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III. WISDOM. DISCUSSION ABOUT ANDREW TARGOWSKI'S BOOK: *HARNESSING THE POWER OF WISDOM: FROM DATA TO WISDOM.* 2013. NEW YORK: NOVA PUBLISHERS

REVIEW

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LIFE WITHIN THE *AKHANDA* WORLDVIEW

ABSTRACT

Life cannot be understood in isolation from consciousness, mind, self and information on one hand, and space, time, matter, energy on the other. There are deep interconnections amongst these nine entities constituting the operational divisions of the unbroken whole within the *Akhanda* worldview. The author postulates that material evolution culminates in developing the state called the living state of matter which supports and helps to manifest the intangible, all-pervasive and irreducible life-principle as life-form, living entity or living being. The enclosure of life-principle within matter and the creation of a bioenergetic membrane have cosmological, biological and spiritual purposes.

Keywords: the Akhanda worldview; life; consciousness; information; philosophy and science.

THE AKHANDA PHILOSOPHY AND THE WORLDVIEW

The Akhanda philosophy is the 20th-century culmination of different Indian philosophical traditions. The Akhanda worldview grasps life as a part of an unbroken but differentiated wholeness, only operationally divided. In this worldview nature is an indivisible extension of consciousness. The traditional parental concepts of nature (*prakriti*) and consciousness (*purusa*) are extended to the basic and rock bottom, the matter, where all feminine elements are extensions of Mother Nature. Mother Nature is the kinetic pole, mobile facet and operational front of consciousness. When a person's nature becomes identical with Mother Nature, the being is identical with consciousness. The Akhanda worldview accepts consciousness and Mother Nature as inviolable elements. In the human context, the Akhanda philosophy operates without any assumption of irreversibility of the pathway from dualism to non-dualism and from anthropomorphic non-dualism to non-anthropomorphic non-dualism. The Akhanda metaphysics conjugates the self-effulgent unconditional non-dual, non-anthro-

pomorphic consciousness-as-such with the evolutionary state of "self" of the being operating in an ever evolving human brain. The human neuraxis behaves like an inverted tree with roots nourished by Mother Nature-consciousness and the branches work with the matter through the sense apparatus. The Akhanda-state of the being is inseparably blended with the cosmology of multiple universe(s), called multiverse. The system of multiple universe(s) constitutes the largest intellectually comprehensible system, the multiversity. In the Akhanda worldview, the being is rooted in the essence of the multiversity. The Akhanda state of the being experiences every individual position of the base camps, rest camps, and also of the summit of the unfathomable vertical depth and, in the process it acquires the ability of having freedom from any territorial imprisonment without losing the capacity to enjoy the richness of every territory.

In this paper I try to place life within the Akhanda worldview as one of the operating manifestation of the whole, as a hologram of consciousness-nature. The matter-based scientific paradigm has not so far succeeded in fully explaining what life is. The Akhanda worldview constructs the concept of life in relation to consciousness, self, mind and information on one hand, and space, time matter and energy on the other. Consciousness (*chaitanya*, in Sanskrit), self (operational representative of consciousness working within the system, which evokes the sense of "I", me and mine), mind and life-principle (*prana*, in Sanskrit) are difficult to localize in space and time, and are therefore treated as non-local, while matter and energy are localizable. Information can operate in both the domains.

The main thesis of this paper is that the phenomenon of life can be explained only by taking into account the role of consciousness, self, mind, life-principle and an informational organization in an evolved state of matter. In this attempt I refer to some relevant scientific accounts, to imagination and intuition of some philosophers and scientists, and to my personal inclination towards the Akhanda worldview.

WHAT DO WE MEAN BY LIFE?

Life is grasped differently by spiritualists, philosophers and scientists. For common people, life (*Jivan*, in Sanskrit) begins at birth and lasts through its uninterrupted span till death. For Aristotle life was an animation, for Descartes a mechanism, for Kant an organization, for Darwin variation and evolution, for Whitehead a process, for Weber life is an emergent complex system and for Dawkins an epiphenomenal gene vehicle! For the accomplished spiritualist, life means life-principle. For a biologist, life is enclosed within a membrane with a typical form, bounded by space and time. For a materialist, life is "orderly and lawful matter based partly on existing order that is kept up."[1] For a scientist

[1] Schrödinger, E. 1944. *What is Life?* Cambridge: Cambridge University Press.

adopted to an advanced self-organizing paradigm life means the living state of matter.[2]

Although Encyclopedia Britannica defines life as "a localized region that increases in order (decreases in entropy) through cycles driven by an energy flow" the question remains, is it possible to explain life as life-form, life as a living state of matter, or life as life principle by taking into account exclusively a materialistic or only spiritualistic view. The answer is negative. The theories of physics fail to explain the enormous complexity of life-form. They are not capable of answering the following questions: What aspect of the living system is invisible? What is the nature of this yet unimagined feature of life? What can be the new staff in the living systems which is beyond our current scientific understandings? Rodney Brooks raises these issues while discussing the relationship between matter and life.[3] The role of nonlocal elements like consciousness, mind, self, life-principle and information in generating life-form are not at all clear. Can they be the "new staff" which Brooks seeks in living systems outside current scientific understanding?

AN ANALYSIS OF LIFE-FORM AS A SYSTEM

Life-form is certainly an open system since it exchanges both matter and energy with the environment for its growth and multiplication.[4] The life-form, a nonlinear system, includes both dissipative and anti-dissipative processes working far from equilibrium, and evolves irreversibly in time.[5] Kompanichenko recognizes four unique key properties of the cellular bio-system:

"(i) The ability to accumulate free energy (negentropy) and information by extraction from the environment at the expense of the own activity. Environment is a medium transformed by life-forms.

(ii) The ability of active counteraction, intensified reaction to an external action or influence.

(iii) Expedient behaviour i.e. the ability to coordinate behaviour in order to achieve most favourable condition for its existence.

(iv) Regular self-renovation on different hierarchical level (molecular, genetic, organismic etc.). Self-renovating properties are non-spontaneous and prevail over spontaneous destructive processes."[6]

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[2] Mishra, R.K. 1983. *The Living State. A Cloudscape. International Seminar on the Living State.* New Delhi: Pub. Eastern Media Services Private Limited.

[3] Brooks, R. 2001. "The Relationship between Matter and Life." *Nature*, 409, 409–411.

[4] de Duve, C. 1991. *Blueprint for a Cell.* Burlington: Patterson.

[5] Prigogine, I. 1961. *Introduction to Thermodynamics of Irreversible Processes*. New York: Wiley.

[6] Kompanichenko, V. 2004. "Systemic Approach to the Origin of Life." *Frontier Perspectives*, 13(1), 22–40.

