Journal of Siberian Federal University. Humanities & Social Sciences 8 (2015 8) 1569-1575
~ ~ ~

УДК 165.4

Critical Analysis of the Systems Approach

Vladimir I. Zhukovsky[a] and Daniil V. Pivovarov[b]*
[a]Siberian Federal University
79 Svobodny, Krasnoyarsk, 660041, Russia
[b]Ural Federal University named after the B. N. Yeltsin
19 Mira Str., Ekaterinburg, 620002, Russia

Received 15.05.2015, received in revised form 19.06.2015, accepted 15.07.2015

The systems approach emerged mainly in natural science as an expression of scientists' naive belief that the universe has a very simple and logical structure. Today, more and more philosophers rightly criticize this methodological ideal. The critics argue that, firstly, the systems principle in its most important aspects is alternative to the holistic principle; secondly, the holistic principle is much richer and more realistic than the systems principle. The whole not only includes the unimaginable number of systems, but also certainly always contains in its essence anti-systemic trends – forces aimed at changing or destruction of existing things and phenomena. Apparently, the system's concept is associated not so much with the sign of epistemic truth, but with one of the rules of language games of philosophers, theologians and scientists.

Keywords. systemness and wholeness, the systems approach, a thing as a metasystem, the holistic approach, epistemic truth of knowledge about the wholeness of things and logical correctness of systematic knowledge about any fragment of some object.

DOI: 10.17516/1997-1370-2015-8-8-1569-1575.

Research area: culture studies, philosophy.

"System" is a set of structured elements, "element" is a minimal integral part of some system and "structure" is a way of relationships of elements and larger parts within the system (Pivovarov, 2006, 5). German classical philosophy sees in the systematic knowledge one of the criteria of science. G. V. F. Hegel and K. Marx believed that the real-valued truth is born only in the philosophical or scientific system. The systems analysis began to turn into a special methodological approach in works of A.A. Bogdanov, V. I. Vernadsky, L. von Bertalanffy, T. Kotarbinski and others. Extensive researches of systems were developed from the late 40s years of XX century and continue to our days. The systems approach mainly formed inside the natural sciences as an expression of belief in the fact that our universe has a very simple logical device. This belief is rooted in the teachings of Pythagoreans, Platonists and Christians, according to which the laws of nature created by God are very simple, and these laws are the easiest to express through the simple mathematical formulas. It is enough here to recall

* Corresponding author E-mail address: daniil-pivovarov@yandex.ru

that, according to Pythagoras, the essences of things are their numbers; according to Plato, the God is the Master of geometry; by G. Galileo and I. Newton, mathematics is the key to the reading of the Book of Nature.

Literally, the word "*system*" is translated from the Greek as "congestion" ("barrier") and figuratively – as "fixation of thought at some point". During his experiments, a scientist withdraws a definite piece from any natural whole thing, reworks it into a "reference object" and subjectively identifies thus obtained "standard" with some real genuine part of the universe. Then the world around us begins to look like systematically and clearly arranged. Later people will find that the "standard", already recognized by science, is not perfect, and it does not organically fit into a living whole.

It is important to remember the idea of B. S. Gryaznov that a scientific theory is, above all, the knowledge of *abstract objects*, but not the knowledge of real objects of nature and society. Therefore, the theoretical conclusions should not be directly – without special technical amendments and empirically determined coefficients – use for practical purposes (Gryaznov, 1982, 2).

The systems principle in its most important aspects is an alternative to the holistic principle. Irrationalists, who criticize the systems approach and justly appreciating it as "naive realism", declare that any living entity has some metalogical unity, which comprehends only by intuition. According to them, wholeness is not reducible to any system or a metasystem if to understand by the latter some of exhaustive scientific and rational descriptions.

The whole – is a way of existence and cooperation of parts, complex unity of simple components, and qualitative certainty of interrelated elements. We can distinguish different types of integrity on logical grounds, depending on the nature of the relationship and the degree of fusion of parts into a whole thing. There are becoming and became integrity, totalitarian integrity and partitive integrity, etc. Integrity is a measure of unity of parts, measuring their interpenetration of each other. Characteristics of totalitarianism as a kind of integrity (totality) are the suppression of the whole of its parts, domination of uniformity and identity, leveling of internal quantitative distinctions between elements of some total quality. Partitive integrity, on the other hand, distinguishes the highest possible autonomy of its parts and a clear manifestation of their "individualism".

The whole is not only includes the unimaginable number of systems, but also certainly embodies antisystem trends in its essence – forces aimed at changing or destruction of existing things and phenomena. In the whole there are rationally knowable moments and moments that are inaccessible to our reason. Integrity can be oneness of sensual perceptions and something extrasensory, and of real and ideal. Often a conglomerate of conceptual systems, competing with each other, theoretically describes the same entity.

