Representation Systems and Theoretical Design Frameworks

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Abstract

This contribution, developed within the broader context of a reflection on the role of drawing in the conceptual phase of the design process, analyzes how the adoption of a specific analogical projective representation system aligns with adherence to a particular theoretical orientation in composition.
As a mediator between the design concept and its gradual final configuration, drawing becomes an expression of design intent. It is an essential tool for the designer, who can explore examples and solutions drawn from historical tradition and the reference context, reinterpreting and enriching them with new potential and meaning. Drawing is not a neutral tool, but is always linked to the architectural culture that produces it, shaping design choices. This highlights the non-neutrality of representation as a form of language, linked both to the cultural attribution of meaning to the graphic sign anchored in a specific historical moment and to the ways in which the author employs it to convey a design intention. Today, technological evolution has led to the proliferation of a wide range of digital tools capable of influencing design practice itself. The research to which this contribution refers has shown how digital technologies can restore a central role to drawing in the conceptual phase of design, offering designers innovative tools to explore new creative possibilities.

Keywords: drawing, projective systems, language representation, design intent, compositional theories.

Introduction

According to the theory of design as an exercise in hermeneutics formulated by Renato De Fusco [De Fusco 1990], the design process is characterized in its initial stage as a moment of intuition, defined as the 'auroral' phase, in which the process of formal invention begins. At this stage, the designer, recalling all past design examples that have provided solutions to problems similar to the one at hand, engages in a series of cognitive, interpretative, and manipulative processes of reality, which culminate in the intuitive act of making and shaping defined formal choices. In this process, drawing plays a fundamental role, serving as a cognitive tool for understanding the existing reality and its potential for transformation, thus fostering the development of design thinking.

The compositional process, therefore, takes shape as a fundamentally cognitive activity [Monestiroli 1999], insofar as it reinterprets previously known and internalized formal solutions, filtered through the designer's formal conception. These same solutions are re-experienced and recalibrated in relation both to the external reality, represented by the context and/or specific constraints, and to the memory of architecture as the concrete material of their work. Drawing, when applied to the design process, thus enables critical reflection on the existing reality and brings to light its inherent potential for transformation, in order to uncover meanings within it that can anticipate a possible future configuration [Monestiroli 1999].

This dialectical and unified relationship between representation and design thinking has been widely acknowledged not only by Ernesto Nathan Rogers, who affirmed that the intrinsic nature of drawing lies both in its representational function and in its ability to express, through its symbols, the thought underlying the architectural project [Rogers 1933], but also later by other scholars, who suggested that, precisely through its connection with the design process, drawing can become a conceptual space of architecture and a theoretical model that, "through elaborations entirely internal to the language of two or three-dimensional representation, can be transformed into built matter" [De Rubertis 1994, p. 155].
When drawing takes shape as a manifesto of the designer's intentionality –assuming the role of a conceptual program, an indispensable tool for managing form within the design process, as well as a means of investigation and expression through which to explore the heritage of models and solutions handed down by history, reinterpreting and enriching them with new potential and meanings– it can no longer be regarded as a neutral element. On the contrary, in the designer's gesture and in the way it is employed to formulate a critical judgment on reality, drawing reveals itself to be deeply rooted in the culture that produced it, exerting a decisive influence on design choices.
Roberto De Rubertis, in *Il disegno dell'architettura*, emphasizes that representation is never neutral, but rather constitutes a form of language, closely connected both to the cultural meaning attributed to the graphic sign in a specific historical moment, and to the ways in which the author of the drawing uses it to express a precise design intent [1].
Given these premises, and assuming that drawing manifests itself not only through the practice of still-life drawing but also through its theoretical corpus, codified in projective representation systems, it can be hypothesized that the adoption of a particular system of representation, in reference to the specific geometric device that governs it, constitutes the manifestation of a precise design intent. Therefore, each time, the design is nothing but a dialogue that the author establishes with the representation itself [2].

Representation as the language of the architectural project. Orthogonal projections as the rational foundation of composition

In the formal genesis of certain architectures, the adoption of a specific analogical projective representation system constitutes a manifestation of the possible approaches and methodologies for manipulation by the designer.
The idea of architectural composition as a scientific response to a construction problem widespread in 19th-century France emphasizes a functionalist approach to architecture. Prominent figures such as Jean-Nicola-Louis Durand [Werner 1986] based their architectural composition lectures at the *École Polytechnique* on the assumption that it should occur through the recomposition in plan of elements that typologically constituted the vocabulary of possible architectural forms, the latter cataloged and represented according to the method of orthogonal projections, and then collected in *Recueil et parallèle des édifices de tout genre, anciens et modernes* (fig. 1).
Following the wave of French positivism by Auguste Comte, for whom the scientific method is the only valid means of understanding the world and solving problems, the influence of the *École Polytechnique* is based on the belief that the teaching of architecture can be assimilated to that of the exact sciences and technical disciplines, whose transmission must be carried out with scientific rigor, ensured by the use of Gaspard Monge's descriptive geometry. This approach abandons the three-dimensional representation of architecture in favor of its composition and representation in plan, and only later in section and elevations [Werner 1986].
Durand taught at the *École* until 1833, compiling his teaching principles into important volumes published between 1809 and 1825, including *Partie graphique, Précis des leçons, and Nouveau précis des leçons*, the latter being the result of the compilation of works carried out in his architecture courses. The compositional method he taught is based on a limited number of architectural forms, whose relationship is regulated by a module that varies in shape and proportion depending on the type of building to be designed (fig. 2).
Since architecture is intrinsically geared towards utilitas, a rigorous classification of its elements becomes essential in order to optimize the reorganization of its parts. Architectural elements are therefore cataloged according to a formal and functional principle, constituting a true vocabulary from which to draw during the compositional phase.
Durand's method is therefore based on orthogonal projections, with buildings conceived starting from the plan drawing: "The elevation is deduced from the plans

according to certain rules, and the section results from the first two. The three representations must align on the same sheet, on the same axis, at the same scale of proportion" [Werner 1986, p. 133].
This approach implies that architectural design originates from its plan distribution, based on orthogonal projections on the horizontal plane. From this projection, all other design documents are then reconstructed, in which the altimetric compositions are a rigorously scientific consequence of the plan distribution, paving the way for an objective, rational architectural approach. For this reason, in Durand's architecture course, students practiced composition by drawing on graph paper, which not only helped identify the starting module, its related planimetric proportions, and symmetries, but also allowed for planimetric composition exercises starting from elementary shapes –such as the square, rectangle, and circle– as highlighted in the 1802 plate that illustrates a set of buildings resulting from the divisions of the square, parallelogram, and their combinations with the circle (fig. 3).

