

BOOK REVIEWS

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Oleh Pylypchuk

State University of Infrastructure and Technologies

9, Kyrylivska Street, Kyiv, Ukraine, 04071

E-mail: olegpilipchuk47@gmail.com

<https://orcid.org/0000-0002-8178-3347>

**Whether the biosphere will turn into the noosphere? Review of the monograph:
L. A. Griffen. The last stage of the biosphere evolution: monograph. Kyiv:
Talkom, 2024. 200 p. ISBN 978-617-8352-32-5**

The biosphere is usually thought of as the shell of our planet, formed by *living* matter, *literally* as a certain "sphere of life." However, for V. I. Vernadsky, who developed the doctrine of the biosphere, it was a *geological* phenomenon, the part of the earth's crust, that was *suitable* for the existence of life. He was talking about a certain structure originally formed not by living but by *inert* matter. Life appeared millions of years later, also thanks to the biosphere. The biosphere not only created the conditions for the existence of life, it *gave rise* to life itself. The latter arose due to the interaction of planetary and cosmic factors, in particular, the *inert matter* of the earth's crust and solar *energy*. And then life in the biosphere developed owing to all the same factors – the *material* of the inert matter of the biosphere and the *energy* of the sun's ray, also causing the evolution of the biosphere itself.

Living organisms function as active agents that cause and determine the direction of the biosphere evolution. Using its inert matter for their *own construction*, they thereby change the character of the biosphere. The biomass of living organisms gradually increased due to the transition of atoms of inert matter into living matter. But the life of every living organism is limited in time, and after its end, the substance that made it up *completely turned back into* the biosphere for further use. This, in Vernadsky's words, "current of atoms" between living and inert matter under the influence of solar energy was the main reason for the evolution of the biosphere. But as a conclusion of his doctrine of the biosphere, Vernadsky suggested that with the appearance of mankind on the planet, a new factor in the evolution of the biosphere arises – mind ("scientific thought"), which accelerates and qualitatively changes the evolutionary processes in the biosphere, gradually turning it into the "sphere of mind" – the *noosphere*.

This assumption of the scientist caused a significant resonance in the scientific and semi-scientific community. Especially recently, there have been a lot of materials



devoted to this issue and at the same time to another such "sphere" – the technosphere. But despite the abundance of relevant publications, there are still no *defined ideas* about these phenomena. Different opinions are expressed, but attempts to generalize and analyze them with consideration of the issue on solid scientific grounds, are hardly ever made. One of such attempts is the peer-reviewed monograph in which the author sought to consider this issue in connection with the peculiarities of society as a kind of biological superorganism on the basis of its scientific and technological progress, which largely determines the interaction of living and inert matter in the biosphere today.

Having considered the main provisions of V. I. Vernadsky's concept, as well as a number of current publications on the noosphere and technosphere, the author comes to the conclusion that many of those who seem to consider themselves followers of Vernadsky, *have actually departed far* from his views. The main content of publications about *the noosphere* is actually reduced to considering it not as a material phenomenon, but as a kind of "emanation of the mind" that creates this very noosphere. This causes a certain euphoria in these authors in anticipation of the beneficial moral and ethical consequences of its functioning. As for the *technosphere*, even its composition is not really defined, but despite the recognition of its usefulness, many of the publications are downright imbued with technophobia.

As a result, the author considered it necessary to study the current evolution of the biosphere on the basis of its history and to see how society as an active biological organism differs from the previous ones, and what impact these differences have on modern processes in the biosphere. In this regard, he consistently considers the emergence and development of living organisms in the biosphere, their evolution, as a result of which the processes of interaction between living and inert matter change. With the enormous variety of their forms arising as a result of the development of living matter, the main direction of evolution associated with the *complication of the structures* of living organisms can be clearly traced in this development. From the very beginning, they were *separate* autotrophic and heterotrophic types of *cells*. Their interaction with each other led to the formation of colonies of such cells, and then to the formation of an integral *multicellular organism* with the division of functions first between its constituent cells, and then between the organs.

