

Philosophical And Methodological Aspects Of The Scientific Picture Of The World And The Humanization Of Science

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Abstract – In the modern intellectual question analysis of the humanitarian fields of scientific knowledge is indicated as an important philosophical problem. The fundamental intentions of the cultural development of the 21st century intersect at this point: on the one hand, there is an awareness of the loss of spirituality, and on the other, the indication of science as the highest human value. Science, entering into the mysteries of space, living matter and the human body, creates rise to acute social, ideological, methodological and humanistic problems concerning the individual and social aspects of man. The large amounts of scientific knowledge development should be combined with humanistic ideals, otherwise it is sure to give rise to further discord to the human condition and the world of culture. Next natural question arises in the problem of humanizing science context: "What should be the peak of scientific knowledge in order to avoid further mismatch between man and nature, society, science and humanitarian ideals?" As a result, the task arose to supplement the analysis of scientific aspects of cognition with an analysis of its synergetic, existential, axiological components. It is necessary to consider cognition not only as discovering the objective truth apart from man or from mankind, and also as part of the human-species, containing valuables that act to determine the human genuineness. With this in view, we will consider how the ideal of science is changing, leading from principle ontology when the most significant value for the cognizing subject is the world in itself, to taking into account the subjective conditions under which principles of new knowledge are gained. The evolution of the paradigm of science and the scientific picture of the world is shown. This evolution goes through three stages: classical, non-classical and post-non-classical.

Keywords – Science, Culture, World Picture, Scientific Picture Of The World, Humanistic Ideal, Ethics, Synergistic Paradigm, Classical Picture Of The World, Nonclassical, Post-Nonclassical.

I. INTRODUCTION

Throughout the life span of humanity not only knowledge which was of practical value had a great significance, but also knowledge that which reflected common ideas about nature, society and man himself. It was this knowledge, which was integrated into a single whole of the spiritual world of people. This integration was the basis for emerging, shaping and developing traditions in all spheres of human activity. No less important a role was played by how man conceived of the world structure. The human self-consciousness has the tendency of conceiving the surrounding world, or in other words to see with insight the Universe. Man seeks to find his own place among the surrounding objects material and spiritual, to determine his own place in the cosmos and natural hierarchy. Modern science is oriented toward building-up an unified integrated picture of the world, depicting it as an interrelated "net of the being". The "scientific picture of world" (SPW) is a term that points to the integrated system of knowledge, not only a part or fragment of knowledge. In social consciousness different PW are historically formed and changed. The human species generally accepts and distinguishes ordinary, religious, scientific, esoteric, and philosophical PW, we will consider only the SPW.

Traditionally the combination of the concept of "scientific picture of the world" is the wide panorama of knowledge of the nature, including the most important theories, hypotheses and facts. In the scientific picture of the world, a central theoretical core and particular theoretical models are distinguished, which are constantly being refined. The scientific picture of the world is not just a quantity or a set of separate knowledge, but the result of their mutual consistency and organization into a new integrity, i.e. into the system. The scientific picture of the world is paradigmatic in nature, since it sets a system of attitudes and principles of mastering the universe. The content of the scientific picture of the world determines the method of seeing the world. This affects the socio-cultural, ethical and methodological foundations of science. At present, the humanization of science is acquiring an imperative character. Science simply needs a humanistic paradigm. It must fully address the person, his existence, survival and prospects for further development. [1, p.81].

Within the notion SPW the scientific community associates the well-grounded concrete-historical knowledge of the world, which determines the style and method of scientific thinking. The structure of the SPW includes an array of theory postulates, conceptions about methods of interaction, genesis and development. The SPW drives new thought movements, poses the constraints placed on the characteristics of assumptions accepted as new "reasonable" hypotheses. The SPW organizes the system of directives and principles of exploration of the Universe in accordance with characteristics of what its paradigmatic character reveals. The essence of the SPW stipulates the manner of how scientific world vision is to be approached. It influences the forming of logic, methodological processes, and social and cultural and ethical norms of scientific exploration.

