

Research Article

HOMEOSTASIS AND INNOVATIVE ARCHITECTURAL STYLES

***Dubinskii Vladimir Petrovich**

*Department of Architecture of Buildings and Constructions, Kharkov Beketov National University of
Municipal Economy, Ukraine*

**Author for Correspondence*

ABSTRACT

Questions of homeostasis as a stable statement of the system are being considered in the context of development of modern architecture. The tendencies of development of modern architecture from the point of view of “homeostatic balance” and perspectives of its development are being detected. Homeostasis is a stable statement of the system, allowing it to follow its goal. Together with the development, the increasing complexity of the system, there occurs decreasing of the level of its stability and the life of the biosphere depends on the stability and variability, the optimal combination of these two features is called plasticity. One of the basic principles, reflecting the statement of stability, is the principle of homeostasis. We usually consider homeostasis as a desire to preserve the essence of the system, its immutability. If the system is too homeostatic, if it is practically incapable of change, then in case of changes in external conditions, very often after the futility of the mobilization of all internal potentials, it is being destroyed, either as a result of the attack from the outside or from the internal overpressure. To preserve itself, system needs to possess the property of variability. However, if there is a great potency to variability, then this ability can undermine the system from within, which leads to self-destruction of the system. The optimal combination of stability and variability, called plasticity, provides a sustainable development of the system. To detect the tendencies of development of modern architecture from the point of view of “homeostatic balance” and perspectives of its development.

Keywords: *Architecture, Homeostasis, Bifurcation, Morphogenesis (Form Making)*

INTRODUCTION

On the modern stage of development of ideas about variety and complexity of relations between nature and civilization, many researchers are defensibly afraid of possible drastic reduction of magnitude of Homo sapiens population. These fears are based on certain mechanisms of regulation of natural systems in terms of different kinds of crisis.

Global concepts, that have emerged recently in architecture, such as the Smart City or the Vertical city household, shows that scientists of the entire world have been challenged by the process of optimization of relationships between civilization and nature. As a reaction on the concept of civilization of sustainable development, put forward by a number of intergovernmental conferences of the United Nations, the term "architecture of sustainable development" has emerged in the architecture. There is yet no clear definition of what it is on present stage of development issues. Each school of architecture of the world is looking for an answer to this question. That is why it is so important to understand what constitutes the main challenges of modern civilization, what are means to solve them, and what is their impact to the architecture.

RESULTS AND DISCUSSION

Research Results

Turning to the question of the relationship of the system and the chaos, stability and variation in architecture, we should note that the language of architecture is characterized by the pursuit of a certain form; alongside with the deviations from this norm; when such deviations become too frequent, they form a new standard. The norm is determined by the predictability of one or another phenomenon. It marks already existing connections between the mark and the content.

In the architecture, the dialectic of regulatory and non-standard determines the dynamics of its development. An important aspect of the internal dialogue of culture is historically formed: the earlier

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tradition sets the norm, having already automatic nature, and the semiotic activity of new structural forms develops against this background. Thus, the productivity of the conflict is maintained by the fact that in the consciousness of the preceptor, both past and present states of the system are present simultaneously. In the literature, music or painting it is ensured by the fact that past cultural epochs do not disappear without a trace, and remain in the memory of culture as timeless: the emergence of Mozart does not lead to the physical destruction of the works of Bach, the Futurists “are throwing Pushkin off the ship of modernity” but they do not destroy his books physically.

In modern conditions not only the problem of maintaining the values of tradition is highly relevant, but also the problem of the emergence of the innovation, as well as the problem of the synthesis of traditions and innovation in the process of establishment of artistic consciousness (Zilbermann), (Spirkin, 1978), (Kamenskiy, 1983).

As Muzharovski states, due to its dynamic nature, the norm is subject to continuous change; it can be even suggested that any use of any kind of norm for every particular case at the same time causes changes in the norm itself: not only the norm influences on the formation of a particular fact, but at the same time a particular fact inevitably affects the norm (Muzharovski, 2009).

Any living system needs to possess stability in order to survive – by stability we mean the ability of the system to maintain its own homeostasis. And they certainly possess such skill. Moreover, in the process of evolution, the stability of living systems is growing steadily. First of all, stability is the system's ability to adapt to changing conditions by appropriate modifications (but not a revolutionary reconstruction) of its own structure. The revolutionary restructuring, as we know, are fraught with trouble. Nobody needs revolutions every other day and it is right position.

Though, neither nature, nor society is able to survive without having revolutions from time to time. For a brand new living system to emerge (for example a new kind, or even type of animals) The old structure should be destroyed, and then something new can be combined of its splinters.

This fact, now seeming almost trivial, took Darwinists long time to be realized. Both Darwin himself and his followers believed that evolutionary changes should occur more or less smoothly and gradually, although their speed may vary. Facts of paleontology, however, show the opposite: the evolutionary transitions often occur very quickly and not always (actually, very rare) and the whole sequence of transitional forms cannot be found.

Then the experimental data were obtained, showing that many of the changes that had taken place in the evolution occurred not in “evolutional” but rather in “evolutional” way. Entomologist G. H. Shaposhnikov transplanted population of aphids from the plant on which they live in nature, to another – the plant they don't live in nature. And amazing things started happening. Of course, first reaction was increasing of mortality. Fortunately, some individuals still survived and gave offspring. Over the next 8-10 generations, the mortality had declined gradually. But the main thing, worth noting, lies in the fact that certain changes have occurred in the structure and behavior of aphids.

