

Color in architecture among futurism, neoplasticism, rationalism (and more...)

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ABSTRACT

In the first decades of the Twentieth century, the relationships between the culture of color and all forms of creativity were intense. In general - between Futurism and Rationalism - if chromatic theories, trends and "fashions" are clearly recognizable in sectors such as graphic and painting, these are less evident in the complex of architecture. The Futurists immediately appeared open to international contacts: Prampolini, in the area of French Purism; Marinetti, close to Karel Teige and the new Czechoslovakian researches; Paladini to the Russian Imaginism, while Carmelich is the trait d'union with the Yugoslav constructivist area. In all cases, the roots of Bauhaus appear central, even with the fertile role of generator for chromatic theories (Matotta, 1999), with Itten, Klee, Kandinsky, Hinnerk Sheper, Albers (fig. 1), but van Doesburg as well. On the basis of studies on the history and theories of color, this essay intends to re-establish - albeit through still largely incomplete fragments - the network of diffusion developed in Futurism, from Futurism (between theory and practice, knowledge and experience), to start possible comparisons through analogies or discrepancies, and to grasp some developments in architecture, in the contemporary debate, or in subsequent moments. From this point of view, both in coeval and in subsequent periods, the figure of Alberto Sartoris is confirmed illuminating if we take into consideration his intuitive ability and his cultural background, even in the field of color. Combining cultural or speculative aspects with experimentation in the architectural design, his national and international contacts in the field of color, by taste and in the Futurist period, later matured with Rationalism (including all the derived and/or connected "isms") are also valuable.

KEYWORDS contemporary architecture, futurism, neoplasticism, rationalism, Bauhaus, theories of color

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1. Futurist Manifestos as a cultural strategy

One of the typical traits of Futurism lies in the copious production of manifestos (fig. 1) intended as a real cultural strategy and for which reference is made to the chronology already collected by the author (Marotta, 2019).

In 1914 Antonio Sant'Elia (fig. 2) published the Manifesto of Futurist Architecture in Milan: the city is placed at the center of interest and is conceived as a symbol of dynamism and modernity. The paper does not explicitly refer to color, nor to its historical and theoretical foundations, nor to the relationship between architecture and color.

The second Technical Manifesto for Futurist painting is much more interesting (1911), where - for the chromatic aspects - it is explicit a precise reference to "style, in the belief that the new painting must be based on the decomposition of color, of Divisionist origin. The breakdown of colors (defined by them as «congenital complementarism»), not only must enhance the sensation of dynamism, but must contribute to that new spatiality where it is precisely light, together with motion, that makes objects interpenetrate one another".

2. The neoplasticism by Gerrit Thomas Rietveld and Theo van Doesburg

In those years, from Bauhaus to Constructivism, up to Neoplasticism passing through De Stijl, (and vice-versa) Mondrian, van Doesburg, van der Leek, Rietveld, Vantongerloo and Huszár expressed their individual opinions about color.

In any composition, Rietveld conceives color in an ancillary (almost supportive) term, but with an essential function in individual perception, reinforced by a captive role, of the primary colors especially. In addition, it was he whom created the Schroeder House in Utrecht (1924), an authentic architectural emblem of the movement: the decomposition of space into planes is underlined here by the use of primary colors, pure and saturated on the same surfaces (fig. 3). In a game of "pure" rectangles and colors, Rietveld creates a perfect synthesis of the theories of the movement, where the furnishing objects and the architectural structure embrace the same constructive principles. The house develops on two levels, based on four fundamental elements, comparable with the theories that began at the Bauhaus: Primary elements in white color that determine the shape and structure of the house; Flat elements in gray or white color aimed at defining the relationship between inside and outside; Linear, vertical and horizontal elements-

architraves, pillars, drainpipes - in yellow, red and blue combined with white, gray and black; Functional elements - windows, doors, railings, external staircase and skylight - in black and white.

It should be noted that as early as 1921 Johannes Itten (at the Weimar school since 1919) had made a first model of color (Marotta, 1999, pp. 45, e 134-135). From the same years (1919-21) his "Fire Tower",

derived as is known from the complex and in-depth intertwining with the geometric and mathematical disciplines.

On the contrary, Huszár and van Doesburg adhered to the theories of Wilhelm Ostwald (Marotta, 2018). The latter created the Color Construction in 1922: it is a work of which Zevi writes: "The wall partitions are no longer silent, they have no weight, they can be dismembered into minor rectangles chromatically distinguished by the basic colors." (Marotta, 1999, p. 76). These are the results of the rigorous formal and functional research that van Doesburg had conducted with colleagues such as Cor van Eesteren and of which we can recall what he had written in 1923: "we examined the laws of color in space and duration, and we found that the balanced relationships of these two elements eventually lead to a new and positive plastic" (Marotta, 1999, pp. 24-25).

