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Design by Le Corbusier 1931  
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## Famous architectures in urban contexts: the impact of colours and materials

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### Abstract

Architecture is not just a container or a place in which it is possible to perform functions; architecture is everything that surrounds us, it is the space in which we immerse ourselves and with which we communicate. It is not the shape of the project that first influences our perception of space, whether it is open or closed, but the colours and materials that characterise and define it, making it harmonious and pleasant or, in the opposite way, hostile and inhospitable. In 1981 the UNI 8289:1981 "Construction. Needs of the final user. Classification" defined the term "well-being" as "the set of conditions relating to states of the building system appropriate to life, to health, to the performance of the users' activities", how do colours and materials contribute to the conditions of well-being? Which are the targets that can be achieved through the wise use of these elements?

The aim of this work is to analyse the application of colours and materials in famous architectures in order to determinate the impact at urban and human level, how they dialogue with the context and how they dialogue with human perceptions, identifying three directions of intervention: colour and materials as anthropomorphic relation, colours and materials as pictorial support, colour and materials as function.

**Keywords:** Materials, Colours, Urban Context

### 1. Introduction (MF)

Today, during Covid19 pandemic, the internet page of WHO informes: "The world is facing multiple health challenges. These range from outbreaks of vaccine-preventable diseases like measles and diphtheria, increasing reports of drug-resistant pathogens, growing rates of obesity and physical inactivity to the health impacts of environmental pollution and climate change and multiple humanitarian crises. To address these and other threats, 2019 sees the start of the World Health Organization's new 5-year strategic plan – the 13th General Programme of Work. This plan ensure one billion more people benefit from access to universal health coverage, one billion more people are protected from health emergencies and one billion more people enjoy better health and well-being. Reaching this goal will require addressing the threats to health from a variety of angles with 10 many issues that will demand attention from WHO and health partners in 2019: Air pollution and climate change, Noncommunicable diseases, Global influenza pandemic, Fragile and vulnerable settings, Antimicrobial resistance, Ebola and other high-threat pathogens, Weak primary health care, Vaccine hesitancy, Dengue, HIV.

Starting from 1948, the WHO's goals were "to achieve, by all populations, the highest possible level of health", defined as "a state of total physical, mental and social well-being" and not simply "absence of disease or infirmity". To these principles, we add what the "Ottawa Charter" (1986, first "International Conference for the Promotion of Health") declared and precisely that: "Thanks to a good level of health, the individual and the group must be able to identify and develop their aspirations, satisfy their

needs, change the environment and adapt to them ". Finally, from 2019 the new definition of health WHO also includes "the ability to adapt and manage oneself in the face of social, physical and emotional challenges" or what we commonly call "resilience" today. Therefore, well-being must be understood as the sum of physical needs (thermo-hygrometric comfort, air purity, acoustic comfort, visual comfort, tactile comfort, anthropodynamic comfort and hygiene), but also emotional and social. These assumptions appear fundamental to highlight that the minimum objective of architectural design and territorial planning should be the high level of quality of life of the users who must be guaranteed complete well-being. That said, it is even more evident today how far the problems connected to this objective are wide and interrelated and, above all, how far a conscious management of architectural and urban quality is still far away.

The theme of urban hygiene developed above all in the post-war period when new peripheral residential neighborhoods were designed and the gap between "traditional" cities and their contemporary urban suburbs increased. The new settlements were declared the alternative to the historic centers for the best hygienic and environmental quality: toilets in all the accommodation, openings (windows and balconies) better proportioned with the surface of the internal environments, width of the roadways sized in function of the diffusion of cars and vehicular traffic, attention to the orientation of residential buildings with respect to the sun. In fact, some "experimental" settlements of the 1950s are still valid for the discreet urban quality or for the care of the relationship between the building volumes and the residual connective surfaces, for the attention to green in the areas of public relevance, for the differentiation of pedestrian and vehicular routes, due to the presence of spaces for collective use as well as other elements and technological solutions, on a more strictly building scale, designed to guarantee the well-being in the accommodation. Think of the contemporary rationalist utopia and Le Corbusier's brilliant idea of the "ville radieuse": *unité d'habitation* which concentrate, on a limited urban area, a large resident population who can thus enjoy the natural green space left behind! Remote perception is in the attention of the designer and is made richer thanks to the use of colors that fragment the reading of the large building volumes that thicken thousands of inhabitants; so they themselves can recognize their home, their apartment remotely, albeit in a concrete facade with modular and repetitive elements. Unfortunately, these extraordinary architectural experiments as unique large housing complexes did not have the exemplary character they would have deserved, but they were succeeded by large-scale serial creations that did not have the same design attention to the composition of the apartments and the relationship of the built with the context.

