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COLOUR IN ARCHITECTURE – PERCEPTION OF TRUTH

KOLOR W ARCHITEKTURZE – PERCEPCJA PRAWDY

Abstract

The publication aims at showing the complexity of the problem of learning the truth in architecture through the perception of colour. Any search for 'truth' arises from the desire to know and understand reality. Colours are among the most eloquent means of expression. Its perception results from the cultural message. All these properties are related to the human experience. The article is complemented by the analysis of selected architectural objects where colour has a significant impact on the perception of the narrative layer.

Keywords: colour in architecture, light in architecture, truth in the architecture of meaning

Streszczenie

Publikacja ma na celu ukazanie złożoności problemu poznania prawdy w architekturze poprzez percepcję koloru. Wszelkie poszukiwanie „prawdy” wyrasta z pragnienia poznania i rozumienia rzeczywistości. Barwy należą do najbardziej wymownych środków wyrazu. Percepcja koloru wynika z przekazu kulturowego. Właściwość ta wiąże się z ludzkim doświadczeniem. Artykuł został uzupełniony analizą wybranych obiektów architektonicznych, w których barwa ma zasadniczy wpływ na odbiór warstwy znaczeniowej.

Słowa kluczowe: kolor w architekturze, światło w architekturze, prawda w architekturze znaczeniowej

1. INTRODUCTION

These last centuries, studies show that colour is a physical, physio-chemical and physio-psychological phenomenon. Since the times of ancient Greece, attempts have been made to enclose the colour theory into a compact system.¹ Depending on this research discipline, colour was defined by different aspects. To this day, the science of colours is still relevant to various fields in research.² The question of colour in art and architecture in particular is a very

¹ M. Rzepińska, *Historia koloru w dziejach malarstwa europejskiego*, Wydawnictwo Literackie, Kraków 1983, p. 78.

² *Ibidem*, p. 17.

broad one. The perception of colour in architecture consists of many factors, in particular the relation of specific elements (backgrounds to accents). In architectural design, the first step is always the process of selecting the materials used, and thus their colours, by the architect. In this complex process of architectural design, one should ask oneself what influenced the choice of colours when designing the object. Is the selection process determined by the material? And what, then, influences the way these colours are perceived, in the context of what we can name 'The Architecture of Truth'?

2. PERCEPTION OF COLOUR

One of the characteristic features of each colour is how they are perceived through human emotions. This perception is related to the emotional state of a given recipient at a specific time.³ This property is related to the human experience of perceiving colours, an experience that is both instinctive and cultural. What we really see when we look at an object is not the colour itself, which is an actual characteristic of the matter, but the light reflected from the surface of that object that falls into our eye. Items have different colours because they absorb some wavelengths while reflecting others. Colours with different wavelengths affect the human autonomic nervous system in a different way, and thus its hormones, body temperature and blood pressure. More energy is needed to process long waves through the eyes and brain than short waves. Therefore, the perception of warm colours, such as red or yellow, is always accompanied by an acceleration of metabolism and, consequently, stimulation. In turn, cool colours such as green or blue help to reduce energy consumption and thus slow down metabolism. The contact with short-wave colours has a soothing and calming effect on the recipient.⁴

If we consider the above characteristics, it should be concluded that the colours are related to human emotions. How much colour affects us depends on the individual's psychological predisposition and previous perception experiences. It is also worth noting that many perception processes happen in unconscious areas, we only see the impact of a given colour on the human being. A slight change in blood pressure after looking at the blue colour occurs without our will. As with other external factors, many perception processes take place on an unconscious level. Previous experiences are of great importance in this cognitive process.⁵ Therefore, we have to conclude that colours determine to a large extent our mood and behaviour.

The psychological and sociological aspects of colour perception depend not only on the emotional component, but also on cultural factors and the personal experience of the onlooker. The importance of a given colour varies and depends on the factors that have shaped a given cultural circle and society. The same colours have a different symbolic in various regions of the world. Moreover, the importance of particular colours has also changed over the centuries, which can be observed, for example, in the art or clothing. Colour is able to define, strengthen or completely change the meaning of a symbol in a given culture. Due to

³ It should be noted here that emotions are a short-term state often unconsciously caused by external stimuli. However, feelings are a permanent emotional state not always associated with external factors.

