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Imaging and Imagery in Architecture

edited by
Alessandro Luigini

EDITORIAL

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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,

>

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. Postwar 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 DIGITAL PARADIGM IN CONTEMPORARY ARCHITECTURE

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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

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

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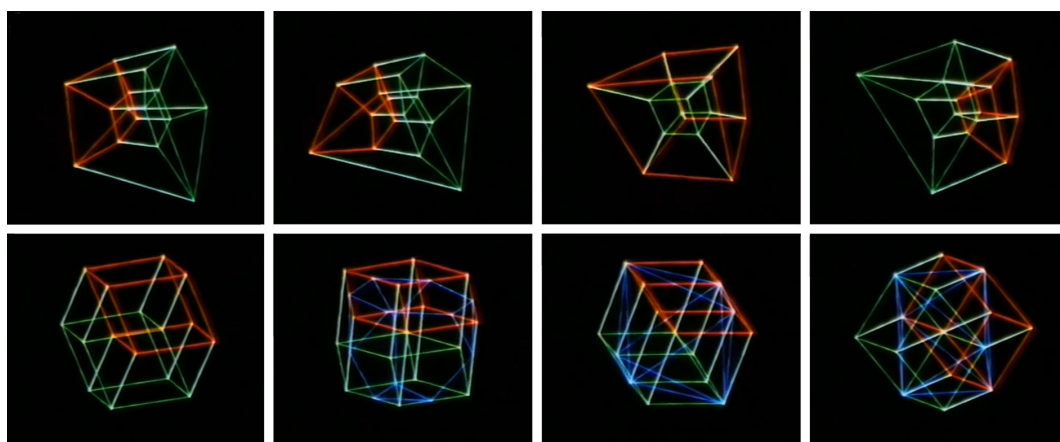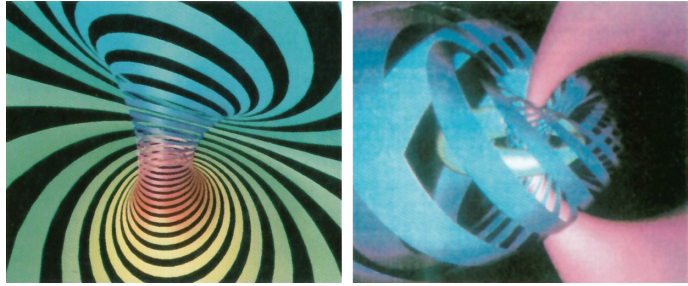
Figure 2 Thomas Banchoff, images from the film *Hypersphere*, 1987 (Emmer, 2006, p. 147).

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>
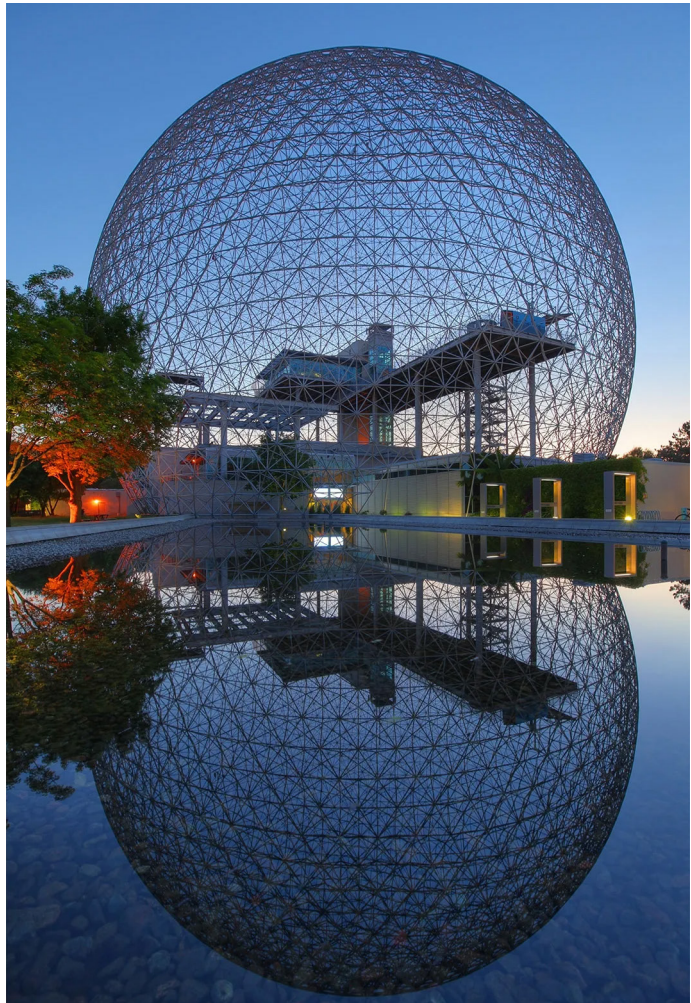
ORGANIC SHAPES IN EUCLIDEAN SPACE

