
ОНТОЛОГИЯ И ТЕОРИЯ ПОЗНАНИЯ

THE HISTORY OF SCIENCE AS AN INTEGRATOR OF CULTURE

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Science of the past is directly involved in scientific work of our time; and in the form of various ideas, concepts, semantic, etc. this increases the role and importance of the history of science, its integrative function. Key methodological role play here: the concept of formation of knowledge, concept of cognitive functional of consciousness, concept of value functional of consciousness, laws of historical development thinking, the principle of "Ghost culture", etc.

Key words: science, history, culture, object of cognition, subject of cognition, cognitive, value, logical relationship.

The complex dynamics of various processes intrinsic for the modern spiritual culture demonstrates several trends. New semantics, ideas and concepts appear and old ones vanish; value standards replace each other like in a kaleidoscope; old ideals and guidelines die, expressing the change of demands and interests, and new synchronic ("horizontal") and diachronic ("vertical") connections between the spiritual culture elements are established; diverse syntheses and spin-offs appear. The history of spiritual culture is not only the expansion of its elements, enrichment with new elements, components and creative work; it also implies the crystallization of its structure, strengthening its internal consistency, including through the establishment of new diachronic relations between its historical layers. At the same time, the processes of diversification, proliferation and differentiation within the spiritual culture system is inevitably supplemented by integrative and synthesizing trends and processes. Differentiation of any complex dynamic system naturally generates integration processes and development of syntheses of various complexity and typology. The processes of differentiation and integration essentially stimulate each other, they are not possible without each other (1).

The analysis shows that there are common core patterns characterizing the integrative processes within the spiritual culture system.

First, in the course of the integration, the boundaries between cognitive and value functions of the consciousness are blurred. Cognitive activity is increasingly directed not so much by the internal logic of the development of a particular type of objects, but more so by the ones determined by the demands of the society, the dominant system of values.

Secondly, the result of integration is the complexity of relationships on the bases (substantial cooperation guiding the genesis, development and deployment of this form of culture), which are represented by the bipolar connection “motive — goal”. In this case, the motive pole is generated by the content of the links including this form of culture in the functions of the social integer, it serves as an essential and subordinate component; and the goal pole sets goals based on the internal structuring of this form of culture.

Thirdly, with the development of modern civilization (post-industrial, information-driven society, the postmodern era and so forth.), the connection between the motives and goals have become more mediated, multilink. Their interaction is increasingly demonstrating irregular, random circumstances stimulating creativity of the deviant culture lines. Therefore, the integrative processes run in two ways: through the main and deviant lines of development in the culture system. Cultural mainlines are its directions naturally growing out of the bases of a culture form; they rely on the base of this form of spiritual culture, its historical layers, feed on them, generate stable structural connections and relationships with such layers. That is what ensures the existence of high requirements for professionalism and creative criteria in these areas of culture; it determines its elitism, rationality, etc.

Deviant lines do not grow naturally out of the bases of culture, they are generated through the interaction of secondary, incidental, fluctuating, random factors. Deviant culture lines (in art — various forms of pop art; in science — various forms of quasi-scientific mythology, pseudoscientific theories etc.; in religion — various nontraditional sects; etc.) are characterized by the lack of deep historical roots, loss of connection with the cultural and creative bases etc. This entails lower criteria of professionalism, the domination of momentary, utilitarian values, populism, etc. The growing role of deviant lines in the culture system has developed with the growth of the personal focus principle in the modern forms of human activity. “Personal gap” in the functioning of the cultural bases generates, on one hand, the potential infinity of the “universe of human spirituality”, and on the other hand, the incompatibility of the irreducibility of the subjectively valuable and the objectively-conditioned, the casual and the regular in the culture system (2).

Fourth. An important regularity has been clearly manifesting itself in the dynamics of contemporary culture: every new important step of cultural creation is accomplished by mastering both the latest achievements of culture and the deep historical culture strata through a large-scale synthesis of the culture history and modernity. The history of culture is being involved in a larger scale of cultural creativity of our time, it becomes its very precondition. Deep culture strata do not remain in the past, they enrich the current state of culture and its development in the form of ideas, semantics, processes and trends.

We increasingly feel that history does not remain in the past; the distant past seems to be living with us and in us; it is present and together with the present it determines the future.