The living system is creative, spontaneously changes itself with the increase of order. Life-as-such, therefore, is disentropic. This criterion of life has brought surprise in NASA's search for life in planets other than Earth. Acceptance of disentropy as a criterion of life supports the view that life is teleological. "Neither AI or A-life," according to Rodney Brooks, "has produced artifacts that could be confused with a living organism for more than an instant […] A-life cannot match the complexities of the simplest form of life." Interestingly, recent experiments on A-life (artificial life) and the genetic algorithm also point towards this teleology.[7] Life-form is able of retaining its original pattern in its entire growth trajectory. However, some specific behaviors of life-form (like spontaneity, expedient behavior, self-renovation against spontaneous destructive process) cannot be explained by an extraneous source of energy. At this point, we are inclined to think beyond material source of energy and the author's view of an alternative intrinsic source of information-based energy might be taken into consideration.[8]

LIFE-FORM AS A PROCESS

Life-form follows a process, which is probabilistic, continuing against the gradient of energy between inside and outside the system. In this sense, it is similar to several active natural systems like stars, planets or cybotactic grouping in magma in having (i) catalytic activity, (ii) selective assimilation of substance, (iii) ability to grow and (iv) self replication (see footnote 6). Life-form differs from another active natural system by its (i) uncoupled response of spontaneity and (ii) the ability of self-maintenance by metabolism and natural self-replication. (iii) Enclosed life-form has information flow in a reverse direction from DNA to RNA to protein (in contrast to information flow outside the enclosure from environment to protein to RNA to DNA) with the establishment of the central dogma of molecular biology. DNA has acquired the place of pride for storage of information across the generation barrier. Kompanichenko points out that in life-form occurs an inversion of the universal process (which I prefer to describe as outside-in phenomenon involving zero point energy, ZPE, fields) and thereby the acquisition of its ability for the boundless self-development.

According to Tibor Gánti[9], everything falls within one of the four groups of objects: living, potentially living but not dead (e.g. seeds, dried or frozen microbes), dead (irreversible transition from a living to non-living state) and non-

[7] Levin, M. 2005. "Evolution vs. Design: Genetic Algorithms May Clarify the Controversy." *Journal of Scientific Exploration*, 19 (1), 115–122.

[8] Mukhopadhyay, A. K. 2008. "A Radical View of Information. On Its Nature and Science." *Frontier Perspectives*, 16 (2), 19–29. http://akmukhopadhyayconsciousness.com/pdf/LINK6.pdf

[9] Gánti, T. 2003. *The Principles of Life*. With a commentary by Szathmáry, E. and J. Griesemer. Oxford: Oxford University Press.

living. He also calls the total properties that are present in living state but absent in the non-living state as the principles of life. Chemoton is his proposition (1971) consisting of a chemical motor, chemical membrane and chemical information system, which is not necessarily DNA/RNA. It is an autopoietic system with a minimal structural and functional requirement for living, not necessarily on Earth but extra terrestrially as well.

The life-form has the following characteristic processes:

(i) Life-form exhibits autopoiesis (Maturana and Varela[10]) within a surrounding membrane, which is being incessantly recreated by its own metabolism, thus producing a kind of autonomy which, however, is restricted by a logical operational closure affected by the boundary membrane. For the autopoietic system reproduction/replication is optional. Chemoton, however, replicates.

(ii) Life-form has the ability to inherit its nucleic acid sequence. The principle of natural selection, applied to the evolution of life-form, presupposes a kind of replication system.

This self-replication process is not always a property of life. There are computer programs, which can create themself but are not considered living. The modular robot has been reported to self-reproduce with supply of materials.[11] Phospholipids molecules in water form hollow spheres, which often trap energy, grow and subdivide but are never considered living. Some animals like mules cannot reproduce but are alive. According to James Lovelock (the originator of GAIA theory), Earth is alive although it cannot self-replicate. Further, there are enough observable differences between replication and reproduction (see the next section).

(iii) All living systems are cognitive systems, which operate with the "currency" of information. The process of cognition involves the system as a whole. This inclines us to look at the property of the whole (that cannot be explained by the property of the parts), which transcends the behavior of the parts and nevertheless causally affects their behavior in identifiable way in maintaining a coherence of the whole system.[12] The cognitive process is inclusive of a process of vigilance by which it can segregate and exclude those matter and even information that are detrimental to the system.

(iv) Life-form acts locally but can communicate nonlocally. Therefore, it has the capacity to evolve. Evolution necessitates cognitive openness to some signals or information despite having the prized boundary with selective molecular permeability.

(v) Openness and logical closure: Life-form is unique in the sense that it is open as well as closed. Its processes are far from equilibrium and unstable, but,

[10] Maturana, H. R., F.J. Varela. 1987. *The Tree of Knowledge*. Boston: Shambala Publishers.

[11] Zykov, V., E. Mytilinaios, B. Adams, H. Lipson. 2005. "Self-reproducing Machine." *Nature* (435), 163–164.

[12] Goodwin, B. 2009–10. "Reclaiming a Life of Quality." *Network Review*, vol.101, 7–10.

in addition, it exhibits thermodynamic openness. Mere thermodynamic openness also cannot explain life. Moreover, there is selective informational openness. The informational openness of life-form empowers it with more options in making choice outside algorithmic pre-specifications.

> "In animate, matter and energy remain bound by the wide scope of thermodynamics concerned with dissipative processes primarily related to *sinks* of non-conservative fields. On the contrary, life as a system is based on sources of various non-conservative fields. Living organisms are characterized by tapping the sources of non-conservative fields in a higher rate than by directing their energy into sinks."[13]

Within the *Akhanda* worldview one can extend this openness of life-form to nature which is beyond Planck's scale of measurement. It is open to the ultimate source-field of scientists, the "hyperspace"/ BULK (as described in the brane theory). In my view, the ultimate source-field is the essence of the multiversity (EM).

(vi) I suggest that life-form stands[14] at the boundary dividing the nature that operates within Planck's scale and nature that operates beyond Planck's scale. We, the human beings like any other primitive life-forms, transform nature beyond Planck's scale into nature within the Planck's scale as measurable, observable and reproducible. We therefore are capable of equalizing between what we perceive as the spiritual abstraction from beyond Planck's scale of nature and what we label as scientific rationale within Planck's scale of nature.

(vii) Life is creative. Life has all the elements in command which are responsible for creative emergence and new creations. Life has to ceaselessly adopt itself to countless phenomenal and informational inputs. It is itself a great creative feat. Besides, life is a major source of creating new information. The non-living entity does not and cannot generate information.

WHY SOME OBJECTS CANNOT BE CONSIDERED ALIVE?
Could the viruses be considered a living entity?

If we stick to the criteria presented above, a virus, natural or synthetic (e.g., synthetic polio virus) could be considered only an intermediate phase, which by itself cannot lead towards the evolution of life-form. The International

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[13] Grandpierre, A. 2004. "Entropy and Information and Human Organisms and the Nature of Life." *Frontier Perspectives*, 13(2), 16–21.

[14] Mukhopadhyay, A. K. 2012. God Particle to Consciousness: Life-science, Neuroscience and Nonlocal Science Hold the Key. The Science and Spiritual Quest. Integrating Capabilities with Values. Ed. S. C. Mishra, Sudipto Ghosh, Varun Agarwal. Proceedings of the 7th AISSQ Conference, Bangalore. Pub. Bhaktivedanta Institute, Kolkata, India, 108–123.
http://akmukhopadhyayconsciousness.com/pdf/LINK12.pdf

Comimttee on Taxonomy of viruses[15] does not acknowledge officially that the viruses are living entities and excludes them from the tree of life. David Moreira and Purificación López-García discuss ten reasons of this exclusion. [16]

Synthetic DNA and life

One of the major scientific feats[17] in 2010 in the laboratory of J. Craig Venter Institute is the synthesis of the whole genome of *Mycoplasma mycoides* and the subsequent cloning of this DNA sequence inside the yeast cell and then transplanting the genome inside the *Mycoplasma capricolum*, whose own genome had already been removed. This new bacterial colony grew in culture. The readers are requested to note here that the feat requires an intermediate yeast cell. Also the growth in culture requires a *mycoides* carrier cell. This raises the issue of the difference between DNA as chemical and DNA as life, and also leads us towards something subtle and intangible operating within a existing life-form.

