RESEARCH OF PHILOSOPHICAL PROBLEMS OF NATURAL SCIENCE BY SCIENTISTS OF THE KYIV OUTLOOK-EPISTEMOLOGICAL SCHOOL DURING 60-70'S OF THE XXTH CENTURY

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Abstract. This study analyzes the focal points of research on philosophical problems of natural science carried out by Soviet philosophers of the Kyiv outlook-epistemological school in the 60-70's of the XXth century. The main emphasis is on current issues of research of the Kyiv philosophical tradition, as well as outlines and clarifies the specifics of the Kyiv Philosophical School of this period to reproduce a holistic picture of the development of Ukrainian philosophical and scientific knowledge. In particular, the peculiarities of explication of philosophical and methodological problems of biology, physics, cybernetics, mathematics, chemistry, cosmogony, astronomy and geology are studied, as well as the interaction of natural sciences and humanities in solving complex problems of complex human measurement systems is traced. The basis of this study was the issue of the journal «Philosophical Problems of Modern Science», which actively published the works of philosophers founded in 1964 N.T. Kostyuk scientific school «Philosophy of Science», as well as naturalists from all over the USSR. At that time these were quite decisive studies, which attempted the creative development of dialectical materialism, based on the latest achievements of natural science, attempts to move away from the theoretical and methodological doctrine of Marxism-Leninism, contrasting the development of philosophical problems of science, epistemology, methodological issues for scientific knowledge. this a certain revolution in

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philosophical research. The methodological basis of this study were: specific historical, comparative and interdisciplinary approaches, which involve the integrated use of methodological principles of historical and philosophical, scientific research and conceptual generalizations, modern methodological standards and prescriptions in philosophical and natural sciences, structural and functional content analysis. The method of bibliometric analysis was also used to determine the development, evolution and features of scientific research, to identify real problems raised by Kyiv Soviet philosophers and naturalists. The purpose of the authors of this study is to analyze the dynamics of development and change of research topics of Kyiv philosophers to trace how the Kyiv worldview and epistemological school developed, what problems were raised and studied by scientists of this school in the Soviet period. Such a study makes it possible to understand what Ukrainian scientists fed and worked on during the existence of the totalitarian and communist regimes in the USSR. Will help to reconstruct the scientific picture, showing the real situation with the status, nature and functions in the systems of contemporary science and education in the USSR in the field of philosophical and scientific research, will help reveal the practical significance of scientific research of philosophers, physicists, mathematicians, biologists, sociologists scientific-theoretical and methodological achievements of Kyiv scientists. To show how the value ideological and humanistic worldview of the representatives of the Kyiv worldview-epistemological school influenced the formation of the spiritual philosophical and natural-scientific culture of the Soviet and post-Soviet eras.

1. Introduction

The main source of formation and development of the Kyiv outlook-epistemological school was a powerful humanistic tradition of world and Ukrainian philosophical thought. First of all, these are the philosophical works of P. Kopnin and V. Shynkaruk, which in the 60-70s of the twentieth century. caused a wide resonance in Soviet philosophy, actualizing the study of Marxist-Leninist philosophy in terms of studying the unity of outlook and methodological functions of Marxist-Leninist philosophy, the unity of dialectics, logic and theory of knowledge. The development of the Kyiv school was also facilitated by the «scientific achievements of researcher, who considered the dialectical way of thinking as the property of centuries-old development of philosophy, which is no less valuable than philosophical materialism» [1].

Thus, the appeal to dialectics and its consistent immersion in the whole world «pre-Marxist» philosophical tradition (in the Ukrainian field, Volodymyr Shynkaruk constantly took care of it) transformed «dialectical materialism» into a kind of explosive mixture for the official ideology» [2, p. 93]. These and other events prompted Kyiv scientists to study the socio-philosophical problems of social science, which consistently continued in the development of philosophical problems of science. The formation of the Department of Philosophy of Natural Sciences at the Faculty of Philosophy of Kyiv State University in 1963 also contributed to the study of philosophical problems of natural science, which also had a beneficial effect on strengthening the ties between the Faculty of Philosophy and the Faculty of Natural Sciences.

It should be noted that the ideological requirements of the time necessitated «the use of dialectical-materialist methodology for the development of modern natural science knowledge, for scientific research and forecasting ways to solve natural science problems. In the process of teaching philosophy, the goal is to show that the front of ideological confrontation covers the natural sciences, that the worldview and methodological principles that guide scientists in constructing natural science pictures of the world, theoretical conclusions are evidence that scientific knowledge is involved in ideological struggle. although this circumstance (the presence of an ideological context in natural science) is not always taken into account by representatives of specific sciences» [1, p. 249].

Quite intensively in the 60's of the XXth century. philosophical problems of natural science are developed by scientists founded in 1964, under the influence of research ideas of prof. N. Kostiuk, scientific school «Philosophy of Science». N. Kostiuk for many years studied the philosophical and methodological problems of biology and prepared a team of students who worked and still work in this field. Over the years, the field of research of the school has significantly expanded, philosophical problems of physics are beginning to be widely studied (cooperation with Kyiv physicists of the university, who created living physics, helped to clarify the philosophical foundations of this new science), research in philosophy of mathematics, biology and geology. There is a large area with diverse and extensive research topics: studying post-classical scientific practices in various fields of modern science, tracking the interaction of natural sciences and humanities in solving complex problems of complex human measurement systems [34].

Since 1964, an interdepartmental collection «Philosophical Problems of Modern Natural Science» was launched within the Kyiv School «Philosophy of Science». The collection publishes articles in which the main attention was paid to the study of biological issues in philosophy, taking into account the advanced achievements of modern biological science. Articles are also published in which methodological issues related to natural science in general, the relationship of the most important categories of dialectics in the study of natural phenomena and the development of natural sciences, methodological problems of modern physics, cybernetics, mathematics, cosmogony, psychology and others.