In 1927, according to a similar but more complex concept, Theo created (together with Hans Arp and his wife Sophie Taeuber) the Café Aubette in Strasbourg, one of the most ambitious designs of the architectural culture of the time: here his spatial vision through formal synthesis and pure colors is evident (Marotta, 2019). Again, by De Stijl, while Van der Leek considered the color essentially as a medium to achieve greater control in formal synthesis, Vantongerloo finally elaborated a chromatic theory, conceived through pseudo-mathematical formulas in order to match music to colors, and developed seven of it systematically related.

3. Chromatic and geometric matrices from Bauhaus

In 1919 because of an invitation by Hans Richter and Viking Eggeling (Siggillino, 1998) (whose filmic experiments between color and geometry are known, such as Diagonal Symphony or Orizental/Vertical orchestra) van Doesburg went to Berlin, bringing with him the first abstract films, the collection of the De Stijl magazine and pictures of the neoplastic works (Zevi, 1974, pp.16-17). On Christmas night, in Bruno Taut's house, van Doesburg met Adolf Meyer and Walter Gropius, (as Teo remember) (van Doesburg, 1925) with

the aim of being included in the teaching staff of Bauhaus. In 1922, he also collaborated with the magazine *Dada Mécano* together with Schwitters, Arp and Tzara. His painting was confirmed in the combination of primary colors with elementary geometric shapes: lines, diagonals, squares, to enhance spaces and architecture. In 1925, the Bauhaus published *Grundbegriffe der neue Gestaltenden Kunst* in Munich, a paper about the basic principles of the plastic arts.

4. The futurist color by Nicolay Diulgheroff

The Bulgarian Nicolay Diulgheroff came to Italy, in particular in Turin (Belloli, Pinottini, 1987). He trained in Vienna in the 1920s at the *Kunstgewerbeschule* in Dresden (where he met Kandinsky, who was decisive for him also for the chromatic theories). He then went to the Bauhaus he spent time with Johannes Itten, whom soon became one of the best-known theorists of color. In Turin, he enrolled in the *Scuola Superiore di Architettura*, at the *Accademia Albertina*, where he left traces and documentation (the writer now investigates these, in order to better recognize the chromatic components in the design activity: the current constraining conditions have unfortunately forbidden the consultation).

Nicolay met Fillia (Luigi Colombo), close to the Constructivists: in 1931 he was significantly present in his book *La Nuova Architettura* [8], which cites - together with the Futurists - also authors of other tendencies: Gropius, Le Corbusier, Sartoris. This is where the premises of Futurist Mechanical Art were born, the manifesto signed by Pannaggi and Paladini in 1922, followed the one on architecture by Sant'Elia.

He signed architectural designs (Villino Montaldo, or "Il Faro") (fig. 4 d), but also interiors, as for exhibitions, as well as graphic and pictorial activities. In Albissola Marina one of his significant works: Casa Mazzotti, (fig. 4 a, b, c) for Tullio Mazzotti (called Tullio d'Albissola by Marinetti) as his home and ceramic laboratory, with an adjoining shop to display and sale. It is one of the rare examples of futurist housing still intact, designed and built under the direction of the architect without undergoing changes or additions over time. It currently houses the Ceramiche Mazzotti company.

The formal and structural language connotes the "dynamic" futurist style: the projecting roofs at the entrance to the shop and on the facade of the residence, the large windows of the house and the ones curves of the stair space, the numerous metal railings, the harmonious play of lights and shadows, the curved parts of the staircase and the shop, the protusions that frame the openings and the rounded corners. On the other

hand, the proportion of the volumes and their division according to the functions for which the villa was built is rationalist: house, ceramic laboratory and adjoining shop to display and sale. In 1930, he wrote to his friend his testament about his own theory of architecture: "Architecture is beautiful and superior to the other arts, because it creates living and harmonious organisms in everything... The design of the new Mazzotti factory is of a modern and futurist style, but of a futurism of which we should not be very frightened because "we are very, very far from Prampolini's futurism". In our design there is only "simplicity, logic, proportion, economy", the rest is harmony and good taste" (Belloli, Pinottini, 1987, pp.7-14).

The colors suggested by Tullio (artist and ceramist of great cultural allegiance) stand out unusual on the Ligurian promenade even nowadays: they were inspired to Nicolay by the beach and the marine location for the choice of colors, but also by the ceramics by Albissola. On July 26th, 1932: "I chose three tones: straw yellow (almost white) for the front of the shop that stands out well in the plastic complex of the house that is in blue gray color instead, on which the tower of the staircase is painted all in earthy yellow or vice versa, and fits in the central block" (Belloli, Pinottini, 1987). The book by Fillia in 1932 (Colombo, 1931, pp. 68, 73, 75) reports the name Diulgheroff several times.