DNA as a chemical substance and DNA as life

At what stage a chemical RNA/DNA becomes an informational RNA/DNA? How and why are not clear? How much the sequence of nucleic acid is to do with it and how much crucial is the conformity (cf: the role of conformon) of DNA segment, a specific configurational acquisition, is not known yet. "It is not DNA but what maintains the conformity of DNA (conformon) is life"—Prigogine says. For Prigogine, "Conformon is life."[18] Conformon is the wave package of energy carrying information. Having gone through evolutionary selection process, conformon is capable of performing a goal-oriented work. There are successive steps from a molecular DNA to informational DNA, to DNA which can replicate in a thermocycler, DNA which can self-replicate and DNA which can transcribe as mRNA which in turn, is translatable into protein. When one compares the DNA as chemical with DNA within life-form, one gets the clue of existence of something subtle, intangible, which we miss and which might have probably been called life-principle by some natural philosophers and spiritualists.

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[15] Van Regenmortel, M. H. V. et. al (Eds.). 2000. *7th Report of the International Committee on Taxonomy of Viruses*. San Diego: Academic Press.

[16] For details see: Moreira, D., P. López-García. 2009. "Ten Reasons to Exclude Viruses from the Tree of Life." *Nature Reviews Microbiology*, 7, 306–311. doi:10.1038/nrmicro2108

[17] Gibson, D. G., et al. 2010."Creation of a Bacterial Cell Controlled by a Chemically Synthesized Genome." *Science*, 329 (5987), 52–56.

[18] A personal communication with me by Professor Sunchulji at the Shillong Conference (1985) on Living State.

The stature of cyborg

A cyborg, the hybrid of the human brain and a computer is only an extension of the information-processing system of the brain outside. Surgically it is a huge success. Kevin Warwick, Professor of cybernetics in the University of Reading, UK, is a living example of cyborg. The hybrid computer does not possess other features of the life-system. Neither has evolved to a living state of matter. It has no independent evolving capacity. However, such a device has far-reaching implications. The range of sensation for the human being by this could be extended to the ultrasound and infrared range. The two-way communication of thought without use of any language is possible between the brain and the computer. This thought and even feeling reaction can be communicated to another distant cyborg on real time basis.

A suggestive evidence of nonlocal entities operating in life-form

Life-form as a cognitive system is conscious. When we observe that the life-form processes information and also it is logically closed, we can infer that it has a mind. "The movement in the physical matter is either entailed or stochastic (probabilistic). There is no place of choice in physical matter," says E.C.G. Sudarshan.[19] A self-organizing crystal can replicate but there is no choice in this movement. During polymerase chain reaction DNA replicates in a thermocycler not by choice but because of compulsion induced by circumstances and environment. The life-form on the other hand has an ability to move with a choice. "Life has a faculty of choice" (Sudarshan). This leads us to question further where from choice comes? Obviously, to execute choice is a function of "self." "Self" is the operational representative of consciousness within the system. That life-form moves with a choice outside algorithmic pre-specifications suggests that there is an operational self. The ability of self-programming in life-form is also indicative of the presence of self.

When we accept the hierarchical organization in the life-form of physico-chemical processes, organization by information, organization by life itself, organization by self, organization by mind and organization by consciousness, we have been approaching towards the Akhanda worldview. We are to answer how these different organizations differ from each other in general and how self-organization differs from organization of life in particular?

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[19] Sudarshan, E. C. G. 2004. "Life, Mind and Consciousness: A Physicalist's View." *Life Mind and Consciousness.* Ramakrishna Mission Institute of Culture, Kolkata, 303–309.

THE ORIGIN OF LIFE AS LIFE-FORM. A SCIENTIFIC REPORT AND EXPLANATORY GAPS

There are three questions: when, where, and how did life-form come into existence on Earth?

When? There are clear scientific evidence that life-form, like bacteria was unequivocally detectable on Earth from 3.5 Gy onwards. Before that, the virus and the virus-like precursors have been documented.[20] Where and how did life arise remains one of the several unanswered questions in science.[21] To find out this, scientists have marched forward in time from the formation of Earth 4.55 billion years ago, and also have moved backward in time from the life as we see today to the point of its possible arrival in simplest form. No answer is yet in sight. Recent reports (see below) suggest that life originated long before the origin of Earth!

How? Matter-based origin of life: The formation of elements like C, N, O, P, the development of inorganic and organic molecules from atoms, progress from molecular monomer to polymer often against energy barrier, then chiral selection, and attainment of specific configurational change by the polymer and then formation of self-replicating molecules are all part of chemical evolution (one should be extra cautious to use the term "evolution" in the context of inert inanimate substance). Primitive lightning, solar ultraviolet rays, radioactive energy, chemical energy, thermal entropy, configurational entropy all could be spotted playing their respective roles.

The matter-based theory of the origin of life on Earth took a concrete shape in the Oparin-Haldane-Urey-Miller (OHUM) model.[22] However, the matter-based theory of the origin of life has taken its modern form with much emphasis on RNA and DNA. Also, the composition of OHUM's prebiotic soup has changed from time to time and even changed its name (like, Darwin's warm little pond). Recently, doubts have also been raised on the reaction conditions of prebiotic soup. "Chemical reactions in prebiotic soup produce other sugars that prevent RNA and DNA replication."[23] Also, "Nucleosides and amino acids cannot form in the presence of oxygen, which is now known to have been present on the Earth for at least four billion years."[24]

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[20] Rao, T. 2009. "Origin and Diversity of Life." *Life and Organicism*, vol. XII, Part six of the Project History of Science, Philosophy and Culture in Indian Civilization (PHISPC). Rangaswami, N.S (Ed.). New Delhi: Publ. Centre for Studies in Civilization, 1–39.

[21] Zimmer, C. 2005. "How and Where Did Life on Earth Arise?" *Science*, 309, 89.

[22] Miller, S. L. 1953. "A Production of Amino Acids under Possible Primitive Earth Conditions". *Science*, 117, 528–529; Bada, J. L., A. Lazcano, 2003. "Prebiotic Soup—Revisiting the Miller Experiment." *Science*, 300, 745–746.

[23] Orgel, L. 1994. "The Origin of Life on Earth". *Scientific American*, 271(4), 81.

[24] Bortman, H. 2001. *Life under Bombardment.* NASA Astrobiology Institute. www.nai.arc.nasa.gov/news_stories. Accessed on 07-07-2010

Darwin's "warm little pond," the primordial soup, or its extension (e.g. the spontaneous synthesis of adenine as shown by Oró[25] and Ponnamperuma[26]) has the following shortcomings in explaining origin of life: (i) It requires a reducing environment. (ii) Unlike the synthesis of amino acids, peptide bonding is not a thermodynamically downhill reaction. (iii) The chiral selection of only L-form of amino acid and D-form of sugar as building block of life-form is not easy to explain in spite of the advancement of the theory of vortex force. (iv) If the prebiotic soup even existed, it existed for such short period of time that chemical evolution would have been impossible. What still cannot be explained in matter-based origin of life are (v) three dimensional configurational work, (vi) the coupling of thermal work with configurational work (vii) the mechanism of non-informational molecule becoming informational molecule, (viii) the development of coherent states as observed in a life-form and (ix) the finally self-programming ability of the molecule to renovate, to replicate etc.