A significant number of scientific publications (G. Aliayev, I. Bychko, V. Gorskyi, V. Yevdokymenko, S. Yosypenko, P.Yolon) are devoted to the formation and study of various philosophical schools and directions in the period of the 60-80s of the XX century, I. Ogorodnyk, S. Proleev, M. Popovych, S. Rudenko, M. Rusyn, V. Tabachkovskyi, etc.). However, these studies do not exhaust all possible ways to study the history of Soviet philosophy, especially those related to the study of philosophical problems of science, carried out by Kyiv scientists. Therefore, there is a need to explicate the definition of such a phenomenon as the Kyiv outlook-epistemological school, a systematic and in-depth study of the least studied stages of its formation and development in the Soviet era.

2. Methodological traditions of natural science

Since the 60's of the XXth century, Kyiv philosophers together with natural scientists from various educational institutions paved a new direction in science, developed natural science in collaboration with philosophers. However, it should be noted that in Soviet times, such studies, for the most part, were aimed at combating idealism, metaphysics and philosophical relativism, for the establishment of dialectical materialism. But there are some studies in which the ideas of the historical approach to the analysis of scientific knowledge are developed, the problems of science methodology are developed with the use of significant material of the history of natural science. Natural science is becoming the subject of scientific research, it has been shown that it is natural science as an object of study. Such studies are based on the fact that natural science has no clear boundaries. If the quantitative criterion for estimating the amount of knowledge is the number of sciences

that are part of the natural sciences, disciplines, theories, etc., then the natural sciences will have about six hundred constituent elements. Therefore, there is a need to classify the natural sciences. As a result of this classification, natural science is divided into separate branches which include dozens of sciences, each of which is a system of coexistence of scientific theories, which have their own subject and method of development (O. Kedrovskyi) [6, p. 34].

Paying considerable attention to the study of the main problems of the relationship of the philosophical method with the methods of natural sciences, Kyiv scientists noted that the concept of method can be defined as a way of organizing human activity that contributes to the goal of this activity. Therefore, the development of certain methods is of great importance in the practical and theoretical activities of people's lives. This is because each method reflects certain patterns of the real world. However, the reflection of such patterns becomes methods only when it consists in the appropriate human activity. When a person, based on knowledge of the laws, assumes the coincidence of the consequences of their activities with the phenomena that are subject to these laws, then such knowledge becomes a method of its activities. The most accurate reflection of the laws of the real world is achieved only in scientific knowledge.

This is how Kyiv researchers explain the emergence of the dialectical-materialist method. This method arises and develops through the disclosure of the general trend of the history of cognition, the generalization of the laws of practical cognitive activity of people. Therefore, it plays the role of methodology of activity, revealing the general principles of various system-scientific methods. Disclosure of the laws of interaction of philosophical theory with the methods of natural sciences requires the development of transitional stages that lie between these methods, ie philosophical questions of science, the picture of the world of natural sciences so-called specific methodologies of these sciences, and solving the problem of «information crisis». the whole system of cognition in the philosophical method (V. Lutai) [23, p. 3–12].

Without denying the method of materialist dialectics, which follows from the Marxist-Leninist methodology, scholars of the Kyiv school pay considerable attention to the study of the system-structural method, explaining that it embodies the requirements of dialectics, which are expressed in the principle of historicism. requirements of the method of ascent from the abstract to the concrete. It was noted that this method is

widely used in various fields of science because it reflects the objective trend of modern science based on dialectics (G. Vdovychenko) [23, p. 58].

Also, the issues of theoretical and cognitive function of the axiomatic method in natural sciences are investigated. The clarity of scientific knowledge involves the application of the axiomatic method, which in different sciences differs in theoretical and cognitive functions, due to the different nature of the objects of study (V. Droshkevych) [23, p. 58–64]. Quite new for Soviet times were the studies of analytical and synthetic methods in the development of genetic ideas. Such research is associated with the development of molecular biology, which increasingly needed to improve the concepts in genetics, adequate to the content of biological objects and their properties (V. Kolodyazhnyi) [23, p. 85].

The complementarities of theoretical information and energy methods, which were recognized as equal and had a deep relationship, are intensively studied. Due to a certain methodological limitation of the principle of addition, the philosophical analysis of this problem involves the disclosure of the dialectic of discontinuity and continuity, certainty and uncertainty in the relationship of energy and theoretical information methods (O. Kotova) [28, p. 67].

It should be noted that considerable attention of Kyiv scientists was focused on the study of logical and methodological problems of application of the system-structural method in natural science. Such a study was based on a form of atomistic doctrine based on the principle of structure, which necessarily follows from Lenin's idea of the inexhaustibility of matter. The system-structural method of research, which was widely used in various branches of science, is the result of the objective requirement of developing science, the penetration of dialectical-materialist methodology into modern science (G. Vdovychenko) [16, p. 3].

Further research by scholars of the Kyiv School of Philosophy concerned the possibility of strengthening the union of philosophy and science. To do this, they believed, it is necessary to take into account two aspects of the development of knowledge, namely: significantly increased the active, transforming role of science in human society and the development of a single, universal language of science – what is called mathematization, symbolization of science. Such actions are the main way to strengthen cooperation between philosophy and representatives of natural sciences (G. Ivanov) [10, p. 12].

Soviet scientists considered two concepts concerning the role of philosophy in the development of natural science:

1. natural-philosophical, its essence is that philosophy by its own means is able to some extent to build a scientific picture of nature;

2. dialectical-materialist, formed by F. Engels and developed by V. Lenin according to which Marxist philosophy is a worldview and the most general method of natural science, ie acts as a methodology of natural science (P. Dyshlevyi, A. Uyomov) [22, p. 45].