Fig. 1. Plate 19 of the Nouveau Précis from 1813 showing the possible plan configurations of buildings based on the possible recombinations of their parts [Durand 1813].

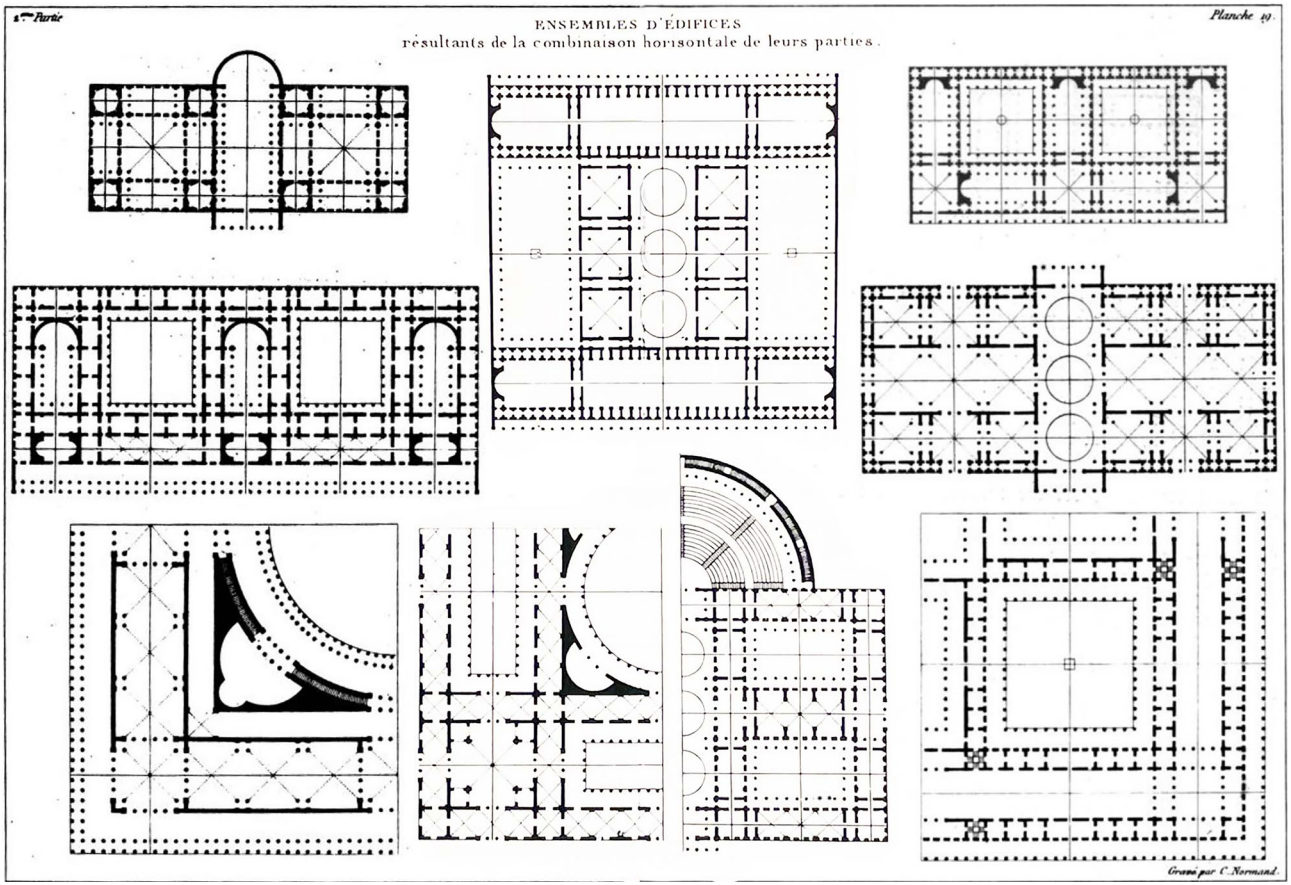


Fig. 2. Plate 3 of the Partie Graphique from 1821 with the planimetric grid defines the modules of the rooms [Durand 1821].