There are two distinct lines of material players in life-form which forms the basis of nucleocentric (gene first) and cytoplasmicist (metabolism first) schools of thought in the origin of life form.[27] In this regard I raise the following questions: What brings nonlocalizable players (e.g. life-principle, self, mind and consciousness) together with two lines of material players? How location-non-addressable, content-non-addressable and context-non-addressable information become location-addressable, content-addressable and context-addressable within the nucleotides? What causes the enclosure? How a specific pattern of space and time is created for the formation of a life-form? Where, how and when this enclosure was first created? In spite of this enclosure, how the life-form remains cognitively open to evolutionary signal and information? It is not clear, therefore, how all did happen. Do all these happen by historical contingency or by chance? Or, was it a necessity with a purpose? Laboratory experimental evidence indicates the chance formation of amino acid (Urey and Miller), of protein (Oparin), of RNA molecule and catalytic RNA (Manfred Eigen) and also of DNA. Is then the enclosure of DNA/RNA to begin a probiotic life-form also a consequence of chance? Are all these random events consequences of probability over 4.5 billion years of Earth's existence? Wolfgang Pauli wonders on biologist's use of the word "chance" in the context of natural selection and like Francis Crick, calls it a "miracle."

> "In discussion with biologists I met large difficulties when they apply the concept of 'natural selection' in a rather wide field, without being able to es-

[25] Oró, J. 1961. "Comets and the Formation of Biochemical Compounds on the Primitive Earth". *Nature*, 190, 380–390.

[26] Ponnamperuma, C. 1965. "A Biological Synthesis of Some Nucleic Acid Constituents." *The Origin of Prebiological Systems*. New York: Fox, 221–242.

[27] Podolsky, S. 1996. "The Role of Virus in Origin of Life Theorizing." *Journal of the History of Biology* 29, 79–126.

> timate the probability of the occurrence *in an empirically given time* to just those events, which have been important for the biological evolution. Treating the empirical time scale of the evolution theoretically an infinity they have then an easy game, apparently to avoid the concept of purposiveness. While they pretend to stay in this way completely 'scientific' and 'rational,' they become actually very irrational, particularly because they use the word, 'chance,' not any longer combined with estimations of a mathematically defined probability, in its application to very rare single events more or less synonymous with the old word 'miracle'." [28]

What do we miss and leave this to chance? Is not chance the antithesis of information? Could all these events continue independently of information which, as I suggest, have an operational mechanics of its own?

Where did life-form originate?

Did life-form originate on Earth? Earth was bombarded by meteor for 700 million years after its birth. Following that, life-form could originate (a) in Darwin's primordial soup, (b) and/or in a deep hydrothermal vent, where hyperthermophilic microorganisms (extremophiles) still flourish. The panspermia theory (suggested by Lord Kevin, developed by Fred Hoyle, Crick and others) claims, on the other hand, that life was brought to Earth by asteroids and meteors from outside the planet, even from somewhere outside the solar system.[29] For the extraterrestrial origin of life there are two possibilities. The most plausible postulate is that the ready-made nucleic acid came on Earth from an extraterrestrial space, from another planet within the same solar system. The possibility of readymade nucleic acid sequence coming on Earth from the interstellar or intergalactic space is far remote. However, a recent evidence suggests the phenomenon of the horizontal gene transfer across the galaxy.[30] Recent findings[31] from analysis of the dust in the interstellar space, Halley's comet and

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[28] Pauli, W. 2006. "Letter to Niels Bohr, February 15, 1955;" 2001. "Letter." Transl. Atmanspacher, H., H. Primas. *Journal of Consciousness Studies*, 13 (3), 36.

Also go through: idem. 2005. "Naturwissenschaftliche und erkenntnistheoretische Aspekte der Ideen vom Unbewussten". *Dialectica*, 8, 283–301. Transl. Atmanspacher, H., H. Primas. *Journal of Consciousness Studies*, 13 (3), 35–36.

[29] Davies, P. 1999. *The Fifth Miracle*. *The Search for the Origin and Meaning of Life.* New York: Simon and Schuster; Davies, P. 2001. "The Origin of Life. When and Where Did It Begin?" *Science Reporter*, 84, 1–16; Davies, P. 2001." The Origin of Life. How Did It Begin?" *Science Reporter*, 84, 17–29 ; De Duve, C. 2002. *Life Evolving*. Oxford: Oxford University Press.

[30] Napier, W. M. 2004. "A Mechanism for Interstellar Panspermia." *Mon. Not. Roy. Astr.Soc*., 348, 46–51. Wallis, M. K., Wickramasinghe, N. C. 2004."Interstellar Transfer of Planetary Microbiota." *Mon. Not. Roy. Ast.Soc*., 348, 52–61. Wickramasinghe, J. T., Napier, W. M. 2008. „Impact Cratering and the Oort Cloud". *Mon. Not. Roy. Ast. Soc*., 387, 153–157.

[31] Kissel, J., Krueger, F. R., Silen, J., Clark, B. C. (2004). The Cometary and Interstellar Dust Analyzer at Comet 81P/Wild2. *Science*, 304, pp. 1774-1776.

other comets also support the view that nucleic acids originated outside Earth.[32] Some findings of signs of life on Mars and on Enceladus (one of Saturn' moons) make the scenario more exciting. Stephen H. Dole estimates in his *Habitable Planets for Man* that in the Milky Way Galaxy alone there may be 600 million habitable planets with conditions similar to those on Earth, allowing for the origin of life.

How this readymade nucleic acid sequences were carried on Earth? The lithopanspermia theory provides a partial answer. In fragments of meteors there is an evidence of the existence of nucleic acid. It is suggested that 4 billion years ago Martian microbes were carried to Earth on a meteorite.

The panspermia theory says that the origin of life is widespread in the cosmos. Chandra Wickramasinghe argues for the cosmic origin of life less than a million years after the Big Bang.[33] Extraterrestrial organic matters, like polyaromatic hydrocarbon, which are supposed to have an abiotic origin, may be break-up products of life. In this sense interstellar clouds, according to Wickramasinghe, may represent the graveyard of life (the matter originated from life). This view is contrary to the view of mainstream science.

Further, it is a matter of debate whether life-form evolved from one common nucleic acid sequence (Last Universal Common Ancestor, LUCA), the microbial Adam. The last common community (LCC) of microbes, which were promiscuous in the horizontal exchange of gene transfer, is a more accepted possibility. How did the present life-form originate from the probiotic state? There are four distinct possible routes as Paul Davies suggests.[34]

This brings us close to Vernadsky's theory of the geological eternity of life claiming that the formation of Earth and the beginning of life on it probably took place simultaneously. It remains the possibility that genetic material comes from space (or hyperspace) and life-form grows further on the Earth. Włodzimierz Ługowski describes it as the bilinear origin.[35]

In spite of having all those data, I have several dilemmas.

1. What is the difference between live-DNA and chemical DNA?

2. Is life a conjugal product of vitalism and material causes? Leaving behind the old notion of distance between vitalism and material mechanism we can reframe the issue by stating that life-form acts locally but communicate nonlocally. The most momentous event in the formation of life-form is phenomenol-

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[32] Martins, Z., Botta, O., Fogel, M. L., Septon, M. A., Glavin, D. P., Watson J. S., Dworkin, J. P., Schwartz, A. W., Ehrenfreund, P. 2008. "Extraterrestrial Nucleobases in the Murchinson Meteorite." *Earth and Planetary Science Letters*, 270 (1–2), pp. 130–136.

[33] Wickramasinghe, C. 2010. "Cosmic Biology". In: *Science and Spirituality Quest*. Subhas C. M., B.S. Arun, S. Ghosh. Kolkata: Bhaktivedanta Institute; Allahabad: MNIT, 105–120.

