

Third All-Union Conference on Philosophical Problems of Modern Natural Science

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The task of the further strengthening of the connections between natural science and philosophy is as important in our day as 60 years ago, when in March 1922 Lenin published in the journal *Pod Znamenem Marksizma* (Under the Banner of Marxism) his "philosophical testament," in which this task was placed before Soviet scientists and philosophers.

Its topicality in our day is underlined by the resolutions of the last three congresses of the Communist Party of the Soviet Union concerning the strengthening of the interaction between the social, natural, and technical sciences and the critical comments made in the report of the Central Committee of the Communist Party of the Soviet Union to the 26th Congress concerning the manifestations still encountered of scholastic theorizing.

It was to the solution of the problem of the further strengthening of the connections between the natural sciences and philosophy that the Third All-Union Conference on Philosophical Problems of Modern Natural Science was devoted. It took place during April 22–24, 1981 in Moscow and was organized by the USSR Academy of Sciences.

The USSR Academy of Sciences has made a significant contribution to the solution of the problem of the correct understanding of the relationships between natural science and philosophy. It has systematically organized all-union conferences on philosophical problems of natural science in order to give information about the problems on which natural science is currently working and to discuss ways of realizing Lenin's "testament."

The first such symposium was in 1958. It condemned the tendencies to deny the real significance of the fundamental scientific theories (theory of relativity, genetics, etc.) expressed in the thirties and forties by various well-known and influential people (not only philosophers but also natural scientists). It also pointed out the inadmissibility of an indifferent attitude by certain of the natural scientists to questions of methodology.

The second symposium took place in 1970. It discussed questions of the relationship between philosophy and natural science, epistemological problems, and philosophical questions in physics and biology. The main attention was concentrated on the analysis of problems of materialistic dialectics as the basis of modern natural science. A report on this symposium was published in this journal.¹

Between the second and the third conference more than a decade has elapsed, and between the first and the third more than two. We shall see below how the subject matter of the conferences has changed during this time, but we note first that irrespective of the official agenda the true spirit of the conference was expressed, as before, in a desire to demonstrate how important it is for the natural scientist to master materialistic dialectics in understanding nature, to continue strengthening the connections between philosophy and natural science, and to involve in the process those who still believe that the specialist scientist may not need materialistic dialectics (there being problems enough in a specialist field!).

This approach of the third conference was clearly expressed in the introductory words of A.P. Aleksandrov, president of the USSR Academy of Sciences, and also in the first address of P.N. Fedoseev, vice president of the Academy of Sciences. Opening the conference, Aleksandrov said: "In no way can one be satisfied with the position that obtained in our country at the beginning of the thirties, when these groups of scientists (the philosophers and natural scientists) were opposed to one another. Philosophers cannot assume that by pure speculation they can create a philosophical system, any more than the natural scientists can, without deep thinking about the philosophical side of their problems, hope to create anything fundamental."²

These considerations arose naturally in view of the fact that among some of the natural scientists, including the physicists, arguments are sometimes put forward to the effect that it is entirely sufficient for natural scientists to restrict themselves to a knowledge of the theses concerning the materialistic nature of the world and its cognoscibility (such arguments can even be found in the proceedings of the conference). In fact, the problem is deeper: It is not enough to regard oneself as a follower of the dialectical-materialistic philosophy, one must further learn to master it and recognize the need for its conscious use in concrete scientific investigations.

The dialectical-materialistic philosophy contains a wealth of laws and categories that give expression to general properties and relationships of the objective world and the process of its cognition, these being the outcome of the long and complicated development of human knowledge. The laws and categories of materialistic dialectics do not enter the natural sciences directly but rather in a special, specific form. In particular,

this means that their application in the natural sciences requires not only a knowledge of the particular scientific field but also knowledge of materialistic dialectics and a capacity to use its formalism as the method of scientific understanding in a particular scientific problem. Not in vain did great Soviet physicists—among whom we mention in the first place A.F. Ioffe, S.E. Vavilov, and I.E. Tamm—repeatedly emphasize the need for physicists to master materialistic dialectics in the professional interests of the development of their science.³ In this they followed Lenin's famous appeal. In his introductory talk "Lenin and philosophical problems of modern natural science," P.N. Fedoseev pointed out the fundamental importance of Lenin's ideas "not only theoretically but also in practice, since the analysis of philosophical problems of natural science is a necessary prerequisite for the successful organization of scientific investigations, the correct choice of the basic directions of fundamental and applied developments, and the recognition of the perspectives of scientific progress" (Ref. 4, p. 3).