The problem of the relation of the whole and its parts is composed of the following questions: 1) the whole is the sum of its parts, or it is still more than the simple sum of its parts? 2) parts precede the whole or the whole precedes its parts? 3) parts give rise to the whole or the whole generates its parts? 3) but, perhaps, the relationship between them is quite different, non-causal? 5) from what it is better to start cognition of the whole – by studying its parts or by cognizing all integrity at once, immediately, i.e. to begin from the idea of the whole, which immediately will describe and explain parts of the whole themselves?

Three basic approaches have developed when addressing these difficult issues: 1) *holism*

with its holistic principle, 2) *merism* with its principle of elementary and 3) antinomism trying to hold dialectically the opposite solutions stated above.

Holism (from the Greek. *holos* – whole, entire) – the methodological approach, according to which the whole is ontologically (or logically) primarily in relation to its parts, and it takes precedence over its parts.

Merism (from the Greek *meros* – a part, role, queue) – the methodological setting to explain the whole in terms of properties of its parts. Merism takes the form of: a) elementarism (the whole first divides, theoretically or practically, into simple components, and then it provides itself with partitive properties); b) mechanisism (its representatives understand the whole as a simple sum of the mechanically associated parts); c) reductionism (the whole, really having highly, complex and solid quality, reduces to the level of simple units).

Antinomism and rationalist dialectics seek to resolve the dilemma of holism and merism, focusing not so much on the whole or on its parts, but rather on relations among the whole and its parts. The secret of totality lies in the *cooperative effect*, in mutual influence and interpenetration of parts. Interconnected parts, changing each other, form within their sets the mediator, general for them, which invisibly pervades every part and at the same time qualitatively differs from every part.

"System" – a concept specified and simplifying the philosophical category of "whole". When scientists want to cognize rationally the metalogical whole, they reduce it to some system of simple parts (elements) and replace the idea of the inner form of the whole with the notion of structure. The real whole mentally decomposes into a set of simple parts. Then a structural network (possible connection between components) imposes on parts, and the system image of a specific thing arises depending on the amount of our achieved knowledge.

Let us illustrate the disadvantages of the systematic approach with the help of the metaphor of the cloud. For example, we see some cloud, and we observe in it many "illusions-pictures" that spontaneously change each other. Points, lines and volumes, by themselves, which are visible in the cloud, at first, completely meaningless – they are some uncertain events. Nevertheless, just as illusory organize these events in connection with some of our whim, and they immediately become "facts" for us. The observer selects these "facts" and creates of them his own picture of the cloud reality (the images of the sea, mountains, military compounds, people, animals, etc.). When we change the previous setting and switch our attention to other configurations, then the "facts" are starting to transform, and a different picture of the same part of the sky occurs. Cloud "pictures" are mental emergents arising from the fusion of the external optics with cognitive stereotypes of a human being, and not only our minds but also the personal and collective unconsciousness take part in their production.

Let us assume that a single cloud is quite objectively real, and our contemplation of it as a cloud is probably true in Aristotle's sense. However, it is difficult to accept that the set of "pictures" that we see in the cloud, are objectively true. However, what is amazing – we are easily able to convert these pictures-illusions into the corresponding material objects! For example, let us eliminate excess graphs shown in the chaos of points and figures and leave only the "picture" that we have previously seen in the cloud. Here it is possible to recall a certain analogy, talking about the sculptor who removes all excess material from a block of marble and who releases a beautiful statue from the prison in the chaos of welded particles. It is difficult to answer the question, where is the original, a copy of which

was our "picture" – is it: a) the perceived chaos of particle in clouds? b) cognitive structure of consciousness of the author of the picture? c) both in their entirety?

We intend now to extrapolate the sample with a cloud on any cognitive process. A cloud is a metaphor for the fullness of being, which has an innumerable multitude of potential opportunities. A creator constructs something separate when he limits this fullness of being. It is unlikely that someone is able to check for validity the created image of the object by an external experience or practice (if you define "truth" in the classical sense – as the correspondence of knowledge with objective reality). It is hard to resist the temptation to draw an analogy between pictures in clouds, a statue in a block of marble and scientific theory about the examinable object. Several alternative but equally plausible reviews of the same areas of things often compete in every science. But why? Is this because we see the world, as we want to see and understand it, and we understand it in the end, as we are able to act practically with it?