II. TRANSFORMATION OF THE SCIENTIFIC PICTURE OF THE WORLD AND HUMANISTIC IDEALS OF SCIENCE

Let us consider how the evolution of SPW, from classic through non-classic and including post-classic views, evolutionality influences humanistic ideals and ideals of science. Historically the flourishing of scientific knowledge was connected to advancements of classic mechanics of the 17 - 18 centuries. Classic mechanics elaborated specific concepts of matter, motion, space, and causation. Absolutisation of mechanics laws gave rise to the creation of the PW where the Universe is a closed mechanical system consisting of unchanging elements, the motion of which is subjected to the laws of mechanics. These laws are considered universal and applied over all matters' motion. In such a world there was no place for chance, and irreversibility and probability were usually connected with incompleteness of knowledge. That meant predetermination of all occurring world processes. Scientific knowledge as well became dominated by such a world-outlook and methodological principles of determinism, rationalism, mechanicism and reductionism. Within the frameworks of classical SPW man had been brought out of the limits of nature and represented as a subject cognizing it as well as constructing and spiritualizing it. Developing science and engineering man ensured domination over the nature aimed at meeting his own needs [2, pp.125-126].

Under the impact of forming non-classic (quantum mechanic) PW serious shifts in philosophical foundations of science, expressed in recognition of various types of explanation for one and the same fragment of physical reality, which were only a partial reflections of truth. Such types that had pronounced references became acceptable to the means and procedures related not only to the object but also to the subject of cognition. To the picture of world created by quantum physics, due to the principle impossibility to eliminate the measurement instruments impact on the parameters of investigated phenomena alongside with the object of cognition there were introduced the means and the very act of measurement. The physical PW in this case was becoming the picture of interacting objects under study and their instruments of measurement. Coming into being of the new PW means the transition from thinking of reality only in the form of an object to the thinking about it as about human sensitive activity and practice.

The decisive changes in gnosiological comprehension of scientific knowledge took place when into the sphere of science were introduced objects such as historically developing systems, and interrelationship and intertransitions between them. These systems comprise not only a biosphere, Metagalaxy and the Earth being the system of geological, biological and technological processes in which the human species is also included (biotechnology, nanotechnology, artificial intelligence, ecology, noosphere, informatics, sociocultural sphere, etc). Hence, one could define the changes in understanding of the object of scientific knowledge as one of the ways of humanization of scientific knowledge. As a result of this the objective sphere of science has broadened and will continue to become more sophisticated due to the new objects evolving into it, the considerable part of which is itself the outcome of the scientific and technological development ("artificial intellect" and bioelectronics). Thus it is the question to represent not only the simple broadening of objective world but its radical "humanizing", new systematization of natural characteristics, in the result of which man enters the PW not as a thing besides other things, and not as an active participant of natural processes, but as a system forming principle, as the beginning of all the coordinates and initial point of any knowledge about the world. The essence lies in the "prism" of the humanistic values and aims through which the cognizing subject looks at the "environment", the world in which

he has to live" [3, p.290]. The thinking of such processes is indissolubly related to the characteristics of a cognizing human, by which the very process of cognition is oriented. Researcher V.K. Sergeev examines the humanization of science through the prism of the acmeological approach. According to his point of view, "in general to science in all types of its rationality, this aspect is essential, since science has always strived for the heights of the human spirit. From this perspective, those results that affect the co-evolution of society, nature and man, striving to harmonize their relations, can also be considered real positive achievements of science. A scientist can reach the heights of the human spirit if he measures his spiritual path with the needs of society and nature." [4, p.53].

III. POST-NONCLASSICAL - SYNERGETIC PARADIGM OF SCIENCE

In the second half of the 20 century the transition of most fundamental scientific disciplines to the studying of new types of objects — self-organizing and self-developing systems became complete. The study of systems able to self-organizing had led to a radical transformation of mechanistic concepts of nature. Non-classical and thermo-dynamical approaches essentially changed the SPW. I. Prigogin stated that "the world is neither an automatic machine nor the chaos" [5, pp.4-8]. Following this the erroneous views of opposing self-organizing to organizing and self-governing and governing arose. These forces most probably however are subject to the principle of supplementation, order and chaos most probably are mutually supplementing rather than excluding each other. In the framework of this new concept, chaos is not only destructive but also creative, if it is regarded in the limits of "order - chaos" [5, pp.4-8]. According to synergetics most systems existing in nature are those of the open type. Between them there is a constant exchange of energy, substance and information, and, thus, constant changeableness and stochasticity [6, pp.4-8]. With the notion of stochasticity the phenomena of fluctuation and bifurcation are closely related. At times, the fluctuations become so strong that the organization which existed before fails to stand up to damage. In this critical moment (point of bifurcation) it is impossible to predict in which direction further development will go: whether the condition of the system will be more chaotic or it transfers to the new, higher levels of organization.