Thus, the integrative culture processes also develop in two planes: synchronically (“horizontal plane”) and diachronically (“vertical plane”). Synchronic integration is a close interaction of culture forms in a given historical period, mutual enrichment, sharing images, meanings, ideas, etc. between different and even seemingly distant culture areas (for example, between art and science, natural and social science etc.). Usually, when speaking of the culture integration, we have in mind such “vertical” integration, generated by identifying deeper aspects, connections, regularities in the structural organization of the world in the process of spiritual cognition. However the integrative develops in culture not only by the object but also the subject of creativity, its activity growth, which alloys the cognitive and value components, the objectively predetermined knowledge and subjectively expressed values. All this is the “vertical” integration of historical culture.

This raises an important issue of objectivity of such historical (“vertical”) integration. This problem stems from the fact that all types of historical consciousness, including the modern consciousness, ineradicably contain all ancient strata, including its primitive base. Surely, the accumulation of historical types of consciousness substantially modified, transformed this basis, but it did not, in any way, dissolve or eliminate them. Under certain conditions, the archaic forms of consciousness can be revived (in versions). This occurs when the understanding and a sense of cultural and historical distance between the past and the present is lost.

An example of this is the quasi-scientific myth-making, where the scientific and the mythical and poetical, the logical and conclusive and the mythological, the rational theoretical and the irrational and mystical coexist and, moreover, in some ways even complement each other. The ideas and concepts used by the modern scientific view of the world and the mythopoetical images (borrowed from the arsenal of ancient folk beliefs, pagan cultural strata, preserved in the depths of the mass consciousness until today), religious ideas, stereotypes of ordinary consciousness peacefully coexist in the quasi-scientific mythology [6]. Another example is the quasi-scientific work on the basis of the construction of the “new history” (Fomenko, Kalashnikov, Nosovsky et al.), which will replace the currently existing (Scaliger’s) chronological timeline of historical events, dating back to the 17th century, and which, according to the supporters of the “new chronology”, has led to a lengthening of human history by thousands of years (3). One can cite other examples of inadequate “vertical” integration of cultural forms.

In our modern society, full of acute contradictions and crises and therefore particularly vulnerable and striving for stability, balance and sobriety, the non-doubtful deficiency of calm, rational analysis of the history of culture, the need for the development of an adequate attitude to the historic events is practically in the air. Theoretical and methodological basis here is the principle of historicism allowing to develop objective models and evaluation of the specific historical distance between the modernity and the various stages of the evolution of cultural forms. The history of science plays an important role here.

The history of science is an interdisciplinary branch of cognitive activity. It studies cognitive, socio-cultural, ideological, psychological, institutional and other factors of the development of scientific knowledge. This allows to better understand the most complex nature of cognitive activity, the diversity of its conditions and factors and to better represent the dynamics of the historical process as a whole. The history of science accumulates and summarizes the experience of the historical progress of science, helping to develop new ideas about the ways and principles of further development, methods of organization, its functions in the society, etc.

The history of science is a most important channel, contributing, first, to the integration of science into a coherent system of understanding the world, and secondly, to the integration of the cultural system, including the establishment of the internal unity of the natural science and humanitarian knowledge, to the strengthening of cooperation between science and culture, science and public relations, spiritual and material culture. The general subject of the history of science includes the patterns, the logic of historical development of scientific and cognitive activity. The science subject covers numerous links and relations of the scientific knowledge of the world: cognitive, social, cultural, economic, political, psychological etc. (4).

The historicism of science is included in the general context of historicism of the spiritual culture as a whole. The past of science is directly involved in the scientific work of our time; as a variety of ideas, concepts, semantic, etc., it enriches its current state. We increasingly feel that the history of science did not remain in the past, it lives in the present and largely determines the future of science. This signifies the role and importance of the history of science, its integrative function. The history of science helps implement the diachronic (“vertical”) integration of science and its inclusion in the historicity of culture as a whole. The history of science and history of culture precondition each other. The historical and scientific research deepen the understanding of the content and structure of both science and spiritual culture in general.

The integrative function of the history of science is realized through restoring the ties existing between the various branches of science and cognitive methods in the previous historical periods; the logic of science development from early to later states; structure of the quality (including revolutionary) transitions in the history of science. Here, the key methodological means include the concept of knowledge formation, the concept of the fundamental attitude of consciousness (cognitive and value), the concept of historical development of thinking, the principle of “the spirit of the culture” etc.

