feature | Synergetics as a New Naturphilosophie?

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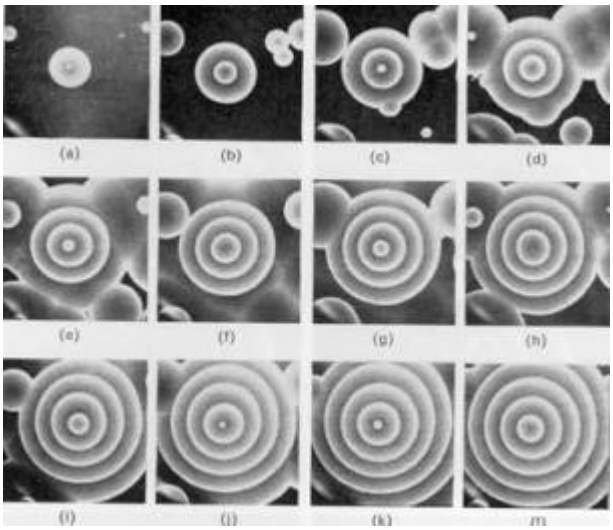

Claims of synergetics

Synergetics provides us with the knowledge of behavior of complex nonlinear systems in nature, society and in the human consciousness. The theory teaches us how we can comprehend this complexity and cope with it. In other words, it pretends to universalism. The question arises what is the difference between synergetics and the known systems of natural philosophy which consider nature in its integrity when resting upon concepts elaborated in natural sciences? Can we consider synergetics as a natural philosophy of the epoch of the post-nonclassical science?[1)]

Every system of natural philosophy – be it Aristotle's physics or Giordano Bruno's and Tommaso Campanella's natural philosophical study in the Renaissance or the system of natural philosophy of one of the German philosophers such as Leibniz, Schelling and Hegel – builds a certain general picture of the world. As a rule, there are philosophers, such as certain first principles in it and a path is laid top-down. For instance, Aristotle says that first principles should be accepted (their credibility can be established only through themselves) and all the rest should be proved. Then, in the frames of this or that system, some mental speculative reflections on nature are built: how – in accordance with these speculative principles of organization of the world – must nature behave in each of its individual fragments?

In opposition to the natural philosophy, synergetics prescribes nothing, it only describes and develops some theoretical notions determining how nature conducts itself and how it organizes itself. Synergetics investigates what general laws underlie the appearance of complex structures. It discovers some universal patterns of self-organization and evolution. Therefore, synergetics has strong empirical grounds. It is not speculative but scientific study. It is not a question of invention of laws in accordance with a certain general picture of the world, as it was in the systems of natural philosophy in Renaissance and in the present times, but that of revelation and discovery of laws of organization of reality per se. This difference is a matter of principle: a result of the process of invention is the creation of a new entity (for example, of a wheel, a simple gear), whereas, as a result of discovery, something in reality itself is revealed, a mysterious curtain over reality is half-open.

Synergetics studies the processes of self-organization in certain fragments of nature, for example, the formation of coherent radiation of laser or structures which develop in plasma or convective cells in a

liquid, and builds a model, which allows to describe these processes in a mathematical way and to represent them in a theoretical way. This model turns to be deeply substantial, and it functions successfully in many other fields of scientific cognition. This is a path bottom-up, from careful scientific studies to theoretical and further even to philosophical generalizations, not vice versa. The synergetic models contain no prescriptions and, moreover, no compulsion with respect to nature to behave exactly in this and not in a different way. To use the synergetic models means to understand the internal machinery of evolution and self-organization, of the growth of complexity in nature in a better way.

