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1. INTRODUCTION

In recent years the very rapid development of biological sciences as well as the research techniques has enabled and enables the presentation of more and newer attempts of solutions to the issue of the origin of life on Earh. It has turned out that the point has been reached when all structures of living compounds, molecules and macromolecules may be understandable only when the essence of combinations of so called spontaneity of chance and necessities of natural laws are shown. On the other hand, considerations of the attempt of logical analysis of the way of deduction of random events have been undertaken. Enumerating of necessary and sufficient conditions for the construction of the scientific system of explanation by chance. The argument that the certain paradigm is concerned here has been assumed. Deduction of chance as the „reason" of processes causing the origin of life is a specific kind of explanation of the prebiotic evolution.

2. FEATURES OF RANDOM EVENTS

What chance are we talking about in the origins of life? It seems that the equivalent thought on this issue is tied generally with the specification of abiogenesis factors as well as with the determination of the living system. Different definitions of life exist, the source of this ambiguity may be sought, among others, in different means of embracing the continuity and differing events tied with the evolution of life. It means the understanding of laws ruling the proceeding of those processes. Systematic approach to life is one of such attempts at pointing to the relevant laws. A living compound is a „relatively separated homeostatic compound of very complicated subordinate

subcompounds, usually reconstructing in time, granted a potential ability of reproducing similar systems of higher homeostatic abilities"[1].

Random events are not mentioned in the definition of life referred to above as well as in others although they are acceptable. In the meaning of many different evolution processes the random events are dealt with the most frequently as initiating the 'reconstruction' of certain compounds, the elements of life in time.

2.1. THE CAUSE AND THE CHANCE

Relations of events of prebiotic evolution may be understood as a causality, the consequence of particularly determined events appearing only once which thanks to one „effective" series of tests formulated life. The chance appears here as a seeker of the appropriate series. It became the beginning of a new sequence of reasons and thus the appearance of structurally new compounds. They are however too generalizing thesis because „we are not able either to reconstruct the conditions as a few million years ago or to recall the proceeding of biogenesis"[2].

We may only suppose that the interferences of series of matually independent events causally bound could be set up on the ancestral Earth. Such an understanding of the chance is bound D with the appearance of new processes, compounds, structures, different from the existing, displaying the appropriate chemical composition, volume, pressure, temperature (i.e. a natural necessity)[3].

It is also important for specification of features of random events, to emphasize that the causality (relation between causes: the natural necessity and chance and consequence: nucleotid, amino acid, polymers, protocell) was of direct but simultaneously reversible and variable nature. Thus we may say that the chance as a particular cause of the processes set up on the ancestral Earth is determined by an event or a group of events appearing as one of the possible phenomena such, without which other events or groups of events could not take place within certain processes of prebiotic evolution more or less possible. Thus processes of organizing the matter which were initiated by the chance, directed toward the appearing of life and formed the appropriate background for the understanding of the significance of chance as a reason.

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[1] J. Chmurzyński: *W poszukiwaniu istoty życia*, w: *Organizm – jednostka biologiczna*, Warszawa 1977, s. 64

[2] W. Kunicki-Goldfinger: *Podstawy biologii, od bakterii do człowieka*, Warszawa 1978, s. 341.

[3] C. Hesslow: *Causality and Determinism*, „Philosophy of Science", 48 (1981) 4, s. 597.

It was assumed implicitly in the aforementioned analysis that even the factors determining the prebiotic processes and specified clearly and precisely do not exclude the random events due to the impossibility of evidencing the thesis on the common order of events and phenomena in nature as well as their complexity. Thus the explanation of nature of the abiogenesis processes by referring to the chance is based on the unevidenced theory, althougt does not exclude chaos, chaos is not identical with chance. Thus, it means generally, withim the scientific procedure called the explanation by referring to chance, pointing to certain events which considerably specify the evolution of one compound into other, more complex ones.

2.2. THE GOAL AND THE CHANCE

A demand is hidden in the statement that a chance is a cause (initiation) of formulating life, of its „purposeful" action during the processes on the ancestral earth. The scientists undertaking the issue of the random birh of life by way of the purposeful action, mean just the group of functions set up between events. A question is raised do not the scientists see random events as purposefulness?