But, he emphasized, the idea of the union of philosophy and natural science is also that the analysis of the achievements of natural science is necessary for the development of philosophical thought. It is on the basis of such an analysis that progress is made in the further development of the categories of materialistic dialectics, its entire categorial formalism being enriched. The duty of philosophers, therefore, is to study deeply and critically the results of modern natural science and the difficulties which it encounters during its development and, on the basis of a philosophical and methodological analysis of the most general laws and properties of objective reality and its recognition to assist natural science in the solution of these problems. The union facilitates the realization of this task.

In terms of the problems discussed, the Third All-Union Conference differed significantly from the first two. Problems under the following three headings were presented to the participants for consideration: 1. The evolution and structural levels of matter. 2. The unity and diversity of the world, the differentiation and integration of knowledge. 3. Man, society, and nature under the conditions of the scientific and technical revolution.

These headings reflect the development of the philosophical analysis of the problems of natural science during the decade which has elapsed since the Second Conference. As before, questions of methodology in the natural sciences and analysis of philosophical problems occupied an important place in the work of the conference. This can already be seen in the form of the first two headings. In many lectures and contributions under the first heading, attention was concentrated on discussion of the problems of the evolution and development of our ideas about the structure of living and nonliving nature.

Several lectures and contributions criticized the tendency in logic and the methodology of science to overestimate the importance of theoretical cognition and underestimate empirical knowledge. This tendency, which

V.A. Ambartsumyan and V.V. Kazyutinskii referred to as "pantheoretism," was opposed to the well-known dialectical-materialistic thesis of the unity of theory and empiricism as aspects of the unified process of cognition. The tendency noted in recent years in philosophical and biological literature to absolutize the results of molecular biology was criticized. As was emphasized, for example, by Ya.A. Ovchinnikov, neither a molecule nor even the DNA double helix is a basic unit of life. As was assumed earlier, this part is played by the cell. Understanding of life can be achieved only in a unification of molecular biology with other fields, both specifically biological but also belonging to general natural science and philosophy.

In the part of the program devoted to the second heading ("The unity and diversity of the world, the differentiation and integration of knowledge") attention was drawn not only to the objective processes of evolution and development in nature but also to the evolution of the corresponding disciplines in natural science and the forms and methods of scientific knowledge. Study of the evolution of science and analysis of the various tendencies in its development are very important. In particular, they permit one to make predictions about, at the least, the immediate future. And questions of evolution are intimately related to the history of science. It is therefore not surprising that the history of science was represented at the Third Conference much more fully than in the first two.

Great attention here was devoted to a discussion of the problem of the inexhaustibility of the process of gaining knowledge, the development of the problem of "the style of thinking," the analysis of integrating tendencies in modern natural science, the justification of the heuristic role of the thesis of Marxist philosophy with regard to the material unity of the world and the unity of scientific knowledge, the investigation of the role of intrascientific and social factors in the development of science and the interconnections between them, the analysis of the essence of scientific revolutions, a critical analysis of T. Kuhn's well-known ideas about the structure of scientific revolutions, and so forth.

In the part of the conference devoted to the third heading ("Man, society, and nature under the conditions of the scientific and technical revolution") attention was directed toward the interaction between the human and natural environment, the ever increasing danger of underestimating the problems associated with the conservation and renewal of the natural environment, the need for rational use of natural resources, the problems of the interconnection between science, technology, and industry, the problems of the interconnection between the social, natural, and technical sciences, the social-ethical and humanistic problems of science and technology, the fundamental questions of modern genetics, and so forth.

These are only some of the problems discussed under the third heading. The basic aim of the discussion was to elucidate the role of the natural, social, and technical sciences in solving the global problems of the present day.

