

Problems of Technogenic Society in the Process of Noospheric Transformation

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Abstract—The main factors affecting the increase of the contradictory influence of scientific and technological progress on the life of society and nature, as well as the appearance of inconsistency of unbalanced human needs to the natural cycles of the biosphere are identified. It is shown that the sustainable development of mankind will be possible only in the equilibrium (non-degrading) biosphere, so the future of the biosphere should be the subject of close attention of representatives of many branches of scientific knowledge, on the basis of which it is possible to solve the problems of environmental forecasting. The purpose of the article is to substantiate the new principles of human action, consistent with the laws of the natural Universe for the entry of mankind into the noosphere society, to ensure co-evolution of man and the biosphere. It is revealed that the eradication of consumer standards, the correlation of human behavior in relation to themselves and nature, with morality in accordance with humanistic principles will implement the basic provisions of the strategy of sustainable development.

Keywords—*ecological crisis; biosphere; noosphere society; ecological culture; ecological consciousness*

I. INTRODUCTION

In the organization of life of modern mankind the role of science, technology and innovative technologies, of course, is great, but at the same time, humanity, solving one problem, from the best intentions of improving life, immediately creates other, more serious, associated with the consequences of the use of a discovery, invention. Through science, we make predictions, assess the growth and expansion of the boundaries that nature and our technical capabilities set. However, any forecast loses accuracy as its time characteristics increase. The speed of our progress and the building of technical and economic capacities must be commensurate with our capabilities. New loads on the biosphere should be compensated by the development of ways of its adaptation to these loads and our ability to compensate them. In addition, we need to know in advance about the possible dangers. Forecasting models should help us in choosing alternative options for the development of productive forces, in choosing areas of scientific activity, etc. And intensive research is already underway here.

Modern production can be represented as a planetary technological process to provide the necessary human civilization. In the era of industrial development, this technological process was not closed, because it could not exist without the use of non-renewable reserves of the earth's subsoil; it throughout the period to the present time depleted and depletes all natural resources. Violation of the natural course of things in the recent past was of a local nature and did not significantly violate the natural cycles of the biosphere. The situation began to change since the Renaissance, as the discrepancy between the unbalanced human needs and the natural cycles of the biosphere increased.

II. SUSTAINABLE DEVELOPMENT STRATEGY AS A BASIS FOR A NEW HUMANISTIC WORLDVIEW

In the XX century, mankind realized the contradictory influence of scientific and technological progress on the life of society and nature: the deterioration of the global environmental situation, due to the level of development of material production, anthropogenic impact on nature, the aggravation of global problems, including energy, food and mineral resources, social and class contradictions of the modern era; military conflicts, economic, financial and information dependence of developing countries and their transformation into places of export of "dirty" technology and storage of toxic production waste; the phenomenon of spiritual degradation, etc. In the XXI century, given the crisis situations in many regions of the world with food, non-renewable resources, pollution of the environment as a result of natural and man-made disasters, humanity will have to solve the urgent problem of survival. For example, currently in the world every three urban dwellers lives in a slum, a shack, or urban ghetto; slum dwellers are more than 900 million people; in life-threatening conditions living in poor countries 78 % of the urban population; 1 billion people own 80 % of global wealth, the remaining 20 % split between 5.5 billion; the volume of freshwater is rapidly decreasing, about half of the world's population are faced with a disadvantage; the world average die every day from diarrhea caused by contaminated water, about 6,000 children. The dominance of the consumer mentality with the increasing level of unresolved global problems can contribute to a global catastrophe in nature and society (geopolitical and economic

breakdowns of established borders, an increase in aggressive (ethnic, racial, religious) trends: terrorist acts, military conflicts).

Incredibly high growth rates of modern scientific, technical, technological development have led to a multiple increase in industrial production and consumption of energy resources. The reports of the club of Rome ("Limits of growth", 1972) for the first time presented the idea of the transition of modern civilization from exponential economic growth to a state of "global dynamic equilibrium", from quantitative growth – to "organic", that is, to qualitative growth and "new world economic order". The Declaration of the First UN conference on the environment (1972) emphasized the interdependence of environmental issues with economic and social development. In the further development of the strategy of development of relations for the existing social system, it is important to determine the place of man in Nature and in the Universe and on this basis to develop a new worldview.

