Perspective

THE SCIENCE OF CONNECTIVENESS

PART III: THE HUMAN EXPERIENCE

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ABSTRACT

This is the third in a series of three articles that outline a proposed scientific model with the goal of stimulating a new vision—one that acknowledges an underlying connectiveness in the universe. Part I: "Modeling A Greater Unity" and Part II: "Mapping Beyond Space-Time" were published in the two preceding issues of *Subtle Energies*. Part III, "The Human Experience" will summarize the model, address possible mechanisms underlying the emergence of space and time, describe the physically measurable connections to the human from beyond space-time, and relate this process to our perception of reality. This series of three articles on the model and the supporting evidence has presented an alternative way to *think* about phenomena at the human level. The expanded science outlined could well lead to a world view or paradigm that will help us better understand how we perceive "reality." The interplay between the body/heart/brain and patterns beyond space-time and the relationship of this interplay to the set of real physical constraints that govern the electrochemistry of the body becomes apparent. The model provides a physical basis for understanding why there can be no actual limits to human potential.

KEYWORDS: Archetype, brain, choice, connectiveness, consciousness, intention, love, mind, paradigm, perception, physics, quantum, reality, symbol, twistor

OVERVIEW OF THE MODEL

This three-part series of articles is designed to provide a basis for understanding the human experience in terms of *connectiveness* instead of *separation*, which is the prevailing Western paradigm. Furthermore, it is our intention to demonstrate that this connectiveness can be described in terms of conventional concepts used in physics and mathematics. The resulting model, which is the subject of Parts I & II of this series, first outlines a series of mathematical linkages which begin in the familiar world of objects, descend into the world of the ultimately small, and continue into *the realm of mind and thought.* The *connectiveness* properties of this "knowledge realm" and the dynamics of a creative flow process possible via the existence of such links are presented. Evidence in both physics and other fields supporting this hypothesis is put forth. Part III will focus upon the resulting expanded paradigm and how it relates to a human experience of connectiveness.

First we will provide a brief synopsis of the linkages of the model:

1. Classical physics, including the electromagnetic interaction, provides means for understanding phenomena and structures in our immediate physical reality, down to the level of large molecules.

2. Quantum mechanics is required for appropriate "pictures" of objects smaller than atoms. Relativity theory is usually necessary because particle speeds approach that of light.

3. When the Planck length of 10^{-33} cm is reached, a "phase change" occurs which transforms space-time to a spaceless-timeless realm or knowledge realm, which is inherently non-local and multi-dimensional. A number of possible mathematical systems could be proposed to model this transition region. We believe the Penrose twistor and its associated twistor space constitutes an effective mathematical approach. Representing fields and particles in twistor space is done using the Penrose transform. In other words, the physical world of space-time can be created from twistor space.

4. Structures from differential geometry called fiber bundles are used to add a richer topology to twistor space. Higher dimensional symmetry spaces within the knowledge realm can thus be associated with particles, *i.e.*, with physical matter.

5. The branch of mathematics called group theory has the ability to span structures and relationships from the simple to the highly complex. We believe that groups can represent the basic archetypes *out of which emerge* the structural patterns and organisms of the physical world.

These five links show how to construct a mathematical or symbolic bridge that unites two of the most important aspects of our reality into an encompassing whole which possesses the properties of connectiveness.

AN EXPANDED PARADIGM

Physical science has studied the patterns of nature by assuming matter to be the starting point. Our model makes it possible to examine the nature and origin of the physical world from the opposite perspective. Matter results from a creation process originating beyond space-time, in realms where *connectiveness* rather than *separateness* dominate. Ordering principles beyond space-time that embody this connectiveness produce the archetypes from which arise the patterns of the physical world. These patterns can be classified into three types: fields that represent unmanifest form; matter that represents manifest physical form; and symbols that represent manifest mental form to which humans have assigned meaning. We believe that the "mystery" of why mathematics, and hence modern science, can so successfully model nature arises because the human mind can function beyond space-time and manifest meaningful symbols.

This exemplifies a continuation of the scientific process of ever expanding paradigms with their resulting worldviews as depicted in the cover art. We have provided supporting evidence to justify such an expansion. As many have noted, the seeds for such an expansion have already been planted by modern physics itself. For example, Larry Dossey, M.D., in his book, *Space, Time & Medicine,* was one of the first to recognize the importance of changing the way that science, medicine in particular, looks at its fundamental assumptions. He concluded that the time was ripe for a major change, basing his hope on the following scientific developments:[1]

1. Matter has become "de-materialized" by modern physics. The emphasis is no longer on objects, but on processes, fields, and wholes.

2. Cause and effect are not identifiable at the most fundamental levels in nature where individual events take place.

3. Dividing lines in nature between the microscopic/macroscopic, living/nonliving, and conscious/unconscious appear increasingly arbitrary, if not impossible to define.

In addition to assuming that the creation process begins beyond space-time, our model assumes that mind is also located beyond space-time. This infers the possibility that our minds can interact with the process. In fact, humans appear to have an innate talent for interacting with and even adversely distorting the creation process. (This may be the reason for the admonitions of the Buddhist and Taoist philosophies that one's actions should be in accord with the "flow.")

We experience the physical world in terms of matter, energy and information. In our model we consider these three as interrelated and *interconvertable* aspects of the fabric pattern of our physical world. We note that energy (the capacity to do work) and information (the capacity to store and transmit patterns) are defined in science only operationally. Hence they are ultimately indefinable. In addition, matter is recognized as mostly "empty" space and is discerned by its physical patterns or, as a physicist would say, by its energy resonances.

