

THE SEMANTICS OF TRANSDISCIPLINARY CONCEPTS OF SOCIO-NATURAL CO-EVOLUTION: A CONSTRUCTIVE UTOPIA, SOCIAL VERIFICATION AND EVOLUTIONARY RISK

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Summary. The utopian character of modern scientific theories, with the human nature as a subject, is an inevitable consequence of the presence of an imperative component of transdisciplinary human dimensional scientific knowledge. Its social function is the adaptation of the descriptive component of the theory to the given socio-cultural type that simplifies the passage of the process of social verification of the theory. The genesis of bioethics can be seen as one of the basic premises for the actualization of the anthropic principle of ontology, which thus acquires the axiological and epistemological sense.

In our previous publications [1] it has been argued that transdisciplinary scientific theories the subject of which is the genesis and evolution of complex human dimensional socio-natural systems, have complicated epistemological and ontological structure. It is represented by partially overlapping ("centaurum") socio-humanitarian and natural-scientific verbal and logical concepts with the specific to each of them standards and regulations to assess their reliability and validity. Causal determination, as the main principle of the adequacy of the classical scientific concepts, gives way to the coherence (consistency) of all elements of the interpretive knowledge.

On the other hand, the concepts of modern science serve as explanatory models of evolution, which include human reality, and provide the tools to transform this "human dimensional" reality [2, p.59]. Therefore, they must be regarded as a special techno-rationalist adaptive module, which, together with biological and socio-cultural adaptive modules are the unique product of the global evolution of the Universe - stable evolutionary strategy of Homo sapiens (SESH). The genesis of SESH included two consecutive adaptive inversions.

As a result of the first of them [3, p. 7] the externally predetermined human adaptation to the changing reality was replaced by the creative transformation of the reality itself to human nature, which at this stage stands as some global constants. Consequently, the initially single object of the spontaneous global evolutionary process was divided into socio-ecological environment (the object of evolution) and teleologically current carrier of the mind (the subject of evolution). Therefore, in the issue of the second, recursive adaptive inversion the technology has become a tool of evolutionary transformation of humanity itself

It implies two fundamental conclusions. First, the presence of two cycles of adaptaciogenesis in human evolution leads to a jump in the size of evolutionary risk up to the existential level of the significance, that is fraught with physical extinction or loss of socio-cultural self-identity of human.

Secondly, due to the dichotomy of the global evolution to the object and the subject the problem of semantic code that binds with common rules of correspondence of flowing parallel biological, sociocultural and techno-rationalistic components of anthropogenesis raises. It allows speaking not only about co-evolutionary semantics of genes and culture, but also about semantic aspect of the ontology of a scientific theory in general and theory of global evolution in particular

The analysis of the semantic aspect of competing paradigmatic concepts of the noosphere of V. I. Vernadsky, the anthropocene of P. J. Crutzen and pneumatosphere of P. A. Flolensky will be the subject of present publication.

Global evolutionary concepts of socio-natural co-evolution as the example of transdisciplinary science

The starting point of this analysis is the substitution of logical-empirical verification of scientific concepts for the sociocultural verification; and this substitution is derived from the superposition of descriptive-nominative and value-imperative discourse in transdisciplinary post-academician science.

Under the condition of the coherent logical consistency of descriptive and values constituent, the concept successfully undergoes a process of social verification. In the case of internal inconsistency of the two components, there is a need for creating a system of criteria of the balance of humanitarian and natural science paradigm cores.

The most obvious candidate to study the structure of scientific knowledge in the age of transdisciplinary scientific theory is the theoretical global ecology as the variants of which in different periods of the past and of the present century were the concepts of the noosphere, the anthropocene and pneumatosphere (in the latter case to a lesser extent, compared to the other two). Furthermore, the mentioned

concepts have hybrid origin that puts them in the category of ethical and epistemological hybrids and makes it possible to consider them as objects of social verification.

