Article

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Abstract: Theories about consciousness—what it is/is not; who does/does not possess it; included/excluded functional modes; how/when it appears to be operational—are regularly published in books and articles. This essay opines that while many, if not most, of those speculations contain elements properly subsumed within a comprehensive doctrine, none satisfactorily fulfills its subject's immense scope. *Consciousness = Metaphysics + Physics + Biology* is intended to rectify the situation by providing omitted components. As the title states, this is a wide-ranging approach neglecting many relevant details found in cited references, but also including ideas not found elsewhere in the easily accessible literature.

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Introduction

What is the largest scale upon which a theory can be generated? Universal inclusiveness: the idea that everything in existence—avoiding proper definitions for *everything* and *existence* for the moment—fits together with nothing omitted and no discordances among included items. This outcome, if attainable, exhibits both comprehensiveness and self-consistency. When considering systems capable of generating precision for its definitions, in particular with respect to unifying physical reality with the mathematical underpinnings of its theories, Gödel's I*ncompleteness Theorem* tells us the quest for both traits cannot be simultaneously accomplished. Theory must remain incomplete because it cannot prove itself to be true (Nadeau and Kafatos, 1999; Gödel, 1962). As pertaining to a study of consciousness, the first question to be asked and answered is: does this subject necessarily entail an ability to provide precise definitions for included terms? If 'yes,' then any plausible theory could be, at best, self-consistent at the expense of being noncomprehensive; if 'no,' the Incompleteness Theorem does not serve as a limiting constraint; given 'fuzzy' definitions for key components, comprehensiveness and self-consistency are both attainable.

A strong hint that the latter situation holds—that, in this case, the relevancy of Gödel's proof can be dismissed—is provided by the word itself: "One of the main problems related to consciousness is its definition. The probability of having different definitions of the same object correlates directly to the number of theories that try to explain the nature of consciousness itself" (Sattin *et al.*, 2021). Centuries of investigation going back at least to Ancient Greece have failed to generate consensus on the main topic's boundaries (the purpose of definition). Precision employed in defining subsidiary terms does not alter the overall character of the field of inquiry.

Although self-consistency is an inalienable attribute demanded by theorizing on any subject, the study of consciousness might still yield comprehensiveness if, at some level of investigation, imprecise definitions and meanings are regarded as unavoidably acceptable. Nonetheless, limits must be placed on expositions of scope simply because the print and/or electronic publication space available is determined by people other than oneself. Consequently, it is fair to ask: what disciplines are included here? Physics, chemistry, biology, mathematics, philosophy, religion, history, and psychology all have a place. It would be unrealistic to pretend this treatise exhaustively covers any of these domains. Instead, aspects from each topic area will be used to assemble a self-consistent picture.

Beyond self-consistency and (potential) comprehensiveness, are there other traits a proper theory of consciousness should incorporate? First, with an aim towards universal inclusiveness, an

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inquiry into its connection to metaphysics is mandatory, especially if the universe is not "causally closed" (Velmans, 2000); i.e., not limited solely to the manifest material world and the physics used to describe its natural properties. Stipulating no need for metaphysics, adherents of closure are unable to uncover fundamental axioms undergirding their science(s). However, as will be expressed, by cosmology's own doctrines, the universe is energetically open with respect to particle creation. This notion leaves the door open for access by other agencies that can only be characterized as 'metaphysical'.

Second, given a desire for universal inclusiveness, one immediately discards as controlling a principle of logic possessing a long, distinguished history: the *Law of the Excluded Middle*. Inclusion and exclusion are iincompatible. Aristotle's original formulation was/is valid: "It is impossible for the same thing at the same time to belong and not to belong to the same thing and in the same respect" (Aristotle, 1960). What Aristotle, and the long line of thinkers since his time, failed to articulate was an important corollary. Call it the *Law of Universal Inclusiveness*: it is necessary for the same thing at the same time to both belong and not to belong to the same thing in different respects. Both/and counterbalances either/or. The original Law has limited value not because it is wrong under many situational conditions, but because it has frequently been misapplied, or to be clearer, has been applied in ways precluding a demonstration of universal inclusiveness.

