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DISCOVERING THE (REAL) HISTORY OF NATURE

“When a problem persists, unresolved, for centuries in spite of enormous increase in our knowledge, it is a good bet that the problem entails the nature of knowledge”¹

1. 'Those damned problems' (of origin)

From the philosophical point of view the history of nature is certainly the most important discovery made by modern science². Let's specify: the authentic history, the one with a capital “H” – addressing the issue of the origin of everything what is new and has never existed even in embryonic form. The history spelled with a small “h”, liberated from the category of origin, has gained philosophical approval quite easily. Serious disputes arise precisely when ‘those damned problems’ come into play.

I take the view that the inclusion of these problems in the field of scientific research was a philosophical breakthrough, in three aspects indeed. In the ontological aspect it required the rejection of understanding matter as an inert substance and instead of that the matter had to be perceived as “active”. In the epistemological aspect – it meant abandoning scientific criteria connected with classical physics for the ones offered by evolutionary biology. The third aspect of this breakthrough – even today having serious difficulties with paving its way to the consciousness of scientists – consisted in deciding that the issue of the origin is worthy of consideration. I will attempt to show that this decision was based on a certain philosophical choice which was all the more difficult to be recognized as – contrary to popular opinion – the philosophy in question was not the academic (or, broadly speaking, institutionalized) one.

It turns out that following precisely this – philosophical – approach it is possible to (1) have a good grasp of the *essence* of the most important breakthrough which came in the twentieth-century natural history, (2) establish the *circumstances* in which it happened and finally (3) to explain the reasons why the foremost representatives of neo-positivist orientation has put so much effort to replace the *truth* with the *legend* in recent years. The dispute over the nature (and over the assessment) of philosophical ideas which were at the root of the above-mentioned breakthrough – led to the advanced polarization of stances but also to completely unexpected alliances.

It is hard to overestimate the educational value of these disputes: “Les études sur l'origine de la vie et de la biosphere sont actuellement les plus riches d'enseignement, non

¹ H.H. Pattee, *Artificial life needs a real epistemology*, in: F. Morán, A. Moreno, J.J. Merelo, P. Chacón (eds.), *Advances in artificial life. Proceedings of the Third European Conference on Artificial Life, Granada, Spain, June 1995*, Berlin 1995 Springer, p. 23.

² „Die philosophisch wichtigste Entdeckung der neuzeitlichen Naturwissenschaft ist wohl die Geschichte der Natur”, C.F. von Weizsäcker, *Vorwort*, in: B.-O. Küppers, *Der Ursprung biologischer Information. Zur Naturphilosophie der Lebensentstehung*, München 1986 Piper, p. 9.

seulement par les resultats, mais aussi et surtout par leur méthode”³. And the reason was of a fundamental nature: the problems concerning the origin represent the biggest challenge to classical physics and the whole so-called modern science: “die klassische Physik kennt kein Mechanismus für die Entstehung des Neuen”⁴.

Although “damned” for some people, for others these problems are the most important, even fascinating⁵. And it is probably not by pure chance that *philosophical* works dedicated directly to the “problems of origin” have been usually written by the same authors whose philosophical self-identification remains clear, either in case of the Jesuits⁶ or members of the Rationalist Association⁷, or finally the declared mechanists⁸. What do they have in common apart from obvious differences? They have their open partiality in common. I am not an opponent of partiality – philosophy is always partial – however I am an opponent of the hidden and well-concealed partiality, characteristic especially of those who have a great deal to say about empirical verification and falsification while the argument “from obviousness” cannot be either verified or falsified. In this situation I feel it my duty to prove that science is not one, eternal and universal and that criteria of scientificity are by no means philosophically neutral.

Can therefore “the problems of origin” be a subject of scientific research? Before we pass on to philosophical disputes connected with them, let’s familiarize with an answer to this question given by scientists. Their answer seems simple: apparently they can, since they are. The problem of life’s origin may serve as the best example of that. Let’s also mention that among the authors of works on biogenesis there are over twenty Nobel prizewinners: some of them advanced their own theories on biogenesis (as Philip Anderson, Melvin Calvin, Francis Crick, Christian de Duve, Manfred Eigen, Walter Gilbert, Hermann J. Muller, George Wald) while others (as Linus Pauling, Ilya Prigogine, Abdus Salam, Peter Mitchell, Richard Syngé, Joshua Lederberg, Albert Szent-Györgyi, Harold Urey, Jack Szostak) addressed various theoretical aspects of this issue. However, I would rather treat this fact as a certain colourful feature portraying this field of research than as an argument supporting its scientificity. All the more so because the group includes also such scientists (as Jacques Monod) who regard the problem of biogenesis as inaccessible to scientific cognition and the scientists (as Peter Medawar) who admittedly accept the idea of evolutionary origins of first living beings (like the idea of evolution of the living world) but with obvious reluctance (“unfortunately, there is no other way, we have to accept it, like an axiom that two parallel lines will never intersect”). What is worse, some of the Nobel prizewinners rendering considerable services to resolving the problem of biogenesis contributed also to its mystification.