⁴ T. Samara, *Kroje i kolory pisma*, PWN, Warszawa 2010, p. 13

⁵ P. Zimbardo, *Psychologia czasu*, TED2009, https://www.ted.com/talks/philip_zimbardo_the_psychology_of_time?language=pl#t-371380 (access: 01.07.2020).

the fact that colours 'are among the most eloquent means of expression. They are a sign of people nations, communities and families, a manifestation of religious and political attitude, an expression of mourning, joy or homage; they are seen as a hallmark on flags, coats of arms, ribbons, etc.'⁶

A perfect example of the diversity of how we read colors according to our cultural differences are these two colours with the greatest contrast – black and white. The point of reference for this characteristic is the 'Western' civilization, whose foundation dates back to the culture of antiquity, and formed through the Judeo-Christian religion. In ancient times, in the Mediterranean culture, black was considered primarily as the colour of death. This colour was attributed to the kingdom of the dead, and also symbolized night, destruction and mourning. Black in the Bible is also the opposite of natural light, a spiritual symbol of eternal darkness, sin, unclean forces and Satan but also of mourning and abandoning this world to the spiritual life. In ancient Rome, as Flavius wrote, in black robes, there were debtors and defendants standing in court asking for mercy.⁷ At the same time, in Egypt, it was white that symbolized death, infertility and defeat. This image was connected with the image of the desert, which was a danger and consumed human life. In India and China as well, this colour is associated with death. To this day, the Chinese still wear white clothes for funeral ceremonies. Unlike Mediterranean culture, in ancient Egypt and India, black is 'the colour of life, associated with the life-giving silt of the Nile, the earth and its blessing for man'.⁸ In Japanese culture, black is associated with experience. It symbolizes nobility and wisdom. Black, though, which in Europe has always been a symbol of death and mourning, has over the centuries gained a status of an elegant and chic colour. Since the twentieth century, it has been referred to as a formal colour. In the Church, black as the liturgical colour was present until the Second Vatican Council. After the Council, purple took over its function. Black, however, remained the colour of the priests and of many religious congregations because of the symbolic 'death' to the world in the service of God. Medieval writers associated with the church saw black as a symbol of humility and modesty. The formation of the consciousness of this colour over the centuries has made black both a sacred and secular colour.⁹

White symbolizes innocence, youth, purity, lack of experience. Unlike Japan, white in Europe was associated with the ethos and symbolized moral attitude. White is an expression of innocence, goodness, heritage and justice. White is the colour of angels and saints.¹⁰ The New Testament, and especially the Apocalypse of St John points to white as the colour of worship, which represents perfect purity, victory and eternal glory. In the Church's liturgy, white robes – also a symbol of light, glory and chastity – are assigned to celebrations dedicated to God and Jesus Christ, including Easter and Christmas, but also, for example, to celebrations of remembrance of the Blessed Virgin Mary, the celebration of angels and on All Hallows' Day. Wearing a white cassock is the Pope's privilege.

The ceremonial white dresses that girls and women wear in some sacraments are a sign of purity and virginity. [...] White is also a symbol of the beginning, of open possibilities, of

⁶ D. Forstner OSB, *Świat symboliki chrześcijańskiej*, Inst. Wyd. PAX, Warszawa 1990, p. 113.

⁷ T. Samara, *op. cit.*, p. 117.

⁸ K. Jurek, *Znaczenie symboliczne i funkcje koloru w kulturze*, Kultura – Media – Teologia, 2011, no. 6, p. 76, https://kmt.uksw.edu.pl/media/pdf/kmt_2011_6_bezspadow_jurek.pdf (access: 01.07.2020).

⁹ D. Forstner, *Świat symboliki chrześcijańskiej*, Pax, Warszawa 1990, p. 117.