The increase in anthropogenic impacts on the environment is associated with the increasing frequency of natural disasters. This fact is reflected in the reports of the world conference in Rio de Janeiro (1992). Development of a new worldview, a new mentality based on humanistic values, a new worldview based on the postulates: 1) that all that is done in the name of man should not harm nature; 2) mutual respect between people; 3) the importance of the well-being of future generations; 4) the preservation of the biosphere, in which man and other species of living beings coexist, is not only an eco-ethical, philosophical task, but also the goal of mankind – to preserve itself as a species on Earth. Only the awareness of all people of these postulates will contribute to the sustainable development of mankind.

Many countries of the world community, in accordance with the Rio Declaration and Agenda 21 (Rio de Janeiro, June 1992), participated in the development of a sustainable development Strategy, committed to building a model of sustainable development and took concrete steps to implement it. However, to solve global problems, according to the UN Commission on sustainable development, not everything is done: in nature there are processes associated with land degradation, air and water pollution, depletion of natural resources (raw materials and energy), forest loss, biodiversity reduction; in society – the increase in the number of mankind, the preservation of social inequality, hunger, the increase in the number of poor, human rights violations, increasing morbidity, social and military conflicts, terrorism and violence.

Man's desire to adapt the Earth to his needs knows no bounds. As a result of anthropogenic activity there were anthropogenic disturbances of the earth's biosphere. According to academician K.Ya. Kondratiev, the maximum permissible value of anthropogenic disturbances should not exceed 1% of its total productivity: in this case, the Earth is able to compensate for adverse human impacts. However, at present this value is more than 10%, and the man-made system created by mankind continues to have a destructive impact on the natural environment. The establishment of a

dynamic balance in the biosphere at a favorable level for people, sustainable development of mankind requires: a) revision of the irrational attitude of man to the environment, as a result of which it should become environmentally safe; b) transformation of social institutions for productive and peaceful coexistence with each other and nature; c) changes in the way of human life, changes in human values, through the introduction into practice of his life environmental imperatives based on morality to prevent biosphere catastrophe and save future generations. Sustainable development of mankind will be possible only in the equilibrium (non-degraded) biosphere. The future of the biosphere is the subject of close attention of representatives of many branches of scientific knowledge, on the basis of which it is possible to solve the problems of environmental forecasting.

III. THE ROLE OF THE THEORY OF THE NOOSPHERE OF V.I. VERNADSKY IN THE FORMATION OF A NEW WORLDVIEW

The creative heritage of V. I. Vernadsky has not lost all relevance in our time, it should be noted its huge heuristic significance. In the creation of his doctrine of the noosphere, the scientist proceeded not only from the laws and facts precisely established by science. He would not have been able to raise this idea to the height of the scientific concept if he had not foreseen (almost half a century ahead of his time) the emerging and imperceptible to other rudiments of the trends of the future development of science, the needs of material production, the development of society and the problems associated with their implementation. Now, based on the achievements of modern science and practice, we understand the contradictory influence of STD on the life of society, we see the aggravation of global problems of our time, due to the level of development of material production, the way of society's impact on nature; the aggravation of the problem of energy, food and mineral resources, the deterioration of the world environmental situation; social and class contradictions of the modern era; military conflicts, economic dependence of developing countries and their transformation into places of export of "dirty" technology and storage of toxic wastes of production; phenomena of spiritual degradation, etc.

