

JAN SŁYK*

A HOUSE IN THE CITY OF BITS

DOM W MIEŚCIE BITÓW

Abstract

The house materializes human endeavours in the realm of necessities of life, security, social and individual development as well as in the sphere of realization of aesthetic needs. Groups of houses built on the basis of rules of coexistence form cities reflecting the spirit of the times and the spirit of the place. What is the specificity of the house in the era of the information society? To explain it, I will present artistic visions, theoretical and practical concepts that affect the reality of the houses immersed in the digital realm

Keywords: information architecture, futurism, virtual reality, augmented reality, exhibition pavilions

Streszczenie

Dom materializuje ludzkie dążenia w sferze potrzeb życiowych, bezpieczeństwa, rozwoju indywidualnego i społecznego a także w sferze realizacji potrzeb estetycznych. Zespoły domów budowane zgodnie z regułami współistnienia, tworzą miasta odzwierciedlając ducha czasu i ducha miejsca. Jaka jest specyfika domu ery społeczeństwa informacyjnego? Chcąc ją przybliżyć przedstawię wizje artystyczne, teoretyczne i koncepcje praktyczne, które wpływają na rzeczywistość domów zanurzonych w rzeczywistości cyfrowej.

Słowa kluczowe: architektura informacyjna, futurizm, rzeczywistość wirtualna, rzeczywistość rozszerzona, pawilony ekspozycyjne

* Assoc. Prof. PW Ph.D. D.Sc. Arch. Jan Słyk, Faculty of Architecture, Warsaw University of Technology.

The house is an architectural expression of man's desire to meet his needs in both the material and spiritual realm. It is a sign of the times in which it arises. It determines the standard of daily activities. It manifests the aspirations and tastes of the householders. Sometimes it becomes an externalization of their personality.

In order to determine the home of our time you need to start by understanding the background in which it exists. In the pessimistic approach – the background of decline, which Oswald Spengler associates with the extreme specialization, glut, loss of strength and interest in life. In a positive perspective – as an environment driven by a new force, the force of digital technology and new media.

The user of a contemporary home is on the border of two worlds. If he is a Brazilian, he spends more than nine hours a day connected to the Internet and social media. He uses mobile devices to transfer the information for four hours. For four hours to transfer the information used for mobile devices¹. He makes extensive use of the interpersonal and social contact, implemented through communication portals².

Lifestyle changes have reached a level where apart from the social consequences, a clear impact can be seen on the economic sphere. According to a Scandinavian study, surfing the Internet takes the average European citizen about an hour of the daily working time³. This is not related to obtaining the information needed to perform the tasks. It is an alternative, private sphere of intellectual activity, as some think – unproductive and demobilizing...

We use our spare time, as statistics show, to watch television and use digital media, in addition we rest passively, spend time with the family, stroll. We read progressively less, we do not go to concerts and more rarely choose physical activity⁴.

Exposure to information is the dominant feature of the environment of civilized countries. This applies to the urban and architectural environment, including the housing environment.

To get closer to determining what a house corresponding to the specifics of the era of the information society is, I will examine three groups of premises. I'll start with the literary and cinematic visions which draw the futuristic picture, free from the limitations resulting from the advancement of technology. After that, I will look at objects of exhibition pavilions seeing them as prototypes for future solutions. I will conclude with an analysis of methods of design and execution, specific to the digital world.

The "Futurologic" house and the Matrix house

Ion Tichy takes board on Costaricana in a space which would satisfy a conservative vulnerable to luxury. In the spacious hall the floor is covered with carpets, the walls with majolica, light is provided by iridescent chandeliers and the food is served on exquisite silver tableware [4, p. 291]. This is at least Ion's impression. Only when he takes *antych* supplied by Trottelreiner, does he recognize that, in fact, he is sitting in a concrete bunker. The aesthetics of the environment does not differ from the quality of *grey-brown slush*, which just seemed to be a tasty roast.

¹ Global *WebIndex 2015* states that Brazilians are world leaders in the field of time spent on web services; according to the same data Poles spend on web based activities approximately six hours a day.

² According to the report *Digital in 2016* prepared by *We are social media*, 31% of the world population uses social media, which creates an annualized growth rate of 10%.

³ Report by *Centric* based on 2015 data.

⁴ Sources: Eurostat *Quality of life in Europe 2012* and CBOS: *Czas wolny Polaków, 2010*.

In the reality of *psyvilization* which Lem draws on the pages of Futurologic Congress, nothing is as it seems. A federal ban on aging is in force. *Libiscites* determine the dominant type of feminine beauty. Ingestion of suitable *mascons* guarantees satisfaction in terms of aesthetic sense, including the character of the architectural environment.