The synergetic worldview is not a philosophy in the strict sense of this word, and it is not legitimate to consider synergetics as a modern “speculative physics”, i.e. as natural philosophy of a new type. However, there is no doubt that a certain worldview is built on the basis of synergetics and this worldview oversteps the boundaries of basic scientific disciplines and reaches a meta-scientific research level. Synergetics comes quite naturally to traditional philosophical problems which are permanently under discussion and which are solved proceeding from the spiritual situation of a corresponding historical epoch:

— What is new? Does something new appear in general? Or is every event simply a déjà vu, a repetition of a known case, which happened once earlier? — What is time? How does time correlate with eternity? How is the present connected with the past and with the future? And what is the present in general: is it an eluding instant between the past and the future or their eternal presence? Is the utility of the teleological thinking justified? And if yes, to what extent can it be used in the cognitive activity in the modern science? — What is correlation between the potential (the feasible or for the time being the unfeasible) and the actual, the latent (the unrevealed) and the realized (the revealed) as well as the accident and the necessary in the world? — What is the whole? How does the whole correlate with its parts? According to what principles is the complex evolutionary whole built, does the assemblage of a complex structure occur from simple structures? What new holistic notion does synergetics develop? Although these philosophical dilemmas are generally considered as ultimately insoluble (“eternal”), synergetics provides us with some additional arguments in favor of a certain solution. Namely, synergetics substantiates the following statements: — self-creation, autopoiesis, the constructive role of both order and disorder in the process of the appearance of something new; — quasi-teleology, processes flow as if they have objective aims (structure-attractors of evolution), but they do not; — holism, the whole determines the development of parts.

synergetik, synergetisch, naturphilosophie, monismus, selbstorganisation, evolution, autopoiesis, holismus, komplexität, struktur, neuheit, neues, emergenz

The concept of self-organization in the natural philosophy of Schelling as a forerunner of synergetics

In his classical system of natural philosophy Friedrich Wilhelm Joseph von Schelling (1775–1854) came very close to the modern synergetic worldview. Although not he but Kant began to use the term “self-organization” already in the subcritical period of his work to grasp processes in the living nature, it was Schelling who for the first time extended the concept of self-organization to the description of processes in the inorganic nature and gave an integral picture of evolution of the universe from primary entities up to the emergence of life and of the human mind. In his “speculative physics” (as he called natural philosophy) he focuses the self-creation and self-formation of organized forms. In his philosophical system self-organization became one of key notions of the consideration of the historical development of nature, its inorganic, organic and cognitive spheres.

The natural philosophy is a necessary initial stage of development of the philosophical system because, according to Schelling, “philosophy should descend to the depths of nature in order to ascend from there the heights of spirit”.[2] Such a penetration into the concealed essence of nature allows to state that nature is not a static and mechanical system, but a “dynamic process” or “progressive genesis”, starting from inorganic systems up to the appearance of the human consciousness. This idea of formation (or becoming), going through all forms and structures of nature, was carried on by the British philosopher Alfred N. Whitehead in his “philosophy of process”.

Another important idea, which can be traced back in Schelling’s natural philosophy, is the idea of productivity, of the active and creative forces of nature. Schelling understood nature not as a product (natura naturata) but as a productivity and product simultaneously, i.e. nature is not simply something created, but it continuously and endlessly creates itself (natura naturans). In his introduction to the First Outline of a System of the Philosophy of Nature (1799) he wrote that “in nature all is endlessly a subject and an object for each other, and nature is primordially a product and productivity simultaneously”.[3] “Strictly speaking, nature as endless productivity should be conceived as being in the process of infinite evolution”.[4] Hundred years later, in Henri Bergson’s work Creative Evolution (1907) the idea of productivity and creativity of nature, of creation of new forms in nature and of open future turns again to be in the center of attention.

From the standpoint of the modern views of synergetics, Schelling’s idea of holism, of the deep inner relation of parts to the whole and of the whole to the parts, is of great significance. “The whole displays itself in the single, because each part is absolutely co-participant in the nature of the whole, whereas the present being (Dasein) of a numbed entity rests just upon the fact that parts, which are relatively different from each other, are diametrically opposite to each other.”[5] Both nature as a whole and its separate natural entities undergo the process of the unlimited and eternal becoming which is recurrent by its nature. “Separate things of nature make not a discontinuous and going into infinity row, but a continuous, returning to itself chain of life each link of which is necessary for the whole, just as it feels the whole and cannot undergo changes of its relation without the manifestation of signs of life and sensitiveness.”[6] The building of separate things into this united dynamical process is an indicator of the fact that “the temporal is brought into the eternal” and “the eternal is reflected in the temporal”.

According to Schelling, evolution is self-similar, since in its course the recurrent production of matter takes place on different levels. This notion resembles the modern notion of fractal form which appears in the processes of self-organization of nature.

