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Nature, Society, Technology in Global Ecological Interaction: The Experience of Philosophical and Synergetic Analysis

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Abstract: The research aims at systematizing the world view of ecological range of problems. The key issue is target setting for solving global ecological interaction systems of "nature", "society", "technology". These problems come to light through methodological apparatus of interdisciplinary direction of synergetics. The study is carried out in disclosure of the main points of the question under consideration: from speculative philosophical theories of man's alienation from nature and technology to modern theories of philosophy of natural science based on the concepts of synergetics.

Key words: Ecological view of the world, ecological problems, philosophy of ecology, philosophy of technology, social philosophy, synergetics, evolutionary theories

INTRODUCTION

The world-view of a modern man essentially embraces the ecological range of problems. But as experience shows, these conceptions have random and frequently controversial character. In philosophy, there is an experience of appeal to ecological problems at the level of philosophy of society, philosophy of nature, philosophy of technics. And also an experience of methodological consideration of such problems. Methodological tools of philosophy helps to take a fresh look at the heart of the problem, as well as to rightly form some attitudes of ecological view of the world. Even the great Benedict Spinoza differentiated "creating nature" and "created nature". Today we call them natural nature and artificial nature. The artificial nature of modern man is anthropogenic cultural environment. Therefore, in matters of global interaction we will study the system of "nature-society-technology". The ecological angle in consideration of this interaction attaches humanistic and world-view aspect to the problem.

The problem of man's alienation from natural nature and artificial nature: One reveals ontological grounds in philosophical analysis: ruminations on ecological problems turn a man to the question of his existence and non-existence as the problem of alienation from nature. It was philosophically expressed by Russian thinker F.I. Girenok: "Ecology is unfortunately, one but a modern mask of eluding being. Such masks do not conceal what they are hiding (there is no hidden existence), they reveal those that are in front". And, this eluding mask of being discovers the beginning of non-being, man's alienation from the nature natural and artificial.

The philosophers such as F.W.G. Hegel, left Hegelian L. Feuerbach and K. Marx discussed the problem of alienation. And the dynamics of understanding was in direction from the abstract to the concrete. So, if Hegel considered the problem of alienation by way of the example of abstract spirit-Absolute Idea, then the problem of alienation in the process of history of philosophy was gradually taking a more concrete character.

In the philosophy of interaction between man and nature it is traditionally considered in historical succession from pristine harmony to gradual alienation of man from nature natural and artificial. At that the philosophers find the multilevel alienation. Firstly, man estranges himself from his natural native habitat. Secondly, estrangement from artificial nature in the form of the estranged product of his labor and his work activities from man comes. Thirdly, man becomes alienated from his human nature: aloofness to God (Feuerbach), materialzation of human nature (Marx).

F.I. Girenok detects dialectics of alienation in the fact that the artificial world is essential for self-knowledge and

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man's being aware of his genuine connection with nature: "In order to live sensibly in the natural world, we had to create the artificial world <...>. Using technology, we irreversibly move not according to the logics of senses but according to the logics of revertible connections of the things in existence".

Evolution of views of interaction of man and nature. Modern ecological dillema: The beginning of anthroposociogenesis (the periods of the late Palaeolithic and Mesolithic) is characterized by man's involvement into the processes of nature but in that period there appear the premises of man's alienation from nature which is explained by emergence of ideas about the transcendent world of spirits and then gods. Nature becomes the object of scientific research in antiquity: soul and intelligence are attributed nature and man is regarded as united with nature in space. Tearing of man away from nature becomes apparent with the development of scientific rationalism and empiricism with the flourishing of classical ideal of rationalism in new time: the subject ceases to be solely the knower but becomes a transformer of the world. In the Newest time the environment has been already recognized as an object of scientific experiments for the purposes of social progress, the ideas about global environmental issues, ecological crises emerge, environmental forecasts are built.

Modern conflict of the society and environment creates a dilemma in the approaches to the environmental problem formulation. On the one hand, we strive to preserve nature in its harmony and integrity. On the other hand, we want to save the human species from degradation and extinction. How to state the problem? What is the primary task? The course of our further actions depends on the wording of the problem. Philosophical reflection can help to identify the heuristic potential of approaches, reveal weaknesses, define possible vector of scientific research.

MATERIALS AND METHODS

The main methods of synergetic approach to the research: Let us consider what principles and methods will be used in our study and substantiate our choice. Note that within the framework of post-nonclassical science the principle of evolutionism becomes a basic principle of the present picture of the world. Having replaced creationism, evolutionism explained a variety of species and the unity of all existed things in a new way. The research methods of evolving objects were developed in turn. In 40's of the 20th century systems analysis as theoretical study of complex systems began to be developed. Systems analysis shows that the behavior and the structure of the complex system cannot be fully described.

