

Unity of Consciousness Experience, Nature of the Observer and Current Physical Theory

Richard L Amoroso
Elizabeth A. Rauscher

Noetic Advanced Studies Institute
amoroso@noeticadvancedstudies.us

....the wise man looks into space, and does not regard the small as too little, nor the great as too big; for he knows that there is no limit to dimensions. - Lao-tse

...it is by logic that we prove, but by intuition that we discover. - Poincaré

He liked watching the glorious stars, thinking “there must be myriads of worlds out there”. Then one night he shifted his awareness toward and into himself. “By God,” he whispered, but only to himself, “there are myriads of worlds there, too!” [1]. We in the western scientific culture have just begun, *en masse*, to explore our inner cosmos. Inner exploration has been an intellectual activity in the relatively recent past, has been associated with psychotherapy. Now inner exploration is beginning to enter the domain of emotional and spiritual development as well. Certainly, the nature of our inner being, the nature and structure of our consciousness, shapes and determines our concept of reality. This realization is having a vast impact on the world societies and us, as individuals. One manner in which we internally organize the mental, emotional and spiritual information we receive is by mental system of concepts or categories of information and their causal relations. We address the fundamental nature of conscious perception and how we comprehend existence. Techniques such as yoga, meditation, and processes of spiritual awakening have opened the horizons to the consideration of the attributes of the consciousness. There also appear to be clues as to the nature of consciousness in the structure of physical theory. In fact, the co-called internal journey and external validation system of science may be leading us onto a similar path of knowing.

1 Role of the Observer in Modern Physical Theories

In this chapter, we explore some of the basis of the structure and representations of human thought and thought processes in order to better understand the scientific method and other modes of inquiry. If we can better understand the relationship between our inner thinking, feeling modes on the external world and our universal connections, we will be able to better move to world peace, personal peace and freedom in time. What should start our discussion of the possible relationship between states of consciousness and modern physics? Let us start from a concept so well expressed Eddington: “Physics is the study of the structure of consciousness.”[2] It is the mind that is the ultimate instrument for “doing” physics. Not only do concepts in philosophy, psychology, and perhaps neurophysiology lead us to the conclusion that the structure and content of physics may depend deeply on the relationship of physical theory and the structure of consciousness. Also, recent discoveries in physics itself indicate a need to examine this relationship.

Discoveries, and/or creations of new concepts in physics lead to the observer/participant issue. Quantum mechanics, the theory of atomic microcosm, is a description that may imply that the state of

the observer affects his interpretation of what one sees. In the context of quantum theory and relativity, we may be able to shed light on the relationship of discovery vs. creation and its validation of the properties of an external reality. In quantum physics, as well as in the structure of n-dimensional relativistic models, the implication for a fundamental remote connection of events is deeply implied by the structure of these models, and we can use this property for the experimental verification of these models.

The structure of physical theory, its very fabric, is pointing towards a world view that speaks of concepts which have been considered external to the body of science but yet may be implied by modern physical theory itself. Can light be shed on the seeming paradox from research in the altered or unusual states of consciousness, paranormal and mystical phenomena, and states of meditation, etc.? One of the deepest, most profound discoveries for the western mind is the induced meditative state that is, the discovery of an intrinsic variety of a state of consciousness common to most people who modify their behavior to experience it. Altered or mystical states of consciousness may hold great clues to resolving conceptual paradoxes in science and in life. We have an unprecedented opportunity in current world society to integrate the intuitive mystical and spiritual with the analytical mode of thinking and being.

2 States of Consciousness and Reality Perceptive Modes

We will define “altered states of consciousness” (ASC) for purposes of the present discussion as mental states other than awake, “beta wave,” or sleeping, non-dreaming states of consciousness. Therefore, we are including dreaming as an altered state. Note that this is a matter of definition. Also, there is a great variety of subjective reports within the dreaming experience.

The methods for inducing such states may either be chemically or methodology produced, such as in the use of meditation, yoga, self-reflection, “magic mushrooms,” *amanita muscaria*, or not require an external agent and resorting to meditation or sleep/dreaming. There appears to be a set of relatively well characterized states of consciousness [3,4] which can be induced and experienced by one’s internal self that produce descriptions by individuals of very similar mental/emotional and spiritual experiences [4].

Visual imagery (audio, etc.) is well known in dreams but is also reported by meditators. One of the primary experiences induced by artificial means such as psilocybin, and hallucinogens is their visual pageantry which excites the imagined, stimulated sense. What is meant by image, hallucination and stimulus? A hallucination is usually defined in terms of an image in the mind which is not prompted by an external source of visual stimulus of light (photons) impinging on one’s retina through the lens of one’s eyes. We talk of “imagined,” which is associated with not being real, i.e., not having a counterpart in the external physical world.

But then, how real is real? How real is an internal visual image? If it is an experience which is acted upon – it is seen, felt, heard – is it not real? The criterion for reality in the western world (and science) is one of a consensus reality. The usual test of an experience (for example, a visual image) is usually made against an assumed to be external physical reality. But we cannot develop a hard and fast proof of “It Exists”, (cf. Rene Descartes’, “I think therefore I am! I did not create myself, therefore God did it.”

Meditators also report a consensus reality (more on this later), but where is the image? It’s in the mind! Visual imagery that also appears not to be instigated by photons from external sources is the remote perception psychic information imagery. A subject-participant, in a laboratory experiment, describes a randomly chosen distant target location, under conditions in which an agent, termed a “blind judge”, can match a target with a subject’s description, blind to the correct match, out of many possibilities. We then bridge the gap between external information sources and internal mind imagery without physical light input and yet a correlation of that perception is made to an external target and

hence is an objective reality.

We have at least three sources of imagery:

- that prompted by an external stimuli;
- that prompted only by an internal stimuli;
- that which is prompted by an external stimuli but is not connected by any known physical means [5] to the process of perception.

Another example of a checkable reality match for a so-called external imagery is exemplified by Friedrich August von Stradonitz Kekulé, 19th century German chemist, who dreamed of six snakes biting each others tails. He had been trying to work out the structure of the molecular form of benzene, C₆H₆, and based on his dream, demonstrated it was a ring structure and not a linear structure.

A resolution of the discussion of the validity of these various information sources which lead to mental imagery may lie in the concept of the existence of states of consciousness. If the model of consciousness is a set of states or its structure has “levels of awareness”, this concept might resolve the disagreement about the criterion of internal vs. external validation. Both internal and external experiences and their source of origin may be equally valid, but may involve different distinct levels of consciousness in a vast possible array of states of consciousness being and perceiving.

Perhaps the concept of altered, non-ordinary or unusual states of consciousness or levels of perceptual awareness will shed some light on some of the current paradoxes in modern physics. The existence of a paradox implies lack of information or ignorance, as nature does not admit such a paradox. A paradox resolved leads to a new level of awareness and understanding. Perhaps current events are leading to a Kuhnian paradigm shift [6] which may involve a shift in understanding that some scientists and non-scientists are in a different state of consciousness as they examine the same event. The lesson of autogenic training and other processes which modify the central nervous system (CNS) may be that there is a host of new horizons, of new unexplored states of consciousness, to experience, and in which one can attempt to explore reality and discover a wider, vaster view of existence. Then, if we do deal with the framework in which consciousness is “all”, or the seat or root of reality, then understanding more about states of consciousness is a vital key to comprehending the nature of reality.

3 Defining Science and Mysticism: Methods in the Search for Knowledge

There are two dominant methods for gathering information about reality and developing concepts about what one deems reality to be. They are: the scientific method, and the mystical, intuitive or experiential method. Science is defined as accumulated systematized knowledge, ascertained by observation and experiment, which is brought under general rules or laws. At the basis of the scientific method is experience, i.e., in the form of experimental tests. What is crucial to the method is the interplay of observation (experiment) and testable theoretical hypothesis. Reason and logic are fundamental to the construction of these theoretical models. Mysticism, on the other hand, relates to obtaining information by direct or intuitive experience. Mysticism is the belief that the most reliable source of knowledge or truth is intuition rather than reason or the scientific method.

Perhaps the most fundamental aspects of intuition are not at odds with science but are at the root of both science and mystical experience such as Kekule’s dream. The relationship of the scientific and mystical view is rooted in the nature of consciousness. Forms and varieties of the experience of states of consciousness can give us clues as to the relationship and validity of the use of methods of science and mysticism in the search for knowledge. One of the ultimate desires of mankind is self-knowledge, i.e., understanding consciousness itself.

4 Some Basic Tenets of Science and the Western View: Duality, Causality and Object Grouping

The struggle between parts, separateness or duality and unity or whole is seen in many world religious and philosophies. Central to the struggle is an attempt to understand one's connection to the Universe. In physics we examine in more detail the possible relation of the observer and the observed. Often, when the dualistic view is set up, there is an attempt to overcome dualism and reunite that which has been conceptually divided. Socrates, via Plato's dialogues, suggests a model of reality consisting of physical objects and another world filled with a perfect "master plan" of images of those objects, such as a perfect chair or table. The perfect-image world also contains a representation of perfect love, or good, etc. Another model employing a multiplicity of objects, or noun concepts, or ideas is that of Immanuel Kant, who suggested that the mental attribute to categorize objects or concepts (for example, to identify and distinguish chairs from tables or love from hate) is an inborn characteristic of the human mind. These are, in essence, dualistic models (see Table 1), and the concept of categorization, or object identification and grouping, is also a key tenet of science.

Table 1 Western Philosophers and Their Concepts

| Philosopher | Born/Died | Major Concepts |
|----------------------------------|------------------|--|
| Descartes, Rene | (1569-1650) | <ol style="list-style-type: none"> 1. Mechanistic view 2. Mind/body duality 3. Importance of pineal gland 4. Acausal 5. Space-time independence 6. "What you see is what there is" |
| Leibnitz (Wilhelm von Göttfried) | (1646-1695) | <ol style="list-style-type: none"> 1. The monad as fundamental metaphysical unity 2. Synchronistic link of mind/body division 3. Space-time independence 4. Acausal |
| Kant, Immanuel | (1724-1804) | <ol style="list-style-type: none"> 1. Innate categorization 2. Causality (cause-effect relationship) |
| Spinoza, Benedict | (1632-1677) | <ol style="list-style-type: none"> 1. Contingency (like monads) 2. Causality 3. One-world unity 4. Process as primary |
| Hegel (George Wilhelm Friedrich) | (1770-1831) | <ol style="list-style-type: none"> 1. Thesis, antithesis & synthesis: analogy to yin-yang concept |
| Jung, Carl | (1875-1961) | <ol style="list-style-type: none"> 1. Archetype (as in Socrates "world of images") 2. Synchronistic (analogous to 6th century B.C. view of Lao Tze) |

William von Gottfried Leibniz attempted to reconcile the Greek mind/body dualism by hypothesizing the existence of monads. The monads, or "atoms of matter and mind", operate to link up, by a synchronistic mechanism at one's birth, in such a manner as to correlate one's intentions with one's actions. If one intends to raise one's arm, it will move, not because one directly wills it to do so but because at one's birth, mind/matter monads were set up to produce this coincidence! This is Leibniz's

view. Enter the debate over free will vs. determinism. In this view, all events are now definable in terms of causal terms.

A predominant concept of western scientific truths is that of causality. The causality description is the way in which causes and effect are related and is certainly another dualistic model. Immanuel Kant suggests that causality, like categorization, is also an innate construct of the human mind.

Besides Leibniz's theory, in which he attempts to reconcile the mind/body duality by introducing the system of monad synchronicity, is the synchronicity theory of Carl Jung. After Carl Jung's break with Freud, Jung suggested an acausal model in which events are correlated by meaningful coincidence of synchronicities. Not only do these coincidences occur "randomly," but also methods can be utilized to set up meaningful synchronicities which can yield useful information. Jung was particularly interested in the I Ching, in which information is accessed by a "random" process of a set of tosses of three coins of yarrow sticks. Jung describes a mechanism whereby the system of synchronicities are correlated by a universal or cosmic consciousness [7]. Again, we have thrust toward the holistic or universal model. It is difficult to summarize anyone's philosophical framework in a few words. In fact, one's philosophical concepts change over time and may explore different points of view, comparing and contrasting them to other's philosophies.

5 Physical Models of Interconnectedness

Much of the conceptual framework of western philosophical and scientific thought treats the observer of world processes as an inert and passive agent with respect to the observed "reality". Reality is pictured as something external and untouched by the process of observation by human consciousness. How universal is this view? Are there philosophical systems which hold other tenets about the relationship of the observer of reality and the observed reality? Systems of thought such as physical science or mysticism are based on philosophical precepts. There are realms of physics and mysticism where the observer may not only be linked to the observed by affecting the observed, but may also be, to a degree, the creator of the observed reality.

Once one chooses the view of the observer and observed as separate, one is immediately confronted with a dualistic model (discussed in the previous section). Then the philosophical thrust is towards reuniting the dualistic aspects. Although dualism is a predominant concept in western science and philosophy, there are also non-dualistic models or conceptual frameworks about reality, as we shall explore further. Starting with the observer/observed duality, let us explore some ways in which new discoveries in 20th century physics may imply a link between these two and a possible dissolution of this duality into a unity.

At the microscopic atomic level, the position of particles and information about their physical properties, which we are observing and measuring, appear to be altered by our probes. These probes are other particles which collide with the target particles. It appears that we cannot "look" at the world as though we didn't observe it. The apparent effect of the observer on the observed, in the micro domain of the atom, is termed the Heisenberg Uncertainty Principle.

Physicists are also interested in another observation about microscopic quantum phenomena which seems to imply a connection or correlation of systems of particles remote from each other in space. If particles which are juxtaposed in space are correlated with each other; that is, are related to each other by their respective physical properties, they remain correlated even when separated by large distances (several meters, which is indeed large on the atomic scale) [8]. This form of "interconnectedness" is not part of the conventional interpretations of physics but was proposed by Einstein and others in the 1930's [8]. The interconnectedness hypothesis relates to the formulation of completeness of the quantum

mechanical description of matter and the universal applicability of the Heisenberg Uncertainty principle [9].

Bell [8] formulated a very detailed description of the behavior of a particle in the microdomain. Bell's work in 1964 is based on the earlier important questions raised by Einstein and others in 1935 about the nature of the completeness of the quantum description of the microscopic behavior of particles. In 1973 Clauser [10] and others tested Bell's hypothesis in the laboratory and found that the interconnectedness hypothesis formulated by Bell appeared to be valid. The experiment involves the production of a pair of photons (or particles or quanta of light) at a fixed source. These two photons move away from each other in opposite directions. (Photons move at the velocity of light since they are quanta of light.) The relative spins (photons rotate like little tops) are measured. It has been determined that this spinning is correlated even when the photons are separated by up to several meters. This correlation, although somewhat complex, seems to be a manifestation of a fundamental interconnectedness, at least on the microscopic level [5,10].

This nonlocal correlation, termed Bell's Theorem, may have implications similar to the Heisenberg Principle. It's as if a spider in its web feels each distant disturbance of the web's far reaches as it sits at the center of the web waiting for dinner. Bohm and Pribram, [12] as well as others, have suggested holographic models of events and consciousness [11,12]. This view may be consistent with some of the multi-dimensional models discussed below.

Perhaps the universe is constructed in such a way that what one does or thinks here on the planet Earth may indeed affect conditions in the far reaches of space. Discoveries in physics do relate to the philosophical precepts constructed by humankind. Volumes of philosophical discourses have been generated on the issue of observer effects, chance and free will, and the uncertainty condition proposed by Heisenberg. We anticipate that volumes will also be generated on Bell's "interconnectedness" theorem and its relationship to cognitive processes generating physics and mystical concepts, as the implications of the theorem seem to relate to the visions expressed by certain mystics. Do the implications of Bell's theorem (nonlocal interconnectedness) hold for large-scale processes? Are there other theories that could describe remote or nonlocal interconnectedness? There are a number of differing views by researcher on the first question and much work may precede its resolution. We shall examine some physical models which may answer the second question [13-16].

There are other models being examined which involve apparent macroscopic nonlocal correlations. One such model which we have been examining is a macroscopic interconnectedness model formulated in terms of multi-dimensional geometries [5,13]. Geometries involve more than the four dimensions of three spatial (dimensions) and one temporal dimension. The construction of these dimensions is such that there are conditions in which information can be accessed from remote space-time locations such that they appear juxtaposed and not remote from the perspective of the higher dimensional space. A set of these dimensions involve both real space-time and imaginary dimensions which are space-time dimensions multiplied by the imaginary number or $i = \sqrt{-1}$. We examine the possibility that physical effects can be transmitted over a distance, which does not violate our usual concept of the relationship of causes and effects [14,16]. The important point is that physicists are now examining the concept of remote interconnectedness (see [5] and [13] for further details).

The potential nonlocal connection of event may demonstrate certain types of unity which we will discuss as a mystical concept. Also, if there are systems where photons and other particles are nonlocally connected, this type of correlation may also involve the observer and the observed. Perhaps physical theories will describe certain systems in which the manner in which one looks at something will determine what it appears to be.

The relativity of motion, as described by Einstein, implies that one's observational vantage point affects what one thinks one is observing. The relativity theory is, in general, a macroscopic description of causal connections of events and synchronization of time. It is observed in physics that the time recorded on a watch depends on the relative frame of reference of the observer and the observed (such

as their watches'). If the timepiece moves very near the speed of light past the observer, the time reading appears to change depending on the velocity of the watch's motion. Although the principle of Lorentz invariance insures that the laws of physics remain unchanged by motion, translation, rotations, etc., one's observational perspective makes things appear different, depending on the way in which they are observed.

From the macroscopic domains it seems that we cannot make a physical observation of the world without affecting the patterns of the observed; that somehow, "the observer is a participator; it is a participatory universe," in the words of Wigner [17]. What is observed? What is reality? We assume (in western thought based on the logic system developed in Greece a few centuries prior to the birth of Christ) that there is an external, solid, "out there" reality; that, in essence this reality is immutable [18]. But is this the case? We discover, more and more, that this "reality" depends on our frame of mind, on our state of consciousness or, ".on state specific science," Tart [3,4]. If one's mood can effect how one views life, can it also effect one's observation of the period of swing of a pendulum bob?

The results of the Clauser-Aspect experiment testing Bell's theorem appears to require giving up realistic, local models of reality, i.e. objectivity. The ability of the mind to transcend space and time demands giving up absolute "Newtonian" objectivity because the interaction of consciousness with physical matter changes and modifies matter and other consciousnesses. The scientific method yields the valid results that it does because there is approximate objectivity, which is more applicable in the classical domain and begins to break down in the quantum domain.

Eddington goes further by suggesting that, "Physics is the study of the structure of our conscious minds!" [2]. In fact, it is certainly valid to say that our minds are the ultimate instruments for "doing" science; that is back of every telescope is an eye, and back of that is (hopefully) a mind! Eddington's thoughts may lead us to the Buddha Prince (Gautama, ca 550 B.C.) concept, that reality is in part, or completely, a construct of consciousness, and that not only is the universe "perturbed" by the observer consciousness, it is created by it! The ultimate question then is: Is what we believe not only creating how the world appears to us (state specific science), but determining how it really does work?

One of the major debates in science, and the so-called pure science of mathematics and science itself, is: does the human mind discover the workings of an "out there" external reality, or does mind create the reality? Do we create ideas, ideas about the workings of an external reality? In fact, do we create the reality through individual and/or collective consciousness? Certainly this hypothesis has been made. Let us term this model a "consciousness ontology": that being or existence is a creation of consciousness [19].

Much of western philosophy and science concerns itself with what we may term as theories of knowledge of epistemology. The main concern of such a system is how do we discuss the nature and structure of an external reality. Such a system, consisting of the "discoverer" and the "discovered" in the epistemological approach, necessarily leads to a dualistic model of the observer and the observed. If there is the mind (observer) and the physical reality (the observed), how then are the two (mind-body) linked once dualism is hypothesized? Where does one draw the line in the chain of the observer and observed. This is a major concern of quantum theorists since, as we discussed, it appears that the observer is not passively inert, but a participator. In defining a quantum system it is of major consideration where one decides the "eye" ends and the "universe" beings? See some constructs of unity we list in Table 1.

Another example in physics of the expression of a fundamental interconnectedness is a principle formulated by Mach (1838-1916) [19], we may find another "connectedness" clue and a possible relationship to the absolute "Achasic records". Mach's principle is not tightly formulated like Bell's theorem, but may relate to it. Although one of Einstein's axioms of relativity is that there is no fixed reference frame in space, the structure of his theory does not preclude this possibility. Mach's principle states that a local even, such as the rotation of a bucket of water, depends on the whole fixed star system, i.e., the rest of the universe. If one rotates the bucket of water fairly rapidly, the surface of the water

forms a parabolic meniscus. The rotation of the bucket and the shape of the water's surface depend on the existence of the universe or some fixed reference frame defined by it [20]. Then it would appear that Mach's principle is also a statement of or aspect of a principle of interconnectedness which is more precisely and specifically formulated by Bell's theorem [5,17]. The application of Bell's theorem has been specifically made for quantum systems, although it is more general than the quantum theory. Mach's principle has been discussed primarily in terms of astrophysical applications. In the next section we will discuss the possible interpretation of the incompleteness theorem of Kurt Gödel.

Table 2
Objectivity, Subjectivity, and Reality: Contour Integral Model

- 1) What we perceive as reality depends on our assumptions and state of consciousness
- 2) Barriers are useful but limited and are artificial constructs of the mind
- 3) What is real must necessarily include that aspect called mind/reality as well as what is called external reality, to be complete or unified
- 4) It is as though we see only the isolated islands above the sea rather than the universal of the whole of the land beneath the sea
- 5) In a sense, when we include the mind's knowledge and structure in our description of reality, we find our perception appears to become dynamically "unbounded" with new aspects of possibilities. See Chap. 13.

6 Gödel's Incompleteness Theorem and the Search for Truth

"The way that can be described is not the way", from the Book of Tao by Lao Tze, China, ca 6th century B.C. Can we find an expression of this eastern thought in western culture? Prince Gautama Buddha expressed the concept that enlightenment comes to an individual but cannot be taught or explained. The only thing that can be taught or discussed are some of the possible conditions one can practice to make it possible for enlightenment to happen.

Gödel, developed a mathematical theorem in 1931 which states, in part, that all the truths of a mathematical system do not follow from its axioms. (There are more truths than axioms.) [21]. He first applied his theorem to algebraic systems, then to geometric systems, and demonstrated that every mathematical system (algebraic or geometric) was necessarily incomplete. Since all language systems, mathematics, English, Japanese, Chinese, Russian etc., are based on the logic axioms of arithmetic or algebraic systems, then Gödel's theorem implies that all language systems are necessarily incomplete. Since we communicate thought by the symbolic representation of language, it appears then that a complete thought system can neither be expressed verbally nor written in a language/logic system [21].

By definition, we believe that in order to construct an ultimate truth, this truth should necessarily be complete. Then it appears that in western logic we see a parallel to Buddha's contention about enlightenment. The ultimate truth then will "just come" when the right conditions are met and not reasoned; that is to say, one cannot write the ultimate truth as a mathematical equation or set of equations, nor can one even describe it to another. Can one at least suggest the path to take to obtain enlightenment? Or can one suggest the path, or Tao? Yes; this is what Buddha's teachings are about, how to set up the conditions to receive enlightenment.

