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Modern ideas about the object of scientific knowledge and bioethics

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Abstract

The present article analyzes and outlines significant changes in ideas about the object of scientific knowledge in modern science. Special attention is paid to the transition to the paradigm of complexity, within which the object of scientific knowledge acquires a complex systemic character and remains in the same complex connections with systems of different levels. It is marked that such changes entail a number of methodological requirements, which are especially clearly manifested in modern theories of bioethics and its real practices. A special role in this case is assigned to issues of transdisciplinary approach, complementary methodology, and values of the subject of bioethical cognition. The prospects for further research are related to the possibilities of deepening the methodology of the paradigm of complexity based on the application of a transdisciplinary approach.

Keywords: scientific revolution, paradigm of complexity, complex system object, transdisciplinary approach, value orientations of the subject, problems of survival, theory and practice of bioethics

Introduction

Talking about revolutionary changes in modern science has long been commonplace, but the crux of the matter lies in the fact that in modern science one can observe a strange revolution. Firstly, it is permanent in nature, that is, it is stretched in time and diffusely scattered in all directions and fields of science, and, secondly, the dynamics of changes in modern science has imperceptibly turned into a "dynamics of dynamics", i.e., into a continuous increase not only of its changes, but also in the constant acceleration of the pace of these changes. However, the matter is not limited to the external parameters of the existence of modern science only, it also concerns its most profound and vital internal states. In the modern understanding of cognition, the terms "cognitive schemes" or "cognitive map" appear (Neisser, 1976), which are an essential element of, first of all, scientific knowledge and paradigmatic cognition installations in general. At one time, when discussing the issue of the content of "cognitive schemes", Georgy Shedrovitskii defined them as general "notions of what can be the object of scientific knowledge and about its structure" (Shedrovitskii, 1984, p. 70).

Indeed, despite the fact that modern ideas about the relationship between the object and the subject of scientific knowledge differ significantly from the times of classical science with a shift towards a significant increase in the role of the subject not only in the cognition of the object, but also in its selection and primary delineation, the object has remained an ontologically self-sufficient entity for science that ultimately justifies its very existence. Therefore, changes in the understanding of the object of science are necessarily reflected in the entire structure of science, determining to a large extent its cognitive means, the inner content of science and the substantive coherence of the results of scientific knowledge. This justifies our appeal *to the structure and status of an object in modern science.*

Although, at the same time, there are additional factors for considering the issue posed by us. The realities of modern social life presuppose the issue of human survival to come to the fore in all social strategies. This is primarily due to the incredible expansion of the scale of man-made activities of people, which both exacerbate a number of traditional issues of social development (for example, the issue of resources) and give rise to new problems, often of a

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nature that has never been encountered before. In the latter case, we are talking about attempts to intervene in the human body, and about the emergence of biological threats to the existence of mankind in total, that is, about the emergence of new deadly diseases covering all countries and continents. This is the rationale of today's peer attention of the scientific community to bioethics, which can be evidenced by referring to the latest publications on this topic (Lupton, 2020; Klenk, 2020; Childress, 2007; Düwell, 2013; Trčka, 2020; Lee, 2017; Draper, 2019).

In this article, we do not consider all the rather complex and acute issues of bioethics itself, but focus on how significant shifts in modern scientific methodology, concerning *changes in ideas about the object of scientific knowledge*, can affect its development.

Initial grounds for revising the ideas of an object in modern science

There is every reason to believe that the understanding of the object of scientific knowledge in the latest modern scientific searches and innovations is changing significantly. Let us note and briefly describe these changes together with the methodological implications that they entail.

First of all, an object in modern science is understood *in the paradigm of complexity*: classical and even non-classical science placed between theory and reality a geometric and mathematical model that simplifies real objects, but modern science is no longer limited to this since it actively includes informational constructing and visual computer modeling in perspectives of possible technological construction (Examples: 3-D modeling of the Earth's history, contemporary informational map of the Universe, computer modeling of biological processes) (Hazen, 2012; Popova, 2017). In this case, a new understanding of the object serves as a guideline, namely, it is now understood more and more often and mainly as *a complex systemic formation*, which is in same complex systemic connections with various objects, structures, and processes. These objects can be of different levels of complexity and width (Marin, 1997). This understanding of the object brings scientific research beyond the boundaries of not only a separate science, but also beyond certain areas of science, urging the introduction of *transdisciplinary research*.

