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Eva Vaništa Lazarević, Aleksandra Đukić,
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MONOCHROMATIC IN THE ARCHITECTURAL COMPOSITION: WITH SPECIAL REFERENCE TO THE APPLICATION OF WHITE COLOUR

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ABSTRACT

The application of colour in the architectural composition represents an effective instrument that can achieve a number of effects. Knowledge of its impact is a powerful tool in the hands of every architect. Warm and cool tones, by their nature, can cause various effects of depth, emphasis and suppression of certain elements to some extent. Colours can create the illusion of area increase and decrease and cause a number of other effects. The aim of this paper is focused on solid colour (monochromatic) architecture, with special reference to the usage of white colour. The colour is the most effective tool of distinguishing and perception. All of the visual appearance owes its existence to light and colour. The world of colour is not one source of countless tones, but is clearly designed on the basis of three primary colours and their combinations. Special mental attitude is required for a person to organize his world of colour in accordance with perceptual characteristics. Colour names are to some extent vague, because the very notion of colour is questionable and problematic. The most interesting difference in conceptualization of colours refers to the cultural development. The basic colour names are common in all the languages and cultures, but they also include various extents of tones. Not all the languages contain all of these names as well. Architectural works using one colour on its envelope, besides the value achieved by the composition itself, carries certain associative meanings related to the colour that it exhibits in a particular environment. However, most of the colours have identical or approximate meanings in most mental representations through all regions.

Keywords: architectural composition, monochromatic, colour, communication

INTRODUCTION

The application of colour in the architectural composition represents an effective instrument that can achieve a number of effects. Knowledge of its impact is a powerful tool in the hands of every architect. Warm and cool tones, by their nature,

can cause various effects of depth, emphasis and suppression of certain elements to some extent. Colours can create the illusion of area increase and decrease and cause a number of other effects. The aim of this paper is focused on solid colour (monochromatic) architecture, with special reference to the usage of white colour. The colour is the most effective tool of distinguishing and perception. All of the visual appearance owes its existence to light and colour. The world of colour is not one source of countless tones, but is clearly designed on the basis of three primary colours and their combinations. Special mental attitude is required for a person to organize his world of colour in accordance with perceptual characteristics. Colour names are to some extent vague, because the very notion of colour is questionable and problematic.

The most interesting difference in conceptualization of colours refers to the cultural development. The basic colour names are common in all the languages and cultures, but they also include various extents of tones. Not all the languages contain all of these names as well. Architectural works using one colour on its envelope, besides the value achieved by the composition itself, carries certain associative meanings related to the colour that it exhibits in a particular environment. However, most of the colours have identical or approximate meanings in most mental representations through all regions.

However, today's use of colour itself differs from the stereotype of associative meaning in architectural composition. It is not impossible that residence or office buildings are designed in black, but without suggestion of primary correlation with grief and sadness. Black contains the meaning of seriousness as well, but it is hardly acceptable for many mentalities— at least for residence.

Monochromatic approach to design, even if it initially seems like a simple procedure, accompanies successful architectural composition and was utilized by renowned architects. There is a multitude of architects, including Eduardo Souto de Moura, which are not loyal to only one colour but apply it in relation to context.

Volumetric expressive architecture of Mario Botta's (neo) wall composition is usually monochromatic, utilizing red bricks.

Even Luis Barragan himself, with his distinctive architecture of extremely warm colours, uses monochromatic approach, both as a whole and in dominant sequences of his architectural compositions.

We can recall vernacular Egyptian architecture, Mesopotamia; monochromatic expression is present within outstanding architectural achievements, and there is no need to go beyond the Egyptian pyramids.

We can conclude that monochromatic approach is the most successful when used for lucid and impressive architectural composition. Aren't Frank Gehry and his buildings a proof of monochromatic in metal shine, as well as Botta for his brick façade?

White colour is still the most impressive in monochromatic approaches to architectural composition. As an achromatic tone with most neutral attributes and metaphors, it suits both complex and simple architectural compositions with only one condition: that they are exceptionally successful. After Le Corbusier, Richard Meier and others, one needs to be reminded of some contemporary architects, e.g. Zaha Hadid. Her architecture is characterized by remarkable architectural compositions.