The thesis seems to be quite obvious, out of considerations presented above, that random events are of purposeful nature (constructive), a feedback is set up between the chance and the goal, the reason constitutes the goals of the prebiotic evolution processes, but simultaneously also the goal is some kind of „destiny" ot the random events. Therefore the random appearance of the living compound assumed the existence of the protein of the specification and catalytic features as well as nucleid acids featuring so called selfinstruction. Neverheless the proces itself formulating „the protein – sampling of subsequent aminoacids in the sequence – was not completely random. There were the rules of the ballgame which limited the possibility of choice"[4], even the selection or dependence of aminoacids polymerization on the properties of the bonds in the formulating sequence. This sort of reasoning, in the natural aspect, is reasonable on the grounds of tests data of biological sciences (biochemistry, molecular biology, biophysics), as well as on the grounds of the simulation of the evolution processes. On the other hand, in the methodological aspect, both referring to the purposefulaness and the chance becomes pointing only on certain functions of appearing structures (I exclude here the meaning of the purposefulness on the ground of the „vital force" of appearing compounds). In this meaning teleological and „by chance" exp-

[4] W. Kunicki-Goldfinger: *Dziedzictwo i przyszłość*. Warszawa 1976, s. 201.

lanations are equivalent. The teleological explanation possesses such a particular outline that clearly specifies, from the functional point of view, the result of certain processes[5]. Could not thus the explanation by chance be „included" in such type of the explanation? The attention in the teleological explanation is drawn on the products of „specific processes and in particular upon the contribution of various parts of a system to the maintenance of its global properties or modes of behaviour as a whole, on the other hand the nonteleological, on the other hand, explanation direct attention primarily to the conditions under which specified processes are initiated or persist and to the factors upon which the continued manifestations of certain inclusive traits of a system are contingent"[6]. It seems, that, with this sort of expression, the explanation by chance should be included in non-teleological explanations due to the impossibility of the prediction, in a unilateral way, the formulation and reaction of certain compounds. The prediction is obviously possible but it is specified by a certain possibility of polymerization of certain structures on the grounds of the natural laws[7]. Nevertheless when the functional aspect of the prebiotic evolution is emphasized, then the explanation by chance may be meant as a particular form of the teleological explanation. Therefore referring to chance does not apply to the lack of our biological knowledge about the origins of life but it is a conscious theoretical assumption. Thus the explanation by chance may consitute a new classification aspect of biological explanations, it does not mean the differentation of teleological and nonteleological explanation but rather pointing on essential prerequisites for certain factual outcomes appearing in a certain universe. In this context, the statement that the chance is a factor not fulfilling its functions but generally „testing" new, better tasks of evolving structures, is easier to understand.

2.3. THE LAW AND THE CHANCE

The thesis seems obvious that certain events appearing on the ancestral Earth featured certain regularities, subject to certain rules. Thus the scientists pointing to chance as one of the abiogenesis factors, attempt to „discover" those former regularities within many different calculations, applying the probability calculations or the

[5] T.L. Short: *Theology in Nature*, „American Philosophical Quarterly', 20 (1983) 4, 3. 314-315.

[6] E. Nagel: *The Structure of Science, Problems in the Logic of Scientific Explanation*, London 1979, s. 363.

[7] D.S. Chernavski, N.M. Chhernavskaya: *Some Theoretical Aspects of the Problem of Life Origin*, „Journal of Theoretical Biology" 50 (1975), s. 22-21.

information or the information theory. It means most often so called statistical law specifying the relative action of the apperance of the predicted event in a series of test. As a result while expressing an opinion that the life originated by chance, many scientists offer the possibility of such an event, the possibility is an amount of certain conditions in which the formulation of proteins, nucleid acids and such may (but do not need to) appear. So a demand is implicitly included in the thesis on the possibility of certain events about indirect or direct meaning of the origins of life as an event possible in certain conditions or as the process consisting of possible events[8]. By the way the authors into two specific groups. One group of scientists, which includes mainly De Guye[9] as well Du Noüy[10], draws attention to the meaning of the events of the very low possibility, thas is why they conclude that it is impossible to approve of the statement on the random origin of life. Another group of authors: Argyle[11], Craig[12], Bolzan[13], Yockey[14], Dauviller and Desguin[15] and others declares that the appearance of a very remotely event cannot be excluded. Besides the event of a low possibility may take place and it cannot be traeted as an unavoidable event[16]. Thus random events are disclosed as „elusive". The extent of this „elusiveness" results from the impossibility of unequivocal specification of appearing structures and functions of mutually reacting organic compounds on the grounds of the valuation of the previous characteristics within the probability calculation. Thus Bolzan[17] privides the opinion that the use of the probability calculation does not prove anything either for or against the occurrence of a certain event. Therefore while referring to the probability calculation it is impossible to obtain the answer to the question: are compounds and structures appearing during evolution, the „orderly" compounds or only a mixture of particles? Moreover given physical conditions of the certain event such as the

[8] W. Krajewski: *Konieczność, przypadek, prawo statystyczne,* Warszawa 1977. s. 115-120.

[9] C.E. Guye: *L'évolution physico-chimique*, Paris 1921, s. 231-232.

