

Ecology and Architecture: the Design of the Environment for Human Survival*

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Abstract—Ecological problems of civilization have not lost their relevance since the twentieth century. Methods of their solution are limited to a one-sided view of the situation, which does not allow changing it radically. Consideration of the system of knowledge in the context of the transformation and the transition to a new type of network society provides an opportunity to rethink the very way of human existence, which is directly reflected in the concept of a contemporary city. Modern society is moving towards a network-based, horizontal distribution of knowledge, which is both the cause of the actualization of the environmental problems of the city and the way to solve them.

Keywords—ecology; nature; environmental problems; eco-settlement; knowledge; power

I. INTRODUCTION

One of the most important problems of our time is the deterioration of the environment. Environmentalists and ecologists criticize the emergence of a modern industrial city as the most problematic point in the development of civilization. So, already at the beginning of the last century, there has been an idea of the ecological city. But until now, the principles of its design have not changed and are reduced mainly to landscaping, greening and reasonable energy consumption.

Due to the existing fragmentary approach to solving environmental problems, the methods of designing an ecological city do not differ structurally from the principles of creating any other type of settlement. The cause of environmental problems should not be looked for in the environment itself but in the mindset and a modern paradigm in general. Today it is possible to observe social, economic, political, technological transformations. However, one way or another, all of them is reflected in the change of discursive practices that produce knowledge or truth.

The central thesis of this text is that the knowledge, the

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attitude to the knowledge as such determines the environmental concern of our time. The processes of production, consumption, and preservation of knowledge are changing, which entails the transformation of power relations, and hence the paradigmatic situation itself. The ecology of the city as a way of life, in the end, reflects a form of knowledge distribution. Modern society is committed to the network-based, horizontal distribution of knowledge, which is both the cause of the actualization of the environmental problems of the city and the way to solve them.

II. KNOWLEDGE

The man has always been interested in the problem of his relation to the outside world, the environment, nature. Throughout history, nature has been interpreted and described in many ways. One way or another, it always turned out to be the external “other” in relation to a person, so the man built his thinking in opposition to it. The man has knowledge of his own existence, which always surpasses the outer world, so the man is not nature.

Ian McHarg being one of the pioneers of ecological design claimed: “In the history of human development, man has long been puny in the face of overwhelmingly powerful nature. His religions, philosophies, ethics, and acts have tended to reflect a slave mentality, alternately submissive or arrogant toward nature.” [1]. The man has never been fully incorporated into nature. He was either in a subordinate and dependent state or in a position to fight it and dissect its secrets.

The reflection of the outside world is formulated as an understanding of the “nature — man” relationship. McHarg notes that this relationship is not important when people are not able to have a serious impact on the environment. But they become crucial when a person is endowed with power and opportunities, which can cause regression or even destroy all the living: “Yet the problems are only of yesterday. Pre-atomic man was an inconsequential geological, biological, and ecological force; his major power was the threat of power. Now, in an instant, post-atomic man is the agent of evolutionary regression, a species now empowered to destroy all life.” [2] The power of man, his ability to influence natural processes makes him dangerous for the world.

In the XVII century, nature was put in a rigid counter position to man, was understood as an enemy. Knowledge allowed man to subjugate it and turn it into a resource for the subsequent development of civilization. Only knowing the world around, it was possible to defeat it. “Knowledge is power” (lat. *Scientia potentia est*) – says Francis Bacon and announces a new era of relationships with nature, where there is a place only for the scientific knowledge. In the “*New Organon*”, Bacon proclaimed that the goal of science is to increase the man's power over nature. Scientific knowledge is designed to facilitate human life and contribute to the development of civilization. Bacon defines nature as a consumable which sole purpose is to be used by man.

But knowledge itself is not a neutral and transcendent tool. It is always involved in social practices in different ways. Knowledge about the world around gives power over it. Knowledge is inseparable from any power relations that always arise in relation to the “other”. The philosopher Michel Foucault says that power and knowledge presuppose each other, their relationship is described by the “knowledge — power” scheme: “We should admit rather that power produces knowledge (and not simply by encouraging it because it serves power or by applying it because it is useful); that power and knowledge directly imply one another; that there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations.” [3]

Knowledge is a reflection of the outside world. And if the order of nature remains independent and external to man, the form of the knowledge about the world constantly changes. The very way knowledge exists is changing. Knowledge exists in ways and forms of its production and distribution. The history of the transformation of the form of knowledge is the history of power relations. Knowledge was highly elitist and sacred when a voice was the only way to spread it. The transmission of information by word of mouth made the knowledge inaccessible, owned by the powerful few. Knowledge gave power and allowed to produce some form of true, regulatory knowledge.

