

## SHAPING ARCHITECTURE IN THE CONTEXT OF INTUITIVE AND RATIONAL THINKING

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### KSZTAŁTOWANIE ARCHITEKTURY W KONTEKŚCIE ROZUMOWANIA INTUICYJNEGO I RACJONALNEGO

#### Abstract

Architectural shaping is a complex process. Contemporary inspirations are an important element in architectural design. The process of shaping the form and spatial-material solutions can be based on subconscious, aprioric, creative searches based on experiences and associations, without realizing the ongoing process. In this context, sensory design is important in relation to with space phenomenology or biophilia. The architect's vision is then based on a general outline of the impression and connection of the building with the surrounding environment in the field of spatial and material solutions. Associations and unconventional thinking can lead to non-standard solutions, leading to significant changes in accepted canons and theories, contributing to evolution and development. In contemporary architecture, there is also a shift towards process design, in which *forms follow process*. As a result, it is possible to search for optimization of design solutions, which can be particularly exemplified by bionic or numerical design based on the results of analyses. Particular effects can be achieved by using both intuitive and rational elements in the pursuit of modern architectural solutions.

*Keywords: phenomenology, bionic, process, experience, architecture*

#### Streszczenie

Kształtowanie architektury to proces złożony. Współczesne inspiracje stanowią istotny element w projektowaniu architektonicznym. Proces kształtowania formy i rozwiązań przestrzenno-materiałowych może polegać na podświadomych, apriorycznych, kreatywnych poszukiwaniach opartych na doświadczeniach i skojarzeniach, bez uświadamiania sobie zachodzącego procesu. W tym kontekście istotne jest projektowanie wrażeniowe związane z fenomenologią przestrzeni czy biofilii. Wizja architekta opiera się wówczas na zarysie ogólnego wrażenia i powiązania obiektu z otaczającym środowiskiem w zakresie rozwiązań przestrzennych i materiałowych. Skojarzenia i niekonwencjonalne myślenie może prowadzić do rozwiązań niestandardowych, powodując istotne zmiany w przyjętych kanonach i teoriach, stanowiąc przyczynek do ewolucji i rozwoju. We współczesnej architekturze widoczny jest również zwrot w kierunku projektowania procesowego, w którym *form follows process*. W efekcie możliwe jest dążenie do optymalizacji rozwiązań projektowych, czego przykładem może być projektowanie bioniczne czy oparte na wynikach analiz numerycznych. Szczególne efekty można uzyskać, wykorzystując zarówno elementy intuicyjne, jak i racjonalistyczne w dążeniu do nowoczesnych rozwiązań architektonicznych.

*Słowa kluczowe: fenomenologia, bionika, proces, doświadczenie, architektura*

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\* Ph.D. Arch. Anna Nowak, Department of Structural Design, Construction and Technical Infrastructure, Faculty of Architecture, Warsaw University of Technology, anna.patrycja.nowak@gmail.com.

## 1. Introduction

The process of shaping architecture is based on both intuitive and rational reasoning. The complexity of this process can be seen in the different, step-by-step approach to shaping architectural solutions.

Intuitive reasoning is characterized by a holistic approach to issues without prior analysis. Inspiration may consist in subconscious, aprioric, creative search based on experience and associations, without being aware of the process. This process may be emotional. In this context, it is important to design impressions related to the phenomenology of space or biophilia, which are based on images, patterns and associations. The result is an outline of the image without any additional details. Associations and unconventional thinking can lead to non-standard solutions, which in turn lead to significant changes in accepted canons and theories, contributing to evolution and development. The architect's vision is then based on the general outline of the impression and connection of the building with the surrounding environment in terms of spatial and material solutions resulting from the immediate and step-by-step process. An object is accounted for holistically. The resulting picture of the concept still requires specification and analysis of the correctness of the adopted solutions. The perception of architecture is mainly oriented towards an emotional and sensual approach.

In contemporary architecture, there is also a shift towards the "forms follow process" design. As a result, it is possible to optimize design solutions, which can be particularly exemplified by bionic or numerical design based on the results of analyses. Rational thinking involves consciously applying rules and symbols without additional emotion. The results of the analyses undertaken can be reasonably explained. As a result, the concept is the result of a linear, cause-and-effect process. The perception of architecture is focused mainly on the cognitive understanding verified by experience, but without focusing on impressions and emotions. The most important part of the project is a logical and justified combination of individual elements.