This third part of the conference, devoted to man himself and his relationship to nature and society significantly broadened the scope of the conference. Such a broadening takes us, it is true, beyond the bounds of the interconnections between philosophy and natural science, but it is entirely justified, since it reflects the general tendency of modern science and practice to regard the development of the objective world and its scientific cognition dialectically as something interconnected. Ultimately, this is explained by the fact that the direct organizing body of the previous conferences—The Scientific Council for the Topic “Philosophical Problems of Modern Natural Science” (attached to the Presidium of the USSR Academy of Sciences)—has been reorganized into The Scientific Council for Philosophical and Social Problems of Science and Technology, which contains the previous council with the rights of a section.

In the three sections of the conference a total of 33 lectures and 34 contributions was presented. The three basic parts of the conference were felicitously augmented and given a natural particularization at three evening discussions: on problems of global evolutionism, on the dialectics of scientific revolutions, and on V.I. Vernadskii and Modern Science. At these evening sessions there were 11 lectures and about 50 contributions.

We cannot list here all the lecturers and still less all those who contributed. We shall mention only some of the physicists and philosophers who participated actively by giving lectures or making contributions. Besides those already mentioned, we have: a) physicists—N.G. Basov, V.L. Ginzburg, G.B. Zhdanov, P.G. Kard, A.A. Logunov, M.A. Markov, A.M. Prokhorov, Ya.A. Smorodinskii, A.A. Tyapkin, E.L. Feinberg, and others; b) philosophers—V.S. Gott, P.S. Dyshlevyi, B.M. Kedrov, V.A. Lektorskii, Yu.V. Sachkov, A. Tursunov, A.D. Ursul, I.T. Frolov, and others. Much preparatory work was done before the conference. A significant number of the lectures presented at the conference were published well in advance in the journals *Voprosy Filosofii* and *Filosofskie Nauki*. All lectures were published in advance by the publishing house Nauka in three volumes.⁵ A collection of reviews of modern non-Soviet literature on philosophical questions of natural science with a bearing on the subject matter of the conference has also been published⁶ together with an index of literature on philosophical problems of modern natural science published during the years 1971–1979 in the Soviet Union.⁷ Some of the contributions have been published in the form of summaries in four parts (a total of about 30 printed sides) containing abstracts of about 120 contributions [Evolution of Matter and its Structural Levels; The Unity and Diversity of the World, the Differentiation and Integration of Knowledge; Man, Society, and Nature Under the Conditions of the Scientific and Technical Revolution; Problems of the Dialectics of Scientific Revolutions (Institute of Philosophy, USSR Academy of Sciences, Moscow, 1981)]. We mention these publications for two reasons. First, from the information we have given about the number and size of the publications it can be seen that it is virtually im-

possible to say anything in this report in any detail about the material presented at the conference.

Second, many of the lectures and contributions have an interest that goes far beyond the confines of the conference. Covering almost the entire field of the natural sciences (physics, chemistry, technology, biology, ecology) and given, as a rule, by leading specialists in their fields, they give a fairly full picture of the level of modern natural science and its philosophical problems. Of course, these lectures and contributions will be published in the Proceedings of the Conference, but in the meanwhile they can be read in the references we have given.

A strengthened connection between natural scientists and philosophers is an undoubted positive result of the conference. At it, in contrast, say, to the previous conferences, discussion centered not so much on the value of collaboration between philosophers and natural scientists as rather on the choice of the most expedient forms for such collaboration. This was discussed in particular by V.A. Ambartsumyan and V.V. Kazyutinskii, by V.L. Ginzburg (who also mentioned examples of unjustified philosophical extrapolations in the field of cosmology), and by others.

Some of the forms of collaboration already found require further development and improvement. We have in mind: a) joint work by philosophers and natural scientists in methodological seminars of scientific-research institutes and universities on the problems that the development of the natural sciences poses for philosophy; b) joint conferences of philosophers and natural scientists like those traditionally organized at the Joint Institute for Nuclear Research and at the P.N. Lebedev Physics Institute; c) the preparation and publication of joint books on philosophical problems of natural science such as “Philosophical Problems of Elementary-Particle Physics” [Nauka, Moscow (1963)], “Philosophical Problems of Quantum Physics” [Nauka, Moscow (1970)], “Space, Time, Motion” [Nauka, Moscow (1971)], “Einstein and Philosophical Problems of Physics in the 20th Century” [Nauka, Moscow (1979)], “Lenin’s Philosophical Heritage and Modern Physics” [Nauka, Moscow (1981)], and others.

