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Abstract. The article defines the most essential elements of the organic architecture concept. Features of organic architecture appearing in the works of architects of the second half of the twentieth century are specified in the context of sustainable development. We consider T. Alberts to be the representative of this period and the study of his works enables us to define these elements more precisely. The authors refer to the following features of organic architecture of the second half of the twentieth century: current development of regional types of organic architecture, which are opposed to globalistic and postmodern trends; organization of international community of organic architecture followers; dominance of complex rather than single structures in the projects of organic architecture representatives including landscape, water, greenery and other elements; intensification of the attention to a human as a consumer of architecture; utilization of organic architecture as the element for building up the image of large European companies; intensification of the architects' attention to technological and economic indices in projects in contrast to the emphasis on the aesthetics of forms in the early twentieth century. These regularities would help understand the principles of organic architecture in connection with sustainability.

1. Introduction

Urban environment of the twentieth and twenty-first centuries is becoming more chaotic and disharmonic, and particular objects of architecture may contrast sharply with the environment, as cities grow and construction is carried on a large scale [7; 20]. Classical ensemble resulting in the creation of harmonious paces is rarely achieved today. In some cases, innovative architectural forms can be created exclusively based on technologies, that is by means of engineering rather than architecture; their absolutization makes people estrange themselves from material environment. Disintegration of architecture in cities, in particular, actualizes the creation of architectural objects that fit human spirit and mentality and restore the sense of harmony. New paradigm of urban development, for example, the concepts of creative city, intelligent city, open city or neo industrial city, allows to turn to socially responsible position of architects. This position, in turn, helps realize organic architecture.

The concept "organic architectural form" relies on the idea of necessary integrity and inner structuredness of an object of any scale designed by an architect. L. H. Sullivan, F. L. Wright, A. Gaudi and R. Steiner are considered to be the founders organic morphogenesis in contemporary architecture. Both ideological and professional [9] and technological factors highly influence the concept development.

2. Methodology

Object of the article: to define fundamental concepts of organic morphogenesis and emerging features of organic architecture of the second half of the twentieth century analyzing the works of Ton Alberts (1927–1999), one of the most typical representatives of this approach.

Research methods: *System-genetic analysis* allows to define the object of study and to follow its evolution in terms of specific manifestations of organic approach in architecture. *Interdisciplinary* nature of study is defined by the necessity to attract theoretical material of humanities and philosophy of organicism starting from Aristotle. *Morphological* analysis allows to evaluate the realization sequence of organicism as designed methodological guidelines for architects.

3. Argumentation

Organic architecture held itself out as certain trend on the cusp of the nineteenth and twentieth centuries, although the approach itself is mature [5; 14]. Philosophic theoretical argument for the necessity and possibility to create organic forms in architecture took place, first, in cultural environment of Western Europe. The concept of organic architecture was realized in Antiquity but was not constantly developed in the subsequent epochs. One may point to a number of discontinuous historical periods when the interpretation of architectural form as an integral, dynamic and inner potential realizing principle – Gothic, Art Nouveau, Bionics of the 1960s and 1970s [10; 12; 18; 24] – predominated.

3.1. The profile of organic architecture

Organic architecture is the architecture of integral and structured forms, similar (isomorphic) in its structure to forms of nature. However, the accents in the interpretation of organic architecture are changing under the influence of scientific data as well. For Antiquity, it is the possibility to attain *rationality* of the form, consequentiality of unified idea realization, no matter, whether it is the idea of Demiurg or an architect. For the Medieval and Renaissance, it is human moving on the way of divine creation and possibility to escape chaos owing to the *primacy of the whole* rather than parts [4; 8]. For organic architecture of the twentieth century, it is the idea of the necessity of relationships with *natural environment* attained by means of application of new technologies and materials as well. For Art Nouveau architects, from F. Schechtel to A. Gaudi, first, it is *aesthetic* idea of harmony of the form being integral and unified in its elements. For R. Steiner and his followers, it is the idea of human body *isomorphism* and the "body" of architecture [1; 3; 13; 21] filled with ecological contents in the second half of the twentieth century, mainly thanks to the activity of F. Hundertwasser [4, *130–140*].