From this evolution of the city, however, our contemporary urban perception arose: the design of the building volumes, which tend to be much higher than those in brickwork, the relationship between the full and empty spaces on the facade and the absence of elements of decorative elements that have characterized the architecture until the advent of reinforced concrete. Precisely the development of the use of this building material has led to a revolution in architectural design whereby the undoubted extraordinary advantage of conceiving a different spatiality, thanks to the plasticity of the material, has led over time to the reduction of the designers' creativity and the affirmation of a serial design characterized by the repetitiveness of the solutions. The decline of decoration in rationalist architecture has, however, sometimes left room for the controlled use of surface color as a characterizing element.

This paper is focused on some interesting cases of collective famous architectures in Europe that we consider influenced by different use of color as a fundamental material in the modern building design: the recent expansion of Reina Sofia Museum (2005) in Madrid, *Maison de l'homme* (1963) *Pavillon d'exposition ZHLC* in Zurich, *Centre Pompidou* (1977) in Paris.

## **2. Reina Sofia: colours and materials in a anthropomorphic relation (PLIB)**

The architect has an intention and pursues a goal when he is doing a project that responds to a first idea, in function of which the materials are decided and determine the colours. What happens with some frequency, is that the perceptual mechanisms of man [1] sometimes provoke unexpected or unforeseen experiences as is the case of The New Wing of the Reina Sofia Museum in Madrid. Red reinforced by the materials used, high brightness and reflectance, is applied in two places: in the large shelter in which colour plays a compositional role, a wake-up call resorting to a traditional use of red colour in Madrid, and the large volume container of the hall. Supposedly, these are the two purposes pursued but the fact is that in the case of the rounded volume, a perceptual experience of an anthropometric nature takes place, becoming the center, the heart of the building; without further explanations, we understand that it is an important place. What happened? The perception that takes place is not a simple perception, as in the case of the huge cover, but it becomes a perceptual experience in which there's a thought involved that stains and permeates our perception. Hence the belief that deep and intense red is the colour of blood is reinforced by the rounded shape of the auditorium container, "sensing" it as a Heart, as the center of the building; beliefs related to the human body, coloured and penetrate perception [2].

## 2.1 Colours (CL)

Extending of the Reina Sofia Art Centre Museum in Madrid is another masterpiece by Jean Nouvel. Initially, there was only one large courtyard building with the function of a hospital, built in the 16th century by King Philip II. At the want of King Charles III, the project for an extension was made by the architects José de Hermosilla and Francisco Sabatini, who took care of much of its construction, but only a third of the project was completed. It underwent many modifications but continued to function as a hospital until 1965, when it was closed. In 1977, it became a national monument due to its high historical and artistic value and in fact, the east façade continues to be the original one interrupted only by three steel and glass elevator towers inserted in the façade during the 1988 restoration by architects José Luis Iñiguez de Onzoño and Antonio Vázquez de Castro. In 2001 Nouvel completed an innovative project that respected the historical architecture to which it was to be attached and connected. He created three buildings under a large roof, shaped as a wing. "A wing in brick red colour, with a slight sheen that provides an imprecise reflection of the museum façade and the trees; a wing under which the sky is revealed in reflections and transparencies; a unifying wing that does not touch the museum, but is rather set back at least a metre to let through a ray of light; a wing whose lower face corresponds exactly with the entablature of the second last floor of the museum. In order to extend, the museum has stretched out a wing: a light wing with the colour of the roofs, protective and sheltering, which shows visitors that the Museum cares for them." [3]. All Nouvel's works have been conceived considering the surrounding environment. For Nouvel the environment is fundamental as it conveys sensations and recalls history and the past and, for this reason, the architecture is a source of emotions and sensations. In order to respect his ideas, in this project, he designs a large red wing that protects visitors but allows them to glimpse the sky as a sign of hope, of a look towards the future. According the architect, colour and its relationship with light are very important. For him colour is a means capable of arousing surprise and emotion, it is a main element of architecture. The colour is not chosen at random but is chosen according to the context. In the extension of the Reina Sofia museum, Nouvel used the colour red a lot. This colour has also been used in his other projects but each time with a different meaning. On the facades of the Kilometro Rosso in Bergamo, red symbolizes the sense of speed of car traffic, in the Serpentine Gallery in London, red is chosen as a representative colour of the city. On the facades and roof of the Reina Sofia, red represents the link with the city, the colour of the roofs the houses in Madrid. This link is increased with plays of reflections and transparencies made of highly reflective materials. Thus the red of the large wing of the Reina Sofia represents the roof of the house of culture and Spanish art, it represents the same security that everyone perceives in their own home in a public place. But the red also represents the colour of human blood, of the heart, because just like a living organism that evolves, grows, the art museum has developed, has grown and with its thousand activities will continue to do so.