5. Color by Alberto Sartoris, futurist, rationalist and functionalist architect

Alberto Sartoris (Turin, 1901-1998) rationalist architect, then functionalist architect, has a profile with strong traits linked to the Futurism. He trained in Switzerland, at the *École des Beaux Arts* in Geneva, he made his artistic debut as a painter, continuing his studies in Paris. In 1920 he met Marinetti in Geneva, became his friend as well as his Futurist disciple [10]. Together with Terragni, Figini, Rava, Pollini, Frette and Larco (il "Gruppo dei Sette"), he signed the official Manifesto of Italian Rationalism, which later became the Italian Movement for Rational Architecture (MIAR).

He adhered to Futurism according to a free, independent relationship, with numerous architectural designs and to the editorial staff of the periodical "La Città Futurista". He took part to represent Italy at the International Congress of Modern Architecture in Switzerland in 1928 (a conference directly influenced by Le Corbusier), and in the same year he participated at the 1st Exhibition of Futurist Architecture in Turin. He was friend with Le Corbusier and Alvar Aalto and Gropius (with whom he developed the study of a new architectural language

based on geometric form as an absolute and structuring value).

He published in 1930 a monograph about Antonio Sant'Elia. In the 1941 he joined the "Gruppo primordiali futuristi Sant'Elia" proposed by the philosopher Ciliberti, and conceived as intellectual coordination in the field of "modern" art.

He punctually takes up the fundamental themes of the way of thinking and chromatic project, ranging from theoretical aspects to project practice, even in the architectural interior, as a lucid critical filter in his volume dated 1990: *Tempo dell'Architettura* (Sartoris, 1990) (to be compared, moreover, with his founding *Encyclopédie de l'Architecture Nouvelle* dated 1948) (Sartoris, 1948). These are the topics dedicated to the theme: Polychrome dynamism, Mystical measurement, Science and measurement of color, Polidimensional exaltation, Fourth dimension. In the first case, the "Mystical measurement" (referring to places of worship), it requires psychological colors in his opinion. "The functional windows - he says - will therefore be formed by special superimposed glass, engraved, doubled, screwed, frosted, silvered, gilded, with new mixtures, and realized with the tones of the most audacious polychrome theories" (in this regard, note the very important and conclusive experiments by the Hungarian painter Ladislav Moholy-Nagy and those by the German painter Josef Albers, with the implied theoretical implications)". In the chapter on Science and Values of color, he agrees with Ugo Maraldi (Maraldi, 1943), who examines colors and shapes of sounds studying the prodromes of a new art for a future man, according to «images created by the alchemy of words and visible harmonies of musical chords» (Marotta, 2019).

In Sartoris' way of thinking and project, in his systematic and complex vision of color, a strong character component is the relationship between his futurist training and the Neoplasticism. The in-depth knowledge of the elementary architecture and of the neoplasticist pictorial field, offered to Sartoris the starting point for a thorough investigation of the relationship between architecture and color. In the unique issue of *Circle. International Survey of Constructive Art* (Sartoris, 1937) published in London in 1937 by J. L. Martin, Ben Nicholson and Naum Gabo, Sartoris published a piece entitled *Color in interior architecture*, not sufficiently considered by critics yet. The focus is on the need to reintegrate color in the interiors of the new architecture, putting an end to the reaction against the Nineteenth-century abuses, which determined the monochrome of modern architecture in its first phase (Sartoris, 1937, pp.212-214).

Sartoris also talked about it in its application forms: "my other experiences concern a different method: the neoplasticist procedure. It treats the same wall with various colors (always joined together by grays, whites and blacks), while preserving the specific character and destination of the environment, accentuating it or transmuting its correlations if the architecture requires it. In this case, I prefer to use pure, fundamental colors, such as yellow, light and dark turquoise and red, when the dynamic method uses all the known ranges of colors and those that the invention preconize" (Sartoris, 1937 and Sommella Grossi, 1993).

From the chapters on Polydimensional Exaltation and the Fourth Dimension, Sartoris confirms some concepts: "in the neoplastic compositions, which pursue, for example, the aim of constituting the joyful atmosphere of a specific environment, with the use of pure fundamental colors, together with whites, blacks and grays, the functions to be represented plastically are very different. The very function of the local no longer requires complete, absolute unity, but the dismembered, fragmented, diaphragmatic faction. It is for this reason that the composition made with turquoises, yellows and reds (which can also be represented by plastic materials or with artificial light effects) combined in relatively small dimensions, but in numerous quantities, has been treated by categorically breaking the bare walls, while not destroying the volume". Here too, the reference (among other things) to Rietveld, van Doesburg and Mondrian is evident.

However, Sartoris' interest in Neoplasticism (with the desire to confront with van Doesburg in particular) is also reflected on a speculative level regarding the influence of Futurism on Rationalism (concerning Italy). The complexity of the relationships between the various spheres of the international avant-gardes is based on constant confrontation and intellectual speculation. In this regard is exemplary the much debated question of the Futurist contribution to Italian Rationalism, in the light - in particular - of the essay by Sartoris, sent to van Doesburg, *Le Rationalisme italien* (1929), whose manuscript is kept at the van Doesburg Archive (L'Aja) (Pianzola, 1990 and Sommella Grossi, 1988).