Our model assumes (see Part II) that the physical world is unfolding at the speed of light out of realms beyond space-time. The realms are viewed as nested in a "Chinese box" or "Russian doll" configuration. Thus, the "weaving" of the fabric of physical reality (the patterns of matter, energy, and information) involves a continuous back and forth exchange between space-time and the higher realms. David Bohm called this process of undivided wholeness the holomovement.[2] Keep in mind that this "weaving" process includes humans. To elucidate how our model addresses this process, the relationship between light, space, and time will be discussed.

OUTER LIGHT

In Part II we stated our assumption that the physical world (including our bodies) is unfolding at the speed of light out of realms beyond space-time. We

will now extend this concept and consider the entire physical world to be various manifestations of light. Physics has long recognized that, under the right circumstances, light and matter can switch identities. In such a physical world, as David Bohm has stated, matter could be considered as "condensed or frozen light."[3] Hence, light becomes the manifestation of archetypes that take on physical form. This is not a new concept, having been proposed as long ago as the thirteenth century.[4] In the present context, by light we mean the entire electromagnetic spectrum, not just the one octave that we experience as visible light. To understand our basis for taking this position, we need to review what science knows about space, time, and light.

The scientific concept of space-time is intimately associated with our understanding of light. In fact, space and time lose their meaning when one imagines traveling at the speed of light, which is what Einstein did when he started thinking about relativity theory. So first let us look at our scientific understanding of space and time. One of the great mysteries of science is the nature of "space." Ever since the concept of space has been used in modern science, it has represented something that can hold whatever we want—a receptacle. It is like the emptiness inside a cup that can be filled with an infinite number of substances. Science recognizes the importance of the emptiness, assumes its existence, yet accepts the mystery of the deeper meaning of its nature.[5]

In modern science space and time have become inseparably linked, the combined entity being called space-time. As discussed in Part I, space-time is the foundation upon which modern science has built its impressive structures. But the nature of time joins space as another mystery of science. Since the advent of relativity theory in 1905, science has known that when its search for knowledge reaches outward to distant galaxies or inward to the core of the atom, the common sense notions about time are of little value.[6,7] Even though classical physics and philosophy may rule out journeys into the past, the "laws" of quantum physics do not. In a recent article on *The Quantum Physics of Time Travel* the authors state: "If time travel is impossible, then the reason has yet to be discovered."[8]

To the scientific mysteries of space and time we must add an even greater mystery—what is light? The nature of light cannot be reduced to matter or

its motions; it is its own thing. In fact, light is the tool by which we have gained almost all the knowledge we have about our universe.[9] Neither of the great pillars of modern science, the theory of relativity or quantum theory, reveal anything about the fundamental nature of light. Yet, all of modern scientific theory rests upon a foundation based upon an observed property of light—the fact that light *always* travels the path that minimizes the *time* it takes to go from one place to another. This observation has been generalized into the famous "principle of least action"[10] that we mentioned in Part I and will discuss further in this article as it is applied to human thought.

If a photon of light is like a particle—what are its attributes? If we cannot assign specific attributes to an object then the object loses its identity—its individuality. The non-locality experiments described in Parts I & II were an attempt to check Einstein's view that objects possess real, enduring attributes such as color, polarization, and a path of travel. A photon of light was the first object subjected to this test. Since the photon has no mass or charge, light could be quantified by four other attributes: polarization, wavelength, direction, and intensity. However, science is now facing a dilemma. For each of these four attributes, careful experiments in quantum optics have shown that "there is no truly unambiguous attribute of Light!"[11]

Why is this strange and unexpected result not apparent to us in everyday physical reality? The quantum effects that result in the loss of attributes, and hence individuality, appear to become diluted as the entanglement grows, *i.e.*, as we involve more and more particles. However, the photon interference experiments that gave these startling results have now been performed with what we traditionally call matter, *i.e.*, electrons, other atomic particles, and even atoms. These "matter" experiments are showing that the quantum effects do not always diminish with increased numbers of particles. Thus, at a deep level the "individuality" disappears and a connectiveness or oneness appears. Hence, the whole basis of scientific thought that assumes that our physical reality is built upon well defined individual attributes of matter now seems questionable. We are suggesting that the science of individuality be replaced by a "science of connectiveness"—a connectiveness that emanates from beyond space-time.

We have been discussing "outer light," the light that scientists study objectively. Later we will discuss the "inner light," the light that we as humans perceive.

Before we can do this, however, we need to sketch a broader picture of the part of the connection that deals with light, space and time. Hence, a few more details about the twistor are in order.

TWISTORS, LIGHT, AND SPACE-TIME

In Part II we presented a brief, non-mathematical description of the Penrose twistor as the central feature of our model. Roger Penrose, physicist and mathematician at Oxford, England, is a major contributor to the theoretical exploration of what occurs at the bottom of space-time. About 30 years ago he became interested in the problem of why quantum theory resists so strongly being married to gravitational theory (general relativity). He reasoned that the difficulty may lie in the conventional view of space-time as a smooth, 4-dimensional manifold (which may be curved in the vicinity of gravitational mass). His research led him to try to construct abstract mathematical spaces out of "spin networks." Partial success prompted the invention of a new kind of object, the "twistor," which combines both angular and linear momenta. An individual twistor projected into 3-d space looks like a twisted rope ring that travels along its axis at the speed of light. "Twistor space" is 8-dimensional with 4 real and 4 complex dimensions. And even though twistors are discrete as opposed to continuous, they can effectively be used to represent space-time, because, at Planck-length dimensions, quantum uncertainty "fuzzes out" a point in twistor space.