³ F. Foulatier, *Le roman cosmogonique*, Paris 1988 Aubier, p. 49.

⁴ F. Cramer, *Gibt es eine wissenschaftliche Welterklärung?*, “Universitas” 1999, no. 631, p. 19.

⁵ E.g. T. Fenchel, *Origin and early evolution of life*, Oxford 2002 Oxford University Press, p. 13 (“it is the most important question for biology and perhaps for science in general”); J. Chela-Flores, *Some physical problems in biology. Aspects of the origin and structure of the first cell*, Trieste 1995 International Centre for Theoretical Physics, p. 12 (“the fascinating first question in biology”).

⁶ F. Selvaggi, *Il problema filosofico delle origini e dell’evoluzione*, in: V. Marcozzi, F. Selvaggi (eds.), *Probleme delle origini*, Roma 1966 Editrice Università Gregoriana, p. 295-334.

⁷ *La question des origines*, Paris 1989 Nouvelles Editions Rationalistes [= “Raison Présente” no. 92].

⁸ F.J. Varela, J.-P. Dupuy (eds.), *Understanding origins*, Dordrecht 1991 Kluwer.

2. The “OHUM paradigm” and “OHUM theory”

In order to make an attempt to reconstruct the paradigm of modern scientific research on biogenesis it would be necessary to state right away that the paradigm combines certain scientific findings and hypotheses with philosophical theses. The premises consisting the paradigm can be presented, although schematically and in a crude approximation, as follows (I do not settle the issue of the name itself which is derived from surnames of Oparin, Haldane, Urey and Miller; for the time being I will use it as a draft version):

- Scientific premises. 1. Atmosphere was different than that of today (non-oxygenic). 2. The idea of heterotrophy of the first living beings. 3. The most plausible (but not the only possible) environment was so-called Darwin’s “warm little pond”. 4. The idea of the common origin of the living world from one or several simple forms. 5. Non-existence of life (otherwise the first living system “would be instantly devoured”). 6. Cosmic scale of transformations (in space and time). 7. The major significance of solar energy (and not e.g. the Earth’s heat). 8. Active Earth’s crust [I will add right away that (non-mechanistic) philosophy of antropocosmism served as a philosophical source of the last three premises, usually not mentioned in the specialist literature].

- Philosophical premises.

A. Ontological, or what lies behind the formula “life is a natural emergent property of matter”. 1. Holism: holistic interconnections among phenomena, nature understood as a whole (system) with interconnected and interacting parts. 2. Historism: reality is perceived as a process (contrary to mechanism which viewed matter as being in itself); multitude of factors and variability of transformation mechanisms. 3. Autodynamism: active nature of matter (substance as *causa sui*), the capacity to develop as a result of a clash of antagonistic forces and elements.

B. Gnoseological. 1. The purpose of science: among other things to provide the world-outlook (contrary to narrowly understood utility). 2. The expected result: a theory, not necessarily one. 3. The concept of science: undivided “natural history”. 4. The influence of philosophy on science is normal, philosophical theses form the foundation of scientific theory.

What is “worse”, the open approval of the last thesis in particular is not a disgrace. Especially frank in this respect was one of the co-founders of the paradigm, namely Haldane (contrary to bourgeois hypocrisy noted by the historians of science⁹). In his opinion it is always useful to a scientist to know the history of philosophy, including ancient and oriental one; it is even inevitable when trying to solve fundamental problems. Social, including view-of-the-world motivation of the undertaken research does not disgrace a scientist – it is not shame but honour.

Separate premises will be discussed below. For the time being let’s just say that the key role in the philosophical aspect of “OHUM paradigm” plays a thesis on autodynamism of matter, or in other words the thesis on the capacity for self-organization of matter. In the last 50 years about 150 theories of biogenesis have been formulated¹⁰ based on this

⁹ J. Strick, *Sparks of life. Darwinism and the Victorian debates over spontaneous generation*, Cambridge 2000 Harvard University Press, s. 189.

¹⁰ See: W. Ługowski, *Filozoficzne podstawy protobiologii*, Warszawa 1995 Wyd. IFiS; idem, *Philosophy and biogenesis*, Wrocław 2008 Arboretum.

paradigm. However, this theoretical pluralism is not a source of delight for everyone. The positivists and scientific creationists unanimously agree that the problems of origin – even if they are, they should not be the subject of scientific research and that there is *no one* theory of biogenesis or – there may be *one* but it is imperfect. This one theory would be “OHUM theory”, or “the theory of chemical evolution”¹¹.

Quite considerable reservations concerning the outlined in this way theory have been recently voiced¹². It is worth emphasizing therefore that “the theory of chemical evolution” (alias “OHUM theory”) occurs in *the singular* mostly in textbooks (and rather school than university ones) whereas in scientific literature there is a number of such theories. At least some of them avoid difficulties noted above. At least in some of them the presence/absence of oxygen in a primordial atmosphere is not of the paramount importance. At least some of them can do without the assumption about a long-standing existence of primaeval soup; in many modern theories this classical postulate has been significantly modified or replaced with another, equivalent postulate. And finally – at least some of the theories are not limited to pure chance in their explanation of the processes of origin of order or biological information. The authors of many modern theories of biogenesis aim at establishing the regularities of this process.

