

Connotation of Life beyond Molecular Biology

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*One of the profoundest enigmas of Nature is the
contrast of dead and living matter*

Weyl H

Manifestly, the physical world consists of three entities: Matter, Energy and Information. Energy is a capacity to make the matter move; information comprises signals to regulate this motion. Material systems tend to prevalent types of structures showing an increase of entropy in accordance with the Second Law of Thermodynamics. Living systems have a certain ability to withstand this structural degradation, so they must acquire in some unknown way negative entropy as delineated in the popular book by Schrödinger [1]. However, for the organization of Life information plays much more vital role rather than merely opposing the degradation in view of the entropy increase.

The idea that Life and Mind involve activities beyond the ponderable matter had flourished in the XIX century with the development of aether theory. In widely acclaimed book of 1873, *The Unseen Universe*, Stewart and Tait wrote: "We attempt to show that we are absolutely driven by scientific principles to acknowledge the existence of an Unseen Universe and by scientific analogy to conclude that it is full of life and intelligence - that it is in fact a spiritual universe and not a dead one" [2].

In the XX century, with the elevation of relativity the idea of aether has been abandoned, although "undeservedly" as regarded by Wilczek [3]. Actually, the concept of relativity lends to two interpretations: according to Einstein the absolute frame of reference does not exist, according to Lorentz and Poincaré the absolute frame of reference exists, but is simply undetectable. For practicing physics adhering to either of these interpretations is basically inconsequential. As to the biology, the later interpretation opens a route to additional information processing facilities in the otherwise physically undetectable infrastructure. Such an infrastructure is indispensable for Life and arises with the introduction of the aether of a cellular automaton type [4].

A cellular automaton is a grid of nodes whose states are transformed in discrete steps depending on the states of the surrounding neighbors [5]. Realization of the cellular automaton model of the Universe encounters two major difficulties. First, trying to find a Cellular Automaton Rule that can produce all the complex behavior of physical objects seems unattainable. Second: it is not clear how localized Cellular Automaton activities can expound the apparent non-locality of the Universe.

The necessary prerequisite for synchronization removes any arbitrariness in the choice of the primitive Rule. The cellular automaton mechanism of Nature must contain a grid of mutually synchronizing circular counters; and the system is characterized by the collective dynamics of the phases θ ($0 < \theta < 2\pi$) defining the individual states of the counters. Astoundingly, but this simple approach completely solves the problem. It turns out that the whole richness of the physical world condenses in a plain sentence: "All physical phenomena are different aspects of the high-level description of distributed processes of mutual synchronization in a network of digital clocks" [6]. The cellular automaton model for the physical Universe is a high-tech restoration

of the classical notion of aether. As Anatole France said, "It's much easier to create the world, than to understand it". The developed model was named CAETERIS (Cellular Automaton EThER Infrastructure). Workings of this model have been presented in several publications starting [7]; in many various aspects they are considered [8-13].

As long as elementary particles of matter are generated by relocations of the cellular automaton activities our inertial frame of reference acquires kinematical unidirectional anisotropy [13]. For bulk bodies, this circumstance essentially complies with the laws of macrophysics. Yet for separated particles this unidirectional anisotropy leads to quantum peculiarities [14]. To begin with, nobody knows why quantum states are described by complex numbers. Here, motions of separated particles are presented by vectors, characterized by a pair of inclinations with respect to the prevalent relocation of the bulk bodies. Therefore, quantum states represent a hidden Hilbert space and so quantum objects expose themselves irregularly through the notorious act of "measurement" by collapsing to **zero vector** presenting the bulk bodies. Thus, Schrödinger's cat is categorically either dead or alive. The most mysterious quantum effect-single particle interference comes from short-term memory capacities inherent to the surmised presentation of quantum states. The salient phenomenon of quantum entanglement is considered the main mystery of Nature and this phenomenon is tied persistently to the most profound functionality of Life. Quantum entanglement for momenta as introduced by Einstein, Podolsky, and Rosen does not present a real paradox. The actual intellectual embarrassment begins when for pedagogical clarification this paradox has been presented in terms of spins and polarizations. In our concept, in the framework of the kinematical unidirectional anisotropy the spin and polarization get a different interpretation that makes them mutually interdependent in kinematical sense similarly to the case of momenta in the original EPR paradox. As a result, the seemingly formidable effect of entanglement becomes just a trivial consequence of a curious occurrence of the so-called Dr. Bertlmann's socks [15]. Further, the purported entanglement in space is supposed to extend over the time domain through fabricated interactions of no coexistent particles [16]. In our explanation the pretended improbable interaction with a ghost particle simply appears due to the fact of the opposite compelling of the anisotropy of the space on the contrary motions, and this fact is unrelated to whether a coupled origination particle exists or does not.

Besides shocking impression on modern physics and long-lasting

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influences on the theoretical progress in biology and medicine, the presented concept should also produce an immediate practical impact on the current crucial technological developments.

As described by Berkovich [13], the Cellular Automaton machinery of the physical world provides a distributed supply of energy to all the processes. Particularly, it is explained how this can happen with Low Energy Nuclear Reactions (LENR) aka Cold Fusion. Following the presented concept this primal energy can be extracted not necessarily through disruptive nuclear reactions, but more smoothly through parametric amplifications. Actually, the same physical setting might be also the source of energy for biological locomotions. Notably, the considered mechanism may be responsible for the recent mishap with the massive recall of exploding Samsung lithium batteries [17]. This surmised supposition can be readily tested because being associated with spatial anisotropy, the considered effects should be influenced by the spatial orientation of the objects of study.

Further, especial attention is given by Berkovich [13] to an extremely improbable effect of NASA electromagnetic drive [18]. This effect is not just another weird quantum phenomenon, but it overtly goes “against humankind’s fundamental comprehension of physics”.

“A potentially groundbreaking device which many scientists have called ‘impossible’ might very well be real”

“It is not labor, not capital, not land, that has created modern wealth or is creating it today. It is *ideas* that create wealth...One single idea may have greater value than all the labor of all the men, animals, and engines for a century”. A scientific idea becomes more powerful when it combines more different phenomena in a single theoretical framework. In this work, the first presented idea introduces an informational processing infrastructure of the physical world. Further, it explains basic biological facts and elucidates many physical paradoxes.

The invented construction presents the ‘Big Data’ environment for information control of biological systems with Cloud computing as described by Berkovich [4,19-24]. Curiously, the work of Berkovich [20] introduces a one level storage for human memory, and as it degrades it shows typical features of Alzheimer’s dementia: loss of short-term memory with retention of long-term memory. It is shown a particular way of replication of macromolecules, which is decisive for all molecular biology [21].

The given contraption may have an abundant supply of energy needed for actuation, as indicated by Berkovich [13]. Thus, the material world appears as the technological marvel- “Internet of Things” (IOT) [22,23]. Very likely, this could lead to the long aspired goal of Physics: discovery of the Theory of Everything (TOE), Namely, it turns out $TOE \equiv IOT$.

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