The term "null line" is used frequently in twistor geometry. It refers to a *ray of light* in space-time, with the "null" coming from the fact that at the speed of light, time and distance intervals go to zero. This implies that along a null line, time and space have no meaning, which is what non-locality represents. The space-time corresponding to a set of null lines is said to be conformally invariant, which means that certain geometric shapes remain unaffected by an expansion or shrinkage of the space. Circles always remain circles. The twistor concept, therefore, is a symbolic way of representing the on going creation process of the physical world of space-time via light rays.

THE ROOTS OF FORM

In our model, we propose that the *non-local emergence* of light (electromagnetic waves) can be treated as a universal change of state, *i.e.*, a phase change at the Planck length from the spaceless-timeless realm of *knowing* to the space-time realm of *form*. But how does form manifest into what we call matter? We address this question by approaching it from a point of view not normally used by science—we start from beyond space-time and inquire what science can say about the creation process. The goal is to explore whether there could exist a mechanism for introducing in*form*ation (form or pattern) into space-time at the Planck length. The following facts from information theory will set the stage:

Pure, unvarying vibration carries no meaning; it has zero information content. For example, in order to communicate we must modulate the tones of our vocal chords, forming them into words. Meaning is conveyed as we combine sounds with periods of silence. In addition, we notice that our sight, like our hearing, requires a modulated and crafted form of light for meaning. If visual images are perfectly stabilized on the retina they disappear. We see only change, movement, life.[11] (p. 107)

As we consider the emergence of form, think of the ancient words, "Let there be *light*." What would space-time be like if it emerged from the darkness of the void as absolutely pure, unvarying fields of electromagnetic energy. The early universe (just after the "big bang") was probably like this, with light being the dominant constituent and ordinary matter a negligible contaminant.[12]

However, complete uniformity is not in accord with quantum physics. The reason is that uncertainty and random fluctuations in the quantum vacuum at the Planck length and larger guarantee that the supposed uniformity would vanish in an instant. In its place a sea of virtual particles is presumed to exist. This sea has previously been assumed to be completely unstructured. But accumulating evidence shows that the assumption of an unstructured vacuum is probably incorrect.[13,14]

Hence, our model provides a mechanism for the introduction of structure into the vacuum. This process originates from beyond space-time in the realm of

archetypes (which contains the incipient patterns and forms of the physical world) that lies next to the Planck length. The driving force behind this process has been called consciousness *[See Part I p. 60].* It represents the universal intelligence that uses these archetypal patterns to modulate the light as it emerges into space-time and condenses or "freezes" into matter.

LIFE PROCESSES AND ELECTROMAGNETISM

In the second of our Basic Assumptions *[see Part I]*, we stated that there are four interactions that physics has identified—electromagnetism, strong, and weak forces, and gravity. Physics has been moving toward a unification of these forces. The first three of these are now understood as aspects of a single force. Broadly speaking, this force can be considered as an expanded version of electromagnetism. Even gravity, the maverick force, may eventually be brought into the fold.[15,16]

It is because of these unifying principles that we believe the physical realm is a manifestation of vibrations that span wavelengths from the Planck length to "infinity." Of course, an infinite wavelength implies zero vibration or absolute stillness, which is impossible because of the Planck-length vibrations inherent in the wholeness. The EM spectrum is normally represented as an open-ended range of wavelengths covering what scientific instruments have been able to measure. Figure 1 is a representation of an *expanded* EM spectrum that provides the basis for the manifestation of the physical realm interfacing with the knowledge realm beyond space-time.

In order to understand life processes we will be concerned here with more than chemical reactions, which have been understood in detail through the powerful tool of quantum mechanics. We need to understand how the *mind*, which we locate in the knowledge realm beyond space-time, can affect the physics and chemistry of our bodies and how a concept like *choice* can be integrated into physical science.

A number of articles in this Journal[17-20] have dealt with experimental evidence pointing to the intimate connection of the *magnetic* part of the electromagnetic field to life processes. The obvious question at this point is, what charac-