Further, we go back to talking about the systemic approach and the holistic principle. Philosophical categories of "whole", "part" and "form" extremely simplified when they unthinkingly equated with general interscientific concepts of "system", "element" and "structure". A thing as a real whole is metalogical and metasystemic actuality. Researchers usually reduce the integrity of things in the process of rational cognition – in the spirit of the methodology of mechanicism – to the object's system model which modern scientists are able to understand. In this case, the objectively existing thing mentally decomposed into series of simple parts (elements), and the details mentally fastened to each other by means of simple idealized communications (invented speculative structure). In this way, an articulate image of being as a system of elements arises logically.

If to associate scientific objects with the metaphor of clouds, then it can be assumed that – like different pictures-illusions attributed to the organization of the same cloud – no one of many invented scientific systems (theories, hypotheses), interfaced with the same object as a whole, does not copy the contents of the whole in an exhaustive and complete degree. There is always a significant and unavoidable moment of imaginary, illusory, utopian in scientific systems. This moment, *existentially real*, is often more valuable in pragmatic terms than the *epistemically true* component. Epistemic truth is the relation of knowledge to holistic reality, but not to the remnants of once living parts of being which theorists artificially reconstruct in the form of systems.

Undoubtedly, the great thinker J. W. Goethe is right that truth is in "the whole but not in the system". "The natural system – Goethe writes – is a contradictory expression. Nature has no system, it lives, it is life and it is travelling from the center to the unknown indefinable edge" (Goethe, 1957, 1). The experimental division of nature into pieces-objects in accordance with the needs of scientists and a systematic review of these objects is caused by specific European cultural ideals of Christian monotheism. In addition, the rules of correctness of that network of categories, which scientists use in the construction of theoretical systems, change historically.

Remember the parable of A. Edington, the famous astronomer, about a man who has studied the deep-sea life, throwing his network with three-inch cells. After many measurements captured samples, the researcher concluded that there are no deep-sea fish shorter than three inches. According to Edington, we catch only what is defined by our fishing tools. The same is true with regard to science. For example, cells of the systemic network of science cannot catch and hold those spiritual things, which are the objects

of religious experience. Science is very selective and is not able to draw by itself its own universal view of the world.

It is understandable why spirit, soul, life, love, hope, and other similar categories escaped from the conceptual network of materialistic science (Pivovarov, 2007, 6). It would seem, biology, physiology and psychology directly study these objects, and the conclusions of these sciences have practical value for people. However, spirit, mind, and life, interpreted in a materialistic manner, become just technical terms, meanings of which materialists determine by series of instrumental procedures. Is the definition of the essence of life as, say, "the mode of existence of protein bodies, exchanging material with the environment" (F. Engels) brought us closer to solving the mystery and meaning of life? From this definition of life only follows that a certain class of amino acids, specifically associated with its chemical environment, capable to reproduce itself (heredity) and to change. In his "Notebooks" Ludwig Wittgenstein left the following note: "I dare say that even when science will answer all conceivable questions, problems of life still remain intact." Science does not know how we learn and remember, how we think and communicate, how the brain stores information, what is the relationship between language and thought.

Kurt Gödel, logician and mathematician, indirectly contributed to debunking ideal of the system approach when in 1931 he formulated several theorems about incompleteness. The conclusion follows from his second theorem that incomplete (rich) formal theories, in which all true theorems of arithmetic would have proved, do not exist. We always can find in any incomplete formal system two mutually exclusive statements derived from the same axioms (Kline, 1984, 3). A wide (freestyle) interpretation of Gödel's results suggests that every developed logical-mathematical or scientific theoretical system has consequences, which cannot be determined either as true or as false. The property of systemness itself which scientific knowledge provides through logical and mathematical rules, as well as by artificial language, inevitably combines with dilemmas, aporia and paradoxes. It turns out that systemness should rather refers to certain technical criterion of correctness, to the accepted rules of reasoning, but systemness is not the same as totality and truthfulness. Science as a systemic knowledge is logically paradoxical, so we are not able to install the truth of its statements using the internal means of a variety of its disciplines.

European science is still proud of its systemic nature defining itself as a systematically organized knowledge about the world. Its systematization is based on the seemingly unshakable logical-mathematical foundation. Now it becomes increasingly clear that logic and mathematics are a lot of diverse estimates and systems that we cannot consistently generalize or dip into the large super system, which extremely unifies them. Logical criterion of truth shatters into many private technical ways to determine the correctness of systems of propositions, and it turned out to be weakly sensitive to the wholeness of truth. The ideal of systemness as a form of expression of objective truth, rooted in the belief in the accuracy of the logical-mathematical dialogue with nature, fades and loses its fans. Previously, truth is seemed as living like a canary in a cage, in the system of scientific statements; scientists supposed to measure its properties using the criterion of correctness (consistency, feasibility). It seems that the truth-bird cannot live in such a system-cell.