In this aspect, the supporters of the first concept came under criticism from their opponents, among them P. Kopnin, E. Zharikov, V. Bosenko and others, who were accused of an irresistible nihilistic attitude to the philosophical issues of social, natural and technical sciences. It was noted that «there is a widespread view of the so-called epistemologists, who consider the real task of philosophy to develop only the theory of knowledge and logic, as for the development of philosophical, methodological problems of social, natural and technical sciences, it is not philosophers but only naturalists». P. Kopnin was especially criticized, accusing him of erroneously excluding from the subject of Marxist-Leninist philosophy the philosophical problems of modern science, calling them «epistemology», natural philosophy [12, p. 4].

However, despite all the accusations, Kyiv philosophers continue their research, in which they substantiate the impossibility of the development of natural science without philosophy. Exact sciences, which deal with the cognition of certain specific forms of motion of matter, at a certain stage of their development come to know such movements, through which the essence of motion in general is revealed. Since the object of cognition becomes not only directly perceptible things, but also such realities, which are revealed as relations (atom, meson, proton, etc.), the latter appear before us as rational categories in relation to which thinking must decide. Where the very concepts and thinking become the object of knowledge, philosophy must decide. For natural science, which has entered the theoretical field, the task is largely to express movement in the logic of concepts. Therefore, the further development of knowledge of the exact sciences without the ability to operate with concepts, without taking into account the genesis of the formation of concepts and their relationship, is impossible. Thus, natural science in the course of its own development invades the field

of epistemology, logic and sets such tasks that independently, without philosophy, without the application of philosophical principles can not solve (V. Bosenko) [5, p. 71].

In this context, Kyiv scientists study the main categories of natural science in relation to relative philosophical categories such as phenomenon and essence, chance and necessity, cause and effect, etc., shows the transience and secondary categories, concludes how methodologically correct in the materialist spirit are general judgments about these categories in science [3, p. 16]. Also, based on a comprehensive approach, the problems of systematization of categories of philosophy are considered, the position is substantiated that in solving this problem philosophers should work together with representatives of the exact sciences. Attempts are made to reveal some general principles of interrelation of all categories of cognition with practice as a basis of cognition, based on materials devoted to the formation of human thinking and language in phylogeny and ontogenesis (V. Lutai) [6, p. 29; 9, p. 31].

Scientific publications do not do without criticism of the idealistic understanding of the category of time as one of the means of proving the insubstantiality of physical phenomena. Currently, the idealistic understanding of the concept of time by G. Reichenbach, who considered the idealistically and metaphysically logical function of the category of time, is criticized. He tried to prove that physical phenomena do not have a substantial genetic identity, they oppose any identity that has an objective meaning. Also, a critical analysis of Russell's scientific postulates is made: quasi-constancy, independent causal lines, spatial continuity in causal lines, structural postulate, postulate of analogy. It is concluded that an important element of their logical structure are the categories of space, time and reason, which were idealistically interpreted by B. Russell (V. Pavlov) [3; 6, p. 116].

Among the philosophical categories, the problems of the relationship between interpretation and intuition, which have been little studied in Soviet literature, are considered. Scientists focus on the study of the interdependence of interpretation and intuition in the knowledge of objective reality. Intuition is defined as a direct «contemplation» of the truth, it takes place not only at the «beginning», the result, but also in the process of interpretation (I. Voloshko) [18, p. 107–113]. Also, Kyiv scientists study the

relationship between such concepts as «law» and «principle» in the system of scientific knowledge. They substantiate such a study by increasing the level of theorizing of scientific knowledge, which necessarily requires epistemological analysis of the basic principles of construction of a scientific system. Clarification of the generally accepted definition of the concept of «principle», solving the problem of its relationship and correlation with another fundamental concept, with the concept of «law» becomes the subject of their study (I. Ogorodnik) [30, p. 3–9].

In the Soviet philosophical literature in the field of reflection theory collected a significant amount of scientific material, the content of which is recorded in a number of philosophical categories. As noted by Kyiv scholars, in this aspect one of the urgent problems facing philosophy is the problem of systematization of accumulated knowledge, the problem of systematization of its categories. Therefore, attempts are made to subordinate some categories:

– relation – external relation – influence;
– internal relation – interaction;
– external reflection;
– internal reflection (V. Muzychenko) [18, p. 24–30].

Also, a number of articles are published in which the issues of relativity of mappings and determination of their number depending on the number of objects and bodies displayed are published. Such studies are based on the Marxist-Leninist theory of reflection, which shows that the concepts of object and device, object and frame of reference in physics are relative. It is shown that the influence on the form of reflection is manifested not only in the change of structure and properties of objects, but also in the structure and properties of reflecting bodies, which act in physics in the form of devices, reference systems. The relativistic effects are interpreted using matrices. The introduction of the mapping matrix was applied to the interpretation of the relativistic effects of the special theory of relativity. Their general methodological significance and the fact that they can be applied in a specific form in all fields of science that studies the unity of quantitative and qualitative definition of subjects, including the theory of measuring political economy, the theory of measuring classical physics, quantum theory and etc [3, p. 38–51].

Scientists have also studied the expression of ideas of reflection and development in mathematical form. In this regard, six types of mapping

matrices have been derived that can be used both for the statistical case and for the case of measuring motion, development in time of certain objects and reflecting bodies, and so on. Also, the obtained matrices of mappings have a general methodological significance, so they can be used in the field of measurement theory of classical and modern physics (O. Shugailin) [4, p. 3–12].