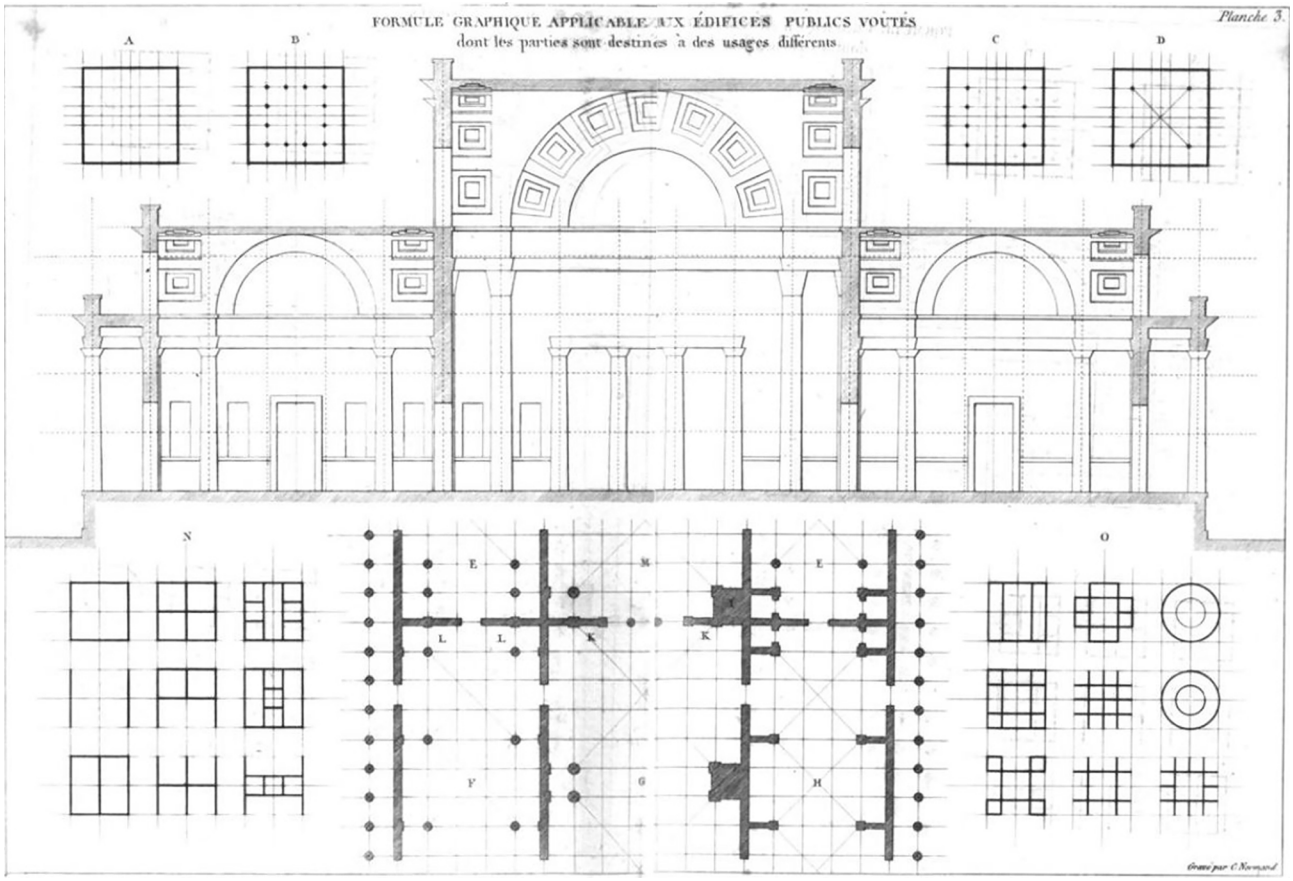
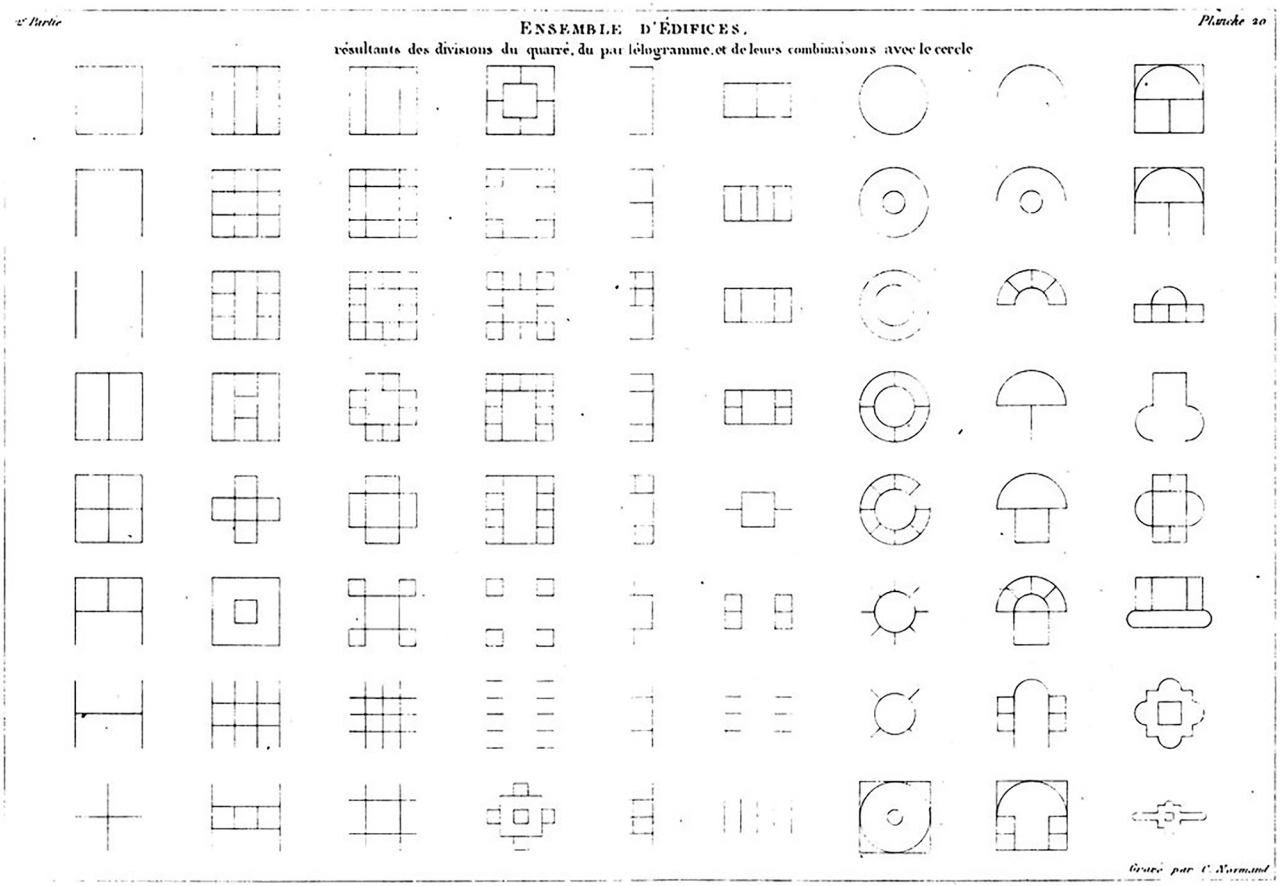


Fig. 3. Plate 20 of the Précis des Leçons from 1809 explaining the design method based on exercises in planimetric composition starting from simple forms [Durand 1809].