¹⁰ K. Jurek, *op. cit.*, p. 76.

renewal. Today, under the influence of European culture, in many circles of civilization, white has become a symbol of innocence and purity, but also of beginnings, honesty and neutrality. The nobility of such materials as marble, silk, ivory and porcelain contributed to creating this image of white as an expression of nobility and exclusivity.¹¹

The above outline of the issue of colour and its cultural diversity show how colours affect people when it comes to culture, religion and community. All the known civilizations of the world attributed colours with a specific meaning to some groups. They performed various functions – symbolic, persuasive, or communicative. Colours appear in the descriptions of God, symbolize contacts with the sacrum. They refer to traditions, customs, and rituals, which acquire a deeper meaning through this symbolic. In all the cases mentioned above, one can see that people at a certain stage of civilization's development felt the power of colours and knew how it influences the human psyche. They decided to use them to emphasize certain rituals of religion and daily life.

3. COLOUR IN ARCHITECTURE

Colour is an essential element of architecture. Each component of the building has its own colouring. When combined with each other, they create vivid compositions. It is worth mentioning here that the purpose of architecture is the basic factor influencing its colour. Adequacy is the foundation of a good composition of materials, colours and building structure. Some of the colours will seem to us to be appropriate for a hospital building, a painting studio, a family house, and others for a place of the sacrum. The location of the object has also a great influence on its reception. The context determines not only the perception in the spatial sphere, but also the cultural sphere. Architecture is contextual by assumption, and in contrast to paintings, that have been widely described in terms of colour, it has a location. It is precisely the location that is the first determinant at the initial stage of design. It has a great influence on the designer and his perception of the colour atmosphere of the space. Sometimes it is impossible to find a universal colour key for a given type of architecture precisely because of the context. As with the temperature contrast, we can perceive a warm-looking colour as cool when an orange-red colour appears next to it. The same is true when designing the colour of architectural objects. The environment in which we design imposes a framework and constitutes a reference. The context is, in this case, fundamental for the perception of architecture and to judge it as truth. As Wittgenstein rightly points out: 'From the two places around me that I see as of the same colour in a certain sense, one may seem white to me, and the other grey to me. In one context, it's white in low light, in another context, grey in good light'.¹² This seems an appropriate summary of the philosopher's contextual considerations about colour and context.

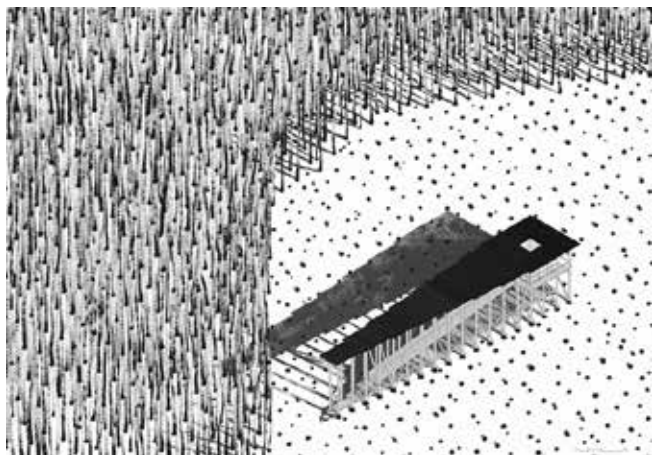
In 2019, in the Workshop for Sacral and Monumental Architecture, at the Faculty of Architecture of the Warsaw University School of Technology, Wiktor Gago has written his thesis entitled 'Experience of colour in architecture – design of a place of contemplation' under the direction of Prof. Dr hab. arch. engineer Anna Maria Wierzbicka. The work was

¹¹ M. Odgaard, *Shades of Light*, Collection & Craft, Copenhagen 2019, p. 17.