As science is represented as a particular historical form of knowledge, and the history of knowledge is reconstructed as the history of the origin, development and replacement of a holistic type of cognitive activity (formation of knowledge) by another, better organized (other formation), which “removes” the previous one, transforms it and turns into its subordinate. The history of knowledge distinguishes three formations: subject-effective, and figurative-mythological and rational-conceptual, in which the conditions for the emergence of certain specific areas of science appeared. Such key conditions include: active and practical development of a certain type of objects (largely determined by the degree of the development of practical and technological capacity

of the subject); the existence of material (substantive means of interaction between the subject and the object; intermediary objects performing symbolic functions, etc.) and ideal (i.e., knowledge, skills, operational procedures and so forth.) means the cognition of objects of this type; the existence of appropriate value (need-motivational and regulatory) prerequisites of knowledge objects of this type; nature of the organization (institutionalization) of the collective knowledge subject (5).

An important part of the diachronic integration is the principle of cognitive historicism developing through the interaction of cognitive and value consciousness functionalities. Thinking is a two-stage (operand-operational) cognitive process of the abstract-conceptual reflection of reality, growing out of the mythological, sensual and significant generalizations of the world. Thinking does not simply reflect the properties of objects — this problem is solved by the perceptual image — it identifies relationships and their links. To shift from summarizing images to the abstract-conceptual (i.e. to go beyond the immediate boundaries of experience), it is essential to develop methods for the operational impact on an image which can only be derived from the very image, its image tissue. This is possible with the use of the language, its symbolism, defining a separate image, and a separate operation, which expresses the relationship of images, or with a single word. An idea is formed with the procedural impact on the images through operations derived from the very same imagery and fixed by language signs. These operations allow to isolate the objective relations originally fused in the images, and to express them in logical and grammatical forms. Thus, the cognitive process assumes the form of a two-step system implemented through the constant interaction of the elements (images, abstractions, operands, operations etc.), both within each stage and the inter-stage interaction, between the primary and secondary images on the one hand, and abstractions and signs — on the other. Historically, thinking develops in a direction, on one hand, highlighting deeper objective relationships, and on the other hand, with account for subjective constraints imposed on the cognitive process, and introduction of corrections for them in the course of cognition.

An important role in the diachronic integration is assigned to the concept of “the spirit of culture”, the “deep principle” connecting science and culture. After all, science is a part of an integrated system of spiritual culture, based on certain civilizational grounds. Science is connected to the system of spiritual culture with a variety of relations which have a significant impact on both the structure and the content of scientific knowledge. “The spirit of culture” largely determines the type of cognitive activity and can be (to some extent) clarified in the course of epistemological analysis (6).

These considerations help clarify a number of fundamental problems of the history of culture and science. The historical, epistemological and scientific analysis of quasi-scientific myth shows that its cultural and creative bases are not dominated by the focus on the disclosure of the objective laws of reality. Moreover, the quasi-scientific creativity is fundamentally alien to the cognitive, subject-object view of the world. Here the spiritual exploration of the world is determined by the value factors operating in the system of subject-subject relations, interpersonal communication, in the configurations of everyday human interaction. In other words, quasi-scientific myth-making is not

a kind of cognitive (even extra-(pre-) scientific) activities. In fact, it is a modern kind of folklore, its distant historical folklore protoform being a genre of oral folk prose tales like short fables [6].

The folklore consciousness seems to have remained in the contemporary forms of culture, and plays a leading role in their generation and innovation. It is able to catalyze the integration processes in the spiritual culture system, open new ways, establish new connections between various forms of consciousness, and thereby contribute to the emergence of new forms of culture, including such “strange” ones as quasi-scientific mythological centaurs. This ability is apparently due to the fact that the folk consciousness is improvisational in its nature, the cognitive and the value are merged in it, or in the process of primary synthesis, incomplete, which can not be related to the interpretive activity of the mind. We can assume that in future forms of culture, the ability of the folk consciousness to catalyze the integration processes in the system of spiritual culture will manifest itself yet again, and we may be faced with an even more unexpected, more “strange” spiritual phenomena than quasi-scientific myth-making.

The historical and scientific problems requiring consistent application of the cultural and historical distance principle include an issue actively discussed at the present time: Newton’s attitude to alchemy. According to the archives, for over 30 years (from 1660 to 1692) Newton dedicated most of his time to alchemy so that, apparently, he got poisoned by mercury vapors and became seriously ill. There are various explanations of Newton's alchemy hobby. Some are inclined to see this as proof that Newton actually was “not the first scientist but the last magician” seeking to understand the “secret knowledge” [2], while others see his focus on mastering the techniques of the experimental method [3]. Many authors see Newton's passion for alchemy as a banal attempt to get rich, that is, “to eat from silver plates and to ride in a carriage”. It is difficult to clearly understand Newton’s motivation for his “alchemical” activities; the motives here may be combined into a “game”.