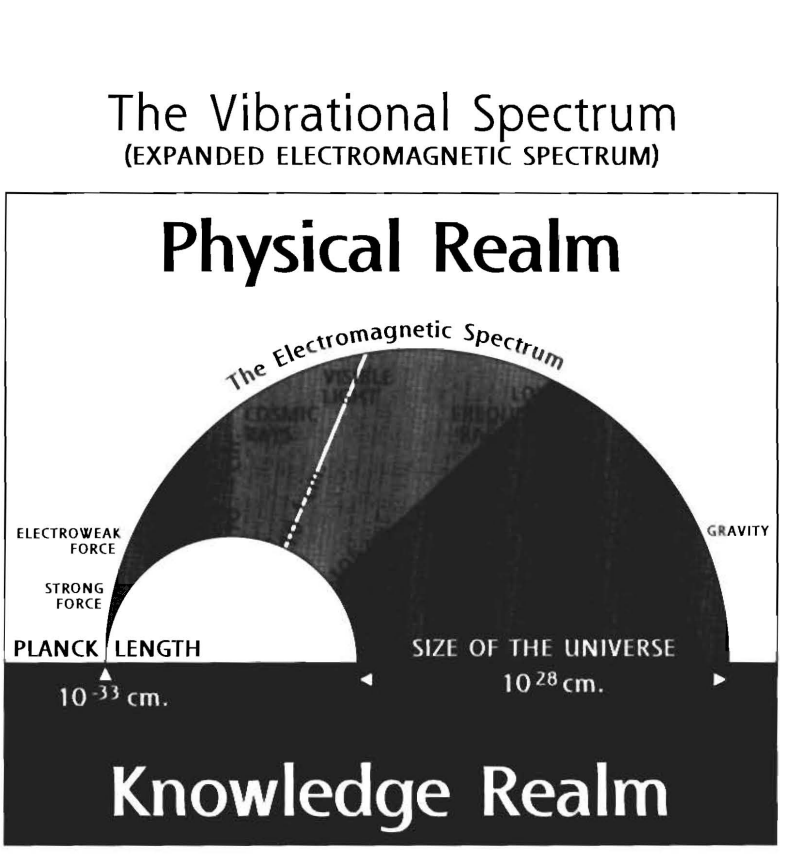

Figure 1. *A representation of the physical realm as a spectrum of vibrations ranging in wavelength from the Planck length to the size of the universe. This vibrational spectrum can be considered as an expanded EM spectrum. It is the vibrations emerging from the knowledge realm that create space, time, and matter.*

teristic of a living system appears most closely related to magnetism? The answer is its informational aspect, *i.e., a living system's ability to make choices.* This answer forces the next obvious question: *what does choice have to do with magnetism?* The question of choice (or free will) is one of the fundamental issues in the nature of consciousness that many scientists and philosophers have struggled with. Our model may be able to shed some light on this age-old problem. Consider the following sequence of arguments:

1. Choice can be reduced to a binary, left-right or yes-no type of process. A binary process is familiar to us; it is the basis for the information in our computers and music on our CDs. In the physical world, the

smallest possible increment of binary change is Planck's quantum of action, and this amount of change (or larger) can be brought about through an alteration of the constraints that determine the energy flow for a particular process. That is, *a choice modifies a least action path in an organism.*

2. Therefore, a physical or chemical process is altered when a choice is made. The more immediate consequences of choice are changes in the quantum states of atoms and molecules which then influence their chemistry. Tiny currents arising from the dynamics of electron spin and orbital motion exert magnetic forces on each other and are also influenced by external magnetic fields. Because of their quantum structure, some molecular systems can be flipped into different spin states by extremely small magnetic disturbances.[21] A change in the orientation of the spin represents a means for encoding information into the physical system.

3. So now the question becomes, how do such magnetic changes couple in from the mental realm? Dirac's quantum theory of the electron shows that magnetism (specifically, the "vector potential") affects the phase of the electron's quantum wave function. Under certain conditions this phase alteration can affect the electron's location and thus the atomic and molecular structures of which it is a part. The twistor formulation (discussed in Part II) provides for a "fiber connection" between the particle and higher dimensional abstract spaces. Our model views these mathematical abstract spaces as symbolic representations of the knowledge realm beyond space-time. Since the knowledge realm includes the mind or mental realm, we can connect these abstract spaces ultimately to conscious thought processes.

To summarize: human choice (a conscious act in the mental realm) alters the constraints on chemical processes in the physical realm. The informational content of the system is changed. The diagram below, based upon our model, shows the intermediate steps.

MENTAL REALM (choice)
Groups
Fiber bundles
Twistor space
Penrose transform
EM field
Particles
Chemistry
PHYSICAL REALM (behavior change)

It remains to deal with the issue of *intention,* a psychological variable closely related to choice. Several studies[22] have been done attempting to correlate intention with psychokinetic effects on mechanical and electronic systems. Also intention is a variable in studies of its effect on living systems. The various studies of Therapeutic Touch,[23] intercessory prayer,[24] and other techniques of mental healing can also be construed as a study of intention. However, most of these have looked only for the existence of an effect and have not attempted to correlate the strength of the intention with the magnitude of its effect. Laskow is the first investigator we are aware of who has attempted to address the intentional process in a quantitative way.[25]

We propose that *intention is focussed choice, i.e.,* intention uses the same mechanisms involved in choice except they are amplified quantitatively. There appear to be several physiological correlates to intention: *e.g.,* intensity of feelings, heart-felt motivation, lowered heart rate variability, and brain hemisphere synchronization. These correlates would tend, through feedback processes, to involve greater numbers of spin flips resulting in a much stronger coupling between mind and body than in the basic choice process. The "coupling coefficient" discussed in Part II would therefore be a function of the population of changed spin states. Figure 2 illustrates how the life process relates to intention and constraints as implied by the model.

ENERGY MEDICINE

The foregoing section should help make it clear that the explanatory power of this model extends to the subject of energy medicine. Three examples will illustrate how the model is applied.

Homeopathy. The remedies are often of such high dilution that no molecules of the active substance are present. What remains in the inert carrier is a *pattern* of the active ingredient whose "potency" is a direct function of the degree of dilution, a feature which causes allopathic practitioners to be even more skeptical of the practice. We propose that the pattern is impressed through the "succussion" method of preparation, where the pattern is amplified in proportion to the dilution. This pattern is then stored in the carrier and serves as an intermediary link to an archetypal memory. Initial intention may strengthen the coupling to the archetype. When the remedy is given to a sick

Figure 2. *An illustration of how the life process relates to intention and constraints as implied by the model. The act of mental intention produces changes in one's brain/body which can often be experienced as "feelings." The target of intention can be one's self, another person, or any thing/object in the universe. The figure suggests how this non-local process can be understood in terms of standard physics concepts—the end effect is a change in physical constraints which alter the body's chemistry.*

person, his body is able to respond to the pattern without having to deal with the toxicity of the active substance.