The center of scientific research of the Kyiv School of Philosophy was the creation of a theory of scientific research, which can be an effective means of finding new knowledge, if it will be a generalization of the historical development of specific fields of science. In this regard, Kyiv scientists are working to reflect the history of science in a formalized form, in mathematical form. This idea of presenting development in mathematical form was deeply developed by O. Shugailin on the basis of the matrix apparatus. O. Shugailin's ideas influenced further research in the mathematical form of reproduction of the historical process of the emergence of basic mathematical operations, pointing to some predictable moments that arise during such research (O. Kedrovskyi) [9, p. 110]. The thesis is substantiated that practice is the basis and ultimate criterion of truth in mathematics, as well as in biology, chemistry, in any other natural science field of knowledge. The epistemological essence of mathematics is traced and its inseparability from formal logic is proved [3, p. 87].

3. Logical and epistemological research in the system of natural science knowledge

Scientific research of logic problems took place on the basis of the original Kyiv school of logic and methodology of science initiated by P. Kopnin in the 60s of the XX century, in which the principles of combining meaningful and formal-logical analysis of scientific knowledge were developed. Within this school, a number of studies by prominent scientists continue to be created, among which were M. Popovych, S. Krymskyi, P. Dyshlevyi and others. Research in the field of philosophical and methodological problems of the history of natural science adjoined the development of the logic and methodology of science and philosophical problems of natural science. In the early 1960's, conferences and symposia on the logic of scientific research and seminars on logic took place. Thus, in 1962, a symposium on the logic of scientific research was held at the

Kyiv Order of Lenin State University Shevchenko, in which philosophers from Kyiv, Moscow, Leningrad, Tbilisi, Odessa, and others took part. cities, as well as teachers of philosophical and natural sciences of higher educational institutions of Ukraine. The symposium considered and discussed issues of dialectical logic and the development of the logic of scientific research, analysis of the problems of the science of logic based on the apparatus of contemporary formal logic, content-genetic analysis of scientific knowledge, methodological problems of contemporary physics and biology [13, p. 3].

These measures had a positive effect on the activity of research of Kyiv scientists on philosophical problems of natural science. During this period, the center of logical and epistemological research is the analysis of important logical elements of empirical knowledge – non-demonstrative inferences. The structure of non-demonstrative inferences, as well as the problem of confirming the empirical hypothesis are studied, the logical problems of induction are analyzed. Soviet scientists set themselves the task of studying the question of inference analysis as logical elements of the structure of experimental science. In logic, inference is divided into two major groups: demonstrative and non-demonstrative. The correct demonstrative inferences are inference. With their help it is impossible to obtain a logical conclusion from the true foundations, which is not contained in the foundations. The scheme of demonstrative inference is a logical method by which a conclusion is drawn from the basics. In non-demonstrative inferences, there is no conclusion in the basics (I. Semenov) [19, p. 104–114].

Also, the possibility of expressing important provisions of dialectical logic in mathematical form, namely in the form of reflection matrices, continues to develop their ideas. These mapping matrices are derived from a combination of axioms of general dependence, development, and mapping in mathematical form. It is concluded that the matrices of reflection have both ontological, epistemological and logical significance, and therefore express the identity of dialectics, logic and theory of knowledge of dialectical materialism. Research in the field of identity of dialectics, logic and theory of cognition in physics is carried out [5, p. 3–19; 7]. Also, attempts are made to identify the basic principles of dialectical logic, which can be put into mathematical form, manifested in

the general relationship, reflection, change of objects and reflected bodies in space and their development in time, in practice as a basis for cognition, reflection and concrete truth, moving from ignorance to knowledge, from incomplete, inaccurate knowledge to more complete and accurate. Based on these principles, a general matrix of reflection of objects in the displayed bodies is derived, which change in space and develop in time (O. Shugailin) [6, p. 58].

Kyiv scientists reveal the logical structure of mathematical research, in which the research process is considered as the basis of self-movement, self-development of knowledge. It is noted that this approach requires that the logical structure of the study was closed, in the end the study should come to the starting point, the result of one study should be the starting point of the next. The starting point of the study should be – the acquisition of socially known knowledge – learning, the next stage is the choice of research area, then – problem statement, problem, problem solving – idea, deployment of the idea into a hypothesis, substantiation of the hypothesis, theory and, finally, inclusion of theory in society known knowledge (O. Kedrovskyi) [7, p. 101].

Scientists of the Kyiv school study Hegel's scientific heritage in great detail, paying special attention to the substantiation of differential calculus by scientists in the «Science of Logic». They conclude that Hegel fully understood the difficulties of that period in the development of mathematical analysis, which is called mystical differential calculus, and tried to eliminate them by applying dialectics; it was he who showed that in a derivative a certain quantity disappears, the relation of the infinite small is quality. Hegel eliminated the one-sided quantitative approach to the basic concepts of differential calculus and thus paved the way for some important ideas of Marx (M. Bulatov) [15, p. 105].

Thus, the study of scientists in the late 50's – early 60's of the XXth century can be characterized as a discussion of the relationship between dialectical and formal logic, when analyzed in more detail some of the main issues of traditional logic in its philosophical justification. However, the specifics of the then formulation of questions of logic and the form of their study was due to the need to criticize various «idealistic tricks» in the field of logic. This made it possible to further analyze a number of logic problems related to science (mathematics).

4. Philosophy and mathematical knowledge

The original research of the Kyiv outlook-epistemological school includes scientific investigations of philosophical problems of mathematics by professors of the Department of Philosophical Problems of Natural Science O. Kedrovskyi and L. Solovyov. At present, O. Kedrovskyi pointed out the lack of organic unity between substantiation and research in the process of developing a mathematical method and the consequent lack of provability and heuristics. By supplementing purely mathematical studies with historical philosophical context, he demonstrates the emergence of new methodological circumstances that form a specific organic historical unity between justification and research in the process of deploying a particular mathematical method [34, p. 134].