Note that the issues of organic form appeared in the works of authors – theologians, naturalists and others - indirectly related to architecture but reflecting upon world structure. Theorization was not always realized in practice because of the lack of construction process development. The development of construction technologies in the second half of the nineteenth century resulted in the formation of the architectural trend – "organic architecture".

3.2. Identification of basic elements and development of theoretical model of organic architecture

The analysis of the idea genesis shows:

- there is no unique interpretation of organic architecture, nowadays it has diverse interpretations and manifestations. Nevertheless, extended interpretation of organic architecture as activity *imitating* natural forms and even their structure is not correct.
- at the end of the nineteenth and the beginning of the twentieth centuries the architects from the USA and Western Europe suggest similar views on organic architecture as the creation of forms on the principles closely related to those of the development of wildlife objects. In the works of F. L. Wright, for example, pragmatic view on nature prevailed initially, being typical of American culture of this period.
- L. H. Sullivan and F. L. Wright typically understood organic architecture through the category of *interrelation* of the exterior and interior of a building and landscape.

- although high degree of reasoning, morphogenesis by R. Steiner may seem to be irrational resulting in semantic "unreadability" of a function of a building. R. Steiner did not aim himself for the totality of organic architecture and suggested it was used for completely specific conditions and tasks to create educational, religious and scientific centers and accompanying objects.
- in the twentieth century organic architectural form was created by various processes and utilization of various materials from earth and clay to metal ware (R. Piano, S. Calatrava [23] et al.) and novel materials (foil ETEF, for example, by N. Grimshaw [4, *232*]), which provide architects with various opportunities. Their utilization effects the structure of an architectural object.

One can specify the features of an organic architectural form in the course of studying the texts on architecture. Prominent urbanistic researcher K. A. Lynch fairly pointed out, "A beautiful and delightful city environment is an oddity, some would say an impossibility. Not only American city larger than a village is of consistently fine quality, although a few towns have some pleasant fragments. It is hardly surprising, then, that most Americans have little idea of what it can mean to live in such an environment. They are clear enough about the ugliness of the world they live in, and they are quite vocal about the dirt, the smoke… and yet monotony of it. But they are hardly aware of the potential value of harmonious surroundings…" [16, *2*].

K. A. Lynch used exactly a string of correlated words, which helped him interpret basic quantities of aesthetic urban environment. These are *continuity* (regularity, *непрерывность), integrity*, *harmony*, *giving "delight" (enjoyment наслаждение) every day*. According to K. A. Lynch, opposed to them are randomness, stuffiness, crowd, and monotony – more physical and special features than psychological ones. From the scientific point of view, a man in a city is lost in discrete, disordered and uneven environment, insufficiently influencing man's feelings and emotions.

The analysis of organic architecture genesis [6; 10; 13] and representations of professional thinking (of architects [4; 16] generally affords a basis for an author's model of organic architecture (Fig.1). The qualities emphasized in each historical period remain significant and can become actual in the creativity of the following generations of architects and at a new problem and technological spiral. All qualities at the same time can be either unrecognized or unused by an architect. Their presence in objects enables not so mush classification, as conception understanding.

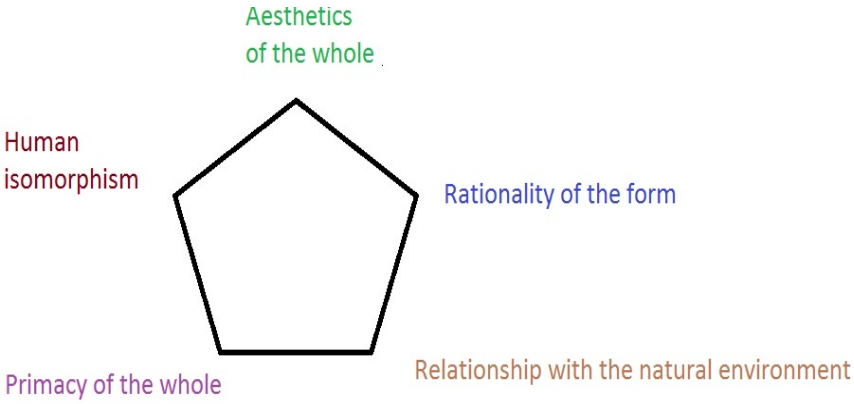

Figure 1. Model of organic architecture, author T. Bystrova.

