

# **A contemporary understanding of logic in Nature & its evolution to consciousness**

## **God as the unified logic of Nature**

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### **INTRODUCTION**

*Logos* or Logic since the time of the Greeks is essentially viewed as an abstract method or tool of reasoning employed by the human mind to analyze, understand and solve all kinds of problems and dilemmas that have plagued mankind since it entered the period of civilization. This includes its use for pursuing philosophical questions and quests. This unchallenged and almost dogmatic way of looking at logic has created a dichotomy within our minds between logic and objective reality, with the result that we do not view logic as a concrete and integral part or property of objective reality. It remains just a part of our subjective reality, which we view as apart or distinct from the rest of Nature. The premise of this paper is that this approach of looking at logic deprives us of inquiring into and knowing the true nature and potential of logic vis-à-vis the life of contemporary human beings. This paper is an attempt to introduce this issue and layout another approach of viewing and understanding logic and its concrete operation in every phenomenon that exists in Nature including human beings.

The first part of this paper focuses on exploring the issue of how logic is a concrete internal property of all things and phenomena in Nature and not just an abstract tool of reasoning. The purpose is to enable the reader to recognize the actual nature of logic and make the distinction between logic and human reasoning. The relationship between the concept of logic and our concept of God is another important component of this part. The second part speculates about the origins of logic in the pre-Big Bang era of Nature's history and takes the reader through the three stages of the unintelligent or random phase of its evolution from the pre-big bang onwards. Concepts like dormant logic, active logic and the aesthetic of Nature will be introduced in this part. The third part explicates the programmed or intelligent logic phase which begins with the emergence of living things in Nature. It explains the causation and mechanics of the growth in capabilities of living things and the parallel increase in conflicts and tensions within and outside of them and the continuously developing contradiction between the two, which eventually leads to the emergence of mental structures as quantum organizations of fundamental energy forms. The concept of event intelligence is introduced to the reader in this part. The concluding part explains the process of the emergence of systems intelligence in human beings after the emergence of civilization. And how this systems intelligence has today acquired the capability to become mature and incorporate event intelligence in it. It explains how with the maturing of systems intelligence and its maturing pleasure process logic itself will become conscious and capable of fulfilling the agenda of the Aesthetic of Nature that emerged in the active logic stage of unintelligent or random evolution in Nature.

## **Part I. Logic as a concrete internal property of all things in Nature**

Logic, in the functioning of Nature and phenomena within it, is generally understood as the relationship between cause and effect; that there will not be an effect without a cause and cause will explain the effect. We infer the existence of logic in nature from our repeated observation of phenomena behaving logically, i.e., in accordance with some laws, and not in an anarchic manner. But the question is where does logic come from, what is the reason behind phenomena operating logically? In result of an inquiry into this question we propose a completely new understanding of logic as an integral part and property of energy forms and things in Nature. Logic we propose does not exist as some abstract idea or design about the working of processes and phenomena in Nature by operating separately or outside of them; which is really how it has essentially been seen till now—i.e., as an abstract category. If it is an objective reality then it must exist as a concrete thing operating as an inseparable part of nature's energy processes. In fact tracing the history and origins of the Universe will reveal that logic really exists as an integral property of the most fundamental energy forms/process in Nature that existed way back before the big bang. It is the source or the building block of all energy forms and phenomena that we know of, including ourselves.

We propose properties of things being as objective and concrete as the things themselves, and not something abstract having a separate existence from the thing itself. Just to give an example, when we attribute goodness to some person, then generally we consider it as a subjective category and not as something objective and concrete as the energy/matter form of the person of whom it is an attribute. But goodness today we can say is a concrete property operating in terms of a certain mental formation/configuration---the human emotional energy processes in this case---composed of weak energy forms<sup>1</sup>.

All properties are parts of a thing and are not entities in themselves. For instance spin is a property of a magnetized particle; it does not have an existence of its own. So properties are

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<sup>1</sup> This proposition is explained in detail in the subsequent parts.

really inseparable from the thing; in fact they are the thing itself, because without them the thing does not even exist<sup>2</sup>. In addition properties of a thing belong to the whole of it; if we consider each property of a thing to be only for a part of it, then it will no longer remain a property of the thing as whole. For instance the property of spin is not of some one part of the particle but its property as a whole, or the same with charge; we do not say one part of the particle is charged. In the same way logic is a property which belongs to the thing as whole. In addition it is a property which dominates and determines all other properties, and being an integral part of the primary energy form, its operation is universal.

Thus logic operating as property of energy at its most fundamental level governs the functioning of things/phenomena at all levels—of motion, interaction, destruction, creation—throughout every dimension of the universe from the elementary and micro to the complex and macro, and also in point of the dimension of time—from the past to present and the future, which means throughout all stages of evolution. Hence we can say that the complex variety of phenomena (beginning from neutrinos to the human brain/mind) have been a product of the interactions, permutations and combinations determined by the cause and effects arising from the internal properties of Nature’s energy processes, which means a product of one unified chain of cause and effects, a continuous thread of an evolutionary process determined by logic.

Thus logic we propose is a dynamic phenomenon operating at all stages of being and existence in Nature; that is what makes it universal, which means that it is a general law of nature that specific causes will produce correspondingly specific effects, and these will flow from no source other than those specific causes that produce that specific effect. An important aspect of logic that needs to be highlighted here is that it operates as a composite body of logic. Composite means all dimensions—micro and macro, individual and collective—operating simultaneously. Logic is composite and holistic cause and effect in a moving state which operates in Nature independent of the mind. Human reasoning, on the other hand, focuses upon simple, isolated or severed cause and effect because it evolved as a part and

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<sup>2</sup> As Hegel says “to know the properties of a thing is to know the thing itself.” (Grant & Woods, 2001, online edition)

product of the human mind, which basically evolved to fulfill subjective needs and not to understand reality or its logic.

In view of the above Nature needs to be seen as a logical system in space and time—space means micro and macro, and time means momentary and long term. The point about understanding logic in above terms is that it excludes anything other than the operation of the logic arising out of specific causes which are internal to phenomena; logic excludes all interference from external causes. The difference between logic and all other things in Nature is that logic will remain logic. This however does not mean that it is like some fixed static rule of law, but it is a dynamic evolving logic, which goes through different states and levels of logic. As is manifest in the ever more complex phenomena that it has produced in evolution. Here we need to add that logic has not been proceeding smoothly, harmoniously in a straight line, but in a zigzag manner, through a process of conflicts and contractions to produce new forms and phenomena at more complex levels. It has not been operating like some intelligent designer, but at the unconscious, unintelligent level through a lot of failures, destruction and rejection of forms. So that today we are able to see only those forms and phenomena that got selected on the criterion of logic in the course of its unconscious operation.