¹² *James Turrell*, exhibition catalogue, Centrum Sztuki Współczesnej Zamek Ujazdowski, Warszawa 1998, p. 6.

about the study of colour and its relation to architecture and place and combined the perception of human vision, psychology and the technical expertise of the architect. The designed object is a narrative of the author's subjective look at the architecture of the pretext, about a house built to be looked through. The main assumption of the project was to create a space that would become a place of contemplation and an experience of colour, a space for reflection and focus. The building had to be an answer to the individual needs of the visitor. It was also important to leave room for interpretation by the onlooker and to give them the opportunity to influence the space and the relationship between the object and the surrounding nature. Like the description of a colour as warm or cool, the reference point is essential for the design space. It is the onlooker who decides the degree of penetration of space. The project is also an answer to the need to be in a place that imposes nothing. It allows to be alone not only through the absence of others, but also by eliminating objects evoking the world of daily life, which are completely determined by human relations.

From the very beginning, one of the main design assumptions was to create a contemplative object in a place with strong landscape values, which has no direct access. It forces the recipient to put in some work and travel before reaching his destination. The initial assumptions were also based on the fact that the space provided for the designed architecture should naturally undergo a contextual and colour change. The location of the project was a commercial forest plot. The object designed matches the forest, it is a part of it. It is an architectural metaphor for the forest life cycle. Made of solid wood, the structure refers to the small infrastructure of the forest. The object is an homage to nature. It complements it, allows you to observe the forest from a different, new perspective. The work received an excellent evaluation and was one of the best-rated diplomas given at ADWUT in 2019.

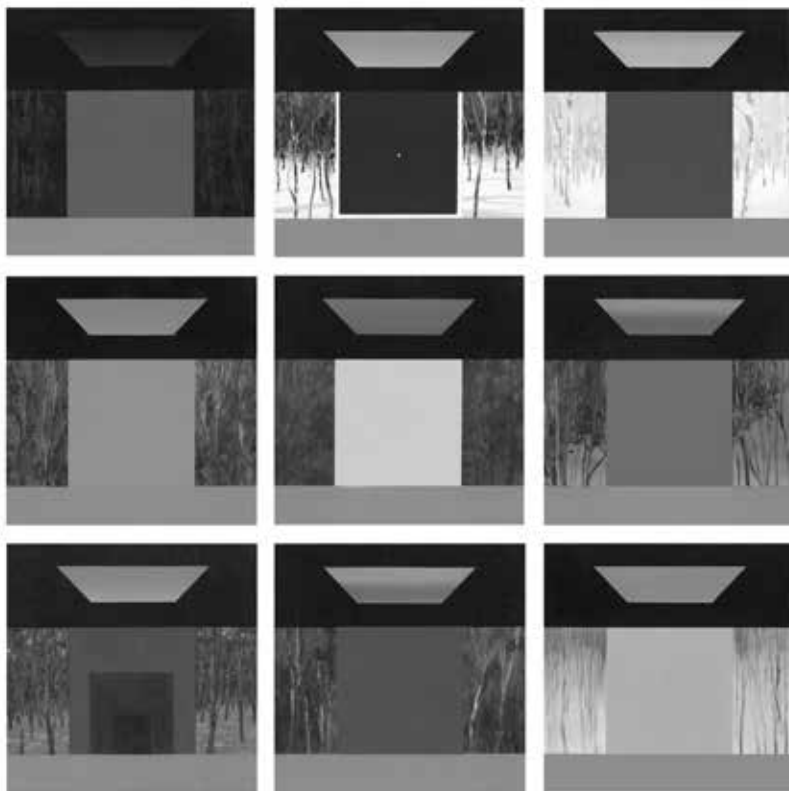


Ill. 1. 'Experience of colour in architecture – design of a place of contemplation', author Wiktor Gago

The main space located in the highest part of the building was created as a result of juxtaposing 12 sub-areas together. Looms covered with linen canvases form a square room. Each wall is made up of three sub-walls, which can rotate around their own axis. The frames marking the space for contemplation will be repainted once a year by a selected artist. The hangings will be covered with a colour which, according to the painter, is supposed to help to contemplation and concentration. Despite the generally known colour theory, the choice

of a colour that pleases the viewer and, according to him/her, is still a subjective decision. The colour you choose will change within 12 months. Experiencing a given colour will evoke different emotions in the summer and others in the snow. The room has many arrangement possibilities and it is up to the observer to make the interior open to nature. One of the permanent apertures is open on the sky, which we allow us a different perspective, without the natural view of the abundance of trees.