Axonometric projections for the simultaneous visual experience of constructive relationships

While orthogonal projection suggests a conception of the architectural project starting from its plan distribution, the adoption of axonometric projection in the Constructivist movement and the 20th-century avant-gardes, on the other hand, reflects a conception of architecture free from preconceived morphological and linguistic configurations. The volumetric values and the instances of simplification expressed through the method of axonometric projections reflect a growing critique of past orders and styles. Architectural compositions thus detach from the concepts of frontality, symmetry, and axiosity, in favor of a simultaneity of visual experience.
Axonometry as a symbolic form reaches its full expression when, following the Neoplasticist movement of De Stijl, Theo Van Doesburg and Cornelis Van Eesteren in 1932 present axonometric drawings of architectural projects at the Parisian gallery Effort Modern (fig. 4).
The use of the axonometric plane as the sole projection plane –capable of synthesizing a comprehensive, and thus simultaneous, view of the artifacts– reflects a growing interest in figurative abstraction, where architectural compositions are no longer bound by the concepts of symmetry and axiality, but embrace the multiplicity of ways of experiencing them: "Already now we can see the beginning of an architecture conceived on a space-functional basis, which is drawn according to the axonometric method. This method of representation allows simultaneous reading of all the elements of the house in their exact relationships, even from top to bottom, that is without any perspective vanishing points. It is evident that the entire project must also be developed axonometrically, from the foundations to the roof" [Van Doesburg 1929, p. 305; Giordano 2002, pp. 246-248].
Van Doesburg's theory for the new architecture, expressed in Grundbegriffe der Neuen Gestaltenden Kunst published in 1919 and 1925, is based on the concept of 'rebellion against styles' and the consequent theory of the harmony and universality of the arts, which in the architectural field is expressed through the reduction of architecture to its volumetric and spatial values, and thus to pure plasticity. According to Van Doesburg, compared to music, theater, and literature, painting and architecture are the arts that enjoy the greatest expressive freedom because they can easily aspire to universality. This concept of universality is based on the belief that shaping means finding a balance between the basic components that constitute the art itself, whose opposition gives voice to the aesthetic experience of the artist. If the artist, then, makes use of the specific means of the art to find a plastic balance, the work of art itself will become a metaphor for the universe, thus acquiring a harmonic and universal character: "All arts have the same content. The aesthetic experience is expressed in relationships. These relationships manifest themselves within the pure means of expression of each form of art […]. The architect expresses his aesthetic experience through the relationship between planes and masses with interior spaces and external space. 'Giving shape' essentially means: balancing the positive and the negative to achieve a precise harmonic unity" [Van Straaten 1993, p. 8].
Therefore, in architecture, this universality and harmony can be achieved if it aims for pure plasticity, reducing itself to its essential geometric-volumetric elements.
Referring to his design for a fountain for the city of Leeuwarden (1917-18) as a pure example of spatial plasticity, Van Doesburg states that "A valid example of spatial plasticity […] must give the impression that all sides emerged simultaneously. In this way, so to speak, the annoying distinction between 'front', 'back,' and 'side' disappears. Only in this way can the viewer, moving around the work, perceive a logical development of space and volumes" [Petersen 1918, p. 72].
This plasticity is clearly expressible if architecture is conceived and represented through the use of axonometric projection systems. By providing the three-dimensional image of an object without subjecting it to volumetric-spatial deformations –which are characteristic of perspective representation– axonometry, as a form of cylindrical projection, conveys the idea of architecture as an object observable from different viewpoints, without predefined modes of experience or prefiguration, allowing the viewer to "[…] freely choose their positions and thus experience the countless and changing ways in which the object exists" [Magnago Lampugnani 1982, p. 12].
By rejecting the concepts of axiality and frontality in architecture and promoting an architecture that places its plastic character at the core of the composition, Van Doesburg envisions a new architecture of the future that seeks to achieve harmony between space and time: "Unlike frontal architecture, in which everything is concentrated on the façade, the architecture of the future will develop a richness of dimensions that we can barely imagine today.

The modern architect will no longer be satisfied with the two-dimensional idea of the façade; the new task of the modern architect will be to conquer three-dimensional space. This will only be possible if he feel and think simultaneously about the problems of space and time" [Van Straaten 1993, p. 31]. This spatial-temporal harmony is understood as the appropriate relationship between designed spaces and their use, the right spatial balance that allows the activities of life and dwelling to unfold according to their own rhythms.

For this reason, the new architecture had to be elementary and grounded in the foundational concepts of use, mass, plane, time, space, light, color, and material, all of which were to be endowed with a plastic quality. In this regard, the axonometric system of representation enables a level of abstraction of architectural elements that allows for the delineation of lines, surfaces, and volumes, recognized by Van Doesburg as the basic components of architecture [3] (fig. 5).

Specific axonometric studies conducted by Van Doesburg demonstrate how the architectural idea is conceived precisely from an axonometric vision of space and architectural elements, subjected to a process of deconstruction into vertical and horizontal planes, filled with solid tones of blue, red, yellow, grey, white, and black, adhering to the theory of the universality of the arts, in which painting and architecture merge. These axonometric experiments, referred to as "counter-constructions" or "color constructions in the fourth dimension of space-time" [Van Straaten 1993, p. 10], aim to transfigure architecture into its basic elements, reduced to a juxtaposition of colored planes, in order to decipher their reciprocal relationships and spatial configurations.

Emblematic are the *analyses de l'architecture* supporting the design of the *Maison particulière* of 1923 (fig. 6), collected by Van Straaten in a monographic volume [Van Straaten 1993, pp. 118-127]. These studies clearly reveal the structural scheme of load-bearing and supported elements, reduced to lines and planes, while the use of color illustrates the space-time dimension of the architecture and the spatial configuration of the interior.

The compositional approach based on axonometric projection developed by Van Doesburg laid the groundwork for the deconstructive processes also explored by Peter Eisenman in his experimental house projects designed between 1968 and 1975: House I (1968), House II (1970), House III (1971), House IV (1971), House VI (1975), and House X (1975).

Fig. 4. Drawings of the Maison particulière and the Maison d'artiste from 1923, in which axonometry becomes a manifesto of the simultaneity of the visual experience of architecture [Van Straaten 1993, pp. 110-131].

Fig. 5. Studies on the opposition between passive and active in painting, sculpture, and architecture [Van Straaten 1993, pp. 99, 100].