Touch. Physical contact (or close proximity) with the hands is an important modality in virtually all healing systems. Whether the recipient be bacteria,

plant, animal, or human, practitioners of this technique frequently report the sensation of "energy" being transferred to the recipient through the hands. Again, *intention* is a key ingredient, since the healing process implies an alteration of the constraints in the healee which affect the chemistry. If this intention is combined with love, the effectiveness is enhanced through an increased coupling coefficient *[See section: **Love—A Least Action Process**].*

Placebo Effect. Although viewed with disdain in years gone by, the placebo effect has come to be recognized as an important adjunct in the doctor-patient relationship.[26] The placebo reduces the doctor's dependence upon traditional chemical medication. Instead, it is the attitude of the *patient* as well as the relationship between doctor and patient that we must examine. When the patient's attitude is characterized by openness, expectation, and confidence, there is a relaxation of the constraints which led to the disease in the first place. Symbol, ritual, and suggestion then get to play their vital role in the healing process, and the thought patterns of our body getting well are reestablished. The least action paths are opened up for the chemistry of healing.

THE BRAIN

What does our model suggest about a complex system like the human brain? Most of the patterns in the body appear relatively stable. For example, when we look in the mirror, we find ourselves essentially the same as the day before *except* for what went on in the brain yesterday. The brain represents an ever changing universe of patterns. Let us make some speculations about the brain based upon our model. First, we suggest that the brain may be a set of structures optimized to create, record, or change patterns so that they can resonate with aspects of the mental realm and provide feedback. Second, the brain's function in the physical body is to convert the patterns received from the mental realm into electrochemical feedback to the body. Most of the scientific research on the brain/body connection has been dealing with these electrochemical phenomena. We are suggesting that the pattern-changing process has a deeper meaning in terms of a linkage and tuning to archetypal patterns beyond space-time.

How does this pattern-changing process in the brain work? The brain is composed of scores of billions—possibly even a trillion—tiny cells called neurons. The neuron itself works electrically. However, the link between neurons is chemical. The chemical links permit the neuron's most astonishing characteristic: Neurons can change their activity, so that identical inputs lead to different outputs. It is as though the neuron has been reprogrammed. This changed activity is known as long-term potentiation (LTP). "Neuron reprogramming appears to be *the* basic *physical* event behind all learning"[27] *[emphasis added].*

The firing of the neurons represents a purely physical process. However, when the neurons fire, we become aware of certain qualities of experience. The sensations we feel at the time of firing are a pure quality of awareness, *something subjective to be interpreted.* These sensations are "immeasurable experiences of awareness."[27 (pp. 163-165)] Your brain has changed, but it does not store information about the reason for the change. Instead, the billions of processors in the brain just regularly reprogram themselves.[27 (pp. 65-68)]

One's *experience* of the sensations can be changed by the act of attention. Attention enables us to combine separate sensations into unified objects, and to examine objects closely to be sure of their identity. When the neurons respond to an input, a sensation suddenly enters our awareness. We can then focus our attention upon these sensations and discover qualities that the neuron processors originally missed.[27 (pp. 53-54)]

The reason is that when a brain cell fires, it is temporarily spent. It cannot fire again, so, when the second input occurs, the cells that have just fired are quiet. This rest period allows a new set of cells to fire. Then they too fall still and yet a third set of cells can fire.[27 (pp. 65-73), 28] This analyzing by the brain of a single focus of attention into a hierarchy of ever more specific qualities arises spontaneously. This is why the ability to maintain a focus of attention is so important in ancient religious and shamanistic practices.

One implication for traditional psychic healers and shamen from our model would be the prediction that the brain/body can reestablish a physical pattern if its linkage to the causative pattern in the mental realm hasn't been altered. Thus, if an archetypal pattern remains activated in the mental realm with the patient still strongly coupled to it, a problem originally solved by an alteration of the physical body might reoccur in the same or different form.

LEAST ACTION AND CONSTRAINTS

To describe the model's ability to explain how one's thoughts can affect an experiment, we need to review the Principle of Least Action. Action is a scientific concept that is defined by multiplying energy and time. The action for a physical process begins at time t_1 and ends at time t_2 and takes place over some "path" defined by appropriate physical variables. It turns out that *of all the possible ways a physical process can go, Nature always selects the one that minimizes the total action along the path.*[10]

The Principle of Least Action describes how the universe runs, but this is not sufficient. It is also necessary to explain how the Principle can be applied in a given instance. In physics this is done using the concept of "constraints." As an illustration consider the difference between a weighted unmanned toboggan and an equally weighted manned toboggan as they make their way to the bottom of a snow-covered hill. The path taken in the first case (unmanned) is governed by least action subject to the *constraint* of the hillside. This path could actually be predicted through mathematical modeling given sufficient computational power and knowledge of the physical parameters and initial conditions.

Notice what happens when we put people on the toboggan and get it started down the same hill in exactly the same way. No longer is it possible to assume a similar set of constraints is acting on the toboggan as before. This time moment by moment *choices* are being made to change the constraints under which the toboggan is moving. The predictive power of mathematics is no longer of any use since the choices constitute mental acts—acts that in our model occur beyond space and time.