Third, with allowance for a forthcoming 'fuzzy' definition of consciousness, speculation must be applicable to all lifeforms, individually and collectively, if it can be reasonably postulated that each living thing possesses some degree of consciousness—Cons$_1$ or *sentience* (Shannon, 2008)—despite theorists alleging either human beings only are so endowed or that other species don't somehow 'measure up' to our attainments in this area (Hobson, 2009). At the opposite extreme from 'humans only' is a claim that each electron exhibits consciousness (Argonov, 2012). A distinction is thereby warranted: consciousness is not equivalent to self-consciousness; the latter is an individualized aspect of the former. In the context of a theory to be delineated, Argonov is correct, though electrons lack self-consciousness because they do not qualify as lifeforms.

Fourth, a crucial implication of all-life inclusiveness for each full-bodied theory is: consciousness cannot be solely dependent, either for its existence or its operation, on any or all parts of a brain. If valid, proposals specifying consciousness as a brain product are automatically discounted. The reason is simple anatomy: plants, single-celled creatures (archaea, bacteria, protists, fungi), as well as viruses all lack brain organs, much less its neuron-based substructure. This stipulation for a viable theory allows for human and nonhuman animal consciousness to be channeled through brains; it merely asserts these are not essential for consciousness or self-consciousness to exist and to act.

Fifth, from a psychological perspective attributable to living entities, self-consciousness cannot be conceptually defined as commencing with an awareness function. Such a process requires cognition of a minimum of one object for onset; becoming aware *of something*. A condition exists preceding awareness, namely alertness (attentiveness), a generalized object-less status. It is altogether different from attention, which likewise denotes a behavior prior to awareness; focusing *on something*. Only after a singular object is in view may awareness, an integration of object-dependent past experience with present activity, take place. An aware subject is ready and able to report; i.e., to acknowledge conclusions derived from the exercise of awareness. Reporting need not demand human language ability.

In sum, metaphysics is as important as physics to consciousness theory; religion as important as mathematics; mysticism as important as biology. Truth is not acquired through scientific method alone, for only science need abide by scientific method. Reality is not the handmaiden of science. The opposite is more plausible: science is a tool for finding out what is real. Other tools exist. Of importance, aside from scientific method, is personal experience. Phenomenological events occurring to sentient creatures must be deemed acceptable evidence; if not, a vast corpus of data is removed from consideration. Another tool is imaginative intuition. Its invocation does not suggest 'anything goes'; this is precisely the realm in which either/or is appropriate as a guideline.

A project of breadth and depth must still have a point of origin; i.e., premise(s) or assumption(s) or axiom(s) from which the remainder proceeds. The point of origin has been stated: the articulated

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theory stems from a premise that reality is all-encompassing. Component pieces should mesh smoothly without forced connection. Consider jigsaw puzzles: vast collections of irregularly shaped pieces, no one of which makes it obvious what the final picture looks like. Through iterative combinations attempting to match disparate shapes, at completion of a puzzle all pieces are included, and all join naturally without positing any necessity to fit square pegs in round holes, or by taking a pair of scissors to smooth out rough edges; i.e., without employing simplifying gross approximations.

The case of 'square pegs in round holes' is an example of failed imaginative intuition by virtue of definitions for *square* and *round*. Imaginative intuition does allow one to rationally conceive of a proper fit between *pink* and *elephant* even should no animal matching this combination exist on Earth. Scientific method, phenomenological experience, imaginative intuition offer independent modes towards establishing a complete theory of consciousness. As convenient notation distinguishing metaphysical constructs from physical analogs, the former will be denoted with capital letters as needed.

Metaphysical Ontology and Physical Cosmology

Scientists presume cosmological theories begin with physics. The aforementioned *Incompleteness Theorem* demonstrates this is an incorrect assessment. The field of physics, no matter how sophisticated its precepts and proofs of internal consistency, cannot provide proof of its own correctness. Cosmology begins with metaphysics, the branch of philosophy that historically gave birth to systematic, disciplined study of 'generalized thinking about' in both Orient and Occident. Metaphysical thought concerning the origin of the universe began with mythological stories about creation induced by one or multiple gods (Sproul, 1979). These mythic tales, prime examples of imaginative intuition, were embraced within local religious thought by indigenous peoples on every continent. Classical Greece took a different route: its citizens segregated religion, perceived as concrete practical, from philosophy, judged abstract intellectual. They subsumed their mythic legends into what was eventually called *metaphysics*.

Beginning with the twentieth century, due to theoretical and technological achievements, ideas emanating from scientific pursuits gained ascendancy in concept maps disseminated by intellectuals. This resulted in most thinkers declaring metaphysical speculation no longer relevant, hence could be ignored.