## **Logic and God**

In the light of the above understanding of logic we may share a very interesting insight about its working and role in Nature as akin to that which we associate with the concept of God. Being a property of the fundamental energy forms in Nature it is all pervasive, present and operative in all phenomena in Nature, just like God is. Like God logic also cannot be seen; it does not manifest itself as logic, but lies in everything. It is also all mighty, all-powerful and creative like God in the way it governs the existence, functioning, survival, growth, destruction and birth of new phenomena in Nature. So God we may say is the unified logic of Nature governing not only the functioning of phenomena at all levels but also at the same time their evolution. However this covers only half of its semblance to God; the other half is

connected with its semblance to God's intention and purpose; which as we will explain in the forthcoming arguments, unfolds in the progression of unified logic to qualitatively more complex and enabled levels. Until it reaches a stage where it becomes conscious, through the maturing of the evolution of the human mind, consciousness, which operates in terms of the same pre-big bang universal energy form as logic.

With this Nature's logic, which has so far been operating at the unconscious level since before the pre-big bang through contradictions, tussles, force and hence pain would henceforth be able to proceed and progress to higher and more complex levels much more dynamically through the dialectic of harmony, which we term as the Aesthetic of Nature, and as the preference of Nature's logic, representing a state of pleasure as opposed to the pain of contradictions. This qualitative evolution of logic is not achieved through some predetermined design, abstract law or a purpose; but in result of the operation of the characteristics/properties inherent within it, its own property and tendency to progress to higher levels of complexity and functions.

We are aware that it is not going to be easy to understand the operation and evolution of logic in the above terms. For that we will need to break away/free from the whole variety of concepts about Nature being governed by some abstract design, ideas, laws or purpose outside of the natural process. Starting from the concept of God as some Supreme Being, Personality, who has made the laws and principles of Nature, the concepts of *Sabdabrahman*<sup>3</sup> and *Varuna*<sup>4</sup> in ancient Indian tradition, concepts like *arche*<sup>5</sup> put forward by early Greek philosophers. And later on Plato's theory of perfect ideas or forms in which there exist eternal perfect forms in the world of essence towards which created forms (which are imperfect copies of those perfect forms) of our existing world are moving (Russell, 1946, p. 143). Then the Hegelian concept of an absolute idea being the eternal and absolutely powerful essence or substance of the world (Russell, 1946, p. 763), up to the currently reigning developed & modified (from the works of Greek mathematicians like Pythagoras, Archimedes, Apollonius,

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<sup>3</sup> The grammarian Bhartrhari (A.D 450-500) describes this concept as "that beginningless and endless one, the imperishable Brahman of which the essential nature is the Word, which manifests itself into objects and from which is the creation of the universe." (Rowell, 1992, p. 36)

<sup>4</sup> "The administrator of the cosmic law (rta, dharma), which regulates all activities in this world. (Embree (Ed.), 1988, p. 10)

<sup>5</sup> It is a "beginning or origin; and it is also a rule or a ruling principle" (Barnes, 1987, p. 20)

and many more) concept of mathematical logic in modern science, which explains & limits the understanding of logic as operating merely in terms of some abstract mathematical equations or laws. Mathematical logic basically abstracts aspects of things in terms of quantities, and deals only with the logic of those quantities which can be dealt with as entities in themselves, as separate from the things they represent. The implication of doing this is that logic then becomes a thing in itself, it acquires a spiritual, non-material existence, so to speak, which is real only in the world of mathematics and not in the world of things. Quantities do play a role in logic, but we propose, that they are only one aspect of logic and not the whole of logic.

We do not however reject all the perceptions laid out in the past ideas; they were an understanding in the making and not yet complete. The concept of logic, its different aspects and shades that we have already discussed and will be discussing in the forthcoming parts, is a link in the chain of the same human endeavor, and incorporates a lot learnt from the past ideas and perceptions of man. The problems and defects in the earlier concepts mainly flow from the absence of the knowledge fund available to us in our times, about the origins, functioning and evolution of the macro process of the universe, the various dimensions and levels of the functioning of phenomena within it. The scientific knowledge about the human mind and reasoning process being a part and product of Nature and of the origins and evolution of biological need based mental processes in other living forms. Ignorance of this last area really made man view his mind and reasoning/idea process as being apart and separate from Nature, in which he had the autonomy of conceiving any ideas or reasoning as truth. We must also look at the flaws in earlier concepts as being a product of the limitations and defects of the reasoning process coming from the biological basis on which the mind, its perceptual and idea processes have evolved. Nevertheless it is a phenomenon representing the most advanced stage of Nature and having the potential for approaching proximity to logic as it operates in nature. The reasoning process is a recent phenomenon in Nature, emerging some five thousand years ago, with the beginning of civilization. Hence it is still a nascent process but nevertheless an evolving one. It is bound to keep on improving its capability of knowing over the course of the future evolution of our mind.

## **Part II. Historical journey of logic from the pre-Big Bang onwards**

The understanding of logic that we are putting forward we must say was possible only now, when we can address the question about the source of logic in Nature, and how it operates in Nature by going into the history of Nature before man and his idea and reasoning process emerge in it. Logic was operating in Nature even before man came into being and started having ideas about it. Today we have enough facts and knowledge about the macro process of the Universe and the micro phenomenon within it and their history, to be able to go even further back into the nature of their origins.

### **Unevenness in pre-Big Bang space; the period of Dormant Logic**

We propose the existence of a whole history of the universe, spanning over say a hundred and fifty billion years, before the Big Bang<sup>6</sup>. In the early stages of this period, we are postulating there was no matter or energy but only dimensionless space and dimensionless time<sup>7</sup>. The dimensions were zero or infinity, which are really the same thing because zero has no dimensions and infinity is where dimensions end. But there was unevenness in terms of time and space<sup>8</sup>; which we suggest was in the form of there being different parts or segments of space, and time impacting differently on those different segments. So this is how unevenness existed at this stage without there being any energy and matter.

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<sup>6</sup> The Big Bang is said to have occurred roughly 15 billion years ago.

<sup>7</sup> Time we are proposing existed even before the Big Bang, in terms of a unit of time which can be referred to as X; it was in motion without reference to any other phenomenon. And now when we can measure it in terms of more tangible phenomena then we can see that it is apparently moving at different speeds.

<sup>8</sup> Unevenness had to be there, otherwise there would be no prospects for interaction and logic to come into play, which it only does in interaction between different things. And surely there was an interaction between some elements if not energy and matter as we know them, otherwise there would not have been a big bang and further evolution.