By using both intuitive and rational elements in the search for modern architectural solutions, particular effects can be achieved. Architectural design is a process that should be initiated by inspiration, perception and experience of a place, associations, etc. and project inspirations. However, focusing only on experiences and emotions may not be enough. Good architecture should be a consistent and rational choice of elements. According to the Vitruvian triad, architecture is not art for art, but apart from the beauty visible in proportions, the material it uses and generally understood harmony, it should be useful and durable. These elements may require a more rational approach to the project. However, a creative approach to the concept of durability does not necessarily mean that a building will remain stable over time due to the materials used or the adopted functional layout. In order to ensure its usefulness, it may also relate to the possibility of flexible shaping and adaptation of the building to new functional requirements, which will provide for the duration and functioning of architecture in the urban surrounding. Beauty, however, can be shaped as a result of inspiration, but also as a result of searching for appropriate patterns, e.g. resulting from processes observed in the beauty of nature.

## 2. Intuitive thinking in architecture

Intuitive thinking is based on subconscious reactions, which are evolutionary in nature. As Albert Einstein claimed, *our thinking takes place to a large extent without the use of*

signs (words), and also to a large extent without the participation of consciousness. How do we explain the fact that sometimes some experience induces the feeling of a spontaneous amazement within us? This amazement comes when this experience contradicts the world of concepts that we have established. The influence of intuitive thinking in architecture is particularly visible in the phenomenology of architecture and biophilia, which are based on the experience of space and sensual perception.

The beginnings of phenomenology can be seen in the work of Edmund Husserl in his work *Philosophie als strenge Wissenschaft*, in which he emphasizes that the present philosophy is not science, *one philosophy*, but *only a collection of philosophical systems, schools, and directions, the claims of which do not form any harmonious whole*<sup>1</sup>. As a result, the need to create a new, first philosophy, which can be considered as science, led Husserl to reject the mistakes of naturalism, i.e. the naturalization of consciousness (treating conscious experiences as accompanying phenomena) and the idea (which was identified with facts or reduced to mental creations). Husserl's phenomenological method consists of a return to things, an eidetic analysis and phenomenological reflection. As a result, a phenomenological reduction is particularly important, consisting in a return to things, which helps to "bracket" everything known about a given object in order to be able to see its "essence in direct eyewitness". The eidetic analysis of the being allows for the recognition of the eidos, the general being, in a special direct cognition in the so-called eidetic intuition. The next step is to learn about the phenomenon that is the entity that appears. Roman Ingarden created a kind of instruction and means on how to experience the aesthetic experience in order to live through what appeared to the phenomenologist. A real work of art object, which is a deliberately created object, initiates an aesthetic experience in which an aesthetic object is created. A work of art is also a regulator of this process. A real object is not the same as an aesthetic object that is formed as a result of experience. For Martin Heidegger, an aesthetic experience is *a state and a process of mutual interaction, the ultimate effect of which will then be the existence of, on the one hand, a work of art or an aesthetic object, and, on the other hand, our emotional response, the reaction of the artist, or the preceptor to what was created and with what ultimately became close in some way, not only cognitively*. He also pointed to the interdependence of the artist and the work of art, because one is the source of the other and the other is the opposite. He also made a special reference to space, stressing that *man's connection with places, and through them with spaces, is about living. The relationship between man and space is nothing more than an essential habitat*.<sup>2</sup> A place is not an absolute creation, but it is constituted as a result of interaction with humans: *when a person exists, he constitutes his attitude towards the environment: it is not placed in advance in an existing space, but this space is created in the course of existence as a certain relation*". Hanna Buczyńska-Garewicz also adds that *"Places, experienced spaces, are neither psychological nor physical. As a result of their relational character; they must have a different way of existence, irreducible to them both, but also both containing them. Places have inalienable contents and exist as certain ideal entities, or there are no places or people spiritually inhabiting them at all. The concept of experienced space is an attempt to understand how they exist"*.<sup>3</sup>

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<sup>1</sup> Z. Kuderowicz, (red.), *Filozofia XX wieku*, Wiedza Powszechna, Warszawa 2002.

<sup>2</sup> H. Buczyńska-Garewicz, *Miejsca, strony, okolice. Przyczynek do fenomenologii przestrzeni*, Towarzystwo Autorów i Wydawców Prac Naukowych UNIVESITAS, Kraków 2006.

<sup>3</sup> *Ibidem*.