So it appears that the facts of physics and the scientific method may not yield the ultimate answer to the riddle of the universe, but the scientific endeavor is enjoyable and may be a part of the Tao. Science involves maps or theories which are approximate to the territory or reality. So-called "occult truth" may be irrational, that is, "not of reason", or at least beyond the scope of reason, but maybe, via Gödel's theorem, all Truth is "irrational". One interpretation is that it is neither rational nor irrational but a-rational. That is, it is not one or the other but at the root of both. Reason and feeling may be derived from the ultimate truth and have their roots in it.

Gödel also entered the search for certainty in mathematics by demonstrating it is not absolute, just as Heisenberg had done for the physical sciences with his Uncertainty Principle developed five years earlier [21]. Whereas Heisenberg demonstrated that the observer is a participator, Gödel formulated the incompleteness of mathematical systems. It was the completeness concept that led to the formulation of Bell's theorem [8]; the theorem is a quantitative formulation of the Einstein Podolsky Rosen Paradox formulate [22] by these three authors in the 1930's as a description of the completeness (or lack of it) and connectedness (and perhaps unity) become inexorably intertwined. If we search for truth, particularly a universal truth, we certainly would consider these two concepts as central.

7 Observer / Participant and Schrödinger's Cat

We have a variety of thinking modes which we utilize. These bring into question objectivity vs. subjectivity. One of the major tenets of the scientific method is the assumption of objectivity, that is, a consensus reality about external events such that a scientist replicates his own and other scientists' results so that under the same conditions he gets the same results. This is also called Lorentz invariance. Subjectivity, on the other hand suggests that observations are dependent on and unique to a particular observer.

Some have thought that internal reality states, such as in meditation are therefore subjective, and yet we do find a consensus reality here also, even though the "objects" observed are in one's head. But then where is the object of "blueness" (qualia) of the sky in our head? and what is "out there" prompting our perception? Cognitive psychologists argue about our ultimate experience of internal and external perceptions. Let us discuss the observer/observed issue in terms of physics. What is the definition of an external/internal boundary? Is the skin (sense), retina (sight), eardrum, anvil and stirrup (hearing)? Is this definition in some sense arbitrary?

When we attempt to define the observer/observed link, we find that the definition affects the manner in which we define a so-called objective system. We have a test then that this boundary between observer and observed is not arbitrary. In the 1920's and 30's there was much discussion of the interpretation over the newly developing description of microcosmos with the quantum theory. Some said that the theory was just a pragmatic method of predicting the outcome of a specific experiment termed the Copenhagen view, after Neils Bohr's interpretation and one could not build a model of reality from this theory. Others said the purpose of doing physics is to comprehend reality by building testable models of it.

One *gedanken* (thought experiment) that pinpoints some of the problems of the interpretation of the quantum theory and the link of the observer with the observed is the "Schrödinger cat paradox", named after one of the developers of the quantum theory, Schrödinger [23]. A cat is locked in a room where it will eventually be killed by a poison gas pellet activated by a "random" quantum atomic decay process. Before an experimenter looks in the chamber, and after a given time interval, is the cat dead or alive? The theoretical physicist sits down with pen, paper, calculator and computer, and using the quantum theory figures out what will happen after a certain time interval. The solution to the Schrödinger wave equation, used to describe the process of radioactive decay, has two solutions. In one possible universe (solution), or eigenstate, the cat is still alive; and in the other equally possible universe, the cat is dead. The total solution is the sum of these two solutions and the wave function eigenstate only "collapses" to the alive or dead cat eigenstate, after the cat is observed. In this sense, the observer's consciousness participates, but then the cat knows if it is alive (and perhaps if it is dead, if there is life after death for the cat) [23]. The famous Schrödinger cat paradox brings many concepts into consideration. It basically asks whether our physical models describe the universe objectively or just define the limits of our own knowledge.

As Walker [5,24] suggests, the problem in quantum measurement is not a problem at the microscopic

level (which the Schrödinger wave equation describes), but is at the connection of this level, hooked to a macroscopic (classical) measuring device. This is just another way of describing the problem of where and how the observer is connected to the observed. This may be ultimately expressed thus: that the paradox invokes our lack of understanding of our connection to the universe. Can we find unity? Is unity experienced in some state of awareness and not in others? What role do the constructs of space and time play in our confusion over this issue [25-2]. There may be a connection path for the observer and observed in a similar manner to that of the remote connection of the two photons in the experimental result of Bell's theorem as well as the single photon through one or two slits in the Young's double slit experiment where diffraction occurs when both slits are open, no diffraction when one slit is open when only one photon at a time is emitted from a source through the slits to a screen.

8 Particle, Processes, Geometry and Spacetime Independence of Consciousness

We can ask ourselves what is the primary essence of the Universe? What is its fundamental building block? The Greeks called it "atom" (indivisible), the Hindus called it "processes". Are there sufficient clues in nature and/or in our minds to suggest an answer? What are space and time? These apparent restricting aspects of reality appear to be rigid physical constraints and yet are transcended by consciousness. These fundamental concepts appear to be "breaking down" as we probe the elementary particles at the micro-level, and perhaps even the macro level. Even the concepts of processes vs. particle are coming under close scrutiny in particle physics. Let us examine these ideas in the following subsections.

8.1 PARTICLE AND PROCESS, LOGIC AND REASON

The two main tenets of the scientific process are logic and reason. The origin of these words are *logos*, "the word" (from Greek) and *ratio* (from Latin). As Pribram [28] points out, words or noun concepts are the objects of scientific law (such as pressure, momentum, etc.) and ratios of these concepts are incorporated into scientific law. For example, in the ideal gas relation we have $P_1/P_2 = V_2/V_1$, so that the volume becomes smaller, as the pressure of a fixed quantity of an ideal gas becomes larger [28].

In western culture the primary structures of the Universe are postulated to be objects, particles, noun terms, etc., which are inert and immutable. Suppose the Logos were verbs or other action concepts. Suppose, as Benedict de Spinoza suggests [26], the God is not Being (existing) but Becoming (or process) [29]. This concept is closer to the Hindu Vedic concept where process is primary, not inert objects [30]. He also suggested that the God concept ultimately refers to ultimate nature – nature as all, an infinite whole of possibilities (even in a closed universe). We have still the universal in the sense of the whole containing all the variances, dualities, change, flux and dynamism of the "Universe" or Multiverse, we observe, yet somehow cohere, even by the measure of our comprehensive states to even live in it and with it. It is dynamic, change whole as nature, as existence that is many faceted with dynamical forces interacting that may be seen in Nature as God.

If the ultimate absolute is a dynamical process with infinite possibilities; this is fortunate because it gives infinite possibilities for achieving a Socratic "good" from this world of abstract images of things of reality. Some associate Socratic good with the idea of God. We relate to these two conceptual frameworks as experiences – an ebb and flow of the tide, or the seemingly immutable commuter traffic jam. If we developed a physics around the concept of process and not object, we would describe the same universe but our theories might look quite different!

Finkelstein suggest a model of quantum phenomena in which process is primary. His theory of "spacetime code" suggests that quantum processes are not random, i.e., "God does not play with dice,"

quoting Einstein [31]. These processes may appear random, due not to some intrinsic Universal property, to our ignorance of it. Some experimental evidence supports this view to the degree that several experiments have found small (5% or so) deviation from randomness of radioactive decay. Wheeler develops a geometric model of the Universe in which geometrical constructs are utilized to express the fixed, immutable, symmetric aspects of reality. This is also the approach that was taken by the “geometrizing” Greeks [32]. As stated above the entrance to Plato’s academy, “Geometry is the highest form of religion”, and his “Noetic Insight” he considered the highest form of knowing. The nature of force and dynamics and the manner in which they originate, from constant constructs in a model, which assumes static geometry as primary, is not well understood. Starting from dynamics to express change or process in the manifold and deriving the constant construct of geometry may be a way to proceed, or putting dynamics and process on an equal footing may lead to a new conceptual framework for physics and for science in general [33,24]. Geometric models are useful for expressing constant constructs in the physical universe.

8.2 INTRINSIC AND EXTRINSIC GEOMETRY, MIND- UNIVERSE

People have observed, under a variety of conditions, extended before them a detailed and often colorful regular geometric pattern or lattice-work of structure and color. Approximately one person in ten, according to Shepard, have such an experience upon awaking, in meditation, in a Lilly sensory-deprivation tank, etc. Rauscher has noticed such a phenomenon in meditation, in a Lilly tank and while observing a variable-frequency stroboscopic flash and in Kundalini yoga. Many scientists and mathematician have developed models of the Universe based on geometric constructs. Perhaps there is an intrinsic structure in the mind which prompts us to describe our perceptions of reality by means of geometric structures or constraints [35]. Maybe Eddington has a valid point about the study of physics divulging an aspect of the nature of consciousness.

8.3 SPACE-TIME INDEPENDENCE IN PHYSICS, PSYCHIC PHENOMENA AND MENTAL IMAGINATION

Some of the concepts of cause and effect formulated by Immanuel Kant and utilized by the currently defined scientific method are based on space and time as primary constructs of the universe. Now, both recent multidimensional models in astrophysics by Rauscher [15,16,19,20] and earlier geometric models by Wheeler [35] as well as recent discoveries in the descriptions of elementary particle processes by Chew [33] and Stapp indicate that space and time have lost their central and inert place and are no longer primary!

But it is the subjective aspect of space and time of which mystics, psychics and others speak. Techniques such as yoga, meditation or simple contemplation take us out of the normal space time ego self [35] which perhaps it does, as do other self-referential experimental exploration. Our research in remote perception (clairvoyance and telepathy) seems to imply that conscious perception can access remote information in space and time and transcend space and time [4,36]. Also, in the words of Einstein, 1941, “time and space are modes by which we think and not conditions in which we live” [36], or in the words of Eddington, 1923, “time is a mental construct of our private consciousness. physicist construct the concept of a worldwide time from a string of subjective instances” [36,37].

We can only detect space-time transcendence of consciousness and we can formulate the relationship between ordinary, real space-time and the complex multi-dimensional space-time domain of consciousness as we have mentioned earlier [5,13]. Particle physics and psychic phenomena tell us something is wrong with our present formulation of space and time. Since the causality concept is an

expression of even connections in space and time, we see that this fundamental concept may bear the brunt reformulation. Such modifications are afoot in particle physics Chew [33] and discussed in [5].

Another form of interconnectedness is that expressed in multidimensional geometries is Einstein linking space and time, and matter and energy [36]. There now appears to be evidence that a multi-dimensional Universe which relates to matter, energy, space, time, momentum and force having a fundamental link [19]. This concept is termed a Descartes geometry after Rene Descartes (who suggested such a geometry might be possible) [19,20]. This is an extension of the relativity theory. In the words of Einstein (1921), “It was formerly believed that if all material things (matter and energy) disappeared out of the Universe, time and space would be left. According to the relativity theory, however, time and space would disappear together with the things” [36].

There is experimental evidence that a so-called vacuum, supposedly devoid of all matter and energy, is not really devoid at all but seething with virtual (not directly physical) energy, which indeed can be observed as affecting observable physical (particle) processes and therefore, in that sense, has a physical reality. This virtual energy makes itself known, for example, in observable modifications of the conductivity and dielectric constant of hot fully ionized gases, called plasmas, consisting of ions and electrons. The energy of this system (of which the Sun is an example) excites and polarizes the vacuum “sea” of energy which in turn interacts with the plasma, affecting its electrical properties [38].

The type of geometrical picture of the Universe which is multidimensional leads us to the possible existence of a macroscopic remote connectedness which may extend over great distances: thousands of miles. This model may be consistent with the test of the space-time transcendence of consciousness tested in remote perception, at least over terrestrial distances [5]. This virtual sea of energy could possibly be accessed by consciousness to remotely manipulate matter in the so-called psychokinetic (mind-movement) phenomena which would truly be a measure of the connection of the observer to the observed!

9 Mystic Oneness: Unity

What is the experience of oneness from feeling, rather than thinking point of view? Meditators describe their experience as unity or oneness. In the words of Kriyananda, in 1967, we can see the description of this experience [39]. We read, “See how meditation is like a boundless sphere of light. The light has started to grow – light and joy fill the air of the room, the people, the objects nearby. All these in the peacefulness of that blue light of joy, are one with you – this light embraces your country, your continent, the world! – the limits of the solar solar system, to the distant stars, to the galactic fringe. You are boundless, Eternal!” [39]. This so well expresses the meditative experience. It is the reality of this experience that leads to the constructions of traditions such as those expressed in the Tantric Upanishads and Vedic literature.

The “ontological consciousness” concept is not at odds with the view of western science and it is becoming more like this tradition. Science deals with collective agreements about so-called external reality, called external validation realities; for example, in general, people agree the sky is blue. Meditators can agree on internal conscious states of reality such as the so-called “blue pearl” of mediation. Meditators often report seeing a blue-green light when their eyes are closed. Rauscher has discussed the color of this light with other meditators and we agree on its form, shape and color. It appears as a speckled pattern like laser light and the color of Chernov radiation in a reactor. (The normal field of vision for closed eyes in semi-darkness is reddish, since one “sees” the blood in the eyelid vessels.)

How different is the discussion of the color blue of the sky from the color of the “pearl” perceived in meditation? Some may “explain” the blue light of meditation as a neurophysical response to the meditative experience. What is the image? Where is it? What is its reality context? Some may call it a

hallucination. No matter the explanation, the observation leads us to ask where is the perception of the color or awareness of any reality, which is the basic essence of consciousness?

The basic unity or oneness of the universe is central to the mystical experience, as well as to the present direction of physics, as we have discussed in the interpretation of Bell's theorem. "The world thus appears as a complicated tissue of events in which connections of different kinds alternate or overlap or combine and thereby determine the texture of the whole" [23] again, we have unity and wholeness expressed by another: "He on whom the sky, the earth, and the atmosphere are woven and the wind, together with all life-breath, Him alone known as the one Soul (unity and God)" [30]. (from the Mundaka Upanishad)

To paraphrase Jean Paul Satre the turning point in his own intellectual development with the thought: "Everything we experience is hallucination or illusion, *Maya*. Reality is a structural-mathematical-principle that we do not see. That is, each person creates his own universe out of his own imagination, biases and belief systems. Science is nothing else but the search for the unseen structural integrities that underline these appearances" [35], this again brings us to Eddington's concept [2]. We all struggle through this *Maya* to truth which we will ultimately find within each of us. *Maya* may not imply total falsehood, but just our limited view. The Vedic literature gives a detailed description that may involve moving beyond our present state of consciousness to understand.

In the system of the tantras and in the Vedic literature (Rigveda), all creation is the manifestation of a Supreme Consciousness, which is unbounded. His Consciousness "spreads" itself out into manifestation and this becoming does not exhaust It's being. Consciousness has two aspects: S'iva is the static and S'akti is the active or kinetic (motion) aspect. These terms are from the Tantra Sastra tradition and the parallel terms in the Vedantic tradition are Sat, as being and Cit, as action. The static state is one of Supreme Unitary experience wherein the "I" and the "this" are without distinction. The active state, the S'akti, negates itself, becoming the object of experience, leaving the S'iva consciousness to become mere "I". Here arises the beginning to dualism of being and doing (action). By the operation of consciousness, that limits itself, called *Maya*, the united consciousness is severed and from this separation follows the multiplicity of creation. By a series of Tattvas (or steps) the pure become impure; the entirety of creation becomes the inner and the outer.

It is said that the travesty of the *Maya* of inner and outer, observer and observed, can be overcome by the mantra power which is S'akti in the form of sound, or mandala in the form of light. The earthly striving is to re-unite one's S'akti consciousness to the S'iva of beingness or bliss consciousness and, in so doing, overcome the *maya* of the divisional reality of the physical world. This model presents us with a possible prescription for overcoming dualism to obtain unity. The true essence of reality is Universal Consciousness. The essential feature of this model is an ontological consciousness one. Eddington alludes to such a model in his earlier quote that it is consciousness that can know only the structure of consciousness and hence dispel the duality of consciousness and matter [40].

Often the scientific and mystical are thought to be at odds. Perhaps they are not. The methods of science and mysticism or intuition, utilized by conscious minds in the search for truth stand as two paths to find truth, or, in part or in whole, to create truth. Einstein expressed the workings of these two paths together so well:

The most beautiful and most profound emotion we can experience is the sensation of the mystical. It is the sower of all true science. He to whom this emotion is a stranger, who can no longer stand rapt in awe, is as good as dead. The view of the mystical is my idea of God [41].

Another quote by Einstein brings us to the whole from the scattered parts we often perceive in our daily lives.

A human being is part of the whole called by us “universe”, a part limited in time and space. He experiences himself, his thoughts and feelings, as something separated from the rest, a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of understanding and compassion to embrace all living creatures and the whole of nature and its beauty.

The experience of unity is a fundamental state of consciousness which can be experienced. It appears to have a universality beyond the manner in which it is achieved, such as by autogenic training, *amanita muscaria*, meditation, or Za Zen. The dynamic, flowing oneness with the Universe, in which the observer participates and creates reality, is a common experience reported by many throughout yogic and other practices. These descriptions are often taken to be subjective babblings of a few, yet the basis for western thought, the methodology of science, yields similar concepts deep within its structure¹.

Such concepts as the Heisenberg uncertainty principle and relativity lead us to concepts in which the observer is a participant and that the perspective from which he observes from determines what he sees. Bell and Mach have developed concepts which lead to a universal connectedness. Some recent work by us and others indicate that some multidimensional geometries consistent with astrophysical data also lead to the concept of interconnectedness. Bell’s [7,5] theorem of interconnectedness originated from the discussion of the completeness of physical theory (in this case the microcosmic quantum theory). Gödel also shows us that mathematics is open-ended and not complete, and therefore not absolute – shades of Buddha.

Unity and wholeness are major experience and concept creators in some eastern mystic traditions as well as some westerners who have some experience with a variety of states of consciousness. As more conceptual frameworks of thinking are exchanged throughout the world, we gain new insights in our personal experiences of the world. The crux of these experiences, and the new discoveries in physics, is the multi-level nature of consciousness and the multidimensional nature of reality. Space and time are no longer hard and fixed absolute constructs, but are themselves becoming fluid, becoming Einsteinian flowing clocks or fluid time. Particle physics also is telling us that time and space no longer are the totality of the arena for the dance of particles but, as particles dynamically interact, the space-time continuum participates and is itself dynamic too. In the words of Chew, “particles are no longer isolated entities separated in spacetime, but are created out of each other and spacetime, or are “bootstrapped” from and with spacetime itself. Perhaps spacetime is also bootstrappable”.

Perhaps in a sense, all we know is “wrong” in the sense that it is incomplete (Gödel’s theorem). Science is a dynamic process, in that we continuously add to and modify our body of scientific knowledge. An altered state of consciousness does effect how one feels and how one interprets what one sees or what one actually sees. Observer/participant physics seems to tell us that what we see is determined by how we look at it. Also altered unique states of consciousness may affect the structure of physical theories we create. Examining this question could be a test of Eddington’s concept that the structure of the physical is a reflection of the structure of consciousness.

Perhaps with the infusion of the recognition of the role of states of consciousness in our observation of reality we will be in a better position to understand the relationship of parts to the whole. The “melting point” of the observer and the observed and the obvious connection of the two will surely lead us to a reformulation of models of physics and a new comprehension of reality. We have discussed the relationship of the multiplicity of the parts and the universal whole in the Tantric literature. There is the universality of the S’iva and the separateness of the S’akti. This is a model which attempts to dissolve the relational philosophy by methods (meditation – enlightenment) in moving from the Shakti to the

¹ Rauscher grew up on an indigenous Witton Indian land in Northern California and her intuition is that everything has a form of consciousness and is alive.

Shiva. Until there is no more Shakti, there is still a very basic duality in this model; the duality of the universal and the particular. All universal models appear to contain within themselves relational aspects. Unified theories attempt to resolve the relational aspects by explaining the relation.

We can now ask: Does the duality of the mind/body or observer/observed, etc. come about as a fundamental property of reality? Is the relativity of the separate parts real or imagined? The resolution of the universal vs. particular and the relations of parts may lie in just that – the relational description. Parts and whole may both exist but the key is that they are related and there are methods to describe their relation. The basic concept of universality is not that there are no parts but that there are no truly isolated entities or parts! A useful model of reality involves understanding the connections of the parts to each other and to the whole. The Chinese expressed this as Yin-Yang.

The observer does not stand aloof and isolated from the world, unconnected from the observed. There is mounting evidence, both physical and mystical that there is this interconnection. The observer, we, is a participant and is connected to our Universe. Perception of this depends on our state of awareness. On our growing living planet we must embrace existence globally.

10 Nature of the Physical Observer and the New Noetic Paradigm

The nature of the observer has long plagued physical science. Here we review the current status of cognitive science in the context of a cosmology of mind in an Anthropic Multiverse. The concept of an *élan vital* or life force has long been considered the elementary action principle driving the evolution of living-systems by theologically minded scientists and individuals. Sufficiently extending Einstein's original model of a Static Universe, to a Holographic Anthropic Multiverse (HAM) cosmology, provides a context for solving this centuries old problem for introducing this type of teleological principle into Physics, Biology, Medicine and Psychology [42,43]. This means the contemporary framework of *biological mechanism* should no longer be considered the formal philosophical basis for describing living systems and contemporary allopathic (scientific) medicine. The new noetic action principle has far reaching implications for medicine and transpersonal psychology.

We introduce a quantum-informational-unitary field noetic model of brain-consciousness-universe interactions based on the holonomic neural networks of Pribram, the holographic quantum theory of David Bohm, the nonlocality properties of the quantum theory and the unified field (tantamount to the *élan vital, prana, qi, chi* or spirit of God). We consider this model an extension of the interactive dualism of Sir John Eccles. His ideas (stemming from Descartes) of an interconnection between brain and spirit by means of quantum microsites (dendrons and psychons), has deeply influenced the development of our conception of consciousness.

We propose a dynamic concept of consciousness, a new teleological action principle driving self-organization, that generates a flux of the noetic field interconnecting quantum brain dynamics with the unitary nature of the universe. This scale-invariant self-organizing flux is embedded in the holographic mode of neuronal information can be optimized through practices of deep meditation, prayer, and others states of higher consciousness underling the coherence of cerebral waves to improve health generally and totally prevent conditions like influenza by blocking viral adhesion.

Brain mapping studies performed during the occurrence of these harmonic states have shown a spectral array of brain waves highly synchronized and perfectly ordered like a unique harmonic wave, as if all frequencies of all neurons from all cerebral centers played the same symphony. This highly coherent brain state generates the nonlocal holographic informational cortical field of consciousness interconnecting the brain and the holographic cosmos. Comprehending this holonomic quantum informational nature of brain-mind-universe interconnectedness allows us to solve the old mind-matter Cartesian "Hard Problem", unifying science, philosophy, and spiritual traditions in a transdisciplinary, holistic, integrated paradigm.