By proposing the above we are not at all suggesting that space and time were like some “nothingness” out of which things arose; a concept that some philosophical and scientific theories propagate. We propose that before energy came into existence in its most micro and simplest form as in neutrinos and their quantum states, there was no nothing. There must have existed components of energy in space; because energy even in the neutrino<sup>9</sup> form is a highly developed logical process.

These components we suggest neither existed in the form of an ‘energy package’ as in a particle form, nor in a quantum wave form, but in a pre-particle, pre-wave mass-less form of energy, which has an energy characteristic, but is not the energy we know of<sup>10</sup>. The only characteristic of these ‘pre-energy’ components was logic, but in potential form; and the only characteristic of logic was these components expressing, if we may say, the multiple potentials of energy. So we can say that energy & logic in their potential form existed as one in the beginning; they were the same. This state where energy and logic existed as one can be described as a kind of a stable state of space which was always there, in which there were no interactions and changes that arise from packets of energy in a wave or particle form<sup>11</sup>.

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<sup>9</sup> According to the standard model neutrinos are considered mass-less, but, Brian Greene (1999) thinks “not for any particularly deep reason” and we agree. In recent years, however, scientists have made huge progress in understanding neutrino masses and oscillations. On the basis of some experiments regarding neutrino oscillations it has been suggested that neutrinos do have a mass and the fact that they exist in three forms or types (Electron-neutrino, Tau-neutrino and Muon-neutrino) is also well-known today. Experimental data regarding the solar neutrino measurement problem also suggests that they exhibit complex properties in terms of their ability to change from one type/form to another while moving through matter and space. A number of experiments have also been conducted to understand their interactions with other matter and energy forms. String theorists have also been trying to explain the existence and properties of neutrinos. Thus, neutrinos cannot be considered a simple phenomenon.

<sup>10</sup> The dimensions of that energy would be quite different, something we can’t possibly make tangible in terms of existing notions of energy. Nature has no problem with weight, size, or functions; it seems to be so relaxed with all these dimensions. All things are lying in its domain. In our minds, there are kind of ceilings, limits on the basis of observation. We operate only in some dimensions which are tangible for our existing mental framework and tools of observation.

<sup>11</sup> To argue the reasoning we have done on the pre-Big Bang world we would like to mention here the work of Gasperini and Veneziano on the pre-Big Bang scenario. As explained by Brian Greene (1999, p. 362) this work suggests that “the universe started out as cold and essentially infinite in spatial extent.” And then according to them “an instability kicked in, driving every point in the universe to rush rapidly away from every other...this caused space to become increasingly curved and results in a dramatic increase in temperature and energy density.” Which led to the Big Bang and the universe we are familiar with. This work has some significant implications which need to be recognized and developed. The universe being infinite in spatial extent can be related to what we are saying about the existence of infinite stable space, although we are pooling in an additional factor here, the existence of components of energy in a state of inaction vis-à-vis each other. The ‘cold’ state of the universe that they are proposing in our view could be due to the absence of interaction between the components of energy or in other words their state of inaction-vis-à-vis each other. We will be putting forth the concept of tensions in the next paragraph. In our view the ‘instability’ that they have referred to

So we can visualize an infinite space having components of energy separated from each other in a state of inaction vis-à-vis each other. These components of energy are forms of dormant or potential logic manifested only in time being in motion. So the unevenness in space we are suggesting would be with reference to the dormant components of the weakest form of energy forming different segments of space. The role of time was that it would be compacting those dormant components in different ways unevenly. This produced an interaction between time and space due to tensions arising from contact between unevenly compacted components. Tension means an obstruction, in whatever little degree it may be. Once there is tension, active logic is born; before that we only have dormant logic, and tension is a product of dormant logic.

### **The birth of Active Logic and the aesthetic of Nature**

With the emergence of tension there is a ‘need<sup>12</sup>’ to resolve that tension, do away with that obstruction, which in other words means an aversion to that state and a preference for another state. The moment that emerges we have the origin of pain and pleasure, after which it is only a question of how it goes on to express itself more efficiently, creativity and with greater productivity in evolution.

The mechanics of this process of aversion and preference (pain and pleasure) are that when those unevenly compacted components in space come in contact with each other then it is a contact between uneven categories in motion, which reverses the direction of motion of the weaker category. In other words when the forces of motion of components collide and the

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could have been in the form of those tensions that we are proposing as arising from contact between unevenly compacted (by time) components of weak energy.

<sup>12</sup> ‘Need’ is a property of being which has a rule in it that governs how things will move and interact, and is the objective basis of logic, applicable to all stages of the evolution of logic.

weaker segment reacts with aversion to its motion being reversed then at that point there is a resistance from it, which means an inherent preference in it to proceed in its own direction. That is how logic becomes active.

Thus the difference between dormant and active logic is when the logical process has not only motion and direction but also acquires an added feature of preference and aversion—the logic of like and dislike. This new dimension of logic is not only interactive but coupled with previous dimensions becomes the mother of complexity. With complexity it becomes an expanding playground for active logic, whose first product is the weak energy packets<sup>13</sup> such as neutrinos and then the Big Bang<sup>14</sup>.

Complexity actually occurs in result of trying to resolve, overcome tensions and contradictions, and for achieving harmonious motion and interaction. The dislike or aversion for contradiction in the very next step means a preference for motion and interaction through harmony, which we propose and term as the Aesthetic of Nature. It is to achieve motion and interaction through harmony that phenomena become complex and acquire increasingly greater capabilities for interaction; which is what we see in evolution, that we move from less interactive energy forms like neutrinos, to quarks, gluons, then atoms and so on.

To explain how this happens concretely let us take an example of some energy particle A which faces an obstruction, a conflict in its lines of force from some other energy particle B in its environment. When this happens then the force of A which was moving forward starts travelling backwards, and hence there is a conflict between a forward and a backward travelling force, which we propose is bound to reach the origin. As a consequence of which the origin has to undergo a change; it can either get suppressed or become something else. The same happens with the other energy particle B; it also has to change in some way. Now if we transpose this situation to more particles interacting in an environment then this would

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<sup>13</sup> Both particles and their quantum states are actually weak packets of energy. Particle only means when you can measure these packets in a static state.

<sup>14</sup> The big bang we know of is probably the second one which we are speculating resulted from the violent interaction of not just individual neutrinos but different alignments of neutrino clusters which formed when their wave form or wave motion would have aligned by chance or accident, giving rise to gigantic magnetic forces interacting in a manner to produce the Big Bang.

lead to compounding conflicts and tensions within and amongst them, which are only resolved when some balance or harmony is achieved through the destruction or suppression of some and through new permutations and combinations of energy forms. In result of which the energy forms keep becoming complex, and acquiring greater capabilities.