It is often forgotten in architectural and urban planning about the fact that a building or a space should be useful and charming to the viewer, and not just a shape for the very sake of being a sculptural display of the architect. Inspiration, which is an important element in the design process, should be an impulse that shapes the outline of an object, detailed as the creative process progresses. However, the inspiration alone should not lead to a focus on the creator, but to a perception of the building and space. In this context, Peter Zumthor's words are important: *Once again, I come across buildings that are shaped with a great deal of effort and with the will to give them a unique form, and I feel irritated. An architect who has committed this thing is all but present, but he speaks to me constantly through every detail of the building, and all the time he tells me one thing and the same thing, which is why I quickly lose interest. Good architecture should welcome people, allow them to survive and live, not convince them of something.*<sup>4</sup> Unfortunately, more and more often one can find objects, where the description created by the author of the object is much overbuilt and overdrawn, and the main ideas are not easy to read. The building does not give the impression the architect intended. The key may be to search during the creative process for the truth that lies in the things themselves. Zumthor, referring to Peter Hendke's texts, whom he calls "*the writer of places*", states that it is important to set details in a factual mutual relationship, which will allow to *reduce the content to the state of the art*. In Peter Henkel's opinion, it is particularly important to be loyal to things. *He would like his descriptions to be seen as faithful to the place they describe, not as additional colouring*, he says.<sup>5</sup> What is important in living the architecture is what is most intangible. Zumthor writes: (...) *the spark of a work of art ignites only between the realities of things and imagination. (...) It is only between the reality of the things we treat as the building and the imagination that the spark of a successful project lights up. And this sentence is not a revelation to me, but a confirmation of the experience that I invariably gain at work and of the desire that seems to have its roots in me. (...) The reality of architecture is concrete, something that has become form, mass, space, its body. There is no idea except the one hidden in things*. Peter Zumthor also suggests how the design process should be carried out to achieve a satisfactory result: "*When I focus on a particular place where I have to design something, when I try to explore it, understand its shape, history and sensual properties, then the process of careful examination soon begins with the penetration of images of other places – images of places I know that once made an impression on me, images of common or exceptional places whose shape I carry within me as a model of specific moods and quality, as well as images of places or architectural situations from the world of visual arts, film, literature, theatre*. However, according to Juhani Pallasmaa, *the timeless task of architecture is to create bodily and living existential metaphors that concretize and structure our being in the world.*<sup>6</sup> What, then, is architecture and what should be its structure in order to enable it to live properly. According to Roman Ingarden, a work of architecture *is never a real building – it always contains two layers: a layer of specifically, visibly <heavy> solids, and in special layouts or sequences of exposed appearance*<sup>7</sup>. To see the multiplicity of meanings, to experience space and architecture, as Husserl writes, you have to go back in time to geometry. It may seem, however, that these searches do not necessarily mean her

<sup>4</sup> P. Zumthor, *Myślenie architekturą*,. Karakter, Kraków 2010.

<sup>5</sup> *Ibidem*.

<sup>6</sup> J. Pallasmaa, *Oczy skóry. Architektura i zmysły*, Instytut Architektury, Kraków 2012.

<sup>7</sup> Z. Kuderowicz (red.), *Filozofia XX wieku*, Wiedza Powszechna, Warszawa 2002.

negation, as Hanna Buczyńska-Garewicz writes. By *bracketing* the geometric elements of space one can feel the very purpose of such a shaping. The parameters and means of expression, such as proportions, applied geometry, the play of light and shadows, or materials used, are important for the way of experiencing space in architecture. An appropriate choice of proportions in shaping public spaces or rooms can influence the feeling of security or alienation. The geometry of the layout can have a similar effect, e.g. by using a circular projection you can create a sense of community. The relation of form also plays an important role and the structure of the site, which should aim at mutual integration and synergy. Not without significance is also the conscious illumination or shading of the rooms, which can help in emphasizing the boundary between the sacred and the profane. The material used, through its colour, texture and architectural detail, also has a significant impact on the perception of space, making it more or less accessible. All these elements are part of the perception of architecture, which can be shaped by intuitive thinking as a result of inspiration and the concept of emotional perception and experience of space. These elements form the language in which the architect, artist and creator communicates through his work with the viewer and user. As Peter Zumthor writes, *the sense that must be given to a material entity lies outside the limits of the rules of composition and the tangibility, smell and acoustic expression of the materials are the only components of the language in which we are to express ourselves. Sense is born when (...) the specific meanings of certain materials can be brought out, which in this way will be felt only in one object*<sup>8</sup>.