Thomas Anderson, similarly to Tichy, lives and works in a safe, averaged spatial environment. His messy apartment seems spacious. Finishing materials, furnishings and accessories create a coherent picture of a modern but not avant-garde interior. Similarly, in the workplace. It is dominated by ergonomics and simplicity. There are no signs of extravagance, and at the same time nothing interferes with the office tasks.

To break the veil of delusion, you have to swallow a pill. Then we watch the real world of Neo. The house of the freed is an ark – a ship floating in an undefined space built by the machines and for the machines. The bridgehead of normality is not convenient. Cut from the menacing surroundings *human* fragment is primarily to ensure safety. Applied materials, technical solutions, and even clothes and food are a sign of concern for the rational management of resources. The minimalistic design, rational and modest interiors create a film image of a resurgent community of tomorrow.

The futurologic house and the Matrix house are mental representations that today we would call **virtual reality**. They are separate by a distance of nearly thirty years, they have been realized using different techniques of stimulation. In Lem's vision – they are chemical, in the Wachowski Brothers' – electronic. Still, the resemblance is striking.

The vision of the future is based in both cases on the assumption that the development of civilization will lead to disaster. The domination of technology over social life will cause a blurring of the image of reality – including the image of the spatial environment. The perception of the true vision of the world will require physical and mental effort.

The picture of the houses of the future of Lem and the Wachowskis is associated with the rebirth of a healthy hierarchy of values. In the architectural context it means a return to the fundamental characteristics of the house – protection, functional rationality, and a sense of identity.

The house of Neuromancer and the house of Anderton

Henry Dorsett Case, a hacker from Chiba City⁵, lives in a two-tier world. Dean's office, which he enters, has been furnished with neo-Aztec bookcases, and a steel table in the style of Kandinsky painted red. At the same time it has been accessorized with *transport modules* out of glass fibres and a holographic clock forming the illusion of hands having variable shape [1, p. 16]. The cheap hotel at Baiitsu, in which Case keeps a chest was made *without a project*, the construction uses bamboo and epoxy resin. You enter through a plastic cage, the lock of which responds to a magnetic recording. In the interior, which is based on a regular square plan, a synthetic floor resembling a lawn is used. Books are read using a *semicircular console*. The entrance to the room responds to commands from the computer controlling the flat.

Agent John Anderton⁶ enters his home through a window, because it's there he just parked his magnetic car. With multi-level flyovers intersecting the vertical space of Washington, D.C.

⁵ The main character of the novel *Neuromancer* by William Gibson.

⁶ Main character in the movie *Minority Report*, dir. S. Spielberg.

2056 r. he turned to a vertical wall of a skyscraper, to finally rest on the shelf protruding from the apartment. The apartment gives the impression of being traditionally furnished, but with the arrival of the owner it comes alive. Furniture recognizes the presence of Anderton, lighting reacts to his movement. Accessories can be controlled by voice, a projection apparatus creates an artificial scenery. The PreCrime Office, in which the hero is working, is equipped with even more fascinating outfits. You do not need a lot of space for the control panel and monitors. Access to information is provided by a terminal responsive to the movement of the hand equipped with markers. Translucent, multi-function devices are accompanied by traditional architectural elements providing support to the senses, providing spatial orientation and a sense of identity. The GAP store entered by Anderton is the most outstanding example of the functionality of the hybrid environment. Functional organization and furnishings seem traditional, but the retinal scanners identify the user and offer goods and refer to previous visits. The phenomenon of personalizing content, which we know as users of Internet portals, in this case takes a spatial form. Unfortunately, Anderton has undergone surgery and the shop is mistaken in identifying him. In the world created by Spielberg, the spatial context of your home is not pre-defined. What house you enter depends on the response of the digital infrastructure that correctly or incorrectly recognized your identity.

The architectural space surrounding Anderton and Case is futuristic but is fundamentally different from that which we know from the movie *The Matrix* and *Lem*. By analogy, based on the theory of architecture, the second concept could be associated with the thought of Kengo Kuma [3]. In virtual space, nothing is objectively true. Only our ideas and feelings are real.

The reality materialized in the film *Minority Report* stems from the rational, Aristotelian, concept, in which we trust the senses and reason to create a true picture of the world. This idea was already present at the stage of pre-production, which was aided by academics. Among them – the expertise of Professor William Mitchell, dean of the Faculty of Architecture at MIT, who had an impact on the spatial solutions.

Anderton and Case live in architectural augmented space. It is a combination of tectonic (embedment, structure, detail) and electronic (detection, control, projection) elements. This vision, shaped in literature and film in the last quarter of the last century, proved to be so accurate that we can speak today of its partial implementation.