[34] For details see: Davies, P. 2001. "The Origin of Life II: How Did It Begin?" *Science Reporter*, 84, 17–29; see also: Dyson, F. 2000. *The Origin of Life*. Second Edition. Cambridge: Cambridge University Press.

[35] Ługowski, W. 2008. *Philosophy and Biogenesis. 'Those Damned Problems' (of Origin)*. Wrocław: Arboretum.

ogy of enclosure of nucleoplasmic (genes) and cytoplasmic (metabolism) components and integrating those with the evolutionary activity that is reserved for the system, which acts locally, and can communicate non-locally.

3. Is it possible to know life completely without understanding the phenomenon of death? How principles of life (Tibor Gánti) disappear at the point of irreversibility during the process of death? How life-principle becomes operationally inactive in the material constituent of biological life-form at the point, which is recognized as death? And, in the absence of such operation how the physico-chemical and even informational organization fails to sustain life?

HOW AND FROM WHERE WE CAN MAKE A NEW BEGINNING?

Let us begin with Christian de Duve's statement: "Life and mind emerge not as by some freak accident, but as a natural manifestation of tendencies in matter written in the fabric of the Universe."[36] What is this fabric of the universe? And what is this tendency? "Life originated naturally, as a result of spontaneous process. Had I not made such an assumption, the mystery of the origin of life would no longer be a scientific problem."[37] For de Duve, life is one, as it is expressed in the unique commonness of all living systems.

If life is one, and is a natural manifestation of tendencies in matter written in the fabric of the universe then how does it originate spontaneously in nature? There is no overt leaning towards the vitalistic paradigm in this argument. However, it surely suggests an emergence, if we continue to call it emergence, which appears from the deeper recess of nature. Whether materialism or vitalism, the truth lies probably somewhere in the middle incorporating the elements from both sides. The "fabric of the universe" might be another name, may not be identical but may be notional, of what has been called life-principle in the vitalistic paradigm, and the "tendency in the matter" could be a specific state of matter, the living state of matter, which can support life. The establishing of a connection between the two, the spark of action-contact followed by a lasting combination of separation (closure) and a selective union (openness) requires the phenomenology of enclosure. Brooks, while looking for some "new staff" in explaining life, mentions Penrose's and Chalmers' views on consciousness, but also suggests that other philosophers might hypothesize some more ineffable entity, such as a soul or *élan vital.*

[36] de Duve, C. 1995. *Vital Dust*. New York: Basic Books..

[37] de Duve, C. 1999. Life as a Cosmic Imperative. Science and Society. Moscovits, M. (Ed.). Toronto: House of Anansi, 83.

A PHILOSOPHICAL STANDPOINT AND A PROBABLE RESEARCH HYPOTHESIS FOR SCIENCE

We have made our philosophical standpoint clear. Could it be translated into a workable research hypothesis for science? Possibly yes. This hypothesis, at this stage, could be stated as follows. Life-principle in combination with the living state of matter in a specifically informed situation created by means of a viable spacetime framework is necessary for the development of life-form. To put it another way, life-form is created by an enclosure of matter which has evolved to a critical threshold of the living state that can be the operational ground of life-principle. The relationship is not that of simple addition since life-form minus life-principle does not make the living state of matter. In between, the author hypothesizes the involvement of operational mechanics of active information acquiring a specific structural geometry.

Life as we commonly know is, therefore, an integral of (i) life-principle, which is made to work (ii) within a specific form (space and time) of (iii) an evolved state of matter, called "living state of matter." (iv) The boundary of life-form is a special space-time formation out of a specifically informed situation taking material contribution from both the environment and metabolic milieu inside.

To formulate the hypothesis more explicitly, one has to address five nuggets, namely (i) life-principle (ii) the living state of matter, (iii) emergentism and possible operational know-how of information (may be called information mechanics) (iv) the phenomenon of enclosure and (v) the chronology of operational cessation of nonlocal elements during the process of death and their restoration during the generation of life.

Further elaboration on the five nuggets
1. Life-principle

Could this "fabric of the universe" or life-principle be a fundamental entity like consciousness? Henri Bergson suggests that life-principle itself could be a distinct entity, *élan vital*[38]. The living system is not closed, and if it were so spontaneous, changes therein would lead to an increase of disorder (entropy). This observation was made by Hans Driesch who suggested the concept of entelechy. In the Sanskrit language, the subtlety of life has been expressed as *prana*. Sri Aurobindo calls it life-force, *prana-sakti*. In the 20th century an Indian yoga guru, Paramahansa Yogananda[39] described this intangible aspect of

[38] Bergson, H.1998. *Creative Evolution*. Trans. Mitchell A, Dove Publication.

[39] Yogananda, P. Sri Sri. 1999. *God Talks with Arjuna*. Kolkata: The Bhagavad Gita. Pub. Yogoda Satsang Society of India, 570.

life as lifetron rhyming it with the electron. According to him, lifetrons can be further traced to its source, the thoughtrons of God. Some of the scientists of the CERN laboratory have been looking for this life-particle, or anti-gravity particle if any. Ervin Bauer[40] suggests that the intangible aspect of life, its irreducible element is life-principle—an inescapable assumption for life-science. This principle cannot be and does not need to be produced in the laboratory. It is abundant and inexhaustible in nature. Regarding the origin of life-principle the questions "when," "where" and "how" would be the toughest to answer. Life-principle is omnipresent and is almost as old as consciousness and Mother Nature.

The hardware within the brain is a living hardware. Life-principle is that in absence of which the brain in spite of having all its hardware and software, its 10^{11} neurons with highly specified membrane, complex microtubules (Stuart Hameroff, Roser Penrose) and extensive synaptic network (Bernard Barr) with almost 10^{12} cooperative glial cells, fails to support the operation of consciousness within the brain. Also because of its absence, a robot even when it is self-replicating can never become conscious or have conscious experience. Life-principle connects mind with self and also the process of cognition with that of phenomenology. Life-principle is that which enables mind to 'download' information from different source-fields of nature. Life-principle is that which completes the incomplete operation of 'mind uploading' (of Kenneth Hayworth, Natasha Vita-More) from different 'connectomes' within the brain irrespective of whether the process is discrete and focal, or diffuse and global. Life-principle is which makes consciousness 'here', consciousness 'there' (Christof Koch and Giulio Tononi) into consciousness 'everywhere' within the brain. Involved in sleep-wakefulness cycle life-principle is what makes a sleeping person spontaneously awake! Also it plays a crucial role in psychology of motivation. Life-principle is that which offers the subtle yet stable anchorage between cell membrane and microtubules. In absence of this, microtubules crumble and the process of apoptosis is switched on in the neurons and glial cells.