Some materials also have one hidden feature that they represent about their strength, which unfortunately is not so often used by architects. Namely, there are materials that age beautifully, revealing to the world their new quality, sometimes filled with soul. The right choice of colours also plays an important role, as Merleau-Ponty wrote: *If a painter wants to express the world, then the combination of colours must carry this indivisible whole, otherwise the image will be only an allusion to the thing, will not show their prowess, their presence in an unparalleled fullness that is for all of us the definition of reality.*<sup>9</sup> The individual, detailed elements that affect the overall impression and design of the site are detailed in a way that makes it possible to see an analytical approach, characterized by rational thinking.

All these elements form *defined contents*, material, seemingly visible at first glance in the viewed architectural object, but their exact image, sense appears only in the aesthetic experience. Only then can you experience these seemingly obvious elements in a new, complete way and understand the purpose for which they were used. All these elements have a significant impact on relations with the surrounding landscape, especially with nature. It is particularly important whether the building forms a coherent element of the composition and seamlessly fits in with the surrounding nature, or whether it has been shaped in opposition to it. The aforementioned durability, as an element of Vitruvian triad, significantly influences the perception of architecture. The timelessness of the architectural and urban solutions adopted may make it possible, depending on the means used, for the building to become part of the surrounding natural and urban landscape: *The presence of some buildings hides a certain (...) mystery. They just seem to be there. They will not receive special attention. Yet it is probably impossible to imagine the place where they stand without them. These buildings seem*

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<sup>8</sup> P. Zumthor, *Myślenie architekturą*, *op.cit.*

<sup>9</sup> J. Pallasmaa, *Oczy skóry. Architektura i zmysły*, *op.cit.*

to be firmly anchored in the ground. They create the impression that they are a natural part of the environment, and they say: *I'm what you see, and here I belong*<sup>10</sup>. Then two worlds, natural and anthropomorphic, complement each other and their integration creates something inseparable in the shape of synergy, something more than the sum of both elements, a hidden added value. It seems that there are still intangible elements in architecture that make up the experience of architecture as described by phenomenologists, such as the cultural and historical significance of the place, the genius loci, the identity of the place, the emotional colour and the sensual impact. As Edward T. Hall writes: *Whatever you do, you can't get rid of your own culture because it's written down in our nervous system and defines our perception of the world*<sup>11</sup>. Genius loci can be understood as an urban landscape that is particularly expressive in its experience, i.e. a metaphysical, transcendent, invisible and nature-related spirit of the place<sup>12</sup>. As Ewa Rewers writes, genius loci is an undefined representation of a complex relationship between the individual and a place full of different levels of meaning, interpretation, construction going beyond the structure<sup>13</sup>, as purely intuitive in design. There are no specific rules that determine the origin of genius loci, the identity of a place is born in the pure experience and experience of space. Cultural and semantic layers, which shape the aura of the place, are also of particular importance<sup>14</sup>. One can repeat, after Steven Holl, that *"the way you feel the space, the sound and the smell of these places is as important as their appearance"*<sup>15</sup>.

This theme is not only relevant for newly designed buildings and sites, but also for adaptation and revitalisation of buildings and spaces. In this context, the words of Pier Luigi Cervellati seem to be very timely: *There is no need to design anything new to recover the past. To reuse what exists is a truly modern design concept*<sup>16</sup>. But will everyone experience the same space, architecture, or works of art in the same way? Not necessarily, but as Christian Norberg-Schulz writes, *the value of great works of art lies in their many interpretations without losing their identity*<sup>17</sup>. This reception also has intuitive features. However, it should not be forgotten that *"architecture is created by ordinary people, for ordinary people, so it should be easily understood by everyone"*<sup>18</sup>. Not without significance is also the fact that intuitive thinking has a long evolutionary background, characteristic of all of us. Biophilia works on this basis as well. Space is perceived sensually and emotionally in search of a connection with nature through appropriate, harmonious proportions, arrangements and landscapes, light, acoustic parameters, etc. From the point of view of biophilia, interpretation is of particular importance and the perception of space determined by factors arising from human anatomy, neurology and physiology, and anthropological features resulting from life

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<sup>10</sup> P. Zumthor, *Myslenie architektura, op.cit.*

<sup>11</sup> E. T. Hall, *Ukryty wymiar*, Warszawskie Wydawnictwo Literackie, Warszawa 2005.

<sup>12</sup> E. Rewers, *Od miejskiego genius loci do miejskich oligopticonów, Fenomen genius loci. Tożsamość miejsca w kontekście historycznym i współczesnym*, Instytut Historii Sztuki Uniwersytetu Kardynała Stefana Wyszyńskiego w Warszawie, Muzeum Pałac w Wilanowie, Warszawa 2009, p. 17–27.

