

THE IMPASSE OF ENCOMPASSING MODERN BIOLOGICAL THEORIES

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ABSTRACT

Within scholarly disciplines the use of concepts is usually embedded in a theoretical view of reality. The latter hides the problem of what is given in an ontic sense or viewed as theoretical constructs. Particularly in respect of living entities there is a general tendency not to distinguish between the multi-faceted nature of living entities and the biotic function of such entities. Leading neo-Darwinian biologists do realize that since molecules are not alive it is mistaken to speak about “molecular biology.” This fact motivated the physicist Erwin Schrödinger, to publish a work on the physical aspect of the cell. He explained the apparent mysterious ability of living entities to increase biotic order within themselves by showing that organisms feed on negative entropy. Von Bertalanffy generalized the second main law of thermodynamics to open systems in order to account for the dynamic “Fliessgleichgewicht” (flowing equilibrium) found in living entities. With reference to the nucleoplasmic index a few remarks are made in respect of the quantitative, spatial and kinematic properties of a cell. These remarks depend upon an insight into the modal universality of the various aspects of reality. It also opens the way to distinguish between modal (aspectual) laws and type laws – where the former hold for all classes of entities with the latter only for a limited class of entities. The big bang theory presupposes the first two laws of physics as well as the irreducibility of number, space, movement and energy-operation as modes of explanation. These laws render the attempt of Hawking to argue that the law of gravity would create the universe meaningless – illustrated by a brief analysis of the law of gravity. This raises the question if physical entities, such as atoms, molecules and macro-molecules, can account for the origin of living entities. Dobzhansky considers the origin of “life” and of “man” as two crises in the “flow of evolutionary events.” Pierre Durand recently claims that the problem of the “origin of life” is solved by explaining it through the accidental formation of RNA (Ribonucleic Acid) strings. However, since living entities require proteins and nucleic acid (DNA), the assumption is that initially protein and DNA had to be present at once. The vicious circle is that without nucleic acids (DNA) the cell lacks the ability to construct proteins and without proteins the cell cannot function as a living unit. Invoking the idea of millions of years does not help, because the truly critical point is condensed into a unique, abrupt moment: before a specific moment the constellation was still non-living and the next moment it became alive. Von Bertalanffy ridicules the physicalist idea that molecules could be alive when he states that one DNA molecule, protein, enzyme or hormonal process is as good as another; each is determined by

physical and chemical laws, none is better, healthier or more normal than the other. Producing specified information from purely physical or chemical precursors has never been shown to be possible. Gould refers to Dobzhansky who posed the key question of organic form and taxonomy: “why do organisms form discrete and clearly nonrandom ‘clumps’ in populating morphological space? Why does the domain of mammalian carnivores contain a large cluster of cats, another of dogs, a third of bears, leaving so much unoccupied morphological space between?” The central problem of evolution, according to Dobzhansky, is the origin of discontinuity among species. Emergent-evolutionism wants to have it both ways: continuity in descent and discontinuity in existence. Rensch and Wright revert to assigning “proto-psychical” properties to matter. Wright argues that if mind is totally absent in the non-living universe its appearance will be inexplicable – the emergence of mind from no mind at all is sheer magic. Perhaps the most prominent neo-Darwinian biologist questioning the continuity postulate in biology (actually going back to Leibniz) is Stephen Gould who wrote that these stories begin from the same foundational fallacy and then proceed in an identically erroneous way. They start with the most dangerous of mental traps: a hidden assumption, depicted as self-evident, if recognized at all—namely, a basic definition of evolution as continuous flux. Surely, the impasse exposed in this article will continue to pose a serious challenge to future biological thought.

Key words:

Concepts; entities and functions; molecular biology; nucleoplasmic index; the physical aspect of the cell; negative entropy; dynamic equilibrium; gravity; DNA and protein; origin of discontinuity among species; “sheer magic”; *mysterium tremendum*

1. THE NEED FOR CONCEPTS

Within philosophy as well as within the various academic disciplines the use of *concepts* is indispensable. Without concepts it would be impossible to delineate a field of study and to identify and distinguish diverse states of affairs encountered within such a field of investigation. The same applies to the formulation arguments and the development of (comprehensive) theoretical views of reality.