The building shows two faces. The first is full harmony. The object belongs to the landscape. The material used and the way it ages allow it to blend in with the surrounding nature. The contemplation space itself, at the moment of total or partial opening of the hangings also creates a dialogue with nature, and thus becomes an integral part of it. The second face is contrast. As we walk through the forest, we can see the sky only in a fragmented manner. The trees and shrubs are constantly witnessing our presence. The companionship of nature is also strongly noticeable when we walk along the ramp towards the contemplation space. However, once we are in the secluded centre, we move to an illusory world. The senses of smell and hearing are still conscious of the forest, but from now on, the eyes only can see the colour applied to the hangings and the colours of the sky. Contrary to the forest, this space is static. We start to notice the movements of the sky. This object is a subjective look at the architecture of the pretext, colour and its natural source. It's a return to nature and a search for the self.



III. 2. 'Experience of colour in architecture – design of a place of contemplation', author Wiktor Gago

While working on the project, the author also conducted a research exercise. Its aim was to analyse whether the changeability of nature would have a significant impact on the colour of the contemplation space as it was being designed. Is the colour of the interior dictated by the experience of nature by the recipient, or is the architectural object being designed significantly influences the colour decision? Nine graphics depicting the designed space and its relation to nature presented the various types of weather that can be observed in this location. The centre of each painting was empty, to symbolize the contemplative space. Eminent architects and artists were asked to fill it. Their task was to paint the missing element in such a way that, looking at the result, one could feel an atmosphere of harmony and concentration. As a result of this filling of nine graphics by over 50 people, several hundred illustrations were created. Almost in every case, the colours constituting the filling were exceptional and unique. This shows the subjectivity of how the colour and location can be experienced. It was not possible to distinguish one universal colour that could be considered as a perfect complement to all. The project is also an answer to the need to be in a place that imposes nothing.

One of the examples of architecture that strongly uses colour are the objects of Luis Barragán.¹³ This Mexican architect developed his own definition of Mexican style in the early 1940s. His architecture, which he used to call emotional, made use of materials and colours strongly rooted in the Mexican culture. Barragán used colours that were not arbitrary, but only came from the place where he was building. He believed that the colours that accompanied him during his life in Mexico always shone strongly under the hot Mexican sun. Colours such as yellow, purple, blue, pink, magenta, red were present in everyday life as well as in rituals. They evoked the lush flora and fauna of Mexico. According to the architect, bright colours are a testimony of cultural identity. The colours used by Luis Barragán were not accidental. The architect carefully selected and designed them in such a way that they created a natural bond with the context while maintaining the homelike character of his architecture.¹⁴ In his author's statements, the architect stressed that 'peace would be a great and true antidote to anguish and fear, and today, more than ever, it is the architect's duty to make him a permanent guest in the house, no matter how lavish or modest he is. During his work, he always strived for peace and quiet, but you have to be careful not to destroy it with an undefined pallet'.¹⁵ His legacy in the use of colours has been used extensively by artists and architects in other places in the world. However, the colours of Luis Barragán, their accurate use and truthfulness of expression were made obvious by the context. Its architecture, which comes from a place we can certainly call real once it's located outside of Mexico, loses its sense and sincerity. Using such intense and luminous colours in a place without the warm Mexican light would be at least pretentious and loud. The colours would seem arrogant and out of context.

¹³ Luis Ramiro Barragán Morfin, born March 9th, 1902 in Guadalajara, died November 22nd, 1988 in Mexico. Mexican architect, Pritzker Prize winner in 1980.

¹⁴ E. Eifler, J. Pilaroscia, *Luis Barragán, Architect of Color* [in:] Life in Color, <http://blog.colourstudio.com/2013/03/luis-barragan-architect-of-color.html> (access: 07.01.2020).

¹⁵ *Ibidem*, "Serenity is the great and true antidote against anguish and fear, and today, more than ever, it is the architect's duty to make of it a permanent guest in the home, no matter how sumptuous or how humble. Throughout my work I have always strived to achieve serenity, but one must be on guard not to destroy it by the use of an indiscriminate palette." Luis Barragán.