The discovery of the interactive Noetic Theory represents a Copernican class discovery; one that comes along only once in several hundred years. In sharing this occasion, it seems fitting to enjoy an ancient verse by Lucretius:

I am blazing a trail through pathless tracts of the Muses' Pierian realm, where no foot has ever trod before. What joy it is to light upon virgin springs and drink their waters. What joy to pluck new flowers and gather for my brow a glorious garland from fields whose blossoms were never yet wreathed by the Muses round any head. This is my reward for teaching on these lofty topics, for struggling to loose men's minds from the tight knots of superstition and shedding on dark corners the bright beam of my song that irradiates everything with the sparkle of the Muses [44].

What would it take to make psychology a hard science like physics or chemistry? Hipparchus, a Greek mathematician 2,000 years before Copernicus was first to make calculations revealing a heliocentric cosmology in conflict with Aristotle's principle of perfect circles or spheres. After some intellectual struggling Hipparchus discarded his calculations as false because elliptical planetary orbits were considered unphysical theologically. Hipparchus' influence was so strong that his bias suppressed the truth for 2,000 years! A similar problem exists today. Scientists insist that consciousness is a product of brain only. Noetic Science is in radical opposition to current thinking in six main fields of scientific endeavor: Psychology, Philosophy, Biology, Physics, Cosmology and Computer science. Progress in medicine is driven by advances in these disciplines. Progress in the evolution of human consciousness most often takes place in a constant series of tiny steps; however on rare occasions like that of Galileo, Newton, Copernicus, or Pasteur for example, a radical transforming event occurs. You dear readers are witness to such a historical moment. The purpose of this chapter is to introduce the revolutionary concepts of noetic science precipitating a revolution where mankind leaves the 'modern Age' enters the Age of Consciousness.

The current vogue – *Biological Mechanism* states that: 'The laws of chemistry and physics are sufficient to explain all life; no other principles are required'. Providing a physical basis for the action of the '*life force*' or *élan vital* would finally change this myopic naturalistic perspective. The empirical formalization of such an action principle leads to a whole new class of consciousness based medical conditions and associated '*spirit*' or transpersonal based treatment modalities. When psychology is recast as a physical science 'Moral Psychology' will also have a pragmatic basis because one will be able to experimentally measure which types of behaviors or mental conditions promote life and health or disease and death.

This immense task is accomplished by first extending the standard model of cosmology from the current Darwinian naturalistic (mechanistic, atheistic) 'Big Bang' theory to one that contains an inherent teleology or purpose. Making this change creates a domino effect that runs through all the other standard models of science. Evolution remains in the new model, not as a random Darwinian progression; but one considered to be 'guided' by the teleological action inherent in the Conscious Multiverse [42,43]. Such a Noetic cosmology called the Holographic Anthropic Multiverse (HAM) has now been developed in general form [45-47]. The associated comprehensive theory of mind is now sufficiently mature; and is not only empirically testable, but also able to rigorously define qualia² and begin categorizing the associated fundamental conscious elements in a manner similar to that performed in developing the periodic table of the chemical elements in past centuries. This will lead immediately to new 'conscious technologies' allowing dissolution of the 1st person 3rd person barrier. Because of the teleology inherent in Noetic Cosmology, the HAM represents philosophically what is called a form of Cartesian substance dualism / interactionism. This means that the brain is not of paramount importance to consciousness; the brain is not the seat of awareness as cognitive psychologists currently define it [48]. The brain plays

² Qualia – short for 'quality of the feel', the 'what it feels like' sensation of awareness.

only a secondary role with three main biological functions related to the operation of the complex self-organized living system:

- The brain couples awareness to temporal reality.
- The brain acts as a transducer for processing sensory data and intentional action.
- The brain represents a form of naturally occurring ‘conscious quantum computer’ that data processes and operates the moment-to-moment homeostatic and metabolic functions of the body.

This important discovery has not been feasible earlier because the currently dominant model for consciousness research (cognitive psychology) has rejected it by definition.

10. Allopathic Medicine – The Demise of Vitalism

Contemporary Western Medicine is comprised of Traditional and Alternative treatment forms. Traditional scientific medicine is the orthodox style also known as Allopathic; a term derived from the Greek *allo* – reversal and *pathos* – to suffer. Traditional medicine is characterized by four treatment modes:

- Pharmaceutical drugs,
- Surgery,
- Radiation and Chemotherapy
- Psychotherapy,

which sadly are all applied only when a person’s life is threatened.

The development of organic chemistry began in the middle of the eighteenth century when alchemy began to evolve into modern scientific chemistry. There were unexplained differences between substances in minerals and those observed in living systems; compounds from living systems were difficult to isolate and tended to decompose more readily than compounds from minerals. Swedish chemist Torbern Bergman [49] was first to express this difference between *organic* and *inorganic* substances in 1770. Many chemists at that time believed this difference was the result of a *vital force* which they believed precluded the ability to prepare organic compounds in the laboratory. But in 1816 when French chemist Michel Chevreul discovered that soap made from alkali and animal fat could be separated into glycerin and a number of pure organic compounds he called *fatty acids*; Vitalism was dealt a severe blow. This was the first-time organic substances were converted into other substances without the influence of a vital force. About a decade later in 1828 German chemist Friedrich Wöhler converted the inorganic salt ammonium cyanate into the organic compound urea. By 1850 the scale had tipped heavily against Vitalism [49].

Not until the beginning of the twentieth century did standard scientific (allopathic) medicine become totally dominant. Before that allopathic physicians prescribed harsh and distasteful cures based on mercury, purgatives, emetics and blood letting which were not considered more effective than popular alternatives such as phrenology, homeopathy, botanics, eclecticism or folk remedies. Allopathic theory was based on the mechanical or material laws of physics and chemistry. The adherents of alternative medicine generally believed that health was based on a vital force related to the soul or spirit. A combination of adherence to the educational standards of state and local medical boards, the complete adoption of science (which history had shown meant progress) and development of a strong professional identity by the class of allopathic physicians led to the inevitable demise of Vitalism which became considered old fashioned by an increasingly progressive science and technology based society [50]

Is it time for a rebirth of Energy Medicine? First to clear up any nomenclature conundrums, Although there may be a loose association with contemporary discussions of Energy Medicine and Mind-body Medicine; any of these modalities would be considered primitive in terms of the advances Noetic Medicine will introduce. The standard models associated with the current state of medicine are

- Darwinian naturalism,
- Biological mechanism and
- The cognitive brain model of psychology.

To summarize briefly this implies:

- Evolution by natural selection,
- The laws of physics and chemistry are sufficient to explain life, and
- The mind is state of brain processes.

Obviously Noetic medicine would be considered a radical heresy by these standards. Noetic medicine redefines the basis for living-systems based on a new cosmology that is an advanced form of Einstein's static universe model. This model includes what Bergson [51] and others called the *élan vital* or vital force. Currently use of Energy Medicine and Mind-body Medicine uses the vital force in only a superficial manner like the early history of electricity with only 'amber and fur' not the highly advanced transistor based devices of modern technology.

11 Status of Cognitive Theory

The study of awareness has been recently classified as a 'Hard Problem'; with the easy problems of awareness being ones that are nearly impossible to research by scientists [48]. The nature of mind has been called the oldest and most difficult problem facing human epistemology [52-54]. While people of faith have always been complacent with theological doctrines stating that individuals have an immortal soul created by God; it is only recently that a framework for posing the question of the nature of mind has reached sufficient maturity that any real scientific progress has been able to be made [55]. Chalmers' initial premise that 'awareness is the fundamental principle from which to formulate a theory of mind' [48] is a reasonable assumption for studying consciousness; but he mistakenly goes on to ask: 'what processes in the brain give rise to awareness?', which creates the very 'hard problem' he wants to solve because this manner of posing the question represents a category error for philosophy of mind. While it is true that the brain is the most complex structure known in the universe it is not the seat of awareness. If the mind is instead a whole cosmology; then trying to save the problem in terms of the brain alone will be forever impossible. Historically whenever there has been a 'hard problem' in science, it has turned out to be because the underlying principles have been poorly understood. Although it has been postulated that the mind/body is a naturally occurring form of conscious quantum computer; mind is more than brain or algorithm [56-58] and it is impossible to formulate a correct or sufficient theory of awareness from the point of view of AI, computer science or neurobiology alone. Mind, to be adequately described, must be represented by a complete cosmology with mankind imbedded in it [45-47,55,56,59-61]. Currently about 93% of scientists mistakenly believe the brain is sufficient to model the mind.

12 Philosophy of Mind - Vitalism / Teleology

The noetic model of cosmology called The Continuous State Holographic Anthropic Multiverse (HAM) requires reintroducing concepts like Vitalism and teleology that have been historically disdained by

science. Mechanistic models of the universe have allowed no place for these ‘philosophical constructs’ considered non-scientific and non-physical even by their major proponents. In the HAM they finally become physicalized and thus subject to falsification or study by empirical scientific methods. So in one sense we cannot blame science, because by definition it only allows concepts that have been empirically tested even if it is obvious to many that they exist.

Teleology is the philosophy based on the supposition that the universe has intelligent design and inherent purpose beyond the mechanics of a Newtonian Big Bang universe driven acausally by a Darwinian type of natural or random evolution. Evolution obviously exists, but it is not a random series of accidental events. It is guided by a teleological quantum of action (God defined in the coldest scientific terms) inherent in the higher dimensions of the HAM. In perennial philosophies, teleology represents a basic argument for the existence of God, that the order and self-organization of the natural world are not accidental. If mind is fundamental to existence, an ultimate designer or teleological principle exhibiting a quantum of action must exist. Since God is unseen in the usual sense, he does not exist in our temporal locale but resides in a higher dimensional realm that acts nonlocally on our three-dimensional domain.

Modern teleologists like H. Driesch or H. Bergson proposed a principle of *vitalism* - the processes of life result from a self-determining fundamental rule not explicable by currently observed physiochemical laws. Bergson, proposed an *élan vital* or vital force [51] as the spontaneous energy of the evolutionary process and defined mind as pure energy responsible for all organic evolution denying sciences claim to explain the universe on purely mechanical principles. This *vis vitae* is shown to be physical when discussed in terms of the noetic field [59-61].

13 Current Theories of Mind

Consciousness is not a brain state but a complex multi-factor cosmology. Often individual researchers consider their component theory to be a complete fundamental model. The time has come when it is possible to go beyond this "elephantness" consciousness to formulate a true comprehensive theory. The elephant metaphor relates to six blind men trying to feel an elephant, each attempting to describe it: One thinks of the tail as a rope, another the leg as a tree, the elephant’s trunk as a hose, the body as a wall, the tusks as swords and the sixth thinks the ear is a large fan. Until now this has been a major problem for consciousness researchers.

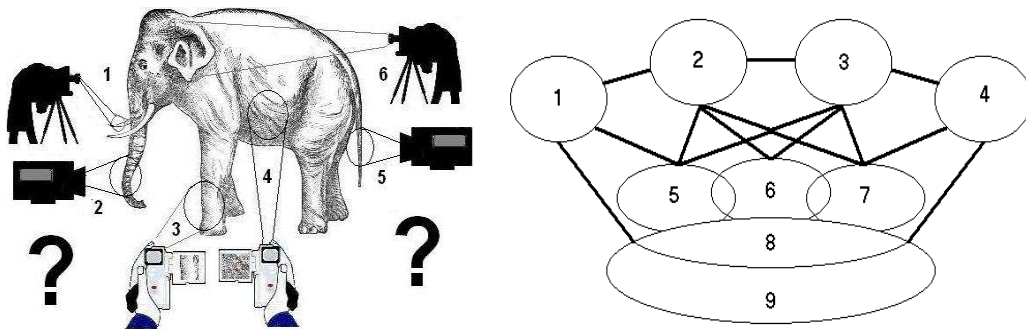


Figure 1. A) The Elephant of consciousness – see text. B) Another metaphor for current theories of mind illustrating how they are integrated into one comprehensive model by noetic field theory. 1. AI and Computational models, 2. Neural Networks, 3. Synaptic Tunneling, 4. Quantum Brain Dynamics, 5. Holonomic Brain Theory, 6. Orchestrated Reduction (Orch-OR), 7. Dualist / Interactionist Mind-Body Theory, 8. New Physics, 9. Noetic Field Theory: The cosmology for Quantization of Mind.

A number of partial theories of merit at the forefront of consciousness research are outlined below and then integrated into one comprehensive theory called Noetic Field Theory (NFT) representing The Quantization of Mind in a Holographic Anthropic Multiverse (HAM). NFT is the first complete and empirically testable theory of mind.

13.1 COMPUTATIONAL AND AI MODELS

The artificial Intelligence (AI) model states that the mind is merely a computer; and if the correct algorithm was known it would be able to completely describe all the functions of human consciousness. This view stretches from considering a thermostat as a conscious entity because it has two bi-stable states on one hand to an advanced autonomous android on the other.

Current classical computers are much less complex than the human brain and do not have enough degrees of freedom to handle consciousness. Furthermore, they are pre-programmed and unable to change or escape from this condition as a sentient being is [58,59] able to make choices based on spontaneous volition.

13.2 NEURAL NETWORKS AND CELLULAR AUTOMATA

The neural network model of mind states that the subjective process of awareness is a result of computational information dynamics in various biophysical networks such as neural, quantum and sub-cellular systems. Cognition is a problem of both processing and representation [62]. There is a wide spectrum of belief among researchers regarding the nature of mental data processing in networks. Some think the linear electrical pulses along neurons are sufficient. Others believe quantum processing with nonlocal effects is required [63,64]. Or is it nonlinear, parallel processing or a more complex form of distributed processing throughout the whole neural network as in the holonomic model of Pribram [65]? A similar conundrum occurs among researchers of the neural model regarding representation. This is called the problem of *qualia* - the nature and origin of qualitative subjective experience. Do qualia emerge into a mind from the neural substrate? How does thought bind to the conscious system? This is called the binding problem. These questions have been called the hard problem of consciousness [5]. For example, a 6D hypercube with 64 nodes and 6 connections per node representing connectivity for computation in a neural net or cellular automata. This is a form of computer modeling used to study the possible neural network structure of the brain [66].

13.3 SYNAPTIC TUNNELING

The linear action potential along a nerve fiber is electrical; and is converted to nonlinear chemical transmission at the synapse (See Fig. 4) which are ‘boutons’ at the end of nerve fibers that release various neurotransmitters. There is always a low level continuous release of neurotransmitter acting as the baseline of activity. Quantum tunneling is the charge transport of electrons through an otherwise impenetrable barrier or insulator at the synapse. Acts of volition or other neurosensory inputs are believed to be the phase regulators that trigger, through quantum tunneling, the release of neurotransmitter vesicles which is called exocytosis at the synaptic grid [67,68]. The most a neural impulse can evoke is a single exocytosis, probably because of the paracrystalline nature of the material the vesicles are imbedded in. Exocytosis is the most fundamental action of the cerebral cortex; and is an all-or-nothing response each of which results in a brief excitatory postsynaptic depolarization [67].

The trigger model itself is still incomplete because it has only been developed at the classical level of the electron transmission. What is still needed is a description of the coherent process that couples a mental event by quantum probability selection to the actual biochemistry associated with action. At the synapse and synaptic grid neurotransmitter vesicles are released by quantum tunneling of electron

transmission. The tunneling mechanism is believed to be the trigger action of intentional mental activity or the site of the mind-body connection [67].

13.4 QUANTUM BRAIN DYNAMICS

Quantum Field Theory has several branches, Quantum Electro Dynamics (QED) for electromagnetic interactions, and Quantum Chromo Dynamics (QCD) for strong interactions. Quantum Brain Dynamics (QBD) is a quantum field theory describing biological systems and the fundamental mechanics of the brain [69]. QBD is mediated by an exchange field called the corticon [69], a quantum of the water rotational field which interacts with electric dipole oscillations along neural proteins. When synchronization of the water corticon and electromagnetic field occurs, nonlocal coherence is manifest giving rise to long-range order and collective phenomena. Nonlocal coherence provides a much stronger correlation than a classical collective mode could describe.

QBD of the water rotational field and interacting electromagnetic field although providing an excellent model of neuromolecular computation is not sufficient to describe consciousness because freewill or intentionality is still left out of the picture and the founding fathers of quantum mechanics said it was not capable of describing biological systems. The Schrödinger equation describes the evolution of a particle on a manifold; so just because QBD describes action on a brain manifold it is not a sufficient extension of the theory. For this we need an extension not only of the orthodox Copenhagen interpretation but also are required to go beyond the quantum ontology of Bohm into a higher dimensional extension of Cramer's theory [70,71]. Bohm described the quantum potential as a nonlocal pilot wave effecting the probability matrix of the Schrödinger equation.

As we will show Noetic Field Theory: The Quantization of Mind completes Bohm's work by introducing a noetic effect [72]. Neurocomputing models of the brain are linear closed systems; Once a computer is programmed there are no remaining degrees of freedom for rational input.

In summary water has been theorized to play two important roles in consciousness:

- To provide a storage buffer to amplify or attenuate the corticon field,
- To allow switching between sensory computation and intentionality.

Although the role of ordered water in the dynamics of consciousness remains a qualitative model at this point in time; a growing body of literature from both experimental and theoretical areas are converging to suggest an important role of water in the quantum physics and molecular biology consciousness.

13.5 PRIBRAM'S HOLONOMIC BRAIN THEORY

The holonomic brain theory relying heavily on the Fourier relation and the holographic application of Fourier's theorem by Gabor in 1946; has been expanded by Pribram [73] to include a phase space of interaction in the brain; called the holoscape [65]. Integration of holonomic theory and the Bose-Einstein model provide a substrate for explaining recent work on quantum information processing represented as conformational changes of alpha and beta tubulin dimers in microtubule protein structure [74] providing a stage for the first application of these concepts to tangible brain material. However the brain, a Fermi apparatus with Einstein-Bose interactions; is viewed here as only one of three key aspects of consciousness.

Integral to Pribram's holonomic brain theory is the concept of the holoscape, a neuronal manifold which embodies the polarization occurring in dendritic networks [65]. The holoscape is the active manifold of entrained neural processing that couples phenomenal information to the phase space of

what Pribram calls the Heisenberg matrix which includes the raster of consciousness (of an analog TV screen) below it. Gabor and Fourier relationships describe the activity of information processed in the neural ensembles as a raster of mental functioning.

Freeman [75] relates that chaotic dynamics can create information in the Shannon-Weaver sense of information. This is the relationship with the Gabor logon utilized by Pribram [65] in the holoscape. Pribram has skillfully integrated his holographic model with quantum activity associated with QBD in what might be thought of as a dualistic picture of consciousness. The question remains, does consciousness originate from qualia at the level of holoscape dendritic microprocess or is it underpinned by the quantum domain? There has been general skepticism of quantum effects having any relevance to such a hot entropic matrix as the brain. However there is a distinct difference in coherence at these levels. In the quantum realm there is essentially thermodynamic equilibrium. Much could be written about the holoscape, where the major philosophical issues are information coding and processing, the binding problem.

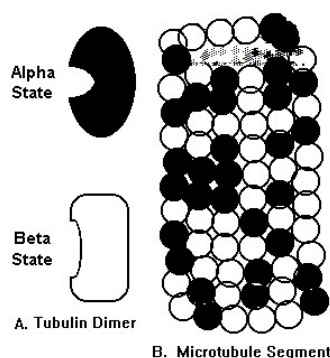


Figure 2. Alpha and Beta configurations (Two quantum states) of tubulin protein dimers provide a bit state model for information processing at the quantum level in cell structures that contain microtubules.

In Fig. 2 is a segment of a microtubule composed of tubulin rings. Shading represents conformational ordering as data I/O patterns in active quantum states as a basis for brain level dynamics of consciousness. A tubulin dimer is about 8 nanometers long. The quantum dipole shifts or conformational shape changes occur with transitions of 10^{-9} – 10^{-11} seconds.

13.6 ORCHESTRATED REDUCTION (ORCH-OR) MODEL

The Hameroff-Penrose theory states that quantum events at the microtubule (MT) (Fig. 2) and other nanoscale objects are sufficient to process the necessary amount of information to satisfy the needs for consciousness. The conformational states of the tubulin dimer are coupled to Van der Waal dipole moments. Each conformational state could represent a bit for information exchange [76].

There are several types of microtubules in the cytoskeleton that seem to have complementary features such as acidic and basic tubulin subunits. The tubulin polypeptide dimer has been found to have seven alpha and over ten beta species. Other differences include dynamic or stable, more or less curly, and variance in turnover rate. MT's are involved in a wide variety of cellular functions. They form the spindles during mitosis and meiosis, the cytoskeleton plays a major role in cell morphology, MT's aid transport, and maintain cell surface sites like receptor caps [77-79].

Microtubules do not handle all the information processing of mental states. There is an integrated system of data processing that includes DNA, cell topology, microtubules, cAMP, and water [80], not only in the brain, but also coupling the noetic field throughout the entire body modulated by muscle dynamics, thought, and other psychosphere processes [60,61]. One problem with the Orch-OR model

is that it attempts to utilize a conservative model of gravitation asking: 'what is the minimum gravitational mass required to collapse the wave function' which Orch-OR considers the process of mental action. This limits conscious systems to creatures only as small as a planaria; but we know from noetic theory that even the prion responsible for mad cow disease is a conscious system albeit a mechanical one [72,81,82].

13.7 DUALIST / INTERACTIONIST THEORY OF MIND-BODY

Over 400 years ago Rene Descartes claimed to receive a revelation from God that consciousness was divided into mind stuff - *res cogitans* and body stuff - *res extensa* [83]. This dualism of mind and body has endured until today because intuition dictates self as separate from world and until now there has never been a comprehensive mind/body theory. The nature of rationality or free will, as opposed to Newtonian determinism evidenced in a computer program or robot suggests that the basic theory of quantum mechanics also is not equipped to describe consciousness. The violation of the 2nd law of thermodynamics and entropy flow by living systems, and the smoothness of our perception of reality versus the discreteness or discontinuity of its origins at the microscopic brain level all show the inadequacy of our current thinking on the nature of cognition. Dualism states that although the mind has an independent eternal existence from the temporal body, it acts in concert with it [84]. Traditionally considered beyond physics because by definition only measurable quantities are deemed to exist; the dualistic view has funneled most scientists into the erroneous belief that brain equals mind. Since the brain is a physical object, scientists have believed this is the only basis for developing a physical theory of mind.

The complaint against the current thinking of Cognitive Psychologists regards the limits of inquiry bounded by its myopic metaphysical foundation of considering the brain as equal to mind. Science fits the basic definition of a theology by its rigid adherence to its principles. This heresy is not a call for science to embrace an *a priori* philosophy. Since Galileo the profound value of empiricism has been well learned. But the finite limitations surrounding the measurement problem in quantum theory and the need for a more advanced approach strongly suggests that we have come full circle to the time for mandating another evolutionary step to improve:

- The ability to pose foundational and empirical questions, and
- Data gathering and evaluation techniques that accept input in ontological terms, allow subjectively or both.