6. Critical and comparative synthesis: similarities and differences

In the awareness of the different positions, in the developments of the various movements over time, we can summarize some possible general terms (if not real parameters) for a first comparative synthesis: chromatic

theories, "chromoplastics", pure color (also called "spatial color" by van Doesburg), "chromatic axonometries".

In a first hypothesis of comparison - towards possible analogies and discrepancies - it is possible to confirm the relationship with colour theories as a basic parameter: Itten (especially for Diulgheroff, (Marotta, 1999, pp. 31, 76), and in the "anticipatory experiences" of Rietveld); Ostwald (at which van Doesburg adheres to); Goethe and Albers (favored by Sartoris).

Furthermore, for van Doesburg and Sartoris, a substantial convergence is confirmed in the deepening of contemporary studies and research in the optical field and in the psychology of visual perception [16]. Also in relation to the aforementioned approach, (here obviously in an ex-post reading) the renewed relationship between form, color and structure (also visual) is strengthened in the dimension of the space thought, designed, represented, acted, perceived.

In this sense, a coherent contribution can be found by van Doesburg, in the comparison and application of the concept of "pure" (or "spatial") color, conceived according to a chromoplastic "vision: Teo also hypothesizes "a new way of designing, engaging deeply through color in the relationship of two-dimensional signs with volumetric and spatial reality, against the usual system of tracing the plans, then the sections and finally the perspective facades" (Zevi, 1974) and again affirms: "a balance cannot be found between space and time if not in chromoplastics, that is, in the pictorial composition of three-dimensional space" (van Doesburg, 1925 and Bassegoda Nonell, 1982).

But the same "pure colors" (as understood above) are enriched with wider and deeper values: "Without color, architecture is without expression, it is blind [...] obviously architecture does not become art through the use of color [...] but it is as indispensable to man as light" (van Doesburg, 1925). And van Doesburg concludes that "in modern architecture the surfaces ask to be animated, that is, to be composed with the help of pure color, the color of space" (van Doesburg, 1925). A consequent phase (as a subsequent development) can be identified by the representation of spatial colors in the axonometric dimension, taken not only as a mere graphic tool, but as a laboratory of intellectual speculation for the project. In these applications, similarities and convergences can be found in the visual and chromatic results (shared between Diulgheroff, Rietveld, van Doesburg, and Sartoris) through the intersections (if not real programmatic choices) with the Ittenian contrasts, above all - in the first instance - in the confirmation of pure or "spatial" colors, just mentioned. This is confirmed even more clearly for Alberto Sartoris (fig. 5): whether it is

"chromatic axonometries" (Versari, 1997) or axonometry "as a project" (Reichlin, 1979), or "integrated", according to Besset's thought (Besset, 1992) the color - in the architectural space and in its representation - it lives "no longer on the superficial level of collaboration between disciplines, but on the fundamental level of the fusion of the elements of any creation" (Beguin, Felley, 1992). The documented request for a meeting with van Doesburg (Pianzola, 1990 and Sommella Grossi, 1988) is proof of the extent to which the Turin architect was consensual with Teo's guidelines.

For Sartoris, the integration of all the arts and the various forms of knowledge is valid, but - above all - color "is the fourth dimension of architecture" (Sartoris, 1990, pp. 100-102) which he divides into three approaches: "the first coming from Dutch Neoplasticism and French Purism - mainly used by painters such as Mondrian and Ozenfant - characterized by the exclusive use of primary colors only, combined with white, black and different shades of gray" (Sartoris, 1937). This is the method he applied in the first "polychrome axonometries" from the 1920 (Pianzola, 1990, p.71).

The second "dynamic" method - which can be linked to Le Corbusier's theories and only partially to French Purism - contemplates the possibility of using a wider chromatic range (take for example the Hermitage Circle at Epesses in Switzerland). In this sense, the use of color once again highlights Sartoris's desire to build a "true artwork" through drawing and color, as evidenced by the documentation preserved in the same Club.

Finally, the "functional" method allows the use of the entire chromatic range: the colors must be chosen according to specific psychological criteria (and here the reference to his interest in this type of study - which we have already mentioned is fundamental - also shared by van Doesburg), to generate (also in physiological and perceptive ways) an atmosphere programmatically aimed at inducing targeted sensations according to the intended use in individual environments. As an example, we recall the Morandi-Pasteur house in Switzerland (1935). A long process that is a confirmation of the concept of color as a "fourth dimension", capable of triggering the dynamism and interactivity of the environment, reinforced by the success of his furniture ensembles, to which he had dedicated himself since 1928.