Choice played a role even in the unmanned example above, inasmuch as someone had to shove the toboggan to get it started, thus establishing the initial conditions. All ordinary physics and chemistry experiments are like this. The initial conditions of the experiment plus the constraints are determined *in advance* by human choices; then natural law (*i.e.*, least action) is presumed to have complete dominion between t_1 and t_2. To remove the "thinking effect" in experiments with humans we use a double-blind testing process which is *assumed* to give the experiment these desirable characteristics. The contamination of the experiment by extraneous human choices altering the constraints

is reduced to a bare minimum. By having a large enough population of subjects, there will be an averaging out of the perturbing influence of the "thinking effect." We must point out that the experimenters are also an integral part of the experiment and are coupled into it. However, for experimenters (since there is usually only one or, at most, a few), the averaging out of their thinking effect does not work. This "experimenter effect" has long been recognized in both psychology and parapsychology.[29,30]

The reason that most physicists and chemists do not worry about (or are unaware of) such effects is that the experiments with which they are concerned are sufficiently "robust" so as to be immune from the effects. A "sensitive" experiment, on the other hand, would be affected by very slight changes in the constraints. *Subtle energy* experiments, by definition, fall into this category. What better illustration of this can be found than the fact that telepathic experiences appear to be influenced by the earth's magnetic field![31]

Quantum theory imposes a lower limit on "choice" by "quantizing" action.[32] Therefore, if choice cannot be broken down into smaller units, the quantum of action may represent some kind of *fundamental act of consciousness* comparable to a basic "left-right" or "yes-no" decision. Support for such a position comes from the work and experiments of Dr. L. Mandel at the University of Rochester. Mandel describes experiments in which the *result* (a light beam interference effect) is influenced by the *possibility* that the experimentalist *could* take actions, even if he doesn't take these actions.[33] Thus, these data indicate that mental acts can influence future events. This research challenges the prevalent view of physics in which events are based on what *is* rather that what *could be*.

CONSTRAINTS AND THE BRAIN

Habits and beliefs are highly individualized patterns which regulate much of our behavior and thought. These are represented on the physical plane as structural constraints in the form of well-worn neural pathways in the central nervous system. This set of constraints has almost as much importance as body structure itself. These constraints form the interface between our mental attitude and physical emotion, and thus play a causal role in the hormonal chemistry of the

body. An individual's belief system can therefore be regarded as a key factor in the body's state of health and its ability to recover from disease.

Beliefs, because they do represent thought patterns which have become more or less rigid, determine to a large degree how flexible the brain is in its ability to tune in to a wide variety of archetypal patterns beyond space-time. This ability is the doorway to the paranormal, to healing, to shamanic practice, and to otherwise "impossible" phenomena. The mind can activate non-local connections that remove the constraints of space-time. Thus, an individual can focus "attention" and "intention" on a distant target (*i.e.*, outside one's own body) and superimpose a new pattern on that target, with its corresponding new constraint system. A new least action "pathway" is the result, and the state of the target is altered. The physicist, Fred Alan Wolf, discusses the concept of least action pathways extensively in his book on physics and shamanic practices, *The Eagle's Quest.*[34]

The concept of "letting go," which teaches that the achievement of a desired paranormal result is more likely if only the *result* is specified in mind, not the intermediate steps, can also be understood through least action and constraints. Physical processes usually involve the exchange of energy between a target system and its environment. If the constraints for a process are set in such a way that the necessary energy is unable to flow, then the process will not go. If, however, only the end result is specified in mind and the limiting constraints relaxed (by "letting go"), a least action path to the goal will be found. We would speculate that this is accomplished through consciousness operating at levels higher than the individual mind.

OUR BODIES

We have focused upon the brain as the key for the pattern linkage beyond space-time because of the great emphasis placed upon the role of the brain by modern society. However, every pattern associated with a person whether it be a molecule such as DNA, or an organ such as the heart, or the energy field patterns associated with their functioning are linked to the archetypes of the spaceless-timeless realms. A two-dimensional analogy would be to draw a diagram of a human with various internal organs upon a sheet of paper. Note

that the pattern for the human figure and for the internal organs all remain in continuous contact with the more encompassing three dimensional world in which they are "nested." Thus, in addition to the brain, you can think of informational input from beyond space-time coming directly to the immune and nervous systems, to the endocrine glands, to specific organs, and to every cell. In effect we have a "thinking body"—this expression has been used by Dr. Deepak Chopra is his book *Quantum Healing.*[35]

The body should be considered a dynamic and not a static system. At the atomic level our body continually changes—98% of the atoms in our body were not there a year ago.[35] We are very much like a whirlpool of water in which the water molecules are continuously being replaced, but the form of the whirlpool—its pattern—stays. In a similar manner, our body's pattern stays and changes relatively slowly, but the atoms that form the material basis for the body are flowing right through us. We postulate that there exists a feedback process—a direct linkage between the patterns of the physical realm and the patterns of the mental and higher realms—the archetypes of Jung and Pauli. In fact, if we accept the concept that the memory pattern of our body outlives the body's physical components, then it is plausible to think that there may be archetypal patterns associated with us in the knowledge realm beyond space-time that were there before birth and continue after death and that could "reincarnate" into a new body.