<sup>13</sup> E. Rewers, *Od miejskiego genius loci do miejskich oligopticonów, op.cit.*, p. 17–27.

<sup>14</sup> *Ibidem*.

<sup>15</sup> J. Pallasmaa, *Oczy skóry. Architektura i zmysły, op.cit.*

<sup>16</sup> K. Kucza-Kuczyński, *Czwarty wymiar architektury miasta*, Arkady, Warszawa 1982.

<sup>17</sup> Ch. Norberg-Schulz, *Bycie, przestrzeń i architektura*, Wydawnictwo MURATOR, Warszawa 2000.

<sup>18</sup> S. E. Rasmussen, *Odczuwanie architektury, Karakter*, Kraków 2005.

in society<sup>19</sup>. The essence of the biophilia design relies on the adequate illumination of rooms with daylight, selection of colours for the function of rooms, or their location in relation to the compass directions with appropriate exposure and a view and functional connection with an attractive landscape or a natural element. These patterns are partially discussed in the book *The Language of Patterns* by Christopher Alexander, or in the basic principles of ergonomics. Designing based on these principles should adapt to the biological daily clock, appropriate thermo-humidity parameters, associations that cause, among others, proportions of space (shelter, open area) and widely understood references to nature in the aesthetics of curvilinear forms, or through the introduction of natural elements in the form of plants, animals, water, etc.

Contact with the surrounding nature can be an important element shaping an architectural object. The intuitive way of designing, based on respect for the existing landscape values of the place, can be seen in the example of the European Centre for Geological Education in Chęciny, a project by WXCA architects. Despite the fact that it is a large building, it does not seem to interfere with the place due to appropriate view openings and proportions. By means of technical and material solutions, it was possible to achieve a relationship with nature.

Urban layouts can also have the characteristics of biophilic designs. However, the diversity of the constituent elements of cities is not a disadvantage, but it is advisable to seek harmony in their diversity. It seems to me that this objective was achieved in Amsterdam. The effect was achieved by maintaining a similar human scale of development with cohesive material and aesthetically pleasing facades. The skyscrapers are located in the new Zuidost business centre, the industrial and post-industrial part of which is Noord. The whole city is perceived in a coherent way. However, we must not forget about bikes, which have become the symbol of Amsterdam for good reason. In a typical Dutch city centre and outside of it, the observer feels that the city is designed for his needs. The small number of cars on the street, no traffic jams, people crossing the street freely, low intensity of noise and exhaust fumes seem, in fact, unthinkable compared to the loud, congested and polluted exhaust fumes of the centre of Warsaw. In one city, the key recipient is the human being, in another, the car. In Warsaw's city centre, the intensity of car traffic is so high that people are forced to use underground passages. In Amsterdam, on the other hand, there is an enormous amount of cycling traffic. It seems that every inhabitant is riding a bicycle, and public transport and taxis are only for tourists. The city not only has a network of cycle paths similar in number to the street network, but the dominance of pedestrians and cyclists is also visible in the combination of different road classes, where access roads are less important than pavements along the main road. The scale of the city is also important. Amsterdam is half the size of Warsaw and in 15–20 minutes it is possible to reach practically any place by bike, including recreational areas, which has certainly contributed to the popularity of bicycles in the city. The lifestyle of Amsterdam's citizens also seems to be important. Living in harmony with nature, searching for nature in your surroundings and the symbiotic relationship between the city and the water is visible in the Dutch landscapes.

Architectural design can be oriented towards a multisensory perception of space. Juhani Pallasmaa, in his book *"Eyes of the Skin"*, emphasizes that the dominant sense that allows us

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<sup>19</sup> Modrzewski, Bogusz, i A. Szkołut, *Biofilia – teoria i praktyka projektowa*, Tom 1, [w:] *Biocity*, praca zbiorowa, redakcja: Ferdynand Górski i Małgorzata Łaskarzewska-Średzińska, NKA Naukowy Klub Architektury, Warszawa 2015, p. 123–130.