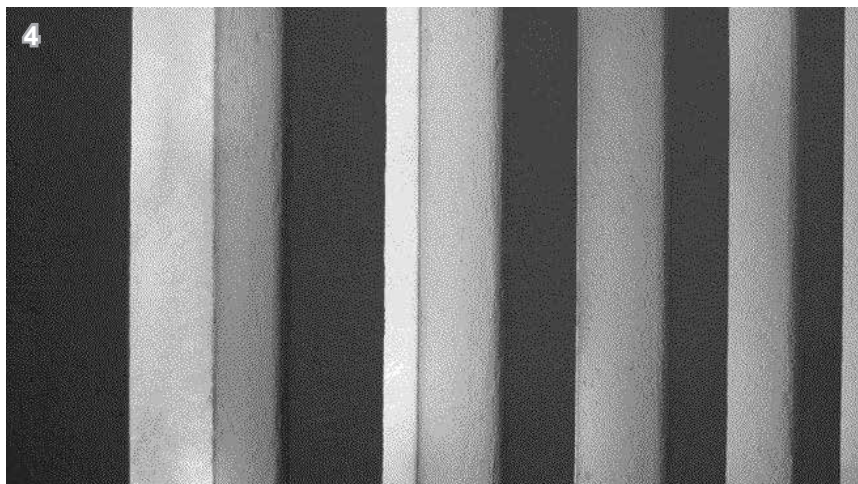
Ill. 3. Casa Gilardi, Luis Barragán, source: <http://www.cesarpesquera.com/casa-gilardi-eng> (access: 20.05.2020)

The architect uses *chiaroscuro* as much as colour. Due to the location of his projects and the sky that is often cloudless, the play of light and shadow has become an integral constituent of Louis Barragán's architecture. The architect used the walls to create shade not only to provide comfort and protection from the harsh Mexican sunshine, but also to create an indoor mood. He believed that the twilight and light filtered through coloured glasses would create an atmosphere of peace and concentration. This is particularly evident in Casa Gilardi, the latest project designed by this Mexican architect. The retirement home house is almost practically devoid of apertures with a direct view of the outside. The architect introduces diffuse light through holes in the corners of the rooms, which he filled with yellow opaque glass. The dining room with an indoor pool is a natural extension of the Mexican sky. This effect was achieved through the intense colour of the walls and the introduction of the natural sunlight through the ceiling.¹⁶

An example of Barragán's work, which was even more focused on creating an atmosphere through light, is the Capuchin Chapel Sacramentarias. The interior is dominated by Mexican colours, which are additionally flooded by scattered light seeping through opaque glass filling the apertures. The entrance hall leading from the patio is also fully flooded with warm yellow light on a sunny day. The architect achieved this effect through a yellow openwork wall, which filters the light and gives it this shade.¹⁷ The effect of illumination is further intensified by the captive water tank located in the wall. Barragán has created a space that adapts to the atmosphere of the day by using an openwork wall. The intensity of the colour is fully dependent on the weather and of how the surroundings react to it.

¹⁶ Casa Gilardi, Nowness, <http://www.cesarpesquera.com/casa-gilardi-eng> (access: 20.05.2020).

¹⁷ K. Duque, *Clásicos de Arquitectura: Capilla de las Capuchinas* / Luis Barragán, <https://www.plataformaarquitectura.cl/cl/02-207404/clasicos-de-arquitectura-capilla-de-las-capuchinas-luis-barragan> (access: 20.05.2020).