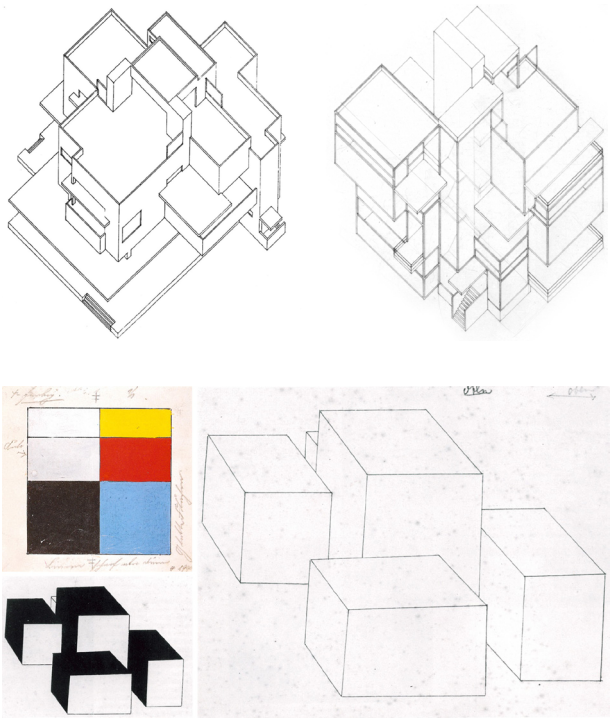


Fig. 6. Van Doesburg's exercises in counter-constructions on the search for universality in architecture [Van Straaten 1993, pp. 119, 120, 125].

Fig. 7. Eisenman's deconstruction exercises for the design of House I from 1968 <https://eisenmanarchitects.com/Residential>.

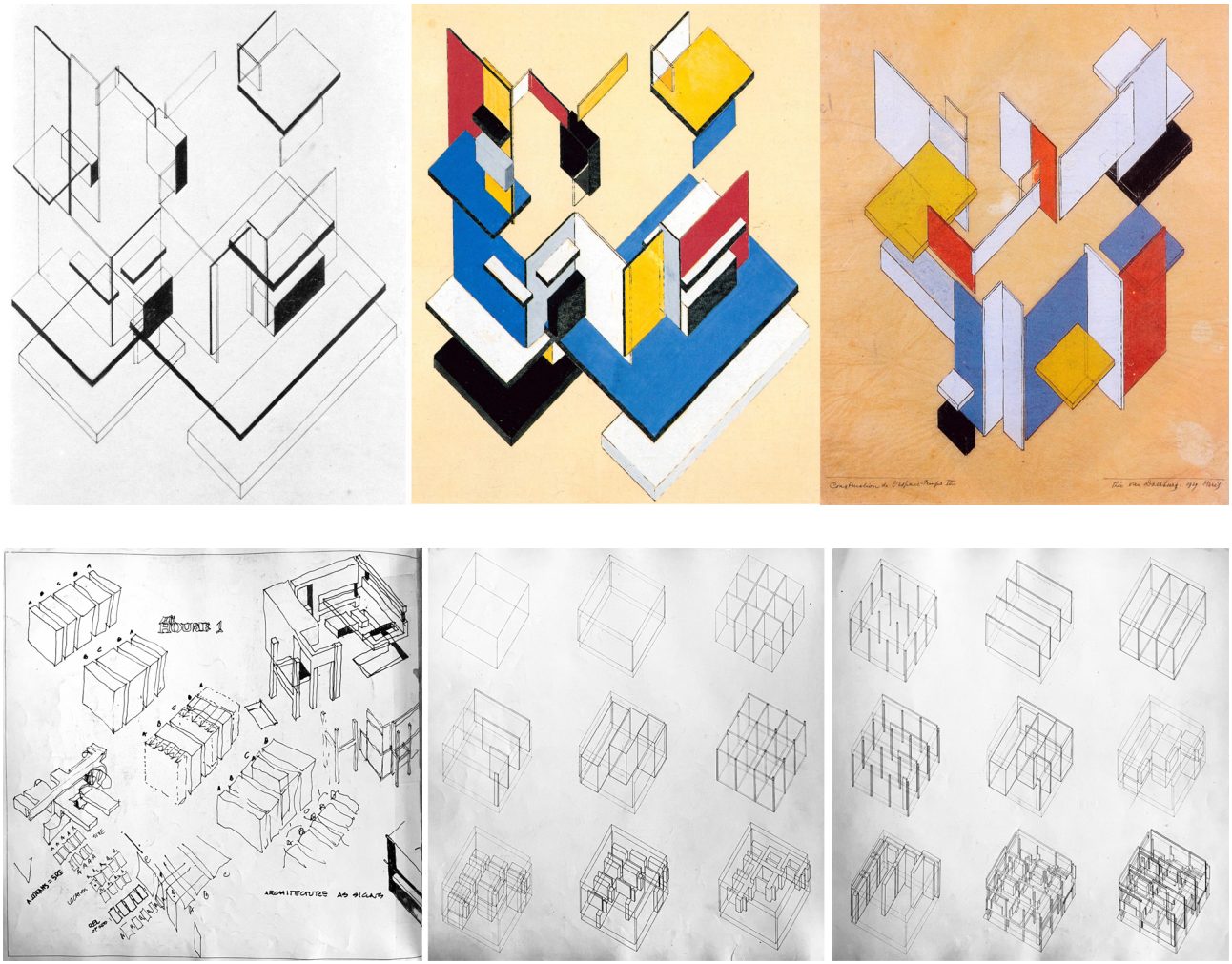
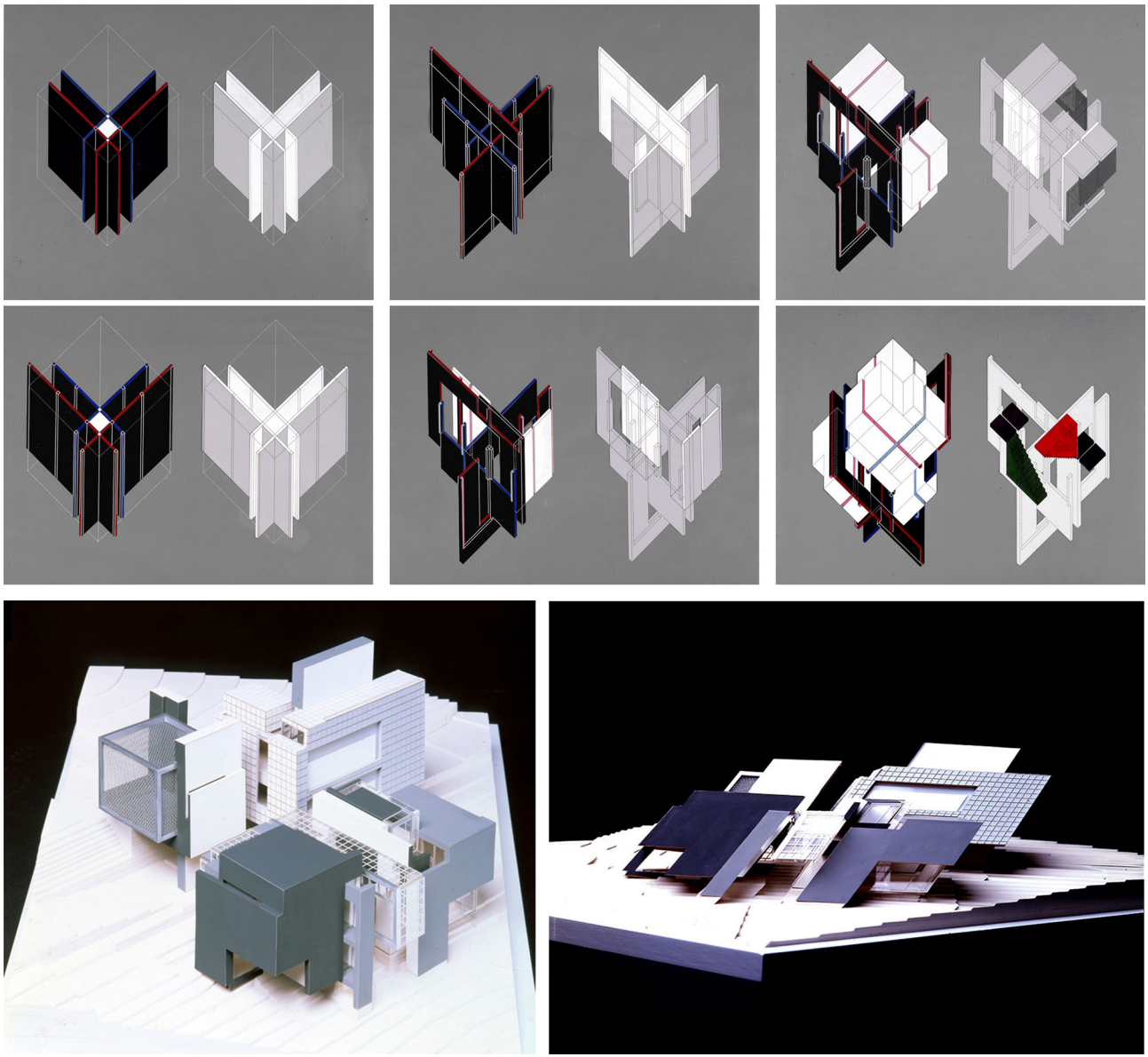


