city was surrounded on the north, east and south sides by a line of earth ramparts and bastions with wide moats, of the Old Dutch style (Stankiewicz & Biskup, 1998).

Figure 8 The historical remnants of the fortification systems of the city of Gdańsk: The Wisłoujście fortress. Photos by J. Borucka.

External fortifications: second half of the 17th and 18th centuries

In 1655, the fortification of the hills west of the town: Bishop's Hill and Grodzisko were started. The valley between the hills was also fortified. Furthermore, the Wisłoujście Fortress was constantly expanded.

Fortifications in the 19th and 20th centuries

At the beginning of the 20th century, fortifications at the mouth of the Vistula River were erected and expanded to defend New Port and the Westerplatte peninsula. The road along the Vistula River connecting the city with the Wisłoujście Fortress has also been fortified. The hill fortifications were also strengthened (Biskup, 1998).

In the years 1868-1900, 13 artillery batteries were erected on the seashore. After 1910, four more modern seaside batteries were built (Hirsch, 2009; Woźniakowski, 2009).

In the years 1921-1939, the Polish Military Transit Storehouse operated on the Westerplatte Peninsula. Its fortifi-

cations consisted of fortified barracks and several combat bunkers. During World War II, numerous air-raid shelters were built in the city. The newest defensive structures are fixed artillery battery facilities, built in 1952-1955 and functioning until 1977.

DOCUMENTATION STRATEGIES FOR BUILDING DIGITAL MODELS

The research, aimed to analyse the historical evolution of the Gdańsk fortifications, is approached through survey strategies focusing at building reliable databases on architectural heritage (Parrinello & Picchio, 2017). These databases, consisting of point clouds and features that collect information of a different nature –both historical and architectural– become the starting point for digital drawing outputs, 2D and 3D, and reality-based parametric informative models. From these informative models, which, once processed, will converge in an integrated BIM-GIS platform, it might be possible to build a narrative tool to promote the cultural identity of the urban landscape.

From a methodological point of view, within the *H2020 PROMETHEUS* project, the structuring of a broader project idea has been proposed, aimed at defining cross-sectoral collaboration protocols for the development and promotion of 3D Information Model Libraries on architectural heritage (Parrinello et al., 2019).

The experimentation was carried out in different European contexts, heterogeneous in terms of type of cultural heritage routes, and at different scales of investigation: from the territorial scale of the widespread heritage of Upper Kama (Russia) (Parrinello & Dell'Amico, 2019), through the provincial scale of the Jaume I sites (Spain), to the urban scale of the fortification system of the city of Gdańsk (Poland).

The complexity of relationships that qualifies the structure of the identity of the places, consisting of monuments and

their relationships with different cultural contexts routes, attempts to be represented into a new 'digital' configuration.

The digitization process becomes a methodological input associated with a deeper analysis ofdecomposition and critical reconstruction of the architectural unity, through a semantic classification of its sub-elements. The objective is to consolidate architectural, digital, and three-dimensional models, as a result of the current, past, and future configuration of each architectural heritage related to its specific route.

An acquisition and survey campaign has been conducted, to build digital duplicates of the state of the art of fortified elements in Gdańsk, as the basis for a more detailed analysis of the historical and evolutionary phases of each fortress.

It involved the use of different tools capable of producing a digital reference archive of the city and its historical-architectural image. An integrated survey methodology was adopted, based on the use of terrestrial laser scanner (TLS), mobile laser scanner (MLS) and terrestrial and aerial photogrammetry (UAV). This strategy made it possible to obtain an adequate dimensional basis for the structuring and validation of the geometric database and photographic data.This archive, properly verified, provides the information needed

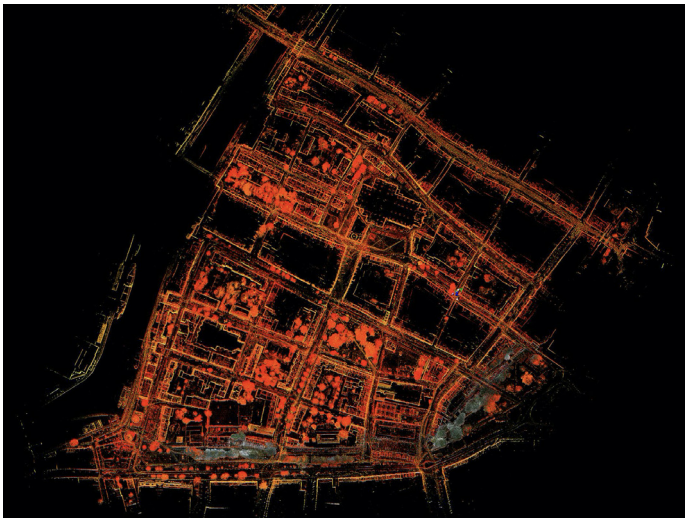

Figure 9 Point cloud view of a part of Gdańsk city centre acquired by mobile laser scanner. Survey & data elaboration by A. Dell'Amico.