The difficult way of searching for the truth is reflected in the theoretical heritage of the outstanding Russian scientist, founder of Geochemistry, biogeochemistry, radiogeology, the doctrine of the biosphere, historian, philosopher and organizer of science, academician V. I. Vernadsky. Vernadsky began his scientific work with Mineralogy and crystallography, later he was interested in the problems of migration of chemical elements and the exchange of matter and energy in nature on a cosmic scale. In the process of research, he identified: - the role of physical processes in the migration of chemical elements, - the influence of life and "living matter" (ie. living organisms) on the formation of the biosphere; the reverse effect of the natural environment on living organisms; the role of society in this process. Thus, the specificity of changes in biogeochemical migration of matter and energy under the influence of human activity was determined. Formulating the conclusions of various studies,

the scientist was forced to turn to philosophical generalizations.

In the biosphere, the processes of formation and movement of living matter are associated with the cycle of matter and energy. Biogeochemical cycles with the participation of living matter, in contrast to geological processes, have a greater degree of intensity, that is, a greater speed and amount of substance involved in the turnover. The degree of population density plays a huge role in determining the level of human impact on the environment. The level of development of the productive forces of modern society affects the biosphere as a whole. "Living matter is more or less continuously distributed on the earth's surface, it forms a thin but continuous cover on it, in which the free chemical energy produced by it from the energy of the Sun is concentrated. This layer is the earth's shell, which the famous Austrian geologist E. süss called the biosphere almost 60 years ago and which represents one of the most characteristic features of the organization of our planet. Only in it is concentrated that special form of finding chemical elements, which we called a living substance", – writes Vernadsky in "Essays of Geochemistry" [1].

The biosphere is characterized by a large number of fundamental parameters. Vernadsky believed that the common idea of the biosphere as a living film (shell) of the planet with a sufficiently Autonomous set of all organisms (animals, plants, bacteria) is inaccurate. "Face of the Earth" corresponds to a certain geological shell of the earth - the biosphere and is not the result of "random phenomena" [2]. "The biosphere is not a static structure of the "shell of life", acting as an eternal reality of the world around us, but first of all a geobiohistorical process – a multidimensional sphere of the development of this process – from hypothetical beginnings in the Universe (less likely - specifically only on Earth) to specific biogeochemical cycles and evolution of living systems on our planet and further – to almost "apocryphal" expansion of the only one and a half million species, which broke spontaneously developing hundreds of millions of years the whole style of energy balance of the planet., – notes researcher creativity scientist B. S. Sokolov [3].

Vernadsky, defining "the conditions in which such an appearance or origin was the only possible" in the work "On the conditions of the appearance of life on Earth", investigating the problem of the appearance, the origin of life [4], points to:

- planetary, geologically natural character of life;
- the closest connection of all geological processes in the biosphere with the activity of living matter.

The first appearance of life in the creation of the biosphere had to happen not in the form of one kind of organism, but in the form of their totality, corresponding to the geochemical functions of life". Acceptable conditions could arise after the separation of the moon from the Earth and the formation of the Pacific ocean, and in the first place had to appear biocenosis. "At the same time he allows as a mechanism for the emergence of life as abiogenesis (origin

outside of life), and the penetration of living matter from the outside, from space. Vernadsky believes that abiogenesis, despite the fact that we do not observe its manifestations now, could exist in certain conditions before the appearance of the biosphere," notes B. S. Sokolov [5].

The earth's crust is the result of the existence of previous biospheres; the biosphere has been widely permeated by living matter and has existed from the cryptozoic to the present day throughout geological history. The biosphere is an open system, existing as long as the Earth itself exists. "We do not know any period of time on our planet when there would be no living matter on it, there would be no biosphere," the chemical structure of the earth's biosphere and its environment is noted [6]. Because of its close connection with other geospheres of the planet, the biosphere has been continuously operating; all organisms are inextricably and continuously associated with their surrounding material and energy environment and, above all, nutrition and breathing. According to Vernadsky, the boundaries of the biosphere, covering the entire globe, due to the sphere of existence of life, where it is possible to reproduce organisms. The troposphere (height 8-10 km in polar latitudes, 16-18 km at the equator) is inhabited by living organisms that are in it permanently or temporarily. "In the midst, in the intensity and complexity of modern life, man almost forgets that he himself and all of humanity, from which he can not be separated, are inextricably linked to the biosphere – with a certain part of the planet on which they live" [7].