It should also be noted that studying the informational nature of thinking, scientists of the Soviet era note that the development of natural sciences, especially physics, chemistry, physiology, which deal with the study of relationships between molecules, atoms, elementary particles and waves, elementary changes in organisms, lead to the study of continuous, infinitesimal changes that occur in bodies, processes, organisms. This gave rise to differential equations, quantitative and functional analysis, topology and other areas of mathematics and contributed to their rapid development. For further research in this area, Kyiv scholars turn to the disclosure of some issues related to the content and quantity of information. This directly relates to such issues as: the ratio of information and reflection, methods of quantitative and functional analysis of information, analysis of problems of application of information theory to reveal psychological and mental activity, to clarify the possibility of creating a general theory of information relations that could quantify side of information and create algorithms and models of psychological processes that occur in humans during the emergence and creation of sensations, ideas, concepts, judgments, inferences, ie in the process of its active cognitive activity [4, p. 111–118].

Along with this, research on the relationship between the system of information signs and the ideal image is actively developing. Analyzed in terms of form and content of the ratio of information signs and ideal images that arise under the influence of a set of signs in the human head, reveals the dialectic of the so-called «psychophysiological paradox», ie the mismatch

of qualitative homogeneity of nerve signals from peripheral receptors caused by various agents information (V. Shovkoplias) [5, p. 139].

The study of the specifics of mathematics, its logical maturity has always attracted the attention of philosophers, which contributed to the development of both mathematics and philosophy. In this aspect, the field of scientific research is significantly expanding, among which a special place was occupied by Hegel's philosophy. Kyiv scientists analyze the connection of Hegel's philosophy with mathematics, show the role of mathematics in the formation of Hegel's philosophy, as well as the influence of Hegel's philosophy on the development of mathematics (V. Shevtsov) [15, p. 106].

Also, some importance is attached to the study of mathematical axioms and their role in science and practice. It is noted that the axiomatic method is such that characterizes modern, at that time, mathematics. Its essence is that at the heart of each mathematical theory there is a certain number of propositions that are accepted without proof (axioms or postulates), after which from them in accordance with the rules of formal logic, the consequences are derived – theorems. It follows that all abstract categories of mathematics are nothing but a modified form of reality in human consciousness (L. Kovantsova) [21, p. 73–78].

It should be noted that in the period of 60-70's the subject of scientific research of Soviet scientists was in the consideration of the two most common methods of mathematics of that time: 1) the method of complete mathematical induction; 2) the method of proof from the opposite. The application of these methods was based on a logical strength, which at that time was considered questionable, so it needed a detailed study. Scientists have argued that the principle of complete mathematical induction, on which the method of mathematical induction is based, is a simple tautology – the statement is valid for any natural number, if it is valid for any natural number as well (M. Kovantsov) [24, p. 75].

The study of the epistemological functions of the algorithm in mathematical cognition was quite innovative in the Soviet period. Kyiv scientists, based on the main features of the algorithm, try to find out its special epistemological nature, which allows the algorithm to be a very effective form of scientific research and fixation of mathematical knowledge. Its essence lies in the ability of the algorithm to give knowledge an objective character and use not only the mathematical result or theory, but also the way, the method of finding them (L. Solovei) [31, p. 62].

Thus, addressing the relationship of mathematics with other sciences, Kyiv practices allowed to establish the importance for the positive progress of a particular science, including mathematics, the connection not only with philosophy but also with other sciences [34, p. 137].

5. Problems of scientific knowledge in physics and cybernetics

Special attention of the philosophical community in the 60-70's of the XXth century. focused on the study of natural sciences, paid considerable attention to the scientific pictures of the world and their changes during the scientific revolutions. Kyiv scientists (P. Dyshlevyi) are actively working on this issue. It is interesting that the change of scientific pictures of the world and styles of scientific thinking (S. Krymsky) was considered a sign of scientific revolutions, and not only the creation of new physical theories. These ideas resonated with the understanding of the scientific revolution as a paradigm shift (and a corresponding view of the world), which were expressed by T. Kuhn. In the late 1970s, a scientific revolution unfolded related to the emergence of nonlinear science. In high-energy physics, it manifested itself in the creation of unified theories of fundamental physical interactions. Further development of theories of great unification (which involved strong interaction) in its application to cosmology led to the emergence of the concept of multiplicity of worlds. The Kyiv School of Philosophy publishes a book by S. Krymskyi and V. Kuznetsov «Worldview categories in modern natural science» (1983), in which V. Kuznetsov covered in detail the physical aspect, and S. Krymskyi made an extremely interesting philosophical review of the understanding of philosophical and philosophical principles. pictures of the world» [34, p. 124].

Also during this period, many articles are published on the study of conservation principles in cybernetics. Scientists explained the interest in such research by the fact that modern cybernetics as a scientific theory was not fully formed, it did not have a system of basic laws such as conservation laws, which are characteristic of many established branches of knowledge. Therefore, a philosophical analysis of the basic theoretical principles of cybernetics, comparing them with the basic principles of more advanced sciences, including physics, will contribute to the development of the theoretical basis of cybernetics. The justification for the existence of conservation principles in cybernetics is the comprehensive contradiction

of stability and variability of motion. The principles of conservation are one of the forms of reflection of this contradiction [3, p. 110–114].