There may be no alternative to integrating a noetic based science for progress to occur. The Perennial Philosophy, attributed to Kant and others, states:

- Deity exists
- Is knowable
- Provides a path to be found [85, 181].

Benefits to utilizing the perennial philosophy include, insight into the nature of absolute truth [86], which promises a more efficient compass for reality testing; and insight into the utility of subjectivity by developing an acceptable methodology for instituting the radical empiricism of James [87].

Aspects of the following premises are based on noetic insight³ using elements of the Cartesian modality (institution and verification by revelation or meditative insight), and presented axiomatically as a bold call for testing this hypothesis. It must be stressed that utilizing the 'Cartesian modality' does

³ Noetic Insight: Plato said Noetic Insight was the highest form of knowing (epistemology) because it was transcendent – beyond ones intelligence and knowledge.

not interfere with the pragmatism of the empirical method. It is a time saver; if the correct model is 'divined' it may save hundreds of years in finding it, but it must then still be experimentally verified. Descartes distinction between *res extensa* and *res cogitans* has not been tested. If this turns out to be the correct model as is presented here; is it any wonder little progress has been made - if no one has been looking where the answer lies.

13.8 BEYOND THE BRAIN - ELEMENTAL INTELLIGENCE

While the brain services the temporal aspects of our Earthly existence; current thinking has ignored the eternal aspects of mind and body. Elemental Intelligence is the fundamental eternal condition of individuality and exists outside of time and the bounds of the phenomenological reality we observe in our 3D world view. This bound, although currently an ineffable domain not yet having an empirical foundation waits for vacuum quantization and a deeper understanding of nonlocality to open the avenue to a more empirical explanation, and is currently only known to exist by noetic insight. Simply stated if individual intelligence has no domain, i.e. is not bounded in some manner; it cannot exist with any connotation of individuality. Apparently, there is as much to us behind the curtain of reality as we see in front of us. So at this time only transcendent or philosophical arguments can be given for Elemental Intelligence as follows:

Firstly, individuality must be separated from 'The One' at some level for absolute unity is again nothingness, and nothing has no boundaries and cannot exist by its very definition. For even the demarcation of nothing as such demands its qualification by something extant which gives it existence. This idea of nothingness is not meant also as in the abstract sense of redness for example. For though redness is not assigned "thingness", it still has existence in sentient apprehension and is therefore not nothing. This is the abstract content of consciousness often deemed immaterial. However, according to the tenets of Noetic Field Theory [60,61] thought is deemed a physically real unitary noetic field that is encoded with information; thus, a typical case of abstractness in this sense is now relegated to tangibility.

Secondly without some form of separation from absolute unity there can be no self identity. Without this identity or boundary "it" would disappear into the 'one' or nothing as stated. Absolute unity is nothingness, cannot exist and cannot be comprehended. Further this complement of elemental intelligence is fixed nonlocally and promotes the separateness mandatory for individuality to exist.

13.9 CONSCIOUSNESS IS A UNIVERSAL COSMOLOGICAL PRINCIPLE

The second compliment of consciousness is a cosmological principle that fills and orders the immensity of space. It could be said to be equivalent to the life principle, *élan vital*, *Qi*, *chi*, *prana*, or Holy Spirit. In contrast to elemental intelligence above this aspect is not fixed but represents flux and promotes the unity of mind and body. This is the root of the mind - brain problem – cognitive brain science versus Cartesian dualism. We are complementary aspects of both unity and separation; monism by itself cannot be an absolute.

The cosmological aspect of consciousness exists in all matter and is itself a pure material with the properties of light. However as ordinary photons originate in atomic geometries coupled with properties terminating in space, Photons of mind (psychons as termed by Eccles) originate in complex higher dimensional geometries. Noeons is the term given to the unitary field in Noetic Field Theory. They are

confined to the spacetime backcloth like quarks. This is why they haven't been measurable by standard methods of Physics and why an extension of QT is required.

Consciousness pervades atoms, is the organizing power deeper than gravitation that controls the universe, causes gravitation, and the flux of which gives life. Plant life does not appear to make direct use of the component of elemental intelligence, only the cosmological ordering principle and the 'body state' of matter. Sentience is caused by the autopoietic (self-organized) integration of elemental (eternal) and cosmological (spiritual) intelligence. This basic holistic framework incorporates 'the implicate and explicate order' described by Bohm.

14 Origin of Complexity in Biological Systems: A New Model for the Origin of Life

Generally unicellular prokaryotes are considered the most fundamental form of living system. Many researchers include viruses since they commandeer cellular machinery in their replication; while others insist viruses are merely complex infective proteins. New biological principles are introduced suggesting that even the prion, the infectious protein responsible for transmissible spongiform encephalopathies, qualifies as the most fundamental form of life; and remains in general concordance with the six-point definition of living systems put forth by Humberto Maturana and his colleagues in their original characterization of living organisms as a class of complex self-organized autopoietic systems [88].

"What is the necessary and sufficient organization for a given system to be a *living unity*?" [88]. Maturana and his collaborators posed this question in their effort to formalize the general definition of a living system. They further stated that all other functions are secondary to the task of establishing and maintaining this unitary organization; defining this process as *autopoiesis* [88]. For review, the description of an autopoietic living system is as follows: *Autopoiesis* from the Greek 'self-production' is a fundamental expression of the basic complementarity of structure and phenomenology [89-91]. An autopoietic system is self-organized, complex, open, dissipative, self-referential, auto-catalytic, hierarchical, far from equilibrium and autonomous. A system is autopoietic when its primary function is self-renewal through self-referential activity. This contrasts an allopoietic system like a robot deriving function from an external source. Stated another way autopoiesis is a network of production components participating recursively as a globally stable structure operationally separable from the background [88,89].

These properties operate in an ascending hierarchy:

- An autopoietic system is an open non-equilibrium system. If closed in equilibrium all processes eventually stop.
- The processes are cyclical.
- As a complex self-organized system, operations occur within multi-levels where higher levels contain all lower levels.
- Function – the primary function of the system is autopoiesis as defined above [88].

14.1 SUMMARY OF MATURANA'S SIX-POINT KEY FOR DETERMINATION OF LIFE

1. Does the entity have identifiable boundaries?
2. Does the entity have unique constitutive elements?
3. Is the entity a *mechanistic system* possessing properties satisfying certain relations for its interactions and transformations?

4. Do the components constituting the boundaries of the entity act through preferential relations and interactions between the components?
5. Are the components constituting the boundaries of the entity produced by interactions of the components either by transformation of previously produced components, or by transformations and/or coupling of non-component elements that enter the entity through its boundaries.
6. If all the other components of the entity are produced by the interaction of the components as in 5 above, the entity is an autopoietic entity in the space in which it exists [89].

14.2 NON-AUTOPOIETIC ENTITIES THAT SEEM TO SATISFY MATURANA'S CONDITIONS

- **Automata** - Superficially automata [92] seem to obey Maturana's six points for autopoiesis, especially in terms of self-reproduction and autonomy; but they are readily disqualified for two salient reasons: Automata are generally nonphysical and cannot naturally escape or exist outside of the computer system they are programmed in.
- **Crystals** - Crystalline structures conform to many of Maturana's six key requirements. The symmetry of the *unit cell* contains the geometric framework of the whole periodic structure, which is repeated in translations of the unit cell. So although a crystal has open self-organized boundary conditions, appears to be recursive and can reproduce; a crystal's main failing is that it remains mainly a chemical reaction because its 'unique constitutive elements' can only be reproduced and remain structure preserving under precise conditions of chemical reactivity.
- **Ribosomes** - Although partially comprised of components produced by the ribosome, as entities they are produced by processes beyond those comprising their operation and their function is not completely self-referential. Ribosomes have high level metabolic properties but they are organelles not unique unities.
- **Belousov-Zhabotinsky Reaction** - A key aspect of a self-organized autopoietic system is its globally stable structure over an extended time. These are called *dissipative structures* because they maintain a continuous production of entropy, which is then continually dissipated. The best known dissipative structure is the Belousov-Zhabotinsky Reaction produced by the oxidation of malonic acid by bromate where rotating concentric or spiral waves create interference patterns oscillating with a periodicity maintaining itself for many hours [89,93]. Although self-organized with environmental interplay, can this be more than a recursive chemical reaction?

Jantsch and Maturana both state that dissipative chemical reactions like the Belousov-Zhabotinsky reaction and the glycolytic cycle qualify as primitive autopoietic systems [88,89]. Should these or any of the entities above be accepted as living systems? Maturana's six-point key is not experimental; but a set of logical premises, and in that sense arbitrary philosophical deduction. Even if these systems are considered autopoietic by the claim of definition, the thesis developed here is to not accept these types of entities as living-systems but to make a case for requiring additional physical principles added to Maturana's key to complete the requirements for properly defining a unique class of autopoietic systems qualifying as true living-systems. Our conclusion is that Maturana's autopoiesis at best only defines the mechanistic components of self-organization.

14.3 MECHANISM IN BIOLOGY AS A SEMI-CLASSICAL LIMIT

Autopoietic systems as defined by Maturana are a special class of *mechanistic system*. This is a challenging philosophical issue. It is generally considered an open question whether all biological process can be described completely in terms of the ‘mechanisms’ of physics and chemistry. In the philosophy of biology *mechanism* is defined as the view that every event described as a biological event is the same as those exemplified in non-biological physical chemistry [94,95]. Beckner in a discussion of *mechanism* states:

It is plausible to suppose that biology contains terms that could not be defined by reference to physics and chemistry, particularly if we count psychological phenomena as special cases of the biological, but perhaps even if we do not. Biological theory takes account of the circumstances of an event’s occurrence in a way that the physical sciences do not. For example, it is a biological fact that lions hunt zebras. The biological mechanist ought to insist merely that everything that happens in a given case of zebra hunting is identical with a sequence of physicochemical events, not that the concept of hunting can be defined in physicochemical terms. It may be the case that *hunting* can be defined only in intentional language [95].

This has left the final sense of reduction for the standard model of biology an open question; and until recently this is where conceptual development had to remain. The philosophy of biological mechanism reviewed here is akin to philosophical naturalism that states that ‘the natural world represents the whole of reality without requiring any additional teleological parameters’. This suggests that the current limits of scientific pragmatism provide sufficient explanation for all universal phenomena. Arguments on mechanism and naturalism have probably not been quite beaten to death but let it suffice here to postulate that additional scientific laws are yet to be discovered because ‘lion hunting’ as intentional action is not describable by the laws of physics and chemistry.

One cannot in good conscience label the Belousov-Zhabotinsky reaction [89,93] as a living system any more than one can logically allocate consciousness with reasonable definition to the bi-level state of a thermostat as is often done in Artificial Intelligence (AI) circles. The sophistication of self-organization in autopoietic systems cannot be discounted. While this inherent complex order provides a highly efficient substrate for living systems to be built on, like a little finger applied to the helm of a megaton ship, mechanism alone provides an insufficient basis for describing living systems. A teleological principle, inherent in a conscious universe [2-4], acting in concert with mechanism is required for life; providing components of what cosmologists have recently called the holographic cosmological principle.

15. New Cosmology Leads to Redefinition of the Observer

Until the advent of the Noetic cosmology [45-47] physical cosmologists generally believed that the universe could not be ordered enough to have a symmetric spacetime with an inherent periodicity where events are structured such that the future-past prepares the ‘nows’ evolution into the future [45-47]. These spacetimes were considered non-physical and appeared to violate the causal principles of quantum theory [96]. The semi-classical limit in physics refers to the boundary between classical mechanics and quantum mechanics where an incomplete understanding of the dynamics of a system allows only statistical predictions to be made on the behavior of a system rather than a precise determination [97]. Consciousness is able to violate quantum causality. Quantum mechanics is known to be both incomplete and not able to describe biological systems; therefore how can biological mechanism offer a complete framework for living-systems!

Self-organization produces *freedom* and the degree of autonomy a system achieves in relation to its environment provides one way to loosely define *consciousness*. Jantsch says “this autonomy appears as an expression of the fundamental interdependence of structure and function which is one of the most profound laws of dissipative self-organization” [89]. Drăgănescu further adds “If a virus is alive it has a phenomenological subconscious, if not, it cannot have any form of consciousness, because there is no structural organization with sufficient complexity to process structural information significantly”[91]. This is similar to Maturana’s idea that the autonomy obtained by autopoiesis relegates a primitive form of consciousness, even to chemical dissipative structures, which he calls a *cognitive domain* in relation to the systems environment [90]. This is where we will draw a line in the sand giving a definitive description of the term *cognitive domain* that goes beyond mechanism.

Consciousness, and not necessarily that with self-awareness, requires a sufficient number of degrees of freedom beyond those of an allopoietic mechanistic automaton. While one might reluctantly concede that the Belousov-Zhabotinsky reaction [89,93] is autopoietic by Maturana’s original definition [88]; one cannot proscribe a cognitive domain with the structural-phenomenology of intentional awareness to such an autocatalytic pattern-producing chemical reaction. How is this ultimately different than programmed automata? We believe that embracing biological mechanism leads one into the trap of ‘conscious thermostats’. The autocatalytic chemistry of the Belousov-Zhabotinsky reaction has a cyclical self-organization that keeps the cycle in motion recursively by a chaotic component in the symmetry of the boundary conditions leading generally to a global stabilization of the reaction until a chance occurrence of an ordered ground state occurs. One could argue the reaction is the result of the inherent activity in the reactions so-called *cognitive domain* because it includes a self-referential multilevel hierarchy that maintains the cycle of the reactions self-production. One could carry this argument further to lend correspondence with Prigogine’s symmetry breaking factors in the thermodynamics of evolution [98,99]. But the driving force described by these arguments is not an intrinsic *intentional awareness*; it is more like the incongruent geometric symmetries driving the chain of unstable intermediaries in a radioactive decay series, an automatic unraveling continues as long as a stable ground state with boundary conditions that preserve the unity of the intermediate atom cannot be reached.

16. Living-Systems and the Physical Observer

Recall Jantsch’s claim that the Beluzov-Zhabotinski reaction, as a result of its classification as an autopoietic system by Maturana’s definition [90], has rudimentary consciousness [89,100]. For decades researchers have believed that consciousness is merely a computer program, “a special software in the hardware of the brain or just a matter of information processing” [101]. This isn’t seem acceptable; and is more a reflection of the current state of bias in the field of consciousness studies where the dominant cognitive model is aligned with the standard model of biology. This *philosophy of biological mechanism* provides only half the story of mind. Our aim is to show that an addition to and clarification of Maturana’s key allows classification of the prion [81,82] as the fundamental living system.

The *cognitive domain* [90] of a prion⁴ does not create and dissipate entropy in its own right like higher life forms. The prion is not even at the same level as the virus where this critical factor of far from equilibrium complex processing is satisfied by proxy when the virus protein commanders the existing cellular machinery of the host. The prion, as the zeroth case of a living system, does not ‘live’ at the viral level. The factor that separates the prion from the non-autopoietic entities listed in section 17 (which utilize only the mechanistic half of the complementarity required for a complex self-organized living system) is the prions utilization of the coherent energy of the *élan vital* in its propagation. This is a prediction of the noetic theory we intend to demonstrate empirically [72].

⁴ The prion propagates through conformational changes in the geometry of its protein structure [72,81,82].

17. Is There More to Biology Than Mechanism?

Returning to the analysis of the fundamental philosophy of biology we summarize Brillouin's [102] categorization of the issues of mechanism versus teleology into three general positions:

- Knowledge of physics and chemistry is essentially complete and life could be explained without introduction of any additional *life principle*.
- Considerable physics and chemistry is known, but not everything. A new law or principle needs to be discovered to explain life; but this concept will not be outside the laws of physics and chemistry already known. Whether or not this is considered a *life principle* or not is irrelevant.
- A *life principle* is mandatory for an understanding of life because living systems are much different and more complex than inert matter. The laws of thermodynamics describe only inert and *dead* matter to which life is an exception requiring a new principle to explain.

Theories of mind abound with great disparity between them [91]. It could be said to be like the early days of electromagnetism when 'for every 100 theorists there were 101 theories'. Simply stated, and reducing from the top down, mind theory can be generally categorized as follows:

- A. Classical Reductionism – Newtonian mechanics deemed sufficient to describe mental activity
 - Neural action – Consciousness can be completely explained by brain processes
 - Information processing in Neural Networks / Cellular Automata / Physics and Chemistry
- B. Heisenberg Cut – Additional degrees of freedom, possibility of nonlinear & nonlocal interactions
 - Quantum computation in brain microstructures like synapses, microtubules or ordered water
 - Copenhagen phenomenology – collapse of wave function essential for mental activity
- C. Cartesian Cut – requires additional 'life' and/or physical principles beyond mechanistic theory
 - Dualism / Interactionism – ontological extension of quantum theory, collapse not required for evolution
 - Monism – all is mind, consciousness is ineffable

The first four types above fall under the domain called the philosophy of biological mechanism. Theories in the Classical and Heisenberg arenas have defined consciousness as a hard problem too difficult to research [103]. This provides significant motivation to explore below the Cartesian divide where additional physical laws are anticipated. What evidence exists to justify such a search?

Continuing with the premise that quantum theory is incomplete, Schrödinger in relating the 2nd law of thermodynamics and life says: "We cannot expect that the 'laws of physics' derived from it to suffice straightway to explain the behavior of living matter... We must be prepared to find a new type of physical law prevailing in it. Or are we to term it a non-physical, not to say a super-physical law [104]?" But what can this new physical law be?

18. Complex Systems Theory: A New Model for the Origin of Life

It appears unanimous that unicellular prokaryotes are considered the most fundamental form of living system with the inclusion of viruses controversial. By defining awareness as a fundamental physical quantity like the concept of *charge* in electrodynamics [72,105-109], it is possible to show how the prion recapitulates, in the sense of its organization, the propagation of its infective state by maintaining the 'charged' form of its conformation by merely being coupled to the Noetic Field. Prion propagation

therefore represents the most fundamental form of biological mechanism and provides the root of its redefinition. Although slightly more complex, the self-organization pertinent to viral replication also falls under this new definition of biological mechanism. Something else happens at the level of bacteria or perhaps any motive unicellular life form. The cognitive domain has sufficient capacity for activity based on an *interactive computational model* [110]; the evolution of the content (qualia) is driven by more than the mere presence of teleology as in the case of the prion or virus, i.e. more degrees of freedom are available.

The *continuous state* of this new action principle, as already suggested, is a ‘force for coherence’ like the well-known radiation pressure in the QED of light propagation. This symmetry enhancing force acts not only on the topological states of prion conformation by constructive interference as the base state of biological mechanism, but also by higher order conditions of self-organization. The structural-phenomenology of the new noetic action principle [45-47] is a complementarity of mechanism and the noetic field, together forming a teleology that is the general driving principle governing all aspects of complex self-organized living systems [60,61]. Applying the concept of a *unit cell* from the nomenclature of crystal structure to this fundamental teleology in the topology of spacetime, forms the scale-invariant hierarchical basis of living-systems from the microscopic origins of mechanism to macroscopic intentional systems. The complementarity of mechanism and teleology is a structural-phenomenology that is the primary cosmological principle of the conscious universe; the fundamental least unit of which is defined as awareness [72].

Defining awareness as a fundamental principle like charge in Electromagnetic Theory [100,103,105] provides two paths to formulate a theory of life and consciousness. 1. The currently popular cognitive avenue poses the question ‘*what processes in the brain give rise to awareness?*’ Unfortunately this creates a *hard problem*, which at present is deemed impossible to study empirically [100,103] - an investigative dead end! Charge has been considered fundamental physically and indivisible; but this definition appears to hold only to the semi-classical limit. Physicists are finding out that the so-called unit of elementary charge arises from a deeper wormhole structure in the higher dimensional topology of spacetime [77]. This is also true in defining the fundamental unit of awareness. Charge, or in this case awareness, does not arise as a brain process. 2. Only looking beyond the brain leads to a model of awareness (consciousness) that is both definable and empirically testable. In brief, the fundamental basis for the least unit of awareness has three complementary components [105-109]:

- Elemental Intelligence – A nonlocal atemporal HD domain or set of boundary conditions co-eternal with God that define an individual entity.
- Noetic Ordering Principle – A new action principle synonymous with aspects of the unified field and mediated by an exchange particle called the noeon that is synonymous with spirit or an *élan vital*.
- Local Fermi and Bose brain/body States – Classical, semi-classical and quantum modes associated with neural activity and other aspects of simpler autopoietic or complex self-organized living systems.

Remaining problems center around the fundamental nature of space; suffice it to say that Einstein’s superceding of Newton’s 3D absolute space with a 3(4)D or (+++ -) signature relativistic space was a significant milestone, but not a final answer. The triune complementarity above provides a sufficient structural-phenomenology of the 11(12) noetic space to define the psychosphere of an individuals mind and body.

19. Action of the Unified Noetic Field

Fröhlich [109,111] proposed a new energy that produces coherent long-range order in biological systems. Some authors have suggested this coherence is a type of Bose condensate. Einstein and Hagelin [110,112] further postulate this coherent principle arises from the unified field, which is also proposed here by Noetic Field Theory. The action of the unified field is the basis for a life principle governing the evolution of complex self-organized living systems.

We will show generally how the continuous transformation of the topology of the 12D superspace of the noetic least unit introduces by periodic holophote action evanescence of a life force from the HD energy covering of each moment of the present [45-47,72,100,103,105]. First we illustrate one of a number of possible models of how at the semi-classical limit from the stochastic background of the vacuum zero-point field, this energy of the *élan vital* is harmonically injected into every point and atom in spacetime by a mechanism like a ‘chaotic gun’ [113,114].

20. Physical Self-Organized Basis of Qualia

Qualia, plural of *quale*, is ‘the subjective quality of experience; a *qua-litative feel* associated with an experience’ [115,116]. The physical HAM cosmology of *élan vital* leads to a rigorous model for representing qualia [117,118] allowing immediate application on the mind-side to psychology and on the body-side to medicine. In ‘What’s it like to be a bat?’ Nagel [116] states that current reductionist attempts fail by filtering out any basis for consciousness; becoming meaningless since they are logically compatible with its absence. He assumes if an organism has conscious experience, “there is something it is like to *be* that organism”. This is the subjective character of experience for any conscious entity whether bat or Martian. Every experience has a specific subjective nature [116].

To Nagel “there are facts which could not ever be represented or comprehended by human beings, simply because our structure does not permit us to operate with concepts of the requisite type”; because “to even form a *conception* of what it is like to be a bat one must take up the bat’s point of view”. If one removed the viewpoint of the subjective observer; what would be left? Nagel suggests the remaining properties might be those detectable by other beings, the physical processes themselves or states intrinsic to the experience of awareness. This changes the perspective of qualia to the form “there is something it is like to undergo certain physical processes”. “If our idea of the physical ever expands to include mental phenomena, it will have to assign them an objective character”. Nagel recognizes that:

Very little work has been done on the basic question (from which mention of the brain can be entirely omitted) whether any sense can be made of experiences having an objective character at all. Does it make sense ... to ask what our experiences are *really* like, as opposed to how they appear to me?...This question also lies at the heart of the problem of other minds ... If one understood how subjective experience could have an objective nature, one would understand the existence of subjects other than oneself [116].