LOVE—A LEAST ACTION PROCESS

In the ancient wisdom, there were *three* key centers in the physical body: the brain, the heart, and the generative system. Unlike Western society, to the ancients the patterns of the heart were considered the most important. "The secret doctrine declares that every part and member of the body is epitomized in the brain, in turn, that all that is in the brain is epitomized in the heart."[36] We suggest that the physical heart has a correlate with the metaphysical heart which has traditionally been considered the spiritual center. Such a position is reflected in the scriptures of many religions: "The heart of the wise teaches his mouth, and adds learning to his lips;"[37] "Out of compassion for them, I, dwelling in their hearts, destroy with the shining lamp of knowledge the darkness born of ignorance."[38]

Although there has been little scientific research to uphold the correlation between the physical and metaphysical hearts, some recent experiments that include an electrocardiogram (ECG) of the heart have been suggestive.[39,40] The normally scattered and incoherent power spectrum of the ECG was observed to become dramatically ordered and coherent when a person experiences *deep feelings* of love, care, or appreciation. Hence, the deep feelings of love may create patterns in our bodies that connect us to an archetypal ordering principle beyond the realm of Mind. When this connection is invoked, an organizing essence or intelligence capable of restructuring the least action paths may be activated and thereby change the energy patterns of the system. Through the removal of constraints, this process could restore balance or bring greater harmony with a more encompassing whole. Note that the coherent state is under conscious control unlike the coherence associated with abnormal cardiac conditions.

The process by which this is accomplished in our physical body would have to be observable in space-time. Since the heart produces by far the strongest electromagnetic field in the body, all cells in the body exist in, and therefore could be affected by, this coherent electromagnetic field pattern and experience a physical force. This would lend support to the statement by the well-known mystic Alice Bailey that, "The soul, seated in the heart, is . . . the central nucleus of positive energy by means of which all the atoms of the body are held in their right place and subordinated to the 'will-to-be' of the soul."[41] Hence, the close linkage between love-symbolism and heart-symbolism may exist because the love experience represents a force which urges the lover towards a given center of a more encompassing unity.[42]

In terms of system dynamics, we may thus consider love as a state of being that creates a balance or coherence with the dynamic force of consciousness, *i.e.*, the dynamic of change emanating from the more encompassing realms beyond space-time. This force embodies the intelligence of the knowledge realm and has been called the life force, or the God force. Hence, when one generates thoughts and emotions of sincere love, these inner symbols appear to create a resonant pattern that places one in contact with the knowledge of a universal wholeness.

Our model implies that imbalance can exist in realms other than the physical. For example, such imbalance for an individual's spirit is known as "karma"—

a restoring drive requiring actions to reestablish balance. What appears to be good or in balance within the physical realm could be out of balance when considered from the perspective of the more encompassing realms.

Good could be defined as love in action—creating balance with the "force." In our model the human mind resides beyond space-time and is linked to and directly affects the patterns of the body. A marvel of the human brain is its ability to rapidly change its inner patterns as it interacts with consciousness. This flexibility enables us to either remain in balance with the creative "force" or not, through our choice or free will. It is the feedback from this process—the positive synchronicities or the stress, illness, etc.—that helps us learn, and steer our ship of life.

PERCEPTION AND INNER LIGHT

These basic ideas serve as a framework for understanding the more complicated (and interesting) subject of human behavior. Science has demonstrated that in the world described by quantum theory, human perception is not an adequate tool for explaining this universe. What our experience gives us is the "illusion" of direct, unmediated access to the external world. Cognitive science has demonstrated conclusively that there is no way for a human to "sense" or experience the physical world directly. What seems to be our experience of an objective exterior world is in fact a *subjective picture* that we construct.[43,27]

Some of the most convincing scientific evidence comes from studies of what is required for sight. "If a cat is unable to see forms during the critical period between the fourth week and the fourth month, even if its environment is still light, then the cat will be blind forever. The optically healthy organ of the eye alone is insufficient for sight."[11 (p. 5)]

What is true for the cat is also true for humans. If an adult who has been blind from birth suddenly gains a functioning physical eye, sight is not automatic. The person remains functionally blind until they learn to see what others would agree was "there" before their eyes. This process is so difficult that some commit suicide as the security of a reality built upon the sensations of hearing and touch becomes threatened.[11 (pp. 3-6), 27 (pp. 105-106)] The

contrasting situation occurs when someone sees something that most individuals would say was "not there."[11 (p. 16)] Such a person has developed an enhanced capability to "see" the inner light. We often call them sensitives, psychics or clairvoyants.

We must accept the truth that vision requires far more than a functioning physical organ. Without an inner light we are blind. In our model that inner light originates beyond space-time, the archetypal level where our minds reside. Thus, "the light of the mind must flow into and marry with the light of nature to bring forth a world"—a world that becomes our reality.[11 (p. 6)] So it is with all our five senses.

Perception is about sensory *qualities,* not the *quantities* expressed by physicists. This can be illustrated by the research of Edwin Land (inventor of the Polaroid camera) who in 1957 challenged the very foundations of contemporary color theory. Land did experiments in which the colors seen by a person just could not be there according to traditional physics. The importance of input from the mental level could no longer be denied. "Our every perception is literally colored by contexts, prior experience, indeed, by every aspect of our inner world. These are all active in producing color."[11 (pp. 191-199)]

Most of the time we don't recognize that patterns/symbols originate from the archetypal realm. However, there are a group of experiences to which we attribute special meaning which give us a hint of this linkage to beyond space-time. These experiences are referred to as "inner knowing." Where they enter our body/brain will determine whether they are considered "intellectual knowing," "heart knowing," or "gut knowing." Thus, perception applies to how an individual responds to the patterns/symbols he or she interacts with and the meaning attributed to them.