This division was caused by the need to improve the adaptation of a living organism to the *environment* in which it exists. Its main task is to resist *entropy* more and more successfully, as all material objects – with the destruction of their structures and the degradation of energy – are susceptible to the growth of entropy in our world. The development of living organisms, on the contrary, presupposes a *decrease* in their entropy, which can be achieved only by removing its material carrier into the environment and consuming objects with *negative* entropy from it. According to E. Schrödinger, a living organism remains alive only as long as it receives negative entropy from the environment. And this means the need for a constant *material exchange* of a living organism with the environment.

The very need determines the main direction of the evolution of living organisms. For this purpose, they become more *complex*, including the formation of their own specialized *subsystems* designed for the more and more successful implementation of this function. And this presupposes the development of a living organism's ability to successfully perform the necessary actions, on the one hand, and to determine the nature of these actions depending on specific conditions, on the other. In other words, the formation and development of two functional subsystems of the body, one of which is intended for *material* (material and energy), and the second – for *informational* interaction with the environment. In a single-celled organism these systems are only outlined in the form of its internal structural components. And in a multicellular organism they already represent groups of specialized cells and then *special organs*. In fact, for the sake of their development and improvement, the evolution of living organisms takes place.

The author of the monograph examines in detail the nature of the ongoing evolutionary changes from this point of view. And first of all, he emphasizes the above-mentioned "general line" on the *complication* of the structure of organisms. In this direction, after multicellular organisms consisting of an organic group of various cells, the next stage in the evolutionary development of living things was the appearance of a kind of "collective" organism consisting of previously independent separate individuals – *a superorganism*. Now the idea of "collective" associations of eusocial insects as unified, *integral* organisms is almost universally accepted. Their appearance basically was revolutionary in nature – precisely as the next stage in the development of living organisms. The division of functions was realized *on the level of separate individuals*. However, these organisms were not able to change their relationship with the biosphere in the same revolutionary way, particularly because of their size that did not contribute to the development of a powerful informational system.

This happened much later on another evolutionary branch, in which the size of multicellular organisms provided the possibility of their development due to the growth of the *brain size*, which not only ensured the enlargement of hereditary programs of behavior, but also their formation in ontogenesis on the basis of experience. So, the *relationship* between living organisms and the inert matter of the biosphere has also changed. Many species of animals in interaction with inert matter not only introduced it into their composition as usual (some – autotrophs – directly, others – heterotrophs – indirectly) but also used *external* material objects (objects of "pre-technology" – from a spider web to a beaver dam) in interaction with the environment. This is potentially a very significant point, although it did not play a particularly important role until the appearance of a new kind of superorganism - human *society*.

Society, like any other biological organism, also forms two functional subsystems – one for *informational* and the other for *material* interaction with the environment. But, unlike the superorganisms of eusocial insects (ants, bees, termites, etc.), these are *systems*, not just *an external association* of their constituent functioning individuals. First of all, this concerns the information subsystem which, in addition to providing

appropriate connections with the environment, also plays the role of a protective, and most importantly, *unifying shell* for the entire superorganism which is formed and functions due to the interaction of the cerebral structures of the individuals that make up the social organism.

In the opinion of the author, the role of connecting elements between informational processes in the brain of each member of society is performed by special *material* formations – *signs*, that form *sign systems*. They provide the *transcoding* of individual information which is processed by the brain of each individual in internal *natural individual* codes by means of "external" *common* codes jointly *formed* in each individual by *society* as a whole. The result of the *social* functioning of such an information system, which significantly exceeds the information of each individual brain in its power, is the appearance of a completely new phenomenon – *social consciousness*. Exactly this makes society an *integral* biological organism in which the individual consciousness of each member is a *reflection* of the social consciousness.

Thanks to social consciousness, the nature of the interaction of the entire social organism also changes with its environment. Regarding the reduction of entropy, this interaction is carried out in the form of a special process – *the production process*. This process begins with social consciousness which forms tasks for individuals on this interaction. It includes the analysis of the environment, the needs of individuals and society as a whole, the possibilities and means for obtaining *consumer goods*, necessary for the satisfaction of individuals from the environment through their labor, the choice of the object of labor as well as the imperative impulse for individuals to participate in the labor process.

This process, just like the formation of social consciousness, is embodied by the same individuals, but in a different capacity. Under the influence of *individual consciousness*, which has accepted the attitude of social consciousness, individuals perform actions aimed at its realization, that is, the *transformation* of an *object of labor* taken from nature into an *object of consumption* necessary for society with the help of means of production. The latter, being a carrier of negative entropy, enters society to reduce its entropy. As a result, the entropy of society decreases, and the entropy of the consumer increases. Therefore, at a certain point, it ceases to perform its function, and it is removed back into the environment as the *waste*, increasing meanwhile its entropy.