The noosphere. The basic premise of the noospheric paradigm is the postulate that the mind, being a product of the evolution of the noosphere, in the interpretation of Vernadsky, is one of the notions of evolutionary concept, which describes the mind as a special natural phenomenon. The noosphere is the sphere of interaction between man and nature, where the further development of nature is determined by the reasonable human activity. "We are currently experiencing the exclusive manifestation of living matter in the biosphere, genetically associated with the identification of *Homo sapiens* hundreds of thousands of years ago...Fully covered by the living matter, the biosphere increases, apparently, its geological force in the infinite size, and processed by the scientific thought of *Homo sapiens*, it (biosphere) moves to its new state – the noosphere" [4, p. 32]. The collective mind, as a determining factor, evolved much later than the appearance of a human as a biological species, namely after the settlement of *Homo sapiens* and their mastering of the entire surface of the earth and the use of invented instruments for broadening the possibilities for change of the surrounding world. We can talk about the emergence of the noosphere from the beginning of conscious transformational (in their own interests) activity.

V. Vernadsky identified a number of prerequisites for the formation of the noosphere, among which, in addition to the settlement of humanity over the surface of the earth, were the creation of a unified informational system and unified government, attributes of which becomes the effective ways to control the behavior of large masses of the population, that is, the development of energy sources, the progressive involvement of increasing number of people working on science, turning of the humanity into a powerful geological and evolutionary force. "The humanity, taken as a whole, is becoming a powerful geological force. In addition, in front of it, in front of its thought and work, the question about the restructuring of the biosphere in the interests of freely thinking humanity as a single unit emergence. This new state of the biosphere to which we, without noticing it, are approaching, is a "noosphere" [5, p. 113]. Therefore, the noosphere paradigm is an attempt of synthesis of descriptive-scientific and axiologically imperative components within a single scientific theory that is the first example of a new - postacademic (post-non-classical) scientific rationality.

Pneumatosphere. The concept of the noosphere introduced by Vernadsky is seen as an attempt of consistent synthesis of philosophical and theoretical research, but not free of internal contradictions, and as already mentioned elements of utopia.

One of the two alternative interpretations of Vernadsky is philosophically idealistic evolutionary concept of pneumatosphere by P. Florensky. In the 30s of the past century in the scientific and philosophical landscape of post-revolutionary Russia this philosopher created the mentioned doctrine, which became the result of religious and theological searches as well as in the case of Vernadsky the synthesis of the spiritual heritage and scientific ideas into a coherent whole. P. Florensky formulated the concept of pneumatosphere from a position of religious and theological outlook «...I want to express the idea that needs a specific justification and represents more heuristic principle. This is the idea of the existence *in* the biosphere, or maybe *on* the biosphere the thing that could be called pneumatosphere, i.e. the existence of a particular portion of the substance involved in the circulation of culture or, more precisely, the cycle of the spirit. Undoubtedly this cycle can not be reduced to a common cycle of life» [6, c.231].

If the noosphere is the highest stage of evolution of the biosphere, the pneumatosphere (from the Greek *spirit* and *ball, kernel*) is based on the part of Theology - Pneumatology - the doctrine of the Holy Spirit - a synthesis of science and the wisdom of God, the incarnate Sophia as a universal reality and the divine creative love. However, being connected with the person and life of the planet, pneumatosphere ontological claims to independence - the man is not counting on divine providence, and develops and transforms the surrounding natural space through science guided by the supreme spiritual and ethical values. Thus pneumatosphere contains idealistic notions assign it the status of spiritualistic conception.

Anthropocene. Anthropocene as a special term indicating the relationship between human and his environment came into use of the scientific community due to the Nobel Laureate in Chemistry Paul Crutzen [7, p.23].

Being originally ideational in its essence (as a worldview problem of the humanities) anthropocene concept was rationalized by Crutzen and received the opportunity to be empirically verified (as a mechanism to control the evolutionary process). The category "anropotsene" itself thus emerged as an attempt to create a global ecological concept at most accessible to the empirical verification procedures. Its main provisions are reduced to the following: living things have an impact on the environment, but only a human at this stage of his development affects all aspects of the biosphere with a force equal to, and often greater than, the power of nature. Humanity exploits $\frac{3}{4}$ of ice-free Earth's surface, using a maximum of natural resources. Almost all of the planet's ecosystems bear the sign of the presence and active transformations carried out by human. The

history of human as a biological species has more than a million years, but during the last two centuries, the collective actions of *Homo sapiens* have a significant global impact on the biocenosis. In this connection, a new era has been defined with the help of geochronological term - *anthropocene* (gr. *anthropos* - man and *sene* - new) by analogy with the *holocene* - the geological epoch, dating from the end of the last Ice Age and the rapid spread of people the Earth's surface, which lasts more than 11 thousand years. The beginning of a new geological epoch with the dominant role of human dates back to the 17th century - the period of the formation of an industrial society.