The results of work in the field of Geochemistry and biochemistry led the scientist to develop the problem of the noosphere. The thinker came to the conclusion that the transition of the biosphere to the noosphere (in the sphere of mind) is determined by all cosmic processes, developing billions of years, and the processes taking place on Earth, including the progressive development of society. Man (humanity), performing a certain function, is a part of the biosphere. For the future development of Nature is responsible only man, as the increasing pressure on the nature of the consequences of human activity (material production, socio-political activity) turns it into the main "geologic force". Vernadsky stressed that the noosphere is a natural phenomenon and a new form of organization of geological force, so the civilization of "cultural humanity" will not disappear. The process of formation of the noosphere in different periods of creativity scientists associated: with the natural process of cephalization in the time of animal predecessors Homo sapiens, with the emergence of intelligent beings (Homo sapiens), with the development of science, with the creation of a world Association of people who consciously transform their livelihoods according to humanistic ideals (and the beginning of the process of formation of the noosphere in time moved away).

Given that the life activity of people in ancient times almost did not differ from the life of other living beings, the process of transition of the biosphere to the noosphere Vernadsky began to associate with the progress of the productive forces of society. At the same time, he noted that

the discoveries in the field of science and technology and on their basis the development of material production, the use of various forms of energy do not solve the problem of inequality, hunger, poverty, disease, moreover, can lead to a deterioration of human conditions, to the creation of tools, means of destruction of people. The reason for the slowdown in the process of formation of the noosphere is, Vernadsky believed, misunderstanding, lack of awareness of man's role as a geological force, non-humanistic use of science and technology, political confrontation of various social systems, social forces. Due to the fact that humanity is socially and politically fragmented, geochemical processes of the biosphere under the influence of anthropogenic factors are multidirectional: on the one hand, a person consciously changes the biosphere, on the other - unconsciously, as a person can not always foresee all the consequences of their activities. Due to these factors, the formation of the noosphere - a long period, the main - conscious purposeful formation of spiritual and material prerequisites for the transformation of the biosphere in the interests of all mankind. Only through conscious, appropriate, active impacts on nature on the basis of scientific and technological progress, taking into account not only the immediate but also the long-term effects of the impact will be possible the process of transition to the noosphere. Awareness of the masses themselves as a politically conscious force will overcome in the impact of man on nature, even through the use of discoveries of science and technology. Only the state-United and organized efforts of free humanity can "extremely expand their power and influence in the biosphere — to create for the next generations conscious state scientific work immeasurably better living conditions. Such a new direction of state activity, — the scientist wrote, — seems inevitable to me" [8].

In the last period of his work Vernadsky pointed to the most important role of socio-political factors for the process of formation of the noosphere, as a conscious, systematic transformation of social and natural human existence on the basis of humanistic ideas is the main, people should consciously organize a joint activity and subordinate it to the common goals of human existence. "The creation of the noosphere in its full manifestation... it will become the goal of state policy and social system" [9]. The factor of purposeful creation of the noosphere society will be scientifically based, systematic, humanistically oriented material production, which does not cause damage to the natural environment. Moreover, only the process of evolution, directed and controlled by man, can lead to the unity of man and nature, as part of nature, namely anthropogenically transformed, can not exist without the functioning of man-controlled technical means. The interaction of science, technology and the biosphere will contribute to the emergence of a new stage in social history, namely, the noosphere.

IV. NEW WAYS OF RELATIONSHIPS BETWEEN HUMANITY AND THE ENVIRONMENT IN MODERN CONDITIONS

It should be noted that economic growth based on the development of the productive forces can contribute to the

improvement of working conditions, increase social wealth and reduce poverty, increase life expectancy, the rise of the cultural level of human society as a whole, but for many regions of the world these processes are not typical. Currently, scientists note the diversity of the consequences of both urbanization and economic growth for the natural environment: accelerated economic development through the use of natural materials and resources, intensifying the economic development of nature, violates the ecological balance, which leads to the degradation of the natural environment and the biosphere as a whole. With the exponential growth of production, all production resources - capital, raw materials, energy-grow; solids and waste pollute the environment more intensively, and pollution of nature also follows an exponential curve.