Properties of life-principle

Like all other nonlocal elements, life-principle is neither observable nor measurable. By nature, it is all-pervasive. Like consciousness-as-such and unlike the mind and information, life-principle is neither reducible nor perishable. As the unconditional consciousness is called consciousness-as-such so life-principle could also be called life-as-such. Life-principle possesses the property of contagiousness. If the system is in receptive and submissive form, life-principle could invade it; for example, enlivening of an inert DNA/virus by introducing it within a host cell. The DNA/inert virus that can be

[40] Bauer, E. 1935/1967. *Theoretical Biology*. Moscow: VIEM; Budapest: Akademiai Kiado, 96.

stored as such in the laboratory for years suddenly gets into life when introduced inside a suitable host. Life-principle in the life-form (host) gets into this nucleic acid polymer, which then starts multiplying. When life-principle leaves life-form, the form is no longer alive. Life-principle generates a new order from disorder. My view on similarities and differences in properties between consciousness and life-principle, difference in properties between mind and self, and between self and life-principle can be found in my recently published paper.[41]

2. Living State of Matter

To support life-principle in a confined phase the matter requires remaining in an extraordinarily evolved state that may be called living state of matter. There are three conventional states of matter; solid, liquid and gaseous state, and four others: ionic state, plasma state, superfluid state (zero viscosity), and superconductor state (zero electrical resistance). If there were any eighth state of matter, it would be the living state of matter. In fact, the eighth state of matter has been proposed in 1983 by Rajen K. Mishra from India (see footnote 2). Paul Davies also writes: "Life is so extraordinary in its properties that it qualifies for the description of an alternative state of matter."[42]

In matter-based science, the focus and emphasis is on "organization" aspect of self-organization and not on self. The living state of matter, which is bestowed with ability to operate with choice, is further evolved from a mere self-organization. In other words, the living state of matter is a more advanced state. Mishra pursued this thesis relentlessly against all obstacles he faced from the upholders of the self-organizing paradigm, which says, "Self-organization is *creation without a creator attending to details.*"[43] While Charles Darwin has disowned any originator of species, the self-organization paradigm seeks to remove the organizer from the organization. The unanswered question in the self-organizing paradigm remains: What could be this self which is made responsible for self-organization? Where from does it come? How does it acquire corporeal property in the system?

The living state of matter could be the culmination of evolution of the chemical evolution of matter where matter has acquired specific configurational properties, has become an informational molecule, and, finally, acquired inde-

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[41] Mukhopadhyay, A.K. 2013. "Non-Observable Influential(s) in the Domain of Consciousness." *Psychology Research*, 3(11), 637–652.
http://akmukhopadhyayconsciousness.com/pdf/LINK15.pdf

[42] Davies, P. 1998. *The Fifth Miracle: The Search for Origin of Life*. London: The Penguin Press, xviii.

[43] Bremermann, H. J. 1994. "Self-Organization in Evolution, Immune Systems, Economics, Neural Nets, and Brains." In: *On Self-Organization. An Interdisciplinary Search for a Unifying Principle*. Mishra, R. K., D, Maab, E. Zwierlein. Berlin, Heidelberg, New York: Springer-Verlag, 5–34.

pendent replication properties to culminate in its translational behavior. Further, the state could be characterized by (i) thermodynamic openness operating far from equilibrium, and (ii) the self-organizing property having (iii) a hitherto unexplainable complexity. Also it has (iv) the ability to act as the operational field of a specific category of information which is active and works with self, mind and matter. This explains the state's (v) acquisition of mind-like properties like the execution of logic and discrimination, (vi) the acquisition of self-like property like demonstrating choice, and thereby (viii) the acquisition of consciousness as the ability of maintaining the unity and coherence of the whole.

When, where and how did ordinary matter evolve into such living state of matter are exhaustive research questions both at philosophical and scientific levels.

3. Emergentism and the mode of operation of information

"Emergence claims the neutral ground between substance dualism (perceived as hostile to science) and reductive physicalism (perceived as hostile to religion)."[44] This paper holds the view that life-principle/"fabric of universe" is omnipresent. It does not emerge from anywhere in the material world. What emerge during the evolution of matter to the level of its living state are the different degrees of "tendency", more and more to reach the critical threshold of coming in action-contact with and thereafter supporting the fabric of universe. What emerges is a specific pattern of informational organization of matter to uphold material changes in a sustainable way, on one hand, and the acquisition of mind-like and self-like properties, on the other. "Life is that property of matter whereby it can remember—matter which can remember is living. Matter which cannot remember is dead."[45]

It is worthwhile to examine Robert Van Gulick's remarks regarding the arguments of Roger Penrose, Lockwood and McGinn in this context:

> "the persistently mysterious nature of the psycho-physical gap gives good reason to believe that we need new ways of conceptualizing and understanding both the nature of the mental and the nature of the physical. Our inability to solve the puzzle of their link […] results from the inadequacy of both sides of the equations. McGinn,[46,] for example, claims that expanding the link would require both a better understanding of what he calls the hidden

[44] Freeman, A. 2001. "God as an Emergent Property." *Journal of Consciousness Studies* 8, 9–10, 147–159.

[45] Butler, S. 1878. *Life and Habit.*

[46] McGinn, C. 1991. *The Problem of Consciousness*. Oxford: Blackwell; McGinn, C. 1995. "Consciousness and Space." In: *Conscious Experience*, Metzinger, T. (Ed.). Thorverton: Imprint Academic.

> nature of consciousness (1991) and a radically different conception of physical space (1995) […] Lockwood (1989)[47] finds the concept of matter itself deeply problematic and argues for what might be regarded as a dual aspect view in which matter and mind are closely integrated at the fundamental level […] Penrose[48], finds existing attempts to explain consciousness in terms of physical or algorithmic processes doomed to failure for reasons concerned with mathematical limits of formal system; he is equally dissatisfied with the present attempts to integrate our physical theories of the very small and the very large at the interface of quantum mechanics and general relativity. He optimistically hopes for a joint revolution that would address and resolve both puzzles."[49]

To bridge this gap one requires "revolutions" on both sides of the apparent chasm. Some kind of emergence is essential on both sides. In *The Millennium Bridge*, the pentaune model of nature-consciousness is the result of such emergence.[50] With the radical kind of emergence of Van Gulick (cf. John Searle's type II emergence[51]), the emergent achieves the causal power to influence the base through which it emerges. This is a rare event in the material world but not entirely absent.

"Life's origin may only be explained through a study of its unique management of information. Our work suggests that the answer will come from taking information seriously as a physical agency, with its own dynamics and causal relationships existing alongside those of the matter that embodies it"—writes Paul Davies.[52] Information exists independently of matter, and has an operation of its own.[53] My another paper also examines this specific geometry and operation of active and inactive information.[54] With this specific operation of active information molecules of both cytoplasmicist and nucleocentric lineages get connected with the function of mind and self by a specific alteration in the structural geometry of information.

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[47] Lockwood, M. 1989. *Mind, Brain and Quantum*. Oxford: Blackwell.

[48] Penrose, R. 1989. *The Emperor's New Mind*. Oxford: Oxford University Press; idem. 1994. *Shadows of the Mind*. Oxford: Oxford University Press.

[49] Gulick, V. R. 2001. "Reduction, Emergence and Other Options on the Mind/Body Problem. A Philosophic Overview." *Journal of Consciousness Studies* 8, 9–10, 1–34.

[50] Mukhopadhyay, A. K. 2000. *The Millennium Bridge.* New Delhi: Conscious Publications, 36–58.

[51] Searle, J. R. 1992. *The Rediscovery of the Mind.* Cambridge, MA MIT Press.

[52] Davies, P. 2013. "The Secret of Life Won't Be Cooked up in a Chemistry Lab." http://www.guardian.co.uk/commentisfree/2013/jan/13/secret-life-unveiled-chemistry-lab

[53] It has been elaborated in my paper "The Radical View of Information" (see footnote 8).

[54] Mukhopadhyay, A. K. 2014. "From Quantum to Consciousness: A Long Way to Go! Making the Science of Information Meanwhile." In: *Brain, Mind, Cosmos: The Nature of Our Existence and the Universe*. Chopra, D. (Ed.). New York: Sages & Scientists eBook (to be published).