It is important to remember the cultural and historical distance, the fact that for the history of chemistry, late 17th century was a transitional period. That was both a time of the decline of the alchemical tradition, and the time of the scientific chemistry rising. The fundamental difference between them is that scientific chemistry tends to “penetrate the structure of matter”, and an alchemist is focused on the “suffering”, “death” and “marriage” of substances, leading to the transmutation of the matter (philosopher’s stone) and the human life (elixir Vitae — “elixir of life”) [8]. Therefore, Newton’s “alchemical” experiments were probably not alchemy but already chemistry. While performing his experiments, Newton acted not so much as an alchemist, but as a representative of scientific chemistry. He focused on the experimental study of the chemicals “attraction” to each other, so as to use the obtained data to understand the nature of gravity, the gravitational attraction of body masses to each other. It is obvious that he could perform such studies only with whatever was available at the time (in fact, alchemical, as no alternative existed). At the same time, the remnants of alchemical ideas led to the fact that many “occult properties” were included in his interpretations of the nature of gravity, which he had assigned ontological status [1]. In view of this interpretation, Newton’s

legendary motto “I do not invent hypotheses!” voiced in his answer to the question about the nature of gravity, gives a new and unexpected ring to the quote.

Thus, the history of science is not only a most important form of culture of historicism; it is also an important part of the modern culture. Enriched with the historical and cultural experience, it stimulates the development of a rationalist attitude to the world, nature, society, the present and future of humankind, thereby forming an adequate cultural and historical gap between the modernity and landmarks of the cultural history.

NOTES

- (1) This relatively trivial philosophical truth has still not been mastered by many ideologists of globalization, asserting the possibility of global integration without parallel differentiating processes in a society (for economic, social, ethnic, cultural etc. grounds).
- (2) Therefore, multiple syntheses in the culture system are mediated by ordinary consciousness and its associated folklore.
- (3) The supporters of the “new chronology” list Isaac Newton among their predecessors, tearing his writings on the subject out of the historical context. The motivation of Newton’s works on history was purely religious in nature: achieving coordination of the two periods of world history, that is, the Old Testament history (before Christ): sacred, filled with miracles and prophecies, and the civil history (after Christ’s death and Resurrection) [4].
- (4) An important feature of the history of science as a discipline is its being very historical. After all, the system of scientific cognition of the world is constantly changing, and sometimes quite radically. Structural changes in the history of science: on the one hand, it diversifies, it differentiates certain research areas (actual science theory, sociology of science, economics of science, psychology of scientific creativity, etc.); on the other hand, it enhanced its integrating tendencies, it increasingly appears as a single, integrated discipline, constituted and justified by the general principles of the “philosophy of science”, epistemology, philosophy of history, cultural history and cultural studies.
- (5) In particular, the analysis showed that the formation of proto-science in the civilizations of the Ancient East and the Ancient Greek science was a natural stage in the development of the rational and conceptual way of thinking, which remained unfinished, interrupted. The features of the socio-cultural environment did not allow the rational and conceptual way of thinking to establish itself on its base or to subjugate its background. The dynamics of consciousness were then dominated not by the cognitive but by the value functionalities. This led to the decline of the ancient science [5].
- (6) This principle is being widely discussed. Empirically oriented researchers focused on the meticulous study of primary sources, concentrating only on the accurate synthesis of sources, often deny the need to take into account the socio-cultural factors in the development of science. For example, a prominent expert on the ancient science, O. Neugebauer wrote: “What is usually called the “Greek” mathematics consists of excerpts of works of about 10 or 20 people, spread over a period of 600 years. I believe it dangerous generalization to try to abstract some common type out of this material, and then establish a mysterious deep principle which allegedly binds mathematical documents with some other works of art” [7. C. 186].

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ИНТЕГРАТИВНАЯ ФУНКЦИЯ ИСТОРИИ НАУКИ

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Прошлое науки непосредственно вовлекается в научное творчество нашего времени; и в виде различных идей, понятий, смыслообразов и др. Все это актуализирует роль и значение истории науки, ее интегративную функцию. Ключевую методологическую роль здесь играют: концепция формаций познания, понятия когнитивного и ценностного функционалов сознания, закономерности исторического развития мышления, принцип «духа культуры» и др.

Ключевые слова: наука, история, культура, объект познания, субъект познания, когнитивное, ценностное, логическая связь.

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