> These five principles, then, constitute the philosophy of material realism: (1) strong objectivity; (2) causal determinism; (3) locality; (4) physical or material monism; (5) epiphenomenalism. This philosophy is also called scientific realism, which implies that material realism is essential to science. . . . A major weakness of material realism is that it seems to exclude subjective phenomena altogether (Goswami *et al*., 1993).

This illustrates either/or thinking at its worst: if scientific knowledge is accepted as revealing what is true, then no other path is needed or even possible. Both/and is a superior approach: science, philosophic metaphysics, religious theology are mutually reinforcing avenues to truth about the nature of reality.

Creation myths can be classified into those in which one deity is responsible for the origin, and those in which two (rarely more) omnipotent beings are ultimate sources of everything. The importance of categorical distinction is both religious and mathematical. Cosmological intuitions about a single Creator—which need not be construed as a 'super' person—gave rise to religious traditions today influencing global populations in the billions. Dualism as responsible for universal creation gave rise to *Zoroastrianism* and its historical offshoot *Manichaeanism*, which are institutionalized belief systems with comparatively few modern adherents.

There exists another collection of mythological stories suggesting creation never occurred, that the universe has always existed. This option can be neither proven nor disproven. Astrophysical estimates about the age of the universe (13.8 billion years) are limited by the speed of light in a vacuum, since we reckon distance by the time it takes light from distant parts of the universe to reach our planet (Turner, 2022). This constraint sets a lower boundary limit for age of the universe, but there is no available means to determine an upper bound, if one exists, and it is that existence

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irrefutably proving creation. However, a permanently existing universe, if true, is not fruitful information by itself. An eternal universe theorem fails to provide an avenue for explanation of the existent laws of physics. It is also lacking justification for the contents of the universe as we know it.

Single Creator myths became foundational for development of the *Perennial Philosophy* (Huxley, 1970). Dual Creator myths became foundational for elucidation of *The Other Perennial Philosophy* (Laibelman, 2000). Mirroring its impact on contemporary religions, tenets of the former are well-known among those interested in philosophy; principles and justifications for the latter are relatively unknown. At the center of this second approach stands the *Theory of Inherent Duality*. It proposes two Absolute Energy Fields, dual Dimensional Spaces, became aware of the Other at the border between Them and proceeded to undergo Interpassage, a process of intermingling. Absolutes are topologically associated with any nonzero degree angle; there is no basis for differentiation from complete automatic merger with zero degrees. Interpassage occurred along an imaginary tangent line serving as common border to both Absolutes in the same fashion as two line segments meet at a single vertex point creating a nonzero angle between them in Euclidean geometry.

In accord with elucidated criteria for a theory of consciousness, mutual simultaneous awareness of each Absolute's Dimensional existence means each treats the Other as Object. Dual Absolutes must first display Alertness, an innate capability to detect Objects. Each Absolute is *Pure Consciousness* (Merrell-Wolff, 1973). Commencement of Interpassage had as immediate consequence the creation of our physical universe through a process cosmologists call *Big Bang plus Inflation* (Magueijo, 2004 ; Davies, 1984), which may be imaged as 'rapidly expanding thermal energy'. After ~300,000 years, this energy cooled sufficiently for material particles to begin to form. Over time, these particles cooled further and collected together under the influence of gravity to create the first chemical elements. Still later came individual stars, galaxies, planets, moons, lifeforms. Gravitational power to attract is a reminder that particulate matter was once connected with no gaps between them. If Interpassage sounds like fiction, consider an exposition from some leading proponents of *string theory*:

> A natural initial state in which two three-dimensional universes . . . approach each other by moving in one of those extra dimensions . . . like two perfectly parallel sheets of energy approaching and colliding. When they collide, they will produce a conflagration that rebounds back into a state of expansion. . . . The energy released by the collision goes into creating elementary particles that participate in the expansion (Khoury *et al*., 2001).

Mating metaphysics with physics, these Absolutes differ in Energy conveniently characterized as *Dark Energy* and *Normal Energy*. If we choose to arbitrarily describe our universe as normal, then dark energy propels expansion because it exerts negative pressure with respect to normal energy. Conversely, normal energy induces expansion of a dark energy mirror universe by exerting negative pressure with respect to dark energy. Interpassage combined with the Theory of Inherent Duality necessarily demands establishment of a parallel mirror-image universe, and symbolism expressed through the Taoist yin/yang icon is a reasonable descriptor of the outcome. Religious iconography here provides another example of imaginative intuition about the underlying reality. The universe we inhabit is known to be expanding at a current speed of ~67 kilometers per second for each megaparsec of space (Aghanim *et al*., 2020), as is its twin, because Interpassage is not yet complete.

