

Pocket house and supra-spatial cities

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Abstract. Modern futurological concepts suggest several options for the development of cities and homes in the future. Each of these concepts in one way or another reflects the possible path of development of human society as a whole. This article discusses the issues of their possible hybridization and synthetic compounds in order to find the most likely and favorable development path. Possible models of the formation of a new type of urban settlements and the living cell model forming it are described, based on the analysis of both advanced technologies used in the construction and operation of housing, and on concepts for the development of society as a whole and the virtual design of new typologies of settlements and residential units for a changed society and his priorities.

1. Introduction

The modern world has long ceased to be calm and comfortable with its order for anyone who at least for a moment thinks about the near future that awaits us. Of course, we set aside the living cities of science fiction writers or various options for a post-apocalyptic future and consider this issue solely from the point of view of promising technologies and historical and social trends that are gaining popularity. Considering various theories [3, 7, 15, 16, 17] regarding the conceptual paths of the development of the future, all of them can be reduced to several global paradigms:

1. The maximum technocratism, implying a high degree of urbanization, up to the creation of global cities in the likeness of the Dyson sphere around the Earth. The tasks of this direction include the development of conditions to achieve a balance between the maximum possible population of the planet and those resources that are capable of supporting this population. In addition to this paradigm, various projects of cities and houses on the water, cave cities, as well as various options for flying houses and orbital settlements can be attributed.
2. The second paradigm is the rejection of the principles of urbanization of settlements and consideration of issues of maximum environmental friendliness of future humanity. This vector can be called deurbanism or anti-urbanism. This idea is also not a novelty in human perception. Some of its elements can be found in the projects of Howard's Garden Cities, the concept of an eco-home in the form of various semi-dugouts and landscape houses.
3. The third vector is a compilation of the first two paradigms. It addresses the issue of the formation of systems of vertical cities, thus freeing up a significant part of the Earth's surface to meet environmental safety needs. This development vector is clearly seen in the ever-increasing height of buildings, occurring both due to the constant increase in land prices, and due to the need to provide housing and places of employment to an increasing number of people.



At the same time, there is a tendency towards minimization of a person's home with maximum satisfaction with its functional content. This development vector also has a significantly long history of its formation. This is the Nakagin tower of Kise Kurokawa, and the projects of mobile and transformable housing, so popular now and various kinds of mini and micro-housing concepts.

2. Living cities

Currently, a rethinking of approaches to the processes of the formation and development of cities is gradually taking place. The city is no longer perceived as a simple sum of its constituent roads, buildings and green spaces. In the new doctrine, which is gaining strength, the city is a complex organization of a quasi-fluid system with an incredibly large degree of freedom. Considering the history of the development of cities in a global format from these positions, it should be noted a number of characteristic anthropomorphic features that periodically occur at different periods of a person's life.

Thus, from birth, a person first forms his own miniature world, understandable and aware of it. This period can be compared to the emergence of architecture and urban planning of the ancient world. Then, having realized himself, a person begins to form microsocial groups, and we see the emergence of ancient city cities. Later, the desire for even greater unification in view of the complex socio-demographic processes taking place in society begins. In terms of urban development - this is the formation of urban development with a vivid intensification of processes of urbanization. People tend to cities. Cities grow both in space and in height, often to the detriment of the general quality of life and the environment in them. Moreover, cities tend to form agglomerations, absorbing nearby settlements and subjugating cities that are not so successful in their development. In general, this process can be compared to the formation of the corporate structure of the state and human society and the form of organization of these processes, which in most cases has become an example of universalization.

However, it is worth noting that, along with this form, there is an alternative option for building corporate communication and culture, based on more ancient principles of interaction based on the principle of "man-to-man" or "person-to-person". With this model, combining the principles of P2P and network interaction, the roles of a person and society as a whole are redistributed, forming not a competitive, but a complementary principle of organizing both production and social processes [6, 8, 9, 10, 11]. Considering this principle from the point of view of urbanization processes, we can clearly see examples of the organization of tribal settlements or remote cities and towns, where all residents and infrastructure elements are in a kind of symbiotic relationship formed by both external conditions of existence and the principles of organizing internal processes.

3. Supra-spatial city

My previous article on this topic [12] was devoted to the concept of a cluster-fractal model of the formation of cities. The principles of growth, development and transformation of cities under the influence of external and internal development factors and sources of contradictions are already partially described. It should be noted that this concept, incorporating the elements of all four of the previously described paradigms, is a kind of synthesizing object that allows assessing the prospects for the further development of cities and the principles on which it can be built. In this regard, it is necessary to recall the concept of the "Guest City" [13], developed by me jointly with a group of my students in the framework of the "House of the Future" project.