In 70's of the 20th century synergy as an interdisciplinary area of research dealing with the study of open nonlinear systems emerged. Ilya Prigogine is known to be its founder. Synergistic areas at different schools are called differently: the complexity theory (H. Haken, K. Mainzer, M. Gell-Mann), the theory of self-organized criticality (P. Bak). In Russia, a synergistic trend is represented by school of thermal processes research (Kurdyumov, Samarsky, Tikhonov), School of Biophysics (Chernavsky, Zhebatinsky, Shnol, Molchanov), School of Hydrodynamics (Klimntovich, Zubarev), the classics of great physics (Landau, Zeldovich). Therefore, it is important to note that we will follow the General Principles of Synergetic School.

Synergetics supplements systems approach with investigating the complex structures that are far from equilibrium. At the same time, synergetics also realizes the idea of creating an interdisciplinary science. The term "synergetics" literally means "joint actions". Thus, it is not a question of certain collective processes. Thus, synergetics can be defined as the science of the collective interaction of many systems of such nature. Synergetics is compared with modern natural philosophy. It describes how order arises out of chaos and how the systems develop, using the new concepts: attractor, fluctuation, bifurcation, etc. This synergetics made a number of useful conclusions for the later analysis of the interaction of man and nature.

We have already mentioned above that the basis of modern scientific theories is an evolutionary and systems approaches. In addition, in post-nonclassical science there dominates the principle of global evolutionism which combines the ideas of systems and evolutionary approaches into a single whole. Based on the principle of global evolutionism, one forms new historical approaches which sight the process of self-organization of social life and the biosphere in the history of humanity. An example is the Universal (Greater, Mega) history as an interdisciplinary trend, "including the evolution of the universe (Metagalaxy), the Earth, biosphere, man, culture and thought into a single context" (Nazaretyan, 2008).

The universal history uses the models of self-organization and management. The models of self-organization explain the formation of increasingly sophisticated systems, the appearance of the control mechanisms that use the environmental resources to maintain the non-equilibrium state; explain the occurrence of crises between the non-equilibrium system and

environment. For example, in the model of the universal history by E. Chaisson. There is the total entropy of the Universe and the local entropy of its segments that grow according to the second law of thermodynamics but at different rates which leads to the appearance of reservoirs for entropy clearance and the emergence of self-organizing foci. It also points to the value of living substance which tends to act purposefully to save the non-equilibrium state.

Formation of the Universal history is based on the widely spread principle of historicism. And for the successful analysis of global processes that describe the collective cooperation, a more accurate method will be synergistic historicism (synergistic philosophy of history).

In combination with a weak, strong or very strong anthropic principle this concept makes it possible to build different evolutionary theories and in many ways to cover the human role in environmental interaction. The variant of strong anthropic principle is used to build the models that justify the emergence of man as an essential element of evolution of the Universe to build hierarchically higher levels. The variant of weak anthropic principle suggests the possibility of an observer at some stage of the global evolution of the Universe.

In Russia in the 1990s socionatural history began to be developed. This trend correlates with the universal history within the framework of the strong anthropic principle. The founder of the school of socionatural history was (Kulpin-Gubaidullin, 2008). In terms of social natural history, the processes of social development are explained by the interaction of society and nature and the processes of development of individual civilizations by their correlations; consideration of the self-organization of human groups is made in terms of self-consciousness of ethnos, epoch world-view, etc.

Having considered synergetics, the principle of global evolutionism, the anthropic principle, universal history and social history we can point out common approaches to the analysis of the modern picture of the world. Everything is seen as a system, the systems are considered as being non-linear self-organizing and man proves to be included into the world historical process and is considered in the context of the history of evolution of the Universe, history is described as the process of complication, acceleration, shortening of life cycles, climbing from more probable to less and less plausible forms, inevitability of crisis is observed, attention is drawn to the importance of random factors in the periods of crisis.

The role of crises in evolution of ecological systems: Synergetic theories describe the formation of any systems through an inevitable passing of crisis periods (bifurcation points). And there is a law of the direct relation between system order (determinism) and crisis. Famous Russian scientist (Ye, 1993) sought out the optimal ratio of determination and entropy (chaos) with the help of synergism. He studied the stages of system transition from maximum entropy to zero entropy (which characterizes the rigid determination, total order). As a result, he showed that the optimal ratio of determination to entropy is the ratio of 80-20%.

Ye (1993) used this conclusion to analyze the degradation of social systems. But he suggested that ratio being optimal for a wide variety of systems in their nature. Explaining the above-stated ratio, we will note that with the total determination of the system loses its adaptive properties and can exist only in a stable environment. Even with small violations of stability a preterordered system is doomed to destruction. Destruction is accompanied by an abrupt transition to a new state and is described as a crisis of the system.