Going back to the issue of philosophical consciousness of scientists (and the role of university philosophers in this field), we may however have the impression that there is something which hinders the presentation of the theoretical achievements in the field of protobiology and that “something” is deeply rooted in the basis of this science. It is rooted not enough deeply to prevent the conduct of empirical research in this field, however, it is perceptible in theoretical discourse. The attempts to relegate that “something” to subconsciousness may bring about seemingly surprising effects. In order to explain them it is necessary to remind the thesis, advanced in the beginning, according to which the introduction of the problem of life’s origin into twentieth-century science was (triple) philosophical novelty and that – in particular – the thesis on autodynamism of matter, or in

¹¹ „In its mature form, this theory can be summarized as follows: (1) the earth, at the time when life began, had a reduced oxygen-free atmosphere, with methane, ammonia, hydrogen and water. (2) This atmosphere was exposed to various energy sources ... which lead to the formation of organic compounds. (3) These compounds, in Haldane’s words, ‘must have accumulated until the primitive oceans reached the consistency of hot dilute soup’. (4) By further transformations, life developed in this soup ... For now, we shall focus on the first three parts of the theory, since *they constitute the reigning paradigm* on the origin of life”, R. Shapiro, *Origins. A Skeptics guide to the creation of life on Earth*, Toronto 1987 Bantam Books, p. 111 [emphasis added – W.Ł.]. In my opinion, it is not true. The correct reconstruction of “the reigning paradigm” has been given recently, e.g., by Ch. de Duve, *Singularities. Landmarks on the pathways of life*, Cambridge 2005 Cambridge University Press, p. 7, where he states: “even though serious doubts have been voiced about its [Miller’s experiment] underlying assumptions” – he continues – “Miller’s findings highlighted the possibility that the building blocks of life could have been the products of natural phenomena, mandated by local physico-chemical conditions”.

¹² J. Brooks, *Origins of life*, Tring 1985 Lion, p. 117-120; G. Wächtershäuser, *The origin of life and its methodological challenge*, “Journal of Theoretical Biology” 1997, v. 187, p. 488; D. Berlinski, *On the origin of life*, “Commentary” 2007, June 14; W.A. Dembski, J. Wells, *The design of life. Discovering signs of intelligence in biological systems*, Dallas 2008 The Foundation for Thought and Ethics, p. 213 ff.

other words – on its capacity for self-organization – was the central ontological premise of “OHUM paradigm”. The thesis is of fundamental importance for protobiology. A lack of awareness in this respect may cause even such an effect that the author who makes (certainly in good faith) an attempt to present the theoretical achievements in protobiology – offers its caricature instead¹³. The other effect is a lack of historical monograph on scientific research on biogenesis in the 20th century; the history is replaced with stories.

Without identifying the real philosophical sources of the paradigm of research on biogenesis it is impossible to either set the date of its origin or – what is more important – to indicate what is essential in the paradigm, and what is not¹⁴. It is possible to find in one encyclopedia mutually contradictory assessments. For example, in PWN encyclopedia (Warsaw, 2001) on page 89 we may read about “widely accepted at the moment theory of the origin of life on Earth” published in 1936, on page 84, however, it is possible to learn that although “many elements” of “OHUM hypothesis” put forward in the 1920s “are still up-to-date” “as a whole it has only historical significance”. We will not learn, however, which elements precisely we should regard as up-to-date, and which not, meanwhile this is the key issue. Without understanding the nature of the breakthrough which was constituted by the formation of the study of life’s origin, the attempt to present its achievements will end in failure.

3. Recognizing the philosophical foundations of the breakthrough

The identification of the ontological aspect of this breakthrough – that is accepting the “active” nature of matter, or its capacity for self-organization – turned out to be relatively the easiest task. When it comes to this actual novelty, that is the thesis on autodynamism, among scientists fully aware of its paramount importance there is a German chemist, the author of philosophical works, Friedrich Cramer (former director of Max-Planck-Institute für experimentelle Medizin, Göttingen), who – stating briefly: „matter has the basic property of self-organization”¹⁵ – adds that the capacity for self-organization cannot be separated from matter in the same manner as gravity cannot be separated from matter. In other work, Cramer develops this idea introducing the concept of “the evolutionary field”, similar to “the gravitational field”: “Es gibt ein Evolutionsfeld in dem Materie sich organisiert. Selbstorganisation bzw. Evolutionsfeld ist nicht von Materie abtrennbar”¹⁶. Agnes Babloyantz, a Belgian scientist and co-worker of Ilya Prigogine, writes directly about

¹³ N. Lahav, *Biogenesis. Theories of life's origin*, New York 1999 Oxford University Press; see about it: W. Ługowski, *Philosophy and biogenesis*, op. cit., p. 47-67.