The human logical-analytical ability to identify and distinguish fundamentally depends upon the *distinctness* of what is cognized. Are these distinctions based upon a given diversity, i.e. are they ontic in nature, or are they rather the outcome of artificial (arbitrary) human constructions?

2. NATURAL AND SOCIETAL ENTITIES AND THEIR DIVERSE ASPECTS

Consider the distinction between concrete entities, such as material things, plants, animals and human beings on the one hand and the various properties they evince on the other. With the exception of material things (physical entities) all these entities are *alive* in the sense that they are all functioning within the *biotic aspect* of reality. Does this preclude these living entities from simultaneously functioning within the physical aspect as well? The habit of speaking about “life” as if it is a *concrete entity* may suggest that this is not the case, but in reality, the biotic aspect of living entities is merely one among many other aspects in which they function.

3. MULTIPLE ASPECTS OF LIVING ENTITIES (SUCH AS A CELL)

Living entities are clearly not entirely alive, for, as acknowledged by leading Darwinistic biologists, the atoms, molecules and macromolecules found within them are not alive. Simpson is quite clear about this issue: “Since biology is the study of life [or rather: ‘living things’ – DFMS) and molecules, as such, are not alive, the term ‘molecular biology’ is selfcontradictory” (Simpson 1969:6).

3.1 *The physical aspect of the cell*

The physicist Schrödinger wrote a book on the *physical aspect of the cell*. He focuses on the fact that within living entities order is increasingly built up which apparently implies that living entities violate the second main law of thermodynamics, the law of non-decreasing entropy. But after von Bertalanffy generalized this law to *open systems*, it was clear that owing to their constant interaction with the environment they exist in a state of dynamic flux, designated by von Bertalanffy as a “Fliesgleichgewicht” and in English as a steady state. Schrödinger introduced the idea of “negative entropy.” The rapid decay of living entities into an inert condition (a physical equilibrium) is counteracted by the use of negative entropy as a means for life. This enables the cell to built-up less order within itself than the disorder it generates within its environment. In other words, when the increasing order within a living cell is observed with a view to the environment there is still on the whole an increase in entropy.

Schrödinger explains:

It is by avoiding the rapid decay into the inert state of 'equilibrium' that an organism appears so enigmatic; so much so, that from the earliest times of human thought some special non-physical or supernatural force (*vis viva*, *entelechy*) was claimed to be operative in the organism, and in some quarters is still claimed. . . . What then is that precious something contained in our food which keeps us from death? That is easily answered. Every process, event, happening call it what you will; in a word, everything that is going on in Nature means an increase of the entropy of the part of the world where it is going on. Thus a living organism continually increases its entropy or, as you may say, produces positive entropy and thus tends to approach the dangerous state of maximum entropy, which is death. It can only keep aloof from it, i.e. be alive, by continually drawing from its environment negative entropy which is something very positive as we shall immediately see. What an organism feeds upon is negative entropy. Or, to put it less paradoxically, the essential thing in metabolism is that the organism succeeds in freeing itself from all the entropy it cannot help producing while alive (WEB version, pages 46-47).

3.2 *Quantitative, spatial and kinematic properties of a cell*

Whereas the metabolism of a cell evinces a constant flow (movement) between what is absorbed and secreted, it also, as the smallest living unit known to us, displays remarkable proportional (*spatial*) properties as it passes through its cycle. During this period the nuclear volume of cells doubles in preparation for division into two daughter cells. When cells are in resting condition, however, the ratio of the nuclear volume to cytoplasmic volume remains constant (captured in a numerical value). This ratio is known as the nucleoplasmic index” (see: Nucleoplasmic index 1). The numerical properties of the cell come to expression in the multiple *organelle* integrated in its biotic functioning, explaining why we speak of *organic life* (see also: Nucleoplasmic index 2).

