Preface

What is life? Although the origins and nature of life are not yet fully understood, it is a widespread phenomenon on our planet which can be characterized by a number of fundamental attributes that differentiate living bodies from non-living ones in significant ways. It is clear that life is a qualitatively specific manifestation of organized matter. However, due to the fact that all life forms are complex and diverse, there is no complete or clear understanding of this phenomenon or its prevalence.

We will attempt to analyse the mysteries of life from a new perspective. Though the material is based on the classical scientific conception of life, we will consider biological phenomena from a non-standard point of view, developing, among others, the notion of the many *dualities of life*.

In particular, when analysing the nature of life, we proceed from the fact that there are individual and specific physical beings (bodies) which, with all of their characteristics, properties, and functions, represent one manifestation of life in the natural world. On the other hand, life is also a systematic determinant of the iterative interactions of individual organisms leading to the establishment of the living world as an entity (as a global phenomenon of life), and therefore also requires scientific and philosophical comprehension on a global scale.

This duality is also tied to the fact that organisms are physical and visual (phenomic) derivatives of the expression of their genomes. This book suggests and develops a hypothesis about the primary nature of genomes in relation to cells and the living bodies they comprise. Life, in other words, includes complex visible phenotypical components and even more complex invisible genotypical ones. Because this duality is present not only at the level of the individual organism but also in the combined existence of global life, we will attempt to understand the concept of the global phenome, which is a result of the expression of the global genome. A final duality is also seen in the immortality of the global phenomenon of life that is maintained by the mortality and replacement of its discrete components, on both an individual and a global level. It may therefore be possible to surmise that this duality is the essence of evolution, by asking whether it is an

effect of the survival of organisms and species or the survival of information, which is transferred and expressed by them.

Because life is a highly complex phenomenon, it is analysed chapter-wise from several points of view. The first part deals with life as a phenomenon of the material world, while the second explores life as the existence of *living bodies* with their inherent properties. Part 3 describes various *processes and mechanisms* that are usually ignored or mixed in with principally different categories. The fourth part delves into the role of *information*, which is a *directive and creative force* of all life processes and mechanisms. The fifth part gives a detailed analysis of the *dualism* of life, followed by a short conclusion that provides a review of the material and gives generalizing summaries.

As a whole, the book provides several key concepts regarding the nature of life. The nature or individual characteristics of humans are not greatly emphasized in the present work, because humans are considered here to be a representative of mammals without any distinct peculiarities which would require a separate and detailed analysis.

Key Concepts

In order to follow and understand the ideas presented in the book, it is necessary to introduce several key concepts that will be used throughout:

1. *Life*. An abstract, collective term that segregates a part of Nature with specific biological properties.

2. *Phenomenon of Life*. One of the forms of organized matter. The process of continuous coexistence of all living bodies which are complementary to the diverse nature of the Earth.

3. *Living Bodies*. A form of manifestation of life. The physical bodies that possess biological properties and peculiarities. These are discrete units of life, which are temporary dissipative self-replicating biological systems. The basis of their rebirth and existence is the relatively permanent genome.

4. *Life of a body* is the dynamic process of the limited existence of discrete units of life from appearance until end.

5. *Gene*. The unit of information that controls the genesis of a certain body characteristic. Genes are segments of NA that carry out specific functions, such as protein synthesis regulation, enhancing or suppressing the actions of other genes, and so on.

6. *Genotype*. The presence of certain genes or their totality in a given individual.

7. *Phenotype*. The presence of certain characteristics or their totality in a given individual.

8. *Genome*. The entirety of genetic information stored in the DNA (or RNA) of living beings. Also, a conceptually defined specific part of a cell that contains a select set of NA and proteins united into an integrated structural and functional

system. This system contains special genetic information as well as mechanisms and instruments of its use.

9. *Phenome*. A visual set of characteristics arising from the expression of genes and from the influence of external factors. Also, a conceptually defined part of a cell that surrounds and integrates a genome, forming a monolithic body. The phenome of a multicullular organism is represented as the combined phenomes of all of its individual cells. In other words, there are highly organized colonies of standard genomes within a combined phenotypic framework.

10. *Genotypic Life*. The totality of the operational processes of all genomic elements for existence and realization of their informational potential.

11. *Phenotypic Life*. Processes of coexistence, functioning and interaction of living bodies, including all their properties and characteristics.

12. *Global Genome System*. The totality of functioning and interacting genomes of all living bodies.

13. *Global Phenome System*. The totality of functioning and interacting phenomes of all living bodies.

14. *World System of Life or Integrated Life System*. The totality of functioning and interrelated genomes and phenomes.



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