In this concept, it was proposed to form a new urban entity - a kind of Supra-spatial city formed of mobile transformable residential cells embedded in the supporting structure of STRINGx4¹. The structure itself, in turn, relies on a system of vertical socio-industrial "centers" of D.O.T.¹ The spatial cells formed in this way (N.O.M.¹) can either be completely freed from development and become

¹ The name of the structural elements of the "Guest City" are given in accordance with the original author's concept

parks, forest or agricultural land, or designed for the installation of public planar objects. Also, the proposed size of N.O.M.'s allows preserving both historical and cultural objects in order to preserve the identity of the settlements, and provides the opportunity to live in familiar conditions. However, the concept provides the ultimate goal - namely the maximum possible release of land for the purpose of its environmental conservation.

The D.O.T.-systems themselves, which are essentially elements of a vertical city, are, on the one hand, load-bearing systems that raise the belts of residential buildings and highways above space, and on the other, concentrate all the elements of business and industrial infrastructure in the likeness of a metabolic tree system, where industry, as well as "harmful" and thermoactive production are cleaned inside the "trunk", and the "bark" is represented by office spaces. The concept also provided for the possibility of spatial transformation of cell cells, changing the functional purpose of the "cortex" depending on the time of day. So, for example, at night it was proposed to remove non-functioning office cells deep into the "trunk", replacing them with hotel, restaurant cells with panoramic views or automatic industrial cells that could work in the dark or provide an environmental exchange between the inner and outer layers "the trunk" thus allowing the entire D.O.T. to breathe. As it can be seen, this concept fits quite well into the above-mentioned paradigms for the development of cities and human society.

4. Pocket House

Another element without which this system cannot be implemented is the living cell itself, as the main element in the formation of human life processes. Considering the prospects for its development, it should be noted the most striking trends that have begun to manifest themselves recently [1, 2, 4, 5, 14, 18]. Most of the trends are primarily associated with the development of technology and post-industrial society. These include: failure to communicate the place of work and place of residence, high saturation of the living cell with smart devices and adaptive technologies, automation of utilitarian life support processes and the formation of a comfortable environment, rejection of zero air exchange standards, as well as the concept of forming a living space that meets the formula: "minimum "normal is sufficient." If for the first time the three trends have almost become an obvious part of our life, then the last two, as the most promising for use in the near foreseeable future, I would like to dwell on in more detail.

Recently, there has been a trend towards a gradual decrease in the volume and area of living rooms. On the one hand, this fact is directly related to the ever-increasing value of real estate. If there are no global changes, this trend will only increase, and consequently, there will be a constant search for new models, forms and technologies that will reduce the minimum space needed for a person. At the same time, this space will perform exclusively minimally normal functions to ensure human life: sleep, personal space, hygiene, minimal everyday functions. Most of the functions of the dwelling will either be gradually withdrawn from the living cell and transferred to the plane of public access, or minimized to a satisfactory size. Already, a significant part of people prefers to eat in public places, and receive training and entertainment online or via remote access. The issues of obtaining a sufficient amount of fresh air have long been resolved by the installation of forced ventilation, which also performs the function of air conditioning. On the other hand, an active search is currently underway for technologies that allow transforming or actively adapting a home (even the most minimal one) to changing external or internal environment conditions. Indeed, in essence - why keep the living room free while waiting for the possible arrival of guests, when you can just rent it for a short time and attach it to your house for the New Year's party? Or, at the time of the birth of the baby, buy a room, which, when he grows up, can do more? Taking into account that the fact that it can be done without changing the already familiar way of life and the area of the city and the lovingly twisted family nest. At the same time, we know that we can always disconnect rooms that have become unnecessary and not pay for their maintenance or maintenance.

5. Conclusion

The new challenges posed by the evolution of society, and the evolution of human habitation, require a new understanding of the concepts and design decisions that we must develop now, forming an adequate supply of knowledge and models that we can apply in the future. It is time for us to learn the lessons of the past, which clearly demonstrate the need to prepare for the impending changes in advance, so that later we do not look for the necessary solutions in an emergency. The movement towards a changing world paradigm began a few years ago, but so far it is only a trickle in the stormy sea of human society. However, each creek will one day become an ocean. So, we should now think the day after tomorrow. In conclusion, I also want to thank people whose thoughts and words led me to these decisions to Viktor Dmitrievich Stankevsky and Natalya Alekseevna Saprykina.

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