A Discussion of the Nature of Information and Methods of Building Its Philosophical Concept (Review)

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Abstract—This paper analyzes the discussion about the immaterial (K.K. Kolin) and ambivalent (A.V. Sokolov) natures of information and appropriate ways of constructing its philosophical concept. It is suggested that information be considered as a generalizing concept and scientific abstraction that designates an information process. The possibility of developing a philosophical concept of information based on the theory of an information process is substantiated. The most general theoretical and methodological assumptions of the theory of an information process are expounded.

Keywords: information, information process, philosophical concept of information, K.K. Kolin's immaterial concept of information, A.V. Sokolov's ambivalent concept

The construction of the information society is inseparably linked with the comprehension of the concept of "information" at its highest philosophical level, which goes beyond the limits of the so-called "pure" academic philosophy and engages scientists from related fields of knowledge. Such a "way out" was exemplified by the discussions of the well-known domestic scientists K.K. Kolin [1] and A.V. Sokolov [2, 3] about the influence of information as a philosophical category on the basic question of philosophy about the nature of information and, consequently, the ways of building its philosophical concept, which occurred on the pages of *Vestnik ChGAKI*[1].

The scientific discussion was initiated in the professional press by Dr. Techn. Sci. K.K. Kolin. His concept, which he interpreted as a new paradigm, is designed to justify the material information picture of reality. It is based on the premise about the ideality of information as such and its consequent interpretation as an immaterial component of reality. According to K.K. Kolin, the proof of the immaterial nature of information is that "the world of reflection" that transforms the physical property of reality into the ideal one is built between the physical world and the world of consciousness. On this basis, he proposes the interpretation of information as a basic question of philosophy as a question about the relationship between matter and information[2]. According to

K.K. Kolin, the adoption of this formulation of the fundamental question of philosophy "provides a basis for the formulation of a new world outlook paradigm, which is based on recognizing the existence of the dual material information nature of reality and all its fragments and components" [1, p. 187]. According to A.V. Sokolov, the "reanimation" of the fundamental question of philosophy by involving the "information aspect" failed, because the main problem concerned the question of the primacy of material and spiritual reality rather than their existence. We share the approach of A.V. Sokolov. Moreover, we believe that the worlds of reflection and consciousness, by which K.K. Kolin tries to separate himself from the physical world, are elements of the same physical world. Are not a reflection in a mirror or a photographic image elements of the physical world? We believe that they are. The same can be said about our consciousness and the mental images that are produced by it. As is known, thinking is based on physicochemical processes that reflect the external world and the state of an organism in a certain way and convert them on the basis of logical operations and intuition to produce new ideas and images. Thus, the world of consciousness is a constituent, although special part of the physical world; therefore, information itself and not only its bound form are material. As for the direct differentiation of reality into the physical reality and the one that exists in our minds, in the context of the schemes that were proposed as early as the time of K. Popper, we believe that it is only a manifestation of discrepancies between the objective picture of the organization of the world and our incomplete and sometimes dis-

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[1] The Chelyabinsk State Academy of Culture and Arts
[2] Recall that the basic question of philosophy was previously interpreted as a question about the primacy of the ideal (spiritual) and material

torted perception, understanding, and presentation of the world.

We will consider the question about the prospect of a new philosophical and information paradigm based on the idea of the immaterial nature of information. The question of its paradigmatic or other status can be resolved only after the development and testing are completed. We believe that one of the major tasks of this paradigm is to study the relationships between information and matter, the potential and conditions for the transition of information into matter and vise versa, just as, for example, a substance is transformed into energy in the course of a nuclear reaction, and energy contained in food is converted into a biological substance.

The analysis of K.K. Kolin's ideas was undertaken by the famous Russian scientist, Dr. Ped. Sci. A.V. Sokolov. He did not confine himself to criticism and presented the main theses of his own concept of information[3].

A.N. Sokolov started to analyze K.K. Kolin's philosophical concept about the immaterial nature of information while analyzing his understanding of information. Let us remember that K.K. Kolin suggests that information be understood as "a universal fundamental property of reality that becomes apparent in that separate fragments of reality manifest themselves in space and time in different ways, i.e., they have the property of distinction. The totality of these distinctions is information" [4, p. 75]. Noting that distinctions are constantly present in the physical world and that all physical systems are in essence information, A.V. Sokolov accused K.K. Kolin of pan-informationalism. Meanwhile, apparently, so that K.K. Kolin would not be greatly offended, A.V. Sokolov declared that other information concepts are also pan-informational, including the concept of A.D. Ursul, who is his old and irreconcilable opponent. We believe that neither K.K. Kolin and certainly not A.D. Ursul claim the priority of the informational over the material, as is asserted, for example, in the informationology of Yu.Yu. Yuzvishin and by A.V. Sokolov himself as a follower of the so-called Obukhov's philosophy (this will be discussed below). This is first. Next, A.V. Sokolov passes to the status of the definition of information proposed by K.K. Kolin. According to Sokolov, all scientific definitions of information are in essence metaphors [2, p. 178], and therefore theoretical constructions should be made on the basis of the so-called "usual values," i.e., in their basic, well-established meaning, which is accepted in a given language and fixed in an explanatory dictionary. As applied to the concept of information, the generalized presentation

of information, knowledge, and messages is such a "usual value." A.N. Sokolov suggested that all other scientific definitions of information should be regarded as metaphors, i.e., definitions of information in a figurative rather than literal sense. This is a very strange statement, given the fact that A.N. Sokolov suggests his own unusual definition of information in the same article.