7. Conclusions

In the period we have considered, in a continuous exchange between art, architecture and theories (significant, for example, Itten's experiences are confirmed), color is one of the approaches to better build,

control and communicate (through visual language) structures and harmonies in three-dimensional relationships and in their respective balances in space-time. But that's not enough: it itself becomes a system and mental model structuring the design process in its complexity. From this perspective, architecture becomes an effective and complete expression of all experiences in perfect coherence with the objectives identified by the various authors. Thus, each of them "draws", represents and shares its own "chromatic thought" making it (as Berenson would observe) tactfully palpable, in a "multi-sensory" way, in a new dimension that is no longer limited to "anti-decorative", but almost a "special effect" of

that period: a new, "manifesto ideal", all projected towards the future, from which new questions will arise, for new research, and therefore still relevant. Because, as Zevi observes about Rietveld's chromatic culture, "When a 'linguistic' system is adopted outside the circle of the movement that produced it, by architects of very different sensibilities, it means that it is not a fashion, but a permanent parameter of a figurative culture" (Zevi, 1958).



Fig. 1. Chromatic matrices between Futurist and Bauhaus, theories and practice.

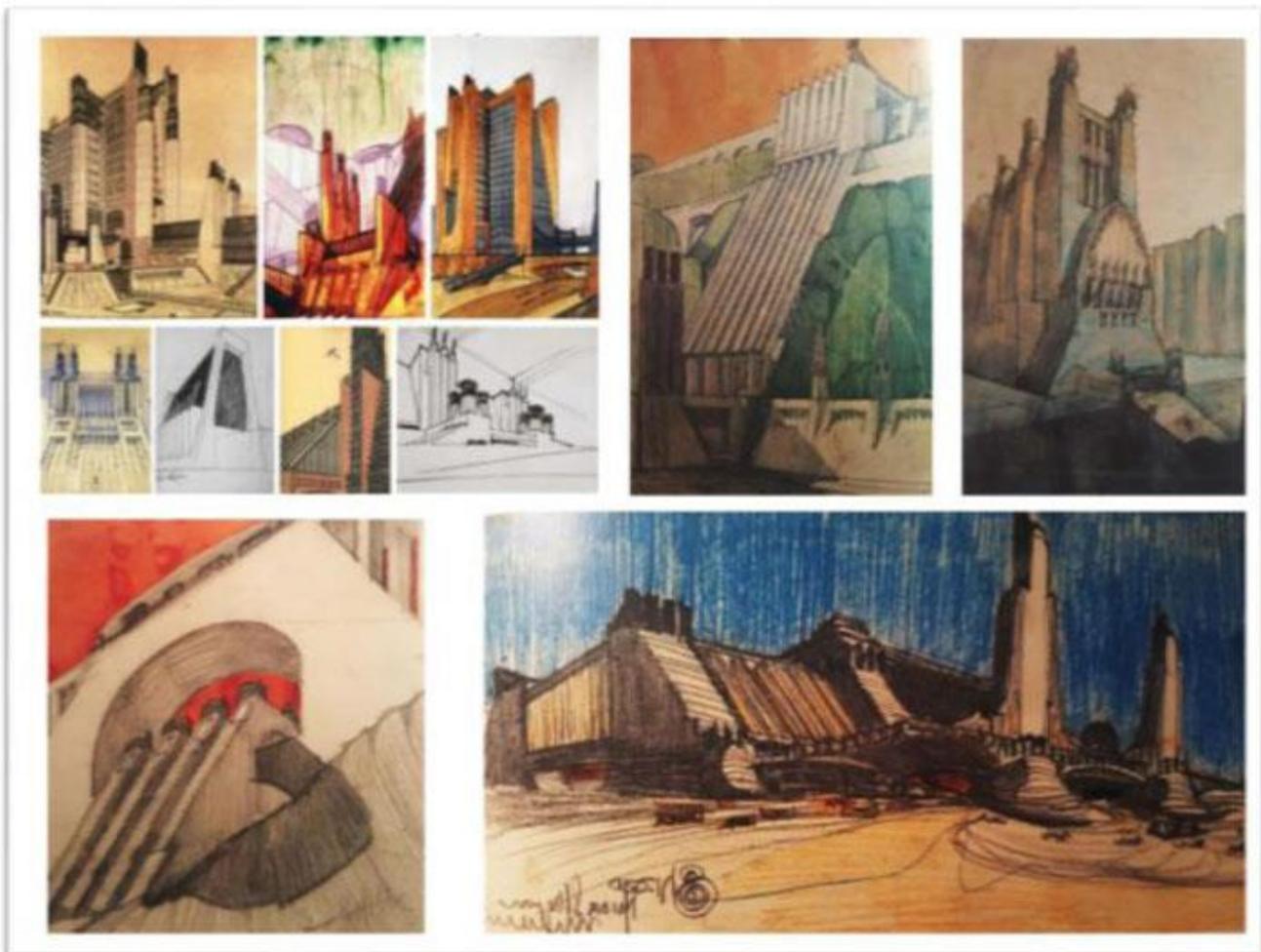
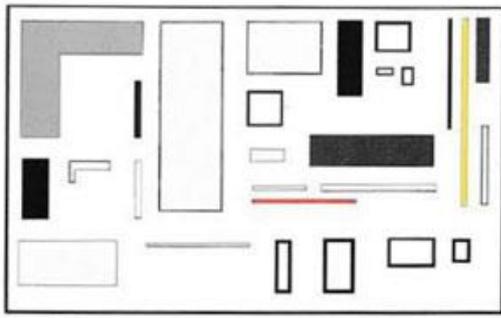