Later, writing and printing allowed a person to have a strong influence on the world. But at the same time, the knowledge ceased to have any super-concentration. The technology of printing leads to the possibility of unlimited dissemination of knowledge, and hence its gradual devaluation and homogenization of power relations. The body that produces the truth disappears, but at the same time institutes for knowledge dissemination appear — the Church, the University, the State, corporations. So, knowledge retains a hierarchical structure, while becoming more accessible and open. Nowadays, the situation in many ways remains the same: many processes of production and consumption of knowledge are still in a vertical structure, controlled by institutions.

A society based on writing and printing is open and unified, which allows the dissemination of knowledge-power on an unlimited scale. Media theorist Marshall McLuhan points to this possibility: “The open society is open by virtue

of a uniform typographic educational processing that permits indefinite expansion of any group by additive means.” [4] The unrestricted expansion of groups and institutions leads to environmental disasters. They not even by virtue of their impersonality or cruelty, but simply by their nature strive for continuous growth and spread of their influence.

The twentieth-century crisis of the system of knowledge-power distribution contributed to the articulation of a variety of opposition ideas. One of the most important concepts which still holds its power is the environmental idea. The club of Rome led by Aurelio Peccei in the 70s in the book “*Limits to Growth*” [5] attempted to describe our apocalyptic future. Scientists have predicted several scenarios of events on the planet and all of them are cheerless.

III. NETWORK SOCIETY

So, the man was alienated, excluded from the ecosystem through a particular way of how knowledge functions. The ways in which knowledge is distributed, produced and consumed are the causes of environmental problems. However, now it seeks a network structure, circulates in horizontal power relations, can act in circumvention of the control of state and corporate interests. The shift from a hierarchical to a networked society, where power is diffusely distributed among many actors is happening. This does not contradict Foucault's definition of power: for him, power cannot be concentrated at some point; it is omnipresent and reproduces itself in any social relations. In a network society power as well as knowledge, exists in a different — horizontal form.

Technological changes cause the emergence of the network society. Electricity and the Internet compress space extremely. The globe, according to McLuhan, has turned into a “large village” with a different social structure and attitude to the outside world and nature: “As electrically contracted, the globe is no more than a village. Electric speed in bringing all social and political functions together in a sudden implosion has heightened human awareness of responsibility to an intense degree” [6]

McLuhan notes that written culture has gained power due to the uncompromising opposition to the world, the exclusion of man from it: “Those who panic now about the threat of the newer media and about the revolution we are forging, vaster in scope than that of Gutenberg, are obviously lacking in cool visual detachment and gratitude for that most potent gift bestowed on Western man by literacy and typography: his power to act without reaction or involvement. It is this kind of specialization by dissociation that has created Western power and efficiency. Without this dissociation of action from feeling and emotion people are hampered and hesitant.” [7] Acting without involvement leads to the alienation of man from nature, while the strategy of participation and inclusion is the definition of ecological thinking. The philosopher Oleg Genisaretskiy says: “... ecological consciousness is characterized by involvement, the perception of itself as the part of the studied or designed whole, identification with it, and not to detachment from the whole.” [8]

Involvement in the total interaction with the whole world becomes possible only with the awareness of the interconnectedness of the entire system, the interdependence of all its components, globality and inclusiveness of its processes. Internet and globalization lead to depersonalization, erasing the space of the planet, but at the same time is the cause of global environmental thinking.

Planet Earth is a public domain, and it belongs to the whole society, as significant changes in one part of it entail changes in the other. Collective value, common interest is a natural prerequisite for the horizontal distribution of power within the network. The next step to the network structure is the joint management of shared resources, the public domain. This becomes possible in the compressed space of a “large village”.

In 1968 biologist Garrett Hardin published an article on the specifics of the consumption of shared resources. According to the scientist, the ocean, atmosphere, national parks, pastures, all public resources will be exhausted if universal free access to them is not limited. If an object or resource is in a state of community ownership, users seek to extract as much as possible from it and spend as little as possible to maintain it, so that leads to its exhaustion and deterioration. Hardin calls this status “the tragedy of the commons”: “This is a tragedy. Everyone is locked in a system that encourages him to grow his herd infinitely — in a world that is limited. The final point, to which everyone is rushing, is a disaster — everyone pursues their interest in a society that believes in the freedom of communities.” [9] Like many other scientists Hardin sees the way out of this situation, in either the privatization of the resource or, conversely, nationalization — the transfer of the control to the state. But, as we see now, neither the state nor the market demonstrates sustainable economic development and reasonable use of public resources.