Any other organism carries out a fundamentally similar process. But in relation to society, the author pays special attention to the fact that, in contrast to the metabolism of multicellular animals, *additional* material objects obtained through the transformation of environmental objects also take part in social "metabolism" – tools of labor and consumer goods (technical devices). Entropy is transferred from the social organism as a whole into the environment by their means. For this purpose, they are functionally and physically included in the composition of the social organism. Namely they, together with individuals in their "creative" function, form the second functional subsystem of society (its "*technosphere*").

This moment – the introduction of environmental objects into the composition of a biological organism – is of fundamental importance. Prior to this, in order to provide its existence in interaction with the environment, a living organism could use only the possibilities directly *inherent in its constituent organic matter*. The appearance in its composition of transformed objects of nature, first of all its inert matter, creates conditions for the use of the forces of nature itself that are also "external" to its living matter, opening up new, extremely wide opportunities for the biological organism. These possibilities are now limited only by the resources of *nature itself*, which fundamentally changes the nature of its interaction with it. The latter circumstance also turned out to be very significant, but its effect became known much later.

Accordingly, the first informational subsystem of society, based on social consciousness, is a certain "sphere of mind" of the social organism, i.e. its "*noosphere*". It includes all the same individuals, but in their intellectual function. Specifically, its material structure consists of the *cerebral* structures of individuals, which are *active* agents of the noosphere, since those processes that are commonly called *ideal* are carried out exactly in them; material *sign systems* that provide the transcoding of information from the individual into the social (and vice versa), and consequently, the interconnection between the cerebral structures of individuals through their sense organs and effectors, thus creating the integrity and unity of the entire *given information system*; specialized *technical devices* contributing to the receiving, processing, keeping and transmission of information; and in a certain sense, all the objects of *material culture* created by society *without exception* are in their *aspect* that represents the objectified in them information, distributed by the cerebral structures of individuals as required.

The author draws special attention to the fact that in this case, in addition to their biological elements, *environmental objects* are also organically introduced into the composition of the organism, *removed from the environment* and turned into elements of the organism itself. After returning to an environment with increased entropy, they appear to be with high energy expenditures and do not completely respond to regeneration, which leads to a steady reduction in the resources of nature, and consequently in the environment of society existence as a biological organism. At the first stages of the development of society, these losses in the environment were not particularly noticeable, although even then the economic activity of society caused significant damage to the environment. But with its development, losses increased quite rapidly, especially with the evolutionary development of the social organism.

Biological evolution did not stop with its emergence. But its object now became not a single multicellular individual, but the entire social organism that took evolutionary changes upon itself. Initially it existed in the form of a primitive tribe with a common noosphere and technosphere, the structure of which was mentioned above. We will only add that the very nature of the interaction of society with the environment as a whole required the appropriate structuring of the noosphere and technosphere so that they would provide the integral nature of society. Therefore, the task of its

functional subsystems included two points: providing direct interaction with the environment and ensuring the integrity of society. Accordingly, both the noosphere and the technosphere were structurally and functionally divided into *extroverted* and *introverted* components.

And as a result of their development (thanks to scientific and technological progress), the growth and division of a primitive tribe are starting, followed by interaction between newly formed social organisms with the formation of new associations, just as before the division with the subsequent unification of unicellular organisms led to the emergence of multicellular organisms. We will not dwell on this here, although the author examines this process and its mechanisms in sufficient detail, showing how the structure and functions of operating subsystems developed in this process. We will only note that as a result of these interconnections, the original integrity of social organisms is lost, they turn into some only partially independent quasi-organisms (such as a state or civilization) with interacting and counteracting *private* noospheres and technospheres. And this, with regard to the additional expenditure, caused the increasing of environmental resources use, *reducing itself* due to the withdrawal of resources in order to include them in this aggregate "social organism" (with subsequent transformation into waste).

