

COLORS IN CONTEMPORARY ARCHITECTURE

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ABSTRACT

The purpose of the research is to study the way colors contribute to architectural form and space building and how color schemes correspond with inhabitants perception. Three famous buildings are analysed in the means of the way color serves the main designer idea.

KEYWORDS: color design, color scheme, architectural design, color in architecture

INTRODUCTION

“Architecture is a fact of art, a phenomenon that arouses emotion, beyond the problems of construction, beyond them. Construction is to hold up: Architecture is to move.”

Le Corbusier, *Vers une Architecture*.

Architecture, as a creation of space, has an impact on man and provides feelings. Without human perception, architecture is meaningless. Architecture emerges with volumes, atmospheres, textures, ... and color. Since ancient times, color has been associated with buildings, for centuries architecture and colors have been intertwined.

How do color and architecture interact? What does color bring to architecture? How can it change the space?

Impact on human emotions

Color in architecture affects not only the appearance of the object, the environment, but also mainly the way the room and architectural space are perceived by humans. The color scheme of the interior and the facade of the building affects mood, psychological state, emotions, feelings. Some colors help you relax, calm you down, others help you focus, activate brain activity, and others improve mood and increase appetite.

Color in architecture is also directly related to light. Indeed, it is not only a hue, a clarity, a saturation, it is also a matter and a light. Without light, there would be no color. And color vision is directly dependent on light (Figure 1).



Figure 1: interior color design in warm colors feel cosy and friendly

MODIFICATION OF SPACE

It is well known that a white volume will appear larger than a black volume. This is the phenomenon of irradiation. It is possible to play with color to sculpt the space. As sculpture needs light to show all the volumes of a work, architecture needs light as well to reveal her shapes. The light in architecture allows to sculpt a room, a space. It allows to show the texture of a wall, to make a room looks bigger than it is, to hide or to highlight an element. It then makes it possible to organize, structure a space, play with volumes. Color creates perspective, shapes volumes.



Figure 2: Sculpting a volume : Black / white

Color also helps to mark the identity of a space. It allows you to read the identity of the building, its function. It allows to divide volumes, to read a facade. As an architecture can have many functions, the use of lights depends on this function. Diffuse and warm light will be used in a library, but a strong and white light in a bank (fig.3). The society expects a special light (and ambiance) in function of the use of the space.



Figure 3: Different functions : Library / Bank

The Serpentine Gallery

Jean Nouvel uses the same bright shades for the tenth temporary pavilion of the Serpentine Gallery, in 2010 in Kensington Gardens, London. In this case, however, red is chosen as the representative color of the city, such as telephone boxes, double-decker buses and doors of the houses of the English capital.

The color scheme of the fiery red pavilion, so lively and intense, creates strong contrast with the green context of Kensington Gardens in which it is inserted. In the pavilion, the temporary architecture is designed on contrasts: between the light material of the roofs and the concreteness of the metal of the structures, between the geometry of the fixed panels and the mobility of the canopies, between the green of the park and the red of the structure that stands out, to pay homage to the city. For both the Red Kilometer and the Serpentine gallery, architect Jean Nouvel uses color as an element integral to the architecture of the building, color as a means capable of arousing surprise and emotions, elements main aspects of architecture (fig.4).



Figure 4: The Serpentine Gallery

The Didden Village

Rotterdam studio MVRDV (Winy Maas, Jacob van Rijs, Nathalie de Vries), design team important in the evolution of architecture in recent years, it uses the colors in a symbolic and experimental way they become a hallmark of the simple volumes of their architecture. An example is the “Didden Village”, a project by building extension of a traditional terraced house of the late nineteenth century, which involves the overlapping of two volumes of elementary: two concrete parallelepipeds painted blue with a pitched roof, without decorations or signs of a break, eaves, or overhangs between surfaces. The provocative project is the declination of the reflections on the city of Dutch designers, the declination in the architecture of some ideas conceived for the urban scale.

Through the two volumes emphasized by color, the designers speak of a "crown on top of the monument", the crown is represented by the new traditional construction and architecture is the monument. The crown represents the possible prototype for a new type of expansion of historic cities, an evident architectural element that adds to the urban fabric existing. The oversized dimension, the almost sculptural plastic processing, make this project like an out-of-scale design object, a postmodern element between classic and vernacular, where architecture plays with chromatics of volumes and surfaces. In this project, the Dutch studio denotes a skillful ability to design with two complementary colors: a cold blue for the exterior and a warm red for the interior spaces. The blue color of the external volumes seamlessly shapes the building as if it were a model, a study model rather than the result of construction (fig.5).



Figure 5: The Didden Village

Le Centre Pompidou

Scientific and technological innovation, in the seventies, had a great impact on society, insinuating in people's minds that more and more could be achieved with technological development. Technological tools became more and more common in the sight of people

thanks to the increasingly frequent use of escalators, television screens, headsets, and structures insight.