Innocence (neutrality) of white colour gives a chance for the architectural form to be expressed completely, without any overtones of colour associative meaning. It accompanies pure form and collaborates with light and shadow. Therefore, the whiteness of building's envelope is, undoubtedly, one of the strongest points of successful architectural form. It does not "interfere" with the power and expression of architectural implications because it ceases to be the bearer of a message, leaving it to the plasticity of the form.

THE ROLE OF COLOUR IN COMMUNICATION

It is believed that the human eye can perceive about 160 different shades of the colour spectrum. However, some colour analysts argue that there are over 12,000 different colour tones. "If we switch to computers, one will learn that the computer monitor contains 16.000.000 tones (...) Of course, there are differentiations, subtle shades of tone and volume of basic colours. However, each colour can have a different effect on the individual - emotional and mental" (Sarenac, 2001, p.16).

There is no doubt that colours have an effect on humans. The question is what colour causes reaction and the extent of its strength (sufficiently strong for the individual to react in communication process or not). Speaking of colours, the transmission of information is even faster than the transmission of information by complex images, because colour can be noted "in a glimpse" and we can subconsciously change the mode of communication in a given process, without any awareness of perceived colour. "Colour is important for man, for people and maybe for humanity in an inexplicable and unpredictable ways." (Gheerbrant and Chevalier, 2004, p. 834).

The most stimulating colour is red - regardless of culture, as an anthropological constant. "In every language, red colour was the first named" (Sarenac, 2001, p. 50). There are many studies that attempt to discover why that is so - from geneticists, zoologists, anthropologists to psychologists, but they failed to come up with a unique answer.

Meanings of the colour red vary in different societies, but boil down to the same sensations - activity, struggle, joy, revolution, passion. The other colour whose meaning does not differ among societies in the communication process is blue - no culture attributes its negative traits. In addition to these two, achromatic colours have universal meaning - black and white - marked as deficiency and excess light in

the spectrum. "The findings of experiments show that the symbolic width of the black, white, red and blue are quite equal" (Trandafilovic, 2006, p.97).

COLOUR AS A FORM OF NONVERBAL COMMUNICATION

When it comes to verbal expression, it is easy to divide it onto denotative and connotative meaning. Nonverbal communication is, for starters, less noticeable in a rational way and as a result the message is filled with non-verbal meaning and influences us to a greater extent than just isolated verbal meaning. To understand non-verbal communication it is necessary, without exception, to learn the codification that conditions it. In the case of education on the meaning of colours, we can say that it is quite intuitive and non-institutionalized, i.e. taught "on the fly" and there are no schools that could train us. Modern linguists are discovering the existence of the so-called "grammar colours". As each language has its grammar, which is valid for all speakers which are taught, one culture also applies certain rules for colour and these rules are adopted in the same way as for learning the language.

Discursive messages are invariably informative and very few question them; however, others find aesthetic notions less informative. Still, "The value of aesthetic messages is predetermined by the level of its informational structure, i.e. wealth of ideas contained in it." (Radojkovic and Djordjevic, 2005, p.137). Colour represents symbols with a wide field of meanings and connotations, although it can be interpreted as symbols. Once upon a time in human civilization, the process of using colour as metaphor occurred for characters, i.e. transformation of character into symbol took place and deepening the symbolic gap between the sign and the signified (Radojkovic and Djordjevic, 2005, p.144). When a man (consciously or not) uses a particular colour for clothing or for the room walls, and the building itself, this person sends us a strong non-verbal message of aesthetic type.

Although non-verbal communication represents a constant for all human beings, culture also has a stake in its application. If we understand some occurrence and culture conditions us to ignore it, the base assumption is that we still learnt something.