4. ASPECTS AS UNIVERSAL FUNCTIONAL CONDITIONS FOR ENTITIES

The fact that living entities function within diverse aspects entails that these aspects are universal functional conditions for all entities.¹ This feature of the aspects of reality may be designated as *modal universality* – where the term *modal* refers to the aspects as *modes of being* (derived from the Latin: *modus quo*). The law of gravity and the laws formulated in quantum-mechanics hold for all possible classes of entities.² Type laws, by contrast, merely hold for a limited class (or: type) of entities. The laws which hold for a water molecule or for a cell are limited to the class of water molecules and cells. They are universal in the sense that they hold

¹ Keep in mind that only human beings function as *subjects* within all aspects. A human being is an individual person (one), occupies a spatial location, moves, is active, is alive, is conscious, is capable of logical thinking, is culturally formative, has a name, socialize, is frugal, perform aesthetic acts, respects the rights of fellow human beings, is embedded in multiple love relationships, and is capable of being trusted and as trusting others. Animals have object functions within the post-sensitive aspects, plants in the post-biotic aspects and material things in the post-physical aspects.

² The physicist Von Weizsäcker holds: “Quantum theory, formulated sufficiently abstractly, is a universal theory for all classes of entities” [“Die Quantentheorie, hinreichend abstrakt formuliert, ist eine universale Theorie für alle Gegenstandsklassen” (Von Weizsäcker, 1993:128).]

for all water molecules and cells, but at the same time they are limited, namely to the class of water molecules and the class of cells. Surely not everything is a water molecule or a cell. Laws applicable to a limited class of entities are *type laws*, they hold for entities of a certain *type*.

5. TRANSITION BETWEEN ASPECTS?

Although natural scientists are inclined to support the “Big-Bang” theory it is impossible to see it as an explanation of the origination of the universe, because the singleton from which it proceeds is not a “nothing,” since the assumption is that it displays an extremely small density and an equally high temperature. The big-bang theory accepts the first two laws of thermodynamics, namely the law of energy-constancy (energy cannot be created or destroyed) and the law of non-decreasing entropy. This means that all the energy already had to be present right at the “beginning” – the big-bang cannot create energy and cannot explain where energy came from.

5.1 *The untenable escape route of Hawking and Mlodinow*

Stephen Hawking explores an escape route in his book, *The Grand Design* (co-author is the physicist Leonard Mlodinow):

Because there is a law such as gravity, the universe can and will create itself from nothing. Spontaneous creation is the reason there is something rather than nothing, why the universe exists, why we exist (Hawking and Mlodinow 2010:282).

Hawking also forgets that every physical law is always related to what is subjected to it and correlated with it. Such a *materialistic* view believes, as Roy Clouser phrases it, “that reality is ultimately physical, so that everything is either matter or dependent upon matter”. Clouser also mentions Paul Ziff who once remarked that he is not certain why he is a materialist: “It's not because of the arguments. I guess I'd just have to say that reality looks irresistibly physical to me” (Clouser 2005:38).

Yet, such a law can never be understood in *isolation* or in a *purely physical* sense. The irony is therefore that the first main law of physics (thermodynamics), affirming that energy cannot be created or annihilated (i.e., the law of energy-constancy), directly *contradicts* the idea that the *law of gravitation* can create the universe out of nothing.

Newton's formulation of the law of gravitation contains the term *force* (F), the gravitational constant (G), two mass-points (m_1 en m_2), and the *distance* between m_1 and m_2 (r). The gravitational force between m_1 and m_2 is directly proportional to the product of their masses and indirectly proportional to the square of the distance between them.

$$F = G \frac{m_1 m_2}{r^2}$$

Mass is a *physical quantity* (highlighting the fundamental connection with number); *distance* pre-supposes (physical) *space*; whereas the idea of a constant coheres with the meaning of a *uniform* [constant] *motion*. From this it appears that the formulation of the law of gravitation

is first of all *made possible* (co-conditioned) by the mentioned three aspects, namely number, space, and movement. They serve as the foundation for the meaning of the physical aspect.³

Given these conditions and interconnectedness one may ask: how could these non-physical aspects (and, for that matter, the universe itself) then merely emerge from the *physical aspect* of reality or originate purely from a physical law? Hawking attempts to pull himself up with the bag in which he positioned himself!

