

New Approaches to Formation of Architectural Space: Innovative Concepts*

Natalia Saprykina

The Moscow Architectural Institute (State Academy)

Moscow, Russia

E-mail: nas@markhi.ru

Abstract—The article is devoted to an actual problem of identifying features of formation of atypical spaces in the context of architectural heterotopy. The purpose of the article is to present the emerging architecture of the development of spatial concepts, identifying their typological signs of emergence and existence in modern conditions. A leading approach to the study of the problem based on the application for the first time proposed by Michel Foucault's notion of “heterotopy”, which outlines a new perspective and offers a new concept for the analysis of space. It is noted that in shaping modernity, heterotopy moved into the category of tools available for use in research practices. In accordance with the concepts of architectural heterotopy formulated nine topical areas of research. Materials of article and descriptions of atypical spaces in architecture can be useful for the theory and practice of shaping space habitats, so as to open up completely new possibilities in architectural activities.

Keywords—*architectural heterotopy; atypical space; dynamic adaptation; virtual reality; project forecasting; information modeling; integrated systems*

I. INTRODUCTION

The emergence of new areas of knowledge, development of high technology and dynamic changes in society affect the operational field of architecture. There is a need to continuously adapt its role and identify concepts formation space habitats in the theory and practice of architectural formation in the context of the latest paradigms. In studies involving the analysis of space today is first proposed by Michel Foucault's notion of “heterotopy”, which outlines a new perspective and offers a new concept for the analysis of space. In this context, the concept of heterotopy is used as a tool for a new interpretation of Foucault's proposed wording of signs of atypical spaces that appeared recently in a general typology of architecture.

A. The Relevance

The relevance of this problem is due to the fact that when

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forming atypical spaces is carried out to obtain new knowledge in theory and practice of architecture, identify new approaches and ways of development of modern Environment. In addition, clarification and formulation of relevant research directions in the field of architecture. This opens the prospect of use not previously applied researchers in architectural theory means. This problem has attracted many professionals involved in formation of space habitats in the context of the formation of alternative spaces [1], [2] [3] [4], [7], [10], [14]. These developments are of interest in connection with the fact that the social and cultural changes that took place in the late twentieth and early twenty-first century, led to the need to rethink many of the usual views.

B. Problem Statement

The purpose of this article is to identify the architectural theory of single space-time approach in the context of innovative concepts and principles of formation of new types of atypical spaces. In accordance with the concepts of architectural heterotopy assumes the clarification and formulation of relevant research directions, as well as to identify the latest trends in architecture in connection with developments in society, as set out in the following nine relevant descriptions.

II. INNOVATIVE CONCEPT FORMATION SPACE HABITATS

A. Integrated Systems in the Context of Architecture Energy Saving

Changing environmental, socio-economic and, in particular, the energetic nature cause the need to find new, innovative solutions including housing and life support systems. These are manifested in the area of space habitats and create architectural objects in the context of a proposed M. Foucault typological signs - heterotopy of crisis. In modern conditions the heterotopy of crisis gets relevance in the context of energy saving, minimization and autonomy as a philosophy of Habitat. In this case there is economization heterotopy [3].

The problem of limited resources contributes to the search for new, topical solutions in the field of architecture and construction, as well as technological innovations related to conversion ideas of latest achievements in the various areas of science in to architectural and construction practices.

In this regard, dealt with research and design and experimental development:

- Strategy for protection of water in metropolitan areas;
- Technology appropriate recycling of waste;
- Reorientation and additional use of inhabited space;
- Offline energy-efficient objects as a new paradigm for survival;
- Mini-houses in the context of the economization heterotopy.

B. Changing Cultural Vectors as Changing Frame Situation

The emerging trend, according to M. Foucault, heterotopy of instability occurs when changes are made to how to use heterotopy in connection with changes of common cultural vectors, in which it is located. With the advent of the newest information technologies heterotopy of instability is manifested in connection with changing cultural vectors as changing frame of situation.

In connection with the change of cultural vectors in many aspects of life and society comes the appearance of new objects or transformation of existing. The proposals for the organization appear tall ground or underground cemeteries, prisons in the city, the ritual of temporary objects. Changing the form of labor activity includes organization of objects, a completely new destination. This is happening against the background of changes in the philosophical worldview of society and is associated with the formation of new knowledge [4].

In the context of heterotopy of instability and in connection with changes of common cultural vectors considered research and design-experimental development:

- Building objects as iconic symbols for organization of rituals;
- Forming the concept of liquid modernity;
- The concept of logistics management spirituality;
- Techniques for solving the problem of the burial of the deceased;
- Approach to detention facilities;
- Trend returns production of objects in the space of the city.

