Architecture as a Consequence of Perception

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Abstract. Architecture, the form it takes, depends on its recipients. It is they who either indirectly or directly determine the shape of the building due to the character of the recipient. The very process of perceiving architecture is unique in this context. The research presented in the article is devoted to defining (presenting) the relationship between the perception process and the shape of architecture. This interdependence – defined by the subject and the object of perception – directs attention to the reception process. The research focuses on searching for determinants that influence this process. They are characteristic of a given recipient; in terms of anatomical structure – common for the whole Homo Sapiens species, in terms of cultural conditions – unique for each individual. The research is based on the assumption that the multisensoriality of this process is distinctive for the perception of architecture in relation to other arts. While in the case of painting the basic sense participating in the perception is sight, in the case of music, it is hearing, in the case of architecture “almost all senses” are involved.

The research aims at demonstrating the relationship between the particular senses and the shape of architecture. The scope of research has been limited to contemporary architecture, with particular emphasis on the buildings constructed at the turn of the 20th and 21st centuries. The research is a study of selected cases that have enabled one to present the features of the architectural form in relation to individual human senses as well as the character of the space of building, resulting from this interdependence. To demonstrate the multidimensionality and complexity of this process, the scope of research has also been expanded to include information from the field of psychology and aesthetics. At the same time, research has been limited to physiological conditions only, assuming that cultural conditions require an independent study. The research leads to conclusions that can be summarized with the following statement: the shape of architecture depends on factors that affect the perception process. Contemporary architecture, which operates with the concepts of a language different from the historical one, introduces new interdependencies, new processes, and changes the way one perceives the surrounding space.

1. Introduction: man-builder

The claim that it is an Architect who designs a building is so obvious that it can be considered a truism. However, it is only one of the possible approaches serving to describe or explain the shape of architecture. Architecture – the form it takes – does not depend on the designers only, but also on the recipients. It is they who (indirectly or directly) determine the shape of the building. This interdependence results from the character of the recipient – man. For the process of perceiving the reality that surrounds them is unique.

Man is not the only species that engages in building as part of their life activity – there are also other animals that build (e.g. birds, insects or mammals). In their interaction with the surrounding
reality, people find beauty in the surrounding nature – in the shape of a stork’s nest, spider web or beaver dam. The role of the relationship between man and nature is emphasized by Maria Gołaszewska who points to: “a variety of phenomena and creations of nature which, being equipped with aesthetic qualities, awaken aesthetic experiences, as well as the diversity of aesthetic situations arising here due to different perceptual conditions, the distinctness of »a priori cultural« recipient” [1]. Since man-made construction exists in parallel with the one created by other animals, is there any element that distinguishes architecture? What characterizes human activity in terms of building? The answer to this question can be found in the studies of Herbert Read and Jerzy Vetulani. Read emphasizes an important moment in the history of human development: “the essence of the matter is the fact that always at some point in this process of formal evolution the form responds not only to a utilitarian purpose, but also to a spiritual need” [2]. As Andrzej Oęka emphasizes in the introduction to that research: “Read does not attempt to determine this moment historically, but states that this breakthrough is of the utmost importance for the human species: it is here that homo faber transforms into homo sapiens, reveals »independent will to form«, which defines one’s own attitude to the secrets of existence” [3]. In thinking about the differences between man and other animals, Professor Vetulani goes a step further and puts forward the hypothesis that it is art that distinguishes us from other animals [4]. Regardless of which definition of architecture we adopt, it should be considered as art... as the art of building. In this context, it will be possible to distinguish human activities. For art carries along with it an additional “element”, a value that allows one to distinguish architecture from construction. However, before the building can be recognized by the observer as an architecture, a sequence of events follows. This process – perception – is initiated by the reception of stimuli through the recipient’s receptors. Its end result is the aesthetic experience [5]. Receptors, or specialized cells for receiving stimuli, build sense organs, characteristic and specific to humans.