Thus once active logic begins then you cannot go back to simplicity; it is logical to proceed towards complexity and increasing capabilities of interaction and for this continuing increase in capabilities there is a logical agenda of the Aesthetic of Nature to move towards a harmonious interaction. Thus first we have the emotive process which is responsible for the birth of active logic and once it is firmly established then the final dimension of the aesthetic as a component of logic is added to it. Without that aesthetic the increasing interactions will only produce a multiplication of aversions together with multiplication of capabilities and there would be no evolution. Because evolution only becomes the fundamental dialectic of Nature when there is resolution of the contradiction between multiplying aversions and capabilities. The process of resolving contradictions and moving towards dynamic harmony is the Aesthetic of Nature.

So we can say that in the early universe there is part A and part B. Part A is dormant logic and part B is active logic which culminates in the big bang. Part C is after the big bang till the emergence of cellular phenomena, before which we have a completely unconscious process, which we can refer to as random logic. The word random does not imply the absence of any laws and logic, but a randomness arising out of the absence of any intelligence, or consciousness. So the pre-intelligent phase of Nature has three segments.

### **Part III. The programmed logic & intelligence phase in Nature**

With the emergence of living things and their mental processes we have the beginnings of the second, the programmed<sup>15</sup> logic phase in Nature. In which intelligence, as the capability to acquire perceptions of the outside world, and do problem solving on their basis emerges as a new factor in resolving tensions/conflicts and pursuing satisfaction in living forms. It is a

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<sup>15</sup> We are calling it programmed logic because in living things there emerges a need and pain/pleasure programme on the basis of which they interact with the world. We will explain in the next few pages how the programme emerges and what it is.

mental capability in its nascent form which arises as rudimentary sensory perception and processing in the early simple organisms.

Beginning particularly with the first nucleic unicellular organisms<sup>16</sup>, which show signs of, if we may say, an 'organized' sensitivity/response process towards the environment compared to their precursors. As living organisms and their perceptual abilities evolved to become more complex, the perceptual data increased manifolds and became varied. This required an entirely separate capability or more precisely a system for organizing and using of that perceptual data; the system of 'intelligence'.

In this system the perceptual data went through a series of steps or stages culminating in a response or action directed at the outside world. Initially these steps included elementary classification of data, its translation into a usable (for the organism) form, storing of it as memory and then simple and direct processing and response. Gradually however, with the accumulation of a large fund of perceptions, processing and the subsequent steps became complex and more directed towards knowing the outside world and devising ways and means for solving the problem of biological needs and tensions. And in the course of evolution as the memory/storage process has grown along with the quantity and quality of perceptions and the experiencing capability of a form, this system of 'intelligence' has kept on developing to more advanced levels.

It is important to point out here that this intelligence system which emerged in living forms did not operate with reference to truth seeking or acquiring an objective understanding of the world and the things therein. It evolved and functioned with reference to a subjective<sup>17</sup> unconsciously formed biological need & pain/pleasure programme of living forms<sup>18</sup>. Nevertheless, it was a qualitatively new kind of capability which developed only in living things and since it arose out of perception and relevant knowing of the environment, it enabled the living thing to respond to and act upon its immediate environment from a

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<sup>16</sup> According to Stuart Hameroff (1987) the eukaryotic cytoskeleton in single cell organisms like paramecium greatly increased their capabilities and in fact took on functions of a nervous system. Roger Penrose (1994, p. 357) is also of the view that "there must indeed be a complicated control system governing the behavior of the paramecium---or indeed other one-celled animals like amoebas..." In our opinion also the various organelles of the paramecium like vacuoles, cilia, trichocysts, large nucleus, etc, which perform specialized functions like digestion, locomotion, self-defense and reproduction would not have been possible without some kind of an 'organized' sensitivity/response process, including an elementary form of mental information processing.

<sup>17</sup> Subjective here does not mean that it is not an objective process but only that it is from the standpoint of the organism.

<sup>18</sup> This basic characteristic of the intelligence process is an operative part of the human intelligence process as well.

position of strength, relatively speaking. An advantage which was not available to non-living phenomena.

Non-living things, whether they are quantum particles, atoms, molecules, the sun, moon, mountains, etc depend upon simple laws of physics and chemistry (the force lines and energy fields arising out of their physical structure and properties) for their response and action towards tensions, conflicts and their resolution. Thus they can never have a dynamic and growing response and action system and consequently can never be in an enabled position vis-à-vis the environment. On the other hand, in living things a proper action tool-kit composed of internally driven but externally directed capabilities like cilia, fins, limbs, claws, etc began to develop as an ancillary of the intelligence system and so they started interacting with the environment from a more enabled position.

Thus, with living things and their mental processes we find that logic does not remain completely random, and goes beyond the properties of physics and chemistry. This is due to two factors. One, there emerges a programme, a standpoint, an agenda on the basis of which the living things start interacting with the rest of Nature. Secondly, as explained earlier, there emerges the ability to acquire perceptions and a rudimentary form of understanding about outside reality, a growing capability of experiencing satisfaction/dissatisfaction and then interaction with the environment on the basis of this understanding and experience, along with a capability for a designed response and intervention on the basis of an advanced action and response tool-kit.

Of course all the above distinct capabilities do not emerge all of a sudden as magic in Nature, but only when Nature's logic reaches a level of complexity where it produces biological cellular phenomena involving complex structures of forms such as particles, atoms, inorganic and organic molecules, compounds that Nature has already produced. In which the tension, need and pain/pleasure processes begin operating on a completely different plane, and there emerges the need for and the possibility of forming complex internal processing systems to deal with them. So living things we must understand do not emerge as something completely apart from the rest of Nature, but represent only a qualitatively more developed/complex or evolved form of the same processes and logic operating in pre-living Nature. In living things the nature and the mechanics of tensions, the needs arising out of them and the relevant pain and pleasure process acquire a much more complex dimension especially, in the context of a dynamic internal instability in the emerging biological cellular structures.

## **Internal instability in biological structures**

The pre-living inorganic atoms and molecules and even simple organic molecules had internally stable structures. Where stable means left to themselves, i.e, deprived of any interaction with the environment they would remain in the same form. For instance, in inorganic atoms, there is motion in terms of the heavier particles of its nucleus, but that motion is balanced out internally leaving the atomic structure stable, similarly the inorganic molecules are again in a balanced state vis-a-vis each other just as the particles of their atoms are. The same internal stability can be found in simple organic molecules.