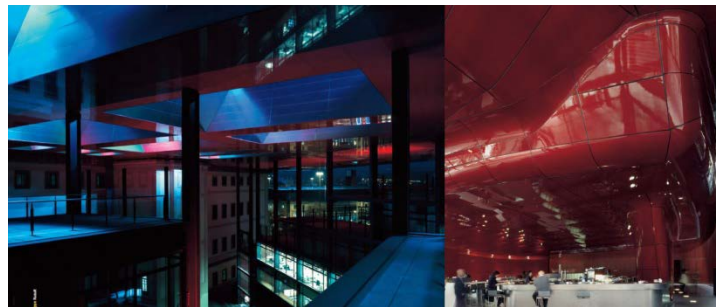


Fig. 1: Light and colours of the big wing

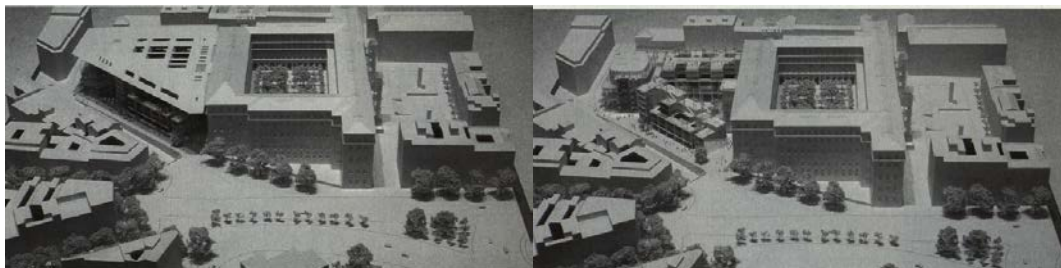


Fig. 2: Masterplan

## 2.2 Materials (GD)

Jean Nouvel's addition project consists in the development of a volumetry that is close to the old museum. Here the materials are both innovative and traditional, in fact, while with the colour it adopts a position of continuity with the traditional roofs of the buildings in Madrid, the choice of fibreglass and polyester as composite material with the application of Gel Coat to make the surface extremely shiny is instead of absolute originality, and characterizes the covering of the auditorium both outside and

inside on the walls and ceiling. This choice is not a surprise, for Jean Nouvel is renowned for his tendency to "dematerialise" architecture. He plays with effects of light, reflections and transparencies, with the aim of creating suggestions.[4] The use of such an innovative material lies, merely from a formal point of view, in the relationship of encounter and confrontation that Nouvel wants to create with the ancient structure of the hospital converted into a museum. In technological and functional terms, choosing this material, together with the characteristic curved lines that define its space and morphology, may not be an optimal solution for the optimization of acoustic performance as analyzed by E. del Cerro and S. Ortiz in a study on the analysis and adaptation of the Auditorium 400, "the whole room is made with the same material that is highly reflective on smooth surfaces, this can cause the sound diffusion is not sufficient to achieve diffuse sound field conditions".[5]

Even the space that hosts the bookshop is characterized by the use of a material out of tradition. With a clear emotional intent, Jean Nouvel creates the cladding with stainless steel panels. The surface, smooth and reflective, strikes the visitor who sees the image of the old building reflected. The aim is once again to contrast "the massive, opaque appearance of the old hospital (the roundness of a simple, orthogonal volume) with the lightness and dematerialization of the new buildings (in which glass is the protagonist in this dissolution of architectural limits) and the recesses of the facades at higher levels that blur the contours"[6].