"There is a level of symbolic meaning of colours, a level that does not apply to visually detectable characteristics of the object, rather than an abstract domain of meaning. This level encompasses interpretation of colour references to a class of abstract concepts." (Trandafilovic, 2006, p.79). Understanding the colour as a symbol is only possible by abstracting meaning on a higher cognitive and connotative level. It is not important whether we explain colour by childhood-gained experience or later in life or through special ways of education. It is important that we see colours and to treat them in the way taught. "Is it a phenomenon that I see a tree? "A phenomenon is that I recognize it as a tree, that I'm not blind" (Wittgenstein, 1994, p.76). Wittgenstein explained blindness as a mean of natural recognition, something that society trained him to perceive as a tree. It's the same with colour - we see it, but we classify it into categories, according to the rules of our social

group, our culture. "One loop is very important and at the same time it's obvious: perception cannot be separated from meaning; people see unfamiliar things, or see phenomenon that they must figure out; without meaning they practically do not see them." (Trandafilovic, 2006, p.108).

When someone asks us on the meaning of words red, green, blue, we show things that are thusly coloured - and that exhausts all of our ability to explain the meaning of these terms. "After all, we either have no idea about their usage, or have it, but it is quite rough and partially wrong." (Wittgenstein, 1994, p.16). It is not in human nature to complicate his expression when wanting to clarify something. Colour communicates directly. "Words must be translated into images in thought. These images must be assembled, organized and categorized to give meaning to words. This is then followed by an emotional response, which also may initiate a physical response. Colour skips all these stages and directly evokes emotion, creating a psychological response." (Trandafilovic, 2006, p.77). Consequently, usage of words for explanation of colour concept is a redundant step, because colours already have a simpler meaning than the words that would be used for its explanation; it would take countless words to explain each symbolic role of one colour. There is no clear notion of colour. (Wittgenstein, 1994, p.35). There is not even an agreement on the number of base colours. Even within the same culture there are different interpretations of the same colour, mostly because we enter into communication processes as individuals, although we hold characteristics of all groups we belong to, or once belonged to.

The average individual does not experience colour as something that has a crucial influence on his life. "I do not see that the colour of the body reflects light into my eye." (Wittgenstein, 1994, p.22). But when you mention the verbal notion that indicates any colour, we react stereotypically, as previously learned (Wittgenstein, 1994, p.38). Some authors speak of the four basic colours, some say that there are seven, and then there are those who talk about 11 or 12 primary colours. Dilemmas exist in relation to whether black and white can be divided into colours, or are they just lack and excess light. "Colours are bundles of distinctive traits and complexes filled with metaphoric meaning." (Van Leeuwen, 2012, p.7).

The results of some experiments (see Trandafilovic, 2006, p.78) showed that all abstract concepts are significantly associated with colour, that is, colours have abstract meaning. Questions like: "What is the colour of love?" or "What is the colour of betrayal?" provide a conclusion that the same communities of people, with almost no exception, give the same answers regarding these categories. "There is empirical confirmation that there is an abstract, symbolic level of colour meaning. The conclusion is that it is a general phenomenon, present in all people, and which probably delves into the domain of the meaning of terms. Previously presented assumption was confirmed that each colour, individually, is rather complex and unique in its symbolism. It is almost awarded with a character." (Trandafilovic, 2006, p.78). Synesthesia in the theory of literature indicates the figure of stirring the senses, but in all the languages of the world there are many examples of

interference with the sense of sight, for example, the sense of taste , that do not sound unusual and synesthetic - say, black coffee, red wine.

"We are not going to create a theory of colour (either physiological or psychological), but the logic of terms of colour. A logic that gives us what we often unjustifiably expected from a theory." (Wittgenstein, 1994, p.9). Wittgenstein writes about the logic of colour in a philosophic manner, not mentioning the non-verbal communication of the spokesperson. He intuitively, however, identifies, although it was not his intention to encourage thoughts on colour as a form of non-verbal communication: "Colour *shimmers* in its environment, the same as eyes smile on a face." (Wittgenstein, 1994, p.14).

FOURTH DIMENSION OF ARCHITECTURE - THE COLOUR WHITE

History of architecture can also be viewed as a representation of objects that have creatively adapted to light. One center of interest is the relationship between what people perceive and the building construction. Architects rely on light and its ability to reveal form as a way of creating these connections. Appropriate combinations of different types of light provide, to a trained eye, infinite possibilities in architecture. Throughout history, light is has always represented a central theme in architecture: the oldest religious architecture dedicated to the Sun, through a combination of direct and indirect light in Hagia Sophia, heavy Romanesque light, or the Gothic tendency to arrange light in order to provide spatial tension and onwards, through the Baroque, as well as an alchemy of light and Bernini's table for measuring light to Le Corbusier, Wright and Mies.