The production of "secondary products" increases the mass and number of new substances that do not exist in nature and do not have natural assimilators. In the 21st century on the basis of new technologies in the biosphere increasingly appears materials, it is not inherent and not amenable to its processing or use in the processes of other life (eg, simple microorganisms). In turn, changes are introduced into the natural environment through the use of new technologies and techniques that are not adapted evolutionarily to the prevailing conditions in it (for example, new processes and reactions associated with nanotechnology or mass production in a short time). These relatively rapid changes differ from the rhythm of natural processes, where mutations occur in fairly long periods of time. This discrepancy between the evolutionary course of natural macro-processes and changes as a result of human activity in certain components of the natural system creates significant disturbances in the natural environment and is one of the factors of the ecological crisis.

Humanity now lacks non-renewable and renewable resources, such as fresh water. In many developed countries of the world, the task of solving local problems, for example, the creation and implementation of closed technologies, for which special measures are taken. At the same time, the solutions to local problems can't significantly affect the balance of the use of land resources. It is necessary to radically restructure the needs of mankind (their reorientation), to harmonize the needs of each person, of humanity as a whole with the real possibilities available to the Earth.

The process of mankind's entry into the era of the noosphere, the formation of the noosphere society, ensuring the co-evolution of man and the biosphere will not happen automatically, despite the evolutionary nature. It is necessary to develop new principles for harmonizing the actions, behavior and the new morality, which will require restructuring of the whole being, changing standards and ideals.

When considering the relationship between humanity and the environment, studying the ways of action and development of productive forces, and the distribution of human efforts, it is necessary to take into account the legal aspects and the relationship of economic and political

institutions that determine the organization of human society. The distribution of power, as V.I. Vernadsky stressed, can have a decisive influence on the choice of strategy in the use of certain resources, the structure of prohibitions, investments, etc. And to take into account such factors, to take into account the "distribution of power" is necessary when considering any more or less large projects, and, especially, international programs [10].

The transition to sustainable development involves the gradual restoration of natural ecosystems in order to achieve sustainability in the development of the environment, Nature to meet the vital needs of future generations of people. For sustainable development, economic efficiency, biosphere compatibility and social justice are important factors in the overall reduction of anthropogenic pressure on the biosphere. To do this, it is necessary to create a single economic, environmental and social self-organizing system, a broad international research program, a system of effective models, data banks associated with the modern assessment of the environmental situation and its immediate prospects. To solve modern environmental problems, it is necessary to change industrial civilization and create a new basis of society, where the leading motive of production will be the satisfaction of essential human needs, uniform and humane distribution of natural and labor-created wealth.

The creation of a new civilization can hardly happen without a qualitative change in the bearer of social power.

In order to maintain ecological balance, "reconciliation of society with nature", it is necessary that technological development be considered in relation to cultural development, the purpose of which is not just the creation of material values, but the preparation of conditions for the realization of man as the highest value. The development of new technologies and techniques for any production should take into account the rational use of raw materials and energy, and then the environment will not have undesirable and threatening consequences. To achieve this goal, it would be logical to focus science on the development of alternative production processes that would meet the requirement of rational use of raw materials and energy and the closed process within the boundaries of the shop with simplicity, providing equal costs or less compared to the "dirty technologies". Such an attitude to technological development requires a new concept of social needs as opposed to the concept of consumer society, to have a humanistic orientation, to cover the needs, the satisfaction of which enriches the creative abilities of a person and helps him to express himself, which is the most valuable for society [11]. A radical renewal of the system of needs will give more room for the development of true human values, instead of a quantitative increase in goods; there will be a condition for establishing a long-term dynamic correspondence between man and nature, between man and his living environment.