to get to know the space around us is eyesight. He tries to discover other important senses helpful in describing the world around us in front of readers, directing our attention, amongst others, to touch. Psychologist James J. Gibson *organizes the senses in five sensory systems: visual, auditory, haptic, palatal, touch and orientation*.<sup>20</sup> As Juhani Pallasmaa writes, *the eyes want to work together with the other senses. All the senses, including sight, can be seen as extensions of the sense of touch, as skin specializations. They define the interface between skin and the environment: between the opaque interior of the body and the outside world*<sup>21</sup>. However, the question arises whether architecture is equally shaped by using all the senses of the viewer. Does the experience of space without the use of visual perception significantly change its perception and the way it is designed? It may seem that the orientation towards design without the use of a pattern may be the essence of intuitive design. As a result, inspiration is not a simple idea of the aesthetics of a given project, but a purely impressionistic sense of space. Such an experience of experiencing space without the use of the sense of sight can be carried out by visiting the “Invisible Exhibition”, among others in Warsaw. In specially prepared, shaded rooms, you can experience different spaces, including the city street, restaurant or museum. In the first impulse, the perception of space is determined by your hearing. The loud noise of urban public space evokes a sense of insecurity, while the silence in the museum room calms down. Secondly, the touch determines the characteristics of the environment, in which we are located. Different textures and discovering objects allow us to realize where we are. You can then see why Pallasmaa noticed that touch is the subconscious of sight. By touching the materials used, the elements of small architecture, one can imagine the character of a given space and its function. There are also spaces that you can get to know by smell, like a café. As Pallasmaa writes, *sometimes the strongest memories of space are its smell. (...) A specific smell makes us unconsciously enter a space completely forgotten by retinal memory; nostrils awaken a forgotten image and we begin to dream. The nose makes your eyes remember*.<sup>22</sup> However, determining the parameters of the space visible at first sight, i.e. dimensions or shape, is not so easy. These elements, which would seem to be essential for the appropriate perception of space, are partly measurable by measuring distance in steps, or by means of hearing, using the phenomenon of reverberation. It may seem that each participant of this experience imagines a given space differently, based on memories of known spaces of this type, supplementing the image with colours and background elements, which is not entirely controlled by the intuitive design. However, the essence of this data in the experience of space, although it is perceived subjectively, is considered in a similar way for all persons in connection with the same biological codes, which allows to achieve a general and diffused understanding and impression that resulted from architect’s inspiration. Urban space simulated in a large room, together with the sounds of cars, passers-by, the noise of markets, changes in floor level (ramps), or objects that lay out the road, such as parked cars, or objects of small architecture and urban infrastructure, introduce a sense of chaos emissions and dangerous conditions. Every noise is perceived by living organisms as a threat. Despite people becoming accustomed to the hustle and bustle of the city, by making it impossible to determine the real danger with the aid of sight, auditory stimuli are beginning to dominate the perception of this type of space.

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<sup>20</sup> J. Pallasmaa, *Oczy skóry. Architektura i zmysły*, Instytut Architektury, Kraków 2012.

<sup>21</sup> *Ibidem*.

<sup>22</sup> *Ibidem*.

Museum spaces seem to be much more peaceful and safe, in which the variety of shapes and textures can be observed only on the presented exhibits. The whole space seems to be very regular and subordinated to the exhibition. The silence covering the room and the recipient also builds the atmosphere and aura of this place. *The silence of architecture is a sensitive, memorable silence. A powerful architectural experience calms down external noise, focuses our attention on our own existence and, as is the case with all art, makes us aware of our fundamental loneliness*, Pallasmaa writes. However, small spaces simulating living and leisure areas provide a sense of security, which is consistent with biological codes. The revitalized Fort IIIa Zwischenwerk, located at Miłostowo in Poznań is an example of an object adapted to a new function, which allows the space to be experienced in a way which uses most of the discussed planes. The building has a well-developed historical layer and cultural heritage. It was built at the end of the 19th century as one of the 18 forts of the Poznań fortress. It is located on a picturesque forest area, close to the town cemetery. At the end of the twentieth century, in accordance with the idea of continuing functions in this area, it was converted into a crematorium. A long, forest road leads to the building, allowing you to “take a deep breath” from the city’s hustle and bustle and symbolically return to nature. Behind the metal gate you can see a former moat surrounding the fort, which has been partially paved to allow access from the back to the building. The building, like other forts, is designed on an artificial slope and somehow “sinks” in its surroundings. It is perceived as a harmoniously integrated element in space also by using natural, earthy materials such as red bricks. A modern entrance portal with a semi-circle ending, accentuated by yellow, modern façade bricks has been designed in the small window-hole façade typical of defensive buildings. This element unequivocally highlights the combination of “new” and “old” into a single, interrelated whole. All these elements underline the symbolic importance of the building. In a specific way you can feel the time that allows you to move from the existing, old point to the new reality, referring to the change in the state between life and death. The front elevation submerged in the slope, which is the only element visible from the observer’s level, announces the metaphysical nature of the object, which seems to have been given by chance, in a symbolic way introduces the observer into the ground and “earthly” dealings. The object, which was created for defensive purposes, is now perceived in a completely different way, overlooking its 19th-century significance. A long dark corridor is visible after passing through the entrance portal. There are small halls close to the entrance that serve as waiting rooms, foyers, etc. with a barrel-shaped ceiling, slightly overwhelming the observer and giving the impression of carrying a huge load. There is little light entering the rooms through the small windows, which makes the rooms more sacred and mood-forming. Light falls on the raw, old, red brick on the walls and on the ceiling. The whole interior seems to be very sculptural through the texture of the materials used and the vaulting. Only the colours from the earth’s palette were used in this space, mainly red, brown and black, which intensifies the mood full of reverie and peace, but also reveals its mystical character. The selection of proportions, materials, their texture, colours and the play of chiaroscuro allows you to feel the new quality of this space. It introduces the observer to a specific state, which does not allow us to say that this space consists only of the mentioned elements, but also has some kind of added value, which constitutes the boundary between the sacred and the profane. From the waiting rooms, you walk through the dark, tall, brick entrance hall into the interior of the building to the next rooms. As we move away from the main entrance, it seems that we are entering ever more into the darkness. The viewer becomes isolated from