But when you have a nascent cellular structure arising out of complex organic molecules then you have the beginnings of a phenomenon which is internally capable of motion and interaction with the environment and does not wait for the environment to act upon it, as in the case of non-living phenomena. In the complex organic molecules of these emerging cellular structures not only the particles of their atoms are in motion but even their molecules are in motion and this internal molecular motion arises because of an instability<sup>19</sup>, which in turn is due to an unbalanced state of the molecules vis-à-vis each other. This unbalanced state of the molecular structure arises out of a need which was not there in a balanced state. It is a need and tension arising out of an imperfect (internally unbalanced) form. A phenomenon that we also observe in some cases of inorganic chemistry like alkali metal potassium, which is a very rare example of a nearly unbalanced state. In chemistry we say that it has a great affinity for oxygen. This means that it is in a state of constant tension, because of its imbalanced state and seeks to balance itself by combining with oxygen.

Now in the emerging complex organic cellular structures there are different kinds of molecules which are not in a balanced state i.e., they are in a state of tension or stress, and it is in this state of imbalance and stress that they take the initiative to interact with the outside environment in order to resolve that tension or stress and reach a state of balance. Now the outside environment is also in an unbalanced state, because of tremendous variations in it; the environment is the whole of Nature in which a whole variety of natural forms are in motion and interaction hence it keeps changing. Thus we find that in these complex cellular structures there occurs a parallel source of imbalance, tensions and conflicts coming from the

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<sup>19</sup> An echo of this instability can be seen in concepts like chirality in living systems discovered by Pasteur (Mc fadden, 2000, p. 10). Or living systems as non-equilibrium coherent structures or far- from- equilibrium dissipative structures which exhibit coherent behavior (Schneider & Kay, 1995). According to Kauffman (1995, p. 21), free living systems are made up of cells and these cells are non-equilibrium dissipative structures for whom equilibrium “corresponds to death”.

external environment as well as from the internal imbalances, which multiply and keep becoming richer with time. It no longer remains a one time need, tension or pain but a recurring and a developing<sup>20</sup> process of a variety of tensions and pains, leading to higher orders of instability and temporary stability in the form of specific and short-term resolution and relief from tension and pain.

The problem which arose over the course of this spiraling process of instability (disorder) and relative stability (order) was that the mechanical processes in the form of simple physical and chemical processes became incapable of handling this growing process of tensions and instability, resulting in an accumulation of failures or rejections of the complex organic molecules and consequently the emerging cellular structures. At this juncture this complex and ever increasing tension and need process, we propose, required the evolution of an equally complex mechanism ( a more complex form of order operating in terms of quantum states of weak or subatomic particles like neutrinos, etc and not the known chemical and physical processes), as opposed to a mechanical system<sup>21</sup>, for handling this process. That is, a mental programme as a design for operating and handling those needs, pains and pleasures, both internally and in relation to the outside world. The templates of the rudimentary form of this mental programme can be found in the genetic structure of the first unicellular organisms.

### **Gene based mental processes as quantum organizations of pre-Big Bang weak energy forms**

Genes, in our view, do not constitute only the design programmes for the biological form and processes of the organism, starting from protein synthesis to the construction of a multitude of physiological organs/systems up to the level of the organism as a whole. Some genes, which we may call 'mental genes'<sup>22</sup> also code for the mental programmes (designs of specific processes and functions) representing the needs and related pains/pleasures, problem-solving, habits and other mental functions of the organism. These would not be operating in chemical

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<sup>20</sup> Every time the tension is satisfied it also multiplies so you have a continuously developing process of tensions.

<sup>21</sup> Which worked when very few and simple functions had to be performed at the simple organic or cellular stage.

<sup>22</sup> Mental genes in Genetics and other scientific literature mostly refer to genes which code for the construction of the brain and are also responsible for mental traits and functions. In our opinion, the genes which make the brain structure are brain genes while those which are responsible for the making of mental programmes and processes are mental genes, distinct from brain genes. These are not composed of strands of the four chemical bases but are formations of the weak energy particles and their quantum states. These carry the templates for the construction of mental programmes and functions.

or molecular terms in which the biological form of an organism operates. These programmes are not the biological form itself, and thus have to be an entity separate from but also entangled with the biological form. Just like the software and the hardware of a computer are distinct but at the same time also integrally connected.

We are postulating that these mental programmes must be operating in the form of the quantum states of extremely weak energy forms akin to the pre-big bang energy forms, or if we may say the universal, primary logic forms (explained in the first two parts of this paper). The emergence of the genetic structure as a composite of biological and mental genes working with the cellular form as a whole gave rise to the first form of early mental functions and processes of perception, processing, storing of processed perceptions and experiences and developed responses. These mental functions and processes like mental programmes<sup>i</sup> would be operating in terms of quantum states of the same energy forms.

In fact living things we propose emerge in the real sense when the cellular phenomena were able to involve quantum state weak energy forms through both producing and trapping them, and then organizing them into functional structures of mental programmes & processes of likes/dislikes, perception, problem solving. This happened when the biological phenomena reached a certain stage of complexity (when it became too many-sided) where in the face of growing internal and external complexity they could not handle and resolve their tensions merely at the biological, chemical level i.e, through bio-chemical level of perception, processing and response. Hence under the constant pressure of a growing toll of rejections and failures and through trial and error the living forms learnt to employ weak energy processes for performing more complex interaction and resolution processes.

Later on as there began to form more complex and elaborate multi-cellular biological life forms, the complexity of the situation within the organisms became multifold due to expanding and more complex needs, pains and pleasures, along with increasing and growing perceptions. This required a multitude of more complex and elaborate programmes of needs and pain/pleasure as well as perceptual, processing, memory and problem solving systems; which led to the evolution of the nervous system and then the brain as a separate organ of cells/neurons specialized in producing and carrying out these functions. The brain we propose

evolved due to the need for generating a greater quantity of these neutrino<sup>23</sup> type fundamental energy forms and organizing them into a multitude of structures constituting the enormous quantity and quality of mental programmes and processes of multi-cellular organisms. Logically the brain cells must have evolved a mechanism for producing and trapping larger quantities of these energy forms, and then organizing them to perform more advanced and well established functions of likes/dislikes, perception, problem solving.

After the emergence and evolution of the brain and brain-based mental processes the capabilities, of likes/dislikes, pain/pleasure, perception, problem-solving/intelligence, acquiring knowledge about the outside world and intervening in it keep progressing to more complex and higher levels in developed life forms. This evolution also takes place through the same process wherein living things try to resolve the contradictions between increasing aversions, multiplying capabilities and a greater pursuit of pleasure. But this happens at the unconscious level, through a random process of trials, failures and rejection. The knowing, intelligence capability of living things is very limited, and is only about given events of conflicts and contradictions. It is neither an intelligence about perceiving and understanding the reality or logic of things and processes nor about the working of the mental, biological programmes and capabilities and the mechanics involved in their modification and development. That is why in living things the random logic process continues along with programmed logic. So it is not completely random and not completely or really intelligent.