Contemporary examples are numerous, which show various aspects of the light in architecture. If you are dealing with light, we can ask a number of questions: Is light a substance in architecture?; Does the history of architecture represent searching for understanding and domination over light?; Is our time, when we have all the resources necessary, the right time for final domination over light?

In the architecture of minimalism light is treated as matter and as a material. When use the axiom "*Architectura sine luce architectura nulla est*", (Alberto Campo Baeza), we then state that no architecture is possible without light. What is architectural magic if not the creation of this splendid intimacy between man and space through light? Architecture is knowledgeable, clean, and fair play with the masses of light - Le Corbusier.

Architecture tends to frame the natural/artificial/environment. Light is one of inevitable topics in architecture today, understood as essential material for building houses, and as an element of decomposition of the house all the way to the basic decorative-illustrative moment of focus - distraction of an individual, is the basic mean of land management, positioning and as an orientation mode, the impulse to move, stopping notification, continuous, common experience of the whole, seen in detail. The lighting is definitely the most important tool that architects have at their disposal, because it is complementary to every design aspect, starting with that

most basic level (visibility of colour, shape and texture), and through different amounts of light, to space transformation. Alberto Campo Baeza states: The fact is that architecture without light is nothing, and less than nothing (Bertoni, 2004, p.182). Natural light in buildings has always influenced human behavior and living conditions. "I charted the form of my journey, not through ideas or stone, but with air and light" (Paz, 1979, p.56). Daylight is constantly changing and space variables require the use of appropriate light design process, which is based on architectural sensibility and principles of interior design. Ian Moore states: "Most important things for our living spaces are light, space and ventilation" (Cervero, 1997, p.142). Users of the facility environment may affirm success of design effects. With today's renewed interest for sustainable development, daylight is to become one of the most important factors to consider, it is gaining attention which puts it, when making design decision, to the place it deserves in order of importance. Light is more than a feeling, it is capable of changing human feelings and makes us tremble in the deepest part of our being.

Light, as a very important factor, changes architecture and its whiteness in the district for the architects Richard Meier and Albert Campo Baeza, who both aim to convey a similar message, apparently using the same resources (light, white colour, precision and faith in the mathematical order, measure and harmony, proportion, rhythm, and the extent and manner of openings, orientation, power of voids as a uniting factor that spaces form around, representing the contents of the house, etc.) in different ways to communicate a specific message: architecture, dematerialized to the extent of ("border") rupture, forms border properties by using only light. Boundaries, conceptually understood, are no longer fixed outlined barriers, but in a symbolic sense, become a factor of reorganization, a reinterpretation of the house, depending on the environment in which architecture exists (Meier's exterior light dematerialization), but also depending on cultural patterns and the individual characteristics of its users, whose interior and privacy, should tickle and irritate its environment (interior light dematerialization and sky openings in the works of Camp Albert Baeza).

Limits (light), therefore, becomes essential inner necessity of defining the field of existence (Tschumi B. boundary as the essential nature of something), in which a man is determines himself (anger/finality, Meier R.). At the same time, the limit is indeterminate, flexible, broken intermediary zone, changing light and frame, through which the light falls in a certain spatial coverage (Kordic, M.). It manifests itself in the form of certain colours, in constant change (R. Meier) and cannot be said that the border closes or opens it, but it establishes a relationship between lines and nodes, surfaces, and the totality of architecture, creating an aura of architecture (Nikezić A.) between the city as the wider context of the development of exterior design (R. Meier) and the individual as a factor of interior development (Baeza). Orienteering oneself to the light, as the basic criteria of de/materialization, un/limitation of space, architecture becomes a living, continuously variable mechanism of establishing new boundaries, while the light itself becomes the substance that forms the border (Baeza and Meier).