2. Man and the senses
For aesthetic experience to occur, the human brain must collect a certain amount of information. Its sources are elements within the space that surrounds the observer. Before they can be processed by the brain, they must be first received. This occurs through receptors which in the case of man allow one to enumerate the five basic senses: sight, hearing, smell, taste and touch [6]. However, one should point out a few characteristic features that distinguish some of them. Since some receptors in the eye are responsible for the recognition of colour (frequency of the wave), and others for the recognition of brightness, one can consider the sight as a sense consisting of two separate senses [7]. Likewise, the senses of taste and smell are also “multidimensional”, and so are sensory stimuli (touch) that allow one to feel in terms of: pressure, temperature, balance (associated with the labyrinth in the ear) and proprioception (the sense of the relative position of one’s own parts of the body and muscle tension). Furthermore, chronocception, or the perception of time, is also considered to be a sense [8].

With regard to the senses of man and the very process of perception itself, it is necessary to draw attention to a certain specific character of this process in relation to man, as discussed by G. M. Wyburn and R. W. Pickford: “The processes of photographing or transmitting the image via television result in a copy that corresponds to reality, and the type of equipment used may change the form of the image, but not its content. On the other hand, in the case of man the content of the observation may not correspond to reality, even when the correct form of perception is preserved” [9]. An example of this type of operation may be an incorrect (incompatible with the actual state) code reading. In contemporary architecture, which prescinded from its historical codes as early as at the beginning of the 20th century, a house may look like an office building (e.g. House R128, designed by W. Sobek, 1998-2000, Stuttgart/Germany); or a bunker (e.g. Terrace House, designed by H. Sambuichi, 2002, Hiroshima/Japan). These considerations, however, go beyond the scope of this research and should form the basis for an independent study.
It should also be noted that the participation of individual senses in the perception process differs – some stimuli are more important to the recipient; others constitute a mere complement to the sensations.

Table 1. Comparison of the perception of the environment by individual human senses

| Sense      | sight | hearing | smell | touch | taste |
|------------|-------|---------|-------|-------|-------|
|            | 83%   | 11%     | 3.5%  | 1.5%  | 1%    |

Although the above table shows overwhelming superiority of sight over the other senses, they should not be ignored. As one can notice: “it is surprising how strange coffee can taste when we drink it convinced that it is tea. One needs to see a lot more than what our eyes encounter. One should hear and feel a lot more than the receptors of our nervous system register. The beginning of creativity is the intelligence of perception” [10]. At the same time, both at the stage of designing and subsequent reception of architecture, what is important is the simultaneous coexistence of the senses whose sensations merge into one reception [11].

3. Architecture and sight

The relationship between sight and architecture (also in relation to other visual arts) seems obvious. Seeing architecture is as irrefutable as saying that “architecture is the learned game, correct and magnificent, of forms assembled in the light” [12]. As Le Corbusier points out: “Our eyes are made to see forms in light; light and shade reveal these forms; cubes, cones, spheres, cylinders or pyramids are the great primary forms which light reveals to advantage. Everybody is agreed to that, the child, the savage and the metaphysician. It is the very nature of the plastic arts”, [13]. In contrast, Juhani Pallasmaa contradicts the imperative role of the eyesight in contemporary reality, stressing that it leads to “partial cognition” [14]. Regardless of this statement, the significance of the sight is undeniable – it allows one to: distinguish light from darkness, evaluate the direction of light incidence, recognize shapes, distinguish colours, assess distance and (sometimes) recognize linear polarization of light.