Fig. 8. Diagrammatic sketches by Eisenman with color opposition of the design for House VI from 1975 and axonometric model of House X from 1975 <https://eisenmanarchitects.com/Residential>.



With the aim of exploring new compositional possibilities based on the principle of deconstruction, these projects follow a process that takes into account the potential geometric transformations to which the autonomous system of the house can be subjected. Once again, the traditional conception of architectural design is overturned in favor of a compositional approach grounded in the search for new topological connections, where geometric decompositions enact a deliberate dissolution of hierarchies between inside and outside, structure and function.
Starting from axonometric diagrams, Eisenman works through processes of decomposition and fragmentation of the initial volume (fig. 7), revealing mechanisms of deconstruction and recomposition, fragmentation, disassembly, and displacement. The application of color allows for a juxtaposition of the various elements of the building, which remain independent yet interconnected [Galofaro 1999, p. 14]. Finally, the physical model allows for the control of the project's evolution in terms of its spatial and formal definition.
Of particular interest is the model created for House X in 1975, a model that aims to simulate an axonometric representation of the building (fig. 8).
This persistent use of axonometry, even in the models, aligns with Eisenman's theories, according to which designing using the axonometric method allows for direct manipulation of spatiality, applying control between internal and external spaces.
The diagrammatic models and the physical model, used alternatively throughout all stages of the project, function as tools for theoretical reflection, whose interconnection and mutual influence not only allow for controlling the formal evolutionary stage of the project but also enable the exploration of new figurative possibilities for the design.
In this process of research and analysis of possible complex systems of spatial configuration, digital three-dimensional models will later allow Eisenman to further explore this spatial theme, in line with the theory that architecture can no longer be conceived from a perspective view simulating visual perception, but rather from its spatial component, first defined in its general volumes and then deepened in the relationships between its elements.
Following this line is the project of the Virtual House from 1997, whose diagrammatic schemes are conceived from virtual elaborations developed through early digital modeling software such as Form Z and CATIA [4]. While analogical schemes allowed for formulating assumptions about the spatial relationship between elements, now digital diagrams become more complex, incorporating the temporal factor, and thus movement, into their process of analysis, which influences the search and formal definition of architecture [Galofaro 1999, p. 54]. In this new process of reflection on architecture, Eisenman believes that it is no longer possible to think of architecture in terms of the combination of its constructional elements –walls, windows, columns– but rather it is necessary to conceptually rework the way spatial definition is approached, seeking a language that, through new digital tools, allows for the exploration of forms of continuity, where interior and exterior merge into a single unity.
In the Virtual House, this folding process is generated starting from the nine initial cubes that define the diagrammatic scheme, which, subjected to vector deformations, create new spatial conditions and new formal expressions (fig. 9). This approach paves the way for a different conception of architecture, expanding the possibilities for manipulating form through a play of transformations and parametric relationships –dimensional, geometric, and logical– of the elements.
This methodology will be reiterated and further explored in *Palladio Virtuel* [Eisenman 2015], which takes some of Palladio's well-known villas as its starting point.

The perspective projection as a medium for a new relationship between architecture and nature

A different compositional approach is based on the perceptual verification of places as if they truly existed, where the adoption of the perspective representation system emerges as a privileged tool, capable of fostering a compositional approach in which architecture is closely related to the context in which it is situated. In this relationship, two main tendencies can be observed: on one hand, a search that places the project in relation to the landscape; on the other, a tendency that seeks the definition of the urban identity of the place through the dialogue between architectural elements and the natural landscape.
The first line of compositional research is reflected in the experiences of the pensionnaires during their travels in Italy in the 18th and 19th centuries. The relationship between architecture and landscape that emerges in the perspective representations of architects such as Karl Friedrich Schinkel and Leo von Klenze helped form a design aesthetic in which the context becomes an integral part of the architectural

composition, a principle that influenced neoclassical architecture and, later, 19th-century urban thought. The perspective representation is adopted to analyze the interaction between architectural works and their natural or urban context, revealing a critical perspective that seeks to integrate the two elements, rather than oppose them, in order to rediscover a sort of natural character of architecture, similar to that of classical antiquity.