It is time to stop to say that science creates a "scientific worldview" and certain systemic "scientific picture of the world." Yuri Osipov, former President of the Russian Academy of Sciences, came to the conclusion that scientific

knowledge by itself even in its entirety is not a worldview and cannot be a worldview, since science does not study being as a whole (Osipov, 2005, 4). Science does not study specifically worldview issues; therefore, always there were scientists with very different worldviews (agnostics, believers, atheists). Every worldview is primarily the area of religion and philosophy. From this, it is clear, that the term "scientific worldview" is conditional.

Thus, the principle of totality is much richer and wider than the systems principle. The latter only partially and within pure logical thinking explains, but does not replace the first. Beyond the capacity of rational knowledge, the idea to express the world in the form of a coherent system of elements is in direct contradiction with the intuition of wholeness of the world. Therefore, it is not always useful to a scientist-theorist" not to abandon his principles", "not to give his opponents a single step", and "to bear his cross to the end".

Perhaps it is more appropriate to philosophers and scientists have engaged in "language games" (Ludwig Wittgenstein) and periodically radically change their theoretical paradigm. For example, Karl Popper, a prominent opponent of Plato's line in philosophy, stated publicly in the 80s XX, that now for him Platonism becomes the most attractive doctrine. As we know, the world philosophy perceptible won due to this Popper's decision.

Apparently, "systemness" is not so much a sign of epistemic truth, but it is one of the rules of language games of philosophers, theologians and scientists.

References

1. Goethe. J.W. Filosofiya prirodi // Izbrannie raboti po istorii prirodi (Goethe J. W. Philosophy of Nature // J. W. Goethe. Selected works on natural history). Moscow: Publishing House of the USSR Academy of Sciences, 1957. P. 149.

2. Gryaznov B.S. Logika, ratsionalnost, tvorchestvo (Gryaznov B. S. logic, rationality, creativity). Moscow: Nauka, 1982. P. 13-25, 50-60; Grjaznov B. S, Dynin B. S, Nikitin E. P. Teoriya i ee ob'ekt (Grjaznov B. S., Dynin B. S, Nikitin E. P. Theory and its object). Moscow: Nauka, 1973. 248 p.

3. Kline M. Matematika. Utrata opredelennosti. (Kline M. Mathematics. The loss of certainty). Moscow: Mir, 1984. 424 p.; Nagel E., Newman J. P. Godel's theorem). Moscow: Krasand, 2010. 120 p.

4. Osipov Yu.S. Istina ne dokazuettsya, a pokazuettsya // Golos Pravoslaviya (Osipov Yu. S. Truth cannot be proved, but it is shown // Voice of Orthodoxy). Moscow, Noyabr, 2005. P. 2-3.

5. Pivovarov D.V. Osnovnie kategorii ontologii (Pivovarov D. V. The main categories of ontology). Ekaterinburg: Publishing House of the Ural University, 2006. P. 139-149.

6. Pivovarov D.V. Nauchno li znanie o duhe I dushe? // Bulleten Rossiyskogo Filosofskogo Obshestva (Pivovarov D.V. Whether knowledge about the spirit and the soul is scientific? // Bulletin of the Russian Philosophical Society). Moscow, 2007. № 1. P. 102-105.

Критический анализ системного подхода

В.И. Жуковский[а], Д.В. Пивоваров[б]
[а]Сибирский федеральный университет
Россия, 660041, Красноярск, пр. Свободный, 79
[б]Уральский федеральный университет им. Б.Н. Ельцина
Россия, 620083, Екатеринбург, пр. Ленина, 51

Системный подход сложился преимущественно внутри естествознания как выражение наивной веры ученых в очень простое и логичное устройство мироздания. Сегодня этот методологический идеал все чаще подвергается справедливой философской критике. Его критики доказывают, что, во-первых, принцип системности в своих важнейших аспектах альтернативен принципу целостности; во-вторых, принцип целостности гораздо богаче и реалистичнее принципа системности. «Целое» не только включает в себя невообразимое множество «систем», но непременно содержит в своей сущности антисистемные тенденции – силы, направленные на изменение или разрушение сложившихся вещей и явлений. По-видимому, «системность» сопряжена не столько с признаком эпистемической истинности, сколько с одним из правил языковых игр философов, теологов и ученых.

Ключевые слова: системность и целостность, системный подход, вещь как метасистема, целостный подход, эпистемическая истинность знания о целостности вещи и логическая правильность знания о системности фрагмента объекта.

Научная специальность: 24.00.00 – культурология, 09.00.00 – философские науки.