The abovementioned capabilities of human perception seem fundamental for architecture to exist in the mind of the recipient. Light has accompanied architecture since the dawn of history, it brings out its shapes, it allows the observer to experience the shape, distance, colour and texture. In the architect’s hands, it becomes a powerful tool for creating the form and character of a building. To visualize the above claim, one can mention the following after-images here:

- The shape of the cross painted with light in the dark interior of the Church of the Light (designed by T. Ando, 1989, Osaka/Japan),
- The glass walls of the Cartier foundation dematerialized to the almost invisible ones (designed by J. Nouvel, 1991-94, Paris/France),
- Or, the façade of the Arab World Institute controlled by the mechanical precision of a camera shutter, (designed by J. Nouvel, 1987, Paris/France)

Contemporary times also offer a wide range of possibilities related to the use of artificial light, as in the Kunsthau Graz building (designed by P. Cook and C. Fournier, 2003, Graz/Austria), Allianz Arena (designed by Herzog & de Meuron, 2005, Munich/Germany), or Galleria Department Store (designed by UN Studio and ARUP Lighting, 2003-04, Seoul/South Korea).

Brightness and darkness are not the only attributes associated with light. Contemporary times offer unlimited possibilities in terms of colour. With regard to historical architecture, we naturally have access to a large amount of colours, but it should be noted that their source was the natural colours of materials (like stone or brick) and the possibility of dyeing (e.g. plaster) with the use of natural, most commonly found pigments. Today, owing to the achievements of chemistry and transport possibilities,
designers have an almost unlimited range of colours at their disposal. However, attention should be
drawn to two aspects of this situation:

- A large part of the materials is produced as artificial elements that have previously not existed in a
given colour scheme, layout of texture and divisions. An example of such a measure is the use of
claddings that imitate brick – they offer a vast colour scheme, and the material can be laid (glued)
differently than in the case of a traditional brick wall;

- Today’s world has become a global village. Access to technology is common and possible in
virtually any place on every continent. This allows one to use any material in any location. This
means that an unfamiliar, non-existent so far, colour can be introduced in a spatial context of an
established nature. It is possible that this experiment will result in the enrichment of space, but
there is also the likelihood that such a disposition will be a perfect illustration of the “fuck the
context” statement delivered by Rem Koolhaas during one of his lectures [15].

4. Architecture and hearing

Mentioning the experience of architecture from the time “when I experienced architecture without
thinking about it” [16] Peter Zumthor reveals one of his childhood memories to the reader. The
description contains such descriptions as “the sound of the gravel under my feet”, “I can hear the
heavy front door closing behind me”. These observations, constituting part of the architectural
description of space, refer to sensory perception in terms of hearing.

As Zumthor rightly observes, the experience of architecture also applies to the experience that the ears
of the recipient provide. As Rasmussen rightly notices: “We are rarely aware of how much we hear”
[17].

The role of sounds in shaping the reception of architecture is emphasized by the walls that build the
spaces of the La Tourette monastery. “The silent, soundless place of residence for one hundred bodies
and one hundred hearts” [18] designed by Le Corbusier has already been analyzed a number of times;
described and measured, it seems no longer to hide any secret. And yet to fully feel the nature of this
place it is not enough to analyse the plans, trace photos or compare colours [19]. One has to hear the
silence of the church, experience the phenomenon of the place that was designed in times when
acoustic standards did not exist yet.

The reception of St. Mark’s Square in Venice seems to be situated on the opposite pole to the
silence of La Tourette. Among the crowd of tourists who tightly fill this space, among the ringtones,
the hustle and bustle generated by unaware visitors, the reception of one of the most beautiful public
spaces has become almost impossible. Today, when Venice is visited by 26 million tourists every
years, in order to be able to calmly contemplate the silence between the façades of the Basilica of St.
Mark, Procuratie Vecchie and Procuratie Nuove, one should arrive there at night. Then, and only then,
one can calmly focus on the shape of the space, illuminated by the delicate light of the moon,
testifying in the silence of the night to the spirit of a once powerful city that is absent now [20].

Somewhere in between the poles of extreme noise and complete silence described above, there is
room for the role of acoustics in the design of contemporary architecture: corridors soundproofed with
acoustic panels in the Bella Sky Hotel in Copenhagen (designed by 3XN, 2011), the interior of the
concert hall of the Polish National Radio Symphony Orchestra in Katowice resounding with music for
several years (designed by T. Konior and team, 2014) or Concha Acústica in Brasilia, mute in silence
(designed by O. Niemeyer, 1973).