4. The momentous event of physical enclosure

The most crucial momentous phenomenon in the creation of life-form is the physical enclosure of nucleoplasmic and cytoplasmic components resulting in self-environment differentiation. We do not know when, where and how did it happen. I have the following view in this regard: The procedure of enclosure is associated with two simultaneous events: the outside becoming in and some of the inside materials becoming out. Regarding outside becoming in, various source-fields of the outside might be the candidates. Several operations of nonlocal elements might be an additional possibility. Various universal processes could be the answer. Regarding inside becoming out, how much of the chemical milieu and how much of the descendent of microbial Adam would work within this enclosure are critical decisions. The descendent of the microbial Adam with a view to getting within the enclosure, has to give up its gene-robbing habit and free-rein sexual promiscuousness. It has to shift its focus from a mere identity "politics" of negativism, exploitation of host, victim-playing prejudice and vengeance and one-pointed evolution aimed at acquisition of more and more virulence, to a broader engagement for the organization of an evolving system. For doing so, the genetic material has to fall on the line of consciousness, life, self, mind and information. What is wasteful and redundant from both chemical milieu and nucleic acid milieu is to be purged outside the enclosure. Critical is also the decision of keeping the genetic pathway of programmed cell death (apoptosis) potentially valid, which could be switched on any moment when the set life-form irreversibly deviates from the defined purpose.

What is this defined purpose at cosmological, biological and spiritual levels? To understand the cosmological purpose, one has to go back to the era of cosmological tug of war between dark matter and dark energy (see footnote 14). Dark matter (constituting about 25% of the universe) is supposed to hold back the components of the universe while the dark energy (constituting about 70% of the universe) pulls the components apart and thus contributes in expansion of the universe. A balance of the two operations maintains the dynamically changing size of the universe. However, this maintenance, even for a status quo, is an extremely strenuous job for nature. Primarily with an objective to ease out this relentless tiring exercise and also with another objective to help manifest nature that is beyond Planck's scale as a nature, which is measurable within Planck's scale, some other mechanism demands innovation. It was found not possible by wandering amino acids or protein molecules. Naked RNAs and DNAs were found to be of no value either. Viruses also failed to rise to the occasion. Nature, which was visibly almost harassed during such pursuance of her effort to contain the cosmic tug of war, started looking for a sensible, sustainable and practical solution. At this point, nature came out with a decision to design life-form by the formation of an enclosure.

Enclosure helped to (i) manage information, which was hitherto address-non-localizable, context-non-addressable, and bombarding on quantum fields or on Emperor's new mind to generate an enormous amount of dark energy hereafter would bombard on the cell membrane, perhaps the material representative of the mind of a cell. Location-non-addressable, content-non-addressable and context-non-addressable information became location-addressable, content-addressable and context-addressable information. It also helped to manage and regulate the (ii) economy of dark energy and dark matter in the universe. Besides, there is (iii) active participation of life-form in conversion of information-based energy into "white" energy and visible matter. My imaginary scheme regarding this is shown in Fig. 1.

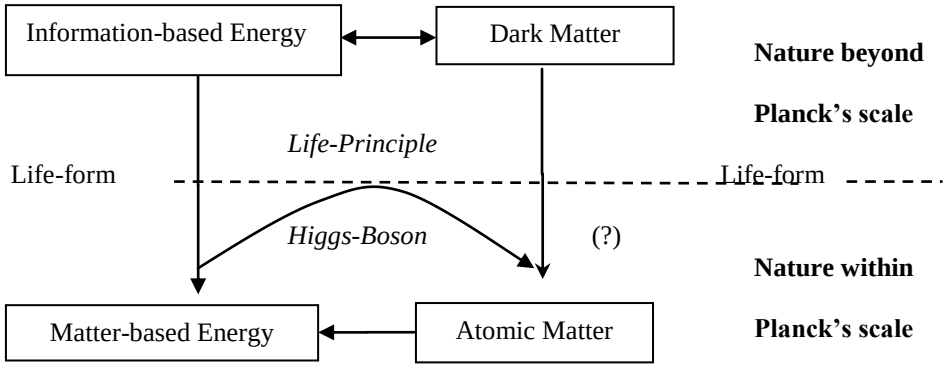

Fig.1

(iv) Life-form thus started playing a role in the transformation of nature, which is outside Planck's scale, into nature observable within Planck's scale. (v) Life-form, thereby, came into the picture for the resolution of conflict between two sides of nature. The biological purpose of this cosmological intent was achieved by the development of a logical operational closure and maintenance of individuality. The spiritualists also describe a profound spiritual purpose in this phenomenon of enclosure. This is a conscious decision to create a miniscule form of the conscious universe with self, mind, life-principle and information, all within the ambit of the material milieu of proteins and nucleic acids (in fact, life is a hologram of consciousness-nature). The purpose is to create multiple holograms of consciousness-Mother Nature and to cherish the pluralistic world.

We are yet to resolve what initiates the procedure of enclosure. The issue merits elaborate discussion. May be it is action-contact, the spontaneous spark created by the contact of the "fabric of the universe" (life-principle) with the culminated evolution of the "tendency of the matter" to living state. Does the Higgs Boson have any role here to play? Probably yes. The scientists

hold the view that without Higgs, life cannot be originated or sustained. Coming in contact with Higgs-Boson's non-zero vacuum fields, several massless energy package like neutrinos, acquire mass. The Higgs Boson operates within Planck's scale of nature, while life-principle operates outside Planck's scale of nature, and the two operations meet (Fig.1) at the boundary of life to make 'nonlocal' work within a local enclosure.

There is no evidence for such enclosure in the cosmological scale except that the Last Universal Common Ancestor (LUCA) had been reported to be chemiosmotic with a membrane bound ATP synthase.[55] However, there are some new ideas on membrane bioenergetics near volcanic vent in the deep sea. It is possible that the membrane formation got initiated in the cosmos and took a further shape in the hydrothermical vent. Further, we are to thrash out what all contributed to this enclosure. Where from did the required proteins and lipids initially recruit to form the boundary? Was it synthesized from viral DNA? The virus can synthesize only when it is inside the host (chicken-egg paradox). Or, could the available protein in the environment contribute in the formation of the simple partition? The phospholipids and iron sulfide are known to be abundant around volcanic vents under deep sea. Perhaps initially it was a simple molecular partition, which changed with time to a complex cell membrane with contribution from the activity of genetic and metabolic materials of the nascent organism. Lane and Martin postulate that "harnessing energy as ion gradient across membrane is as universal as the genetic code,"[56] and propose that "invention"/evolution of the proton pump by a partially enclosed organism takes care of acidic sea water and alkaline vent minerals to develop complexity within as well as to bid a good-bye to the vent-site of origin and to spread all over. This may also be the point of diversion between bacteria and archaea. They also describe possible stages in early bioenergetic evolution and possible divergence of Acetyl CoA pathway in methanogens and acetogens.

5. Analysis of death phenomenon to understand "life'

If the moment of death of a subject is dilated over time, it could be found that at the outset consciousness ceases to operate on the corporeal body followed by cessation of operation by mind when the subject loses its control over urinary and anal sphincters. This is followed by cessation of operation of self with capillary leakage due to failure of Na^+/K^+ pump and development of edema. Life-principle is the last to cease its operation ensuring clinical death of the subject. The chronology is precisely reversed for becoming matter to become conscious!

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[55] Mulkidjanian, A. Y. et al. 2007. "Inventing the Dynamo Machine: the Evolution of the F-type and V-type ATPases." *Nat. Rev. Microbiol*. 5, 892–899.