The participants of the conference were united in agreeing that while philosophy cannot attempt to impose particular solutions to concrete problems on natural scientists it nevertheless must not be restricted *solely* to the investigation of epistemology. This is clear. Indeed, the singular and the particular in the phenomena and processes of nature, which are the subject of the specialized natural sciences, *do not exist otherwise* except in the connection they have to the general and universal, the subject of philosophy. Using knowledge of the general laws and properties of the objective world, philosophy can and must make corresponding predictions and participate in the interpretation of the results obtained by the natural sciences (both empirical and theoretical).

As was emphasized by P.N. Fedoseev, “the overcoming of a natural-philosophical, incompetent approach to

scientific problems in no way signifies a philosophical neutrality in the interpretation of new scientific data" (Ref. 4, p. 10).

In his opening address, A.P. Aleksandrov correctly drew attention to the fact that such conferences should be held more frequently than once in a decade; a corresponding resolution was adopted by the conference. A decade is indeed a long period, especially in view of the present stormy rate of development of science. A vast amount of material is accumulated during such a time. The attempt to present all this material during a three-day conference had the consequence that the lectures and contributions of the participants were discussed far less than they deserved. The conference therefore had an informative rather than working nature (although in that respect too it was undoubtedly also interesting and important for both the natural scientists and the philosophers).

We conclude with some comments about the subjects to be discussed in the future, more frequent conferences. The experience of this and both the previous conferences shows that it is expedient not only to discuss the global problems posed for natural science and philosophy by the development of science and practice but also, as before, to analyze and discuss the so-called traditional philosophical problems relating to changes in the scientific ideas and concepts of matter, the forms of its existence, the laws of its motion, the problems of the further development of epistemology, and the deepening of the dialectical categories, which are all of general interest for natural scientists and philosophers.

At each such conference we believe there should be a discussion of not more than two or three such problems with not more than two or three lectures on each of them. This would give such conferences a genuinely

working nature, transforming them into something of the nature of creative all-union seminars on philosophical problems of modern natural science.

¹S. G. Suvorov and R. Ya. Shteinman, *Usp. Fiz. Nauk* **104**, 692 (1971) [Second All-Union Conference on Philosophical Problems of Modern Science].

²A. P. Aleksandrov, *Vopr. Filos.* No. 6, 27 (1981).

³See, for example: A. F. Ioffe, *Osnovnye predstavleniya sovremennoi fiziki* (Fundamental Concepts of Modern Physics), Gostekhizdat, Moscow (1949), p. 357; S. I. Vavilov, "New physics and dialectical materialism," *Pod Znamenem Marksizma* No. 12, 33 (1933); I. E. Tamm, "On the work of Marxist philosophers in physics," *Pod Znamenem Marksizma* No. 5, 231 (1933).

⁴P. N. Fedoseev, V. I. Lenin i filosofskie problemy sovremenogo estestvoznaniya: itogi i perspektivy (Lenin and Philosophical Problems of Modern Natural Science: Reviews and Perspectives), Nauka, Moscow (1981).

⁵Materialy III Vsesoyuznogo soveshchaniya po filosofskim voprosam sovremenogo estestvoznaniya (Proc. Third All-Union Conference on Philosophical Problems of Modern Natural Science), Nos. I-III, Nauka, Moscow (1981).

⁶Filosofskie voprosy sovremenogo estestvoznaniya. Materialy k III Vsesoyuznomu soveshchaniyu po filosofskim voprosam sovremenogo estestvoznaniya: Sbornik obzorov zarubezhnoi literatury (Philosophical Problems of Modern Natural Science. Material for Third All-Union Conference on Philosophical Problems of Modern Natural Science: Collection of Reviews of non-Soviet Literature), INION, USSR Academy of Sciences, Moscow (1981).

⁷Filosofskie voprosy sovremenogo estestvoznaniya: Ukazatel literatury, izdannoĭ v SSSR v 1971-1979 (Philosophical Problems of Modern Natural Science: Index of Literature Published in the USSR during 1971-1979), Parts 1 and 2, INION, USSR Academy of Sciences, Moscow (1981).

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