5. Architecture and taste

There is no direct connection between architecture and the sense of taste. In this respect, one can
search for references to previous experiences in the experience of each individual recipient. In this
context, the multi-sensory perception of architecture can evoke reactions related to the memories
associated with taste rather than the sense of taste itself. Their recovery, recollection, however,
depends on individual experiences.
It is also possible to find linguistic connotations and similarities... After all, architecture – as any of the arts – can provide as many sensations as the flavours do. Considering the multicultural diversity of global architecture, it is like a melting pot – a composition of repetitive elements that create a unique quality every single time.

6. Architecture and smell
Just like taste, smell does not seem to be directly related to architecture. Designing a building with a thought of its fragrance in mind could be considered simply ridiculous. And yet in Pallasmaa’s memories, one can almost smell the scent of the interior of his grandfather’s apartment; as he points out himself: “We need only eight molecules of substance to trigger an impulse of smell in a nerve ending, and we can detect more than 10,000 different odours. The most persistent memory of any space is often its smell” [21]. Isn’t the fragrance of wood in a log cottage in the Tatras unique, or the smell of an old tenement house – perhaps slightly less pleasant – but still characteristic? It is the sense of smell that allows the recipients to fully experience the open space of a natural landscape untainted by human hand, the same smell informs them that the space in which they reside is a city full of smog and exhaust fumes. Do these stimuli affect the reception of architecture? Undoubtedly – yes! It is through associations recorded in our memory that real sensations arise, accompanying the actual experiences that relate to architecture through the prism of the previous extremely individual and intimate experiences of the recipient. Not only do they accompany the recipients, but they also affect the present, echoing memories, and consequently shape the future.

One should only regret that the contemporariness of the surrounding space no longer smells naturally with the resin of wood, warmth of brick or coldness of steel, and instead – in the world of allergy and ubiquitous smog – it impresses the stigma of artificial fragrances on the recipients, as artificial as the space they build.

7. Architecture and sensory stimuli
As mentioned before, the touch receptors are responsible for the complexity and variety of sensation, as they enable one to record temperature (cold and heat) and the surface structure – smooth/rough, hard/soft. Proprioception, which is an element of the sense of feeling, also supports orientation in space. Impressions, which are the source of this sense, to a large extent allow the recipient to commune with the surrounding space every day. It is owing to the sensory experience that such elements in the immediate human environment as furniture, flooring material, wall cladding are designed. Also, the elements that the recipient does not touch directly can be received with the participation of not so much sensory stimuli as the previously remembered impressions.

An interesting example of the conscious use of the sense of feeling to build the character of space can be the design of Katyń Museum (P. Pyrtek, M. Skaza, R. Zawisza, A. Janicki, M. Fischer, J. Fiszer, E. Szpakowska, K. Fabijanowska, M. Krajewska and R. Krzysztofik, 2009, competition entry, honourable mention): “The project entailed strengthening the effect of audio-visual stimuli with temperature. The chill prevailing in the spaces associated with emotions is to be a factor that reinforces their action in a ‘subliminal’ way. The aim of the project is therefore to design the exhibition space so that it directly influences the emotions of visitors, without losing any educational character. Only such an exhibition can become a function of collective memory” [22].

8. Results and discussions
The reflections presented above relate only to selected issues that describe the complex process of the perception of architecture. The scope of research, limited to the architecture-senses relationship, allows one to identify several key findings for these considerations:

− Perception is a common process both for the creation and reception of architecture;
− The shape of architecture depends on a number of factors, including the biological possibilities of the perception of its recipient;
− Determinants affecting the reception process are characteristic of the recipient; due to anatomical structure – common for the entire Homo Sapiens species, due to cultural conditions – unique for each individual.

− Contemporary architecture, which operates with elements of language in a different way (in relation to the historical one), introduces new interdependencies, changes the way one perceives the surrounding space.