At present, the development of self-organization theory is related to the philosophical comprehension of results of investigations into irreversible and open thermo-dynamic processes and expanding on this basis transformation of world-outlook and methodological principles of understanding the world, what in its turn leads to the change of ideal of scientific knowledge. Today the tough determinism and reductionism, being the basis of mechanistic world-outlook, can not be viewed as universal principles of scientific cognition, as a broad class of phenomena and processes as they exceed the limits of linear, equilibrium and reversible schemes. Reversibility and tough determinism can be applied only in simple limited cases. Irreversibility and chance henceforth are viewed not as exceptions but as a rule.

The processes of self-organization correspond to the subtle interrelationship between chance and necessity, and fluctuations in deterministic laws. In the vicinity of bifurcations fluctuations play the major role, whereas in the intervals between bifurcations the deterministic links dominate. Hence, the functions of self-organizing systems' development have not been predetermined. The future stops being the given matter, it reaches no further than the present time. This means that the end of the classical ideal of omniscience making it necessary to review the mechanistic rationalism as the dominating principle of scientific explanation. In the open and irreversible world where the future cannot be accurately predetermined and the present has several potential lines of development man is in the situation of constant choice and in search of optimal solutions in accordance with changing conditions. The existing classical ideal of scientific knowledge is not adequate to the actual state of the world. This ideal postulates that science is morally and emotionally neutral and rational and that logical principles and argument dominate in within the world [7, P.159].

According to M. Abdullaev, scientific knowledge represents an open dynamic system of the fluctuation, i.e., the spontaneous deviations from the equilibrium state, which emerge as a result of getting outside information consisting from empirical data as well as information, gained from the vast "world of knowledge" as well as the world of moral and humanistic values. Interaction of "the world of knowledge" and "the world of human values" are clearly seen on the example of integration of scientific disciplines, extrapolation of scientific methods, and world-outlook approaches through the higher paradigm level [8, pp.22 - 23].

The modern scientific picture of the world is formed on the basis of the synergistic doctrine of complex self-organizing systems, holism (a holistic approach to the world), global evolutionism, ecology, theories of the Big Bang and the expanding Universe, based on the anthropic principle. Thus, a fundamentally new picture of the world is created, which is fundamentally different from the mechanistic, electromagnetic and quantum field pictures of the world [9, p.12]. Using the paradigm of complexity (synergetic paradigm), it is possible to build a certain picture of the world in which a person is fixed in nature, the world and human existence

are proportional, and therefore the construction of artificial nature and social institutions is carried out in a single network of interactions [10, p.94].

The point of bifurcation, which is revolutionary as to its essence, bears in itself the pluralism of opportunities for new development of the ideal of scientific knowledge. As an alternative to the classical ideal, science can become a science having the following characteristic: differentiation of material and ideal as relative. Man as an immanent part of nature not so much stands against nature. The human species should not govern nature but should be cultuer relationships having dialogue form rather than expecting mathematical knowledge to be a universal language and standard of science. "Understanding" methods are significant; because science should not be ethically and politically neutral, it could be subjected to humanistic values and be responsible to the society [7, p.159]. Taking the etymology of the word "synergetics" it is derived from the word "synergy" - co-energetics, joining of various energies: heavenly and mundane, divine and human, gnosiological and axiological, truth and good, scientific and valuable, - of two plans of Being. Thinking that mankind that is apt to recognize single things, for example Heavens or Earth, or knowledge or valuables, neglected is the unity of these two plans, as a rule. Not many wise men, as the history of philosophical thought testifies, have become aware that the unity of this and that, the nature of the Whole, and unitary as a unity coexist [11. P.90].

The novelty of future situations are that the systems of total confrontation, and dualism have become completely obsolete. Humanism and morals are becoming integral properties of scientific methods. This testifies to overcoming of the metaphysical mode of thinking, broadening consciousness, connecting of the odd, existence of a principally new attitude of integral man making no attempts on the integrity of one another. Everything should come to one formula: "One in all and all in one" [11, p.97].

Synergetics as a science is open to new ideas and theories. Synergetics fosters the establishment of new scientific knowledge, a new vision of our understanding of the world, and meets the requirements common to mankind [12, p.5]. It has a large adaptive resource base. The appearance of synergetics responded to the need to solve the problems of modern humanity. Synergetics has a powerful methodological potential, is characterized by a clearly expressed desire for interdisciplinary synthesis and the creation of a model of a unified science. Its arsenal can be used not only in the natural sciences, but also in the sciences of the social and humanitarian profile, thereby providing a dialogue between two cultures through synergy [13, p.64].