Thus, the defined concept is "not a formalized unit of geological time scale, the geological epoch, characterized by the transformation of human activity in the primary factor that determines the direction and patterns of course of geological processes " [8,c. 135].

It is considered that the noosphere is the late stage of the anthropocene, a period when the scale of the impact of the Intellect on the course of the evolution approached to the critical point. Let us recall that the core idea of noosphere is the idea of spreading of a new mentality, bred by a dictatorship of Reason in the world of sustainable development under the authority of a world government guided by human interests.

The anthropocene as noospheric model of existence and (to a lesser extent) pneumatosphere has a hybrid origin. Empirical facts are intertwined with the imperative installations, flowing from the sphere of natural sciences to the area of the humanities. The attempt to comprehend the anthropocene as search for signs of the coming of a new era led to the split of the flow of cognition in flow of natural science and humanities. The first vector is directed towards the problems that are indirectly related to the person, such as atmospheric composition change, species extinction and so on, in short all that brings us to the problem of the emergence of *technological risks*; orientation of the second vector points to the threat to the human nature – ecological disaster, the introduction of Hi-hume, etc., that indicates the emergence of *social and humanitarian risks*. And at a certain stage the evolutionary risk (as a product of anthropogenic threats) and existential one (as a product of socio-humanitarian threats) tend to merge.

In the analysis of the three alternative global-evolutionary concepts as examples of modern theoretical understanding of post-academic science (in a situation where the man is not only the power of cosmic transformation, but also becomes the owner of the technologies of managing of evolution) the attempts to comprehend this situation bifurcate and even triple - firstly as an attempt of purely philosophical-idealistic understanding (pneumatosphere by Florensky), secondly the attempt of synthesis of axiological and descriptive elements, i.e. science and ethics into a single system (the concept of Vernadsky), accordingly the inevitable sign of it is the elements of more or less constructive utopia, and thirdly (the concept of the anthropocene by Crutzen) the attempt to reduce arisen interweaving of values and descriptive components encountered in post-academic science and civilization in purely positivist interpretation, by the reduction of the explanatory model to the system of judgements available exclusively to the empirical verification and purified from any hints on the appraisal nature of the introduced judgments. However, the concept of the anthropocene in contrast to the noosphere concept of Vernadsky's is "cleared" from its projective-transforming element, reducing the human dimensional evolution of complex self-organizing systems exclusively to diagnosis of the changes in the human environment observed in objective reality and unmanaged in the strategic sense. Unlike the concept of anthroposphere, V. Vernadsky tried to create a nonlinear model of the interaction between ideal (ratio, reason, noos) and material (biosphere) members of the binary co-evolutional opposition with the aim of ensuring its sustainable development, while maintaining the self-identity of human in the world spontaneously changing and purposefully modified by man. That is why the elements of utopia, presenting in the concept of the noosphere, are rather aim (the image of the desired future), whereas descriptive and, therefore, available to the scientific study and verification, components set a vector of development and serve as an instrument of its realization with all the obvious internal contradictions of such a model of development of this paradigm is open to the self-adjustments.

Constructive utopia and social verification of postacademic science in the system of socio-cultural management of anthropogenic evolutionary risk.

The uniqueness of the social status of post-academic science with its inherent mechanism of reasoning is (1) in a substantial lessening of the possibility of consistent, explicit reduction of the theory to empirical data and (2) in increasing of the specific gravity of hidden socio-utopian component. The attributes of scientific knowledge (rationality, possibility of empirical verification, criticism and projectivity) at least partially coincide with the features of the utopian concepts (rationality, teleological character and projectivity). Hence, post-academic science acquires the character of a pragmatically oriented (practical) theory, based on starting points of classical pragmatism.