Another important feature of the new understanding of the object of science is the orientation of conducted research towards identifying *the individualized features and characteristics of the object*. Aristotle's demand to study of the general, having shown its justification and effectiveness at a certain historical stage in the development of science, now turns out to be only a preparatory stage for the transition of research to solving more important problems, namely, from highlighting the typical or general properties of a class of objects to the study and understanding of this particular object. Such an approach, on the one hand, significantly brings scientific statements to the real state of affairs, and, on the other, displays the cognitive means of science to a new level, the level of penetration of knowledge into more subtle and complex structures of reality (Mielkov, 2014, p. 101).

Methodological outcomes of changes in ideas about an object

From the point of view of scientific methodology, the noted changes in the understanding of the science object, as has already been mentioned, essentially require, while studying the phenomena of reality, going beyond the limits of a particular science, since, for example, when studying a certain physical body, it will be necessary to take into account not only its properties at the level of macro processes, but also its quantum and mechanical characteristics, inscribing it, on the one hand, into ecological, geological and geo-cosmic processes, and, on the other, into social, economic, legal, humanitarian and projective-futurological ones. However, an important issue here is that research results should be expressed in some unified matrix (or paradigm), and not fall apart into a series of different scientific and theoretical descriptions. This means that we must inevitably reach the level of the above-mentioned transdisciplinary research (Argamakova, 2017, pp. 120–136). An example of such modern research could be new

branches of modern scientific knowledge such as ecological history or the history of nature (Szabo, 2015). In this modern scientific discipline, the application of a transdisciplinary approach and the inclusion of the subject of research in a wide range of sciences of a different field are especially indicative. One can also refer to the archaeological studies of the construction site of the island of Mont San Michel in France, in case of which it was necessary to inscribe this site not only in social history, but also in the history of the formation of the planet, taking into account the data of cosmology, geology, mineralogy and biospheric processes; something similar was required in determining the age of the stones from which Stonehenge was built.

Another important methodological requirement is the understanding of the inevitability of the transition to pluralistic cognitive orientations: the complexity of the object of cognition presupposes that it is impossible to exhaust this complexity with any particular methodological approach, therefore it is extremely important to see the spectrum of possible methodological solutions in not competing with each other but requiring synergy and cooperation. Naturally, this state of affairs, in turn, requires the cultivation of heuristic and creative thinking, a shift from orientation to a single line of knowledge and methodological solutions. (Bohata, 2013, pp. 163–195; Arshinov, 2012, pp. 169–171).

The next point follows from the previous one: pluralistic methodology significantly increases the role of the subject of cognition, since it opens up the possibility of choosing a strategy for cognitive actions as well as their creative modifications. The choice may relate to the subject section of the object of cognition, the starting point of the cognitive cycle, the choice of research tools, the methods of recording the results of cognition, and, also, the methodological strategies cultivated by different sciences. This state of affairs unambiguously indicates that modern science, professing a new understanding of the object of cognition, becomes noticeably human-dimensional (anthropometric), and therefore allows the presence of a value component in the course of cognition and in its results, on the basis of which, in fact, the choice is made (Mielkov, 2014, pp. 33–62). A new understanding of the object of cognition prompts the researcher to take into account the complexity of individual objects of cognition and consciously choose complex objects for research, these both mutually presuppose each other.

Application of the new methodology in bioethics

In the real conditions of today's situation associated with the expansion of the scale of human technogenic activity, with the pandemic threatening to develop into new pandemics, it is important to use the new characteristics of modern scientific methodology to study such an obviously complex field of knowledge as bioethics. On the one hand, the objects of bioethics are of a systemic nature, on the other – they are inscribed in various systems of connections and interactions, and, finally, a peculiar feature of these objects is that they are both bio-technical (bio-technological) and bio-social systems with the access to various kinds of practice.