Thus, with the Center Pompidou in Paris, built by Richard Rogers and Renzo Piano in 1971, High Tech architecture was born, based on the rupture of the previous urban fabric, on the aesthetic value of technological systems, and the decontextualization of the works, a principle very close to the objective movement. The Center Pompidou is in the eighteenth-century Parisian fabric, in an old parking lot, occupying only half of it, thus creating a square where it was not. The building is out of scale, not very harmonious with the context, and characterized by a huge steel structure, which required the use of beams even more than thirty meters long, transported at night so as not to hinder the neighborhood road routes.

For the Center Pompidou, a cultural center wanted by George Pompidou, a competition was held in which about eight hundred architects and engineers participated. The commission, formed by Jean Prouvè, Philip Johnson, and Oscar Niemeyer, chose the project of the two young people Rogers and Piano, allowing them to become two new star architects, as well as supporters of the High-Tech movement. The structure, containing bars, cafes, libraries, and museums, shows very particular elevations: the main one, managed by steel beams and bracing, is centered on the transparent cantilevered escalator, supported by steel tie rods, an element with an aesthetic value that qualifies the architecture, made of Plexiglas, capable of giving the visitor a suggestive view of the square in front of it and a good part of the surrounding Parisian fabric. On the rear elevation, however, the braces are hidden by the pipes of the technological systems, painted in different shades depending on their function. The pipes are made of plastic, a new material which, with Piano and Rogers, immediately assumes an aesthetic and linguistic value. Finally, one of the side elevations, the one overlooking the Stravinsky Fountain, characterized by works by Jean Tinguely and his wife Niki de Saint-Phalle, shows the thickness of the facades, the shadow of the long access ramp, and the enormous anti-seismic structural nodes, about six meters long. For the entire project, Rogers and Piano made use of the engineering firm Novi Arup and the figure of Peter Rice.

The strong presence of color is one of the key features of the Centre Pompidou's architecture. Four bold colors, blue, red, yellow, and green, enliven its facades and outline its structure according to a color code devised by the architects:

- **RED:** pedestrian walks (lifts, stairs)
- **BLUE:** air flows (air-conditioning)
- **GREEN:** water circuits
- **YELLOW:** electricity (fig.6)



Figure 6: Le Centre Pompidou

SURFACES AND MATTER

Color in architecture contributes to a greater understanding of the built world that surrounds us, is strongly linked to the context in which it is inserted and to its physical, landscape, and climatic characteristics. Color, surfaces, and matter in architecture have complex compositional values: we observe the application of color as a pictorial contribution on a surface - decorative component of the project or fundamental element of the architectural composition - or the characterization of the building artifact using building materials that already show, by their nature or following specific processing, a surface quality that does not require further treatments. A stone wall, for example, is already materially endowed with its color, character, roughness, or shine acquired following specific processes such as flat chisel, sand, tip finishes.

Other materials, on the other hand, do not have finishing characteristics such as to be left as laid, and others that require protection or surface characterization: an example is a plaster that needs a coloring treatment to conceal the poor liminal quality of the material.

The more conscious design approach to the use of color and material makes the chromatic and material component an important element of the architectural compositional language: colors, materials, and surfaces, their composition and surface treatment contribute in a profound way to define the identity of the spaces and buildings designed. The design choices of color and material options can be dictated by multiple needs: context: desire for environmental insertion, or on the contrary, dissonance with the surroundings to emphasize the strangeness of the building in a context; use of a compositional language as belonging to a current of thought:

- rationalist architecture used white in opposition to the decorative of the architecture of the time;**
- structural: desire to emphasize or differentiate the structural elements from those of infill;**
- characterization of internal and external spaces; functional differentiation of spaces; interaction between volumes, surfaces, and natural and artificial light; symbolic and psychological values that take into account the influence of color on the psycho-physical well-being of people;**
- other arguments that create the guiding principles of the architectural project and that connote the identity of the building.**

Below we see how some designers, unlike others, have preferred to rely in their projects on the purity of materials, colors, and the light that shapes and surfaces. Among these, we mention the architect Luis Barragan, active in the 1920s in Mexico, whose projects embody a sense of profound mysticism arising from large colored surfaces in bright and pastel tones. The volumes and spaces take on a plastic and sculptural identity thanks to the grazing light and the colors give materiality to the rough plastered concrete walls. The result is an architecture immersed in a timeless dimension in which it is light that shapes matter and colors and reveals the beauty of shapes and spaces.