These are questions an integrative Noetic Science can answer. Standard definitions of qualia are an inadequate philosophical construct describing only subjective character. In the physical sense of Noetic Field Theory (NFT) components describing qualia from the objective sense are introduced - i.e. distinguishing the phenomenology of qualia from the noumenon or physical existence of the *thing in itself*.

A comprehensive definition of qualia includes three forms considered physically real by NFT because the noetic fields of HAM cosmology on which the noetic model is based are all physically real. See [117,118].

Type I. The Subjective - The *what it feels like* basis of awareness. Phenomenological states of the qualia experience. (The current definition of qualia Q-I)

Type II. The Objective - Physical basis of qualia independent of the *subjective feel* that could be stored or transferred to another entity breaking the 1st person 3rd person barrier. The noumenal elements of qualia upon which the phenomenology is based.

Type III. The Universal - Living systems represent a Qualia substrate of the conscious universe, acting as a 'blank slate' carrier from within which Q-II are modulated into the Q-I of experience by a form of superradiance or hyper-holographic evanescence.

A standard image requires a screen or other reflective surface to be resolved; but if the foci of two parabolic mirrors (Casimir-like plates in our model) are made to coincide, the two images superpose into a real 3D image that does not need a screen. See Fig. 7 above. A science toy called the 'magic mirage' is used to demonstrate this effect of parabolic mirrors. Objects placed in the bottom appear like solid objects at the top of the device.

Cosmological Origin and Production of the Three Types of Qualia

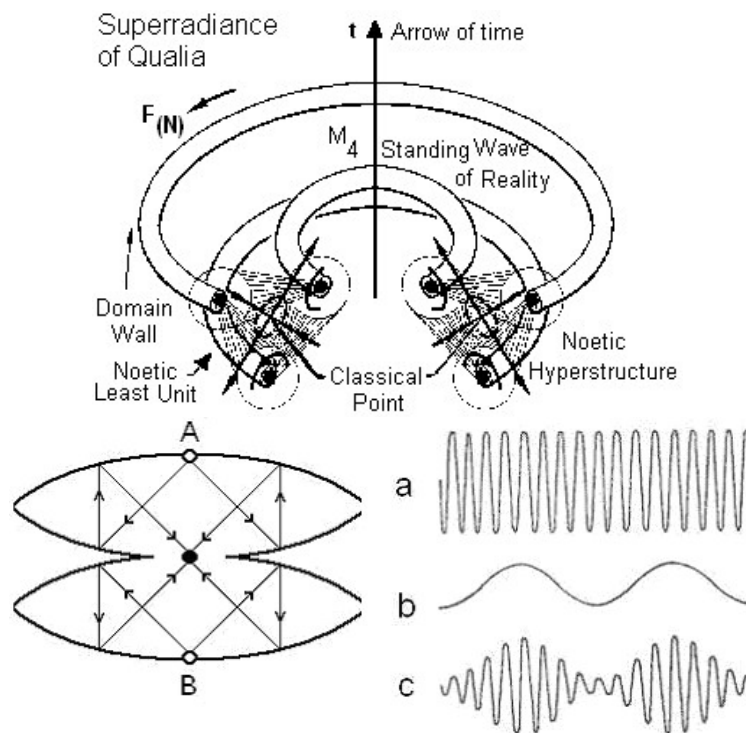


Figure 3. Metaphor for the emergence of qualia from the continuous action of the noetic least unit (1a), a microcosm of the HAM where past oriented compactification periodically produces a classical spacetime point. The standing-wave domain walls represent the lightcone singularities of Q-III propagation, the surfaces of which act structurally as Casimir-like plates, and phenomenologically as a carrier wave base for Q-I qualia evanescence by Q-II modulation. 1b represents two pairs of parabolic mirrors (the Q-III Casimir domain walls) whose foci overlap; this is the high frequency wave in 1c denoted as *a*. The longer wave *b* represents Q-II qualia which is modulated by the Q-III wave into the usual Q-I qualia *c*. Thus *a*, *b*, and *c* in 1c represents the three forms of qualia and how they work together to form Q-I by superradiance of the noetic field.

The holophote action of *élan vital* energetics arises from the harmonic oscillation of least unit boundary conditions tiles the spacetime backcloth and pervades all self-organized living systems. The inherent beat frequency of this continuous action produces the Q-III carrier wave that is an *empty slate* modulating cognitive data of Q-II physical parameters into Q-I awareness states as a superposition of the two (Q-III and Q-II). This modulation of qualia occurs in the HD QED cavities of the cognitive domain. The QED cavities are a close-packed tiling of least unit noetic hyperspheres; the Casimir surfaces of which are able to reflect *quaneme* subelements. While the best reflectors of EM waves are polished metal mirrors, charged boundary conditions also reflect EM waves in the same way radio signals bounce off the ionized gases of the Kennelly-Heaviside layers in the Earth's ionosphere. This reflective 'sheath' enclosing the cognitive domain is charged by the Noeon radiation (exchange particle of the noetic field) [59] of the *élan vital*, the phases of which are 'regulated' in the complex HD space of the least unit HAM cosmology.

How does noetic theory describe more complex qualia than the simple qualia of a light pencil? (The qualia-II of a light pencil is assumed to be *the* pencil of light [117,118] Light quanta are microscopic in contrast to the macroscopic sphere of awareness. It thus seems reasonable to assume that scale invariant properties of the HAM least unit of awareness would apply. Like phonemes as fundamental sound elements for audible language there are qualia-nemes or *quanemes* for awareness all based on the physical modulation of Q-II states by the geometric structural-phenomenology of the Q-III carrier base of living systems [117,119].

21. Cosmology Of Noetic Medicine – An Introduction to Catastrophe Theory

Regarding homeostasis - living-systems and every component subsystem, especially those related to health and well being, biophysically are forms of *dynamical systems* that generally operate in a framework of stability and equilibrium – the maintenance of which is the charge of medical practice. Technically these systems have a restrictive class called gradient systems which contain singularities or points of *extrema*. Some causal action can institute a bifurcation of an extrema that can initiate a qualitative change in the physical state of the system. Catastrophe theory⁵ describes the breakdown of stability of any equilibrium system causing the system to jump to another state as the control parameters change. The changes in the singularities associated with the bifurcation of extrema are called elementary catastrophes [119-121] and can be described by real mathematical functions

$$f : R^N \rightarrow R. \quad (1)$$

The equation describing an elementary catastrophe utilizes variables representing *Control* and *State* parameters of the system and is a smooth real function of r and n where R represents the resultant singularity or catastrophe

$$f : R^r \times R^n \rightarrow R. \quad (2)$$

The r variables are the control parameters of the state variables n . The function f is therefore an r -parameter family of functions of n variables. If we let

⁵ The groundwork for Catastrophe Theory began with the Poincaré work in 1880 on the qualitative properties of solutions to differential equations; and became formalized in the 1950's by R. Thom's work on mapping singularities in structural stability, which he called catastrophes [119-121].

$$f\left(a_1, \dots, a_r; x_1, \dots, x_n\right) \quad (3)$$

be a smooth real-valued function of $r + n$ real variables we get equation (2).

The number of elementary catastrophes depends only on r and is finite for $r \geq 5$ totalling eleven (table 1) and infinite for $r \geq 6$.

22. Catastrophe Theory and Anticipatory Effects of the Noetic Formalism

The structural-phenomenology of Double-Cusp Catastrophe (DCC) Theory in $\geq 9D$ appears homeomorphic to the Riemannian manifold of both 10(11) dimensional M-Theory and the topological geometry of the continuous state dimensional reduction spin exchange compactification process inherent in the action of the corresponding scale invariant least unit of noetic superspace which because it is a complex self-organized system has inherent anticipatory properties mediating the catastrophes. In this general framework the double-cusp *equilibrium surface* is analyzed in terms of a hierarchy of *jumps in state* providing a framework for expanding the basis of allopathic medicine and psychology. One can say FAPP that the noetic least-unit tiling [109] of the Planck backcloth is a complex HD catastrophe manifold mediated by the unitary noetic field.

The noetic action of consciousness $F_{(N)}$ is not a 5th fundamental force but an integration of the electromagnetic and gravitational force at the unitary level where it is confined to the Universal sea of consciousness embodying an 11(12)D Noetic spacetime metric $S_{(N)}$ [88-90]. The well-known Schrödinger equations central to quantum theory make correspondence to Newton's second law of motion $F = ma$ which is also the starting point for deriving the noetic formalism. Newton's law of gravitation $F = Gm_1m_2 / r^2$ is not chosen because it is not the fundamental form of gravitation and also contains an undesirable constant of dimensionality. Whereas $F = ma$ is dimensionless. Likewise, Einstein's gravity is also not chosen.

Substituting Einstein's mass-energy relation $E = mc^2$ into Newton's 2nd law we obtain: $F_{(n)} = E / c^2 a$ where $F_{(n)}$ is the noetic force and E becomes the self-organized autopoietic energy [88,89] related to ψ_e of the cosmology of mind defined in the fundamental dualistic interactionist relationship of noetic theory:

$$|\Psi_M\rangle = |B|\psi_b\rangle + (|\psi_e\rangle + |\psi_c\rangle) \quad (4)$$

i.e. the mind Ψ_M is not merely quantum brain dynamics $B\psi_b$, but a classical \rightarrow quantum \rightarrow unitary continuum of brain, élan vital ψ_e and HD elemental intelligence ψ_c . E is scale invariant through all levels of the HAM beginning at the highest level in the supralocal Multiverse as a hyperdimensional Wheeler Geon - a *ball* of photons of sufficient size to self-cohere through gravity [123]. At the micro level the Geon becomes synonymous with the de Broglie wave-like mental energy of a conscious entity. The Prion [115,123-126], the infectious protein responsible for spongiform encephalopathies (mad cow disease) is designated the simplest known life form, if correct that the prion protein is 'animated' by the self-organizing properties of the *élan vital* of the noetic field [119]. The E unit is comprised of a factor

of *Einstein's*, the fundamental physical quantity defined as a 'mole - Avogadro number (10^{23}) of photons'.

TABLE I

| <i>r</i> (Control Factors) | Number of Catastrophes | Name | | Dimensions |
|----------------------------|------------------------|-------------|------------------------------------|------------|
| <i>r</i> = 1 | 1 | A_2 | Fold Catastrophe | 2D |
| <i>r</i> = 2 | 1 | $A_{\pm 3}$ | Cusp Catastrophe | 3D |
| <i>r</i> = 3 | 3 | A_4 | Swallowtail | 4D |
| <i>r</i> = 4 | 2 | $A_{\pm 5}$ | Butterfly | 5D |
| <i>r</i> = 5 | 4 | A_6 | Wigwam | 6D |
| <i>r</i> = 3 | - | D_{-4} | Elliptic Umbilic | 5D |
| <i>r</i> = 3 | - | D_{+4} | Hyperbolic Umbilic | 5D |
| <i>r</i> = 4 | - | D_5 | Parabolic Umbilic | 6D |
| <i>r</i> = 5 | - | D_{-6} | 2 nd Elliptic Umbilic | 7D |
| <i>r</i> = 5 | - | D_{+6} | 2 nd Hyperbolic Umbilic | 7D |
| <i>r</i> = 5 | - | $E_{\pm 6}$ | Symbolic Umbilic | 7D |
| <i>r</i> = 6 | ∞ | X_9 | Double Cusp | 9-11D |

Table 1. The general forms of catastrophes showing how the dimensions increase as the number of control factors increase. The names bear some resemblance to the geometric pattern of the catastrophe. The double cusp catastrophe is utilized in development of Noetic Theory because it models most closely noetic superspace transitions and is compatible with the fundamental equation of consciousness.

Next the derivation of the noetic equation is generalized for the conscious universe by taking an axiomatic approach to cosmological scaling from the work of Kafatos et al, [127] suggesting that all lengths in the universe are scale invariant. Beginning with the heuristic relation $c \equiv \dot{R}$ or $\dot{R} = L/t = c$ where \dot{R} represents the rate of change of scale in the universe. This corresponds to the Hubble relation for perceived Doppler expansion of the universe where $H_0 = \dot{R}/R$ and $a = \dot{R} \times H_0$. By substituting \dot{R}^2/R for a in the original $F_{(n)} = E/c^2 a$, for final substitution we have $F_{(n)} = E/c^2 \times \dot{R}^2/R$. Since $c = \dot{R}$ the c^2 & \dot{R} terms cancel and we are left with the simple equation

$$F_{(N)} = E/R \quad (5)$$

which is the unexpanded fundamental formalism for noetic action within a conscious entity in the HAM cosmological model. It should be noted that R is a complex rotational length with standing wave

properties and could be derived in terms of angular momentum or spacetime spinors at HD levels in domains described by future developments in M-Theory using Calabi-Yau dual mirror symmetry.

Noetic Action on the Equilibrium Plane of a Double-Cusp Catastrophe

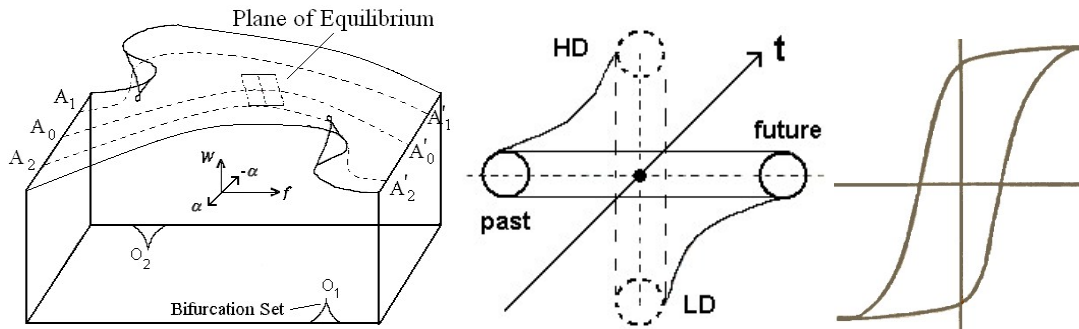


Figure 4. In a, the DCC is illustrated showing cusps at each end of the plane of equilibrium. The DCC occur in ≥ 9 D and the catastrophe most compatible with NFT symmetry. The plane of equilibrium is a topological manifold tiled of noetic *least units*. The equilibrium manifold undergoes a ‘conscious’ quantum computation best described by interactive computation [110,128]. Fig. 4b graphically illustrates the fundamental scale invariant noetic equation $F_{(N)} = E / R$ of conscious action. Any internal or external stress or change in E is a nonlinear dynamic process producing stability or instability in the boundary conditions of R ; an instability in $E \rightarrow$ stress \rightarrow displacement \rightarrow catastrophe \rightarrow jump... whereas stable flux is homeostatic. 8b like noetic HAM cosmology is also a form of hysteresis loop generalized in 8c.

When applied in concert with the fundamental noetic equation of consciousness [106] and the model of interactive computing [110,128] double-cusp catastrophe theory provides a mathematical basis for the noetic action principle called the “Noetic Effect” that applies to medicine and psychology where new medical technologies are under development to ameliorate autoimmune etiologies and balance mental disparities in Transpersonal Psychology. The processes of metabolic homeostasis and intentional action are modulated by the ubiquitous flux of the unitary noetic field as described by the anticipatory effects of the $F_{(N)}$ formalism.

Equation (4) is a standard equation for the equilibrium surface of the DCC [120-122] as modeled in (Fig. 8); where $B \pm Q$ is the state variable and μ_d and ν_d are the control parameters.

$$(B + Q)^3 + (B + Q)\mu_d + \nu_d = 0 \quad (6)$$

The position of the two cusps is found at $\mu_d = 0$ and $\nu_d = 0$.

If Fig. 5a is considered as a present moment; 5b is a flag of temporal permutations as the noetic catastrophe cycle evolves in time from future to past and higher to lower dimensions in the same manner as the HAM cosmology for the spaces:

$$R^{12} \supseteq \dots R^4 \supseteq R^3 \supseteq R^2 \supseteq R^1 \supseteq R^0.$$

Unit Circle and Associated Flag of Temporal Evolution for Noetic Catastrophe Cycle

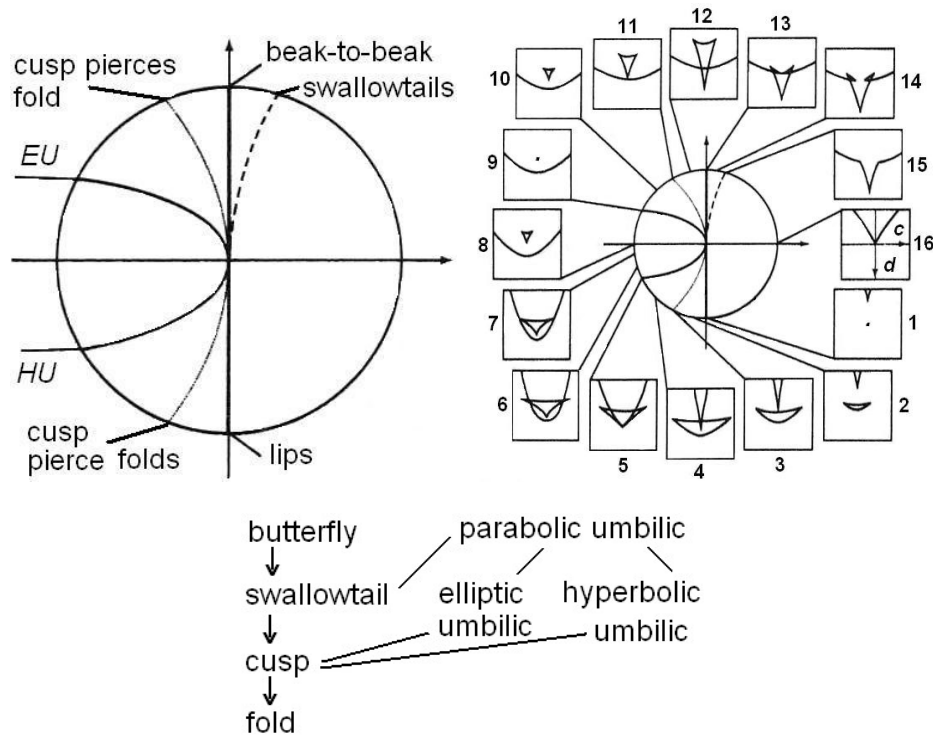


Figure 145. [120,121] 5a represents a plane of the unit circle with corresponding cross sections in 5b: Section 16 for example shows a cusp. A single point in 1 grows to the ‘lips’ in 2. In 3 to 4 the original cusp 16 penetrates the mouth becoming a hyperbolic umbilic point at 5, turning into an elliptic umbilic at 6, shrinking to a point in 9. Growing again in 10 to pierce the fold line in 11 and through it in 12. A ‘beak-to-beak singularity in 13 breaks in 14, collapsing to a swallowtail 15. The seven fundamental catastrophes contain ‘subcatastrophes according to the diagram in 3c.

The putative significance of Tbl. 2 for the application of double-cusp catastrophe theory to the noetic HAM formalism is that the structure of possible boundary conditions and the number of control points is revealed. For example, in this simplistic view, a 3D point in real spacetime might have 16 control photon-gravitons (noeons) covering it. Carrying the analogy all the way up to the 12D holoscape of the Multiverse, the same 3D point might be controlled or guided by a total of 8,176 photons. The number arrived at by summing the points of D4 to D12. No point in the universe is isolated; so this metaphor does not include the possible power factor by associated points in both the HD and LD HAM backcloth. Within the inherent continuous-state dimensional reduction compactification process, the LD domain (dimensions less than 3) might be coupled to orders of magnitude more photon-gravitons. This detail of Noetic Theory has not been completely worked out yet.

**TABLE 14.2. GEOMETRY OF 0D TO 12D SHOWING POINTS
AND LINES CONTAINED**

| NSpace | Point | Lines | Squares | Cubes | Tesseracts | 5T | 6T | 7T | 8T | 9T | 10T | 11T | 12T |
|--------|-------|--------|---------|---------|------------|--------|--------|--------|-------|-------|-----|-----|-----|
| 0 | 1 | | | | | | | | | | | | |
| 1 | 2 | 1 | | | | | | | | | | | |
| 2 | 4 | 4 | 1 | | | | | | | | | | |
| 3 | 8 | 12 | 6 | 1 | | | | | | | | | |
| 4 | 16 | 32 | 24 | 8 | 1 | | | | | | | | |
| 5 | 32 | 80 | 80 | 40 | 10 | 1 | | | | | | | |
| 6 | 64 | 192 | 240 | 160 | 60 | 12 | 1 | | | | | | |
| 7 | 128 | 448 | 672 | 560 | 280 | 84 | 14 | 1 | | | | | |
| 8 | 256 | 1,024 | 1,792 | 1,792 | 1,120 | 448 | 112 | 16 | 1 | | | | |
| 9 | 512 | 2,304 | 4,608 | 5,376 | 4,032 | 2,016 | 672 | 144 | 18 | 1 | | | |
| 10 | 1,024 | 5,120 | 11,520 | 15,360 | 13,440 | 8,064 | 3,360 | 960 | 180 | 30 | 1 | | |
| 11 | 2,048 | 11,264 | 28,160 | 42,240 | 42,240 | 29,568 | 14,784 | 5,280 | 1,320 | 220 | 22 | 1 | |
| 12 | 4,096 | 24,576 | 67,584 | 112,640 | 126,720 | 101,37 | 59,136 | 25,344 | 7,920 | 1,760 | 264 | 24 | 1 |

23. Example of Noetic Medicine: The Mechanism of Protein Conformation in Prion Propagation

Fatal neurodegenerative disorders known as transmissible spongiform encephalopathies (TSE'S) have been shown to spread by a proteinaceous infectious particle or prion [124-126]. According to Prusiner's definition these prion elements propagate conformational variation leading to replication by a mechanism not well understood until now [124]. Two conversion hypotheses have been proposed:

- The *template-assisted conversion model* [186] where a putative cellular chaperone called protein X assists conformational transition by altering the thermodynamic equilibrium of a kinetic barrier in favor of transition state protein formation.
- The *nucleation-polymerization model* where highly ordered aggregates of the infectious element form. This shifts thermodynamic equilibrium allowing this nucleus to act as a seed for further prion propagation. Protein folding thus appears in both cases to be the primary autocatalytic mechanism propagating prion diseases.

According to Prusiner [126]:

Nascent prions are created either spontaneously by mutation of a host protein or by exposure to an exogenous source. Prions are composed largely, if not entirely, of a modified form of the prion protein (PrP) designated PrP^{Sc}. Like other infectious pathogens, they multiply but prions do not have a nucleic acid genome to direct the synthesis of their progeny. A post-translational, conformational change features in the conversion of cellular PrP (PrP^C) into PrP^{Sc} during which alpha-helices are transformed into beta-sheets. Since this structural transition in PrP underlies both the replication of prions and the pathogenesis of the CNS degeneration, much of the effort in the laboratory is devoted to elucidating the molecular events responsible for this process. Indeed, prion diseases seem to be disorders of protein conformation.