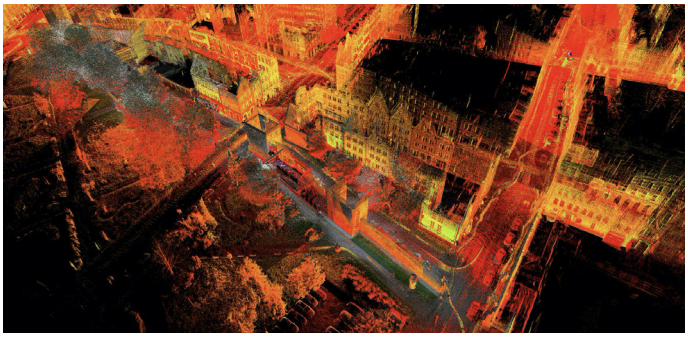

Figure 10 Detail of the point cloud database that expresses the relationship between the fortified system and the city urban fabric. Survey & data elaboration by A. Dell'Amico.

to define what adherence the models should have to the architecture (Balzani & Maietti, 2017).

In this workflow the specific goal is twofold: to enhance heritage through the development of narrative tools, and to create digital media that are useful for heritage management itself. This is why it was decided to focus on working with parametric modeling systems or, in any case, on developing information systems useful for the online preparation of their virtual use.

The results of this methodological framework were compiled in a library of georeferenced digital databases, conceived as metrically reliable and colorimetrically highly descriptive models of the fortified sites characterised by highly accurate spatial data combined with detailed colour mapping.

The digital acquisition, conducted between October and November 2022, focused on three types of fortifications: the inner magisterial walls (sections of city walls and city gates), the system of southern bastions of the city, and the fortified elements defending the access canal to the city from the Baltic Sea.

Documentation of the urban walls and gate

The magisterial walls and gates have been documented using mainly stationary tools (TLS and digital camera) to obtain point clouds integrated with SfM models, with a high level of detail in terms of both geometry and texture. These models were then related to each other and to the urban con-

Figure 11 Structure from Motion models of fortified towers in the city centre. Data elaboration by D. Bursic and P. Giardini from Metaheritage enterprise.

text using the point cloud obtained with mobile instruments, which has a lower resolution but reveals explicitly the volumetric relationships between the fortifications and the city. A small drone (DJI mini Mavic) was also used to complete the missing data on the surfaces not accessible from the ground.

The aim of this integrated detailed survey was to obtain 3D models capable of describing the current image of the fortifications, highlighting the restoration work undergone, the type of material and the state of conservation of the surfaces. The photogrammetric models, validated using the output of the laser scanner, will facilitate investigations aimed at defining the historical-architectural relationship between the image of the fortifications and the buildings in the historic centre.

Documentation of the southern bastion system

The system of fortifications to the southwest of the city takes the form of an extensive urban park that connects several bastions in a single circular path. For this reason, the most convenient acquisition method was to use mobile systems (MLS and UAVs) to generate 3D databases with which data acquired with ground-based instruments was subsequently

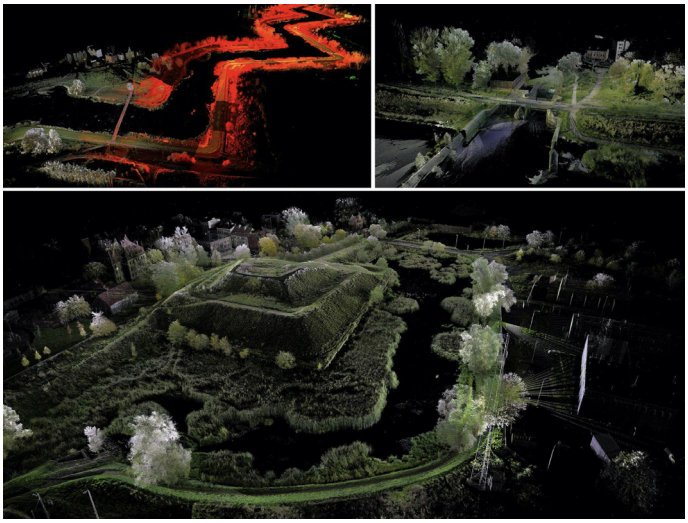

Figure 12 Integrated point cloud obtained by UAV (below and on the right) and mobile laser scanner (above left). Data acquisition and elaboration by S. Parrinello, F. Picchio, A. Dell'Amico, S. La Placa, G. Porcheddu, A. Pettineo, D. Bursic, P. and Giardini.

integrated. This choice was also driven by the fact that the entire fortified crown is surrounded by a large moat that separates it from portions of land, peninsulas and natural islands that are not accessible for ground-based instruments.