### 3. Maison de l'homme: architecture as a pictorial support (PLIB)

In the Thesis "Chromatic Tales of Modernity" [7], we looked for the origins and reasons of the use of colour in architecture, how colour disembarks from the painter's canvas to the architect's dashboard and the architectural project. And this process, lead us to the starting point of a new Concept of Colour. Looking in the recent past, the French philosopher Gilles Deleuze [8] locates this landmark change with the appearance of the Pictorial Diagram, in the path to abstraction in art at the end of the 19th century during the so-called Modernity period. That is when both figurative and narrative aspects are drastically transformed, when what is being told cannot be "read" and "seen" literally. Thus, in architecture from the burst of the artist's Intentional Form, colour loses its decorative and symbolic condition and becomes a constructive tool having a key role in the House of Utopia project. Le Corbusier leads one of the purposes pursued with the "modern" use of colour in architecture: he proposes in his treatise "La Polychromie Architecturale"[9], to modify architectural proportions by introducing certain colours whose associated beliefs are manipulating the space. These mechanisms are contained in the Constructive Tabulae, [7], a conceptual device that orders this process. However, another of the purposes in the use of colour, comes from the Neoplasticist group De Stijl, which almost simultaneously to Le Corbusier, intends to use colour as a constructive means of architecture, moving from Mondrian's painting to Van Doesburg's architectural canvas in his Café Aubette. That is, the scale fades, the artist frame is diluted and architecture, a discipline of tectonic support, replaces the canvas of the painter. And this is the purpose of Le Corbusier in his Maison de L'Homme; vanishing the walls, diluting the boundaries of the builded, assembling a frame of structural boundaries to support his "architectural paintings". In short, we talk about a modern use of colour, architecture as a canvas.

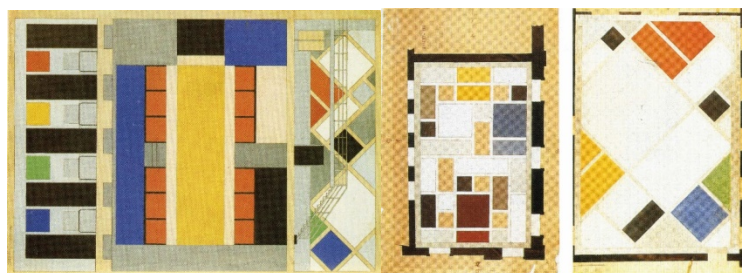
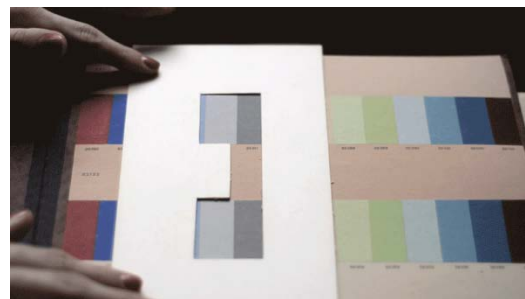
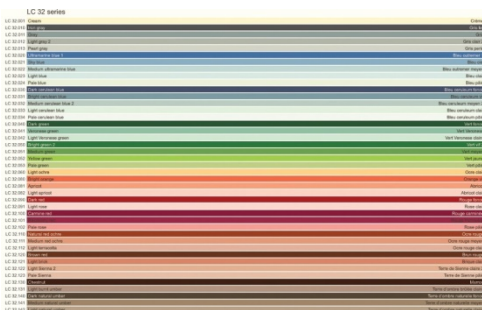


Fig. 3: Café Aubette. Van Doesburg

#### 3.1 Colours (CL)

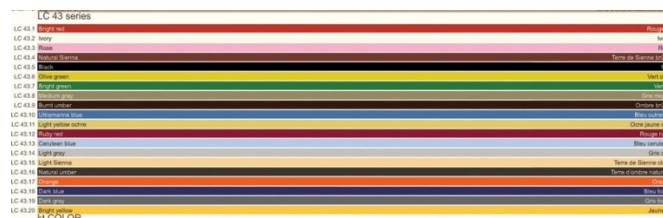
Maison de l'homme designed by Le Corbusier in the park of Zürichhorn (Zurich) and has been completed by two Parisian architects, Taves and Aebutato after the death of the great modernist and purist architect. It is one of the examples of colour used as a pictorial support in architecture, i.e. the surfaces are designed as white canvases and, when it is painted, they must provoke emotions in the viewer. Le Corbusier, as well as being one of the most influential architects of modernism, can also be defined as an urbanist, designer, theorist, writer and painter. In 1921, together with Amédée Ozenfant, he published in their magazine L'Esprit Nouveau, an article in which he called himself a purist, thus creating the current of Purism. The article defined three colour ranges that could be used in painting: the "great range", the "dynamic range" and the "transition range". The first range is composed of constructive and static colours, which give strength and volume; these are the architectural colours (ochres, earths, white, ultramarine blue and some colours derived from these). "Earth colours have