Consider also that the law for physical (material) entities is not itself material, just as little as the conditions for being green are green themselves. Moreover, is the claim that everything is physical or material in nature true? If so, then one would want to know which elementary particles, atoms or molecules constitute its *truth* and the *concept* we form of this truth? The meaning of words and the content of concepts simply transcend the grasp of physicalistic claims. Materialism resolves itself in unsolvable antinomies – the “reward” for not acknowledging ontic laws in their uniqueness and unbreakable coherence.

6. TWO INSTANCES OF “TRANSCENDENCE”

In following the theologian Paul Tillich, the neo-Darwinian geneticist, Theodosius Dobzhansky, calls the origination something new “evolutionary transcendence” (Dobzhansky 1967:44). Such a new level is recognized as a discontinuity (or: crisis) and according to Dobzhansky there are two such crises:

The flow of evolutionary events is, however, not always smooth and uniform; it also contains crises and turning points which, viewed in retrospect, may appear to be breaks of the continuity. The origin of life was one such crisis, radical enough to deserve the name of transcendence. The origin of man was another (Dobzhansky, 1967:50).

To this he adds that “the phenomena of the inorganic, organic, and human levels are subject to different laws peculiar to those levels” (Dobzhansky, 1967:43). Of course, this view immediately raises questions about continuity and discontinuity.

7. DURAND’S CLAIM THAT THE “EVOLUTION OF COMPLEXITY” IS SOLVED

Dr Pierre Durand is the project leader of the “Evolution-of-Complexity” laboratory at the University of the Witwatersrand. Recently the claim is made that the problem of the “origin of life” is solved by explaining it through the accidental formation of RNA (Ribonucleic Acid) strings. The group holds that the first “life” is RNA – which is chemically different from DNA. They have shown how small “non-living molecules” [as if there are “living molecules”!] increased their size. The strings of nucleotides multiplied from 45 molecules to about 100. We

³ The law of energy-constancy reflects the kinematic analogy of constancy on the law-side of the physical aspect.

read: “The story of us begins with a whimper. So insignificant, in fact, scientists think we started out completely by chance.”⁴

The explanation continues:

In a laboratory at Wits University scientists believe they have replicated how life began before a time when there were tissues, cells or even DNA. And it was no earth-moving big bang, just a couple of molecules hooking up. PhD student Nisha Dhar and Pierre Durand from the Evolution of Complexity Laboratory in the Evolutionary Studies Institute at Wits University studied how small strands of molecules linked up to form larger molecules that had the ability to replicate themselves.

Durand says: “These complex molecules by a chance event would have been able to reproduce themselves.” According to Durand “this would be the point at which life is seen to begin to evolve.” “In the past five years Dhar and Durand have been working to find out just how these molecules linked up.”⁵

Initially, “billions of years ago, nothing existed that we would recognise today as living. The world contained only lifeless molecules [as we pointed out: are there “living molecules”?! – DFMS] that formed spontaneously through the natural chemical and physical processes on Earth. However, the moment that small molecules connected and formed larger molecules with the ability to replicate themselves, life started to evolve.”

Dr Pierre Durand and his group holds: “[L]ife was a chance event, there is no doubt about that.” This view results from work done at the “Evolution of Complexity Laboratory” in the *Evolutionary Studies Institute* at Wits University. Their results are published in the journal *Royal Society OS*, in a paper entitled “Molecular trade-offs in RNA ligases affected the modular emergence of complex ribozymes at the origin of life”. They explain that very “simple ribonucleic acid (RNA) molecules (compounds similar to Deoxyribonucleic acid (DNA)) can join other RNA molecules to themselves through a chemical reaction called *ligation*.”

The group believes that “RNA molecules possessed enzyme activity that allowed ligation, which, in turn allowed them to link up with other small molecules thereby forming larger molecules capable to “produce copies of themselves and so kick start the process of life.”

It seems natural to hold that a long time-span was needed: “While the process that eventually led to the evolution of life took place over a long period of time, and involved a number of

⁴ On the WEB Site <https://www.timeslive.co.za/news/sci-tech/2017-09-21-how-life-on-earth-began/> [accessed 21 September 2017]

⁵ Look at: <https://www.wits.ac.za/news/latest-news/research-news/2017/2017-09/complex-life-evolved-out-of-the-chance-coupling-of-small-molecules.html> [accessed 21 September 2017].

steps, Wits PhD student Nisha Dhar and Durand have uncovered how one of these crucial steps may have occurred.”