Parallel engagement of many senses of the recipient in the process of perceiving architecture suggests the necessity of its direct experience. As Pallasmaa points out: “The live encounter with Frank Lloyd Wright’s Eallingwater weaves the surrounding forest, the volumes, surfaces, textures and colours of the house, and even the smells of the forest and the sounds of the river, into a uniquely full experience. An architectural work is not experienced as a collection of isolated visual pictures, but in its fully embodied material and spiritual presence” [23]. F. L. Wright’s project is only an example representative of architecture as such – the conclusion will therefore remain the same: it is important to experience architecture as fully as possible.

References

[1] M. Golaszewska, “Outline of aesthetics” pp. 92–115, 1984 (in Polish).
[2] H. Read, “The Origins of Form in Art”, p. 7, 1973 (in Polish).
[3] op. cit., p. 7.
[4] Brain and Art. Wszechnica PAN Polskiej Akademii Nauk. Retrieved from: http://www.wszechnica.pan.pl/index.php/poprednie-wykłady/18-rok-2010/47-mozg-a-sztuka (in Polish).
[5] R. Ingarden, “Studies in Aesthetics”, Vol. 2, p. 118-119, 1958 (in Polish).
[6] It is worth drawing attention to the development of modern technology, which has enabled man to develop a series of “surrogates” – tools (mainly technological ones, such as computers or smartphones) allowing for the extension of the range of received stimuli, f. M. Wigley “Prosthetic Architecture: Notes Towards a Prehistory of the Virtual” [in:] „What is Architecture? Anthology of texts”, pp. 196-241, 2002.
[7] “Sensation and Perception”, 2002 (in Polish).
[8] It should be noted that some animals also possess other senses, those include dolphins or bats among others, whose organs enable echolocation.
[9] G. M. Wyburn, R. W. Pickford, “Human Senses and Perception”, pp. 11-12, 1970, (in Polish).
[10] “Sensation and Perception”, op. cit., p.11, 2002 (in Polish).
[11] J. Pallasmam, “The Thinking Hand. Existential and Embodied Wisdom in Architecture”, pp. 83-86, 2015 (in Polish).
[12] Le Corbusier, “Vers une architecture”, p. 80, 2012 (in Polish).
[13] Le Corbusier, “Vers une architecture”, p. 80, 2012 (in Polish).
[14] J. Pallasmam, “The Eyes of the Skin. Architecture and Senses”, pp. 23, 2012, (in Polish).
[15] W. Kosiński, “Don’t fuck the Context", [in:] “Architecture and Modernity. Discussion in La Tourette”, pp. 64-73, 2017.
[16] P. Zumthor, “Thinking Architecture”, p. 7-8, 2006.
[17] S. E. Rasmussen, “Experiencing Architecture”, pp. 224-225, 1999 (in Polish).
[18] M. Skaza, “Discovering the phenomenon of La Tourette”, ARCH 2-13 No. 4 (18), ISSN 2081-8092, pp. 102-107 (in Polish).
[19] G. H. Baker, “Le Corbusier. An Analysis of Form”, pp. 267-298, 1989.
[20] B. Malinowska–Petelenz, “La Serenissima: thing about the Beauty, Identity and Magic of the City” [in:] B. Malinowska–Petelenz, M. Skaza, M. Twardowski “Venice. Potential”, pp. 13-79, 2017 (in Polish).
[21] J. Pallasmam, “The Thinking Hand. Existential and Embodied Wisdom in Architecture”, 2015 (in Polish), pp. 66.
[22] Excerpt from the description of the competition entry: “The programme and spatial concept of Katyń Museum in the building and surrounding of Caponier in the Warsaw Citadel”, https://www.archdaily.com/806405/katyn-museum-bbgk-architekci, online: 06/2018

[23] J. Pallasmaa, pp. 54. “The Thinking Hand. Existential and Embodied Wisdom in Architecture”, 2015 (in Polish).