static properties: they represent somehow the force of gravity, the staticity of the vertical structures of architecture. The ultramarine blues, on the other hand, emphasize space, widening its boundaries. The colours of the dynamic and transition ranges, on the other hand, have no architectural or constructive properties". [10] In the second range there are colours such as lemon yellow, orange, vermilion, Veronese green and light cobalt blue. Both in this range and in the last one, the colours do not have architectural characteristics. Le Corbusier, from the very first projects, began to study the use of colour in architectural spaces, what interactions there were and what spatial allusions were caused by colour. Ten years after the publication of the article in L'Esprit Nouveau, he defines for a well-known wallpaper factory, Salubra, a sample book of 43 colours for the creation of wallpapers. The colours "come mainly from the earths-colours and overseas of the "great range", with some additional colours coming from the dynamic range: two English greens, an orange, a blue, a vermilion, a carmine belonging to the dynamic range, plus some neutral colours such as a white and four greys". [10] The colours cannot be chosen randomly from the palette, but are organized in twelve cads, each with a precise name (space, sky, velvet 1, velvet 2, wall 1, wall 2, sand 1, sand 2, landscape, mottled 1, mottled 2, mottled 3). On each card three background colours appear and 14 colours arranged like the "clavier de couleurs", colour keyboards. For Corbusier, the piano remains the best instrument to produce modern music and the link between colours, music and, consequently, emotions is very strong. In order to choose the most appropriate colour he invented special glasses that to isolate some colours close to the chosen background, which determines the setting, so each choice is guided by his wise sequence of colours.



**Fig. 4:** Palette of the 43 colours chosen for Salubra in 1943      **Fig. 5:** Glasses for the choice of combinations

Le Corbusier claims that the use of colourful wallpaperboat paintings instead of paintings represents a technological evolution that makes possible to avoid the modification of the colours on site. Paint become dirty with the addition of white or black and with site dust and other materials. They represent the "great machine of colours" if we can alter a famous phrase by the architect. Ten years after the first sample book for Salubra, in 1959, Le Corbusier added another twenty more intense and dynamic shades to the first forty-three. In fact, his architecture can be divided into two different periods. In the first period, he used colour in a very classical way, he used earth and ochre colours obtained with natural pigments. Light colours have the function of creating atmosphere and are used for structures. Dark colours "create depth, focus attention on beauty and increase the brilliance of white architecture"[11]. In the second period he used much more saturated colours and much brighter and more vivid colours even in the facades of buildings, creating colours with chemical pigments. He surpasses the ideas of the first period by using materials such as glass, bricks, rocks, wood and raw concrete for the functions performed first by light colours and then leaves "the dynamic and transitory, decorative functions for colour"[11].



**Fig. 6:** Palette of the 20 colours added for Salubra in 1959

In the Maison d'Homme, colour together with innovative materials change the perception of space. The building, immersed in the greenery of Zurich's park, stands out thanks to the skilful use of saturated, dynamic and brilliant colours. The structure made up of two juxtaposed umbrellas, forming the roof, is painted light grey on the outside to emphasize the lightness and, on the hottest and clearest days of summer, to confuse the building with the colour of the sky. This colour, taken from the first colour palette chosen by Le Corbusier for Salubra, was chosen to highlight the constructive

functions of the element. Underneath, in the intrados, white, the colour that contains all the others, is alternated with red at the entrance, which affirms the size of the sloping floor, and with green in the part that covers the terrace on the top floor it creates a free atmosphere that looks towards the sky. The building is composed of modular metal elements and panels. These are either transparent, glass that lets light through and shows the activities inside the structure, or coloured panels. The colours used are red, yellow, green, black and white, whose arrangement seems causal at first, but if you look closely, you can see that the colours alternate on the façade and are always interspersed with the white used as a separating colour, it reflects the light and shadows of the surrounding landscape. The complementary colours are always arranged in the same direction; in fact, the coloured panels are arranged forming either vertical or horizontal bands marking a rhythm on the façade. The vertical stripes invite us to enter, the horizontal ones to look towards something or highlight once the floor socket and once the attack on the sky. Inside the building, the colours are left to the materials used, grey for the reinforced concrete stairs, warm beige-brown wood used for the panels, black slate stone for the floor. The chromatic component helps to modify the understanding of the space, dilating or reducing it according to its arrangement on the panels and, as Le Corbusier himself writes, the colour is conceived as "moyen énergétique de la composition architecturale".