8. A CATCH 22: THE MUTUAL INTER-DEPENDENCE OF DNA AND PROTEIN

The claim that “RNA molecules possessed enzyme activity” needs further elucidation. Within living entities, the twenty known amino acids are configured according to the information contained in the DNA – in order to form enzymes with a protein structure serving as catalysts for the metabolic processes within cells. Biochemists now know what the role of messenger (mRNA), transfer (tRNA) and ribozymes (rRNA) is (the latter can act as enzymes). When the cell is intact, containing all its sub-organelles, the physico-chemical substructure persists on the basis of the “simultaneous presence” of nucleic acids and proteins. The catch 22 is that without nucleic acids (DNA) the cell would lack the ability to construct proteins and without proteins the cell would be unable to function as a living unit.

Since living entities therefore, considered from a physical-chemical perspective, require proteins and nucleic acid (DNA), the physicalist point of view is obliged to presume that initially there must be a close relationship between protein and DNA. Already in 1971, however, Orgel and Sulston commented in this regard. However, “This approach leads to new difficulties so severe that it has never been carried very far” (Orgel and Sulston 1971:91). They continue with the striking observation that “progress” can only be recorded in this regard when characteristics are attributed to protein and DNA “which have not been demonstrated experimentally, and which usually seem implausible” (Orgel and Sulston 1971:91).

9. DOES THIS PROCESS REALLY NEED A LONG TIME-SPAN?

Starting with the accidental origination of increasingly complex RNA molecules as ONE phase in a long journey side-steps the real issue. Consider two points: (a) continuity versus discontinuity, and (b) the difference between molecular entities and living entities.

- (a) Millions of years or one abrupt moment?
Stretching the “process” of the origination of “life” over millions of years avoids the crucial point. Every moment of this “millions of years” the question could be asked: is the “constellation” alive or is it non-living? Somewhere along the line a specific moment arrives such that a moment earlier it was still non-living and the next moment it became alive. The truly critical point is therefore condensed into a unique, abrupt moment. The millions of years turn out to be irrelevant, for what is required is an account of this abrupt moment. It does not help to revert to the claim that “life” is nothing but the complex interaction between physical-chemical elements and processes. Which brings one to the second point.
- (b) Molecules and “life”
The generally accepted but incorrect practise to speak of “life” when living entities are intended, flows from a lack of distinguishing between physically qualified entities (such

as elementary particles, atoms, molecules, macro-molecules and macro-systems) and living entities (biotically qualified).

10. THE MOLECULAR LEVEL AND BIOTIC PHENOMENA

Let us look at the position assumed by some prominent biologists of the 20th century. The father of modern system theory, Ludwig von Bertalanffy, for example, considers generally known biotic phenomena, as being either healthy, sick or dead. He remarks:

The present discussion may be started with one of those trivial questions which are often only too difficult to answer scientifically. What is the difference between a normal, a sick and a dead organism? From the standpoint of physics and chemistry the answer is bound to be that the difference is not definable on the basis of so-called mechanistic theory. Speaking in terms of physics and chemistry, a living organism is an aggregate of a great number of processes which, sufficient work and knowledge presupposed, can be defined by means of chemical formulas, mathematical equations, and laws of nature. These processes, it is true, are different in a living, sick or dead dog; but the laws of physics do not tell a difference, they are not interested in whether dogs are alive or dead. This remains the same even if we take into consideration the latest results of molecular biology. One DNA molecule, protein, enzyme or hormonal process is as good as another; each is determined by physical and chemical laws, none is better, healthier or more normal than the other” (Von Bertalanffy, 1973:146).