First, their variability had sharply increased. The “variations of the norm”, which were absent in the initial population, have emerged. The very “normal”, as if blurred, became less visible. Then a new “norm” started being formed: some of the variations became prevalent in the population, and other variants of the structure (including those that have been “normal” for the initial population) became increasingly rare. Finally (after less than a dozen generations) a new stable population had been formed. The level of variability in it became as small as before. But the “norm” itself has been changed, shifted.

It turned out that an intensive selection leads not to a gradual shift of the norm (as previously) but to its rapid “skipping”, the process consists of two stages: 1) the destabilization of the old standards, 2) the formation of the new rules in the new location, i.e. new stabilization.

Debates between proponents of “gradualism” (gradual changes) with the adherents of “punctualism” (fast transition of the system from one stable state to another through a short intermediate unstable state - destabilization) lasted for a long time, and they're still not quite finished. In general it is clear that those properties of the systems that can be changed without greatly affecting the whole can change gradually and smoothly. But those changes, which require more or less complex restructuring of the system can

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only be "quantized" leaps, which is a necessary element of destabilization (in fact, this is the partial destruction of the old system, without which there can be no revolution).

The most interesting question is where do new signs come from in the condition of destabilization? Two ways are possible here.

From the point of view of Darwinists, the first way is the mobilization of reserves of a hidden variability, collected during the period of peaceful existence. Many mutant genes do not manifest themselves in their media because the other (paired) chromosome, there is another, more powerful (dominant) version of the same gene. Rare mutations can "swim out" during close hybridization – chromosomes in offspring can then come across just two copies of the mutant gene. In natural populations, especially in the higher animals, such bans usually also exist. But in the conditions of a crisis, when the number of the population is sharply reduced, many restrictions are removed, including this one.

Second way is emergence of new mutations. To the great displeasure of the "classical Darwinists" more and more facts are being detected, showing that external influence - especially the one that could put the population to the brink of extinction - can lead to a dramatic increase of mutagenesis.

Recently, genetics have made another surprising discovery. It turned out that many of the "working" genes have a few tens or hundreds of "non-performing" variants of the same gene in the genome (of the same organism). These pseudogenes are scattered all over the chromosomes. Pseudogenes may serve as material for the formation of new variants of the emergency working proteins. At least one case of formation of a new protein by replacing the piece of a working gene by a fragment of a pseudogene is already proven.

According to Dobritsina, innovative architectural phenomena of the last three decades hide in their internal interrelations, in their close connection with the philosophical trends, that very implicit common ground that are keeping and even strengthening the pluralistic situation in the architecture. Striving of architecture as a system to the stability requires continuous improvement of its own development mechanisms. The scientific approach to this problem is able to open a kind of system in the spontaneity of this development and thus to predict and, maybe, adjust the aesthetic, visual, and ultimately harmonic qualities of architectural environment (Dobritsina, 2004).

Demographic, social, environmental crises lead to the appearance of innovative architectural typologies in the architecture, which, keeping the development of architecture in terms of style and material within the frameworks of the professional consciousness, opens fundamentally new opportunities to overcome the crisis. It is necessary to understand not only the principles of the implementation of the technological purposes, but also a transition to a new level of studies of the mechanism of periodic turnover of professional ideals, doctrines and standards. This would allow us both to see and understand something new that is being born at the moment, and to save the historical values.

Similarly, the developed community with its complex structure of the food chains, with multiple interdependent ecological niches, each of which is taken by a certain specific kind - is that very same stable system, as organism, and it is not always capable of smooth, gradual changes.

For a long time ago paleontologists have discovered that in the history of life on Earth there had been special turning points, during which many kinds have been dying out at once. These events became known as "mass extinctions." Once upon a time they were connected to global catastrophes, like the Biblical Flood, during which God destroyed all or almost all life on Earth, and then re-created it in other forms of life. Of course, today, scientists are trying to be more reasonable, explaining such mass extinctions.

Conclusions that can be done, based on abovementioned facts, are very surprising. The trend of Technofuturism, popular in 60ies of 20th century, where the expansion of human kind to other Earth-like planets of the Universe, now seems to be pointless, both from the point of view of biological and from the point of view of social expediency.

Conclusion

Once there was a bifurcation, and a new channel of evolution had been selected, the latter is already irreversible. It can only follow new, already chosen path. And the system remembers its past rather

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selectively. If to be more precisely: the elements preserve their past, but not the whole; and a whole has a different body, the scope of variability of which is sharply narrowed in comparison with the situation of bifurcation. Of course, the development of the system will take place. The system will go through crises. There are possible twists in the path of motion of new channel of evolution, but all this will occur in the framework of the canal edges. Unity and diversity of evolutionary processes will be restricted by abovementioned edges (Kul'pin and Pantin, 1993).

For example, shifts in styles of modernism, postmodernism, parametrics, in the context of architectural knowledge representation of bifurcation are being inevitably transformed, evolving, "recovering" taking into account features of both historic and modern, innovative development. The most significant feature here (as opposed to biological evolution) is the increase of the variability of relations of cause and effect? That is reflected in the scientific knowledge in the allocation of patterns of development rather than laws of development. In this scenario, the choice itself is implemented as a gradual clearance, consolidation of the new order, determined by the infinitely complex combination of influences of various parameters of architectural knowledge.

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