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<sup>23</sup> Our interest in fundamental particles like neutrinos or other particles of the same family as the possible constituents of mental processes is due to some characteristics they possess which are known and some which we are deriving from known facts. We know that they are elementary or fundamental particles which means that they are fundamental constituents of matter and energy and in our view probably existed even before the Big Bang. Neutrinos are almost mass-less or have very little mass and there have been propositions that they travel at or close to the vacuum speed of light and exceed it in water ([http://www.phys.hawaii.edu/~jgl/nuosc\\_story.html](http://www.phys.hawaii.edu/~jgl/nuosc_story.html)) so they seem appropriate for carrying out the quality and quantity of mental processing that is and was required by complex living forms. Their abundance in Nature in the form of dark matter (<http://universe-review.ca/R15-13-neutrino.htm>) means they are readily available for harnessing. Maybe the brain cells evolved some antenna like process to harness and organize the quantum states of these particles. There seems to be no evidence of their generating heat as a by-product of their motion and interaction with other forms of matter and energy (which in any case is very limited) which means the brain will not heat up as a result of their intense and continuous usage in mental processing. Most importantly, their limited and indirect interaction with known forms of matter and energy ([http://www.phys.hawaii.edu/~jgl/nuosc\\_story.html](http://www.phys.hawaii.edu/~jgl/nuosc_story.html)) indicates that quantum superpositions of these particles in the brain cells can be sustained within the disturbing and noisy environment of the brain.

The mechanics of evolution in living things are that pleasure, pain and need programmes have to operate and develop in the reality of their environment and so the perceptual and intelligence processes emerge as tools for its interaction with the environment. But in their functioning they are not completely limited by the programme, and are autonomous. They keep bringing back to the organism some new information, data, and the organism also for its needs and likes/dislikes has to keep making some variations in these given capabilities while operating in the environment. Apart from this, the mental experiences of the pressures which the outside environment keeps generating on the organism also keep affecting its programmes. So that over the course of evolution there are contradictions generated internally within the organism, and to resolve these it has to evolve more complex and developed physiological and mental capabilities. That is how the plain/pleasure programme and the knowing and intelligence capabilities keep changing, developing and becoming complex. And in human beings we find that the nature of these capabilities acquires a completely new scale and dimension.

#### **Part IV. Intelligent logic and Mature Systems intelligence based on unified pleasure system**

##### **The human form of event intelligence**

With the emergence of human beings we find that their intelligence capability of acquiring an understanding of the outside world and objects, and consequently the capability to intervene takes a quantum leap. In result of which they begin pursuing their needs on a completely different scale of efficiency compared to the animals. The exceptional increase in human intelligence occurred mainly because of two factors, apart from others. One, due to the making and use of tools after becoming bipedal; due to involving mental input tools were a much more advanced means of interacting with and intervening in the environment as opposed to the physiological capabilities for doing so. The development and use of tools must have led first to an enormous increase in the quantity and quality of our sensory perceptions, and in turn our perceptual capabilities; and secondly, to an awareness/perception of the

properties and logical functions operating in natural processes and phenomena as a result of gaining more experience of working with tools. These perceptions must have then required their creative use for making more developed and complex tools for extracting from Nature, for the purpose of our needs; which must have then led to the evolution of more complex processing and problem solving capabilities. The accumulation of these mental capabilities produced the initial qualitative increase in human intelligence, and then later on its mature development led to science and philosophy.

However the development of these mental capabilities was possible only due to another very important factor, and not just tool making—i.e., the emergence of words, and the development of language<sup>24</sup>. Language initially must have emerged as a more efficient means of communication amongst our species; for the purpose of coordination arising from the need to work in groups for taking work from tools. But as it developed it enabled us to carry out very complex, elaborate series of abstractions and hence complex thought/idea and imaginative processes; store an explosive amount of data not merely in terms of physical aspects of things but also as perceptions about their working, the related aspects and their relationships; which became possible from abstraction. Then store a large number of observations and experiences in time rendering an ability to have a sense of past, present and future; and hence do problem solving with reference to the future as well. All these factors increased our intelligence capabilities tremendously, and made possible the invention and creation of more developed tools, and also other activities such as domestication and breeding of animals, plants, agriculture, which then became the basis for settled communities, groups and then civilization to emerge.

Language once it emerged did not only lead to an explosion in our perceptual and intelligence capabilities for understanding the outside world; but alongside that also in our other emotive mental processes of needs, likes/dislikes and pleasures. As there was a constant interaction between the two, which gave rise to our more developed sensory and feeling processes in relation to our needs, likes/dislikes, and perceptions of the outside world. Enabling us to explore the nuances and experience the subtleties of the taste, colours, fragrances of things; or

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<sup>24</sup> See Diamond, Jared. 1995. 'The evolution of human inventiveness'. *What is Life? The next fifty years*. Cambridge: Cambridge University Press. pp. 41-55

the shades of the sky, the glow of the moon etc. Also there must have arisen the ability to be emotionally imaginative about needs, giving rise to desire for things that were possible due to human capability of working with tools. All these capabilities became the basis for elaborating upon our biological needs and satisfactions relating to for instance the food, or clothes we would like to have, and so on. Thus there arose a whole new breed of ‘mental’ needs and pleasures, or wantings and deprivations if we may say<sup>25</sup> and related experiences of tensions, pains and satisfactions; but rooted primarily in the biological gene based satisfaction systems.

These new needs were dependant more upon man made products rather than nature made things; and were also to be pursued in a man made complex social environment. Which gave rise to new complexities and contradictions within and amongst human beings; arising from a pursuit of these needs from the standpoint of one individual or group against another individual or group. These needs we must understand emerged not upon some new ‘human’ programme, but upon the same biological gene based satisfaction programme coming from the animal, and relating to its own physical being; a programme which it pursued on the basis of an adversarial relationship with Nature, which in our case became man versus man. Expressed in the form of desires for greater wealth and power, these programmes also led man to control and manipulate other men through ideas and idea systems.

From here we may come to another kind of complexity and contradictions created in human life by the idea making capability of the human mind. This capability basically arose out of growing human perceptions based upon compounding abstractions possible with language, and initially evolved as a more efficient tool for solving the problem of needs in relation to the outside world. But later on it led to the development of a whole set of ideas about the world, other human beings, life, Nature, society, about morals, and ethics etc; ideas even about pleasures and needs. This happened one, due to the human being’s own need for producing and operating on the basis of ideas; arising from his growing perceptions about any thing or issue he confronted; and secondly due to the needs arising from having to operate in a complex social environment. Human beings required ideas in the form of a culture as

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<sup>25</sup> These we may call mental needs because they are based more and more on the input of our growing intelligence and feeling processes.

opposed to instincts to create some stability instead of having anarchy and contradictions coming from unintelligent needs and desires.