And further relative to the theory of propagation proposed here:

During prion replication, an as yet to be identified factor that we have provisionally designated protein X binds to PrP^C. The PrP^C/protein X complex then binds PrP^{Sc}; by an unknown process, PrP^C is transformed into a second molecule of PrP^{Sc} [126].

A Postulated 3D X-bundle structure of the PrP^C was chosen by Prusiner from four penultimate PrP^C models reduced from ~300,000 possible configurations by both theoretical and experimental constraints. These four choices correlated best with human prion mutations. A Conceptual model of the orientation of the four helices of the X-bundle model looks like two X's nearly superimposed on each other. Since prions have no nucleic acid based genome to direct their propagation. Noetic theory proposes that prion replication is directed by fundamental mechanisms of complexity theory and that the action principles driving this complexity are a more fundamental form of mechanism than that perceived currently by the philosophical basis of mechanism in biology.

24. Implications for Transpersonal Psychology and Autoimmunity

The immune system is comparable in the complexity of its functions to the nervous system. Both systems are diffuse organs that are dispersed through most of the tissues of the body. In man the immune

system weighs about two pounds. It consists of about a trillion (10^{12}) cells called lymphocytes and about 100 million trillion (10^{20}) molecules called antibodies that are produced and secreted by the lymphocytes. The special capability of the immune system is pattern recognition and its assignment is to patrol the body and guard its identity...The immune system is subject to continuous decay and renewal. During the few moments it takes to read this chapter one's body produced 10 million new lymphocytes and a million billion new antibody molecules. This might not be so astonishing if all these antibody molecules were identical. They are not. Millions of different molecules are required to cope with the task of pattern recognition, just as millions of different keys are required to fit millions of different locks. - *Niels K. Jerne, 1973, Scientific American*

Much biochemistry, biophysics and quantum dynamics has been developed in the study of the immune response relating to the principles of allopathic medicine. But if one recalls that the founders of quantum theory emphatically stated that quantum theory and the Schrödinger equation did not describe biological systems; something must be missing in all this work. This is of course the 'life principle' that is introduced by the Holoinformational principles of interactive dualism. First lets outline all the brilliant models that are insufficient:

- F. Popp's biophotons – Sure all of human physiology is a thermodynamic heat-bath and radiates a spectrum of radiation. But this is after the fact of any immune response and has nothing to do with consciousness.
- K. Pribram's holographic brain model utilizing Fourier and Gabor principles for a spectral holographic domain throughout the brain – A fabulous advance in quantal brain function, but again devoid of principles of consciousness.
- W. Schempp's quantum holography and his discovery that all information about objects, including their three-dimensional shape is carried in the quantum fluctuations of the Zero Point Field, the vast memory store predicted by Puthoff. With this information Schempp calculated, recovered and reassembled three-dimensional MRI images through Fourier transformation. – Again no conscious principles.
- Marcer and Schempp developed a mathematical map of how information is processed in the brain that is a mathematical demonstration of Pribram's theory. – Still no consciousness.
- S. Hameroff's showed microtubules are an exceptional conductor of quantum pulses and these pulses are transmitted through pockets of protein. Hameroff discovered a coherence among neighboring tubulin dimers; calling them "light pipes" or "waveguides" for photons sending these waves from cell to cell throughout the brain with Fröhlich coherence. – A model of consciousness, but insufficient.
- K. Yasue and M. Jibu also theorized that the quantum messaging must take place through vibrational fields and quantum coherence along the microtubules.
- K. Pribram, K. Yasue, S. Hameroff and S. Hagan assembled a collective theory about human consciousness in cytoskeletal microtubules in which microtubules and the membranes of dendrites represent the Internet of the body. Theoretically every neuron could log on at the same time and speak to every other neuron simultaneously via this quantum processes by quantum superposition, 'Superradiance' and 'Self-Induced Transparency'. – A logical step forward but still missing the conscious action principle.
- Similarly, physicists Del Giudice and Preparata suggested Hameroff's 'pipes' contained coherent energy fields. They also suggested that water molecules in the brain extend coherence effects as far

as 3 nanometers outside the cell's cytoskeleton suggesting water inside the microtubules is also ordered. They showed that this focusing of waves would produce beams 15 nanometers in diameter - precisely the size of the microtubule's inner core.

- All this led to the heretical thought already occurring to F. Popp that consciousness was a global phenomenon occurring everywhere in the body, not simply in the brain. Perhaps consciousness is fundamentally a coherent light within a unified theory of mind and matter like Bohm's "unbroken wholeness", where the universe is a vast dynamic and intelligent Holoinformational web of information exchange containing all possible versions of all possible forms of energy and matter. – Yes, but what kind of light?

This is the crux of the problem because any place where there are atoms and molecules and spacetime there are quantum fluctuations. This is all that is addressed by Copenhagen interpretation whether in microtubule, synapse or neuron - there is no consciousness described here even though this is the currently dominant cognitive model accepted by 90% of consciousness researchers today.

A holoinformational cosmology of consciousness is required because consciousness is deeper than the 3D brain. The sphere of action must be taken to where the unified field - spirit of God lies, hidden behind this virtual barrier, the regime described by the Copenhagen interpretation as outlined in the bullets above. We must follow Einstein's view that quantum theory is incomplete: "God does not play dice".

Several hypotheses are considered by immunologists:

- Clonal Deletion theory, proposed by Burnet, according to which self-reactive lymphoid cells are destroyed during the development of the immune system in an individual.
- Clonal Anergy theory, proposed by Nossal, in which self-reactive T- or B-cells become inactivated in the normal individual and cannot amplify the immune response.
- Idiotype Network theory, proposed by Jerne, wherein a network of antibodies capable of neutralizing self-reactive antibodies exists naturally within the body.
- The so-called "Clonal Ignorance" theory, according to which host immune responses are directed to ignore self-antigens.
- The "Suppressor population" or "Regulatory T cell" theories, wherein regulatory T-lymphocytes (commonly CD4⁺FoxP3⁺ cells, among others) function to prevent, downregulate, or limit autoaggressive immune responses.

Autoimmune diseases can be broadly divided into 1) systemic and 2) organ-specific or localised autoimmune disorders, depending on the principal clinico-pathologic features of each disease. An example of a systemic syndrome is Rheumatoid Arthritis; and Local syndromes include virtually any circumscribed mass of body tissue like Addison's disease or multiple sclerosis. A comprehensive list of autoimmune conditions can be found at [120]. Current treatments for autoimmune disease are usually immunosuppressive, anti-inflammatory, or palliative. Non-immune therapies, such as hormone replacement in Hashimoto's thyroiditis or DM Type 1 treat outcomes of the autoaggressive response. Dietary manipulation limits the severity of celiac disease. Steroidal or NSAID treatment limits inflammatory symptoms of many diseases. More specific immunomodulatory therapies have been shown to be useful in treating rheumatoid arthritis. These immunotherapies may be associated with increased risk of adverse effects, such as susceptibility to infection [121-126]. These therapies treat the 'branch' but not the 'root' of the problem; and therefore provide no cure.

25. A Noetic Effect on Autoimmune Systems

Holoinformational-noetic-conscious medicine is far different than scientific-allopathic medicine; it is a spiritual medicine relying on the *élan vital*. This is the gap we wish to bridge. We postulate that all autoimmune etiologies are diseases on consciousness and therefore require a Holoinformational cosmological perspective, rather than the current limitations to brain or biochemistry. Our starting point for correspondence to current theory is the network immune theory of N.K. Jerne [127,128]. This means that medical treatments must be found to regulate the flow of the unified Noetic Field. Complex self-organized systems like living systems are driven by an action principle. This action principle is the teleological life principle equated with the cosmology of unitary field. This is the missing component from Scientific or allopathic medicine; this is the principle that must be added.

STRUCTURAL-PHENOMENOLOGY (INTERACTIONISM) OF THE ECCLES PSYCHON

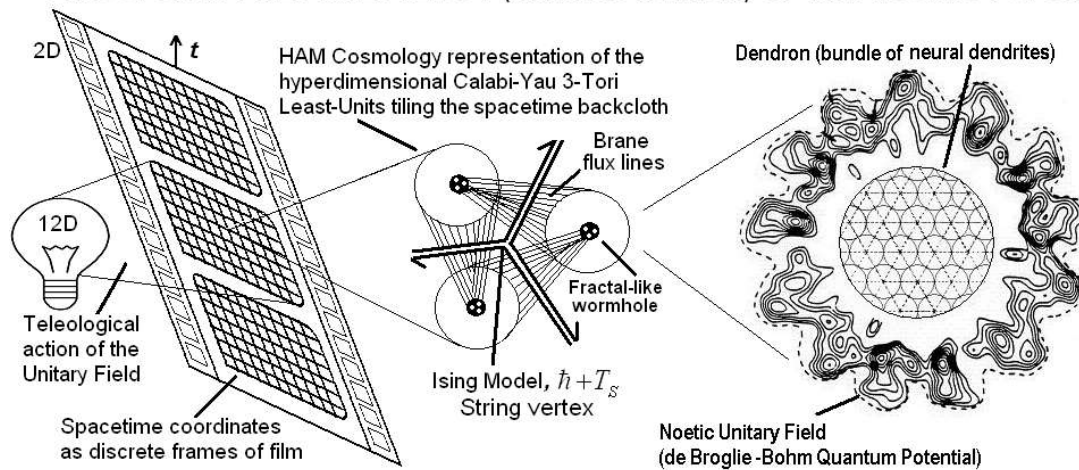


Figure 6. Conceptualization of Interactionist cosmology, a) showing injection of the noetic field or *élan vital* into spacetime points, b) Planck scale least-units mediating the noetic field, c) an Eccles Psychon field coupled to a brain dendron where autoimmune interactions may interrupt normal homeostasis.

In allopathic-scientific medicine if a tumor exists we surgically remove it or give chemo-radiation. If a deficiency we give a vitamin or any of the tens of thousands of pharmaceuticals discovered to control the human biochemistry and its myriad etiologies. But this is the branch only and rarely the root of the problem except for microbial causation. We want to address the root of the problem, the ~ 150 autoimmune conditions [120] that allopathic medicine has little insight into especially at the root. These are the noetic etiologies. Imagine a child with a magnifying glass focused by the sun on an ant that actually can catch them on fire. Imagine those foci are not on an ant but ‘catastrophes’ focused on many energetic microsites of the biochemistry or organ systems. Also imagine the converse – a cover is put over the lens blocking the flux of life energy. This life energy arises from a deep regime in spacetime structure itself in a Holographic Anthropic Multiverse [129]. the entry point of the life force where deep catastrophes may occur in the hysteresis (energy) loop of the propagation of the noetic unitary field with a simple relation that coupled with all the transpersonal-personality pre-disposition which forms a complex pattern specific to the ~ 150 different ways that lead to these conditions. I call it the noetic effect which is governed by the noetic field equation. The noetic effect is the switch for all the quantum/classical places discussed – neural, synapse, MT, maps etc. This deeper understanding is the fundamental key to all conscious medicine.

In Fig. 10 we see a view of the Holoinformational cosmology of interactive dualism. To clarify our critique of allopathic medicine above, we point out that current medical treatment modalities and medical theories related to the work on consciousness and quantum theory are only related to quantum parameters associated with brain or physiological elements associated with Fig. 10c and are silent about 10 a and 10b that relate to consciousness.

From sections 25 and 26 and Figs. 8 and 99 above we can understand that this sustained noetic effect resulting in catastrophes in the Holoinformational noetic unitary field is responsible for all autoimmune disorders. The hysteresis loop in the center of the Double Cusp Catastrophe (DCC) is the energy available for this action. This can be applied to a Jungian type collective unconscious related to Transpersonal Psychology if we metaphorically consider the absorption-emission spectra of complex molecules to be like personality structure: We know already people are made of a web of molecules. We know a little of personality types and wish to apply this as a model to the absorption emission spectra of atomic structure. So, in scale invariance people are like huge particles or atoms. The hysteresis loop in the middle of the DCC represents energy, bioenergy and mental energy depending on the relation. We know in general about extrovert, introvert, dependent personality, dominant, submissive, we know depression is like black hole and from Selye - stress causes foci of negative energy that is destructive. From the relaxation response and meditation, we know of energy balance. For physics the future-past spacetime hysteresis loop can be applied directly to the formula for absorption-emission spectra. What is next is to formally systemize this model to generalize each foci of these noetic catastrophes. For Alzheimer's negative foci are on the brain, for colitis on the intestine Excessive anger in a certain way can cause a brain a tumor, another kind of dominance causes necropsy in the knees or a weak spine for back problems. But this initial idea must be systemized for the whole complex system. What are the precise entry points of the field; Which autoimmune molecules as Jerne suggests are related?

This is a global view generalized for personality structure to focused deficits in energy. The model is empirically testable and medical devices are being designed to implement conscious medicine for both diagnosis and treatment. In the near future new medical technologies will be developed that are currently considered science fiction. The popular US sci-fi TV-movie series Star Trek includes advanced medical techniques utilizing a device called the *Medical Tricorder*⁶ able to diagnose and heal. Most notable at the fundamental level of triage is the tricorder's ability to heal a variety of injuries in a few seconds that today might take several months to heal. At the advanced level using combined features of replicator and transporter⁷ technology as illustrated in the Hollywood movie "the Voyage Home" when Dr. McCoy utilizes the tricorder to repair a ruptured cerebral artery inside Chekov's head. The operation is accomplished by *beaming out* the damaged section of the artery and *beaming in* a new section.

We may not see the advent of the advanced form of the tricorder until our children's or grandchildren's day; but sufficient theory exists to construct the basic form of the tricorder now. In the interim noetic Holoinformational theory can be used to greatly expand the versatility of Transpersonal Psychology.

26. Completing Epistemology: The Utility of Transcendence as a Tool in Transpersonal Psychology

I want to know God's thoughts ... the rest are details - Albert Einstein

⁶ Amoroso has a US patent pending for such a tricorder in hopes that such a device will arise in next 10-15 years.

⁷ The Star Trek Transporter disassembles the individuals atomic and life energy information and broadcasts it to a remote site for reassembly. The replicator is a similar technology for objects and tissue assembled from templates stored in a computer.

Human epistemology has steadily evolved from dark ages of superstition through enlightened periods of logical reason to the current pragmatic age of empiricism. Now another Galilean class revolution completing epistemology by integrating Science and Theology (S&T) utilizing transcendence seems immanent. S&T represent opposite ends of a long continuum of schools of thought rather than mutually exclusive disciplines as often believed. To implement the required paradigm shift an integrative noetic science must include an adequate understanding of Transcendence. Over 2,000 years ago the Greek philosopher Plato considered this type of noetic insight, paraphrased here as a corollary:

§ Noetic Insight: *No matter how great ones intelligence or how vast ones wisdom, noetic insight is cosmic insight transcending the capacity of the self* [130].

Human epistemology has come full circle to a time not only for another evolutionary step, but the final one completing the tools of epistemology through the use of transcendence.

For the first time since the Dark Ages, physicists Paul Ginsparg and Sheldon L. Glashow wrote 12 years ago, we can see how our noble search may end, with faith replacing science once again [131].

This condition is not what is advocated here because it seems that no matter how advanced tools of transcendence may become, empiricism leads directly to engineering which is an integral part of temporal existence. In some arenas current science has already reached, at least in terms of experimental design, the limits of empiricism; for example some experiments in particle physics require an accelerator the size of the universe and some calculations require a computation cycle with a duration the age of the universe. Only about 70 years ago Cosmology was not considered science. The universe was believed to be clock-like as described by Newtonian mechanics. Since the advent of Quantum Theory, the majority of scientists have considered the universe to be quantum.

But recent studies extending the standard models have allowed a growing number of scientists to embrace forms of an Anthropic Conscious Multiverse. The form utilized here in Noetic Theory has continuous-state properties with temporal reality cast as a virtual subspace of a higher dimensional eternity [45-47]. This new cosmology yields key elements pertinent to premises here (especially the periodic properties enabling introduction of an inherent spirit-based action or life principle); some of which are:

- The fabric of reality continuously cycles between classical, quantum and unitarity (continuous-state).
- Phenomenological reality is virtual; because of the arrow of time much of the underlying noumenon is ‘filtered’ out of perception.
- Dimensionality cycles continuously from spatial to temporal to energy. This “energy” is synonymous with the quantum potential or pilot wave in 4D and the unified field or spirit of God in HD.
- Matter by Einstein’s $E = mc^2$ is continuously created, annihilated and recreated (the well-known wave- particle duality) forming the holographic backcloth of perceptual reality.

Inherent in the periodic properties this noetic model is the unified field or spirit of God, acting in governance as a higher dimensional de Broglie-Bohm super quantum potential [132,133]. Periodicity allows for the pervasive ubiquity of this supernumerary action principle. Since a conscious universe is implied the field is one of information. This is key to our idea of transcendence. In an Anthropic Holographic Conscious Multiiverse (HAM) human beings are spiritual beings and a path to enlightenment is possible by following certain laws related to this condition. Because of the nonlocal

(and because of the additional dimensionality – supralocal) character of the Holographic Principle individuals perceive themselves as separate entities in 3-space. But in Higher Dimensionality (HD) we are unitarily imbedded in the holographic backcloth, which because of its spiritual nature –

- Transcendence may occur and
- Information received in the process

The coming paradigm shift does not merely represent a significant intellectual breakthrough like Copernicus' transformation of egocentricity into heliocentricity, the advent of quantum theory or Einstein's theories of relativity; but a profound paradigm shift where Humanity will leave the so-called Modern Age behind and enter an Age of Consciousness.

An 'empirical metaphysics' [134] is under development that will violate the uncertainty principle and allow actualization of Plato's noetic insights in a manner useful for scientific exploration. Noetics, the study of the cosmology of mind, comes from the Greek word *nous* meaning intellect. Noetic insight when used scientifically to complete epistemology is the highest form of knowing because it utilizes and integrates the pure logic of philosophical reason, the rigors of scientific empiricism and the absolute truth of theology.

All scientific theory formation has at least low level metaphysical components. Without entering into a technical discussion of the nature of creativity, we assume here that this is what any creative process entails. The latter-day Mormon prophet Brigham Young went so far as to say "All scientific discovery comes as a revelation from God" [135]; while this may indeed be considered true in an Anthropic Universe, one would suspect the vast majority of scientists are currently neither generally interested in, consciously aware of its occurrence, nor even consider this possibility, especially since statistics have demonstrated that only about 20 to 30% of scientist believe in some form of god in contrast to 95% of the general population.

Does this mean that only few might be initially prepared to take advantage of the premises of noetic transcendence? An informal survey of my colleagues has revealed that some have already begun using transcendent abilities in various ways in scientific endeavor and daily routine with reasonable success. We know of no team efforts yet at this writing; although a five year budget for implementing bulk quantum computing approved in March 2010 will be used to test the premises presented here. As principle investigator Amoroso has chosen a question, because of infinite possibilities, that can only be answered by transcendence. Should we be successful certainly "the game will be afoot" as Sherlock Holmes would say at the beginning of a case. Hopefully preliminary results will be available before this volume appears in 2011. We think a result like this is required to create sufficient pause for engendering a Galilean class paradigm shift in epistemology. Since inception in the 1980's all attempts have failed at implementing bulk quantum computing. By utilizing transcendence we have been provided a unique approach by the *Zeitgeist*; that approach demands the development of what Amoroso calls "the Noetic Transform" [136].

The value of the high-level addition of Transcendence as a tool of science in theory formation would be to accelerate progress by saving considerable time, energy and funds by optimizing both avenues for empirical research and efficiency in contemplating and defining fundamental new tenets of a model. For example, early in my career I sat in on a round table discussion by an august body of great thinkers of the age. They divided up a challenging problem into every logical possibility like spokes of a wheel. Each agreed to take a spoke or two, intending to spend the remainder of their careers working on their arena of interest of the problem. The utility of transcendence in cases like this would be to narrow the field to a spoke or two.

Currently all the standard models of science are Darwinian or naturalistic excluding any place for God or Spirit. For example, Biological Mechanism, the basis for allopathic or scientific medicine and psychology states: The laws of chemistry and physics are sufficient to describe all life; no additional

life principle is required [93-95]. The founding fathers of quantum theory stated it could not describe biological systems, Big Bang cosmology is also naturalistic; therefore, something most assuredly must be missing in physical theory.

The noetic model for the integration of S&T is based on three premises:

§1. That transcendence is a universal Anthropic Principle able to provide an interface or *common ground* between S&T.

§2. Rigorous application of The Golden Rule (see below) spontaneously leads to transcendent abilities under certain optimal conditions because

§3. Man is inherently a spiritual being (*The spirit and the body are the soul of man* [137]) imbedded in a conscious universe guided by a unitary field tantamount to this spirit.

A common ground [119,138] uniting S&T is required because traditionally scientific principles are not accepted by faith based theology; and religious dogma is generally considered an unacceptable anti-intellectual mode of epistemological inquiry by the common definition of scientific pragmatism in place since Galileo showed that reason, in the case of heavier objects falling faster, failed. Similarly today Hubble discovered redshift, not a Doppler expansion of the universe. Other interpretations are available [45-47] supporting HAM cosmology.

To achieve this integrative result a model of an Anthropic Continuous-state Holographic Conscious Multiverse (HAM) [45-47] (and this volume) is utilized that includes an inherent basis for defining complex self-organized living systems in a manner that includes the physical basis of spirituality and therefore transcendence [60].

According to the Perennial Philosophy: God exists and has revealed a path to find him [139]. This perennial philosophy is not only universal to all theology but ultimately to all truth whether theological or scientific as we make the case for here. The HAM [45-47] an extension of Einstein's Static Universe model, is shown to naturally include a new action principle governing complex self-organized living systems. This HAM elucidates the physical basis of spirituality. All legitimate religions or life paths in principle provide avenues to transcendence. Achieving transcendence is not based on the superficial icons of the world's theologies. Superficial artifacts like phylacteries, crosses, rosaries or rituals like bowing east or genuflecting are not relevant.

We believe that because human beings are inherently spiritual [60,137], transcendence can be achieved universally by practicing principles of love, service and charity; or adhering 'perfectly' to what is called the Golden Rule - Do unto others, as you would have them do unto you [140-147]. The Golden Rule is the most fundamental moral or ethical principle; it is the basis for the theology of virtually all world religions, the basis of social order, interpersonal relations, sound business practices and international diplomacy. The Golden Rule has many similarities to the Hindu belief in karma and is the basis for all the worlds major religions.

27. The Golden Rule Subsidiary to Love for God the Great Commandment

For simplicity we will argue our case only from the point of view of Judeo-Christianity but the reader is asked to keep in mind that as illustrated in Fig. 11 the premises here are postulated to apply to all legitimate theologies. The monotheistic religions Judaism and Christianity teach that the Golden Rule and other moral commands for human relations are subsidiary to the Great Commandment relating to God, e.g., Jehovah, Emmanuel or Jesus The Christ explicitly identified the Great Commandment as supreme love for God, as affirmed in the Hebrew Torah and Christian Bible [148]. In contrast to the ancient 'an eye for an eye', Jesus gave a new command - "Love one another as I have loved you" [149].