[56] Lane, N., W. F. Martin. 2012. "The Origin of Membrane Bioenergetics." *Cell*, 151 (7): 1406 DOI: 10.1016/j.cell.2012.11.050

LIFE COMES FROM LIFE

Louis Pasteur[57] stated categorically that life could not originate without life. Life comes from life only."*Omne vivum e vivo.*" Recently, the same concept has been reiterated by Sri Prabhupad, the mystic founder of the Bhaktivedanta movement, and his direct disciple T. D. Singh.[58]

In the sentence "Life comes from life" the word "life" has been used twice. The meanings of two "life's" are not the same. The first "life" means life-form. The second, in the language of a mystical philosopher, means life-principle. So, life-form comes from life-principle. The notion was clear also in Pasteur's vision, as quoted by Koestler:

> "I have been looking for spontaneous generation for twenty years without discovering it. No, I do not judge it impossible. But what allows you to make it the origin of life? You place matter before life and you decide that matter has existed for all eternity. How do you know that the incessant progress of science will not compel scientists […] to consider that life has existed during eternity, and not matter? You pass from matter to life because your intelligence of today […] cannot conceive things otherwise. How do you know that in ten thousand years one will not consider it more likely that matter has emerged from life?"[59]

Is Pasteur's vision correct? What did Pasteur mean by "life" here? Does he not point towards life-principle without naming it? The question still remains what is the purpose of this endless creation of varieties of life-form, the number of which according to the Hindu mythology is said to be 8.4 million before it has to culminate in the present human form.

THE ULTIMATE PURPOSE OF HUMAN LIFE

Following Evan Thompson, we must make a distinction between the physical living body (*Körper*) and the lived body (*Leib*).[60] The latter is rich in experience because of its functioning self, a dynamic mind and an ever-vigilant consciousness. And, from this standpoint we must ask what is the purpose of life. This serious question disturbs scientists, humanists and spiritualists alike. There are three fundamental questions stated in *Prasna* Upanishad and *Brihadaranayak* Upanishad; "Who am I?" "Is there a God," and "What is this World (Universe)?" The purpose of life is to find out the answer of these three ques-

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[57] Pasteur, L. 1857. Mémoire sur la fermentation appelée lactique (Memoire on lactic fermentation). *Compt. Rend.* 45, 913–916.

[58] Singh, T. D. 2006. *Life, Matter and Their Interactions*. Kolkata: Bhaktivedanta Institute.

[59] Koestler, A. 1964. *The Act of Creation*. New York: Macmillan, 702.

[60] Thompson, E. 2011. "Précis of Mind in Life: Biology, Phenomenology, and the Sciences of Mind." *Journal of Consciousness Studies*, 18 (5–6), 10–22.

tions. In the history science, the first recorded answer came from Alfred Russell Wallace: "In order to produce a world that should be precisely adapted in every detail for the orderly development of organic life culminating in man, such a vast and complex universe as that which we know exists around us may have been absolutely required."[61] Dyson penned down the harmony between the universe, life, mind, and self:

> "I do not feel like an alien in this universe. The more I examine universe and study the details of its architecture, the more evidence I find that the universe in some sense must have known that we were coming" [...] Peculiar harmony between the structure of the universe and the needs of life and intelligence is a manifestation of the importance of mind in the scheme of things."[62]

Sir John Eccles commented: "The strange waywardness of the biological evolutionary process seems to match that of cosmic evolution."[63] In 1986, John D. Barrow and Frank J. Tipler published their Cosmological Anthropic Principle (CAP), probably the ultimate of what the physicist could comprehend:

> "The observed values of all physical and cosmological quantities are not equally probable but they take on values restricted by the requirement that there exist sites where carbon-based life can evolve and by the requirement that the universe be old enough for it to have already done so."—Weak Anthropic Principle […] The universe "must have those properties which allow life to develop within it at some stage in its history."—Strong Anthropic Principle. "Intelligent information-processing must come into existence in the Universe, and, once it comes into existence, it will never die out."—Final Anthropic Principle.[64]

In the foreword to Barrow's and Tipler's book John Archibald Wheeler writes:

> "Is man merely an unimportant bit of dust on an unimportant planet in an unimportant galaxy in an unimportant region somewhere in the vastness of space? […] It is not only that man is adapted to the universe. The universe is adapted to man. Imagine a universe in which one or another of the fundamental dimensionless constants of physics is altered by a few percent one way or the other? Man could never come into being in such a universe. That

[61] Wallace, A. R. 1903. *Man's Place in the Universe: A study of the Results of Scientific Research in Relation to the Unity or Plurality of Worlds.* New York: McClure Phillips and Co.

[62] Dyson, F. 1979. *Disturbing the Universe*. New York: Pocket Books.

[63] Eccles, J. C. 1979. *The Human Mystery*. Berlin: Springer International.

[64] Barrow, J. D., F. J. Tipler. 1986. *The Anthropic Cosmological Principle*. Oxford: Clarenden Press.

is the central point of the anthropic principle. According to this principle, a life-giving factor lies at the center of the whole machinery and design of the world."

I find an astonishing similarity between the statement of FAP and one of the statements of Akhandamandaleswar Sri Sri Swami Swarupananda Paramahansa Dev, my Gurudev and the originator of the Akhanda worldview in the spiritual realm and who coined the term "multiversity" in the worldly realm. According to him, "Sadguru gets born but never dies." It means Sadguru is out of the cyclical laws of birth and death. In other words, Sadguru is one whose nature has become identical with Mother Nature. Sadguru may also be called supracortical autonomy; regarding information processing and responsiveness his central nervous system has achieved so much perfection that autonomy has been conferred on him, neurologically to his cerebral cortex by Mother Nature. In this sense Sadguru is the only being who dwells in the *Akhanda* state of life.

However, many outstanding scientists see the universe as indifferent to life, among others Stephen J. Gould: "We are offspring of the history, and must establish our own paths in this most diverse and interesting of conceivable universes–one indifferent to our sufferings, and therefore offering us maximum freedom to thrive, or to fail, in our own chosen way."[65] And, G. T. W. Patrick: "What, in reality, we have is a striving organism, subject to influences on every side, accepting or resisting them, threading its way through them, battling against them, pressing ever on."[66]

The process of human transformation is said to be a two-way process; ascent and descent. Ascent strives to find a place for self in the cosmos. Descent experiences the cosmos within the self and expresses it. In an advanced stage, both processes are experienced simultaneously. Those who see the universe as indifferent to life perhaps draw conclusions from their yet-to-be completed experience in the limb of ascent. The limb of descent completely escapes their observation. What also remained unknown to them are the science of the surrender (volunteered, complete and unconditional surrender) and the practice of implicit obedience to the source-fields. Therefore, they miss the phenomenon of emergence concurrent to the meeting of bottom-up and top-down processes in the undivided *Akhanda* scheme.

In this *Akhanda* worldview, life originates in nature from consciousness. Life-principle, self, mind and information in a spatiotemporal pattern of matter and energy are its constituents. The life-form at its highest level as a self-conscious living being can experience this unbroken *Akhanda* worldview, and can also articulate the scheme in his thoughts and deeds. This is the finest miracle of this creation.

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[65] Gould, S. J. 2000. *Wonderful Life: The Burgess Shale and the Nature of History*. London: Vintage.

[66] Patrick, G.T. W. 1982. *Introduction to Philosophy*. New Delhi: Surjeet Publications.

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