the outside world in every respect. Visual contact with the natural surroundings of the object is lost, as is the case with other senses: no smell of the forest, birds singing, sunlight, wind coming through the tilted window. As you follow a long corridor, you get the impression that the whole world has stopped existing for a moment. The rooms for the rites and the last farewell are completely different from the other rooms. Painted white, they seem to be more elegant and relatively bright despite the lack of windows. Artificial lighting was chosen in such a way as to allow for concentration and a sense of continuity of sacrum. The proportions used, the simple layout of the room and the minimum number of objects in the interior give you the impression of a certain elusive immediacy and unavoidability of the following events. There are no elements that can be distracting (multitude of textures and colours, or striking elements of equipment). After the rite, you go through a long, tall, brick corridor again, but it is perceived in a completely different way. From the darkness and silence that characterizes one end of the corridor, you can see the road leading to almost dazzling light. Leaving the building, one can feel an impression of “emerging” from the ground. After crossing the threshold, you can hear birds singing again, the smell of the forest, a breeze, and life goes on.

Although the object was not originally designed for its purpose, it can be seen that all the elements that are specific to the object are beneficially used. It is surprising how the potential disadvantages of an object, such as the lack of appropriate illumination and relatively long corridors resulting from the shape of the object, were used as elements shaping the mood and constituting its character and symbolism. In this building, light and shadow guide the observer along a predetermined path and create an atmosphere and quality that reveals an architecture full of diverse meanings. Not without significance is also the identity of the place, which constitutes an inseparable whole, adapted for new purposes with respect to both the building and its surroundings. The traumatic and final events that this place has witnessed over the centuries seem to shape the specific spirit of the place, the *genius loci*. The cultural and historical stratification as well as the specific aesthetics of the building arouse emotions, which only intensify the feelings connected with the ceremony, in which architecture seems to participate. Space becomes a catalyst and intensifies the experience through the applied and used elements of structure, proportions, geometry, the play of light, material, relations with the environment, aesthetics, the existing identity of the place and the formed *genius loci*, or the historical and cultural significance. All of this builds an architectural mood, a mood of space that seems to have been created by chance, although it can be a thoroughly analyzed object or one designed as a result of inspiration. The tissue had values that were allowed to bloom in the new function.

### **3. Rational thinking in architecture**

Rational thinking is based on the process analysis of creation, project and using inspirations of various processes, among others observed in the world of nature. It is characterized by the precision of the wording, which can be verified experimentally. The relationships that occur are clearly defined. As a result, the project is not an art for art, but a collection of elements constituted according to selected criteria. As a result, it would seem that every parametric architecture is rational and good. However, in determining its quality, set criteria and parameters are important, which may be inadequately specified and selected.

