Aesthetics of the material in the work of modern architects: Searches and problems

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Abstract: The article aims to find the main problems of the aesthetic content of modern architectural creativity, interaction with the latest achievements of science in terms of identifying the specific expressiveness of the material and, in this regard, always topical issues of the architect's creative freedom. The authors focus on discussions about the permissible degree of "violence" over the material and the definition of criteria for its naturalness as a significant part of the theoretical heritage of researchers.

Keywords: expressiveness of the material, "purity" of the material, "violence" against the material, aesthetic expressiveness of the material, figurative solution of the building, architect's creative freedom, environmentally friendly materials

The issues of the specific expressiveness of the material in the works of architecture have always been the subject of close attention of art historians and the creators themselves. Discussions about the permissible measure of "violence" over the material and the definition of criteria for its naturalness constitute a significant part of the theoretical heritage of researchers of this type of creativity. As is well known, the most acute confrontation is observed between supporters of the "purity" of the material and apologists of fairly broad boundaries of violence against it. There is a certain weakness of argumentation in each of these positions.

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AGATHOS, Volume 15, Issue 1 (28): 199-206, DOI 10.5281/zenodo.10968069

In relation to the first, as an objection, we can safely put forward the thesis of the inevitable violence against the material, because even the truly natural ones, such as wood, stone and others, are inevitably subjected to certain technological processing. Frames and rattan cloths for walls are woven from reeds, stone is cut, wood is freed from knots and bark, and even the soil – the most ancient material of architecture - is subjected to ramming. So the absolute naturalness of the material in architecture is more a myth than a consistently implemented construction practice. Moreover, it is in the process of processing natural material that the authentic aesthetic expressiveness of the structure is often achieved.

Also, an abundance of artificial building materials works against this position, the natural expressiveness of which is out of the question. First of all, we mean brick and concrete, the manufacturing technique of which was mastered in ancient times. And their artificial origin did not prevent them from giving the buildings a genuine aesthetic expressiveness for thousands of years.

At the same time, the position of the second party, which suggests not paying too much attention to the preservation of the natural expressiveness of the material in architecture, has something to object to. The deep crisis of architecture as an art form of the second half of the 19th century vividly demonstrated what neglect of the laws of aesthetics leads to when referring to a particular construction technology. The widespread practice of transferring architectural forms of wooden structures to brick buildings, as well as the use of methods of decorating household items in the design of facades, led to the appearance of a huge number of paradoxical structures that did not correspond to the purpose of their construction and even made an unpleasant impression, which gave rise to the practice of assigning such buildings mockingly ironic definitions of the Ropetovshchina type (see Kirichenko 1986).

So, none of these positions can be accepted as a universal guide to action in order to achieve a high aesthetic result in architectural creativity. It should also be borne in mind that an architect never has the full freedom of expression that is inherent in masters of fine arts. And it’s not just the will of the customer who plays a leading role in architecture, because art is expensive, technologically complex and very dependent on the state or the order coming from those in power. As the outstanding art theorist B.R. Vipper (1985, 216), subtly noted, “in every, the most random, the most arbitrary play of the architect’s

imagination, the spirit of that society, of that collective that the architect serves, is reflected. In this sense, we can say that architecture is much more in tune with the era of art than sculpture or painting."

Modern architectural practice demonstrates several vectors of development of constructive solutions, which, in turn, determine the range of materials used, but do not remove the problems of their aesthetic representation. In our age of tremendous progress in the development and implementation of technologies for new construction solutions, their diversity does not mean that the issues of working with natural materials fall out of the sphere of interest of designers and architects. They have not lost their charm at all and are an important part of the figurative solution of the building. At the same time, modern researchers of the problem state a situation similar to that in the architecture of the eclectic era: "Deliberately emphasizing the visual qualities of the material, the designer embeds their palette into the most complex images of architecture balancing between the paradigm of geometric sterility and the glamour of commercial versions of postmodernism" (Esaulov 2007, 22). Of course, such balancing under no circumstances will lead to the creation of a truly expressive work that reflects the spirit of the era and evokes positive connotations of creation in the mind of the recipient viewer. It's no secret to anyone that postmodernism, however, has practically disappeared from the scene, is one of the representations of mass culture.