The aim of science is, above all, not explanation, i.e. creating a perfect model that is adequate to reality (world of things), but search of ways to implement of utopian, i.e. initially not achievable limit - the world how it should be, supply of human (society) of technical means to transform nature, society and himself. Criticism of utopia is directed not to research its own methods and bases, but to the notion about the reality (in the beginning about the social reality, but then reality as a whole). A criticism of the ideal itself (world how it should be) significantly weakened.

Constructiveness of the utopian concept, including the abstract theoretical constructions of human dimensional, post-academic science within the concept of social verification means accordance to the following three cognitive-projective criteria:

1. **Epistemological criterion.** The availability of a sufficiently broad objective logically consistent core required for the emergence and actualization of some variety of projective and existential schemes;
2. **Axiological criterion.** The logical accordance of the projective component of the concept to the key elements of the humanistic system of values and possibility of co-adaptation of the concept and a set of secondary priorities, principles and imperatives that are derived from this system;
3. **Instrumental criterion.** The ability of the concept to be integrated into the general system of culture as an element of mentality on the basis of a sufficiently strong associative relations with positive emotional coloring.

Post-academic scientific theory in some aspects is a self-fulfilling prediction that plays in both constructive and destructive role in the equation of social evolution. As an example of self-fulfilling prediction with unremovable signs of technological modernism and social utopia we can consider already mentioned concept of transhumanism as the scenario of technological improvement of Homo sapiens [9, p. 3], that will end in post-human future of the Mind (and intelligent life). This ideological premise, despite the rapid transformation from the ideology of small marginal group into an influential social force, often questioned and criticized by the scientific community, a member of RAS B. G. Yudin says: «For those who connect the future with projects of technological modification of the human, traditional humanism is too narrow platform: they characterize their position as *transhumanism*. And at present it is difficult to judge whether transhumanism is a development, modern phase of humanism, or from the point of transhumanism, humanism that is familiar to us should be discarded at all as something archaic» [10, c. 4.].

Noospheric paradigm, combining scientific, descriptive and idealistic elements, potentially is a constructive utopia, able to create compound complex of explanatory models, social norms and socio-psychological predisposti, partially embodied in a reality. In fairness, it should be noted that self-fulfilling predictions made in the framework of this concept can bear both destructive and constructive character. One of the trajectories of development of the thesis about the transformation of the Intellect into the dominant factor of the evolution led to the exclusion of the category of Scientific and technological progress from predispozitie considering the person as an end in itself of the evolution. This line is the basis of the concept of transhumanism and postulates the implementation of all that is not contrary to the laws of science and can be technically feasible.

In another embodiment of the socio-cultural verification of the teaching about noosphere, it is the antithesis of transhumanism and approaches the bioethical paradigm of Schweitzer – Potter. In bioethics, scientific and technical progress is actualizing humanistic values, and does not act as a self-sufficient goal of evolutionary innovations [11, p.58].

Conclusion

The current stage of development of technogenic civilization in ontological and epistemological aspects can be characterized by the emergence of technologies of driven evolution, a specific feature of which (the evolution) is the ability to manipulate socio-cultural, cognitive, and genetic codes. Evolutionary risk as a direct result of the splitting of a single flow of scientific knowledge into two components – dangerous knowledge and preventive science is the system characteristic of complex non-equilibrium systems (including the objects of nature and society in general). In this situation, the stable evolutionary strategy is a kind of attractor to which the system aspires.

The main problem of social verification in this case seems to us as balancing of the binary opposition – evolutionary strategy and the system of human values, as it is the last element that is capable substantially increase or decrease the probability of actualization of evolutionary risk to the border of existential significance. The system of value priorities is equal to the evolutionary semantic code, which in particular determines the validity of rational technological interventions in human evolution and the evolution of systems, which include human.

In these conditions the utopian character of modern scientific theories, that have the human nature as their subject, is inevitable and, moreover, within certain limits, the desirable result of the availability of the imperative component of transdisciplinary knowledge. Its social function is the adaptation of the descriptive component to the given socio-cultural type that simplifies the passage of social verification of the theory, and prevents self-destruction of science due to the "extinction" of the carriers of scientific knowledge.

But then the genesis of bioethics can be seen as one of the basic prerequisites for the actualization of the anthropic principle of ontology, which thus acquires both axiological, and epistemological sense.

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