An example of a rational approach to design are architectural manifestos and theories which determined the shaping of architecture in subsequent periods and eras. The main manifesto of modernism was Mies van der Rohe's "less is more", which determine the simplicity of form, function and structure of an object. As a result, according to the rules, the aim was to select architectural and constructional solutions, e.g. in accordance with the postulates of Le Corbusier's modern architecture. In his publication "Towards a new architecture", Le Corbusier included three mementoes for architects: a plan, an architectural surface and a play on solids in light. The main criterion was geometry, which is also an important element of architectural design in contemporary architecture. As a result, as Mies van der Rohe wrote in his letter "On form in architecture", form as a goal always ends in formalism. Particularly important is the main architectural criterion, which is the starting point of the creative process, and not its very outcome. As a result of the crisis of values, the most important question is 'how' instead of 'what'. The focus on process shaping is also evident in the search for de-constructivism, where the structure is often a geometric experiment. In his essay "Cardboard Architecture", Peter Eisenman points out that it is important to understand the nature of construction and form itself without reference to function or meaning. In his opinion, the shaping of the architectural form of a building consists in distinguishing between functional and technological aspects and those which are responsible for the logic of the structure, leading to the reduction of the significance of the form itself.

The nature of the building is determined by the structure, which is subject to reduction and transformations, as well as form. The structure of the form becomes the dominant element. The development of digital tools has allowed more complex rules and principles to be applied in the shaping of architecture. Parametric design allows for free shaping of architecture with the use of mathematical models and algorithms. The introduced parameters and geometric transformations allow for effective solutions to be sought through the analysis of a large number of examples. Due to the diversity of research in contemporary architecture in the field of shaping structural forms, different possibilities of shaping architectural forms can be distinguished using mathematical standards. In these trends one can notice, among others, the search in the field of designing buildings as simple, rotating solids and as a result of topological transformations (inclination, pulling, changing proportions, twisting) or geometrical transformations (adding, subtracting elements).<sup>23</sup> These issues may also concern the search for the possibility of discretizing the surface, which can be seen in the radial divisions of the dome at the Aquarium in Genoa (project Renzo Piano Building Workshop), or the irregular divisions of the Amazon's Biosphere structure in Seattle.

Optimization efforts resulting from the way of shaping the form, material consumption, pro-ecological and energy solutions as well as the possibilities of prefabrication and execution are important in a rational approach to designing. Architectural design may be the result of interdisciplinary analyses, including architectural, urban planning, aerodynamic and structural analyses, resulting from location (energy, sunlight, and shading), technical-technological or environmental conditions (resulting from the use of materials, their harvesting or processing potential). The design process, based on numerous and multi-criteria analyses, is an element of rationalization of the adopted design solutions.

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<sup>23</sup> A. Nowak, *Kształtowanie bionicznych powierzchni strukturalnych w architekturze współczesnych elewacji*, praca doktorska na Wydziale Architektury Politechniki Warszawskiej, Warszawa 2017.

A particular example of interdisciplinary design, in which an important element is to get to know the process and rules that shape an object, is bionic architecture. Albert Einstein said that he was *aware that the human mind is too limited to penetrate deeper into the harmony of the Universe, which we call 'nature's laws'*, and that *"nature hides its secrets because it is elevated"*. Understanding the rules of nature is particularly important in bionic design. On the basis of the analyses carried out in interdisciplinary project teams with the participation of biologists or using the latest discoveries from the natural sciences, it is possible to create models reproducing processes and systems encountered in the natural world and their application in technology, including architecture. Process design based on natural inspirations may involve shaping form, structure, discretization of surfaces, facade elements, building management systems or material technologies. The solutions found in the world of nature, although they seem to be intuitive, are based on principles related to evolution, morphogenesis and other form-forming processes. By using digital tools, it is possible to use algorithms to shape architecture in a virtual world, where an object is the result of adaptation to physical and mathematical conditions (L-systems and plant development) or biological conditions (genetic, natural selection as the degree of adaptation to conditions). As a result, it is possible to obtain multi-criteria optimization of adopted design solutions, with simultaneous control and selection of aesthetic solutions. As a result of the process and analytical action it is possible to choose the best option among the analyzed ones.

#### 4. Summary

Albert Einstein declared that *thinking without intuition is empty, intuition without thinking is blind*. The sense of this statement is particularly evident in the case of architectural design. The design process should be initiated by intuitive thinking, which allows clarification as a result of inspiration and subconscious experience of the outline of the architectural concept. The emotional and sensational approach is particularly important in the first phase of the design process, where the mood and basic parameters of the space influencing its perception by the user are determined. The next step should be to design with rational thinking in mind. As a result, the inspirations and initial impressions of the building should be logically analyzed and optimized. As a result of a two-stage design process, it is possible to achieve a complete project, the experience of which will have both sensual and intellectual qualities.

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