Finally, Schelling’s idea of self-organization of consciousness is of great importance for the modern researches in the field of synergetics and of cognitive sciences. The human consciousness must somehow correlate with nature since otherwise consciousness would be unable to cognize nature. Consciousness is productive by itself, like nature as a whole. Therefore, Schelling’s philosophy can be called the philosophy of productivity. The process of self-organization in nature indicates that even consciousness undergoes the process of self-organization. One fact is directly connected with the other because, in Schelling’s opinion, “nature must be a visible mind, while mind must be invisible nature”.[7] We are in the unrestricted process of self-organization which goes through all our structures; however we cannot find a single structure where this process has come to its complete and final realization. The German scholar M.-L. Heuser-Keßler noted that Schelling’s hypothesis was the following one: “In our consciousness, we find out the unrestricted aspiration for self-organization, and something similar should manifest itself in the external world as a general trend to organization.”[8]

synergetik als weltanschauung, selbstorganisation, naturphilosophie, evolution, emergenz, prozessontologie, holismus

Synergetics as an embodiment of the holistic trend in modern science

Natural philosophy sought to comprehend nature in its integrity; resting upon notions of natural sciences of a corresponding historical epoch, it often identified phenomena observed in the micro- and macrocosm. Synergetics continues this cogitative tradition in its own way. It is the holistic trend that determines the image of modern science. To all appearances, this trend will become stronger, and the ability of scientists to think in a nonlinear and holistic way will be of great value.

Therefore, one of the tasks of an urgent reform of modern education and self-education systems on all levels is the development of a holistic thinking, the formation of the ability to understand the wider – and sometimes even global – context of the problem under investigation, i.e. the problem of the ability to contextualize knowledge. One cannot study parts without the knowledge of the whole, and one cannot understand the functioning and the development of the whole without the knowledge of its parts. The whole acquires emergent properties which are absent in parts, but at the same time it transforms parts, which as components of the whole display new, unprecedented properties. The complex, hierarchically organized phenomena can only be understood from a holistic perspective.

To train a holistic rather than analytical view is, to all appearances, the today's need of the managerial practice. "Think globally in order to succeed in solving local and peculiar problems!" – that is a slogan of the modern times. The comprehension of the barest reform of management systems is based on non-traditional knowledge of socio-synergetics, i.e. upon the understanding of laws of co-evolution and self-organization in complex social, economic and geopolitical systems. This insight is of inestimable significance as far as it results in a kind of worldview necessary for the understanding of the course of evolutionary processes in complex systems, i.e. systems to which human and social systems belong to par excellence.

To carry out appropriate reforms of social management, it is necessary to change mentality, the very style of thinking. Thinking should be global, non-linear, holistic, solidary, based on the understanding of constructive principles of co-evolution, i.e., at bottom of fact, of rules "to live together" and "to develop together in a sustainable way". In other words, to think globally means to think integrally and holistically, to understand how to integrate structures which develop in different tempos and are on different levels of development into a united concordant evolutionary whole. At the end, it is not superfluous to remember that complexity (from Latin: complexus) literally means a condition of being interwoven, interlaced together. The complexity appears only if different elements begin to form a single whole, only when they have become inseparable from each other and their interdependency takes shape, only if one cloth, i.e. an indivisible interactive and retroactive cloth is created.

Naturphilosophie, Holismus, Synergetik, synergetisch, Komplexität, Relation, Sozialtheorie

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1)
This term was introduced by Vyacheslav S. Styopin, Academician of the Russian Academy of Sciences.
2)
Schelling F.W.J., Works. Vol.2. Moscow: Mysl, 1989, p. 479. (cited from the Russian edition, all transl. H.K.)
3)

Schelling F.W.J., Works. Vol.1. Moscow: Mysl, 1987, pp. 196–197
4)

Ibid., p. 195
5)

Schelling F.W.J., Works, Vol.2, p. 45
6)

Ibid., p. 46
7)

Heuser-Keßler M.-L. Schelling’s Concept of Self-Organization, in: Evolution of Dynamical Structures in Complex Systems. Berlin: Springer, 1992, p. 400
8)

Ibid. p. 401