Unlike Hardin, another famous researcher Elinor Ostrom argues that under certain conditions, there may be such modes of existence and functioning of shared resources, in which they are maintained in a normal state while remaining in the public possession. “What one can observe in the world, however, is that neither the state nor the market is uniformly successful in enabling individuals to sustain long-term, productive use of natural resource systems. Further, communities of individuals have relied on institutions resembling neither the state nor the market to govern some resource systems with reasonable degrees of success over long periods of time.” [10] It is possible to organize self-regulatory institutions that are not similar to the state or the market to avoid excessive consumption. According to Ostrom, they can be created only if the problems of supply, trust, and monitoring are solved, that is, the problems of administration and information, that is, the problems of power-knowledge.

Horizontal resource management is not possible on its own — it requires horizontal knowledge management. In the book “Knowledge Management in Theory and Practice” Kimiz Dalkir states a paradigm shift from “Knowledge is power” to “sharing knowledge is more powerful.” [11] A

vivid example of distributed knowledge is Wikipedia — a platform for sharing information content. The use of a similar mechanism for resource distribution transforms the entire economic system, as it happens in the modern “sharing economy”.

Distributed knowledge is not only an analogy of a distributed economy but also a tool for its administration. Knowledge is needed to create a resource management system that is self-reflective, and responsive to changes within itself. Nature has mechanisms of resource management: the number of foxes and hares is in a linear relationship, so the balance is maintained and there is no depletion of resources happening. Man is forced to invent mechanisms for balancing the system. The closest to this type of regulation is a system in which each element produces and transfers knowledge to another: as if the foxes knew the number of hares and agreed on portions and increase of pastures.

The horizontal form of knowledge distributed within the network ensures the shared management of the Earth's resources as a public domain, which guarantees the sustainability of the ecosystem. The possibilities of network society as a phenomenon radically change the understanding of the city as a hierarchical structure. The city is thought to be included in the global ecosystem of the planet, and we can expect the emergence of new principles of designing an ecological city or ways of human existence.

IV. ECO-SETTLEMENT

The idea of eco-settlements is key in the attempt to transform the way of human existence in the world. Utopian projects of cities of the twentieth century often contained an ecological component, even without being called an eco-city. The most famous of these projects is the Howard's “Garden City” [12]. However, any fact of the presence of greening in such projects was rather a functional element for the maintenance of normal human work, rather than an instrument of a radical transformation of human life. That is, nature was not conceived as an environment — it was one of the serving elements, the preservation of which was a functional necessity.

Attempts to understand what an ecological city is cause great difficulties. The most common definition of an eco-city is a city designed to take into account the impact on the environment, populated by people seeking to minimize the consumption of energy, water, and food, to exclude unreasonable heat generation, air pollution with carbon dioxide CO₂ and methane, and water pollution. The concept of eco-settlement is close to it but different. It is defined as a settlement created to provide a clean living space for a group of people, usually based on the concept of sustainable development and feeding on organic agriculture. Often eco-settlements are ideological, religious communities seeking to restore the old, traditional way of life.

Thus, we see the differences between these two concepts. The city is always designed, imposed from the outside as an idea, like Howard's idea. The emphasis in the description is on the technical side of its functioning. The city by definition

is a hierarchical structure — it has an external regulator, the law — so its essence does not change in accordance with the current trend of the transformation of power relations. The city, as we know it now, has no future. The settlement turns out to be organized from within, each of its elements is involved in the legislative (knowledge-producing) process. Thus, the creation of an ecological city is impossible, since the very definition of a city is hierarchical structure the “correct” functioning of which is affirmed by an alienated force external to it. To become ecological, the city must be understood as an eco-settlement, as the dynamics of internal and horizontal relations.

V. LIFESTYLE

The idea of creating an eco-settlement is a form of nostalgia of a city dweller for the rural life, close to nature. Eco-settlement, however, is not a return to the rural way of life. In many aspects, this idea is close to downshifting and the concept of “slow life”. Downshifter tend to abandon the desire for material benefits, career growth, and consumption. They oppose many of the values of capitalism. However, downshifting reaches its most developed form in countries with a high average wage. Thus, the majority of eco-settlements are organized mainly in developed countries, by people with sufficient income.

It is important to note that the idea of ecological existence is in fact theological. The creation of an eco-settlement is a way of redeeming the “guilt of the white man” before nature, conditioned by the desire to create a “Lost Paradise” on earth. It is also, in a sense, the idea of restoring and preserving lost and habitual orders. That is why most of the people supporting the green party in Europe are also members of conservative and religious movements.