¹⁴ Common opinion among the scientists is as follows: “While many features [of the classical “Oparin-Haldane scenario”] are untenable, they are still an important cornerstone”, A. Negrón-Mendoza, S. Ramon-Bernal, *Chemical evolution in the early Earth*, in: J. Chela-Flores, G.A. Lemarchand, J. Oró (eds.), *Astrobiology. Origins from the big-bang to civilizations*, Dordrecht 2000 Kluwer, p. 71-84.

¹⁵ F. Cramer, *The entropic versus the anthropic principle. On the self-organization of life*, in: F. Bertola, U. Curi (eds.), *The anthropic principle*, Cambridge 1993 Cambridge University Press, p. 117-127.

¹⁶ F. Cramer, *Chaos und Ordnung. Die komplexe Struktur des Lebendigen*, Stuttgart 1989 Deutsche Verlags-Anstalt, p. 232.

a “revolutionary character” of the breakthrough connected with abandoning the view of matter as an inert substance and accepting its capability for self-organization¹⁷.

When it comes to epistemological novelty, it may be stated that the question about when (and by whom) it was recognized, named and popularized is at the same time a reverse side of the question about the beginnings of the study of biogenesis in its current form, or – in other words – the formulation of “OHUM paradigm”. A serious dispute over the sole possibility of research on the genesis (not only of life) flared up in 1963 during the international conference organized by S.W. Fox in Wakulla Spring, FL. One of participants, Peter T. Mora was speaking about “epistemological barriers” inherent in our way of thinking about nature: “There are certain epistemological limitations inherent in our thinking in the physical sciences, acquired, I believe, because of the way science developed during the last three or four hundred years. For practical reasons, we developed a simplifying scientific approach in physics. We follow the dictate of Descartes”¹⁸. John D. Bernal responded, stating that these remarks address in fact fundamental issue: “Dr. Mohra has shown that the principles of experimental science do not apply to discussions on the origin of life and indeed cannot apply in any problem of origin”¹⁹.

Even on the account of this discussion itself the conference was of vital importance to the issue, although it is necessary to add that the conference was not the first meeting of this kind. The year 1957, when the first international conference on the origin of life was held, is usually regarded by historians²⁰ as breakthrough in the process of formation of protobiology as a scientific discipline. A bit earlier, however, that is in 1954, in the editorial of “New Biology” journal, preceding the articles devoted to the origin of life [by J.D. Bernal, N.W. Pirie, J.B.S. Haldane, J.W.S. Pringle], it is stated that currently exists a separate branch of knowledge dealing with the analysis of questions concerning the subject as well as with the provided explanations²¹.

“The provided explanations” had in fact been a subject of analysis for a certain period of time – including “New Biology” where the important article of J.D. Bernal²² was published (in which he responded to criticism²³ of his book “The physical basis of biology”). From today’s perspective this article should be considered landmark as it provides in a simple and clear way (and in a remarkably concise form – several pages long) the realization of the essence of the breakthrough coming at that time, considering *all the three* aspects of the breakthrough. Moreover, from the perspective of today’s disputes it will turn out that things

¹⁷ A. Babloyantz, *Molecules, dynamics and life. An introduction to self-organization of matter*, New York 1986 Wiley, ch. 10.6.

¹⁸ P.T. Mohra, *The folly of probability*, in: S.W. Fox (ed.), *The origins of prebiological systems and their molecular matrices. Proceedings of a conference conducted at Wakulla Spring, Florida*, New York 1965 Academic Press, p. 49.

¹⁹ *Ibid.*, p. 52.

²⁰ So e.g. S. Podolski, *The role of the virus in origin-of-life theorizing*, “Journal of the History of Biology” 1996, v. 29, p. 79-126, who writes about “the establishment of the origin-of-life-field in 1957”; J. Strick, *Creating a cosmic discipline. The crystallization and consolidation of exobiology*, “Journal of the History of Biology” 2004, v. 37, p. 131-180.

²¹ “New Biology” 1954, no. 16, p. 9.

²² *Keep off the grass. A review of a review*, “New Biology” 1952, no. 13, p. 120-126.

²³ N.W. Pirie, *Vital blarney*, “New Biology” 1952, no. 12, p. 106-112.

appreciated by some people – namely the clarity of the paper and theoretical openness of its author – are regarded as disadvantages by others. But about this later.

For the time being let's state that we are not entirely alone in seeking the breakthrough in natural history in the middle of the 20th century. The authors of the joint publication "On the origin of life; hypotheses and theories"²⁴ write about the marked revival of interest in evolutionary theory and biogenesis which could be seen, according to them, in the early 50s in Western countries, especially in England, what can be proved (apart from the above-mentioned discussion in "New Biology" and "The Modern Quarterly") by the fact that the issue concerning the origin of life was addressed in a separate paper presented by J.W.S. Pringle at a biological conference held in Cambridge in 1952.