However the problem with ideas as they emerged is that they included truths as well as falsehoods; they were formed on the basis of intellect working primarily as a tool for solving problems relating to subjective needs and desires, and not on the basis of inquiry or truth seeking about them. Any gaps of knowledge experienced in the making of ideas were readily filled up by the subjective inclinations, motives and objectives of individuals. The problem became worse when these ideas were considered as truths, (determining actions of people), having serious consequences; and becoming a further source of contradictions along with the pursuit of more exaggerated biological needs and desires of power, wealth etc.

### **Emergence of systems intelligence and the process of its maturing**

The above still remains the second phase (of the evolutionary journey of logic) in its most complex and developed form, in which the human need, pleasure and intelligence processes remain rooted in the biological gene based satisfaction and mental systems. This phase continues until there begin emerging truly post biological/genetic intellectual, inquiry and idea processes and along with them also new supra biological needs, pains pleasures and sensitivities, not connected with biological gene based intelligence and satisfaction systems. These we find expressed in the emergence of serious arts, poetry, literature, and in an even more mature form in the form of serious monotheistic religions and philosophical traditions. Which really mark the beginnings of a Systems-Intelligence. The third phase begins in the mature sense with the emergence of a systems intelligence representing the pursuit of an understanding of life as a whole; which means the individual, the society and the whole of Nature.

In our perception, systems intelligence is a product of the needs, tensions and pleasures arising out of the maturing of human spirit, representing an emerging mature, more objective

and unified pleasure system about the quality of human internal and external life as whole. And at a parallel level an emerging unified inquiry and truth seeking process, directed mainly at one, resolving the growing complexity and contradictions arising in the human mental processes developed upon the biological gene based satisfaction system; and two the tensions arising out of the growing new post biological sensitivity and intellectual processes. Leading to the birth of a whole set/body of understandings about the nature and purpose of the universe/Nature, the place and purpose of man in Nature. Including also understandings for instance about what kind of needs and pleasures to pursue and not to pursue; in short understandings about all dimensions of human life and of Nature as well. This systems intelligence was about dealing with the problem of conflicts and contradictions at a mature level, by targeting their source—the ignorance of human beings and his unintelligent programmes; and pursuing pleasure at a mature, human level rather than upon an animal programme.

The above has been in essence the content and the crux of mature religions and philosophies. They were an attempt to resolve the growing complexity and capabilities in the human need, pleasure and intelligence processes through discovering a qualitatively new framework/design for them based upon systems intelligence. Without which these capabilities would generate more contradictions, pains and destruction. The human intelligence and pleasure processes have in them the potential and capability for anarchy and destruction, as well as for progressing towards higher levels of growth in a constructive way leading to a growing experience of happiness.

The systems intelligence we find addresses both, the human biological as well as post biological needs, pleasures and capabilities, and tries to give a framework in which to pursue both of them. But this it did either on the basis of dogmas, like concepts of heaven and hell in religions, in the name of ethics and humanism, or very esoteric means in the philosophical traditions, not rendering an intelligent understanding that could become a part of people as a capability they could build upon themselves. However the stage of evolution at which these dogmas and concepts emerged they was a stage of lot of gaps, unknown factors, un-answered questions with reference to their tangibility for people. Hence they did not work for the

human beings generally in the same way as they worked for those specimens who produced them. This led to diverse interpretation and translation of these concepts and understandings according to whatever the level of intelligence capabilities and the quality of the subjective agenda of different interpreters and translators. This is how and why these systems got abducted by the priests and the feudal class etc., for their power and wealth agendas.

Due to intangibility, and immature/undeveloped pleasure and intelligence capabilities of people in general or common people being at very low levels not really developed, the mental processes of some individuals would get amorphously structured on the basis of the systems intelligence framework, for a temporary period under some crisis which they were unable to handle at their existing level; and then they would revert to type, but at ever more complex levels.

So the human life process primarily remains defined by the by material, economic, power pursuits, i.e., biological gene based satisfaction and intelligence systems; promoting with great force the development of science, industry and technology, at the expense of the development of the systems intelligence. Any ideas and attempts of change that have been emerging in this course have been aspectual or if we may say based upon events intelligence concerned with material, economic problems of man. There have been no mature attempts at developing systems intelligence but only efforts to revive one or two aspects in relation to a specific concerned problem or issue.<sup>26</sup>

Meanwhile science and technology have kept developing, generating an enormous increase in the quantity and quality of material opportunities and pursuits; but at same time making human internal and external life more and more complex approaching a near anarchic situation. Due to the fact that the past idea systems have been failing and diminishing in terms of their role in human life; and due to the lop sided intellectual development which has been focusing only on the outside world and not on the problems of life and our being as a

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<sup>26</sup> We are not going into the details of these attempts here; these issues are being separately elaborated upon in the manuscript on Evolutionary Mentology; we are only stating our broad conclusions.

whole, we have not been approaching the issue of developing and upgrading a systems intelligence.

However now we have reached a stage where the growing complexity of our pleasure, idea and intelligence processes (based upon the gene based satisfaction system) has reached its peak, and so have the conflicts and contradictions. Our existing intelligence and pleasure programmes are not being able to handle the growing complexity which has emerged in our internal and external life. They are becoming more a source of generating conflicts and contradictions at various levels, and hence a source of pain and unhappiness instead of pleasure and happiness. And in the times when the potential for raising human pleasure at all levels, material, emotional, intellectual and also spiritual is within our reach. Our growing intelligence capabilities in science and technology are really leading us towards a conceivable stage of material plenty which would enable us to develop our pleasures at various levels. But the irony is that as we are moving towards that stage our capability to experience pleasure is really on the decline. This is a situation which has resulted from an extremely lopsided growth of our intelligence only in relation to the external world and not about ourselves in terms of our mental processes and life as a whole; and in fact also an extremely lop sided growth of our pleasure system. Thus either we may stop here, and leave our pleasure and intelligence processes to continue declining; or develop a new holistic and unified intelligence and pleasure capabilities to resolve our evolutionary problem where we are able to get the fruits of our growing capabilities.

In fact our mental processes have reached a stage in our evolution where it is becoming possible for us to do the above in the form of developing a mature systems intelligence including, this time, an understanding of the working of our mind as well. Based upon a growing understanding of Nature as whole and mind as an objective phenomenon operating in terms of programmes and structures of neutrino energy forms. On the basis of this growing understanding we can begin developing an intelligent understanding of mental processes, and then restructure, modify and upgrade them intelligently, based upon an understanding of the evolutionary logic of Nature as it is operating in the case of our mental processes—of moving from an immature and unintelligent pleasure and idea systems to mature ones. In other words

from biological gene based satisfaction and idea process to macro logic based pleasure and idea process promoting growth and progress; for decreasing pains and contradictions and in taking life to more pleasurable levels in all its dimensions.