Consciousness may be designated *Inherent Intelligent Energy*. This definition is both broad and vague—antithetical to the purpose of definition, which is to delimit and specify—although entirely in keeping with characteristic definitions for similar types of terms such as *God, love, truth*. Establishing the universe, Dual Absolute Consciousness transitions into monolithic unified *Global Consciousness*. It is important to note Global Consciousness is metaphysically extra-Dimensional and denominated *Theological Space* (Laibelman, 2000), a phrase appropriated from Weiss: "Since everything longs and is answered to some degree and since God needs all things and feels the effect of every longing, theological space is the region which unites nature and God so that together they form a single cosmos" (Weiss, 1941).

Theological Space has, as it must for comprehensiveness, a physical analog, or more precisely a correlate. This is the *zero point energy field*, a residual field energy that is the wellspring of all matter. Its name derives from the classical way of describing the lowest energy state of an atom or molecule

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as the *zero vibration mode ground state*, its most stable condition. Numerically, the zero point field at an absolute temperature of zero Kelvin should likewise be zero because energy is directly proportional to temperature. However, when modeling this field as an ideal harmonic oscillator—think of a frictionless spring expanding and contracting endlessly—a result of infinite energy is obtained. Many physicists do not take this outcome seriously and conclude the model is inappropriate.

Despite disagreement, the zero point energy field is acknowledged to be a source out of which may emerge matter and antimatter particle pairs: "When fluxes in the vacuum cross the energy threshold of particle creation . . . its virtual particles transform into 'real' particles. . . . It now appears that mass is not a fundamental property of quanta, but a product of its interaction with the zero point field" (Laszlo, 1995). A synonym, or a specific example of it in action, is the *Higgs field* named after the person who first proposed its existence without evidence for its actuality. The particle serving as force carrier for the Higgs field is a *Higgs boson*. Other forces—gravitational, electromagnetic, strong nuclear, weak nuclear—correlate with force carrier bosonic particles.

"All the other bosons . . . arise because of some symmetry of nature connecting what happens at different points in space. . . . But the Higgs isn't like that at all. There is no deep principle that requires its existence, but it exists anyway" (Carroll, 2012). Carroll goes on to explain its uniqueness: "Fields like the gravitational field or the electromagnetic field sit quietly at zero when space is truly empty. . . . The Higgs field is different . . . has less energy when it's nonzero than when it's at zero. As a result, empty space is full of the Higgs field. . . . It's that ever-present field at every point in the universe that makes the weak interactions what they are and gives masses to elementary fermions" (*Ibid.*). To clarify, *fermions* are familiar particles like protons and electrons, as well as other types less well-known to non-specialists. Though their terminologies differ, it is clear from the citations that the zero point field and the Higgs field are characterizing the same process.

To tie things together, the zero point energy field is Theological Space, the realm of Interpassage that has not become manifest as four-dimensional spacetime. This conceptualization means our reality is five-dimensional, but only four are subject to our innate sensory apparatus. Such a schematic establishes the existence of both matter and antimatter as consonant with a parallel mirror-image universe where the energetics are oppositional, as befits an overarching Theory of Inherent Duality. Matter and antimatter undergo mutual annihilation when in contact; particle pairs return to Theological Space.

Carroll's absent "deep principle" is metaphysical, which physicists are unwilling to recognize as the foundation for science. They believe "virtual particles" circumvents a need to accept metaphysical validity of another domain. To express disapproval of numerical infinities, the disparaging term *singularity* is employed; i.e., a never-to-be-repeated outcome. Mathematically, techniques for *renormalization* are developed, which eliminates the possibility of obtaining infinity as an outcome from equations, sometimes by introducing new parameters as variables taking on values guaranteeing absence of infinity as result. Another possibility is never entertained: when calculations in physics yield infinity as end product, it is a sign the actual answer lies within metaphysics rather than physics. Infinity as outcome of a mathematical operation is not a synonym for error. Instead, it should be taken literally to reveal the transcendental at work. Infinite zero point energy is consistent with a proposition of Interpassage between Dual Absolutes.