To illustrate the dynamics of this human experience let's use the analogy of a motion picture and how we perceive the apparent motion effect. In a movie, "after images explain why we do not notice the flicker of the projection, but it does nothing to explain how we see still images move. Why doesn't afterimage just turn all movie scenes into a blurry mess?"[27 (p. 19)] Our model suggests that at some deep level the physical universe may be like a motion picture with feedback in which each "frame" represents a choice/decision—a quantum of action.

We are continually interacting via both our physical behavior *and thought patterns* with the whole and thereby altering, however slightly, the next "frame." Our mind is subtly and usually unconsciously active in each of our five senses, constantly forming and re-forming the world we perceive. Everything we have previously seen or experienced affects what we presently see or experience.[44] We must accept the fact, that not only every individual, but every age and culture has crafted their own sensory reality.

The model being proposed assumes that everyday reality is not simply out there nor is it within. Rather, we suggest it is a perception we construct from aspects of the unity within which we are immersed. The model implies that our experience of everyday reality depends upon both the current physical world inputs and quantum linkages to the archetypal patterns of the mental and higher realms—linkages that have been constructed over time. Whatever our current reality is and whatever meaning we attribute to it can be altered by changing the focus of our attention and intention—thereby changing our life. The model predicts that these changes in perception will require energy and work since new least action pathways must be created in the brain. However, the choice is ours—the brain/body system is "tunable." If appropriate choices are made, such changes can move one to more encompassing wholes and perhaps to a new reality with unimagined vistas.

FURTHER IMPLICATIONS

The model hypothesizes that a non-local effect can be considered as an "injection" of a higher level ordering into our three dimensional reality. This implies that any physical pattern, regardless of size, acts as a "receiver" of knowledge from beyond space-time. Thus, there are numerous further implications and ramifications of the model. A few examples from different areas of science and other fields will illustrate the wide range of the explanatory power of this expanded approach to science.

At the *macroscopic* level there are many effects that have remained puzzling for modern science that our model may help explain. In inanimate matter, quasicrystals appear to require the presence of a higher dimensional archetype to guide their growth.[45,46] In the plant kingdom, bamboo will unexplainably

flower and die *simultaneously* worldwide every 60-120 years depending upon the species.[47] In living systems, evidence for linkage to more encompassing archetypal patterns has been evaluated in the work of Dr. Rupert Sheldrake on mammals, birds, fish and insects.[48] For humans, a fascinating fact is that data from studies of identical twins separated at birth are consistent with and supportive of our model and suggest non-local connections, particularly the many cases in the literature of a trail of similar names inexplicably often associated with such twins—from their own names to those of their spouses, pets, cars, etc.[49,50]

The great variety of parapsychological phenomena falling under the categories of extra-sensory perception and psychokinesis[51] can be understood in terms of the direct Mind-matter connection inherent in the model. Pattern-based psychologies such as the enneagram from the ancient Sufi teachings, *The I Ching: The Book of Changes* from ancient China, or the Tarot from 14th century Europe whose origins actually may be in ancient Egypt are illuminated by the model.[52-54] Western and Indian Vedic astrology can be understood in terms of the effects of nested patterns and need not be solely dependent upon physical influence emanating from planets and stars.[54] The importance of body position in Indian Yoga, Chinese QiGong exercises,[55] and sacred dances can be inferred based upon the model because of the body's positional pattern influence upon every organ, cell, etc. within the body. Information storage in physical materials as manifested in psychometry, crystals, and sacred relics is comprehended by the model and recognized as subtle patterns nested within the larger pattern.

CONCLUSIONS

This series of three articles presents the basis for an expanded scientific paradigm that *encompasses* the existing space-time limited paradigm of modern science. The key simplifying assumption underlying modern science is that physical space and time represent a *closed system* and, hence, only patterns originating in the physical world need be considered. In these articles we have attempted to make the case for an expanded science that considers not only space-time patterns, but recognizes effects in the physical world originating from archetypal patterns beyond space-time.

Our third article addresses the formation and creation of the physical world and how dynamic change is introduced from realms beyond space-time. Light and the electromagnetic spectrum are shown to be the underlying base for the structural patterns of the physical world. Choice and intention are related to the physical parameters of magnetic field and spin. This ability to alter patterns and hence information in a two-way "feedback" manner is seen as a critical factor in the intervention of consciousness into the physical realm. They relate directly to our ability to alter both ourselves and the world around us.

This expanded science recognizes both the unifying power of the pattern/symbol; and mind and higher realms as different, but not separate from the physical. Mathematical concepts already exist for the physics of this expanded science. We therefore outlined a conceptual model which illustrates that the realms beyond space-time and matter can be united using connecting elements taken from conventional mathematical physics. Two important features of the model are:

1. space-time is not an impermeable barrier which confines human experience to the world of matter, and

2. mind is located beyond space-time.

All models are simplifying suggestions or proposals on how to *think* about something that is more complicated. We have used the model to think about phenomena at the human level—to understand how we perceive "reality" and the role that the body/brain plays in connecting us to the appropriate patterns beyond space-time. The mental or archetypal patterns that form the basis of our belief systems and habitual thinking are thereby causative factors for the set of real physical constraints that govern the electrochemistry of the body. Thus, because of the malleability of belief systems, the model provides a physical basis for understanding why there can be essentially no limits to human potential.

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