The hidden dangers of following the path of its adoption and dissemination are exhaustively reflected in the definition given to such processes by the outstanding theorist Vadim Mikhailovich Mezhuyev (2006, 40): "Having no clearly defined national coloring and not recognizing any national borders for themselves, these products, unlike ethnic and national culture, can be called mass culture. ...For the most part, they are looking for a source of thoughtless fun, caressing the eye and hearing of the spectacle, filling leisure entertainment, satisfying superficial curiosity, or even just 'catching a buzz', getting different kinds of pleasures. This goal is achieved not so much by a word (especially printed), but by an image and sound, which have an incomparably greater power of emotional impact. They are the language of mass culture". A modern architect will inevitably have to solve an important problem: is he ready to take such a direction in the development of his creative activity and will such solutions really be worthy of the concept of aesthetics of architectural creativity?

A natural question arises – what is the measure of the creative freedom of a modern architect within the framework of the strongest pressure of technological restrictions and whether the aesthetic potential in such architectural solutions is preserved? Environmental issues are also not in the last place, since, for example, the beauty of the granite finish of the New York Central Railway Station is paid for by off-scale radiation, which, as is known, is skillfully held by this type of natural stone. So the arguments about unhealthy life in reinforced concrete structures against this background look like a clear exaggeration.

At the end of the twentieth century, architects also had completely new materials at their disposal, the properties of which can be set even before manufacture. The use of heat–engineering, lighting and other properties traditionally accompanies the branch of building materials science in the 20th and 21st century. The material acts as a means of contributing to the solution of functional problems of architecture. On the one hand, it's like a world of unlimited possibilities has opened up before us. On the other hand, ignoring the generic specifics of architecture as a way of organizing a new space for human use can cruelly take revenge on a short-sighted architect by the rejection of his creation by society or even by a private customer.

For example, the concept of a "smart" or "digital" city also intrudes into the implementation of an architectural solution, which is a natural requirement of the time. The modern urban planning structure is extremely complex, and the urban environment can become unpredictable without appropriate new ways of its digital control and centralized organization. At the same time, the architecture will have to actively participate in the development of such solutions. After all, this applies to energy conservation issues, and the safety of residents, and the availability of transport, and much more. However, where is the line that will not allow turning urban living space into a digital concentration camp, and roads and the facade of houses into spies of our private life? And my house will no longer be my fortress, but my cell, where I am under constant control of external forces. Under such conditions, no design of the environment, the most refined and ergonomic, will be able to remove the feeling of unfreedom in such a seemingly perfectly constructed space. Under these conditions, the Vitruvian "benefit" looks quite ambivalent.

Turning to the concept of "strength" and not plunging into a detailed analysis of the possibilities of modern materials, we must

remember an important property of the architectural image: the building not only must be strong, it must look strong, that is, correspond to our psychophysical experience and the expectation emanating from it. The problem is seriously aggravated by the fact that at present there is practically no need to talk about architecture as art, since it is everywhere replaced by architecture as construction. We build quickly, solidly, a lot, and there are no costs for aesthetic issues in the estimate. Fully conforming to the postulates of functionalism, including the main one – "form follows function", formulated in the 19th century by Louis H. Sullivan, for some reason N.A. Ladovsky's instructions about saving the mental energy of a person who comes into contact with an architectural structure are firmly forgotten.

For example, the "architecture of glass" that appeared at the end of the twentieth century inspired the German-American architect Helmut Jahn to sharp experiments with the use of this material for internal partitions and facades. Art theorists warned about the danger of this approach, despite the seemingly aesthetic expressiveness of the structure, almost a hundred years ago. Architecture should not merge with the surrounding space, because it loses the main element of its functionality – security, the possibility of gaining a private space. You can admire such architecture, visit it for a short time to participate in public or cultural events, but it is impossible to live and work in such a structure.

Another problem of modern architectural creativity has become the use of computer modeling methods, including those based on fractal programs. This approach further exacerbates the problem of aesthetic expressiveness of the building, since it excludes the most important organoleptic components from pre-design preparation. First of all, the architect loses the experience of the gravitational sense, so that the tectonic expressiveness is only conjectured, but cannot be fully felt in such a project development. Tactile sensations, as well as the experience of the real volume and effects of temporary changes in the light-air environment are not available in computer modeling. The exclusion of this spectrum of sensory experience naturally reduces the predictability of the final decision. Human psychology does not change at the rate at which new materials are being invented and developed these days, allowing the construction of the most unpredictable structures.