Fig. 7: Interior and exterior of the Maison de l'Homme

### 3.2 Materials (GD)

The Heidi Weber Museum, or Maison de l'Homme, is characterized by a choice of materials outside the usual schemes; in fact, it is the only building by Le Corbusier built with a metal structure.

The Maison de l'Homme, conceived as an exhibition pavilion, consists of independent bolted steel structures. The composition for cubes is defined by steel metal pillars, glass surfaces and enamelled sheet metal panels whose sealing is guaranteed by the use of neoprene joints, and follows, dimensionally, the proportions designed in the modulator. The only element that remains faithful to the Le Corbusian "beton brut" is the external staircase, made of exposed reinforced concrete in a handcrafted manner, thus departing from all the other elements, resulting from industrialized production [12]. The angular profiles characterizing the seaming sheet metal structure, were patented by Le Corbusier himself in 1953 with the name "226 x 226 x 226", they are used both as uprights and as crossbeams and define the internal core of the modular structure.

The materials chosen aim to create a work of Art in every aspect: on the outside the blind elements in enamelled sheet metal dialogue with nature, on the inside the glass volumes respond perfectly to that skilful play of volumes under the light so dear to Le Corbusier.

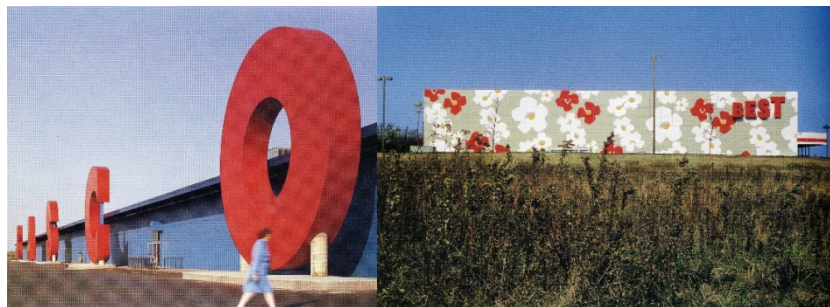
Light enters through the square glazed surfaces of the east and west facades and from the top, through a welded sheet metal roof characterized by an independent steel structure. The roof, in the shape of an inverted classic tympanum, is the result of Le Corbusier's studies on the ideal museum; the idea is to create two opposing parapluie-parasols that act as a great element of protection against solar radiation. The paint used for the finishing of the roofing element caused several problems due to the presence of PCBs (polychlorinated biphenyls); removed and replaced during the restoration work by Arthur Rüegg and Silvio Schmed[13].

Simon Marius Zehnder, Director of the Le Corbusier Pavilion in Zurich, explains: "The pavilion on the Zürichhorn, Le Corbusier's latest work, sums up all the theories of the Swiss architect. He himself described it as the most daring of his architectural projects. Visitors to the building are surprised by the dialogue between space, light, reflections, materials and colours. Inevitably one is led to reflect on the statics and construction techniques of the time, on how far ahead of his time Le Corbusier was and how current his work is". [14]

## 4. Centre Pompidou: colours and materials as a function and communication (PLIB)

According to vision and colour researchers, Professor E.Hita Villaverde and J. Lillo Jover [15], colour is the first thing we appreciate and see with our physical eye, rather than shape and size. It is the call

for attention par excellence that occurs both in the natural world and in the builded environments. On the other hand, in the commercial field the colour expert, Karl Bertilsson, NCS Creative Director, states that color determines up to 70% of the choices we make related to products purchase. All this allows us to consider chromatic codes as effective signalling and a communication media. Let's remember some of the most common applications: from the Metro networks of the big cities, of which we tend not to remember the names but always its colours, to the taxi and the signs of the roads and cities. In short, chromatic codes are effective and widely used. The novelty lies in the place where this communication system is applied: Rogers and Piano take the industrial references of colours – fig.7-, the conducts of the installations are "taken" from the guts and positioned on the facade, creating a double Reading: one related with the composition through pipes, their rhythms and orders, as well as a second through standard chromatic codes. We are facing the use of architecture as a means of communication, albeit in a rather subtle and industrial way. If we look at our recent history in search of a precedent, the first architects who proposed to use architecture as a means of communication through color were the Americans Venturi and Rosch. In "Leaving Las Vegas"[16], they revolutionize the purpose of architecture, its formulation and the application of color, for the sake of its communicative capacity. Suffice it to think of the Basco department store. As developed in the thesis "Chromatic Stories of Modernity"[7] when the purpose of architecture is communication.



