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Life as a Phenomenon

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News and Views

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"The fact that we find it difficult to give precise definition of complex phenomena does not mean that they do not exist" - Georgi Gladyshev

There is considerable difficulty in describing the term life in science which is misleading some enthusiasts to conclude[1] that life is a defunct theory. Some researchers unfortunately refer to Gladyshev's numerous publications [3-6] in support of "defunct theory of life" which in fact is not the case.

In our time, scientists have found many new phenomena and have created new theories. For example, the principles of hierarchical thermodynamics have been created on the solid fundament of the most rigorous physical theory of J.W. Gibbs [2-6].

Hierarchical thermodynamics and new experimental data [5, 6] suggest that it is reasonable to represent life as a phenomenon or a set of hierarchical processes. Considering the similar set of processes, one may talk about the general process of life, or, simply, - the process of life. This process is associated with the appearance and decay of labile chemical substances in certain intervals of changing the physical parameters and characteristics of the environment. Life as a process is also associated with the flow of energy. Life is described by the laws of thermodynamics at all hierarchical levels of physical structures in which life processes take place and react to the physical forces from the environment. Hierarchical thermodynamics sculpt living objects. A special role played by the "principle of substance stability". It is important to note that origins and developments of life are results of a myriad of non-spontaneous and spontaneous stages - the process of life. Due to the complexity of life, as a phenomenon, it is impossible to give an exact and general definition for it. The various definitions of life have depended on the points of view of the researchers that have examined this phenomenon. In recent years, the author of this article has investigated many of the details of modern physical-chemical aspects of life in some works devoted to the *hierarchical thermodynamics* of living systems [5, 6].

Thus, from the foregoing perspective, the term "life" is defined as a phenomenon or process that is observed in the specific conditions of "existence renewing" and evolving biological matter. The term "living" refers to an object (or a system) in which the life process takes place. By speaking of "living matter" we are talking about objects (systems) in which the processes of life take place. From the point of view of thermodynamics, the phenomenon of life is defined as: "Life is the process of existence of constantly renewed polyhierarchical structures during cycles of transformation of labile chemical substances in the presence of liquid water on the planet." According to the point of view presented in this article it is now easy to interpret all the terms and definitions containing the noun - "life", the adjective -"living", the verb - "life" and so on.

The death of an object means stopping in it the life processes. Death is the termination of life.

It is not possible to describe the chemical and biological evolutions (evolution of matter) by mathematical methods using a general equation. We can describe only the hierarchical stages of evolution. Mathematics "likes" the study of interactions or

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conversions of similar objects (same type's objects). As is well known, this fact has been explained by Henri Poincare, J.W. Gibbs, D.I. Mendeleev and other creators of science.

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CONTENTS

Review Articles

01 On Scientific Explanation of Consciousness
(Syamala D Hari) 1-11

02 Impact and Strategies for Yield Improvement of Arid Legumes under Drought
(S. P. Vyas) 12-19

03 Experimental Validation of Indigenous Knowledge for Managing Crop Diseases in Arid Rajasthan
(Arun Kumar) 20-27

04 Integrated Farming System-Need of Today
(L.N. Dashora and Hari Singh) 28-37

05 Biotechnological Interventions to Enhance Food Security Under Abiotic Stress Conditions
(N.K. Gupta, V.P. Agarwal, S. Gupta, G. Singh and A.K. Purohit) 38-43

Research Articles

06 Scanning Electron Microscopic Study Reveals Stomatal Malfunctioning in *In Vitro* Grown *Celastrus paniculatus* Willd.
(Manohar Singh Rao, Dimple Suthar and Sunil Dutta Purohit) 44-50

07 Effect of Calcium and Potassium Supplementations on Shoot Necrosis and Recovery of Healthy Plantlets of *Jatropha curcas* L.
(Vinod Saharan, M.A. Shah, B.R. Ranwah and Birchand Patel) 51-57

08 Direct Use of Rock Phosphate along with Lignite on Cowpea
(N.C. Aery and D.K. Rana) 58-61

09 Agronomic Efficiency of Rock Phosphate in Fine Size with Ammonium Sulphate and Ammonium Nitrate
(Mahesh Ganesa Pillai, Sumedh Sudhir Beknalkar and Saket Sanjay Kashettiwar) 62-65

10 Application of Low Grade Phosphate Rock as Fertilizer with Urea and Urea along with Organic Manure in Alkaline Soil: A Preliminary Study
(Shashank Bahri, Satyawati Sharma and Sreedevi Upadhyayula) 66-69

11 High frequency Multiplication of *Jasminum sambac* (L.) Aiton using Plant Growth Hormone Solutions on Stem Cuttings
(Surya Prakash Sharma and R.S. Brar) 70-73

Short Communications

12 Nitro PROM using Wool Waste: A Preliminary Study
(Praveen Purohit and G. Prabhulingaiah) 74-76

13 Eshidiya Phosphate Deposit-Jordan
(G. Prabhulingaiah, Hanna Qutami and Yasser Dassin) 77-78

14 Lignite in PROM A Preliminary Study
(D.S. Xanthate, Zeba Rashid, P.K. Mathur and G. Prabhulingaiah) 79-80

15 Marine Phosphate Deposit - Namibia
(Hans Hückstedt and DMR Sekhar) 81-82

16 The "Twins" Paradox
(R. Rapparini) 83-86

17 Direct Application of Phosphate Rock with Ammonium Sulphate
(Raguram Sandeep Mutnuru and Ch.V. Ramachandra Murthy) 87-88

Opinion

18 Evolution of Species
(DMR Sekhar) 89-96

News and Views

19 Life as a Phenomenon
(Georgi Gladyshev) 97-98

Correspondence

20 Future of Phosphatic Fertilizers
(DMR Sekhar) 99-100