C. Sustainable Development of Architecture as an Ecological Alternative

Environmental challenge facing humanity creates a new type of architectural heterotopy — heterotopy of sustainability, which is seen in modern practice as a balanced interaction of natural and artificial Environment in the context of the new paradigm of consumption. On the basis of this concept arose the whole direction - sustainable resource-saving architecture as organizational Adaptive-spatial system [5].

Analysis of proposals to solve these problems allows us to highlight some directions related to heterotopy of sustainability in research and design and experimental development:

- Balanced interaction of natural and artificial habitats Environment;
- Problem of production, purification, reuse and desalination of water;
- Purification of polluted urban Environment and climate regulation;
- Bio-energy-active buildings and structures;
- Organic farming as the rehabilitation of urban space;
- Habitat Environment as an integrated ecological system;
- Mega-cities as environmental re-urbanization.

D. Modeling Residential Environment in Extreme Conditions as a Means to Security Habitats

Modern developments identified heterotopy of disasters in the context of human security in Environment, associated with the problem of reducing the vulnerability of the negative influences in extreme conditions and situations. In turn, depending on the options Environment habitats they share in extreme climatic zones, natural Environment, natural disasters. Heterotopy of disasters primarily involves wish natural conditions create artificial habitat Environment, posed by the effects of extreme natural disasters [6].

In the context of forming artificial habitats as Environment the rehabilitation effects of extreme natural disasters considered research and practical design and experimental development:

- Systems and objects for disaster prevention;
- Eliminate the consequences and to mitigate damage from natural disasters;
- Technology, managing change or correction of climate and the restoration of natural phenomena;
- Techniques for the protection and restoration of the effects of the global cataclysm;
- Objects of refuge in a situation of "end of the world";
- Features solutions to the problems of natural disasters in different climatic regions of the Earth;
- Conversion of territories affected by disasters.

E. Objects of Aerostatic Architecture as a Resource for Development of Alternative Space

Heterotopy can be a space between outer mediation extreme substances. In today's world, new heterotopy the gap in space manifesting as a modification of the parameters of its dimensions and position. This is due to the pervasive development of alternative space is in the air, on the water,

underwater, in space and in remote wilderness areas. Creating artificial habitable here Environment raises the philosophy thinking of the new direction - aerostatic architecture. Recent development represents illustrations to limitless opportunities of utopias, and the very act of their realization brings them heterogeneity. According to M. Foucault considered “embodied utopia is the heterotopy” [7].

An emergent conceptual precedent illustrates the ability to create multi-level mega-structures associated with the pervasive development of an alternative space. This is evident in the following directions of research and practical design and experimental development:

- Aerostatic objects for challenges of sustainable development;
- Objects moving vertical landscaping City Environment;
- Techniques of collection waste and air pollutants using unmanned aerial vehicles;
- Air-floating objects for public use;
- Projects flying residential objects and cities;
- Resource development organization alternative space;
- Looking at creating of space architecture.

F. Dynamically Adaptable System in the Context of Variability and Layered

Alternative space often manifest themselves as variables space when two different substances in space and time exist together and switch from one to the other. One of the properties of the formation of spatial habitat Environment manifested in heterotopy consist of many components (layered and variability), which can put in one real location a few spaces and place-provisions, which themselves incompatible. For example, in the theater, which consists of real space and virtual space Hall scene (when the play begins, the real becomes virtual, and disappears, and at the conclusion of the presentation, the opposite is reverse - the viewers is returned in reality) [7].

The processes of adaptation, fully involving the operational field of architectural activities, cause the need to identify the changes that occur in the system apparatus of the professions in the context of the use of innovative information technology [8]. Adaptability as a fundamental principle of evolution associated with the ability of any system to receive the new information for the approximation to its optimal structure generates the notion of adaptive architecture [9].

In this context, reviewed trends in research and practical design and experimental development:

- Kinetic architecture in the context of multilayer and variability;
- Develop flexible transformed constructive systems;

- Techniques of automated control and self-management techniques dynamically changing Adaptive architectural objects;
- Accumulation of information objects within an interactive platform for feedback;
- Concept of the physical materialization of accidental and generate tangible object from the domain of intangible.

G. Mobility and Interactivity in the Context of Station-temporal Pulsations Architectural Environment

Heterotopy most commonly associated with breaks in time. Temporary event in space can become permanent and broadcast in building — from a brief moment in the permanence of the place. In this sense, its further development, in accordance with the fourth principle of M. Foucault, heterotopy of the gap in time is in the context of the slowdown and rapidity.

This is a place where there is a slow or rapid sense of time (museums, libraries, archives, library), as well as space, where time constantly accumulate and perpetuates itself. They oppose space, where time is fleeting and infinitesimally — fairs, festivals, Moon-parks and etc. Temporary heterotopy can include still and resorts, where time runs or stretched in accordance with an alien culture and event saturation [10].