Regarding the assumed chance origination of living entities von Bertalanffy is equally sceptical:

In contrast to this it should be pointed out that selection, competition and ‘survival of the fittest’ already presuppose the existence of self-maintaining systems; they therefore cannot be the result of selection. At present we know no physical law which would prescribe that, in a ‘soup’ of organic compounds, open systems, self-maintaining in a state of highest improbability, are formed. And even if such systems are accepted as being ‘given’, there is no law in physics stating that their evolution, on the whole, would proceed in the direction of increasing organization, i.e. improbability. Selection of genotypes with maximum offspring helps little in this respect. It is hard to understand why, owing to differential reproduction, evolution should have gone beyond rabbits, herring or even bacteria, which are unrivalled in their reproduction rate (Von Bertalanffy 1973:160-161).

An additional obstacle is mentioned more recently by Stephen Meyer where he raises the issue of *specified information* (an issue not considered by Durand and his team):

No undirected physical or chemical process has demonstrated the capacity to produce specified information starting “from purely physical or chemical” precursors. For this reason, chemical evolutionary theories have failed to solve the

mystery of the origin of first life—a claim that few mainstream evolutionary theorists now dispute (Meyer 2013:vi).

The well-known neo-Darwinian geneticist, Theodosius Dobzhansky, in a discussion-remark, affirms that the mechanism of the neo-Darwinian synthesis, namely *random mutation* and *natural selection*, does not apply to the “pre-biological” level: “Pre-biological natural selection is a contradiction in terms” (Dobzhansky 1965:310).

We have noted that another well-known neo-Darwinist, George Gaylord Simpson, is also quite adamant in this regard: “Since biology is the study of life and molecules, as such, are not alive, the term ‘molecular biology’ is self-contradictory” (Simpson 1969:6). In a similar way J. Huxley warns against the “nothing but” trap into which many evolutionary and natural scientific explanatory techniques fall:

... if sexual impulse is at the base of love, then love is regarded as nothing but sex; if it can be shown that man originated from an animal, then in all essentials he is nothing but an animal. This, I repeat, is a dangerous fallacy. We have tended to misunderstand the nature of the difference between ourselves and animals. We have a way of thinking that if there is a continuity in time there must be a continuity in quality (Huxley J. 1968:137).

11. A TYPICAL ORDER IN NATURE

Dobzhansky positions the problem of an assumed continuity in descent and discrete existing forms in the centre of biology as a scientific enterprise. Gould observes:

Dobzhansky poses the key question of organic form and taxonomy: why do organisms form discrete and clearly nonrandom ‘clumps’ in populating morphological space? Why does the domain of mammalian carnivores contain a large cluster of cats, another of dogs, a third of bears, leaving so much unoccupied morphological space between? (Gould 2002:527).

More recently Coyne highlights the same issue in connection with species as *discrete clusters* of living entities: “And at first sight, their existence looks like a problem for evolutionary theory. Evolution is, after all, a continuous process, so how can it produce groups of animals and plants that are discrete and discontinuous, separated from others by gaps in appearance and behaviour?” (Coyne 2009:184). He proceeds on the next page: “For years after publication of *The Origin*, biologists struggled, and failed, to explain how a continuous process of evolution produces the discrete groups known as species” (Coyne 2009:185).

12. THE CENTRAL PROBLEM OF EVOLUTION

Gould points out that Dobzhansky considers the problem of continuity and discontinuity as the key problem of evolution: “how can a theory originally be constructed to describe continuous change in natural populations also explain the discontinuous structure of nature's taxonomic

diversity? The central problem of evolution, Dobzhansky asserted, is the origin of discontinuity among species” (Gould 2002:532).

The “continuous change” postulated by Darwin stems from the continuity postulate of modern philosophy as it was emphasized by Leibniz – known as the *lex continui*. It found its most pointed formulation in the slogan *natura non facit saltus* (nature does not make jumps) – Darwin employs it four times in his *Origin of Species* of 1859.

Yet, already in 1972 Gould and Eldredge emphasized that the foremost pattern of the paleontological record is given in *stasis* (constancy) and not in *change*. Two years later the neo-Darwinian Journal *Evolution* published an article by another palaeontologist, D.B. Kitts, with the title “Palaeontology and Evolutionary Theory.” He points out that “[F]or most biologists the strongest reason for accepting the evolutionary hypothesis is their acceptance of some theory that entails it” (Kitts 1974:466). His final verdict is devastating: “Evolution requires intermediate forms between species and palaeontology does not provide them” (Kitts, 1974:467).