3.3. Specific character of organic architecture of the second half of the XXth century: T. Alberts

The concept of sustainable development emerged in the 1980s emerged as a result of combining the three main dimensions: economic, social and environmental. Sustainable development is understood by specialists as a development that meets modern needs and does not threaten the opportunities of future generations to meet their needs. The economic aspect of the Concept of Sustainable Development implies the optimal use of limited resources and the use of environmentally friendly, energy and

material-saving technologies, including the extraction and processing of raw materials, the creation of environmentally acceptable products, minimization, processing and disposal of waste. It's not about refusing to increase production, but about stopping the growth in the use of environmental resources. The existence of this aspect actualizes the ideas of organic architecture. In this part we illustrate the relationship with examples from the legacy of Ton Alberts, one of the pioneers of the organic approach in Belgium architecture.

Antony (Ton) Alberts (1927–1999) is recognized to be the representative of organic architecture of the second half of the twentieth century [15] in spite of few works done by this unusual architect. It was merely ten years before his sudden death when T. Alberts became internationally recognized for having designed the headquarters building of the bank ING in the south of Amsterdam. Besides, during previous years, the architect was working under the banner of organicism.

Ton Alberts suggested abandoning functional interpretation of geometric patterns peculiar to organic architecture of F. L. Wright and his followers. Such version of organic architecture seems to be appropriate for Holland. Routine standards of this region tend to restraint and rationality inherited from protestant value system. Being involved in constant, rather dramatic interaction with nature, the Dutch have to comprehend the dilemma of natural and civilized, to solve the problem of following the nature or confronting it.

T. Alberts was born in Belgium and studied at Higher Technical School and and Ecole des Beaux-Arts in Paris [2]. Then he went to Amsterdam to teach in the Academy of Architecture for more than twenty years. In 1963, T. Alberts opened his own architect bureau. In 1993, he was invited to lecture at Harvard but continued practicing in architecture. In the course of teaching Allberts was likely to arrive at the interpretation of architecture that was similar to that of an Austrian architect F. Hundertwasser. They almost at the same time formulated the metaphor of architecture as «*the third skin*» of a man [4, *133*] having the structure similar to that of natural skin and clothes.

The objects of T. Alberts may resembled in appearance the works of R. Steiner. Nevertheless, analysys [11] emphasize the very originality of the path of a Dutch architect. If the creation of structures fitted in with world structure was of primary importance for R. Steiner focused on anthroposophy, T. Alberts who prioritized a man, wrote, “It seems we have forgotten that we have to live in buildings that are over rationalised. Besides this rationality we also need fantasy, intuition and emotion” [11]. That defined the steady interest of the author as a consumer of both architecture and its technical facilities, that, in its turn, allows to enhance the ecological potential of objects. Thus, Dutch version of organic architecture approaches the issue of sustainable *development being* relevant for the beginning of the 2000s.

The headquarters’ building of the bank Internationale Nederlanden Group (ING) was built in 1983 году in the southeastern part of Amsterdam; recently the headquarters moved to a new building. We would analyze the building in terms of the presence of features typical to organic trend in its architecture. splay

3.3.1. The relation with natural environment

Ten-tower complex has sloping and expanding downwards patterns. They provide the feeling of stability, reliability and the action in life (Figure 2). Brick specific for Dutch structures is used with brown concrete curtains of piles and shaded by the blue colour of roof and aluminum window frames. The traditional image of a respectable bank remained untouched and was even accentuated. In addition, the slope of the walls intensifies the possibilities of natural lighting and acoustic efficiency as well as decreases the air mass drag. Air spaces accumulate heat and increase energy efficiency. The connection with the environment is not only the connection with landscape but with socio-cultural context and climatic conditions as well influencing the technology solutions.