**Fig. 9:** Basco store. Venturi and Rosch. 1973-79

#### **4.1 Colours (CL)**

In rue Beaubourg 19, in the heart of Paris, where less than a century earlier there were only narrow streets separating wretched houses, a new building, Centre Pompidou, was inaugurated in 1977. It contains a large public library, the Bibliothèque Publique d'Information (BPI), the Musée National d'Art Moderne and the IRCAM, a centre, the latter, dedicated to music and acoustic research. It is one of the buildings that has changed the face of Paris. The French President, George Pompidou, created a major public competition in 1971 to create a building that was to be a work of art itself. The project by Renzo Piano and Richard Rogers won and they, later, helped by engineers Edmund Happold and Peter Rice from Ove Arup & Partners. Their project was selected among 681 others and it was the most provocative and avant-garde of all. As the New York Times reports, the design of the center "overthrew world architecture". The building occupied only a part of the area assigned in the competition because the rest of the area was used as public space, thus creating a direct relationship between the building, the neighbourhood and the city. The building was intended as a big giant machine, it was completely open and permeable, you could look outside in and from the inside out. It was built with a prefabricated metal structure. The load-bearing structure of the building had been brought to the façade to leave the floor plan free so as to guarantee maximum flexibility inside and maximum transformability of the spaces. For this reason, on the facades there is not only the structure but every element that had taken up space inside the building: plant ducts and vertical connections. So what makes this building unique are the facades. These are emphasized even more by the colours chosen for the elements that make it up. The rectangular building has two main facades facing Rue Beaubourg and Place Georges Pompidou. On the first one, all the installations are displayed, each one characterized by a specific colour: blue, green, yellow, red and white. The other facade is entirely crossed by a handling system, the escalators and, therefore, marked by a single colour. Since the Centre Pompidou was conceived as a large work, as such, each element has a function and these are marked by colour. Each element has a very specific colour with specific meanings. In this case, the main elements of the work of art are the installations. Blue is the colour of the air conditioning system. This colour was established by the UNI 5634:1965 standard, later replaced by UNI 5634:1997. With this standard, the colours of the pipes carrying liquids or gases at sight are established to make them recognizable in case of failures or leaks. Green is the colour of water, also established by UNI 5634:1965. The yellow colour has been assigned to one of the most important installations, the one that makes the entire centre work, which allows communications, safety and every activity, the electrical system. In the houses usually this system is characterized by a series of colours; it is the most coloured system of all. Each colour corresponds to a cable with a specific function. In this case



the yellow colour has been chosen, which has a generic function within the electrical system. The red colour is the colour of the circulation, of the movement assigned to escalators and lifting systems. This has a very strong symbolic meaning because "it is the colour of blood that, circulating in the body, brings life. Here we find an important idea of the project which is to create a meeting place between the public and culture: the public circulating in the caterpillar, like blood in an artery, brings culture to life". [17]

FLUID SERVICE	COLOR SCHEME
Fire quenching fluids	White on Red
Toxic & corrosive fluids	Black on Orange
Flammable & oxidizing fluids	Black on Yellow
Combustible fluids	White on Brown
Potable, cooling, boiler feed, & other water	White on Green
Compressed Air	White on Blue
Defined by user	White on Purple
	Black on White
	White on Grey
	White on Black

Fig. 10: Colour scheme of external pipes carrying liquids or gases



Fig. 11: facade on rue beaubourg



Fig. 12: Facade on Place Georges Pompidou

#### 4.2 Materials (GD)

Renzo Piano and Richard Rogers' project, inaugurated in 1977, is an admirable example of HighTech architecture. The building is characterized by an external structure of fourteen cast steel portals and a transparent skin that reaches a height of 50 m with a spacing between the floors of about 7 m, each portal is flanked by two columns full of water for reasons of stability and fire safety; the most characteristic element, which identifies the building in the popular imagination, is the installation system placed on the façade together with the stairway system. The reasons that guided the choice of materials are to be found in the functions that this building is called to perform, in the desire to create a structure that would appear light and stimulate curiosity and reflection. The Centre Pompidou, in fact, should not only be a museum of modern and contemporary art, hosting all the relevant activities; instead, it should be a cultural, open and multi-purpose centre. It was therefore necessary to think of a flexible space, free from material and immaterial constraints, a space capable of bringing culture to the centre of social life. The common thread that characterizes the entire design, from the organization of spaces that can be redefined at each exhibition, to the choice of colors and materials, is that of breaking with the tradition of solemn and evocative architecture. The result is an open, light, decomposed structure that dialogues with the visitors. The idea is to create "an irreverent and provocative work of art that subverts the usual rules of urban planning and the very idea of a museum" [18], a museum that loses its character of interiority, closed to the inside; we see a reversal of hierarchies from an outside-in to an inside-out, it is no longer only the content that educates but the building itself becomes educating, showing with brutality the true essence of the construction, structure and installations. Far from the usual schemes and the formality of marble and decorations, we approach an absolutely revolutionary building that focuses on the function expressed through materials. Le Centre Pompidou reinterprets the French tradition of iron constructions with an exaltation of technology to the maximum power, which is used and played with.