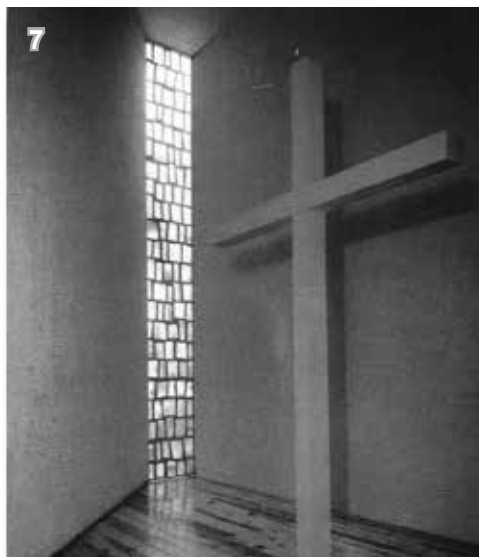


Ill. 4, 5. Casa Gilardi, Luis Barragán, source: <http://www.cesarpesquera.com/casa-gilardi-eng> (access: 20.05.2020)

Light in architectural objects, where the narrative is of great importance, undoubtedly conveys a deep meaning. It is a prominent symbolic medium in semantic architecture.¹⁸ Light as a matter that illuminates objects is one of the most important and universal sacred symbols. The cosmological nature of light makes it significantly global and supercultural.¹⁹ A perfect example of architecture where light is the main narrator is the sacred work of Le Corbusier. By creating three projects of churches in France, he defined the contemporary sacrum and became a signpost for many contemporary architects working in the architecture of meaning.

¹⁸ K. Kucza-Kuczyński, *Sakralizacja betonu* [in:] D. Kozłowski (ed.), *Architektura betonowa*, Polski Cement, Kraków 2006, pp. 45–56.

¹⁹ A.M. Wierzbicka (ed.), *Rola światła w architekturze znaczeniowej*, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2019, p. 41.



Ill. 6, 7. Capuchin Chapel Sacramentarias, Luis Barragán, source: <https://www.picuki.com/location/capilla-del-convento-de-clarisas-capuchinas-sacramentarias-en-tlalpan/1610398762391756> (access: 20.05.2020)

The Dominican Church in La Tourette, built in 1957, is Le Corbusier's simplest sacred project in terms of space. At the same time, it is a perfect example of how a small amount of colour supported by appropriately designed light penetration can create a unique atmosphere in an interior. The monastery church was orientated by placing the main light in the upper part of the eastern wall. The longitudinal apertures, whose glyphs have been shaped at a 45-degree angle, have been coloured.²⁰ Reflected sunlight builds up the climate of the interior, becoming an extremely important symbol of space.

Le Corbusier decided to present the relationship between light and colour in a similar way in the church of St. Peter and Paul in Firminy. The church was designed in 1960–1968 but was not completed until 2006 long after the author's death. As in the project described above, the artist introduces light through crevices filled with colour. The apertures in the presbytery wall were filled with glass lenses. The sunlight lingers in the presbytery only for 30–45 minutes a day. We are able to experience this luminous spectacle between 9:00 and 10:30 depending on the season.²¹ This is an extremely fleeting and dynamic phenomenon. The interior is filled with the colour of the reflected sunshine, which is very dependent on the atmospheric conditions of the moment.

The examples of objects by Louis Barragán and Le Corbusier also show how light is an important element in the process of searching for the 'truth' that arises from the desire to know and understand reality. In 'Polychrome architecturale' Le Corbusier describes colour as 'the daughter of light'. Light and colour are essential elements to experience fully the architecture and learn the truth about it – an art involving all the senses. However, architecture is

²⁰ *Ibidem*, p. 271.