[10] L. Noüy: *L'homme devant la science*, Paris 1939, s. 137-138.

[11] E. Argyle: *Chance and the Origin of Life*, „Origins of Life", 8 (1977), s. 291.

[12] R. Craig: *The Theoretical Possibility of Reverse Translation of Proteins into Genes*, „Journal of Theoritical of Biology", 88 (1981) 4, s. 757-760.

[13] J.E. Bolzán: *Calculo de probabilidades y origem de la vida* „Sapentia", 16 (1961), s. 267.

[14] H.P. Yockey: *A Calculation of the Probability of Spontaneous Biogenesis by Information Theory*, „Journal of Theoretical Biology" 67 (1967), s. 387-394.

[15] A. Dauvillier, E. Desguin: *Sur l' origine de la vie*, „Revue Scientifique", 78 (1940), s. 292-296

[16] W. Weaver: *Elementarz rachunku prawdopodobieństwa*, Warszawa 1970

[17] J.E. Bolzán: *dz. cyt.* s. 268-270.

necessary variable specifying the distribution and formulation of more new organic compounds are slipping away of any calculations. That is why the conclusion shall be assumed that laws according to which the combinations are formulated, are statistical laws. The particular stages of the processes of the random origin of life may seem at first sight „disorder" after a more profound analysis however, some regularities of reactions, may be spotted. The aid in „ordering" the random events is granted by statistical laws, while their polymerization, selforganization nature is specified by the structural laws. Neverheless, it does not mean only pointing to selforganization process of the appearing structures as source of life but rather emphasizing the structural order set up among them. If the prebiotic evolution processes are „subject" to either the order or disorder at the time, chance – during formulation of life – may be treated as a particular law. In this aspect the chance during the formulation of life, such a law justifies the referring to some general assumptions (both theoretical and experimental). In this way the law of chance may be called either a statistical law a theoretical law, theoretical law as much as it is not deduced from the experiment and only proved by the experiment, a way of discovering the law of chance is carried aut on the ground of the hypothetical method supported by the idealization[18]. Thus the law of chance is statistical law when on one hand the random events are D subordinated to either statistical laws (a large scale chance shall be excluded) and the laws of structural relations of appearing compounds. The extent, result from the group of revealed structural laws – (for instance, not all amino acids have the same „power" of bonding each othr, new combination may appear). Thus the issue of explanation by referring to the chance in the context of law and probabilistic explanations shall be considered within the particular methodological principle. Therefore it means searching for many more universal structural laws, coherent with the statistical laws.

The analysis of this scope of interest requires however, the detailed specification of the features of all theories proclaiming the random origin of life, the opinions for or against the chance seem insufficient.

3. SUMMARY AND PERSPECTIVES

Opinions on the formulation of biological organization and selforganization of molecules, genetical mechanism, point to the considerable influence of random events in the compolex process of

[18] W. Krajewski: *Prawa nauki. Przegląd zagadnień metodologicznych*, Warszawa 1982 s. 328-329.

polymerization and joining of proteins and nucleid acids into functional units of protocellar character. The chance has a major influence as a „novelty initiator", the „searcher" for the most optimal development methods leading to the origins of life. Random events are set up, so to say, „inside" the processes of chemical evolution which is proceeding according to certain laws, already to a great extent, discovered. However, all structures of appearing particles and macromolecules may be „understood" only by pointing to the nature of relations between the „spontaneity" of the chance and the „necessity" of physicochemical processes ot the prebiotic evolution. Unfortunately, those relations may be only partially verified. As a result, the issue of chance cannot be solved by giving appropriate structural, statistical laws or by specifying their cause and purpore, but only by presenting the theory of reality and the right interpretation of the prebiotic evolution itself, thus specifying the scope of activity of chance. Therefore the task is possible to be completed in the metaobjective outlook. Thus I have suggested the paradigm of explanation by referring to chance as the most theoretically adequate sketch for specifying the position and the role of random events during the prebiotic evolution. This metabiological paradigm is dealt with as an auxiliary one, with respect to the purely biological approach to the origin of life from the point of view of biochemistry, theory of information, probability calculation. Of course I realize that my suggestion is new and demands more detailed description, particularly from the logical and methodological angle and description of compounds of relations with the form of genetic, teleological as well as probabilistic explanation. Neverheless, even the analyses already carried out in the preset paper show, that speaking about random events in the context of explanation by referring to chance, seems valid and scientifically valuable considering the current approach of natural sciences to the explanation of the prebiotic evolution. I am attempting to prove that the chance is not an autonomous cause of random event due to a certain natural law which does not exclude the fact that in the context of another law it will belong to the group of necessary events (probabilistic law, structural law).