We do not share this methodological view, because we believe that a scientific term is a result of a particular scientific construction or a scientific generalization of certain aspects of practical activities using metaphors or without them. Unlike scientific terms, an explanatory dictionary establishes the meaning of not even terms, but words, which have been formed in the course of their everyday use. Earlier, the understanding of information as data and messages that people exchange in the communication process, was called a "vague understanding" by A.D. Ursul [6, p. 283], which existed prior to the theoretical comprehension of the phenomenon of information. As for pan-informationalism, we believe it to be associated with an attempt to see the fundamental principle of all in information processes. However, we believe that pan-informationalism should not be identified with the information approach as one of the scientific approaches aimed at considering certain phenomena and processes in the categories of the information theory in order to reveal their individual previously hidden aspects or properties.

As we have already noted, the second part of the article by A.V. Sokolov [3] is devoted to a brief presentation of his own philosophical concept of information. Its methodology is formed by the so-called "realistic philosophy" of V.L. Obukhov, which is based on the assertion that "matter and spirit are in fact an inseparable internal unity at all levels of the organization of being and that spirit is correlated not only with a person, but in principle with any state of matter" [7, p. 17–18]. Thus, all matter is recognized by V.L. Obukhov as animated, but spirit is regarded as an immaterial component of the world. Relying upon V.L. Obukhov's ideas, A.V. Sokolov stated in a previously published work [5, pp. 159–160] that information is neither ideal nor material, but ambivalent, i.e., it is the incarnation of dualistic monism as a unity and interdependency of material and ideal principles in the form of an ideal content and material carrier. In the context of "realistic philosophy" A.V. Sokolov defines information as "an ambivalent phenomenon that expresses spiritual senses in a communicable sign form" [3, p. 178], or as "an ambivalent phenomenon that expresses senses in the form of communicable signs" [3, p. 179].

In addition to the definition of information, an essential place in the concept of A.V. Sokolov is given to the classification of information, by which he dis-

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[3] The philosophic concept of information was expounded by A.V. Sokolov in a manual. See [5] for more detail

tinguishes the semantic, machine, and biological types of information. Semantic information is understood by A.V. Sokolov as "natural instruments for expressing spiritual senses (knowledge, skills, emotions, desires, and fantasies) in the form of communicative signs"; machine information means "an ambivalent artifact that manages technical objects and imitates semantic processes according to algorithmic programs"; and biological information is understood as "an ambivalent phenomenon that expresses biological senses in communicable biological signs."

Summarizing the definitions of information types that were proposed by A.V. Sokolov, we can say that he interprets information either as a phenomenon or as an artifact, but the problems of correlation between phenomena and artifacts are not considered. As for semantic information, we believe that its pure form does not exist and we can talk only about the semantic aspect of information. Let us focus on machine information. Its principal difference from semantic information is seen by A.V. Sokolov in that semantic information is "a natural product of human spirituality (mind, emotions, and will) and "an act of consciousness," while machine information is "an artificial product of human skills (technical skills), "an artifact intended to simulate such acts." A.V. Sokolov defines machine-information artifacts as products, in particular, computers, communication facilities, and communication messages [5, p. 228]. His classification seems debatable to us, since information processes modulated by people, for example, speech and technical instruments, which are used to transmit speech in time and space and exceed the physiological potential of the speech system, were generated by the human mind and will. However, first, the manifestation of this mind and will in the case of using technical facilities and devices has a more complex mediated form of manifestation; second, it is not clear how an artifact-product can manage technical objects while initiating something else. We believe that technical facilities are managed by a person either directly, for example, using levers, or indirectly, via programs that were created by him earlier, at least at the initial level. Consequently, it seems to us incorrect to distinguish machine information as a particular type of information that is opposed to others.

We will now touch on biological information. We agree that it should be distinguished but raise an objection against "fitting" its interpretation to the definition of semantic information. When defining biological information, A.V. Sokolov uses the concept of "a naturally formed biological sense." What is a sense in general? Logical semantics understands a sense as a meaning, and linguistics understands it as a condition for the adequate perception of some name [8, p. 618]. As applied to DNA, it is not quite clear, first, who

assigns this sense, and second, how the sense is coordinated with the instincts of reproduction, conservation of life, etc. Perhaps, in this case, we simply need a different formulation of the definition of biological information.