Materials generally have a "selective" behavior and therefore can behave very differently in different wavelength ranges. We are instinctively inclined to judge a material that appears very white "Reflective" and not very "absorbent", and therefore low emissivity and far from black body behavior. This is certainly true in the field of the visible, however, in the adjacent fields, it is not certain that it is. Paintings that they use as finishes for radiators

(radiators), are high-reflective in the field of visible, but low-reflective and therefore high-emissive in the far-infrared, so to favor the emission by radiation. If it is true that the light transmission and reflection factors depend on the distribution of the incident radiation, in the lighting engineering calculations are used fixed reference values, regardless of the spectral distribution of the sources. Only some more sophisticated software partially takes this into account.

Warning: the factors of transmission, reflection, and absorption in English are respectively called transmittance, reflectance, and absorptance: therefore, in the technical specifications of materials or also in the outputs of tools for measurements Spectro radiometric often found "transmittance", reflectance "or" reflectance "ed" Absorbance". Although incorrect, this is also spreading nomenclature and therefore it is necessary to pay attention to what is being considered.

Regardless of the effects produced by the context and the adaptation, the colors of the objects derive from the spectral characteristics of the light that affects them and from the monochromatic properties of absorption, reflection, and transmission of the objects themselves. The objects on which the light affects reflect, absorb, and transmit radiation as a function of the wavelength. The spectral composition of the radiation coming from the object stimulates the human visual system to different degrees.

The perception of color, as already stressed, also depends on the context, and this also includes the observer himself, whose visual system can be in different conditions of adaptation. The two most important theories that explain color vision are the trichromatic theory of Young and Helmholtz and the process of color opposition developed by Hering. Thomas Young hypothesized that color vision depends on three types of photoreceptors (cones) located on the retina, based on the techniques of mixing pigments, used by painters, which allowed the creation of a wide range of colors starting from three colors " primary ".

In the architectural field in recent years the study and research of textures, designs, and textures have intensified, to be able to thoroughly investigate all its chromatic, aesthetic, and compositional possibilities of materials and surfaces. In this regard, there are contemporary cases of architectural creations in which the treatment of surfaces is more researched than pure architectural chromatics. In his architecture, the concrete walls are dematerialized by the light that draws their shape and profiles thanks to the chiaroscuro effects. Tadao Ando's architecture proves to be a perfect combination of pure forms, uniformity of colors, and extreme volumetric lightness.

An example is the Caixa Forum in Madrid, by the Swiss architects Herzog and de Meuron, in which a particular type of steel, Cor-ten, is used as the external cladding of the building. This material is particularly interesting because it changes its appearance with time until it assumes an almost rusty color.

The advantage of digitalization applied to architecture lies in the opportunity to be able to intervene directly and quickly on spaces and buildings, varying both particular and general aspects.

There are also cases in which architecture becomes "intelligent" and can mechanically react to external impulses related to the environment and weather conditions thanks to technological devices. Furthermore, with the recent phenomenon of sustainable architecture, the demand for environmentally friendly and eco-sustainable materials capable of protecting the environment and ensuring a lower impact on the environment has increased.

The awareness of the importance of the environment that has spread in recent years has led to the reduction of consumption and energy savings using new technologies and alternative energies and preferring natural materials, eco-compatible par excellence.

THE COLOUR PLAN

In Italy exists a particular kind of Urbanistic Plan called “The Color Plan”. It is a tool that the Municipality equips to coordinate the maintenance, restoration, rehabilitation, and renovation of the external surfaces of buildings of historical, artistic, and environmental interest and historic centers. With the Color Plan, interventions on the coloring of external facades that look towards streets or squares and those relating to internal courtyards and surrounding walls are regulated to protect, preserve, and redevelop the building heritage of the city.

The problem that architectural culture is facing today is no longer the expansion phase of the building but the management of the existing building heritage, its requalification in terms of recovery and rehabilitation. The historical environment of our cities has acquired ever greater importance in everyday life as well as in the urban culture. This progressive interest has had as a more immediate consequence better attention to those elements that characterize the city environment; from the statelier aspects of the historical building, we have moved on to understand the historical identity of the city. This involves a profound transformation of methodological, planning, and regulatory tools.

Therefore, alongside the structural recovery of the buildings, the chromatic project of the cities is necessary as a tool for understanding and enhancing the architectural and typological characteristics of the houses. Buildings, streets, squares have always undergone the effects of economic and social changes over time, succeeding, until a few decades ago, in maintaining the pleasantness of their entirety unaltered. The coloring plan is therefore proposed as an element of reinterpretation of the local experience through the interpretation of the urban fabric, the study of its construction techniques, the charm of its facade elements, and its original colors.

The randomness in the use of color has caused and causes serious phenomena of environmental quality degradation. Over time, the quality of heterogeneous colors of chemical composition with almost infinite types of finishes has been added to the original colors. The danger is represented by the careless use of these new resources and by a series of wild interventions of coloring and furnishing now visible everywhere. Therefore, regulation of the chromatic aspects is essential: this is the usefulness of the regulation of the color.

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