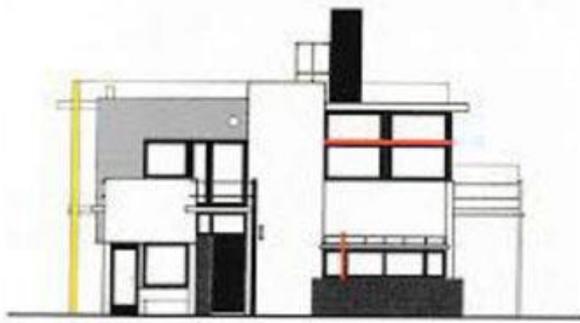
Fig. 2. A Futurist vision: City designs by Antonio Sant'Elia. His Futurist Architect Manifesto (1914) sets forth the principles of this new tendency: the city is placed at the center of interest and conceived as a symbol of dynamism and modernity. Despite the wide and generous use adopted in the representation of his designs, the paper does not explicitly refer to color, nor to its historical and theoretical foundations, nor to the relationship between architecture and color.



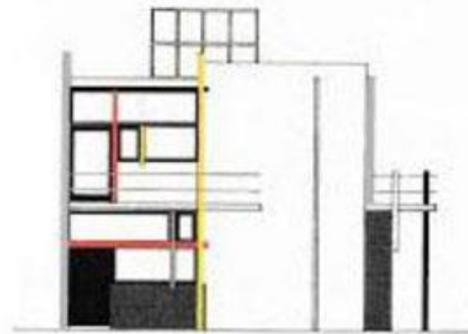
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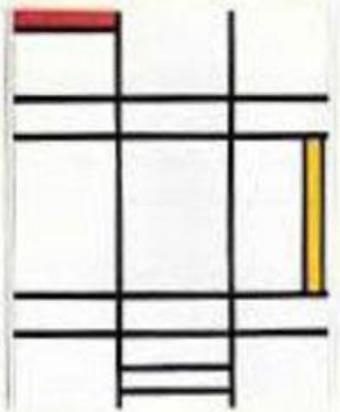
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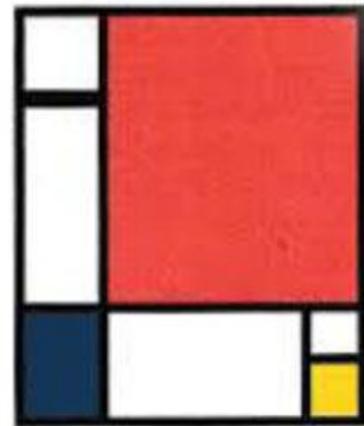
c.



d.



e.



f.

Fig. 3. The neoplasticism of Gerrit Thomas Rietveld in Schroeder House (1924).

a.- Symmetry and repetition. "Instead of symmetry, in the example the architecture proposes the balanced relationship of unequal parts, (by position, measure proportion, etc.) balanced by their functional character. The conformity of these parts is given by the overall balance and not by the equality". (Zevi, 1937, p. 280);

b.-The chromatic system in the building structure. It is often cited as the culmination of neo-plasticism, as a Mondrian painting made in three dimensions: especially from the Prins Hendriklaan side, it reveals many relationships with Mondrian's paintings. But this does not necessarily imply that the building is a translation of a Mondrian in architecture, or that the structural typology and the architectural form depend on uncritical automatism;

c-d-e-f. Exchanges between art, architecture and theories. Rietveld met Mondrian by chance; but in 1918 in the red-blue chair Rietveld had combined lines, primary colors and planes in advance of Mondrian's works of that period. Analyzing the works of Rietveld and Mondrian, we realize that the situation is more of confrontation than of influence; (e) Mondrian, composition with white, red and yellow 1936; (f) Mondrian, Composition with red, yellow and blue, 1926.