Recently raises proposals on the formation of architectural space as an interruption of the daily in the contrast between standing (stationary) and temporary (volatile). The concept of heterotopy of the gap in time in the architecture of the return closely associated with the new paradigm of cycling, which includes the phenomenon of irreversibility, and puts the problem of forming a kind of circular paintings in the world [11].

In this context, identified and examined lines of research and practical design and experimental design:

- Techniques reflect the information flows over time;
- Alternative strategies of vertical circulation through innovative techniques development of space;
- Algorithmic and parametric techniques adapt space using script attractor; Air-floating objects for public use;
- Interactive technologies in the context of virtual reality;
- Milestones of informational in the context of spatial-temporal pulsations architectural Environment.

H. Communicative Space as an Alternative to Private Space Habitats

Heterotopy always offers a system of barriers and passages, which isolates them and creates a permeable, making them atypical. In this regard, in modern practice, heterotopy transition (coercion or rite of passage) finds a

new incarnation in the context of isolation and permeability. Here is the dividing line between public and private space.

One of the terms that began to emerge in the doctrine, is communicative space, taking into account the time factor, the dynamics of structural model of its elements and the functional relationships between them [12]. While this's possible to create a space formed by internal and external forms which most closely reflect human needs in various aspects. This is due to the fact that some heterotopy overturned rules and other heterotopy uses their own - such heterotopies are semi-open nature of the [13].

In modern practice the transition heterotopy finds a new embodiment in research and experimental development:

- Concept of permeability “in-between-space”;
- Inhabited multifunction footbridges;
- Communicative space consumption as “bridge-recipient”;
- Concept of isolation and permeability in space as “bridge-donor”;
- Properties of the openness and closeness of communicative space as “bridge-border”;
- “Sky land” — communicative space, raised above the ground;
- Multifunction communicative space as “terra-converter”.

I. Architecture of Multi-agent Systems as Hybrid Spatial Environment

Modern methodological developments on the formation of architectural space proposed by M. Foucault compensatory heterotopy is treated as a contraposition of pathology and order. The attempt to create a universal, perfect space is related to compensatory heterotopy, which are located between the two extremes, built on the principle of the contraposition of the real world. In the wording of Foucault is a space or reveal all the illusions of the existing world, or, on the contrary, create a space so committed, so well organized, that next to it our world becomes erratic, stupid and unorganized [1]. Different spaces of this kind cannot be aligned in a linear sequence, because they are mutually imposed and penetrate each other. These spaces and counter-space are connected with all the other places that they repeat, and at the same time, deny [14].

The concept of tipping and the contraposition of the real world are embodied in the following theoretical developments and experimental proposals:

- Entropy tendencies in modern urban scenarios implemented in utopias;
- Multi-agent systems as a feeling of continuity;
- Imaginary space as contraposition of the real world;
- Conversion of hybrid spatial Environment for new features;

- Compensation as a reorientation of objects and restore Habitat Environment;
- Global information system and architectural design of Environment;
- Project forecasting techniques in the formation of architectural objects;
- Futures concept of the 20th century as an innovative forecast.

III. PRACTICAL SIGNIFICANCE

Using the properties of architectural heterotopy allows you to define new approaches to research, as well as gives direction finding for creating atypical space, opening up the prospect of the use of new funds in the formation of a new generation of architecture. A new interpretation of the wording of the signs of heterotopy proposed by M. Foucault, and identifying recent atypical spaces indicate the demands of creating a new theoretical language. This is because taking place in real and social space changes is not always can be digested using established categories. In this context, the concept of heterotopy proved popular in the first place, as allows abandoning the traditional binary oppositions.

IV. CONCLUSION

Through the examination of emerging trends in research and practical design and pilot new approaches identified development and innovative concept formation of architectural space:

- Integrated systems in the context of architecture energy saving.
- Changing cultural vectors as changing frame situation.
- Sustainable development of architecture as an ecological alternative/
- Modeling residential Environment in extreme conditions as a means to security habitats.
- Objects of aerostatic architecture as a resource for development of alternative space.
- Dynamically adaptable system in the context of variability and layered.
- Mobility and interactivity in the context of station-temporal pulsations architectural Environment.
- Communicative space as an alternative to private space habitats.
- Architecture of multi-agent systems as hybrid spatial Environment.

The analysis allowed us to identify in theory architecture new approaches to developing the principles of forming a space Habitat and gives direction finding for creating atypical space. In addition, offers the prospect of using innovative modern scientific paradigms and methods for spatial promising development Environment of future.