On the other hand, the use of perspective as a design tool allows for relating the elements that make up architecture with the natural landscape, thereby constructing, through their mutual dialogue, the language of the urban landscape.

An example of this is Mies van der Rohe's use of perspective collage, which creates representations that articulate spatial depth through the overlapping of planes

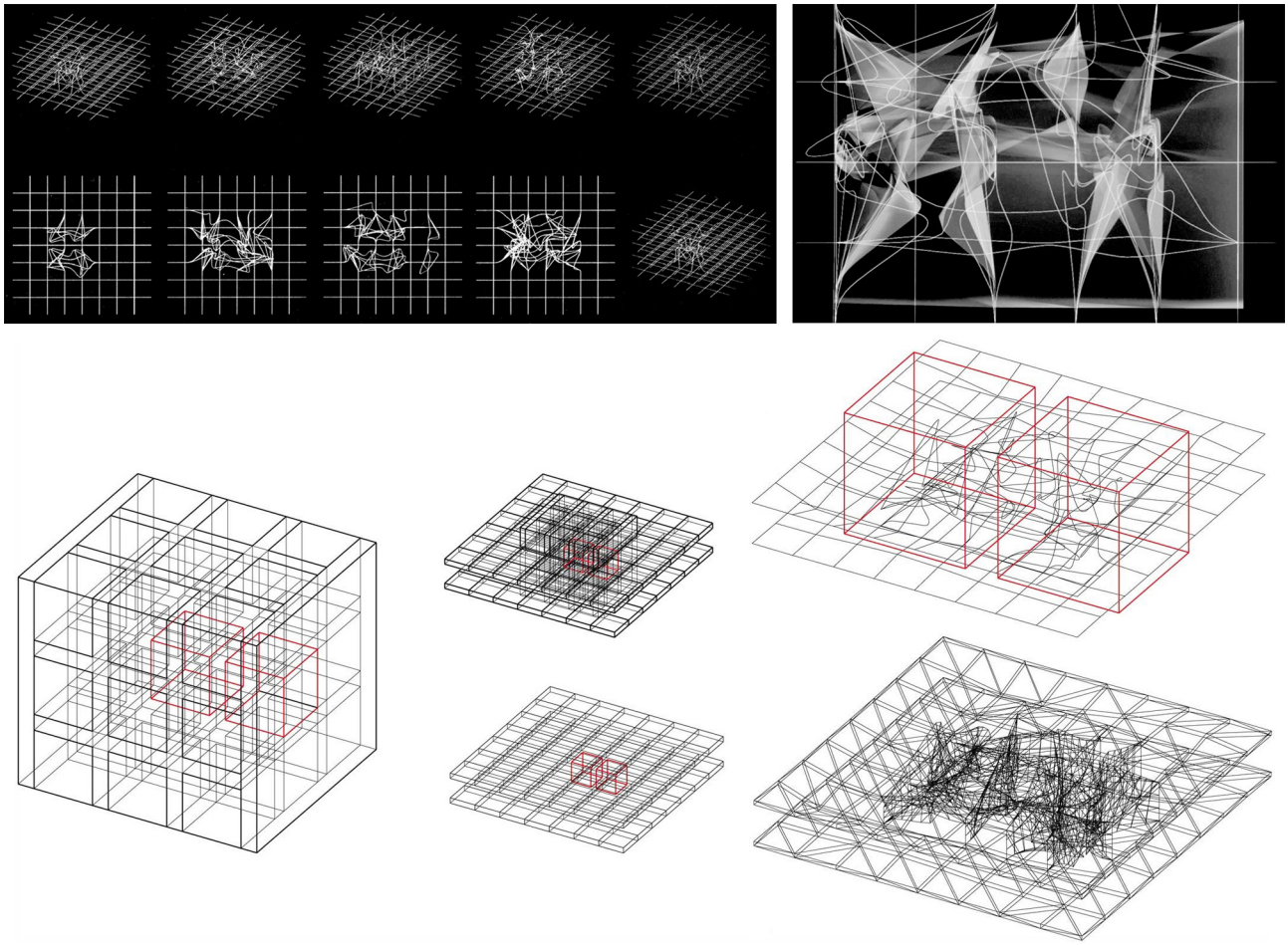
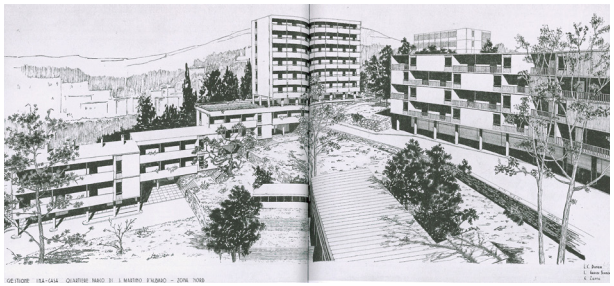


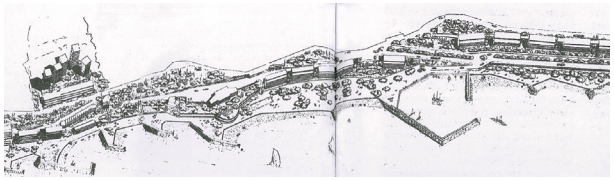
Fig. 9. Conceptual diagrams and drawings by Eisenman of the Virtual House from 1997 <https://eisenmanarchitects.com/Residential>.

[Shields 2014, p. 73]. This method recalls the 17th-century perspective scenery, where architectural elements and the surrounding context are composed in a succession of levels, with the visual layering of fragments generating multiple layers of interpretation, thus strengthening the relationship between architecture and context [5]. The collages related to the 1937 Resor House project clearly illustrate this compositional strategy: the perspective representation, evoked by a photographic image of the mountainous landscape, becomes the central element around which the architectural space is articulated. Architecture is reduced to a system of lines and planes that, like a crystalline structure, define a spatial void, in contrast to the physicality of the natural context. The dialogue established between the architectural object and the landscape raises reflections on the construction of a unified urban language, where perspective representation is not only a tool of depiction but also a method for exploring a new language.
A similar reflection also emerges in the perspectives created by Luigi Carlo Daneri for two different projects:

Fig. 10. The perspective view of the INA-Casa Bernabò Brea neighborhood in Genoa by Danero [Boeri 2024, pp. 76, 77] is part of the designer's search for a solution that integrates the residences with the Ligurian landscape.