In my opinion this conference was of vital importance to the formation of the study of biogenesis, but for reasons much more important than the sole fact of presenting the paper on this subject. Very important was namely the discussion which concerned *philosophical bases of knowledge* in this field (knowledge available at that time and the one which had been still sought after). Certain ideas concerning this subject appeared in the Pringle's paper, e.g. the explicitly formulated thesis on "the history of matter" ("the idea of a continuous form-building process at work throughout the history of matter") and – also explicitly – formulated criteria of preference for hypothetical scenarios of genesis ("a scheme which necessitates a highly improbable event is intellectually less satisfying")²⁵.

However, Haldane's speech defending theoretical pluralism of the origin-of-life-studies was of paramount importance to philosophical self-consciousness of this field of research. Having uttered some critical remarks on Pringle's hypothesis, Haldane ensured him that he is equally sceptical about his own theory. In this context he uttered the words "Some of my own speculations on this topic have achieved the stamp of orthodoxy, in the Soviet Union, thanks to Oparin, and in United States, thanks to Horowitz"²⁶, the words repeatedly quoted to testify to Haldane's characteristic constructive scepticism and distrust towards any form of orthodoxy. Later commentators who noticed and valued Haldane's scepticism and self-mockery did not notice, however, the cognitive ideal formulated by Haldane, namely his statement that when it comes to the issue of genesis we should not expect – at least in the immediate future – the formulation of *one* theory which will overshadow all the remaining ones. In this respect – in contrast to the branches of science based on methodological patterns of classical physics – a *multitude* of competing theories should be regarded as something natural and desirable: "when we have as many theories to chose from about the origin of life as we have about the origin of planets, we shall be in a better position to chose one of them, or items from several". Actually, no matter how the theories differ from each other, they do not have to be mutually exclusive, therefore we will not be necessarily forced to choose some, eliminating the remaining ones. There is – as Haldane states – a more exciting possibility: "Recent works on bacteria and viruses shows that one one simple organism can incorporate and reproduce indefinitely constituents of another by processes which cannot be called sexual. It is therefore not inconceivable that two or more different sorts of life began independently, perhaps by Pringle's method and by Haldane-Oparin

²⁴ S. Skowron (ed.), *O powstaniu życia; hipotezy i teorie*, Warszawa 1957 PWN.

²⁵ J.W.S. Pringle, *The origin of life*, in: *Evolution VII (Symposia of the Society for Experimental Biology)*, Cambridge 1953, p. 3, 9.

²⁶ J.B.S. Haldane, *Foreword*, *ibid.*, p. IX-XIX.

method, and that later organisms are derived from their concrescence". The idea of theoretical pluralism corresponds, then, to the nature of examined phenomena.

Interestingly, it is difficult for many specialists in history or philosophy of science, even for those who put a lot of effort into familiarizing themselves with source literature, to identify the *circumstances* in which the paradigm of scientific research on biogenesis was formulated. The leading position among them is taken by Loren R. Graham (from MIT) who devoted a very long chapter to the issue of the origin of life in his book on the history of the relationship between philosophy and science in USSR²⁷. The chapter was preceded with the motto which is worth quoting in its entirety as it soon started to live its own life:

"In the late twenties and early thirties the basic thinking was done which led to the view that saw life as a natural and perhaps inevitable development from the nonliving physical world. Future studies of the history of ideas are likely to note that this new view, which amounts to nothing less than a great revolution in man's philosophical outlook on his own position in the natural world, was first developed by communists"²⁸.

After this statement names (of Oparin and Haldane) and dates (1924 and 1929) are being cited. However, as admits Graham himself, it is by no means a simple matter. In his opinion it is hard to detect in Oparin's 1924 work any sign of Marxism; it is in fact materialism but a mechanistic one. Graham, admittedly, follows through Oparin's philosophical evolution which aims at conscious acceptance and application of dialectical materialism, and assesses the result positively in every respect. Moreover, Graham is strongly and openly opposed to the opinions of these sovietologists (as D. Joravsky) who ascribe this evolution to "political pressure" or even to opportunism. However, at the same time he shares their view that Oparin's philosophical stance has changed: in the 1920s it was, in short, mechanism, from 1930s onwards – dialectical materialism.

John Farley, a Canadian biologist, the author of a classical now monograph on the history of spontaneous generation²⁹, assesses this issue in a similar way. Appreciating the paramount importance of Oparin's 1936 monograph to science and assessing positively the impact of materialist-dialectical philosophy on it, Farley entirely agrees with classifying written a decade earlier work of this author as pure reductionism. Therefore, he also tries to detect a fundamental change in views of the founder of the study of biogenesis at the end of the 1920s, the beginning of the 1930s (caused, in his opinion, by the influence of new books and different political atmosphere). Similar opinion is expressed by an American historian of science, Mark B. Adams³⁰.

In essence then, the shortest – but incorrect in my opinion – historians' answer to the question on the circumstances in which the paradigm of research on biogenesis was formulated looks as follows: (1) who was the main or only founder of the paradigm? – obviously Oparin, (2) when? – in the 1930s, under the influence of (3) the change in "ideological context". It is worth emphasizing one more time that it is the answer provided

²⁷ L.R. Graham, *Science, philosophy, and human behavior in the Soviet Union*, New York 1987 Columbia University Press [1972].