People who create eco-settlements, without knowing it, turn to already existing forms of settlements. In many ways, a similar order of life with the lack of private property, high horizontal mobility, appropriating the economy, and nomadism was characteristic for the primitive society of hunters and gatherers. Such societies, according to the philosopher Gilles Deleuze, are arranged horizontally and defined as societies without a state, that is, societies where different authorities do not appear. This does not mean that they lack power relations; they are just carried out on a different principle. Deleuze calls this arrangement the “war machine”, which is opposed to the statehood and constantly undermines it. The philosopher addresses the figure of a nomad, who does not know the city, the state, or power: “It happens that historians, both bourgeois and Soviet, will follow this negative tradition and explain how Genghis Khan understood nothing: he “didn't understand” the phenomenon of the city.” [13]

As we know, the society of hunters and gatherers has the limits of its spatial and numerical development, as it depends on the state of the context, the environment in which it is located. It occurs only in places rich with natural resources, as they lack effective artificial means of expanding the ecological niche. The society of hunters and gatherers is

characterized by the appropriating economy and the lack of private property.

Appropriating economy blended harmoniously with nature, but the production economy replacing it, has created many environmental problems. The emergence of private property frees the economy from its dependence on the environment, and hence its sensitivity to changes — it seeks unlimited growth and consumption.

The society of hunters and gatherers did not have tools or resources for knowledge distribution. With the system of administration and monitoring, the modern network society can again return to the appropriating economy. To do so, it is necessary to understand the whole world as a holistic ecosystem, in which the links between objects are more important than the objects alone. Each element or a resource does not exist separately and independently and is always articulated in relation to another, which ultimately maintains the balance of the system.

In agriculture, for example, for the sake of greater efficiency, people replace diverse flora with several grain crops. The use of monocultures entails many problems, including soil depletion, genetic diseases, degeneration of the species, etc. The use of polycultures is also economically unjustified, and the preservation of species diversity in gene banks is a weak consolation after the loss of many unique species and landscapes.

The extinction of species, even those that are not in use, is a threat to our existence, as it exhausts the resources of the ecosystem, which already becomes apparent. God ordered Noah: “Of every clean beast, you shall take to you by sevens, the male and his female: and of beasts that are not clean by two, the male and his female. Of fowls also of the air by sevens, the male and the female; to keep their kind alive upon the face of all the earth...” (Gen. 7: 3)

The design of an ecological city requires a revision not only of the construction technology and planning decisions, but above all the way of life, public order, and economic functioning of the system.

VI. CONCLUSION

Nature has always inspired fear, was incomprehensible, terrible. The modern understanding of nature is transforming — the new mythologization and sacralization appear. Nature is no longer understood as something alien or complementary, rather it is now the only reality in which man must be integrated. But complete dissolution is impossible, as it is impossible to return to the origins, to the pre-cultural existence in nature. The ecological city is the game of extinction, the game of predicting the absence of man. The design must be carried out with the intention of destroying the design traces themselves. Based on these reasons, a person seeks to minimize its impact on nature, seeks to recycle everything. Even the human body should serve as a fertilizer for the upcoming life. It can be concluded that the ideal ecological settlement could be a schizophrenic city without memory, without history, without culture. All

instantly must be erased, destroyed, to avoid leaving traces of man in indivisible and pristine nature.

The next step on the way to this “designing with nature” is complete and structural integration of human activities into nature. The dream of returning to nature is a dream of integration, total dissolution in nature. In fact, with the advent of a network society, a person breaks out of his subjective isolation and gets included in surrounding processes. It gets increasingly difficult for him to distinguish himself from the world. Alienation is replaced by the complete dissolution of the person in functional processes of an environment.

The dissolution occurs as a result of democratization, the horizontal adjustment of all process participants. Data is the universal mediator — it makes no difference between nature and culture, a man and a plant. Data describes the whole phenomenal world in the same one way but keeping so detached from it that it homogenizes any relationships. Natural and artificial become elements of the same order. Mushrooms and birds function on the same principles as buildings and street lights. Everything created by man is understood as links in the food chain; everything tends to occupy its ecological niche.

The versatility of data allows one to integrate himself into nature. As one of the many elements of the ecosystem, man finds himself inside on one phenomenal field along with plants, animals, bacteria. The data enable direct communication between human beings and non-linguistic nature. Anthropocentrism and human scale lose their power while we are entering the era of countless levels of communication, soldered into a single horizontal network of impersonal data flows.

Problems of ecology are usually seen in ecology itself, which results in their fundamental undecidability. In fact, their causes are located in the broader situation of our time. Designing an ecological city is impossible without considering the fundamental issues of human existence.

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