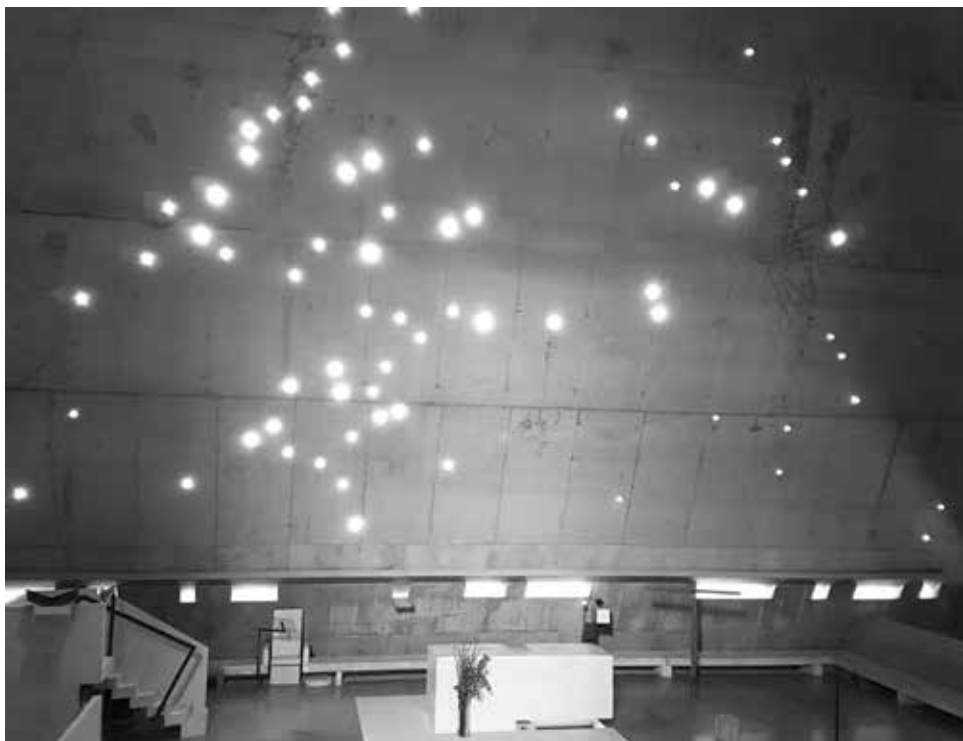
²¹ *Ibidem*, p. 277.

primarily known through the sense of sight. In ancient Greece already, sight was associated with the concept of truth. For the Greeks, what was visible was certain. According to Heraclitus, 'Eyes from ears more accurate witnesses'. Nearly 80% of environmental information reaches humans through vision. The organs of hearing and smell have only a complementary function.²² In this cognitive process, light plays a fundamental role. It allows to extract the essence and the form of spatial architecture.



Ill. 8. The Dominican Church in La Tourette, Le Corbusier, photo: Anna Maria Wierzbicka

²² A. Chęć-Małyszczek, *The concept of light and colour as a key element of experiencing 'feeling architecture'*, *Budownictwo i Architektura*, 2019, no. 18 (1), p. 13, http://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-b9431cae-edc7-42c3-9151-a2828ebe2acc/c/chec_malyszczek.pdf (access: 20.05.2020).



Ill. 9. The Church of St. Peter in Firminy, Le Corbusier, photo: Anna Maria Wierzbicka

4. SUMMARY

The examples mentioned above show how important it is to be able to use tools to shape the environment, which is coloured, properly. It is also important to read properly the nature of lighting and the influence of colours in the surroundings of an architectural object. Every time there is a need to create an object in a given cultural context, the symbolism of colours, which is fixed in a given community and culture, must be recognized and respected. The psychological impact is equally important. Colours evoke different reactions of the body and people are often unconsciously influenced by colour stimuli. When designing a colour, the architect must take into account not only the context but also the nature of the object being designed. The decisions made by the designer have an impact not only on the visual aspect, but also on the well-being of people who are strangers to the building. Spaces such as doctors' offices, psychiatric offices, workplaces, cinemas, homes require special treatment. Therefore, colour design in an architectural space cannot be limited to decoration only.²³ The overall context consists not only of the immediate surroundings

²³ A.H. Radwan, *Colour in Architecture is it Just an Aesthetic Value or a True Human Need?*, International Journal of Engineering and Technical Research, 2015, vol. 4, no. 12, pp. 523–533, https://www.researchgate.net/publication/308439013_Color_in_Architecture_is_it_Just_an_Aesthetic_Value_or_a_True_Human_Need (access: 20.05.2020).

and environment, but also the psychological and cultural background described above. It is impossible to describe colour in architecture in terms of perception of truth without knowing the historical and cultural background of a given place and the community that lives in it. It is thus wrong to look at architecture without taking the context as a whole into account. Learning the truth about architecture through the perception of colour is connected with learning the truth about the context and cultural circle in which a given architecture came to exist.

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