Let us turn to the consideration of the interacting systems “society” and “nature”. We can note that it is the society that tends to the total determination (zero entropy). In the era of globalization, the tendency to ordering becomes universal. In this regard, it is society that becomes a system experiencing more frequent crises. Synergetic theory considers crises to be the steps to a more complex and progressive level.

There are many interesting theories describing nature, society, technology in terms of synergetic view of the world. These are the works by A.P, Nazaretyan, L.I. Medvedko, S.D. Pozharsky, V.P. Bransky, M.V. Sapronov and others. In spite of the variety of theories, we note that they all point to the need for crises and even their useful role.

A place of man in ecological issue: We can subject the idea of the usefulness of crises in history to philosophical reflection. So, if the crisis used to be considered as degradation in the history of philosophy, then from the viewpoint of synergetic paradigm it turns out to be necessary condition for progress. A mechanism of creativity is sighted in chaos. In this context, concern for the environment is seen as a senseless affair. Therefore, the global environmental problem should be considered not as environment protection but as concern for habitat to be friendly for human.

But, if to approach the problem strategically, then crises inevitability can be seen as warning of the periods unfavorable for human existence. Based on the graphical models, the theory of catastrophes being similar in its scientific methodology to synergetics studies the possibility of avoiding the crisis, both in small social

groups and in large systems. This issue can be discussed in a separate work but in this context we want to say only that a warning role of scientific synergetic methodology may also be useful at a certain level of research.

RESULTS AND DISCUSSION

The problem of diversity in evolution of the system "nature-society-technology": The problem of correlation of order and chaos in the system is closely connected with the problem of stability of species diversity within the system. So, talking about preserving any ecological system, we have primarily in mind the preservation of its species diversity.

General scientific problem from the perspective of the diversity of synergetic paradigm was also investigated by Ye (1993). He clarified the question of how the diversity of systems in the process of evolution increases or decreases, offering original methodological solution that significantly supplements the classical law of requisite variety of U.R. Ashby. As a result, Ye.A. Sedov formulated the law of hierarchical compensations, showing that "the real growth of diversity at the highest level is ensured by its effective constraint at the previous levels" (Ye, 1993). This law was elaborated by the scientists to describe the society but it is also applicable to wild nature and inanimate nature. Consider the "society-nature" system from the historical perspective. We see that society gradually becomes more thickened and nature is losing its diversity. Further this process of society thickening and nature reducing will increasingly continue.

It is known that the biosphere compensates catastrophes at the costs of losses of diversity and biomass. Developing environmental forecasts, the researchers take this fact into account. At the same time, as a result of crises biosphere moves to higher and higher developmental levels.

Environmentalists believe that natural disasters caused by unfavorable geophysical processes (solar flares, volcanic eruptions, etc.,) are compensated thanks to changing the mass of biota and its biodiversity. This view of the biosphere has synergistic character and is described by means of the concept of sustainability of ecosystem and homeostasis (ability of the system to preserve itself).

But the death of the whole classes of inhabitants are hidden behind the compensation process. Thus, for the period from 600-70 million years ago, there had been seven planetary crises and all of them developed according to the same pattern: extinction of great number of biological species and emergence of small number of new, more perfect forms. So even before the appearance of a man with his industry the Universe itself ceased the existing of many species in nature.

From the aspect of contemporary ecological problem, biosphere can be thought to be complicated by culture and technology as a result of which there may ensue another biosphere crisis. A.L. Samsonov, A.N. Chanyshev, H. Lacy, A. D. Panov, M.K. Petrova, K.M. Petrov, Ye. D. Nikitin write about it. Within this idea, the scientists indicate indifference of some species systems to the other ones but note that only man is ready to protect the low organisms and with the prejudice of the pace of his own development. Thus, man maintains the habitat to be favorable for himself. Such humanistic ideas should be the basis of ecological view of the world.

Technology as a new level of global evolution: Alvin Toffler had noticed the insuperability of the "third wave". The technological wave updated equipment to the level of independent reality. And it only seems to us that man can affect technology. In fact, technology in the context of globalization has reached the point where its development gains independence and man is included in the process of its development. In terms of the theory of global evolutionism it looks natural.

In today's world it is technology that possesses all the features of the developing system: it increases its interrelationship and interdependence, extends at the same time the external environment autonomy as well as steps up the pace of its processing. Only a degree of self-organization gained by technology provokes doubt. But technologization, being understood not in an anthropomorphic way (as intensification of forming technical knowledge) but as formation of the systems capable of non-biological information processing and management of technological subsystems, looks to be a natural stage of technological attainment of mechanisms of its self-development.