We hypothesize that love is a real physical force of nature and will develop this in future work. By categorizing ‘Love your neighbor as yourself’ as the Second command like unto the first, Jesus placed the Golden Rule and human relationships as not subsidiary but tantamount to one’s ideal relationship with God the father.

The paramount statement relating to our purpose here is Christ’s teaching regarding the two great commands, specifically as stated in the last sentence: Master, which is the great commandment in the law? Jesus said unto him, Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind. This is the first and great commandment. And the second is like unto it, Thou shalt love thy neighbor as thyself. On these two commandments hang all the law and the prophets [150].

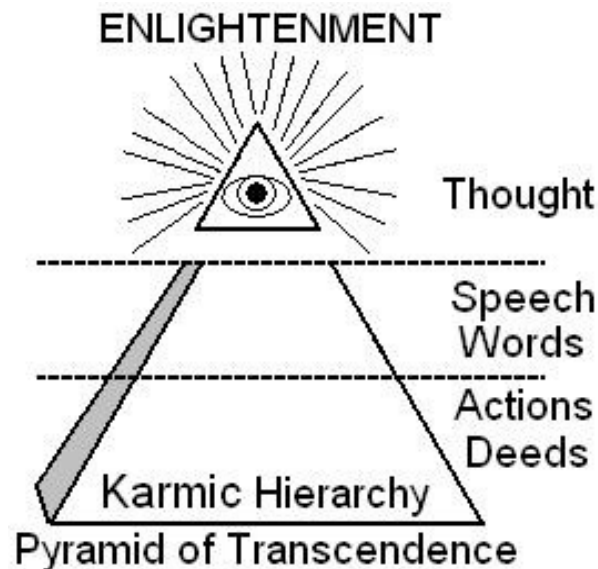


Figure 7. Pyramid of Transcendence / enlightenment. Individuals ‘Living’ operationally at the top of this ‘karmic pyramid’ spontaneously develop transcendent abilities. ‘Sin’ or violation of ethical principles, commandments or Karmic law can be classified into three weighted categories of decreasing severity: 1. Actions, 2. Speech, 3. Thoughts. The pyramid of transcendence is an ascension to refinement.

Prophets are seers and revelators – users of transcendent abilities. The requirements for transcendence may be further clarified in terms of a three-level pyramid (Fig. 11). The base represents crimes or sins of action like murder, theft or adultery for example. The middle of the hierarchy is represented by sins of word like lies or insults, which under extreme conditions could lead to another's harm or death. Goethe’s 1774 classic *Sorrows of Young Werther* [151] is purported to have produced a rash of suicides on its publication; whereas a statement like ‘where’d you get that stupid shirt’ may or may not only hurt ones feelings. The top of the pyramid represents sins of thought. Thoughts by nature are fleeting, but are real and have real consequences. As long as an evil thought is not dwelt on; it can be forgiven as quickly as contemplated. At this level of living the limitations of being human come into play. Deity can expect no more of a mortal being than trying to manage ones thoughts.

According to metaphysical law of the perennial philosophy as applied to HAM cosmology, one is virtually guaranteed attainment of a degree of transcendence when ones ‘moral crimes’ hover at the apex of the pyramid (Fig. 7); provided one has sufficiently good karma or repaired any karmic debt or made restitution for negative conditions of the past.

Noetic Cosmology suggests that by routinely living at this apex a universal Anthropic Principle of Transcendence comes into play whereby anyone maintaining this mode will spontaneously achieve a state of transcendence. If the premise for this noetic Principle of Transcendence is correct, any team of scientists whether comprised of any combination of Jew, Christian or Shinto for example will be able to utilize Transcendence as a tool in scientific theory formation (Fig. 11). Likewise any dialogue between scientists and theologians could achieve similar fruition. Based on the fundamental premise that Men are spiritual beings [60,137] living in an Anthropic Multiverse; the following postulate is said to hold true:

Postulate 1: Any individual or group of individuals living by the Golden Rule, to the extent where those individual's moral offenses⁸ occur generally only at the level of thought, will spontaneously develop transcendent abilities.

Two conditions apply. The past history of the individual must be relatively free of serious offense. The postulate may not apply to those guilty of unpardonable offenses like murder or blasphemy against God⁹ or the absolute truth of the multiverse. The activity of thought is at the limit of human control. Human beings cannot be expected to have perfect control of their thoughts. The karmic rule is satisfied if one does not dwell on negative thoughts.

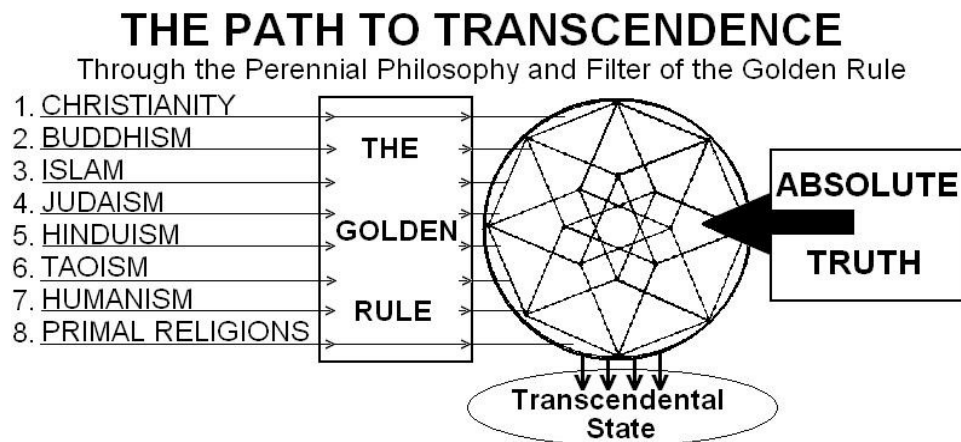


Figure 8. Because of the inherent spiritual nature of mankind as part of an Anthropic Cosmology with an inherent teleological life principle and the concomitant existence of 'Absolute Truth' in regard to spiritual matters, the Golden Rule, as a universal principle of the Perennial Philosophy provides a path to both find God and spontaneously develop transcendence.

A power factor exists. Christian doctrine states: *Charity covereth a multitude of sins* [152,153]. This charity or good works, (of time or substance) provides a power factor for eliminating residual or negative Karma enabling the time to be shortened in reaching the apex of the pyramid or the transcendent state.

⁸ Moral offense – We wish to skip for the most part a detailed delineation of what constitutes moral offense. For our purpose here we chose to simply state that good has a tendency to bring people together and moral offense has a tendency to separate or harm.

⁹ Unpardonable Blasphemy – This is not a condition of swearing or cursing of the general kind; but a rare occurrence of a fully transfigured person who has beheld God like a Moses who then turn against God.

The basic needs of all life on Earth is optimized by 'The Golden Rule' - treating other entities and the environment holistically in the same manner as we would like to be treated. This perennial philosophy is an absolute truth that relates to all sentient consciousness universally throughout the Holographic Multiverse where intelligent life is the rule not the exception. Transcendence can be achieved by a high level adherence to the universal tenets of the Golden Rule. Empiricism has been an impossible challenge for theology; and scientists have historically denigrated any dialogue utilizing religious dogma based on faith-based logic put forth by theologians as merely a product of pre-Galilean imagination. Therefore only by developing a common basis for utilizing transcendence as a universal epistemological tool can S&T be united pragmatically. Producing a universal framework for transcendence seems of grave import because such a completion of human epistemology could have broad impact ultimately leading to world peace, higher quality of life and amelioration of environmental concerns.

28. Transcendence as a Tool in Scientific Theory Formation

Since there are about 10,000 religious sects or spiritual paths in the world today, most of which have conflicting teachings or dogmas; how could developing an empirical metaphysics be possible? Whatever ones spiritual path - the dance of a twirling Dervish, fasting, meditation, charity, chanting, prayer or peyote, it is achieving the resulting pure transcendental state that is of paramount importance.

As performed here for Noetic Cosmology a team of investigators or an individual therapist attempting to utilize transcendence might also utilize historical tracts or scriptures pertinent to their individual path as a starting point to help guide the questions posed to the universe or for the therapy. We realize the extent of this challenge; one must have sufficient faith in the veracity of a scriptural tract to use it as a starting point. The spirit of truth gained from entering the state of transcendence is then used in the Platonic sense [130] for verification. Noetic insight is received through diligent study after sufficiently following one's individual path to perfection (Fig. 11) in conjunction with prayerful meditation. Alternatively, when one comfortably 'hovers' at the apex of the pyramid if ones is studying a physics manuscript a passage on the Bessel function may leap out while reading or later while pondering as a transcendent suggestion that the Bessel function is pertinent to the engineering or other theory at hand.

We wish to make it clear that receiving such 'revelations from God' need not interfere with experimental verification; because as we mentioned earlier all theory formation has a metaphysical element when initially formulated in the creative mind(s) of its inventor(s). Therefore the metaphysical act of theory formation is independent of the pragmatic demands of hard science which is the second step or companion step in theory testing. There is already a growing movement for integrating science and theology.

Examples of noetic insight from history are Friedrich Kekule's dream of a snake joining head to tail in the discovery of the benzene ring, or perhaps more pertinent to our interest in the nature of consciousness here, Descartes claim of receiving a revelation from God designating to the distinction between mind and body [154]. Descartes 'vision' has remained controversial for over 400 years and is only now about to be tested by the methods of noetic theory. Science, if my work here has been successful, has finally progressed to the point where this is possible.

The great value of developing an integrative discipline of science and spirituality is that potentially 10's, 100's, or even 1,000's of years could be saved, along with the resources expended on spurious research paths that could alternatively be used to alleviate human suffering or maintain the environment etc. The timing in the Zeitgeist seems on target as history already suggests an asymptotic increase of technical information; so to keep pace transcendence seems timely. We have the potential now to integrate science and spirituality and complete the tools of human epistemology.

As an example of a test question, for example Amoroso's noetic theory considers the Big Bang an erroneous interpretation of astrophysical data (Hubble merely discovered redshift not a Doppler expansion); more horrific at the time of this writing when a Nobel Prize has just been given out for the Big Bang's discovery touted as one of the most profound discoveries of the last century. If this noetic premise is proven true, some of the best minds in astrophysics could have more efficiently expended hundreds of thousands of man-hours over the last 75 years. Science by definition is satisfied only by empirical evidence and theology by quietly submitting to faith. Francis Crick believes that the concept of a soul is a myth and that modern neurobiologists (except notably the late sir John Eccles [155] see no need for a religious concept to explain the interaction of nerve cells [156]. He calls this an astonishing hypothesis since over ninety percent of the earth's population believes in the soul.

29. Absolute Truth in Theology and Science

The philosophical or theological concept of absolute truth is something has been argued for centuries; whether there is such a thing, what form it takes, can it be proven, and what are the implications if any. A very simple perspective is taken here: Absolute truth indeed exists, it is independent of opinion or even what some kinds of empirical tests might show; because sometimes interpretation can be ambiguous. Absolute Truth can only be verified through transcendence. For example in near history the Earth was considered flat (as can be seen from any mountain top or the seashore) and the center of the universe.

Although we might be interested in forms of theological Absolute Truth like 'the Gods organized the Earth and gave life to man' [157]; some theological elements will not easily lend themselves to standard experiential-experimental forms of 'empirical metaphysics' and will have to be 'confirmed' by mutual verification by teams of noeticists experiencing the same transcendent "facts" or remain faith-based until a viable experimental protocol can be designed. Critics might consider the "divinations" of a particular group a form of group hysteria, which might be dispelled if disparate groups are causally separated.

If we consider God to be the Great Physicist, it is physical truths that science would be most interested in and also most readily verified by standard empiricism after transcendent discovery. It is difficult to predict what the world might do when it realizes that the path to transcendence is formulaic and while not necessarily easy or mundane but certainly no more difficult than learning to play the piano proficiently. And the earlier one began the easier the journey. This is not unreasonable considering that most scientists undergo an average of 22 years of study in preparing for an academic life, plus the lifelong study to keep abreast of developments in ones field(s).

Interestingly there also exists a concept of absolute or immutable truth in science:

A truth that represents a permanent and final grasp of some limited aspect of nature. Most people would say this is incompatible with the expectation that our theories will be falsified. I adhere to the expectation that our theories will be falsified, and look for the immutable truth only in those theories that have already been falsified. Newtonian mechanics...is an example of the most certain and permanent truth man has ever achieved. Its only failing is its scope; it does not cover everything [158].

Now that it has been falsified it is an 'absolute truth' in the domain it describes.

30. The Path to Transcendence

Consciousness is an ubiquitous cosmological principle of the universe; and the human mind is a complex system imbedded in this universe. Inherent in the nature of the human mind is a fundamental

spiritual component; that allows absolute truth to be perceived from any valid perennial path. Transcendent abilities seem to derive from three main avenues:

- A specific type of innate personality structure, which comprises our psychological makeup, level of intelligence, knowledge and wisdom, all of which occupies the spacetime structure of an individual psychosphere [59].
- Special gifts that the universe bestows upon us for its own purposes, or more likely through modification of number 1 above or that we have developed by certain forms of psychological stress or earned as in 3 below.
- Personal preparedness; which seems to equate in direct proportion to living life by the golden rule and any other ethical principles.

There are exceptions to the ascension of the basic karmic pyramid and more details beyond the scope of the discussion here, but as a simple generalization as one climbs the Karmic pyramid of perfection the threshold of spiritual enlightenment or reaching the transcendent state occurs when our imperfections become limited to misdeeds of thought only. There is a motivational factor also, and wisdom can also relate to mastery of the principles related to the chosen path that might enhance or vary this threshold. It helps to be actively engaged in a worthy cause or service to humanity. Idleness would be a detractor to spiritual awareness. One must at least be involved in meditation or prayer.

One must also choose a viable spiritual path. It does not seem reasonable that one could pay singular homage to a stone, currency, psychotropic pharmacopoeia, or 'legal' forms of passion and expect a significant degree of success while mentally occupying the top of the pyramid. Of the 10,000 spiritual paths existing on Earth today, one must use one that works. One's stage of personal growth limits the choice of perceived path. Some paths are significantly better; and it seems that there are relatively few that enable true enlightenment in a reasonable length of time. The path must therefore be chosen carefully. "It takes nearly a quarter century to become a great physician. Why, oh, why do people think they can fathom the most spiritual depths without the necessary experimental and laboratory work accompanied by compliance with the laws that govern it?" [157]. Kimball further states this expertise comes from personal righteousness followed by revelatory experience precept upon precept.

31. The Law of Hierarchies and Noetic Epistemology

In applying Noetic Field Theory [55,108,159,160] to the quantization of the soul [161,162] and "The spirit and the body is the soul of man" [60,137]; how does the metaphor of the Karmic pyramid relate physically as a law of hierarchies as the means for reaching the transcendental state? Following the work of Plato, we have defined noetic insight [130] as the highest form of knowing; and stated that transcendent communion operates because 'the spirit and the body is the soul of man' [60,137] and 'all spirit is matter' [137].

All matter is not spirit but can become so by perfection. But in the meantime, in our temporal existence the human soul is comprised of earthy matter and spiritual matter in a complementarity of temporality and eternity. Our consciousness is imbedded in temporality and this is where our sensory apparatus is coupled to. It is a misconception that there is a 'sixth sense'. What actually happens is that the senses couple to higher dimensionality instead which is in closer proximity to the flux of the vital noetic field. This is what occurs when one achieves the transcendental state. In a crude metaphor this could be likened to an electron going to a higher orbit in an atom when it is energized. The confinement of the electron to the higher orbit is similar to the senses being coupled to a higher plane of spacetime.

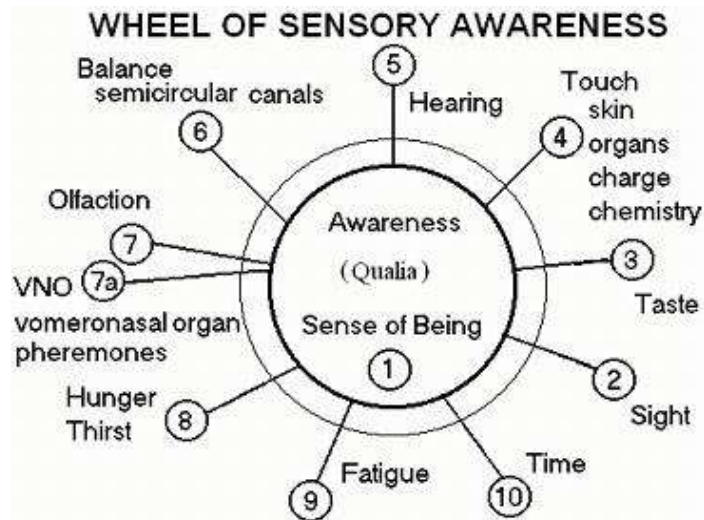


Figure 9. There are many more than the 5 common senses; all of which are connected to awareness. The term ‘6th sense’ is a misconception. All of the senses are normally coupled to receive input from external sources but through a different orientation the mind can be coupled to higher dimensional spacetime to receive nonlocal input which is how ‘paranormal’ effects occur.

Newtonian mechanics was cast in 3 dimensions. Einstein showed us that we live in 4D, which is the limit of our normal perceptual phenomenology; but God dwells in the complete hyperstructure of at least 12D because this is the minimum number to describe eternity – meaning being causally free of temporal reality. Sins of deed and thought maintain a gulf from the 12D of perfection separating us from the full unity of the spirit and confining our matter to the 4D subspace.

Our goal should be to separate our being from the drab matter of imperfection and *precept-by-precept* climb the ladder of dimensions to the full 12D complement of light. Like the light in a laser reverberating between the mirrors of coherent reflection, a light explosion in all the 12 directions, not attenuated by any darkness that stops the light or makes it tarry into dissipation.

References

- [1] Swann, I. (1975) *To Kiss the Earth Goodbye*, New York: Northern Publications.
- [2] Eddington, A.S. (1946) *Fundamental Theory*, Cambridge: Cambridge Univ Press.
- [3] Tart, C.T. (1972) States of consciousness and state specific sciences, *Science*, 176, 1203.
- [4] Tart, C.T. (1975) *States of Consciousness*, New York: E.P. Dutton; and private communications.
- [5] Rauscher, E.A. (1979) Some physical models applicable to remote perception, in A. Puharich (ed.) *The Iceland Papers: Frontiers of Physics, Select papers on experimental and theoretical research on the physics of consciousness*; pp. 50-93, Amherst: Assentia Research Associates.
- [6] Kuhn, T.S. (1970) *The Structure of Scientific Revolutions*, Chicago: University of Chicago Press.
- [7] Campbell, J. (1971) *The Portable Jung*, New York: Viking Press.
- [8] Bell, J.S. (1964) On the Einstein Podolsky Rosen paradox, *Physics* 1, 195.
- [9] Einstein, A., Podolski, B. & Rosen, N. (1935) Can quantum-mechanical descriptions of physical reality be considered complete? *Physical Review* 47, 777.
- [10] Stapp, H.P. (1977) A Whiteheadian approach to quantum theory and the generalized Bell’s theorem, Lectures at the University of Texas, Austin, April and May; and private communication.
- [11] Bohm, D. (1977) Quantum theory an indication of a new order in physics: Implicate/explicate order in physical law, *Found. Phys.* 3, 139; and private communication.

- [12] Pribram, K. (1976) Problems concerning the structure of consciousness, in G. Globus (ed.) *Consciousness and the Brain*, New York: Plenum Press.; and private communication.
- [13] Ramon, C. and Rauscher, E.A. (1980) Superluminal transformations in complex Minkowski space, Lawrence Berkeley National Laboratory report LBL-9752, Berkeley, CA (1979), and *Found of Phys.* 10, 661.
- [14] Rauscher, E.A. Einstein's field equations and the quantal force, Lawrence Livermore National Laboratory report UCRL-71435, Livermore, CA (1968).
- [15] Rauscher, E.A. Closed cosmological solutions to Einstein's field equations, *Nuovo Cimento Lett.* 3, 661-665 (1972).
- [16] Rauscher, E.A. The Minkowski metric for a multidimensional geometry, *Nuovo Cimento Lett.* 7, 361 (1973).
- [17] E. Wigner, The place of consciousness in modern physics, in *Consciousness and Reality*, A. Yound, ed., Outerbridge & Lazard, New York (1972) and private communication.
- [18] B.S. DeWitt, Quantum mechanics and reality, *Phys. Today*, p. 30, September 1970 and private communication.
- [19] Rauscher, E.A. A Unifying Theory of Fundamental Processes, *Bull. of Amer. Phys. Soc.* 13, 1643 (1968); and UCRL-20808, University of California, Berkeley, Lawrence Berkeley National Laboratory (1971).
- [20] Rauscher, E.A. A group-theoretical representation of the generalized Heisenberg relations, *Nuovo Cimento Lett.* 5, 925 (1972).
- [21] S.C. Kleene, *Introduction to Metamathematics*. Van Nostrand, New York (1950).
- [22] J.F. Clauser and W.A. Horne, Experimental consequences of objective local theories, *Phys. Rev.* 10D, 526 (1974) and private communication with J. Clauser in 1971, 1974-1976.
- [23] W. Heisenberg, *Physics and Beyond: Encounters and Conversations*. Harper, New York (1972) and private communication.
- [24] E.H. Walker, Quantum mechanical tunnelling in synaptic and ephaptic transmission, *Intl. Jour. Quantum Chem.* 11, 103 (1977); and private communication, 1977-1978.
- [25] Rauscher, E.A. Conceptual changes in reality models from new discoveries in physics, PSRL-1076 (September 1981); Proceedings of the First International Symposium on Non-conventional Energy Technology, pages 114-140, October 23-24, 1981, University of Toronto, Ontario, Canada, and the ICF Press, New York.
- [26] Rauscher, E.A. Some physical interpretations of multidimensional geometries, PSRL-7628, presented at the Mind/Being Research Conference, Los Altos, California, March 1982.
- [27] Rauscher, E.A. *Bull. Amer. Phys. Soc.* 27, 35 (1982).
- [28] K. Pribram, private communication, January 1980.
- [29] B. Spinoza, *Ethic: Demonstrated in Geometrical Order*, Macmillan, New York (1883)
- [30] *The Upanishads (Vol. 2)*. Theosophical Society, London (1896).
- [31] D. Finkelstein, Space-time code, *Phys. Rev.* 5, 320 (1972) and private communication.
- [32] J.A. Wheeler, *Geometrodynamics*. Academic Press, New York (1962) and private communication.
- [33] G. Chew, Bootstrap: a scientific idea? *Science* 161, 762 (1968) and private communication.
- [34] H.P. Stapp, Space, time and elementary particles, Lawrence Berkeley National Laboratory report UCRL-11688 (1964).
- [35] D. Dune, *Yoga, Funk and Wagnalls* (1967).
- [36] R.W. Clark, *Einstein: The Life and Times*. World, New York (1971).
- [37] A.S. Eddington, *The Mathematical Theory of Relativity*. Chelsea, New York (1922).
- [38] Rauscher, E.A. Electron interactions and quantum plasma physics, *J. Plasma Phys.* 2, 217 (1968).
- [39] Kriyananda, *Yours the Universe*. Hansa, San Francisco (1967).
- [40] Rauscher, E.A. Observer/Participator in Quantum Mechanics and Life, Proceedings of the Twelfth International Conference on Human Functioning, Wichita, KS, November, 1990.
- [41] A. Einstein, *Einstein Philosopher Scientist* (P.A. Schilpp, ed.), *The Library of Living Philosophers*, Evanston, Illinois (1949), pp. 85-683.
- [42] Amoroso, RL (2002) Developing the cosmology of a continuous state universe, in RL Amoroso, G Hunter,