Modern man understands that wasted resources are too expensive to pay for those resources, which are becoming less - clean water, clean air, etc. Protection of the environment from degradation is consistent with the requirement to improve the quality of human life and the

quality of its habitat. To ensure sustainable development, of course, it is important to introduce environmental innovations, which are understood as new products, new technologies, new ways of organizing production, ensuring environmental protection. We are talking about the introduction of an environmental management system, environmental marketing, environmental technologies to ensure interaction between economic development and environmental protection at any level. Due to the tightening of environmental legislation in almost all countries, there will be an increase in the production of ecotechnics and EcoTechnologies.

EU directives, in particular the Directive on emissions of sulphur dioxide, nitrogen oxides and dust from thermal power plants, have a significant impact on the development of the market of environmental innovation. They are oriented manufacturers to develop devices for monitoring trace impurities. The use of preventive measures, rather than neutralizing the effects of pollution, is considered by experts to be a more reliable means of addressing environmental problems. To measures other preventive measures include ecostructures and ecological modernization of production. Environmental restructuring involves the restructuring of the industry structure as a result of reduced demand for products of "dirty" industries or through the modernization of firms - consumers of these products. Eco-restructuring is reflected in the reduction of raw material costs per unit of GDP.

Environmental modernization is associated with a change in the technological base of production, which is characterized by a reduction in the consumption of energy, water and other resources per unit of production. One of the indicators of ecological modernization of production is the degree of development of recycling (re-use of the resource after its processing). Recycling can reduce the harmful impact on the environment without reducing the country's raw material capacity.

Faced with a challenge from the state and other environmental stakeholders, producers have tried to change their economic behavior and develop a new view of improving production efficiency based on a more systematic approach to environmental management. To this end, they have developed a number of tools, including, for example, voluntary environmental charters, or "codes of conduct" in relation to the environment, namely: "Responsible care program" for the chemical industry, a multi-sectoral "Charter of business for sustainable development" of the International chamber of Commerce, etc. These include voluntary environmental management standards EMAS and ISO 14000.

The creation and implementation of environmental innovations are the basis of a new scientific and technological revolution. In accordance with this, it is particularly urgent to solve the problem of greening the entire education system on the basis of a new scientific paradigm focused on the co-evolution of nature and man.. Greening of scientific knowledge is manifested in the emergence of new scientific areas. The biosphere - the Foundation of life, the preservation of which should be a prerequisite for the functioning of the socio-economic

system and its individual elements, should not be considered only as a supplier of resources.

Over three billion years of evolution, the planet's ecosystems have developed sophisticated and sophisticated mechanisms to ensure maximum sustainability. Natural ecosystems are integral and can only be integrated into economic systems. Since the ability of ecological systems to sustain life is limited, the challenge is to determine the environmental limits within which an economy can be sustainable [12]. The economic subsystem should be considered in conjunction with the global environmental system of which it is a part and which should be the object of scientific analysis.

V. CONCLUSION

The path to sustainable development is through improved environmental, economic and social management at all levels, from global to local. In this regard, education, training and dissemination of knowledge in the field of nature protection should be given priority. This will make it possible to mobilize society in support of sustainable development, to implement the principles of environmental ethics, to develop and implement a program aimed at protecting natural resources and reducing their consumption. The transition to sustainable development creates the possibility of survival and further continuous development of civilization, but in a significantly changed, biosphere-compatible form, when a person does not destroy the natural environment of their habitat – this natural cradle of any life, including intelligent. The essence of environmental literacy is to learn the wisdom of nature. It is necessary not only to understand the principles of the organization of ecological communities (ecosystems), but also to use these principles for the organization and maintenance of sustainable human communities in education, science, culture, ecology, politics, etc.

Ecological ethics in the context of ecological education is the main means of formation of ecological culture. A deep study of the system organization of the biosphere, the identification of the role of man in relation to it, the main parameters of human-biosphere interactions aims at the development and implementation of the strategy of coevolution as a joint conflict-free development of mankind and nature.

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