For example, A.M. Kovalev considers technology to be the result of the natural process of evolution of the Universe. According to him, technology has taken a step on the general space way of development, growth of activity and order.

The philosophical problem about the nature of technology turns into a practical question of ecological compatibility of technology. Within the framework of the principle of global evolutionism there can also be two views of arrival of technology into the Universe (as well

as the emergence of man). Technology creating could be planned by the global evolution of the Universe. And it could not be planned then the emergence of technology has become a fatal mistake that violates the biospheric cycles. In this case, the human community can expect serious consequences.

For example, N.V. Popkova (2009) notes the duality of philosophers' positions. In terms of the optimistic forecasts about technology arrival, it is assumed that the increase in concentration of greenhouse gases in the North of Europe prevent glaciation which ought to come according to the rhythm of the Earth's climate changes. Or, given that due to the reduction of volcanic activity of the planet, carbon dioxide shortens, human activity on the atmosphere pollution can be seen as a biosphere salvation, as burning organic minerals (coal, oil, etc.), we saturate biosphere with carbon dioxide.

But the predominant position in the philosophy of technology is pessimistic as P.V. Popkova (2009) notes. Scientists are of the opinion of the technical reality as of a malicious distortion of nature while nature itself is considered to be an ideal of harmony.

Meanwhile, there is no category of the artificial for the synergetic theory. Everything that takes place in the Universe is generated by a single process. Systems become more difficult and complex systems will replace the less sophisticated, even if less complex are sentient beings.

One of the supporters of the pessimistic interpretation of the role of technology is B. I. Kudrin. The technical reality for B.I. Kudrin is a new stage of natural evolution of the universe which replaces the old reality, biospheric one as the natural result. On the basis of the technological reality there an evolutionary development of the next stage of organization information reality: "The emergence of technical systems presently led to the emergence of information systems: these are the systems that create documents... use documents to create new documents; the systems of various documentation. The information revolution has begun". This process, according to the philosopher, does without man as an initiating and guiding factor of evolution.

N.V. Popkova (2009) writes about the human attention need for the issue of growing self-organization of technology: "Let's assume that the existing tendencies of the environment change lead to its uncontrolled crisis. But the technological reality will not be worse, if it has time to attain man's self-organization and autonomy! Perhaps man can prevent his regrettable future if he does not rely on natural processes (which have already "acted" not in people's favor) but remember his qualities-freedom of will and purposeful activity. In contrast, co-evolution with biosphere will lead to its extinction and of humanity. If the processes are destructive for humanity, from now on they become "natural", active intervention in their implementation is needed. The sooner this problem will be put forward, the higher the chance to prevent trouble will be" (Popkova, 2009).

So, if within the framework of classical concepts of technology there are traditional motives of the man's being responsible for technology, then the synergetic theory considers man as a degrading system. Let us clarify this point.

As, we have already noted, according to the law of hierarchical compensations by Sedov, evolution in nature is inseparably connected with involution. And involution due to the loss of complexity and diversity is an element of self-regulation. Now, if we assume that technology is the most highly organized system, then biosphere and society are quite suitable for the role of the degraded systems today. In corroboration of this fact, the researchers noticed the loss of ethnic diversity, cultural unification. Perhaps, general extinction according to the vector of evolution is not threatening people, because even the lower forms of life and the structures of inanimate nature will be preserved. But fall in numbers, diversity, reduction to the level of the lowest degrading subsystem threaten man. Many contemporary philosophers (J. Derrida, J. Baudrillard, M. Foucault, F.I. Girenok, A.N. Pavlenko, A.V. Sokolov, V.A. Kutyryov and others) are concerned about the problems of degradation, unification, universalization.

Summary: Thus, in the context of the essence of technology in the evolutionary and synergetic picture of the world, we come to the problem of the opposition of technology to nature and man. In this context the solution to the problem of ecological interactions within the "nature-society-electronics" system should be considered as the task of saving natural environment being favorable for man. But at the same time, we are arriving at the formulation of the second problem, the protection of man as a species from degradation.

CONCLUSION

This study has studied the philosophical aspects of the environmental problem of interaction in the system "nature-society-man". The studies are based on the methods of synergetics. The problem of human alienation

from nature and technology theoretically had existed in philosophy long before the actual detection of ecological problems. The synergetic approach in various combinations of the anthropic principle gives many interpretations of possible interaction between nature, society and technology. Thus, we can state the main environmental problems in order of importance to man:

- Protection of man as species from degradation
- Protection of environment favorable for man
- Preservation of the biospheric diversity, care for low species

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