Philips pavilion and modern exhibition pavilions.

Exhibition pavilions may not be a home in the literal sense. They do not serve a permanent process of use. However, they are an excellent testing ground. They are relieved from the responsibility for the long-term effect, thanks to which the ideas tested can be bolder.

Although the Brussels EXPO 1958 arose in the era preceding widespread computerization, it was there that there appeared an object that must be called the precursor of the house of the bits era. The form of the majority of the objects corresponded to the spirit of the demands of modern architecture. It was dominated by orthogonal plans and regular divisions of the facades. They sought to minimize the significance of decorative detail. Structural elements were exposed, which were optimized so as to achieve as slender proportions as possible.

Against this backdrop, the Philips Pavilion, a world leader in the electronics industry, had a special presentation. The external form went in the direction of the general trend, although its expressiveness exceeded the achievements of the competition. The most important for our considerations was the inside. It was established as a realization of the idea expressed by Le

Corbusier with the motto *content container*. The hybrid structure resembled futuristic literary concepts. The surrounding surfaces were shaped so that visitors could get away from the outside world. They didn't form a regular system. It was precisely the opposite – they resembled the inside of the stomach, as the author himself called the exhibition space.

Philips has provided hundreds of top-notch speakers and projection equipment providing the ability to create images surrounding the guests. The touring cycle lasted about eight minutes. The content of the message concerned the development of human civilization from its beginnings up to the peak of technology, which was perceived in the fifties as the era of space exploration. Synchronization was assured through the appropriate timing of the entry of groups and going through the whole exhibition.

The Philips Pavilion was designed collectively by Le Corbusier and Iannis Xenakis which contributed to the interdisciplinary nature of its implementation. You can see many features of modern media architecture: variable, programmable content, the flexibility of interpretation of architectural elements, the use of electronic media. The pavilion could not be programmable and interactive in the sense of what we associate with these concepts today. Nonetheless it was a foothold for new trends that, through the spread of computers, strengthened in subsequent years.

The complex of pavilions of fresh and salt water realized in the Netherlands in the late nineties follows the Philips pavilion using elements of contemporary technology. Two independently designed buildings connect with an ellipsoidal shape which constitutes the only plane of correlation. The Pavilion of Fresh Water designed by the company Edwin van der Heide refers to the inspiration by the river, both in the aspect of its mobility and the specifics of the underwater environment. The Salt Water Pavilion designed by a team involving Lénárd and Kas Oosterhuis integrates a metaphor for a heavenly sea surface and a band connecting the two planes. The authors declare their unwillingness to describe the structure of the building in a traditional way. In the pavilion of water environment function changes. It is a component of the structure, the casing and the interface all at the same time. The impact of media was implemented by automatically generating audio and visual signals. As noted by Edwin van der Heide, the user has to have the impression that he can hear the building more than the sound in the building [7].

EXPO 2008 in Zaragoza gave a chance to present a concept that even more boldly combines nature, technology and digital media. The MIT pavilion was selected by Time magazine as the architectural discovery of the year. Three thousand computer-controlled valves let through jets of water in a manner that allowed to create a picture on a vertical wall of droplets. Professor Mitchell, commenting on the concept of the pavilion, emphasized its pioneering role in the reconstruction of architectural language. In the world of programmable structures, such as a water wall, nothing needs to be predefined. You can real-time change the location of the “door”, “windows”, pattern detail and other features associated with the aesthetics of buildings [8].

The solutions presented in the exhibition pavilions penetrate into architectural practice. Most of the pavilions during the last world exhibition in Milan benefited from the achievements of information technology. The effect on the senses of visitors was achieved using techniques the sources of which you need to look for in the Philips pavilion.

Different interpretations of the immersive, innovative displays, projections replacing physical material enrich the language of modern buildings. In modern museums, such as the Mercedes-Benz Museum in Stuttgart visitor presence in a given location is detected, and

the architectural structure responds appropriately. Smart houses, using sensors for weather conditions, respond to user mode in a manner similar to the behaviour of the film apartment of John Anderson.

Digitally generated house: Hershey and Freedman's palladianism, Duarte/Siza estate, DIY houses and houses built by machines

Although this subject arouses legitimate controversy in the architectural environment, in a discussion about the house of the bit era a question must be raised: who would be its author. The complexity of the process of architectural design allows the anxiety associated with the vision of automatic creation to be rejected. However, there are examples of work in this field, which have been successful and the suitability of which for the development of CAD is significant.