Much attention is also paid to the philosophical analysis of the relationship between semiotics and cybernetics. Semiotics is a fairly new science, but it has achieved important results, semiotic analysis has quickly spread to new areas of knowledge. The pace of development of semiotics resembles the pace of development of cybernetics. Although these sciences were formed in different fields of knowledge, they have much in common: a similar process and formation, such a rapid pace of development; both semiotics and cybernetics are closely related to mathematics; their cooperation in solving the problems of other sciences is fruitful. This commonality indicates that both sciences are a manifestation of a single trend in the development of modern science – cybernetics. Cybernetization satisfies the requirements of increasing accuracy, it is one of the types of formalization (O. Kedrovskyi) [4, p. 120–126].

Soviet philosophers are working quite intensively on the methodology of physical cognition. The progress of physics of that time is characterized not only by the expansion of the field of cognition, but also by the construction of theories that analyze new micro-phenomena discovered by the practice of physical cognition. Therefore, scientists believed that the creation of these theories puts before them the task and goal – to explain a large amount of experimental information on the basis of a single fundamental principle. In this process, as noted, a significant role is played by categories and concepts of scientific methodology and epistemology of dialectical materialism, among them – clarity, observation, measurability, which are not identical concepts of modern physical cognition (V. Doroshkevych) [19, p. 132].

There are articles that study the dialectical-materialist concept of determinism in quantum mechanics. They boil down to revealing the objective existence of the laws of nature it studies, resolving the contradictions between the wave and corpuscular nature of the electron, between the quantum description of atomic volume and the classical description of the device, between the properties of an individual object and their statistical manifestations, between probability and causality, etc. Such research was recognized in Soviet times as a new stage in the «latest revolution» in science, which is organically linked to Einstein's theory of relativity and is a continuation of a number of physical discoveries in the late nineteenth century. However, the study of the philosophical foundations of quantum

mechanics does not do without a critical consideration of these issues and is accompanied by increasing criticism of positivism (V. Perederii) [4, p. 84].

Research on the problems of the unity of scientific knowledge, the unified nature of reflection, as the basis for the convergence of sociology and cybernetics is quite interesting. Such studies were explained by Soviet philosophers by the need to study the problem of the unity of scientific knowledge, which is caused by the need to deepen the methodological foundations of modern science and social science. The convergence of two branches of scientific knowledge – sociology and cybernetics is due to the very nature of science and some trends in their development. The deeper the study of nature and society, the closer scientists approach the discovery of the general properties of the objective world, the more science is filled with general content, strengthening their unity. The path to the convergence of sociology and cybernetics lies through the internal development of both sciences (G. Gorak) [18, p. 67–74].

Kyiv scientists study the philosophical issues of relativistic mechanics, show the historical movement of cognition in the field of physics and the process of complication of simple structures in it, draw a parallel between logical and historical research methods. Hegel's legacy in the field of logical and methodological problems of physics is also considered. It was noted that the complex nature of the process of cognition in modern physics gives rise, on the one hand, to many directions in the development of theory, on the other – stimulates the search for objective criteria for further development of physical theory. Therefore, more and more often the views of physicists turn to dialectics. Ukrainian philosophers have considered the role that Hegel's logical scheme can play in saturating it with specific content in problematic situations of modern physics [15, p. 118]. Problems of methodological analysis of high-energy physics are also considered. Such studies are carried out by identifying stable logical forms, imaginary models, accompanying the entire history of physics. The study of imaginary models as a special logical form that reflects the essential features of the theory of a certain structural level, allows us to understand the main trends in the «movement» of concepts (V. Kostiev) [21, p. 98].

It should be noted that in the 1970's, scientists of the Kyiv School of Philosophy actively studied the reflection of the dialectic of the continuous and the continuous in physical theories. They trace the development of physical knowledge, based on the principle of the presence in its history

of stages, similar stages of knowledge of the nature of contradictions in philosophy in accordance with the logic of reflection of cognitive situations. It was noted that modern theoretical physics uses concepts of a fundamentally new type (quantum fields, quasiparticles). In contrast to the one-sided idealized concepts of classical physics, these concepts contain in a condensed form the unity of opposites. In this aspect, an analogy is made between the stages in the movement of philosophical thought to create dialectics as a doctrine of the unity of opposites and the corresponding stages of the movement of physics on the way to knowledge of the dialectic of continuous in essence its object (I. Dobronravova) [28, p. 97–103].

In the same aspect, research on the disclosure of dialectical contradictions in physics continued. It was noted that the application of the general provisions of dialectical materialism to the phenomena of nature is the general methodological basis of all natural sciences. Synthesizing the achievements of individual natural sciences, we can talk about the relevant natural sciences of the world – physical, chemical, biological and others, which together constitute a single natural science worldview, inherent in a certain period of development of science (P. Cholpan) [29, p. 52].

A number of phenomena related to the then stage of development of physical knowledge, such as the problem of the status of phenomenological theories, the tendency of phenomenologization, etc., are studied. Understanding the relationship between these phenomena can be achieved by developing a new style of thinking in science. There are three styles of thinking in the history of natural science: classical, non-classical (probabilistic) and modern. Each of them corresponds especially to the form of organization of methodological functions of the theory (description, prediction and explanation) and its ideal of development of scientific knowledge. Therefore, the study of the structure of modern physical theories allows us to understand the patterns of modern scientific style of thinking (V. Kostiev) [32, p. 11].

In general, attention is drawn to the fact that at a certain stage in the development of natural science, the methods of physics are increasingly used to study chemical phenomena. The role of mathematical research methods in chemistry is also growing significantly. The question of the ratio of methods used to study the chemical form of motion is actively considered, the significance of the achievements of quantum mechanics for the development of theoretical research methods in chemistry, etc. is revealed. (Yu. Ponomarenko) [5, p. 98].

These were the main areas of research on the philosophical foundations of physics in the second half of the twentieth century. These studies were carried out by Kyiv scientists in close connection with research in the fields of philosophy of mathematics, biology and geology.