When the threshold of the illuminated area is perceived from the perspective of an individual, the most appropriate definition would probably be the same as the words of Piero Zanini - border as a place that has its own measure, dimension, with its own story and residents and which cannot be represented as a line, but as a belt, where its edges are not clear, nor firmly defined, nor absolutely impermeable.

A special solution to the problem of light is the colour white. "Life, like the dome made up of a large number of various colours of glass, colours the white radiance of eternity" - (Percy Bysshe Shelley, 1792-1822). It is a solid, safe, effective base for the solution of problems of light: guide light, cast a shadow, engrave with it, and change it. When light is once controlled, and when the white planes that are illuminated shape it, the space is then controlled. White colour is a symbol of eternity, universal in space and eternal in duration. White colour in the architecture of minimalism, represented as absence after so many empty occurrences, seeks to reach everything with almost nothing, more with less.

During development of the history of architecture, light was always horizontal, penetrating vertical plane walls. Since the sun's rays fall diagonally above us, a large part of the creation in the history of architecture can be considered as an attempt to transform a horizontal or diagonal light to light that appears to be vertical. This is precisely what has been achieved in the Gothic style, which not only achieved the greatest quantities of light, but also the fundamental pursuit of achieving the highest possible vertical lighting from its diagonal position. Gothic builders have reduced the weight of their cathedral onto linear structures, with the intent to expand the maximum surface of the glass, creating incredible magic just by directing development towards the ultimate possibility of reaching light, more light. Specifically, it can be said that the Gothic treated light as matter. Since the builders knew that the light rays were diagonal, they extended the height of windows, in order to catch the diagonal, almost vertical rays. In this way Gothic can be viewed as a wish to organize light, in order to provide spatial tension. During the Renaissance, the light was brought inside through domes and other resources, the feeling that the dome actually represents reflected sky, framed and permeated with metaphysical properties. Some Renaissance church roof in Italy have an opening through which the powerful beams of light pass through, so that the line of light paves the way through the church, which represents respect for God and science. Baroque is a kind of alchemy of light, which is a wise mix of diffused light that penetrates through the air, safe and capable of producing breakthroughs in spaces with outstanding vibrations. In the Baroque period, people have tried to turn over the usage of light, by implementing an ingenious mechanism that converts gained horizontal light, into light that may become vertical (one degree more vertical than what was achieved in the Gothic style). Bernini, a light magician, made his own table for measuring light, which was very similar to those now used to calculate structures: methodical and precise. He knew that the light could be measured and classified, as well as all the matter that is measured and which can be scientifically controlled. Using different sources of visible light, he firstly created a homogeneous environment with diffused light, generally north, which gave light to the observed spaces. Then, after its

alignment with the help of geometric forms, he would manage for the light to illuminate a particular point, hiding its source from the eyes of the viewer and creating their own principle of "strong light" ("Luce gettata") positioning it to be the star of that area. Contrast, the initial boundary between the two types of light, brings the tension to that area, producing the first part of the architectural effect. Solid light, in its visible movement, dances over the invisible diffused light, which is in quiet repose. Le Corbusier, in his later Ozenfan study, has pulled the strong light in, facing the building south, in order to accommodate diffused light, which is later distributed in the right measure. South, strong, dramatic poured light, produces spectacular effects. Modernist movement, by breaking down walls, caused a flood of light, which we are still trying to control, with emphasis on the usage of glass. The thread that connects the history of achievements in architecture is to seek new ways of glorifying the intersection between the walls and nature, striving to capture the moment and frame where the light enters the building. Thusly, diffused light would normally be drawn in, if architectural object is orientated towards the north, to provide smooth reflective diffused light, which gives soothing, resting effects. It is possible, therefore, to seek and use different qualities of provided light, depending on the orientation in space and time. There are differences between the clear blue morning lights, when we look to the east, and between the warm golden light of dusk when oriented towards the west, where both types of light are horizontal.

Contemporary architecture sets a new paradigm: the places where light leads to dematerialization, are also the places of on the lookout and discovery of new boundaries between the real and the virtual in the digital age of existence. A deep introspection on light is necessary, and its never-ending pathway that became one of the focal points for the architecture of the future.