²⁸ C.H. Waddington, *That's life*, "New York Review of Books" 1968, February, p. 19.

²⁹ J. Farley, *The spontaneous generation controversy from Descartes to Oparin*, Baltimore 1977 The John Hopkins University Press, p. 172.

³⁰ M.B. Adams, *Oparin, Alexandr Ivanovich*, in: *Dictionary of Scientific Biography*, v. 18, New York 1990 Ch. Scribner's Sons, p. 695-700.

by the people who – firstly – the “effect” itself, that is the formulation of this new paradigm, assess in an extremely positive way (from the viewpoint of the progress of science), secondly – the influence of Marxism on this “final effect” regard as unquestionable (and also assess it in a positive way).

I regard connecting the genesis of “OHUM paradigm” with “political spirit” as generally incorrect, dating its beginnings to the 1930s – as unjust: to both Haldane³¹ and Oparin. The incorrect identification of the ideological context in which his 1924 work was written – as well as ontological stance³² adopted in this work – basically prevents from understanding the nature of the breakthrough made at that time in science in general.

Curiously enough, by the way, the person who identified the breakthrough probably in the most accurate way, namely J.D. Bernal, has been still quoted – also in recent years – on this occasion, but obviously without understanding. Maybe on the account of the fact that his famous statement (from 1948): “Even the formulation of this problem is beyond the reach of any one scientists”, is quoted separately from philosophical commentary provided by Bernal – a bit later³³ and also far earlier³⁴. I will add right away that on the account of such works – contributing to the study of biogenesis the component of (self)consciousness of the breakthrough made in science by the sole fact of addressing one (central actually) of “those damned problems of origin”, the name of Bernal should be added to the name of “OHUM paradigm”³⁵.

³¹ What concerns Haldane’s motivation, in the case of this and any other scientific enterprises, the wright idea has been recently expressed by M.B. Adams, *Haldane’s visionary biology*, “Journal of the History of Biology” 2000, v. 33, no. 3, p. 457-491.

³² I provide more details in other place; here I would like to pay attention to the fact that a central chapter of Oparin’s 1924 work, entitled „The world of the living and the world of the death” (as a matter of fact very long, occupying about 1/3 of the whole text) was intended to prove that inanimate matter is by no means “passive” and it is possible to find there (separately) all the features which (taken together) are regarded as characteristic of living beings, such as: organization, excitability, capability to metabolism and reproduction. On the account of this part of the work – passed over by commenators, even by the most astute and well-meaning ones, e.g. quoted above Graham – it is not possible, in my opinion, to classify the expressed in the work stance as a mechanist one, however, it is very close to the philosophy of antropocosmism presented particularly by V.I. Vernadsky. On the possible influence of the last on the formulation of “OHUM paradigm” I write in another place. Here I will just say briefly that published in 1922 book by Vernadsky *Naczalo i vechnost’ zhyzni* (“The origin and eternity of life”), intended against the very idea of biogenesis [and nevertheless valued by (at least some of) its critics as „oczeń umnaja kniga”, “a thoughtful book”]; see its review by B.M. Zavadovsky, published in 1923, reprinted in: A.V. Lapo (ed.), *V.I. Vernadsky. Pro et contra*, Sankt Peterburg 2000, p. 334-338] I regard – in the light of materials I gathered – as an important, even decisive stimulus in this respect. This year Oparin prepared a paper, published two years later. The comparison of both texts (as well as a range of events which happened a decade later) allows to assume that the latter was a critical (and constructive) response to the former and that it widely adopted and used the philosophical aspect of the former.

³³ Cf his paper in “New Biology” 1952, cited above.

³⁴ J.D. Bernal, *Dialectical materialism and modern science*, “Science and Society” 1937, v. 2, no. 1.

³⁵ “A resolute monist, Bernal saw the unity of science as grounded in the unity of the universe itself”, H. Sheehan, *Marxism and the philosophy of science. A critical history*, v. I, *The first hundred years*, Atlantic Hills 1993 Humanities Press International, p. 313. Cf also: H. Sheehan, *J.D. Bernal: philosophy, politics and the science of science*, “Journal of Physics. Conference Series” 2007, v. 57,

Getting back to Bernal's description of such (perfect) scientist who would be able to face up to the issue of biogenesis, it looks as follows. In his opinion the sole fact of formulating the problem is beyond the capabilities of one scientist. Such a scientist would have to be a competent mathematician, physicist and experienced organic chemist at the same time. He would have to demonstrate an extensive knowledge of geology, geophysics and geochemistry and simultaneously have an expert knowledge of all biological sciences. Another authority in this field, Ponnampereuma, pondering over (in more recent past) the "unusual character" of this scientist who "opened the doors to research on the central problem of natural sciences", compiled a similar "list of qualifications", including – quite rightly – philosophy³⁶. As a matter of fact this statement concerned Oparin but in my opinion we can equally well put here Haldane's name. Obviously, Oparin deserved his name to be mentioned but rather as pars pro toto: the representative of a wide circle of scientists³⁷ who together "consisted" what Haldane represented alone. Some reasons have already been mentioned. Let's add then one word about his excellent education ("Haldane was immensely cultivated"³⁸), his graduation in philosophy and finally his command of a number of foreign languages and cultures – including ancient and oriental ones (by an account of his Indian students³⁹, the work „The unity and diversity of life” he intended to write in Sanskrit). All these factors had an influence on his concept of nature, his fascination with complexity⁴⁰ and variability⁴¹ and on his monistic concept of Being which was