6. Philosophical problems of biology

Kyiv School of Philosophy of Biology was formed under the influence of research ideas N. Kostiuk, who for many years studied the philosophical and methodological problems of biology. It belongs to the proposed in the late 60's of the twentieth century. an interesting conceptual version of the solution of the main worldview problem of biology, which is considered to be the problem of the essence of living things. A significant event in the formation of the Ukrainian branch of philosophy of biology was the work of N. Kostiuk «On the essence of life» (1967), which stated an important methodological task – the construction of a general theory of life. Interestingly, the methodologists of science – philosophers and naturalists – soon formulated the problem of theorizing biology. Significant scientific forces in foreign and Ukrainian philosophy of biology have joined in its understanding. Considering the philosophy of biology, it should be emphasized that university specialists together with colleagues from the H.S. Skovoroda Institute of Philosophy, are the core of a powerful Kyiv school in this area, which stood out due to its scientific achievements [34, p. 126].

The rapid development of new industries in the second half of the twentieth century. in physicochemical and molecular biology – caused an avalanche of knowledge about living things, «closed» specialists on their special issues and the loss of «the general picture of living things». Theorists and methodologists of biology found a way out by proclaiming the task of building a «theoretical biology» that would organize knowledge about living things and define its essential parameters. In the 70's the search for such a theory was defined as «the problem of theorizing biology» [34, p. 128]. Scientists of the Kyiv School of Philosophy began to work actively on its implementation. They actively explore the specific position of biology in the system of natural sciences, man and society, the empirical and theoretical levels of biological knowledge, the problems of the relationship between man and nature in philosophy and biology.

Quite new at the time were studies of the geochemical aspect of the approach to life. They revealed the place of living nature in the mechanism

of the earth's crust, the characterization of life as a paid, geological phenomenon. This study of the geochemical approach to living things is explained by the fact that organisms in geological, geochemical processes are manifested differently than in biological or physicochemical. The rationale is that the living being of the biosphere is of interest to the geologist not in terms of physiological or morphological processes occurring in it, but in terms of work that reproduces the organism in the biosphere in the form of migration of elements [5, p. 163]. The issues of the essence of life from the biophysical aspect of the approach to its cognition are also investigated, living systems as open, dynamic-equilibrium systems are analyzed, and also features of bioenergy (N. Kostiuk) are considered [8, p. 85].

In the late 60's of the twentieth century. Related problems of biology and sociology, aspects of joint scientific research of biologists and sociologists concerning human life remain quite relevant. Human life is social in nature and therefore determined by social laws, but at the same time man remains a living being, whose life is impossible without organic laws. Thus, the task of sociologists and biologists is to clarify the specifics of the manifestations of biological laws in human activity. Finding such social ways to meet human needs, which would positively affect its organic nature – is one of the possible aspects of cooperation between biologists and sociologists (G. Gorak) [6, p. 73].

Kyiv scientists are also studying some tendencies of theorizing biology. It is noted that the problem of theorizing biology has not only purely special aspects, but also aspects related to the solution of important epistemological and methodological issues. The importance of this problem is growing due to the fact that it is on the ways to solve it that the main directions of biology development are determined, the predominant importance of its individual branches. At that time, the literature widely discussed issues related to the peculiarities of the development of biology, especially the ways and methods of its theorizing. These studies mainly had two points of view. The first of these is represented by logical (physical) reductionism, whose proponents believed that theoretical biology could be constructed as a logical consequence of physical theories. The opposite extreme point of view is adjacent to the concepts of vitalism, reviving its tendencies at a higher theoretical level. According to Kyiv scholars, the abandonment of the metaphysical method of thinking and the transition

to the dialectical method was the main result of the revolution in physics. That is why the use of the physical method of thinking in modern biology helps to solve the problem of the relationship between physics and biology in terms of their mutual use and limitation, development of principles and means of synthesis of different levels of research of biological object (N. Depenchuk) [17, p. 3–8].

Quite innovative, but not devoid of ideological component, in the Soviet period look research by Kyiv scientists of physiological science in Ukraine, which in the late nineteenth and early twentieth centuries. stood on the basis of consistent materialism. It was noted that a significant contribution to the development of the materialist tendency of domestic natural science was made by Ukrainian physiologists, who fought against idealistic ideas and mechanistic structure in biology. The scientific approach, the close connection between experiment and theory, the materialist orientation and the connection with the elements of dialectics in the works of Ukrainian physiologists were a favorable ideological precondition for the successful reorientation of physiological science in Ukraine to the methodological basis of Marxist-Leninist philosophy (I. Ogorodnik) [17, p. 27].

The problem of organic expediency is the most important and interesting problem, which due to its methodological and ideological nature occupies an important place in biological and philosophical science. Kyiv scholars choose to study the problem of expediency in the concept of neovitalism. They explore how this problem is posed and solved in the concept of neovitalism, which is in the position of idealism, as well as what issues of theoretical biology neovitalists associate with the problem of organic expediency and how to explain the specifics of solving problems in the concept of neovitalism [21, p. 15–21].

However, the study of these issues does not do without a critical analysis of the neo-vitalist understanding of the relationship between empirical and theoretical in the development of biological knowledge. The problem of empirical and theoretical, their place and role in the process of cognition, and in particular in biological cognition, occupies one of the important places in the understanding of scientific knowledge. This explains the fact that it is the subject of a sharp struggle between dialectical materialism and idealism. Therefore, these questions are studied by Soviet scientists from the standpoint of dialectical-materialist

position, analyze the interpretation of this issue by the idealistic concept in biology – neovitalism (T. Pikashova) [25, p. 56].