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:Guggenh eim_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).
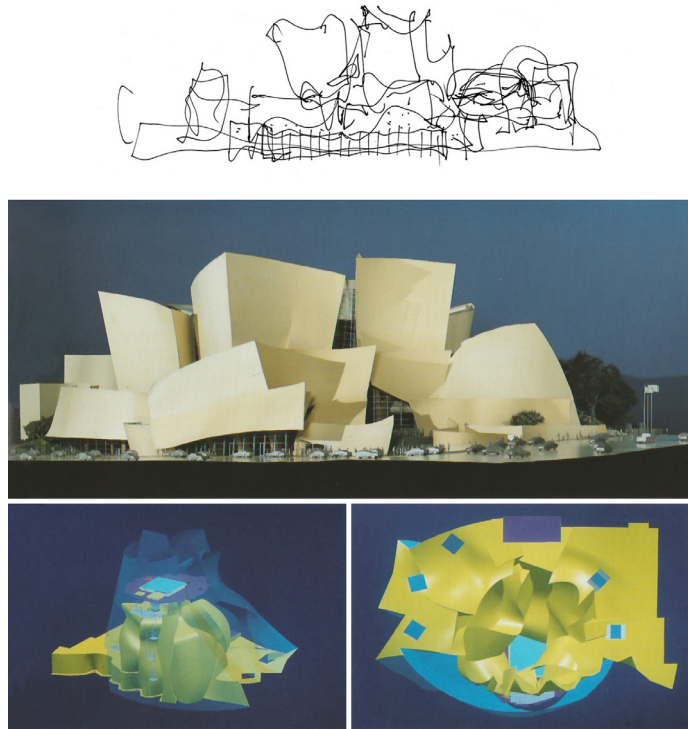
Frank O. Gehry's creative process starts from an analogical universe, through sketches that fix its formal characteristics. The subsequent realisation of three-dimensional physical models allows an initial morphological verification and lays the foundation for the production of a digital model through 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>
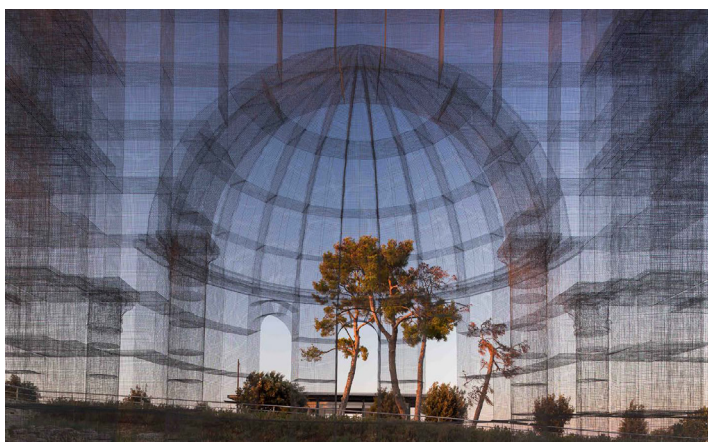
Figures 10,11 Edoardo Tresoldi, *Opera*, Falcomatà Seafront, Reggio Calabria, Italy, 2020. Wire mesh transparent sculpture, permanent installation. Photos by the author.

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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