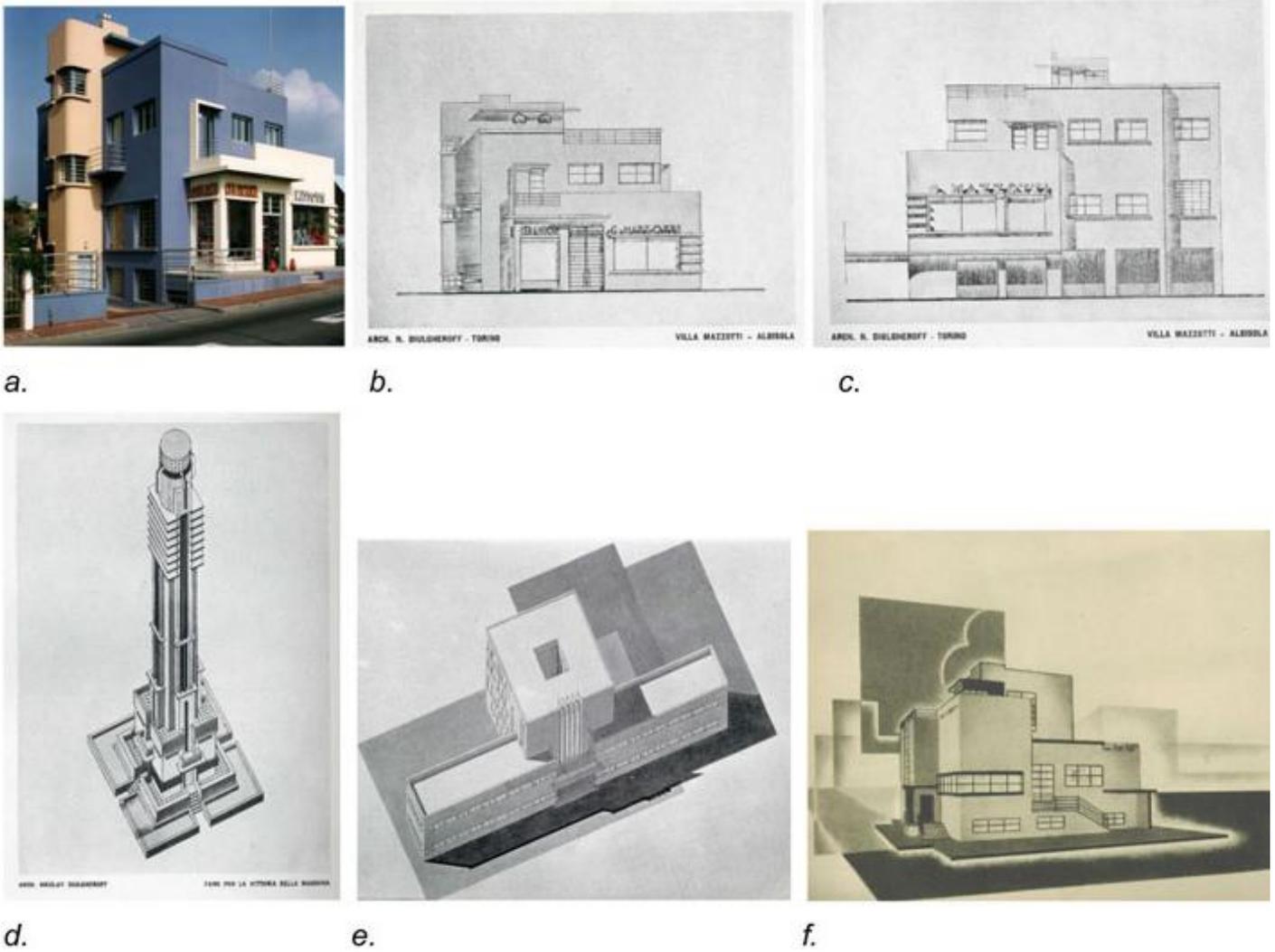


Fig. 4. Color by Nicolay Diulgheroff's futurism (by Fillia, 1931; by Marotta, 2019).

a. - Villa Mazzotti - Albissola - photographic view and façade (Marotta, 2019);

b. c. - Villa Mazzotti - perspective drawings;

d. - "Lighthouse for the Victory of the Machine" - axonometric projection;

e. - Design for a High School, axonometric projection;

f. - Villa Cittadina - perspective drawing.

The colors suggested by Tullio Mazzotti (artist and ceramist of great cultural allegiance) stand out unusual on the Ligurian seafront still nowadays: they were inspired to Nicolay by the beach and the marine location for the choice of colors, but also by Albissola's ceramics. "I chose three tones: straw yellow (almost white) for the front of the shop that stands out well in the plastic complex of the house, in a blue gray color instead, on which the staircase tower is painted all in earthy yellow or vice versa and fits into the central block". July 26th, 1932. (Belloli, Pinottini, 1987).