p. 29-39, where she defends (in front of the recent critiques) "his vision of science as inextricably tied to philosophy and politics". In the same special issue of the journal, another author writes: "I believe that Bernal had a huge intellectual picture of the universe as a coherent and connected whole, a unitary picture, in sharp contrast to many other scientists, A.L. Mackay, *J.D. Bernal: his legacy to science and society*, "Journal of Physics. Conference Series" 2007, v. 57, p. 1-16.

³⁶ C. Ponnampereuma, *The origin of the cell from Oparin to the present day*, in: C. Ponnampereuma, J. Chela-Flores (eds.), *Chemical evolution. Structure and model of the first cell*, Dordrecht 1995 Kluwer, p. 3; Idem, *The origin of life: from Oparin to the present*, in: B.F. Poglazov et al. (eds.), *Evolutionary chemistry and related areas of physicochemical biology. Dedicated to the memory of Academician A.I. Oparin*, Moscow 1995 Bach Institute of Biochemistry, p. 14.

³⁷ See about them: E.N. Mirzozjan, *Razwitiye sravnitelno-evolyucyonnoi biokhimii v Rossii*, Moscow 1984 Nauka, especially chapter entitled "Predstavlenia o proiskhozdenii zhizni v otechestvennoi biokhimii (1859-1924 gg.)", p. 239-248.

³⁸ R. Milner, *The encyclopedia of evolution*, New York 1990 Facts of File, p. 207-208.

³⁹ P.P. Majumder (ed.), *J.B.S. Haldane: a tribute*, Calcutta 1992 Indian Statistical Institute. The recollections included in this volume and other documents I could read in Hyderabad, where Haldane's archive and private books collection are stored, suggest his predilection to examine anomalies and peculiarities in nature.

⁴⁰ Gould paid an attention to it: "Haldane purposely included a plural in the title of his book – *The causes of evolution* (1932) – for he believed that nothing so encompassing could be unifactorial", S.J. Gould, *The structure of evolutionary theory*, Cambridge 2002 Harvard University Press, p. 515.

⁴¹ Cf e.g. article presenting hypotheses about variability of basic physical parameters in time and their consequences for the possibility of existence of different forms of life both in the distant past (when chemical changes used to be less effective source of mechanical energy than today) and in the distant future: J.B.S. Haldane, *Radioactivity and the origin of life in Milne's cosmology*, "Nature" 1944, v. 153, p. 555. Cf N.W. Pirie, *The development of Haldane's outlook on the nature and origins of life*, In: K.R. Dronamraju (ed.), *Haldane and modern biology*, Baltimore 1968 John Hopkins University Press, p. 251-258.

probably taken from ancient Indian thought.

It is time to briefly sum up our considerations. Contrary to various legends, the research on the origin of life initiated in the 1920s was not based on “politics” but on philosophy. 1952 should be regarded as an important date in the history of twentieth-century evolutionism (spelled with a capital „E”, that is covering not only the history of the living world but also the issue of biogenesis). Apart from the above-mentioned discussion during the conference in Cambridge and the article by Bernal which contribute to the research a large measure of philosophical consciousness – let’s add the fact of reissuing the at that time American edition of the book by Oparin, with an introduction written by a translator⁴² who precisely explained its ontological novelty and the article written by an American biologist Urless N. Lanham who emphasized its methodological inventiveness⁴³. The following important date – three decades later – is a formulation of the theory of pre-biological self-organization of matter by Manfred Eigen⁴⁴.

Now the final question is: if and to what extent (university) philosophy contributes to an increase in philosophical consciousness of scientists working in this area, at least those who put forward such “demand” themselves. In reply I will refer to certain situations in recent years. This is one of them. It is 1997. The group of scientists prepare a special issue of a prestigious journal “Journal of Theoretical Biology” addressing issues of the origin and evolution of life. The preface starts as follows: “Fundamental to a deeper understanding of complex biological functions are ideas about how life originated and evolved”, then the authors state that problems of this kind – namely the problems of origin – are unique: “these questions differ in some sense from other problems of natural science”⁴⁵, which does not imply that they should not be addressed to – on the contrary, they should, because they are fundamental, but it should be done with the help of various disciplines, including – philosophy⁴⁶. It is followed by a reference list which proves that the editors intentionally listed the last discipline, they have certain knowledge in this field and truly seek the help of this branch of knowledge. However, one of the invited representatives of the philosophy of biology (neo-positivist orientation), Michel Ruse⁴⁷, will issue the authors – as we will see – with reprimand (it is really hard to call it otherwise). *Caveat emptor*, Ruse says: this field

⁴² Sergius Morgulis, prof. of biochemistry, Univ. of Nebraska, Omaha.