Figure 2. Group of headquarters' buildings of the bank ING. Amsterdam, Holland. 1983. Architects: T. Alberts, M. van Huut. From site R. Gorter. URL: http://robert-gorter.info/ton-alberts.

3.3.2. Primacy and aesthetic qualities of the whole

The complex was planned as the whole rather than as mechanical structure from ten separate elements. The buildings are located S-shaped with the street between members. One can see a great number of patterns and perspectives when walking along the street. Though, ten "towers" are of similar structure, there is no feeling of monotony. The complicated configuration makes similar patterns look alike. At the same time, the architects breaking "vernacular architecture" of Modernism [17], use fivefold symmetric turning of the principle element and simultaneously tie form to landscape. In other words, it is not referred to the imitation of natural forms but to the creation of a structure possessing the degree of flexibility and peculiarity similar to that of life forms.

3.3.3. Form rationality

Seven out of ten towers are south-oriented thus providing a maximum of light and solar heat. Employees work 80% of their working hours at natural lighting. It was possible to save 96 million US dollars and make the construction cheaper because of recoverable standard version of the principle element of the complex.

The complex is equipped with computer-controlled solar batteries and shutters. Energy saving was converted from abstract slogan to economic and human equivalent. For example, costs on battery planting are reported to have been covered during the first year of operation. Exhaust air is kept in pentagonal glass-covered structures at the top of each tower; 70% of such air is used to heat fresh air. These structures serve as monitors. Cool air is caught at night and used then in the daytime.

"Towers"-clasters are of various height with five offices on each story. Similar "cut" geometric patterns are used in the interior. Such patterns are close to the architecture of R. Steiner but look sometimes somewhat deliberately. The finishing from natural materials – stone and wood – intensifies the feeling of dynamism and naturalness.

3.3.4. Social aspect of organic architecture of T. Alberts

What is more important, organic conception is realized to the full at all project stages including a social one firstly mentioned by the theorist of architecture B. Dzevi [15]. The conception is opposed to post modernistic trends of that time with their aspiration for uncommon exterior forms. Social aspect of organic architecture increases in the second half of the twentieth century.

In the complex ING, offices are equipped with devices allowing to control light and air coming. The number of plants used as humidifiers is calculated. They are rain watered; the rainwater is collected from outside water basins and oxygen enriched when coming through special installations. Furniture is from natural wood, stair railings are made of birch, handles are of metal – additional attention was paid to tactile contact with architecture. Building are not very high, nevertheless, employees preferred to use stairs instead of elevators. People felt better due to utilization of water, greenery, and fresh air. Consequently, the decreased number of seek leaves days enabled the company to reduces expenditures by 1.4 million US dollars a year. In that period, in the middle of the 1980s, these indices were novel and extremely positive as they strengthened the position of organic architects.

Conclusions

The project analysis of T. Alberts chosen as a typical organic architecture representative of the second half of the twentieth century allowed formulating specific features of that period concretizing the understanding of possibilities and task of organic architecture and shows its connections with the concept of sustainable development.

We can underline:

- parallelism in the development both concepts and practices caused with ecological and socio economic problems:
- the development of regional versions of organic architecture in the second half of the twentieth century in contrast to internationalization tendencies prevailing in that period;
- direct and indirect connection of regional projects in the area of organic architecture with projects in other countries and regions assigned by the conception integrity in the whole;
- continuous attraction of architects to the complex development rather than single structures with the element of landscape, greenery, water and other elements that allow to create an original architectural microcosm based on the laws of nature;
- growing attention to a consumer of architecture resulted from philosophy and socio cultural situation in the second half of the twentieth century; abandoning the design for an abstract "consumer" and the emergence of conceptual human system models including the system of values, life style, emotional, cultural and other parameters;
- possibility to combine image-oriented interests of a company with organic, human-oriented solutions approved by the projects of T. Alberts and other representatives of the trend;
- increased attention to economic indices of a project, opportunities to achieve economic effect thanks to application of new technologies;
- conversion of energy-saving, resource-saving, health and safety characteristics into integral characteristics of organic architecture as the public interest in the problems of sustainable development, ecology, and healthy life style grows in the second half of the twentieth century and the beginning of the twenty-first century.

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