Synergetics is characterized by clearly expressed aspirations of inter-disciplinary synthesis and creation of a model of unified science. Estimates of truth and lie should be replaced by a broad spectrum of scales including the notions of beauty and goodness, that is they should enter the system of culture and science. I. Prigozhin, and I. Stengers wrote "At present we experience deep changes in the scientific conception of nature as well as in the structure of human society resulting from demographic booms, and this coincidence is rather significant. These changes raise the necessity of new relationships between human and nature as well as between human being as a social species. The old, a priori difference between scientific and ethical values is no more valid" [5, p.383].

Moral and humanistic norms of science. The objective of modern post-non-classic science is not the cognitive value of scientific knowledge about the external world, as the determining of priorities of economic, socio-political and cultural character. A new orientation of science that leads to "the objectively true explanation and description applicable to "man-sized" objects not only assumes but also supposes inclusion of axiological factors into the set of explaining concepts" [14, p. 186]. Insertion of valuable factors increases ethicism of scientific knowledge, its orientation to humanistic ideals and values. Ethical aspects of science, engineering and technology, genetic engineering, bioethics and nanoethics have been actualized in the modern sociocultural and research space [9, p. 13]. This process is due to the fact that the whole world is dynamically developing, forming new values. New landmarks generated by the information and digital age are based on such discoveries as: a) nanotechnology; b) artificial intelligence; c) virtual and additional reality; d) biotechnology; e) neurotechnology; f) robotics; g) energy technologies. The artificial world is actively replacing the natural, and in this world the key figure is a person [15]. The humanization of post-non-classical science and the modern scientific picture of the world are indicated in the fact that it is a person who is increasingly considered the main value and goal of social development, becomes an object of interdisciplinary, comprehensive research.

"The standard concept of science" coming from the classical idealism of rationality proceeds from the idea that nature is in constant motion and at its base there are unchangeable uniformities which can be expressed in universal laws. The priorities here are objective criteria, being personally unprejudiced and emotional neutrality. It appears that theoretical knowledge is built into the structure of the world of nature. Truth is the main norm of scientific knowledge cognition. Such an ethos of thought is found in

expressions of positivism. K. Mangeim, and E. Durhaim paid attention to social constructing of scientific knowledge and facts they derived are theoretically loaded and socio-culturally stipulated. Everything depends on the cultural background, where specialists and scientists work [16, pp.93-94]. With increasing impact of historicism in science philosophy a complicated problem revealed: how in explanation of scientific phenomena to coordinate socio-cultural, humanistic values and cognitive and logical factors? A solution to perspective of this problem is contained in the concept of on-apparent knowledge by M. Polani who drew attention to the concrete-and-personal character of cognition and thinking. He makes attempts to rethink the understanding of objectivity's characteristics of positivism as pure empirical actuality proceeding from opposing objects of cognition to their subjects. He claims that it is characteristic for humans to use abstract thought and representations for penetrating into the essence of things within themselves but to correlate reality with the human world. Thus, any attempt to eliminate the human perspective from our picture of the world, the author states, leads not to objectivity but to the absurd [17, p.7]. On the other hand, the refusal from the ideal of scientific impartiality is hardly ever legitimate based on the fact that cognition contains the element of evaluation, that the "sense" of theory assumes the choice of formal and logical structures. The humanization of science is a way of overcoming the one-sidedness of the rational-experimental way of understanding the world, ensuring its harmonious unity, complementarity with the spiritual, moral, emotional and aesthetic comprehension of objective reality. Conversion of knowledge of scientific truths, goodness, beauty and faith in the ideals and principles of humanism as necessary guidelines in the life of a person and society.

IV. CONCLUSION

The reality requires development of new type of scientific thinking which is aimed both at production of an innovation, and at an assessment of its consequences of negative character. New turn in development of science that its creative power concentrated on tasks of the forecast, safety, counteractions to destructive tendencies, saving and consolidations of resilience of the earth self-organizing system is necessary. The modern paradigm of a scientific pattern of the world and science in general assumes new type of innovative thinking in which the main dominants will be feeling of civil and ethical liability, valuable and humanistic reference points of the higher order. The search for truth in science is also a search for good and beauty. Thus, at the junction of cultural spheres and life spheres unspoken codes and rules for minds are formed - ethos of thinking, which is common for all forms of culture - science, art and morals.

The humanization of science in the 21st century acquires an important methodological significance in the process of integrating various branches of knowledge around the comprehensive study of nature and man, his spirituality, in the search for the meaning of the historical process, its human conditioning. In connection with the development of complex self-organizing systems, points of growth of new moral and humanistic values, a scientific picture of the world and worldview orientations arise, which open up prospects for a dialogue of cultures. This dialogue is necessary to develop an innovative strategy for human life in a globalized world, to get out of the global crises generated by modern technogenic civilization.

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