Fig. 11. Danero's perspective for the tourist complex of Capo Pino [Boeri 2024, pp. 54, 55] is conceived as a tool for the search for identity in relation to the Sanremo seaside landscape.





the INA-Casa Bernabò Brea district in Genoa from 1954 [6] [Boeri 2024, pp. 73-84], and the seaside and tourist complex of Capo Pino in Sanremo from 1957-60 [Boeri 2024].
The first project is part of the vast INA-Casa public housing plan established to address the post-war housing crisis and promote economic recovery. Daneri's project represents a "concrete experiment in the cohesion between territory and architecture, the first attempt at constructing the landscape" [Boeri 2024, p. 78]. It is a truly experimental project, where the architectural language, while adopting the principles of prefabrication, attempts to find cohesion with the configuration of the Ligurian territory, aiming to build an urban language "tailored to both man and the environment" [Gentili Tedeschi 1954, p. 49]. The perspectives created by Daneri for the district, preserved in the L. C. Daneri archive (fig. 10), highlight this search for the coexistence of the buildings with the Ligurian landscape, drawing inspiration from the construction of the streets of Genoa and the terraced layout of typical hillside houses.
In this case, the perspective representation emerges as a design criterion to consolidate the dialogue between the built environment and the landscape, verifying the dynamic experience of the places thus configured.
In the project for the seaside center in Sanremo, the bird's-eye perspective (fig. 11), which shows the configuration of the project on a territorial scale, is used as a tool for the search for an urban identity. Engaging in the debate surrounding the protection of the territory in relation to the massive urbanization phenomena triggered by the post-war housing needs [Boeri 2024], Daneri's design proposal evokes the small Ligurian villas arranged in terraces overlooking the coast, adapting this typology typical of the historic city and the anthropized landscape on a larger scale.

Conclusions

The analysis conducted on the project drawings has shown how, each time, the preference given to a specific analog system of projective representation has been configured as a declaration of adherence to a defined architectural theory paradigm, due to the close correspondence established between design choices and the adopted representation systems.

Drawing, in its various forms, thus effectively emerges as both a language and a theoretical foundation for architectural practice, as expressed by Margherita De Simone, who highlights that "in the design process, or rather in the act of design as a formative will, there are drawings that, in addition to clearly expressing the meaning of what is depicted, contain an emerging theoretical significance" [De Simone 1990, p. 160].
However, this extraordinary power inherent in traditional drawing, with its theoretical apparatus, seems today to be obliterated and overshadowed by the operational efficiency and communicative effectiveness that new digital systems are able to deploy.
Setting aside the more trivially communicative uses of digital technology (sometimes even with a blatantly seductive attitude), it now seems taken for granted, and even outdated, to consider the objective performance advantages (in terms of speed of execution and modification of graphic works) that, in past decades, made vector-based representation systems so successful. After all, these systems were conceived within the tradition of projection based on rigidly Euclidean principles, still reliant on the protagonism of the line drawn by hand, a line replaced in AutoCAD by the canonical straight line passing through two points.

The real revolution, capable of truly acting as a booster for contemporary design thinking, can instead only be induced by the widespread adoption and development of BIM systems, where a wall is no longer a pair of lines, but rather an object placed and oriented in space, which in the project must establish a defined syntactic relationship with the other elements of the structure.
This vocation to govern the architectural syntax was already foreshadowed in the axonometric projection and suggested by William Farish's urgency to provide an adequate geometric-theoretical foundation for the graphic representations accompanying the assembly and maintenance instructions for mechanical systems, the true engines of the English industrial revolution. Therefore, in a sense, axonometry should be reconsidered as a kind of 'pre-BIM'.
In a broader view of the problem of contemporary representation, therefore, only by rediscovering the deeper conceptual connection between old and new systems of representation –without digging trenches between the past and the present, between the analog and the digital– can the project and its representation regain that essential unity between les choses et les mots pour les dire, which is characteristic of every evolved human language.

Credits

The authorship of paragraphs *Introduction* and *Conclusions* is to be ascribed to Maria Pompeiana Iarossi, while the authorship of *Representation as the language of the architectural project*, *Orthogonal projections as the rational foundation of composition*, *Axonometric projections for the simultaneous visual experience of constructive relationships* and *The perspective projection as a medium for a new relationship between architecture and nature* is to be ascribed to Cecilia Santacroce.

Notes

[1] In this regard, De Rubertis states: "Every representation stands as a new reality and a direct object of knowledge. Within it are present both the values of the represented reality and those introduced by the author of the depiction, bound in a semantic structure that is the outcome of the relationship (between the drafter and the subject)": De Rubertis 1994, pp. 120, 121.

[2] "The means of representation […] indicates and is part of the design intention, since on the one hand it is not the representation of a given thing, but of the design conversation that we establish with the representation itself as a matter that challenges and suggests to us": Gregotti 1975, pp. 21, 22.

[3] The three drawings published by Theo van Doesburg concerning the dichotomy between active/passive, positive/negative, in painting, sculpture, and architecture are published in Van Straaten 1993, pp. 99, 100. These drawings were published in various Russian and German magazines between 1922 and 1923. In painting, the opposition was expressed through rectangular surfaces of different colors, while in sculpture the fundamental elements were space, time, plane, line, and volume, visualized through five parallelepipeds with black, grey, and white faces. In the architectural field, on the other hand, the essential principles included mass, space, time, line, and plane, represented through axonometry as five volumes outlined only by their contours.

[4] The CATIA application, developed since 1977 for the mechanical design of airplanes, originated as a CAD/CAE/CAM platform for structural analysis and verification. The software Form Z, following CATIA and developed starting in 1989, is an application for surface and solid modeling through Boolean mathematical operations applied to NURB surfaces and meshes. Pioneers in the active adoption of these tools for design were Peter Eisenman, who developed through the Form Z software the concept of folding and deconstruction in architecture, and Frank Gehry, who

adopted CATIA as a device with which to translate and redefine the soft forms of his architectures.

[5] "The importance of Mies's drawing-photographs lies in the manner in which differing means of signification are used to challenge the symbolic and spatial meanings of a project relative to its context": Hoffman 1994, p. 105.

[6] Project carried out between 1950 and 1954 in collaboration with Giulio Zappa and Luciano Grossi Bianchi.

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