Also within the Kyiv School of Biology a number of issues related to logical and epistemological problems of biology are studied. Philosophical analysis of the use of general natural concepts in biology in their accordance with consonant philosophical categories, will help to clarify not only the patterns of development of modern science in general and biology in particular, but also the possibility of enrichment of individual philosophical categories. Logical and epistemological problems arise during various aspects of cognition of living things (biochemical, biophysical, biocybernetic, biogeochemical, cosmic, etc.), they are largely related to the need to define concepts, especially in connection with the need to periodically review the content of fundamental concepts biology («life», «heredity», «evolution», «species», etc.) in order to clarify their content and bring the latter in line with the current level of knowledge (N. Kostiuk) [26, p. 36]. Forms of manifestation of unity of historical and logical in biological cognition are investigated. Manifestation of integrative tendencies in biological cognition makes it necessary to find adequate methodological tools for the implementation of optimal synthesis of knowledge about living things. Successful implementation of this task is possible on the basis of the dialectical-materialist principle of the unity of historical and logical in biological cognition. approach (L. Sidorenko) [33, p. 39–43].

Such was the Kyiv School of Philosophy of Biology and the scientific achievements of its representatives in the second half of the twentieth century. Post-classical assessments made by modern philosophy of biology allow us to see new perspectives of biology in its study of living things, in influences on humans, in understanding cognitive processes, in expanding civilizational paths of development, to move towards a comprehensive representation of the living world [34, p. 134].

7. Conclusion

As a result, the authors of this study traced the general trends and directions of research in the field of philosophical problems of science, which were carried out by scientists of the Kiev School of Philosophy, analyzed the thematic evolution of these studies. It is established that the ideological factor became the main one among those that helped to determine the direction, subject field and results of the

analysis of philosophical and natural science research in the USSR. The scientific research of Kyiv scholars of new points of contact of philosophical and natural-scientific knowledge in the period of 60-70s of the XX century, which became the impetus for further intensive development in the field of institutionalized philosophical knowledge, stimulated the rejection of Marxist-Leninist philosophical orthodoxy, communism ideologist and contributed to the formation of a new culture of scientific work in conditions of freedom, the development of the Ukrainian philosophical tradition in the post-Soviet period.

References:

1. Konverskyi A.E., Bychko I.V., Ohorodnyk I.V. (2005). Filosofska dumka u Kyivskomu universyteti: istoriia i suchasnist [Philosophical Thought at Kyiv University: History and Modernity] / Za zah. red. prof. A.Konverskoho. Kyiv: Tsentr navchalnoi literatury. (in Ukrainian)

2. Tabachkovskyi V.H. (2002). U poshukakh nevtrachenoho chasu: Narysy pro tvorchu spadshchynu ukrainskykh filosofiv-shestydesiatnykiv [In Search of Lost Time: Essays on the Creative Legacy of Ukrainian Sixties Philosophers]. Kyiv: PARAPAN. (in Ukrainian)

3. Kyivskyi derzhavnyi universytet (1964). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 1.

4. Kyivskyi derzhavnyi universytet (1964). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 2.

5. Kyivskyi derzhavnyi universytet (1965). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 3.

6. Kyivskyi derzhavnyi universytet (1965). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 4.

7. Kyivskyi derzhavnyi universytet (1966). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 5.

8. Kyivskyi derzhavnyi universytet (1966). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 6.

9. Kyivskyi derzhavnyi universytet (1967). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 7.

10. Kyivskyi derzhavnyi universytet (1967). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 9.

11. Kyivskyi derzhavnyi universytet (1968). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 10.

12. Kyivskyi derzhavnyi universytet (1968). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 12.

13. Kyivskyi derzhavnyi universytet (1969). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 14.

14. Kyivskyi derzhavnyi universytet (1969). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 15.

15. Kyivskyi derzhavnyi universytet (1970). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 21.

16. Kyivskyi derzhavnyi universytet (1971). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 22.

17. Kyivskyi derzhavnyi universytet (1971). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 23.

18. Kyivskyi derzhavnyi universytet (1971). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 24.

19. Kyivskyi derzhavnyi universytet (1972). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 26.

20. Kyivskyi derzhavnyi universytet (1972). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 27.

21. Kyivskyi derzhavnyi universytet (1972). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 28.

22. Kyivskyi derzhavnyi universytet (1972). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnytstvo Kyivskoho universytetu. Vypusk 29.

23. Kyivskyi derzhavnyi universytet (1973). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 30.

24. Kyivskyi derzhavnyi universytet (1973). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 31.

25. Kyivskyi derzhavnyi universytet (1973). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 32.

26. Kyivskyi derzhavnyi universytet (1973). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 33.

27. Kyivskyi derzhavnyi universytet (1974). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 35.

28. Kyivskyi derzhavnyi universytet (1974). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 36.

29. Kyivskyi derzhavnyi universytet (1974). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 37.

30. Kyivskyi derzhavnyi universytet (1975). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 38.

31. Kyivskyi derzhavnyi universytet (1975). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 39.

32. Kyivskyi derzhavnyi universytet (1976). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 40.

33. Kyivskyi derzhavnyi universytet (1976). *Filosofski problemy suchasnoho pryrodoznavstva* [Problems of modern science]. Mizhvidomchyi naukovyi zbirnyk. Kyiv: Vydavnyche obiednannia «Vyshcha shkola». Vydavnytstvo pry Kyivskomu derzhavnomu universyteti. Vypusk 41.

34. Kyivska svitohliadno-hnoseolohichna shkola druhoi polovyny XX stolittia [Kyiv outlook-epistemological school of the second half of the twentieth century]: monohrafiia (2020) /L.V.Huberskyi, V.H.Kremen, A.E.Konverskyi ta in. Kyiv: VPZ «Kyivskyi universytet».