But simultaneously with the disjunctive processes, there are also unifying processes. Despite the significant differences in the noospheres of different social formations, the processes of borrowing and unification are taking place between them. Moreover, there has been for four centuries in the world *a forced globalization* of one of the civilizations – the western one, which imposes its noosphere on all mankind as the dominant one. However, now social processes in the world are proceeding in such a way that the possibilities of this are gradually decreasing, but there is a possibility of *voluntary* joint formation of a common noosphere – the "*sphere of mind*" not of planet Earth, but of *united humanity*. And consequently, the formation of an integral, but now *single social organism* again over time. And this gives hope for future changes in the state of the biosphere, which today is very alarming and continues to deteriorate.

The depletion of our planet's resources is a growing public concern. There are more and more ideas aimed at possible changes in the situation. Existing ideas include proposals for the organization of sustainable development, limiting consumption, humanization of thinking with increased ethical aspects, the joint "co-evolution" of society and nature, and many others. The author of the monograph considers the proposed solutions to be purely palliative. They may be useful, but they can only postpone the danger, not eliminate it. After all, they can neither stop the scientific and technological progress of mankind, which is directly related to the expansion of consumption of Earth's biosphere the resources, nor increase their quantity.

The only effective solution is movement into space with its *unlimited* resources. Despite all the seeming fantastic nature of such a decision, humanity is quite capable of it. The first step in space exploration has already been taken, although it is still immeasurably far from a real exit even to near space with the transfer to it of the

productive activities of mankind with its ever-expanding consumption of resources and the removal of waste. Technically, this can be done on the basis of further scientific and technological progress.

But from the societal point of view, only *united humanity* can solve such a problem. For these reasons, V. I. Vernadsky, touching upon this issue, asserted that "the creation of the noosphere from the biosphere" "requires the manifestation of mankind as a single whole. This is its inevitable prerequisite". The solution of this grandiose task presupposes that the entire human civilization will turn within the boundaries of the Earth into *a truly integral* social superorganism, which alone can be able to accomplish such a gigantic achievement. The author of the monograph believes that today's social processes in the world lead in this direction and analyzes them in great detail. However, we will not stop to discuss these matters further here, since they would require a very extensive exposition.

By the time when a real prospect of going into space is achieved, as a result of scientific and technological progress, and in particular the development of artificial intelligence, all production functions *will be transferred* to the corresponding technical systems, *completely excluding* direct human intervention in them, leaving him only the processes that can never and under no circumstances be transferred to technical devices (as "inanimate" ones that do not have their own *will to life*) – *goal-setting* and *innovation*. Now it is difficult to predict with sufficient certainty what the productive labor of a person will look like exactly. The author believes that people's lives will be based on *scientific* and *creative* activities *as their natural forms*. In itself, this activity will become not so much productive labor as *a way of life*, the main way of satisfying *social needs*.

Thanks to the universal informational interconnections, which, together with people and their individual consciousnesses and the universal technical systems of storage and processing of information, will make up the noosphere of society, in which every person will be able *to receive* any desired information from it and *contribute* the information developed by him into the general system, preserving personal authorship. And, as a result of the constant processing of *all* the information received both from individuals and from outside by the public consciousness, a "public production order" will be formed for production *from the noosphere*. Bypassing the human, it will *directly* reach *the technosphere* as a *universal system of interconnected local self-governing technocenoses* that produce both consumer goods as well as the means of production.

As far as exodus into space is concerned, today we cannot imagine what decisions our distant descendants will make, but in the foreseeable future humanity is unlikely to be in need of populating space on a permanent basis. The *extroverted* parts of the functional subsystems of the universal social organism will be oriented there for the organization of automated unmanned production. Meanwhile, the natural and artificial objects that fill the earth biosphere will actually enter the *introverted* parts of these subsystems. The Earth's biosphere *will not transform* into the noosphere, it will simply *coincide* with the introverted parts of both the noosphere and the technosphere of

society, *completely turning from the environment of the existence of the social organism into a cozy common home of all humanity. This will be the last stage of the biosphere evolution.*

In relation to the limited volume of the review, we have not fully considered the content of the monograph here, including the author's rather detailed argument of his point of view on quite important aspects of the problem. For the same reason, many specific issues related to this topic (for example, regarding the development of artificial intelligence) are omitted. Therefore, we invite those who are interested in the considered above problems to directly find the monograph itself, which is available on the Internet, in particular, on the website of the author lagrif.org.

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