Summarizing the above, it should be noted that the philosophical concept of information that was proposed by A.V. Sokolov is original first in its aspiration to present information as some substance that consists of two inseparably united parts. As is known, N. Wiener declared in his time that information was information, and not matter or energy. However, for Wiener, this was an aphorism, which he expressed during a discussion with K. Shannon. The great scientist admitted through this statement that he had not managed to uncover the essence of information, noting that matter and energy within the Shannon model of transmission of information and its entropic interpretation did not uncover the entire entity of information. Unlike Wiener, A.V. Sokolov, relying upon "realistic philosophy," transformed this aphorism into an information theorem, while neglecting to add its convincing proof.

In our understanding, information in a broad philosophical sense is *a generalizing concept, a scientific abstraction that designates the process of adaptation of biological and social life forms to matter, which has the properties of reflecting its immanent qualitative heterogeneity, as well as its spatial and temporal variability*. It is necessary to add to this definition that, besides adaptation to the environment within the social space, the reflective properties of matter were gradually comprehended as one of the most important resources for development, which expands the ideas of matter. Thus, we regard information as an abstraction that designates the quintessence of a material information process, beyond which this abstraction does not exist. Consequently, the philosophical cognition of information can also be implemented through developing the theory of an information process.

The character of an information process is, first, the existence of biological and social forms of the organization of life and, therefore, the biological and social types of information processes and, secondly, the presence of the semantic, syntactic (structural), and pragmatic aspects of information. Meanwhile, the presence of the semantic and pragmatic aspects distinguishes the reflection that takes place in inanimate nature from the information processes in living (biological) nature and society. For example, the water surface of a river really reflects the movement of clouds, however, the river cannot use this reflection to keep or develop, of course, if it does not have, according to the "realistic philosophy" of Obukhov, its own spirit, at least in the form of a water sprite, which is a sweet image. Thus, we believe that there are two types

of information processes and corresponding social and biological types of information. As for inanimate nature, we believe that the process of reflection takes place in it. In this case, both an information process and reflection are based on diverse physicochemical processes.

We believe that social information processes are just what is of interest as applied to the disciplines of the documentation cycle (specialty code 05.25.00), and we will briefly expound our own theoretical understanding [4].

First, social information processes, in our opinion, can be divided into two main types: the first type includes the information processes aimed at transmitting messages in time and space (these are traditionally defined as communicational processes); the second type includes the processes that are aimed at processing information for the purpose of gaining new information. This can be exemplified by mathematics, where new ideas about the surrounding reality are obtained using initial data by means of previously defined formulas, in a broad sense, algorithms. Thus, having measured the sides of a rectangle and multiplied the results of the measurement, we obtain new data on the area of this rectangle, etc.

Second, social information processes in society are implemented using technical means and devices. The degree of their technical support is undoubtedly different. Historically, writing materials were the first technical means. Later, not only technical means, but also mechanical and automatic devices were successively involved in this process. Today, we can talk about the computerization of the information process. The adoption of this thesis allows one to reject the term "informatization," replacing it by the term "computerization," which should be understood as a modern form of automation of information processes.

Third, the constantly increasing social importance of information processes has led to an increase in the requirements for their quality. First, these are the requirement for a semantic (informal) symmetry of information, whose breach is due to the intentional or unintentional distortion of content until its complete loss during transmission in time and space. Another requirement is that the necessary and sufficient degree of updating of information messages that are produced during a temporal information process must be supported.

Fourth, the recognition of these requirements for the quality of information has led to the institutionalization of the information process and professionalization of information activities. The role of major modern social institutions that ensure the functioning of the most important information processes in society is played by records management services, librarian—bibliographic, and archival institutions. For example, the required level of semantic symmetry of an information message is supported at a library by placing it into a library fund and monitoring its use, while updating is ensured by creating and disseminating a bibliographic image of this message, which is made by different bibliographic services, including information agencies.

Fifth, the identification of institutional information processes, for which the corresponding levels of semantic symmetry and updating are supported, is achieved by designating these processes and information messages themselves as documentation processes and documents, respectively. We define the information messages for which no institutional actions are taken to support their updating and semantic symmetry as proto-documental messages.

In conclusion, it should be noted that we regard an information process within which some reflective properties of matter are produced and used as the main subject of information philosophy. We emphasize that while we assert the primacy of an information process with respect to information we do not suggest rejecting the concepts of information and the theory of information as such. We only want to describe one more possible means of cognition. Paraphrasing the aphorism of N. Wiener, we offer another definition: Information is neither matter nor energy in the pure form, it is a biologically and socially determined information process that contains matter in the form of matter and energy that allow this process to occur in time and space.

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[4] The author's concept of information and an information process was expounded in more detail in [9−11].

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