Of its 11,000 square metres of glass and 15.000 tons of steel, each piece is customised, the use of cast steel makes it possible creating something new, breaking the mould, the use of lattice girders allows the development of free plan interior areas, free of any constraints, thus ensuring the fluidity of the exhibition spaces; finally, we move away from the welding technique by promoting prefabricated solutions, made in Germany through casting in formworks and transported to the city of Paris by rail

during the night, whose use has allowed the realization of the part of the project that rises above ground in just ten months. [19] The solution chosen to solve the large spans of the centre is the Gerberette. This element, which works as a balance, is made of cast steel so as not to renounce plasticism and sculptural image, while reducing the use of the material, is present at each floor, and owes its shape both to the efforts it is called to absorb and to the assembly system. The Pompidou Centre represents the ideal synthesis between creation and invention. The choice of materials and technical solutions are the symptom of a strong research for innovation. It is clear that the intention of the designers was to communicate with the public in a simple and direct way, with an action of high impact that generated curiosity; that made the user feel part of the project and in contact with it, "exploring materials and exploring the use of materials, and inventing through this exploration and using the nature of the materials themselves, stimulates and creates this contact. The natural characteristics of materials as a design stimulus is the ingredient which provides the best way of providing the contact between the public and the buildings that we build" [20].

## **5. Conclusion (MF)**

The recognizability of each individual building in the urban context is guaranteed by the finishing materials, their surface textures, their colors, their power of light reflection and their psychological impact. Perhaps precisely in this era in which the globalization of the market appears more of a threat than an economic advantage, the need for recognizability and specific identity of places and architecture is strengthened to enhance their distinctive characteristics. Among these, color is one of the most immediately perceivable, both in pedestrian and automotive transit, within everyone's reach regardless of age and education. The overall "perception" of the urban environment derives from the summation of perceptions connected to the volumetric relationships both between the building and the street and within the building itself between the "full" and "empty" parts, and fundamental are the characteristics of homogeneity or recurrence of the building elements and the "dissonances" with respect to a harmony. These perceptive sensations are also referable to the color of an urban path in that, even before noting the chromatic range, our mind perceives its monotony or multiplicity, identifies the chromatic contrasts and the dominant tones. The chromatic project in architecture continues to have a fundamental importance in social well-being and in individual perception of emotion: the culture of color, with the knowledge of materials, remains in every community of our planet with different meanings and connections to collective memory and therefore it shouldn't be dispersed but sought and safeguarded.

The facades of the buildings, as an interface between external and internal spaces of collective life, between the paths and all the volumes that contribute to structure the environment, are also the place of intersection between the public and the private sector and they are responsible for quality that all spaces for public use require. Once there was talk of urban "decorum" and this now obsolete term in technical jargon is coming back into fashion; in recent decades, not only has aesthetics often been neglected but, far more serious, we have neglected to improve the overall quality of livability of our cities which have not adapted to the acoustic quality, universal accessibility, healthiness of the air (just to report the main critical issues) although civil regulations and laws are in force that would impose a level in compliance with the well-being of users. Some minimum measures are taken only for air pollution with an extemporaneous nature linked to the emergency. As users we should learn to demand higher building and urban quality from the contexts in which we live and carry out our activities. The quality of the built spaces should first of all be that of usability in conditions of well-being; The parameters that contribute to this goal are manifold, but all related to our sensory perception. An euphoric faith in technology has led us, on the one hand, to neglect our sensory capacity and on the other to neglect the symbolic, but also therapeutic, value of the color of the materials of architecture, both in day and night conditions.

The lesson that comes from the master architectural designers is that the color is not a finishing that comes as a final surface decoration, as a make-up, but a material of the project, such as light and air that must be guaranteed and designed from the first idea of a space built especially in relation to the urban context with scrupulous attention to environmental and social "sustainability".

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