13. THE CONTRADICTORY POSITION OF EMERGENT-EVOLUTIONISM

Faced with palaeontological *stasis* and the *type-diversity* of the natural system an escape route is chosen by emergent-evolutionism in its aim to have it both ways – continuity in descent and discontinuity in existence. Emergent evolutionism (such as defended by Lloyd-Morgan, Whitehead, Alexander, Woltereck, Bavinck and Polanyi) opts for continuity in *descent* (in the process of origination) and discontinuity in existence (in *structure*). Structure thus becomes a product of the genetic process of becoming.

However, emergence evolutionists openly admit that this position is burdened by an inner antinomy. Richard Woltereck does so in his *Ontologie des Lebendigen* (1940:300ff.), while Michael Polanyi writes:

We have reached the point at which we must confront the unspecifiability of higher levels in terms of particulars belonging to lower levels, with the fact that the higher levels have in fact come into existence spontaneously from elements of these lower levels. How can the emergent have arisen from particulars that cannot constitute it (Polanyi 1968:393).

The same problem surfaces in the thought of theistic evolutionists. The theologian Wentzel Van Huyssteen on the one hand holds that our universe and “all it contains is in principle explicable by the natural sciences” (Van Huyssteen 1998:75) but then, a bit further in this work, claims the opposite for then he warns that we should not overextend rationality “to explain everything in our world in the name of natural science” (Van Huyssteen 1998:115). Later on he believes that cultural evolution (including the evolution of ideas, scientific theories, and religious worldviews) cannot be reduced to biological evolution (Van Huyssteen 2006:86-87).

14. RESOLVING THE BASIC PROBLEM OF BIOLOGY IS STILL FAR FROM BEING ACCOMPLISHED

Wagner and Lynch relates this issue to the level of cells: “A fundamental challenge in biology is explaining the origin of novel phenotypic characters such as new cell types” (Lynch and Wagner 2011). Denton explains in his recent work on the crisis of evolutionary theory (2016) that the developments after his previous book (1986) shows that the “gaps or discontinuities” are “as wide as ever” (2016:27). The aim of his most recent work is to enter into a detailed argumentation regarding “several well-studied Type-defining homologs (including the tetrapod limb, the feather, and several others)” and to argue that “the gaps or discontinuities alluded to in *Evolution*” [1986] “are ‘as wide as ever’ ” (Denton 2016:27). His overall perspective is captured in his statement: “Nature is in fact a fundamental discontinuum of distinct Types and not the functional continuum maintained by Darwinian orthodoxy” (Denton, 2016:219).

The zoologist, Bernard Rensch, already assumed “proto-psychical” properties of matter – owing to the continuity from molecules to humans (he speaks about “matter” evincing “protopsychische ‘Materie’ ” (Rensch 1991:213). Dobzhansky mentions Albert Schweitzer who holds that the existence of the human conscience, of life, and of the universe itself “all are parts of the *mysterium tremendum* (tremendous mystery).

Wright advances a similar perspective. If mind is totally absent in the non-living universe its appearance will be inexplicable. “Emergence of mind from no mind at all is sheer magic”:

The only satisfactory solution of these dilemmas would seem to be “that mind is universal, present not only in all organisms and in their cells but in molecules, atoms, and elementary particles” (quoted by Dobzhansky 1967:28).

The discrepancy between the (speculative) continuity postulate (nature does not make leaps) on the one hand and the discontinuities in the palaeontological record and the current natural system on the other, is understood by Gould with a striking clarity.

These stories begin from the same foundational fallacy and then proceed in an identically erroneous way. They start with the most dangerous of mental traps: a hidden assumption, depicted as self-evident, if recognized at all— namely, a basic definition of evolution as continuous flux (Gould 2002:913).

15. CONCLUDING REMARK

The foregoing considerations warn us to be modest in our expectations because we are still far away from explaining the origin of “life,” in spite of all the efforts of gifted intellectuals wrestling with the problem before and since Darwin. The impasse portrayed in our preceding analysis continues to highlight the serious challenge facing future biological thought.

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