In the fourth phase our growing systems intelligence will enable us to resolve the conflicts and contradictions within our mental processes and incorporate the event intelligence in a manner where our biological pleasures will be served even better. The conflicts and contradictions in our external societal life will initially largely get resolved in result of the changes we will make within ourselves. After which we will give a new shape to our politics, economics and culture by raising them to an intelligent level. At this stage since the human mind will be free of conflicts and tensions of the past, it will be able to explore and develop new capabilities and tools for interacting and intervening with nature and adding new capabilities in terms of mental neutrino systems.

As much as our intelligence about the internal and external world will keep increasing, along with the capability to intervene in them to that extent we will in steps and stages keep eliminating the contradictions and conflicts in the functioning and evolution of our mental processes and of the external world including Nature. The systems intelligence we conceive would be a highly organized neutrinos-kind energy structure and system, with a potential for growing universal knowing and intervening capabilities; growing because it would be a living form having the unified intelligent pleasure as its nucleus. The emergence of this mature systems intelligence based upon conscious unified pleasure would really represent the emergence of conscious logic, which would really be like God due to the nature of its capabilities. So we can say that conscious logic would in one sense represent an enabled God.

After the maturing of the systems intelligence having a unified pleasure and idea process, the fifth phase in evolutionary journey of logic will commence, where this mature systems intelligence will go on to interact with the whole of Nature and finally resolve the aesthetic agenda of logic which emerged with the birth of active logic in the second part of phase I (of logic's evolutionary journey)

In our view contemporary human beings, as of today, are in the third phase of logic's evolution; they have two phases behind them and two ahead of them. So Bon Voyage!

### **Concluding remarks and implications**

The above discussed hypotheses and thoughts on Logic are some of the basic findings and conclusions which Mr. Kazim arrived at after a long stretch (37 years) of inquiry in this area. These ideas and concepts are being comprehensively developed in the final version of Mr. Kazim's book on 'Evolutionary Mentology', which is in the process of being compiled in the Philosophy department of Sanjan Nagar Institute of Philosophy and Arts (see website: [www.sanjannagar.org](http://www.sanjannagar.org)).

The new understanding and concept of logic as a concrete and fundamental part of Nature and its evolution, as opposed to a mere abstraction of the human mind is a very important concept which has far-reaching implications for man and his future evolution. One consequence and implication of this is that it will not only broaden the horizons of contemporary man's view of his own life but also enable him to understand and experience the reality of his actual place in the scheme of Logic's own evolutionary process, of which he is an integral part and product. This will change his entire way of looking at himself, his society and Nature as a whole and will enable him to form afresh a much more intelligent relationship with all these dimensions of his life.

The hitherto concepts of logic are logical and valid if we view them as products of a certain stage of the development of the human mind, which implies that as the human mind develops and evolves further it would also logically upgrade its existing concepts of logic. The ever-increasing capabilities and tools of the human mind, the explosively accumulating knowledge fund about external phenomena and the mind itself and at the same time the growing crises in the internal and external lives of individuals who are not being able to cope with the many-

sided and many-layered complexity in their lives, are clearly pointing to the need for a revision and upgradation of the concept of logic both in Philosophy and the Sciences.

The insight about logic being an integral part and dominant property of all (including the fundamental energy forms) energy forms and things in Nature can have important implications for Particle physicists, Astrophysicists and Quantum Physicists. It can open up new areas of inquiry and experimentation in these fields. The human mental processes being functional organizations of the quantum states of fundamental energy particles like neutrinos is also an important area which can be investigated by scientists and philosophers working in the fields of Brain/Mind Sciences, Neurosciences, Philosophy, Consciousness Studies, etc.

*Notes:*

<sup>i</sup> Whether it is the cytoskeleton of the unicellular life forms or the human brain/mind, in our opinion both employ quantum energies for carrying out mental functions/tasks and making mental programmes and processes. The specialized physical structure and the complex tasks which the paramecium is able to perform are an evidence of the existence of a rudimentary form of mental system within it and the important thing is that this mental system exists without a single neuron or synapse. Stuart Hameroff (1987, 1994) and Roger Penrose (1994, p. 357) have suggested that the eukaryotic cytoskeleton plays the role of a nervous system for the single celled paramecium and it is the quantum coherence in the microtubules of its cytoskeleton which give rise to its elementary consciousness, cognition and the other mental feats that it performs. The evidence for this connection between consciousness and quantum coherence in microtubules comes from the fact that general anesthetics, in roughly the same quantity immobilize not only higher animals like mammals but also paramecium and amoeba. Thus we do find some evidence of the harnessing of quantum processes even at the unicellular level.

When we come to human beings, the nature of human mental programmes and processes is such that they cannot operate in the form of heavier energy/matter forms like chemical, atomic and molecular processes or even the more understood subatomic forms such as electrons, photons etc. They are so many and so diverse, existing at many different levels and layers and involving very complex and enormous amount of parallel computations requiring incomprehensible speed that if they were operating in terms of the existing electro-chemical processes of the brain, then we would probably need first of all a huge dam to run one brain, secondly heat sinks or powerful cooling devices for heat dissipation and prevention of complete breakdown. And most importantly if that was so the existing brain would simply be left with no energy to sustain its myriad functions both at the biological and mental levels; it would burn out.

A largely agreed concept in the reigning theories of Brain Sciences and Neurosciences states that mental functions and processes of organisms with nervous systems and brain processes arise from the electro-chemical neuronal communication in the brain through a signaling network based on electric potentials generated by chemical actions. If that is so then the following proposition by Bruce Lipton (2005, pp. 111-112 ) would give an important insight into the matter. According to him the chemical coupling used to transfer the information carried by molecules is accompanied by a massive loss of energy due to the heat generated in the making and breaking of chemical bonds, which means that the small amount of energy that remains after this process limits the information that can be carried as a signal. This has two implications. One, the reception and interpretation of environmental signals, a crucial factor for the successful survival of a living thing would become a very slow and inefficient process. Two, the required amount and speed of neuronal synchronization will not be achievable for carrying out the diverse and many-layered biological and mental perception, processing and action, integral to both the survival and satisfaction/pleasure pursuit of an organism. This would be akin to the burning out of the brain process as it will not be able to cope with the growing internal mental complexity of the organism and the external complexity of the environment. It follows therefore that the harnessing of quantum states of weak particles must have become a logical necessity at a certain stage of the evolution of living things and this process has kept on developing up the ladder of evolution with growing mental capacities and capabilities of living things and in human beings we find a mature and qualitatively developed form of both harnessing these quantum states and organizing them into far more capable functional mental structures.

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