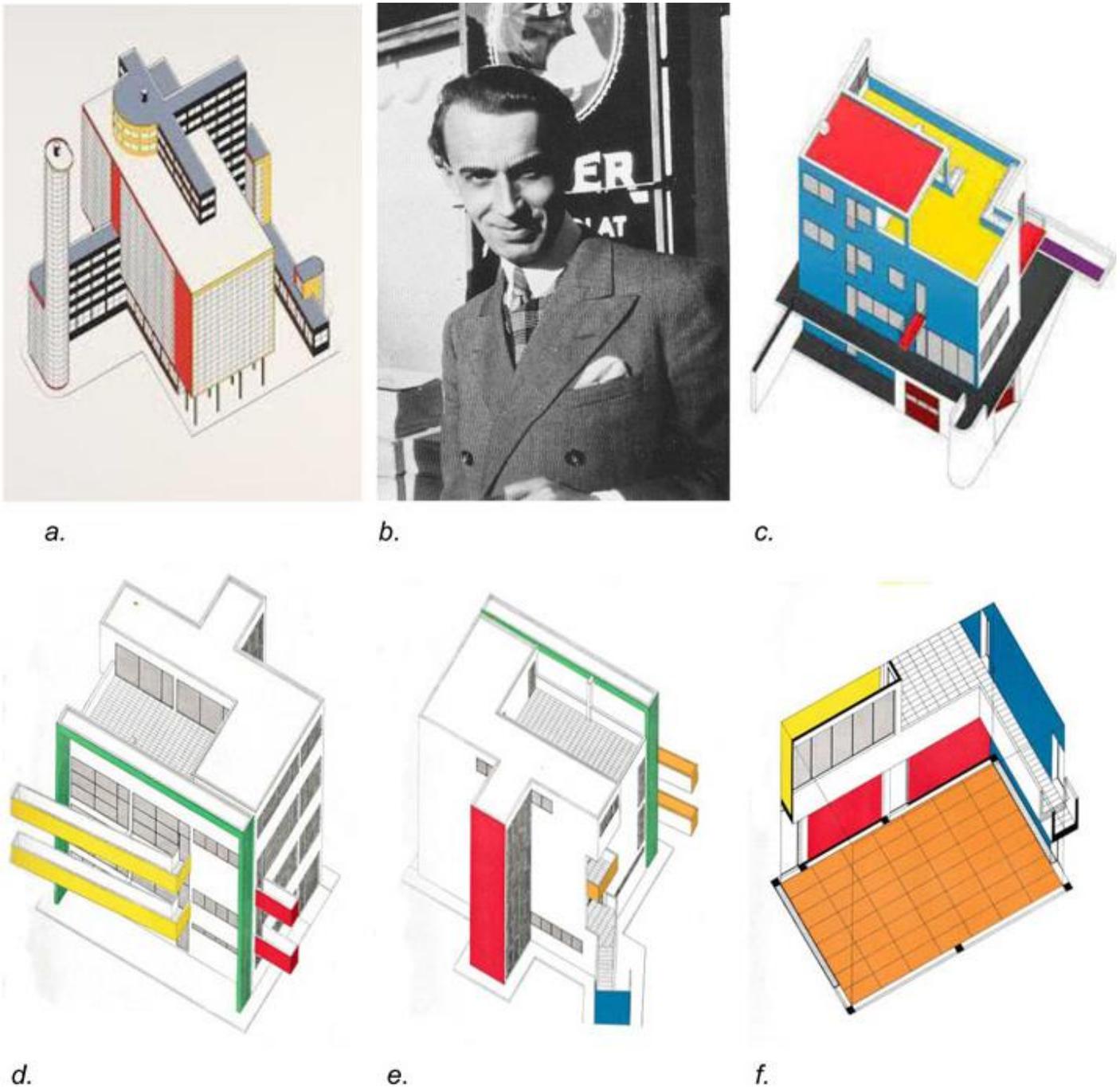


Fig. 5. Color by Alberto Sartoris, futurist, rationalist and functionalist architect.

a. - Cathedral Notre-Dame du Phare, Fribourg, Switzerland, 1931

b. - Picture of Alberto Sartoris;

c. - Villa for Romain Brun, Lausanne, Switzerland, 1934 (by Cristiano);

d. - Residence d'un architecte, side South East East, Florence, Italy, 1942 (in Sartoris, 1948).

e. - Residence d'un architecte, side North-West, 1942

f. - Residence d'un architecte, Interior details of the atelier, 1942.

For Sartoris - above all - color "is the fourth dimension of architecture", which he divides into three approaches: "the first coming from Dutch Neoplasticism and French Purism; second "dynamic" method (linked to Le Corbusier's thinking); finally, the "functional" (based on specific psychological criteria) allows the use of the entire chromatic range.

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9. Conflict of interest

The author declares that nothing has affected her objectivity or independence in the production of this work. There are no actual or potential conflicts of interest, including financial, personal or other relationships with other people or organizations.

10. Short biography of the author

Anna Marotta Architect, Full Professor of Representation at the Department of Architecture and Design (DAD) of Politecnico di Torino. Ph.D in Conservation of Monuments. For years she has dedicated his interests to surveying, reading and communication (in a cultured and specialized sense as the result of the culture of vision) of architecture, cities and landscapes, even in the most up-to-date events, including those relating to color treated according to the "comparative theories". She is the author of many publications on the topics of his research, many of which are recognized in Research Projects of National Interest. She teaches - even internationally - disciplines related to drawing and representation fields, including Visual Communication, Laboratory of Drawing and Architectural Survey, Atelier of Representation and Project, Drawing from the True and the Imaginary. Since 2012, she is a member of the Scientific Committee of the Gruppo del Colore and she is a member of the Presidential Committee of the Associazione Nazionale Colore.

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