The first acquisition campaign was carried out using a DJI Phantom RTK drone. Several flight plans were planned for each bastion, based on the extent of the area to be documented, the height of the drone in relation to the different ground levels and obstacles, the drone's available power supply, and resolution in terms of cm/pixels, i.e. the Ground Sample Distance (GSD), in order to generate reliable SfM models that can be integrated with other digital databases.

These acquisitions were followed by two laser scanner survey campaigns. The first was of the terrestrial type (TLS), used on the three bastions that guarded the access to the city from the south. This campaign had the aim of validating the point cloud generated through the acquisition with the drone and to integrate, for some architectural representative portions (i.e. main gate), the photogrammetric data with those obtained using the laser, which are geometrically more accurate. The second campaign was conducted extensively on the entire fortified bastions path with a mobile laser

scanner. The acquisition with the Stencil Kaarta instrument allowed to put the detailed database of each bastion (TLS + UAVs) in relation to the more sparse and extensive database of the point cloud (obtained from MLS).

Documentation of the fortified elements on the canal

In order to digitally relate the urban fortifications to those immediately outside the city's historical perimeter, two fortifications –located along the canal connecting the city to the Baltic Sea– have been documented.

All the instruments previously used, mobile and stationary, were used to document the Wisłoujście Fortress and the Port Battery. However, in these two cases, a fast survey methodology was implemented (7 hours for Wisłoujście, 4 hours for the Port Battery) optimising the acquisition time by taking advantage of the performance of each instrument used. A specific database was produced for each area or architectural element by a specific tool: the mobile laser scan-

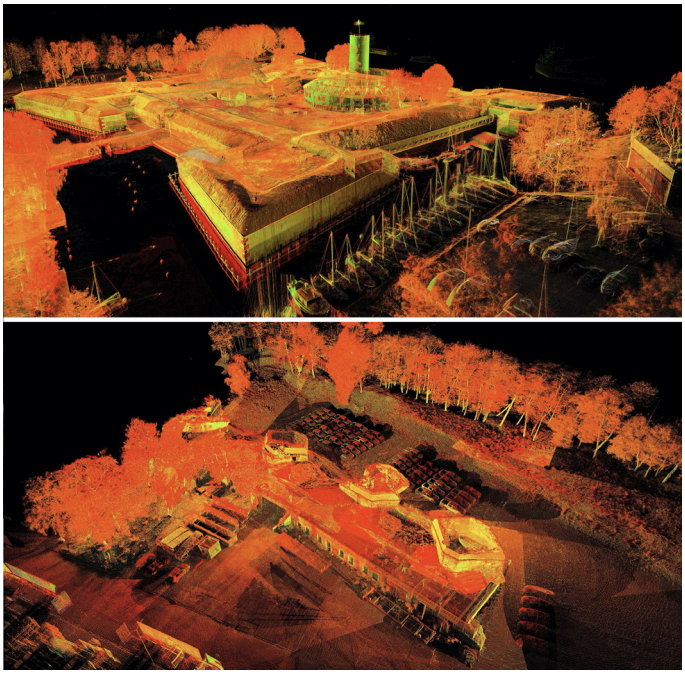

Figure 13 The Wisłoujście Fortress (above) and the Port Battery (below) integrated point clouds. Data acquisition and elaboration by S. Parrinello, F. Picchio, S. La Placa, G. Porcheddu, A. Pettineo, D. Bursic, P. Giardini and Sz. Kowalski.

ner for the interiors, the drone for a general geometry of the fortresses and for the colorimetric aspect, and the terrestrial laser scanner for greater geometric surfaces reliability and for the connection between different ground levels. The aim was to obtain a unique database, more easily manageable and displayable on information platforms in order to link it to the other models produced and to the possible historical phases of construction of the fortress itself.

The advantage of this integrated survey methodology is twofold. Firstly, it enables obtaining databases at different levels of detail (LoD), which give leeway for using different discretisation processes depending on the communicative purpose of the 3D models. Moreover, these databases can be used to relate the image of the actual urban space with that of its fortifications. In particular, combined data on the geometry and colour of portions of the city can be related to the remains of historical fortifications.

The outputs obtainable using these tools are multiple: from SfM textured models that effectively describe the integration between naturalistic and architectural aspects, highlighting the colours of materials and the qualitative aspects that the city and any urban element can offer, to overall point clouds that maintain the spatial relationship between the elements of the environments, establish environmental sections, and highlight the identity signs of the investigated architectural objects. Signs that, encoded and critically transposed, can help trace narrative paths of the city's image. This, together with furthering the aims of the *PROMETHEUS* project, lays the foundations for starting digital and virtual narrative trails through the evolution of the city and its fortified system (Kowalski et al., 2020).