REFERENCES

- [1] M. Fuko "Other space" [Drugie prostranstva]: (translated A. Muratov) [Text] / M. Fuko // Projekt International. – 2008. – №19, pp. 171-179. – URL: <http://www.twirpx.com/file/758896/> [in Russian]
- [2] N. Harlamov "Heterotopy: strange places in urban spaces of post-civil society" [Geterotropii: strannye mesta v gorodskih prostranstvakh postgrazhdanskogo obshchestva] // Coffee club Intelros "Blue sofa" № 15, 2010. - URL: http://www.intelros.ru/pdf/siniy_divan/15/15.pdf [in Russian]
- [3] N.A. Mastalerzh "Thirdspace. General theory of heterotopy Michel Dehaana and Anatol Lieven De Kautera" [Tret'e prostranstvo. Obshchaya teoriya geterotopii Mishelya Dekhaana i Livena De Kautera] // Vestnik SGASU/ Urbanism and architecture. 2012. - № 3 (7), pp. 35-39. - URL: http://www.directmedia.ru/book_143256_vestnik_sgasu_gradostroitelstvo_i_arhitektura_nauchno_tekhnicheskij_jurnal_2012_vyipusk_3_7_/ [in Russian]
- [4] N.M. Mamedova "Space as context identification" [Prostranstvo kak kontekst identifikacii] // Vestnik MGSU "Architecture and urbanism. Reconstruction and restoration" 2012. - № 5, 20 p. [in Russian]
- [5] N.A. Saprykina "Sustainable architecture as a reflection of the future development of innovative technologies" [Ustojchivaya arhitektura budushchego kak otrazhenie razvitiya innovacionnykh tekhnologij] // Proceedings of the International Symposium "Sustainable architecture: present and future". – M.: - 2012. - pp. 170–181. [in Russian]
- [6] T.A. Karimullin, G.N. Ajdarova "Safe city in the extreme world. Statement of the problem. Model" [Bezopasnyj gorod v ehkstremaal'nom mire. Postanovka problemy. Model'] // News KazGASU, 2011, № 2 (16) / Theory and history of architecture, restoration and reconstruction of historical and architectural heritage. pp. 26-29. - URL: http://izvestija.kgasu.ru/files/2_2011/26_37_Karimullin_Aidarova.pdf [in Russian]
- [7] M. Fuko "Other space" [Drugie prostranstva] // M. Fuko Intellectuals and power: selected political articles, speeches and interviews (translated from the French B.M. Skuratov under general supervision V.P. Bol'shakov). – M.: «Praksis» 2006. Part 3. – pp. 191–204. [in Russian]
- [8] V. Mironenko, Y Demidyuk "Development of ideas adaptability in modern city Environment" [Razvitie idej adaptivnosti v sovremennoj gorodskoj srede] // Theory and practice of design 2013, № 4. – pp. 105-112. - URL: <http://jml.nau.edu.ua/index.php/Design/article/view/6286> [in Ukraine]
- [9] N.A. Saprykina "Parametric approaches architectural formation Environment in the context of adaptation and interactivity" [Parametricheskie podhody formirovaniya arhitekturnoj srede v kontekste adaptacii i interaktivnosti] // Science, education and experimental design [Nauka, obrazovanie i ehksperimental'noe proektirovanie] / Works of MARCHI: the materials of the international scientifically-practical Conference faculty, young scientists and students. - M.: MARHI, 4-8 April 2016. - pp. 277-283. [in Russian]
- [10] E.V. Shumihina "Place heterotopy in modern architecture" [Mesto geterotopii v sovremennoj arhitekture]. - URL: <http://knowledge.allbest.ru/construction/2c0b65625a2bd68a5c53a89421216c37.html>. [in Russian]
- [11] A.I. Subetto "The problem of cyclical development" [Problema ciklichnosti razvitiya]. – L: VII them A.F. Mozhayskiy, 1989. – 33 p.
- [12] A.V. Lobanov "Communicative space as a tool of knowledge of modern architecture" [Kommunikativnye prostranstva kak instrument poznaniya sovremennoj arhitektury]. - URL: <http://www.archi.ru/lib/publication.html?id=1850569490&fl=5&sl=1> [in Russian]
- [13] Yanushkina YU. "Visual-kinesthetic ecology public spaces of a modern city" [Vizual'no-kinesteticheskaya ehkologiya publichnyh prostranstv sovremennogo goroda] // Messenger of VolGU. Series 7. Philosophy. Sociology and social technologies/ Issue № 3 / 2014. - pp. 71-72. - URL: <http://cyberleninka.ru/article/n/vizualno-kinesteticheskaya-ekologiya-publichnyh-prostranstv-sovremennogo-goroda> [in Russian]
- [14] O.V. Bezzubova "Heterotopy urban space: towards a history of the concept" [Geterotropii gorodskogo prostranstva: k istorii koncepta] // Aesthetics of architecture and design: Materials of all-Russian scientific-practical Conference, 4-6 October 2010. - M.: Architecture-S, 2010, pp. 27-31. - URL: <http://culturalnet.ru/main/getfile/1464> [in Russian]