- M Kafatos & J-P Vigi er (eds.), *Gravitation & Cosmology: From the Hubble Radius to the Planck Scale*, Dordrecht: Kluwer.
- [43] Amoroso, R.L. (2005) Paradigm for a continuous-state holographic conscious Multiverse, in R.L. Amoroso & B. Lehnert (eds.) *Extending the Standard Model: Searching for Unity in Physics*, Oakland: Noetic Press.
- [44] Lucretius, 55 BC (1957) *On The Nature of the Universe*, R.E. Latham, (trans.) Baltimore: Penguin.
- [45] Amoroso, R.L. (2010) Defining a Context for the Cosmology of Awareness, in R.L. Amoroso (ed.) *The Complementarity of Mind and Body: Realizing the Dream of Descartes, Einstein and Eccles*, NY: Nova Science.
- [46] Chalmers, D.J. (1996) *The Conscious Mind*, Oxford: Oxford University Press; Chalmers, D.J., 2002, The puzzle of conscious experience, *Scientific American special edition*, 12:1, 90-100.
- [47] McMurry, J. (1992) *Organic Chemistry*, 3rd edition, Pacific Grove: Brooks/Cole Publishers.
- [48] Haller, J.S. (1997) *Kindly Medicine: Physio-Medicalism in America, 1836-1911*. Kent: Kent State Univ. Press.
- [49] Bergson, H. (1977) *The two Sources of Morality and Religion*, Notre Dame, Univ. Notre Dame Press.
- [50] Flanagan, O. (1992) *Consciousness Reconsidered*. Cambridge: MIT Univ. Press.
- [51] Freedman, D.H. (1994) Quantum consciousness. *Discover*, June, pp. 89-98.
- [52] Horgan, J. (1994) Can science explain consciousness? *Scientific American*, July, pp. 88-94.
- [53] Amoroso, R.L. (1997) Consciousness a radical definition: The hard problem made easy, *Noetic J* 1:1 pp. 19-27.
- [54] Amoroso, R.L. (1997) The theoretical foundations for engineering a conscious quantum computer, in M. Gams and M. Paprzycki, (eds.) *Mind \leftrightarrow Computer*, Amsterdam: IOS Press.
- [55] Amoroso, R.L. (1995) The extracellular containment of natural intelligence: A new direction for strong AI. *Informatica*, 19, pp. 585-590.
- [56] Amoroso, R.L. (1996) Engineering a conscious computer, in T. Toffoli & M. Biafore (eds.) *Proc. Fourth Workshop on Physics & Computation, Physcomp 96*, pp. 12-16, New England Complex Systems Institute..
- [57] Amoroso, R.L. & Martin, B. (1995) Modeling the Heisenberg matrix: quantum coherence and thought at the holoscape manifold and deeper complementarity, in K.H. Pribram & J. King (eds.) *Scale in Conscious Experience: Is the Brain too Important to be Left to Biologists to Study*, Hillsdale: Lawrence Erlbaum.
- [58] Amoroso, R.L. & Amoroso, P.J. (2004) The Fundamental Limit and Origin of Complexity in Biological Systems: A New Model for the Origin of Life, in D.M. Dubois (ed.) *CP718, Computing Anticipatory Systems: CASYS03-6th Intl. Conference, Liege, Belgium August 11-16 2003*, New York: American Institute of Physics.
- [59] Amoroso, R.L. (2010) The Physical Origin of the Principle of Self-Organization Driving Living Systems, in R.L. Amoroso (ed.) *The Complementarity of Mind and Body: Realizing the Dream of Descartes, Einstein and Eccles*, New York: Nova Science Publishers.
- [60] Perus, M. (1997) Consciousness: network-dynamics, informational and phenomenal aspects, *Noetic J*, 1:2:183-197.
- [61] Stapp, H.P. (2000) Why classical mechanics cannot naturally accommodate consciousness but quantum mechanics can, in R. Amoroso et al (eds.) *Science and The Primacy of Consciousness*, pp. 134-149, Oakland: The Noetic Press.
- [62] Amoroso, R. L. (2000) Call for a model of deep ontology – A commentary on Stapp: Why classical mechanics cannot naturally accommodate consciousness but quantum mechanics can , in R. Amoroso et al eds. *Science and The Primacy of Consciousness*, pp. 150-153, Oakland: The Noetic Press.
- [63] Pribram, K.H. (1991) *Brain and Perception*, Hillsdale: Lawrence Erlbaum.
- [64] Hameroff, S.R., Rasmussen, S., Karampurwala, H., Vaidyanath, R., and Jensen, K.S. (1990) Computational connectionism within neurons: A model of cytoskeletal automata. *Physica D* 42:428- 449.
- [65] Beck, F., and Eccles, J.C. (1992) Quantum aspects of brain activity and the role Consciousness, *Proc. Natl. Acad. Sci. USA* 89: 11357- 11361.
- [66] Walker, E.H. (1997) The quantum theory of consciousness, *Noetic Journal*, 1:1, pp. 100-107.
- [67] Jibu, M. & Yasue, K. (1995) *Quantum Brain Dynamics & Consciousness*, Amsterdam: Benjamins.

- [68] Bohm, D. (1952) A suggested interpretation of the quantum theory in terms of hidden variables, I & II. *Physical Review* 85, pp. 166-179 and 180-193.
- [69] Cramer, J.G. (1986) The transactional interpretation of quantum mechanics, *Revs. Mod Physics* 58, pp. 647-87.
- [70] Sun, Y., Rauscher, E.A., Giandinoto, S., Chu, J. & Amoroso, R.L. (2008) Empirical Mediation of the Primary Mechanism Initiating Protein Conformation in Prion Propagation, in D. Dubois (ed.) *Proc. CASYS07*, Liege, Belgium.
- [71] Pribram, K. H., Nuwer, M. & Baron, R. (1974) The holographic hypothesis of memory structure in brain function and perception, in R.C. Atkinson, D.G. Krantz, R. C. Luce & P. Suppes (eds.) *Contemporary Developments in Mathematical Psychology*, San Francisco: W. H. Freeman.
- [72] Hameroff, S.R. & Watt, R.C. (1982) Information processing in microtubules, *Theor. Biol.* 98:4;549-61.
- [73] Freeman, W. (1993) The emergence of chaotic dynamics as a basis for comprehending intentionality in experimental subjects, in K.H. Pribram (ed.) *Origins: Brain and Self Organization*, Hillsdale: Lawrence Erlbaum.
- [74] Hameroff, S.R. (1990) Computational connectionism within neurons: a model of cytoskeletal automata, *Physica D.* 42: 428-449.
- [75] Schutz, E. (1987) Posttranslational modification and microtubule stability, *Journal of Cell Biology*, Vol 105, pp. 2167-2177
- [76] Webster, D.R., Gundersen, G.G., Bulinski, J.C. & Borisy, G.G. (1987) Differential Turnover of Tyrosinated and Detyrosinated Microtubules, *Proc Nat. Acad. Sci, USA*, 84:24; 9040-9044.
- [77] Cleveland, D.W. & Sullivan, K.F. (1985) *Molecular Biology & Genetics of Tubulin*, *Ann. Rev. Biochem.* 54: 331-365.
- [78] Koruga, D. (1992) Neuromolecular computing, *Nanobiology* 1:5-24.
- [79] Prusiner, S.B. (1982) *Science*, 216, p.136-144.
- [80] Prusiner, S.B. (1998) *Proc Nat. Acad. Sci, USA*, 95, p. 13363-13383.
- [81] DesCartes, R. (1960) *Discourse on Method and Meditations*, L.J. Lafleur (trans.) Indianapolis: Bobbs-Merrill.
- [82] Eccles, J.C. (1986) Do mental events cause neural events analogously to the probability fields of quantum mechanics?, *Proc. Royal Soc. London B227*, pp. 411-428.
- [83] Smith, H. (1991) *The World's Religions*, San Francisco: Harper Collins.
- [84] Kimball, S.W. (1978) *Absolute Truth*, *Ensign*, September, pp. 3-8, Salt Lake City: The Church of Jesus Christ of Latter-day Saints.
- [85] James, W. (1912) *Essays in Radical Empiricism*, F.H. Burkhardt et al (eds.) 1976, Cambridge: Harvard Univ. Press.
- [86] Varela, F.G., Maturana, H.R. & Uribe, R. (1974) Autopoiesis: The organization of living systems, its characterization and a model, *BioSystems*, 5, 187-196.
- [87] Jantsch, E. (1984) *The Self-Organizing Universe*, New York: Pergamon.
- [88] Maturana, H. R. (1970) *Biology of cognition*, Report BCL 9.0 Urbana: Biological Computer Lab, Univ. of Ill.
- [89] Drăgănescu, M. (1997) On the structural phenomenological theories of consciousness, *Noetic J.*, 1:1, 28-33.
- [90] von Neumann, J. (1966) The theory of self-reproducing automata, in A. Burks (ed.) Urbana: Univ. of Ill. Press.
- [91] Zhabotinsky, A.M. (1974) *Self-oscillating Concentrations*, Moscow: Nauka
- [92] Haldane, J.S. (1923) *Mechanism, Life and Personality*, New York: Dutton.
- [93] Beckner, M.O. (1972) *Mechanism in biology*, in P. Edwards (ed.) *The Encyclopedia of Philosophy*, Vol. 5, pp. 250-2, New York: Collier Macmillan.
- [94] Goldberg, J.N. (1981) Spacetime, in *Encyc. of Physics*, R.L. Lerner & G.L. Trigg (eds.) Reading: Addison-Wesley.
- [95] Messiah, A. (1999) *Quantum Mechanics*, Mineola: Dover.

- [97] Prigogine, I. (1973) Irreversibility as a symmetry breaking factor, *Nature*, 248: 67-71.
- [97] Prigogine, I., Nicolis, G. & Babloyantz, A. (1972) Thermodynamics of evolution, *Physics Today*, 25: 23-28; 38-44.
- [98] Chalmers, D.J. (2002) The puzzle of conscious experience, *Scientific American Special*, 12:1, 90-100.
- [99] Searle, J. R. (2002) Consciousness, *Review Roumaine de Philosophie*, Tome 46:1-2, pp.87-108.
- [100] Brillouin, L. (1949) Life, thermodynamics and cybernetics, *American Scientist*, 37: 554-568.
- [101] Chalmers, D. (1996) *The Conscious Mind*, Oxford: Oxford University Press.
- [102] Schrödinger, E. (1945) *What is Life?* London: Cambridge Univ. Press.
- [103] Amoroso, R.L. (2002) *The Physical Basis of Consciousness: A Fundamental Formalism, Part 1 Noesis*, XXVI, Romanian Academy.
- [104] Amoroso, R.L. (2000) Derivation of the fundamental equation of consciousness, Part I, Boundary conditions, *Noetic Journal* 3:1, pp. 91-99.
- [105] Amoroso, R.L. (2000) Consciousness, a radical definition: Substance dualism solves the hard problem, in Amoroso, R.L., Antunes, R., Coelho, C., Farias, M., Leite, A., & Soares, P. (eds.) *Science and the Primacy of Consciousness*, Orinda: The Noetic Press.
- [106] Amoroso, R.L. (1999) An introduction to noetic field theory: The quantization of mind, *Noetic J* 2:1, pp. 28-37.
- [107] Amoroso R.L. (2003) Awareness: physical cosmology of the fundamental least unit, *Noetic Journal* 4:1, 1-15.
- [108] Wegner, P. (1998) Interactive foundations of computing, *Theoretical Computer Science*, 192, 315-351.
- [109] Fröhlich, H. (1968) Long-range coherence and energy storage in biological systems, *Int. J. Quant. Chem.* 2:641-649.
- [110] Hagelin, J.S. (1988) Is consciousness the unified field? A field theorist's perspective. Preprint.
- [111] Ciubotariu, C & Ciubotariu, C. (2002) A chaotic-stochastic model of an atom, in R.L. Amoroso, G. Hunter, M. Kafatos & J-P Vigiér (eds.), *Gravitation and Cosmology: From the Hubble Radius to the Planck Scale*, Dordrecht: Kluwer Academic.
- [112] Argyris, J. & Ciubotariu, C. (1999) A new physical effect modeled by an Ikeda map depending on a monotonically time-varying parameter, *Int. J. Bif. Chaos*, 9:1111-1120.
- [113] Chalmers, D. (1996) *The Conscious Mind*, Oxford: Oxford University Press.
- [114] Nagel, T. (1974) What's it like to be a bat?, *Philosophical Review*, 83, pp. 435-450.
- [115] Amoroso, R.L. (2003c) The physical basis of qualia: Overcoming the 1st person 3rd person barrier, *Noetic Journal* 4:3, pp. 212-230.
- [116] Amoroso, R.L. (2007) *Ce Este Conștiinta? Trepte Intru Cosmologia Mintii (What is Consciousness: Introducing the Cosmology of Being*, N. Bulz et al (trans.) Bucharesti: Editura Academiei Romane, in press.
- [117] R.L. Amoroso (ed.) (2008) *The Complementarity of Mind and Body: Realizing the Dream of Descartes, Einstein and Eccles*, New York: Nova Science Publishers.
- [118] Poston T. & Stewart, I. (1978) *Catastrophe Theory & Its Applications*, New York: Dover.
- [119] Gilmore, R. (1981) *Catastrophe Theory for Scientists & Engineers*, New York: Dover.
- [120] Qin, S. et al. (2001) *International J of Solids & Structures*, 38, pp. 8093-8109.
- [121] Wheeler, J.A. (1955) Geons, *Physical Review*, 97:2, 511-536.
- [122] Prusiner, S.B. (2002) Research Summary, www.ucsf.edu/neurosc/faculty/neuro-prusiner.html.
- [123] Huang, Z., Gabriel, J-M, Baldwin, M.A., Fletterick, R.J., Prusiner, S.B., & Cohen, F.E. (1994) Proposed three-dimensional structure for the cellular prion protein, *Proc. Nat. Acad. Sci, USA*, 91, pp. 7139-7143.
- [124] Kurschner, C. & Morgan, J.I. (1996) *Mol. Brain Res.* 37, pp. 249-258.
- [125] Kafatos, M., Roy, S. & Amoroso, R. (2000) Scaling in Cosmology & the Arrow of Time, in Buccheri, di Gesu & Saniga, (eds.) *Studies on Time*, Dordrecht: Kluwer Academic.
- [126] Milner, R. (1993) Elements of interaction, *Comm. of the ACM*, 36:1, 78-89.
- [127] Prusiner, S. (1982) *Science*, 216, pp. 136-144.

- [128] Mitchell, E.D. (1976) *Psychic Exploration: A Challenge for Science*, J. W. White (ed.) New York: Putnam.
- [129] Musser, G. (1998) *String Instruments*, *Scientific American*, V.10, pp. 17-19.
- [130] Holland, P.R. (2000) *The Quantum Theory of Motion: An Account of the de Broglie-Bohm Causal Interpretation of Quantum Mechanics*, Cambridge: Cambridge Univ. Press.
- [131] Bohm, D. & Hiley, B.J. (1993) *The Undivided Universe: An Ontological Interpretation of Quantum Theory*, London: Routledge.
- [132] Meehl, P.E. (1966) *The compleat autocerebroscopist: A thought-experiment on Professor Feigl's mind-body identity thesis*, in P.K. Feyerabend & G. Maxwell (eds.) *Mind, Matter and Method: Essays in Philosophy and Science in Honor of Herbert Feigl*, Minneapolis: Univ. of Minnesota Press.
- [133] *Teachings of the Presidents of the Church - Brigham Young*, (2002) Salt Lake City: The Church of Jesus Christ of Latter-day Saints.
- [144] R.L. Amoroso, S. Giandinoto, G. Hunter, G. Nibart & E. A. Rauscher (2008) *Universal Quantum Computing: Anticipatory Parameters Predicting Bulk Implementation, Part I – Philosophical Foundations of the Formalism*, in D. Dubois (ed.) *Proceedings of CASYS07*, Liege, Belgium.
- [145] Smith, J. (1989) *Doctrine & Covenants*, 88:11, Salt Lake City: The Church of Jesus Christ of Latter-day Saints.
- [146] Burns, J.E. (1994) *Spaciousness: The common ground between science and spirituality*, in R.I. Heinze (ed.) *Proceedings of the 11th Intl. Conf. On the Study of Shamanism and Alternative Modes of Healing*, Berkeley: Indep. Scholars of Asia.
- [147] Smith, H. (1991) *The World's Religions*, New York: Harper Collins.
- [148] Wattles, J. (1996) *The Golden Rule*, Oxford: Oxford University Press.
- [149] Terry, Q.C. (2005) *Golden Rules and Silver Rules of Humanity*, Bloomington: Authorhouse.
- [150] Holoviak, S.J. (1993) *Golden Rule Management*, Reading: Addison-Wesley.
- [151] Bigelow, J. (1927) *Tolerance, and other essays and studies*, New Church Board of Publication; or <http://newearth.org/frontier/grmain.html>.
- [152] Hare, R.M. (1963) *Freedom and Reason*, Oxford: Oxford University Press.
- [153] Gensler, H.J. (1996) *Formal Ethics*, New York: Routledge.
- [154] Gensler, H.J. (1998) *Ethics: A Contemporary Introduction*, New York: Routledge.
- [155] Citations for The Golden Rule: The Holy Bible: King James Version (1989) Leviticus 19:18; Mathew 7:12, 19:19, 22:39; Mark 12:31; Luke 6:31, 10:27; Romans 13:9; Galations 5:4, Salt Lake City: The Church of Jesus Christ of Latter-day Saints; *Doctrine & Covenants of the Church of Jesus Christ of Latter-day Saints*, 59:6, Salt Lake City: The Church of Jesus Christ of Latter-day Saints; *Confucius (500 BC) Analects of Confucius (1998) D. C. Lau (trans.) Ch. 15, Verse 3*, New York: Penguin Classics; also <http://classics.mit.edu/Confucius/analects.html>.
- [156] The Holy Bible: King James Version (1989) Mark 12:30; Deuteronomy 6:5, Salt Lake City: The Church of Jesus Christ of Latter-day Saints.
- [157] The Holy Bible: King James Version (1989) John 13:34-35 Salt Lake City: The Church of Jesus Christ of Latter-day Saints.
- [158] The Holy Bible: King James Version (1989) Matthew 22:36-40, Salt Lake City: The Church of Latter-day Saints.
- [159] Goethe, J.W. von (2005) *The Sorrows of Young Werther (Die Lieden des Jungen Werther)* B. Pike (trans.) New York: Random House.
- [160] The Holy Bible: King James Version (1989) James 1:26, 3:5-6,8; 1 Peter 3:10, Salt Lake City: The Church of Jesus Christ of Latter-day Saints.
- [161] The Holy Bible: King James Version (1989), New Testament, 1 Peter 4:8, Salt Lake City: The Church of Jesus Christ of Latter-day Saints.
- [162] Descartes, R. (1641) *Meditations on First Philosophy*, in *The Philosophical Writings of René Descartes (1984) J. Cottingham, R. Stoothoff & D. Murdoch (trans.) vol. 2, 1-62.*, Cambridge: Cambridge University

- Press.
- [163] Eccles, J.C. (1992) Evolution of Consciousness, Proc. Nat. Acad. Sci., 89:7320-7324.
- [164] Crick, F. (1994) The Astonishing Hypothesis: The Scientific Search for the Soul, New York: Scribner's Sons.
- [165] Kimball, S.W. (1978) Absolute Truth, The Ensign, Sept, pp. 3-8, Salt Lake City: The Church of Latter-day Saints.
- [166] Misner, C.W. (1974) Cosmology and theology, in W. Yourgrau & A.D. Breck (eds.) Cosmology, History Theology, New York: Plenum.
- [167] Amoroso, R.L. (1996) The production of Fröhlich and Bose-Einstein coherent states in in vitro paracrystalline oligomers using phase control laser Interferometry, Bioelectrochemistry and Bioenergetics 41, 39-42.
- [168] Amoroso, R.L. (1999) An intro to Noetic Field Theory: The quantization of mind, In R. Amoroso & M. Farias et. al. (eds.) Science and the Primacy of Consciousness: Intimation of a 21st Century Revolution, Oakland: Noetic Press.
- [169] Wolf, F.A. (1999) The quantum physical communication between the self and the soul, The Noetic Journal, 2:2, 149-158; also (2000) pp. 404-414, R. Amoroso & M. Farias et. al. (eds.) Science and the Primacy of Consciousness: Intimation of a 21st Century Revolution, Oakland: The Noetic Press.
- [170] Amoroso, R.L. (2010) The Geometry, Topology and Structural-Phenomenology of the Soul, book in progress.
- [171] The Autoimmune Disease Group (Noetic or Spirit-Based Psyconeuroimmunological Medical Etiologies); <http://www.mindspring.com/~l.o.v.e.r/autoimmune.pdf>
- [172] Amoroso, R.L., and Di Biase, F., (eds.) (2005) *A Revolução da Consciência. Novas Descobertas sobre a Mente no Século XXI*, Rio de Janeiro: Editora Vozes.
- [173] Di Biase, F. (1981) *Auto-organização nos sistemas biológicos*, *Ciência e Cult.*, 339: 1155-1159, *Sociedade Brasileira para o Progresso da Ciência*, Brazil.
- [174] Di Biase, F. (1995) *O Homem Holístico, a Unidade Mente-Natureza*, Rio de Janeiro: Editora Vozes.
- [175] Di Biase, F. & Rocha, M.S. (1998) *Caminhos da Cura, Petrópolis*, Rio de Janeiro: Editora Vozes.
- [176] Di Biase, F. & Rocha, M.S. (2004) *Ciência Espiritualidade e Cura, Psicologia Transpessoal e Ciências Holísticas*, Rio de Janeiro: Editora Qualitymark.
- [177] Vaz, N. M. & Varela, F.J. (1978) Self and non-sense: an organism-centered approach to immunology, *Medical. Hypotheses* 4: 231-267.
- [178] Jerne, N. K. (1974) Toward a network theory of the immune system, *Ann. Immunol. Inst. Pasteur*, 125c:373-389.
- [179] Jerne, N. K. (1984) Idiotypic networks and other preconceived ideas, *Immunological Review*, 79: 5-24.
- [180] Amoroso, R.L. & Rauscher, E.A. (2009) *The Holographic Anthropic Multiiverse: Formalizing the Complex Geometry of Ultimate Reality*, Singapore: World Scientific.
- [181] Amoroso, R.L. (2017) Pragmatic Proof of God, *Scientific God Journal*, Vol 8, No. 7; <http://www.scigod.com/index.php/sgj/article/view/573>.