Baeza would say: "If I succeed to lead people to feel the rhythm imposed by nature in my works, harmonizing space with light, softening it with the passage of the sun, then I believe that is time well spent" (Baeza, 1997, p.15). "Light is an essential component of all possible perceptions of spatial qualities. Isn't the story of architectural history a story of understanding different light? Or the search for light? Work of Alberto Campo Baeza, *More with Less*, serves as an example and determines his belonging to a wider context. "I suggest the essential architecture of ideas, light and space. Architecture was brought into existence through light ... Light is an essential material for the construction of architecture ... The space is shaped as a minimal form, with the required number of suitable elements necessary for translation of ideas with precision ... Light is what creates the relation, the tension between humans and architectural space " (Baeza, 1997)."Light is the basic material in architecture. Mysterious, but real, magical, it is able to add the tension in space that sometimes may be necessary to humans. It has the capacity of producing light intensive spaces, that makes them successful for humans." (Baeza, 2004).

Similarly, the architecture of Richard Meier, which represents a system within a system, networking, and synthesizing heavier light dematerialization, achieves a variety of effects and establishes intertwined relations and the alchemy of light, which most valuable role is the ultimate effect of the mere decor. In fact, the house

clearly differentiates the architect's reaction to context, *genius loci*, in which he creates. The degree of internal control of the house is determined by the context, and established with parameters of white colour and natural light. These authors stated that architecture is a form of light. Architecture is a physical manifestation of the idea of human experience. The idea and implementation go hand in hand with the presence of light. I believe that the success of a building lies in its ability to absorb and to enter into dialogue with time-varying phenomena of light and context. They are, after all, its material. The colour white is a symbol of ephemeral perception of motion. It has always been there, but never the same; the colour of light changes during the day, black and vibrant during a full moon on New Year's night. Between the sea of materiality and earth, lies continuously variable white line. White is the colour of the light, the method of power transformation perception. (Meier, 1995).

Lisa Skolonik highlights three types of light that are generally used in architecture, with their roles clearly identified in the works of Meier and Baeza: a) Ambient light, background light, used as a base for the unification of spaces and achieving uniformity of illumination; b) Representative light is used to emphasize movement and orientation; c) Focus and accentuation, that is used for highlighting details (must be at least three times stronger than ordinary light).

Northern light or zenithal lighting, most notably in the creation of the flowing spaces, when striving for heavier material deconstruction of the building, is used to light up large areas and volumes. This type of light is introduced into the space diagonally, while the space itself is open to the east and west, to become suitable for accepting environmental changes. Directional, accent lighting is used to emphasize the orientation and directions. Linear light is present in the form of a horizontal or vertical light. Solid light coming from the south often have this role and in combination with northern light creates distinctive ambiances. Dotted, accentuating light correlates to the effects the strong sunlight and is primarily used as south or east light. Organization of spatial programme depends on the intensity of light, and it can be said that it favors stronger light intensity for daily activities, while dimmer west lights are being used for night spaces and intimate parts of the house. The importance of the northern light is uniform throughout the day and it is remarkable because of its favorable working atmosphere for office buildings.

When it comes to white colour and light, Baeza claims that a good painter knows exactly how to use white spaces to insert the sunlight into the interior. In architecture, white is much more than simple abstraction. White colour provides a safe and efficient base for working with light: it can be used to capture, reflect, attack, and to slide.

CONCLUSION

Contemporary architectural cultural and socio-political context is a condition of recognizing the importance of specific situations of anti-hierarchical and anti-monumentality concepts. This condition, therefore, is the dynamic state of tension, a condition that naturally belongs to the fields of borders. Conditions for the

coexistence of differences in these border areas would be provided. When we use symbols (either verbal or nonverbal) to distinguish one class of actions of others, we create artificial boundaries of colour in a field that is "natural" and "continuous". In principle, there are no limits in size. If you want to mark the connection to the ground, the mark itself will occupy space. In nature, many such milestones are ambiguous in their implications and are source of conflict and anxiety. Space is constructed from the relation of form, colour and borders and is perceived as an extension of the three-dimensional world around us, as well as a number of intervals and distances between people and between people and things.

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