It should be mentioned that, since the time of Hippocrates, there has been a well-known saying "it is not the disease but the patient who should be treated". This provision has been increasingly addressed since the end of the 19th century, when a number of areas of scientific research, i.e., anatomy, physiology, biochemistry, pharmacology, genetics, and molecular biology made it possible to take into account additional issues about the patient. The emergence of the term *individualized (personified) medicine* corresponds to the trends outlined above in changing the object of scientific research in the 21st century. At the same time, an evaluative approach to the analysis of the collected material about the object of research is manifested – the doctor has to determine which of the available facts is important for solving the issue of treating this disease, and which is not.

The founder of bioethics as a separate branch of science was, as is well known, the American ecologist, oncologist and scientist Van Rensselaer Potter, who used Aldo Leopold's concept of Earth ethics (Leopold, 1987). According to Potter, Leopold was the "first bioethicist", who combined ethics and the concept of Earth (Potter, 1988, p. 203). It should be noted that the very emergence of the term 'bioethics', associated with the name of Fritz Young, already brings ethical issues beyond the anthropocentric paradigm, since Young applies the concept of ethical behavior not only to relationships between people, but also to people's attitudes to animals. Another important "going beyond" the anthropological approach in scientific research and turning to transdisciplinary research was the emphasis on human interaction with the environment and on the impact of this environment on human health. Hence, it followed that, to ensure human health, it may not be enough to correct one's personal state of the body (even taking into account heredity, anatomical features and concomitant diseases), but one should pay attention to the fragment of the world in which one lives (profession and occupational diseases, ecology and social stress). Since any person lives in a certain social and natural context, bioethics is viewed as the "science of survival" (Potter, 1970, pp. 127–153) of humanity in general.

Van Rensselaer Potter believed that the science of survival should not just be a science, but a new wisdom that would combine two vital and extremely necessary elements – biological awareness and human morals. "I therefore propose the term 'bioethics' in order to emphasize the two most important ingredients in achieving the new wisdom that is so desperately needed, namely, biological knowledge and human values" (Potter, 1972, pp. 200–205). Bioethics is perceived by Potter as the "bridge to the future" that connects objective scientific knowledge and universal human values, natural sciences and liberal arts, theory and practice, knowledge, and wisdom (Potter, 1971).

The Dutch physician Andre Hellegers interpreted bioethics in a slightly different way; he viewed it as a combination of ethics and medicine in the practical professional activity of a physician. This approach allows doctors to incorporate the theoretical ideas of bioethics directly in the process of treating patients, which is already a kind of manifestation of the interdisciplinary approach (Harvey, 2013). Due to him, the concept of bioethics was used as a synonym for biomedicine and ethics in the works of foreign scientists for a long time, that which linked the theoretical ideas of bioethics with issues of medicine, euthanasia and cloning.

However, it is obvious that the approach of Andre Hellegers, which is possibly connected with the traditions of pragmatism, significantly narrowed the circle of bioethical issues set by Van Rensselaer Potter. With the development of the social bioethical movement, ethical, medical, philosophical studies, which already dealt with not only the issue of human interaction with the inanimate, but also with the living world, ideas about the subject and the object of bioethics have expanded. Extended and considered in the modern world as quite obvious, the interpretation of the subject and the object of bioethics is reflected in the multivolume "Encyclopedia of Bioethics" (Warren, 1978). UNESCO documents and international treaties related to the issues of bioethics and bioethical law take into account both interpretations of bioethics – made by Van Rensselaer Potter, and by Andre Hellegers, thereby emphasizing the transdisciplinary nature of bioethics (not to mention the interdisciplinary nature of bioethical law).

Bioethical knowledge has a complex structure and is characterized by interaction with different forms of knowledge, which makes it possible to single out the intra-system and intersystem aspects when considering bioethics. In the system of modern knowledge, bioethics is at the level of scientific and philosophical superfundamental knowledge. This position of bioethical knowledge is due to its interdisciplinary and integral nature, which, as we have already noted, develops into a transdisciplinary one in modern scientific methodology. Bioethics as a field of knowledge unites not only elements of different sciences, but also extra

scientific forms of knowledge and practical activity. The integrating principle in bioethics is the person as the central object and the subject of moral relations.