⁴³ U.N. Lanham, *Oparin's hypothesis and the evolution of nucleoproteins*, “The American Naturalist” 1952, v. 86, no. 829, p. 213-218.

⁴⁴ M. Eigen, *Selforganization of matter and the evolution of biological macromolecules*, “Die Naturwissenschaften” 1971, no. 10, p. 465-523. Let us add, that soon after this milestone scientific contribution, unfortunately, followed written by Eigen reductionist interpretation of his theory: in the book entitled *Das Spiel* (München 1975 Piper), in the article *Leben* published in *Meyers Enzyklopädisches Lexikon* (Mannheim 1975, v. 14, p. 713-718) and finally in prestigious journal „Angewandte Chemie” (1981, no. 3, p. 221-229). This interpretation was soon the (pseudoscientific) basis for developing a number of broad philosophical concepts of global evolution. Some of them, incidentally, became tools used in social mystification; other, as we may expect, will become soon.

⁴⁵ H. Baltscheffsky, C. Blomberg, H. Liljenström, B.I.B. Lindahl, P. Årnhem, *On the evolution and evolution of life: an introduction*, “Journal of Theoretical Biology” 1997, v. 187, p. 453.

⁴⁶ “The analysis involves a great number of widely differing disciplines, such as chemistry, geology, biology, physics, computer science and philosophy”, *ibidem*.

⁴⁷ M. Ruse, *The origin of life: philosophical perspective*, “Journal of Theoretical Biology” 1977, v. 187, p. 473-482.

did not get rid of philosophy!; the whole field is regarded as “unbridled speculations”. It has not achieved any results (for one hundred years)! Throughout the ten pages of (large format) print two <!> theories have been mentioned, including Eigen’s theory (which, let’s add for a layperson, may be found in encyclopedias) and each of the theories is described in half a sentence <!>. What is therefore the subject of deliberations of the well-known philosopher invited to cooperation by naturalists in order to address the issue of biogenesis? He writes that Darwin (mentioned as many as twenty five times on the first two pages of the article!) did not address such issues – owing to this moderation precisely he has become a model scientist (sic!).

Noam Lahav, a scientist, who apparently found himself in the circle of philosophical inspiration of Ruse, while he intended (according to the title of his book, see footnote 13), to present the achievements of the field of knowledge he went in for himself, as a matter of fact he depicted its caricature. Lahav could probably think that a concession to write about “banned” issues he would secure by making a solemn promise that he won’t discuss the nature of knowledge⁴⁸. But he did not avoid a reprimand for breaking the ban, either.

I commend to the attention of a person who would regard the word “reprimand” as too harsh, the statement of the already known for us Yockey. Rather curious “invocation”: “Darwin is one of the saints (sic!) of biology and of science in general. He lived at a time when most scholars and scientists were gentlemen”⁴⁹ – is followed by a whole list of contemporary scientists whom he, unfortunately, is forced to refuse the appellation “gentleman” and these are (in general well-known to us): de Duve, Bada, Wills, Schopf, Miller, obviously his polemicist⁵⁰ Lazcano, even Lahav, whose attitude was conciliatory after all. These scientists, described many times with regret and reproach by Yockey as “Western intellectuals, men of words”, „have a strange proclivity to fool themselves and, unfortunately, their students”⁵¹. These words would not probably be worth repeating were it not for the fact that they appear in the book published by no mean publisher: Cambridge University Press (in a similar manner, the peculiar book by Lahav could have been ignored if it were not for the reputation of its Oxford publisher). Probably it is not necessary to add that Yockey’s indictment covers mainly one point: “an apologia for dialectical materialism”. [Let’s add that blacklisted was, apart from the above-mentioned people, also a certain institution, namely NASA.] The book by Yockey has been published recently but I could already find on the Internet favourable reviews written by two Western scientists. I think, the situation described in my “Introductory remarks”, the book will be well received by the readers also, among others, in our country⁵².

⁴⁸ The statement made by Pattee, I used as the motto, Lahav quoted (which may seem as quiet unusual) as the first <!> sentence in his book. After that – in the next sentence – he states: “the discussion of the problem of the ‘nature of knowledge itself’ in this context could be postponed until more research is performed”, *ibid.*, p. VII.

⁴⁹ H.P. Yockey, *Information theory, evolution and the origin of life*, Cambridge 2005 Cambridge University Press, p. 119.

⁵⁰ A. Lazcano, *Chemical evolution and the primitive soup. Did Oparin get it all right?*, “Journal of Theoretical Biology” 1997, v. 184, p. 219-223.

⁵¹ H.P. Yockey, *op. cit.*, p. 157.

⁵² Besides all, its author is one of “the creationists’ current favorite scientists to quote-mine on the origin of life” (G.S. Hurd, “Reports of the National Center for Science Education” 2007, v. 27, p. 46).