However, it is not just a matter of limiting the means of expressiveness of architectural creativity. In fact, an architect relying

on automated design programs practically puts himself outside of creativity. Art is an expression of absolute freedom – freedom of design, freedom to choose the means of its implementation and freedom to use the methods of its realization. With the appeal to computer design programs, the architect puts himself in the position of a person using an intermediary, in the role of which the software acts. We note that nothing is written by him, not sharpened by him to solve the necessary tasks and not subordinate to him in any way. Such alienation from the direct realization of the plan cannot pass without a trace.

Computer-aided design really allows the architect a lot. But at the same time transfers it to the power of other types of plastic arts, imposing means of expression more inherent in painting. Tectonics dissolves into a variety of colors, sometimes behaving very aggressively, and, as a result, planar perception replaces the full experience of the interaction of three-dimensional forms and structures. The extra-natural flickering of glass and plastic surfaces really looks spectacular, but to distinguish behind them the logic of the design, which has traditionally been one of the most powerful means of influencing the viewer, is very problematic and sometimes impossible at all. And a modern architect will have to find a way out of this difficult and contradictory situation.

Nowadays we are also entering the era of the revolution of architectural design and construction, which are associated with the use of 3D printers. Note that the construction of buildings from the ground was mastered by mankind in the 4th millennium BC in Mesopotamia. However, in later times, for example, in the Russian Empire, this technology was developed by architect Nikolai Alexandrovich Lvov. He was concerned about the issue of creating a dwelling for a peasant, not burdened with the disadvantages of a chopped hut, which quickly rots, burns easily, and is abundantly populated by a variety of worldly hoarders. Such a construction also requires powerful wind protection and is quite expensive, taking into account the purchase and delivery of timber. According to the architect, the proposed technology for the construction of an earth-breaking building, when the material is extracted literally from under his feet, should have served for at least 50 years. As you can see, the Priory Palace in Gatchina, built by him using this technology, has already been in its third century of existence, suffered heavy bombing of the Great Patriotic War, when the stone campanile was easily

destroyed by a shock wave from a howitzer shell. The palace is also distinguished by exceptionally high qualities in terms of temperature and humidity regulation.

This experience as a whole cannot but inspire modern architects. The construction of houses using 3D printers focuses on different materials, including in Italy a house was built from raw soil, and in Ravenna a house was "printed" from local clay with additives. They also "print" houses out of concrete, which, taking into account modern improvements in its composition, is considered close to environmentally friendly materials. A 3D printer for building a small house weighs no more than 2 tons and consumes energy like an iron. Naturally, this cannot be even remotely compared with the energy and labor costs of traditional construction.

So, at the beginning of May 2021, the fourth residential building in the world and the first in the EU, completely printed on a 3D printer, received its residents. This is the first of five houses built by Saint-Gobain Weber Beamix as part of the Milestone project (see Saint-Gobain Weber Beamix). For printing, a huge robotic "hand" was used with a nozzle that injects specially designed cement having the texture of whipped cream. Cement is printed according to the architect's design, adding layer after layer to create a wall and increase its strength. The whole printing process took 120 hours or five days. Today's existing construction 3D printers allow you to create small architectural forms and elements of structures for their subsequent assembly on site, or allow you to "print" the entire building on the construction site. The height and dimensions of the printed building depend on the technical characteristics of the printer used.

However, the introduction of construction based on the method of using 3D printers imposes restrictions on the choice of a formal solution and unfolds a new range of problems within the framework of creative non-freedom as an architect's dependence on the same software and the degree of perfection of its development. In addition, it is the aesthetic properties of the future structure that are least taken into account in this technology, so they require further refinement, which again raises the problem of increasing the cost of construction.

In this paper, the aim was to identify the main problems of aesthetic content of modern architectural creativity, inevitably affecting the issues of freedom of creativity and interaction with the latest achievements of science. Without claiming to be an exhaustive analysis of the situation, the authors hope to draw attention to this

range of problems of both practicing architects and architectural theorists.

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