The analysis of bioethical issues can be carried out both at the philosophical level (which includes social, philosophical, and historiosophical studies) and at the specific scientific level, which is typical of modern research (Nikulina, 2012). However, none of these options, taken individually, will lead us to the expected results, which should be, as has already been noted, of a complex and systemic nature, giving us not only a holistic vision of issues and ways to solve them, but also setting new horizons for such a vision. In such a situation, other approaches are needed to maximally synthesize the entire range of achievements in natural science, social and humanitarian sciences, as well as in specific scientific research, that is, a transition to the paradigm of complexity is required. At the same time, it is necessary to take into account the principle of historicism, which requires any subject to be considered in its formation and development, since "competition between segments of the scientific community is the only historical process that ever actually results in the rejection of one previously accepted theory or in the adoption of another" (Kuhn, 1962, p. 8). It is in this case that we will be able to build a general picture of achievements and delusions (mistakes) in an important branch of human knowledge – bioethics; because the study of those issues that influenced the aggravation of the bioethical situation in the modern world indicates that they have long-standing roots. This science is based on the knowledge of biology and at the same time goes beyond the limits of its traditional concepts, including the most essential elements of the social and human sciences in the scope of its consideration, philosophy being of particular importance here since it is understood as "love of wisdom" and it uses logics, analysis of methods of scientific research and developed methodology.

Modern bioethics is a "normal science" in Kuhn's meaning of the word: "…'Normal science' means research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice..." (Kuhn, 1962, p. 10). This statement is especially important, since there still are practicing doctors and pharmacists who consider bioethics to be an unnecessary addition to practical medicine and pharmacological work, since it limits (and sometimes prohibits) a number of actions, procedures and manipulations both in the treatment of patients and in production of new drugs (for example, the case of the rapid creation of a vaccine for coronavirus). Any branch of knowledge about a person, the world, society, and natural principles develops on a certain theoretical basis, which is the methodology of cognition of this or that part of reality (Ocheretyany, 2012).

The transdisciplinary nature of modern bioethical research creates an opportunity to "relay" knowledge of a series of different sciences into this area of knowledge, and this allows you to get a special aspect of the vision of the issue, namely, to consider bioethical issues as a global phenomenon that fits humanity into the cycles of the natural and cosmic plan. This new scale of modern bioethics is especially important for consideration in conditions when a person somehow turns into an object of the latest biotechnology, various social experiments, and manipulations (Popova, 2017). In essence, this means that bioethical cognition should consider both a person and the issues of human survival in all modes of time: through the prism of history (past), the present, and future horizons.

Therefore, the subject of bioethics should be enriched with the achievements of culture and modern scientific methodology. It can be expanded in case the representatives of bioethics refer to such areas of knowledge as cognitology, synergetics, anthropology, sociology, politics, and ethnography. A special place in this series is occupied by art. Since the concept of beauty is the basis of human experience, this experience can make a significant contribution to the development of both medicine and bioethics. It is necessary to go beyond the limits of bioethics

itself and address the concepts of cosmology, ecology, biosphere and noosphere, to social, cultural, and political aspects of social history (up to commercial ones).

Of course, under the conditions of such a change in the object of research discussed above, modern science has a new issue of how not to get lost in the variety of connections and relationships of the chosen object, how to draw lines which would restrict from further advancing in this study, since then the achievement of a certain result will become simply impossible. Obviously, under these settings, the role and importance of the correct definition of *the topic* of scientific research, its structure, initial functional connections, etc., increases. Having said that, no matter how we define this topic, the current state of scientific cognition requires inscribing it into the new understanding of a scientific object.

Conclusion

In the context of a significant exacerbation of the survival problem of modern mankind, the development of bioethical knowledge and research areas acquires particular importance, since, in our time, it can hardly be successfully carried out without taking into account sufficiently radical changes in ideas about the object of scientific knowledge in the modern methodology of science. The transition of modern science to the paradigm of complexity, to the understanding of an object as a complex multi-level system, inscribed in a complex set of various systemic connections, dictates for bioethics to focus on a transdisciplinary approach to solving of its own problems, on a significant increase of the role of the subject's activity and the value component on the introduction in scientific research and its results on the individualized orientation of cognition. The introduction of such methodological guidelines into bioethics turns its issues, according to the authors of the article, into a global phenomenon, considering humanity not only in a social and biological projection, but also in the context of natural and cosmic processes.

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