A digital archive thus constituted, in which models, images, and census records are collected, can become a basis for the development of information platforms on the city, in which thematic and interactive maps, historical reconstructions, and virtual narrative paths are collected (Franczuk et al., 2022).

NEW IDENTITIES FOR NEW BORDERS

Today, the fortification system is an integral and identifying part of the city of Gdańsk. Its digitization, together with that of the urban fabric, is part of an inclusive knowledge process: what once constituted the physical boundary of the city becomes, in the digital world, a space of connection and access to a deeper knowledge of the history of Gdańsk. The digitization of the historical fabric makes it possible not only to constitute a zero point for the current image of the cityscape, but also to create open systems of knowledge of the historical identity of the area.

The image of the city and the urban landscape is changing in an attempt to consolidate its historical identity. Throughout history, architectural and formal models are introduced that interfere with the urban space, trying to combine these mechanisms with the structural features of the urban layout. Today, in the digital age, it becomes strategic not only to transform architecture and its models but also to explain the mechanics of the urban image, trying to translate landscape invariants in three-dimensional databases.

The identity signs of the fortifications and architecture of the Gdańsk city centre can be made explicit and critically related to each other through the digital databases and 3D models produced. Their utilisation and systemisation within information platforms is one of the objectives of this project. The aim is to establish a dynamic methodological protocol which, starting from these areas of experimentation, can be replicated in various contexts, developing an active and standardised approach to the 'digitised planning' of Cultural Heritage Routes. This methodology, based on ongoing activities, despite difficulties and adversities, is both an opportunity and a challenge for the urban development that shapes the identity and image of contemporary cities.

ACKNOWLEDGEMENTS:

The study is strictly linked to and supported by the research project entitled: Prometheus: *PROtocols for information Models librariEs Tested on HEritage of Upper Kama Sites* – project for the documentation of the architectural heritage of the monuments within the Cultural Heritage Routes. (This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie; grant agreement N° 821870).

The study is also conducted within CUPRUM Supporting Research Team Building in Emerging Areas IDUB 2022 GdańskTech project entitled: 'Architecture Digitalization and Visualisation Laboratory. DAB LAB - DIGITAL ARCHITECTURE LAB / Analysis and digitization of the landscape of the fortifications of the city of Gdańsk' (This project has received funding from Polish Ministry of Science and Higher Education the 'Excellence Initiative – Research University' IDUB programme; agreement N°: Nr DEC-9/2022/IDUB/II.1.1).

The DAdaLAB team working group for the analysis and digitization of Gdańsk fortifications is composed of: Prof. Sandro Parrinello, Prof. Francesca Picchio, Ph.D. Anna Dell'Amico, Ph.D. Silvia La Placa, Ph.D. Student Elisabetta Doria, Ph.D. Student Hangjun Fu, Ph.D. Student Giulia Porcheddu, Student Alberto Pettineo, Student Martina Frazzica, Student Dante Certomà.

The Metaheritage enterprise, in charge of digitising the city's fortified circuit, is composed of Ph.D. Student Daniele Bursic and Pietro Giardini.

According to the authors' assumptions and expectations, this research will be continued within the above-mentioned project in order to document Cultural Heritage Routes in European contexts.

NOTES

1 *Imaginary Landscape* is a series of five pieces by American composer John Cage, from which *Imaginary Landscape No.1* is known as one of the first electroacoustic works for muted piano, large cymbals and electronic sounds. (Imaginary Landscape No. 1 (1939), Imaginary Landscape No. 2 (March No. 1) (1942), Imaginary Landscape No. 3 (1942), Imaginary Landscape No. 4 (March No. 2) (1951), Imaginary Landscape No. 5 (1952)).

2 Uphagen's house remains today as one of only a few examples of the original depth and arrangement of the bourgeois houses.

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Article available at

DOI: 10.6092/issn.2724-2463/16360

How to cite

as article

Parrinello, S., Borucka, J., Szczepański, J., Picchio, F. (2023). Persistences: analysis of the image of Gdańsk and its cultural identity through survey processes and digital architectural representation. *img journal*, *08*, 258-283.

as contribution in book

Parrinello, S., Borucka, J., Szczepański, J., Picchio, F. (2023). Persistences: analysis of the image of Gdańsk and its cultural identity through survey processes and digital architectural representation. In A. Luigini (Ed.), *img journal 08/2023 Imaging and Imagery in Architecture* (pp. 258-283) Alghero, IT: Publica. ISBN 9788899586362