Research on grammar shapes was conducted at MIT already in the 1970s. By describing the rules governing the system of shapes in a manner analogous to the structure of the sentence, we managed to control, using a computer, the process of drawing (projection, cross section). Consequently, it was possible to formalize the style of artistic expression [6]. A fascinating example of the application of this method can be found in the book on automatic generation of a villa in the Palladian style [2]. The authors created computer programs called planmaker and facademaker, based on the use of a grammar of shapes. They tested their operation by generating projects for houses compatible with the existing designs of Palladio and others embedded in the same stylistic trend.

A little later, a similar method was applied by H. P. Duarte by generating houses based on principles derived from projects by Alvaro Siza for Malagueira settlement. In this case, apart from purely algorithmic tools, techniques of obtaining data directly from customers were used. Through surveys and through contact with virtual models, customers influenced the formation of functional systems. A grammar of shapes ensured compatibility with the fundamental principles of style.

In addition to the academic efforts, the use of computers to design has a dimension of a bottom up process. As Toffler predicted, the third wave society is not satisfied with the consumption of goods. Today's customer wants to contribute to the architect's project for the house. The market's response to the need so formulated is diverse. DIY (Do It Yourself) applications allow us to play designer in virtual space (Second Life, The Sims, Minecraft) and at the same time help to individually shape the home. This applies to interactive catalogues of room equipment, semi-automatic catalogues of residential houses as well as fully functional architectural services (interactive, participatory) available on the network.

Apart from the design applications, digital technology has a place in the executive sphere. Progressive houses of the bit era are so complex that their implementation requires the use of digitally controlled machines. SwissRe Tower, the Olympic swimming pool in Beijing, and many other icons of modern architecture were created with the use of robotic processes. ETFE was digitally dissected for irregular polygons of the plating. Boardings for topological forms of Mercedes & Benz Museum were digitally implemented. It is worth noting that most of these processes had a coordinated character and a dedicated computer program became the control tool. Objects today, complex in terms of functionality and design, require applications which manage design, production and use. Perhaps in the future every architectural object, each house, will have a programmable tool, with which it could be attuned to our needs in real time.

The house of the future – a poetic house of Mitchell?

To sum up these thoughts about the house in the bit era, I will not seek to predict the future. The pace of the development of civilization makes efforts in this direction unproductive. I can, however, pay attention to the trends that gain strength with the expansion of digital technology.

To know the character of the house of the bit era one must first realize the specificity of the communication environment in which the concept of home is created. New media related to the technology of digital information processing, are described, among others, by Marshall McLuhan, Lev Manovich and in the Polish theoretical environment: by Mieczysław Porębski and Ryszard Kluszczyński. The most general synthesis of these works leads to the observation that the change of the functionality of communication is primarily the result of the modular construction of expression. Any information stored digitally, at the elementary level, has the same features of construction. Consequently, the digital medium has the ability of automatization, variation and transcoding.

What does this mean for the house created using digital tools? Such a house can be defined in a variant way (as a palette of available solutions), may react to changes in utility and environment (through the translation of the information) and may finally emerge in an automatic way and create by itself a source of information used by automatic processes.

The image of such a house has been made concrete in an essay published by William Mitchell in 1998 [5]. It creates a concept that does not correspond to the classical image of an architectural object, shaped on the basis of tectonic tradition of interpretation. The new category of house must not be, according to the author:

- Physical;
because the virtual space and access interface create the possibility of communing with the architectural object through direct contact of digital model and senses;
- Dependent on the characteristics of the material;
because the electronic implementation can simulate any behaviour;
- Based on craft;
as CAD-CAM technology replaces the process of gathering experience with simulation methods;
- Local;
because the information flow in the network is not facing time and geographical constraints;
- Limited with a facade:
because in the digital world its role is taken by an interface;

Mitchell's text was at the time of its creation, a program declaration. As such, it pointed out problems and put daring hypotheses. Despite this, in my opinion it withstood the test of time and is now one of the references for our ideas about the house of the future.

References

- [1] Gibson W., *Neuromancer*, Poznań 1996.
- [2] Hersey I., Freedman, R.: *Possible Palladian Villas: (Plus a Few Instructively Impossible Ones)*, MIT Press 1992.
- [3] Kuma K., *Anti-object*, London 2007.
- [4] Lem S., *Kongres Futurologiczny*, Kraków 1978.
- [5] Mitchell W., *Antitectonics: the poetics of virtuality*, [in:] *The Virtual Dimension: Architecture, Representation and Crash Culture*, edited by Beckmann J. New York 1998.
- [6] Stiny G., & Gips J., (1972). *Shape grammars and the generative specification of painting and sculpture*. [in:] *Information Processing 71*, 1460–1465. North-Holland Publishing Company.

Internet resources

- [7] http://www.evdh.net/water_pavilion/, access 6.05.16
- [8] <http://news.mit.edu/2008/zaragoza-tt0611>, access 6.05.16