Philosophy and Physics

Physicists have united three of the four fundamental forces accepted as real. Electroweak Theory combines electromagnetic energy with the weak nuclear force responsible for transmutation of neutrons into protons, electrons, and neutrinos mediated by W and Z bosons. Electromagnetism has, in a separate formulation, become mated to the strong nuclear force responsible for keeping positively charged protons together in atomic nuclei, a process whose absence would mean nonexistence for the subject of chemistry because no elements other than hydrogen could then form. Absent from these unifying constructs in the *Standard Model of Particle Physics* is the force of gravity.

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Not coincidentally, gravitational force is central to another conundrum: the inability to provide a satisfactory method to bridge applications of Einsteinian relativity and Newtonian mechanics with Planck-Bohr-Heisenberg-Schrödinger quantum mechanics. The first two coalesce without *ad hoc* additions. At velocities substantially below the speed of light, Newtonian mechanical laws 'fall out of' the relativistic equations. Einsteinian-Newtonian physics is self-consistent, which means their conceptions concerning the nature of gravity are compatible. Some would deny Newton's and Einstein's conceptions of space are aligned. As conveyed in *Principia Mathematica*, Newton's ideas about time and space demanded we must abide by their reality independent of observers: "Absolute, true, and mathematical time, of itself, and from its own nature flows equably without regard to anything external . . . Absolute space, in its own nature, without regard to anything external, remains always similar and immovable" (Newton, 1995). Einstein's Theory of General Relativity stipulates relativistic spatial geometry as malleable, dependent upon location and the mass of objects within it. At first blush, these two conceptions appear at odds.

Looking more closely, the Theory of Special Relativity bridges these views. There is an absolute speed limit for light to travel in a vacuum. Since speed is a function of distance over duration, if there is absolute speed, there must be absolute Space and absolute Time with which to reference it. Interpassage shows Absolute Conscious Space is unchangeable in itself, yet able to undergo Dimensional movement. Time, absolute or relative, serves as measure of Energy/energy alteration. What causes Energy to change? If perceived as monolithic, nothing. If contemplated as Dual Absolutes, Interpassage reveals continual transformational movement of Energy composition rendering Time a concept engorged with significance. Newton and Einstein were both convinced of reality beyond the physical realm, but different emphases on SpaceTime/spacetime pointed toward divergent interests. As sociocultural inhabitants of their historical time, Newton was much more focused on the transcendental than was Einstein.

Over the last century, efforts to coherently mate quantum mechanical principles to relativity has failed. A branch of string theory known as *M Theory* is said to attain the desired unification by positing four spacetime dimensions plus six more of Planck-scale size (10^{-35} meters). A feature of M Theory said to favor it over competing unification proposals is prediction of a speculative graviton particle associated with gravity as force carrier needed to satisfy the Standard Model (Greene, 1999 ; Kaku, 1994). Gravitons have not yet been discovered, although gravitational waves have been both detected (Abbott *et al*., 2016) and questioned (Ulianov *et al*., 2016). Independent of the legitimacy of the wave claim, a five-dimensional metaphysical ground for unification of known forces is more plausible, because less complex, than a ten-dimensional wholly physical postulation given that in neither case are dimensions beyond the manifest four susceptible to direct inspection.

An uninvolved observer taking note of the situation might conclude quantum mechanics needs to be jettisoned and replaced with a physics 'of the very small' having a similar view of gravitational force to that offered by Newton and Einstein. Quantum physicists bristle at that recommendation, countering it with a statement they regard as infallible proof of the correctness of quantum mechanical methodology and the core principles upon which it was established: "Quantum theory is the most stunningly successful theory in all of science. Not a single one of its predictions has ever been wrong" (Rosenblum and Kuttner, 2006). The question is whether this statement demonstrates what it portends to prove.

The origins of quantum mechanics do not lie solely within the domain of physics; it is rooted in an epistemological proposition enunciated by Kant in his *Critique of Pure Reason*:

> Hitherto it has been supposed that all our knowledge must conform to the objects: but, under that supposition, all attempts to establish anything about them *a priori*, by means of concepts, and thus to enlarge our knowledge, have come to nothing. The experiment therefore ought to be made, whether we should not succeed better with the problems of metaphysics, by assuming that the objects must conform to our mode of cognition, for this would agree with the demanded possibility of an *a priori* knowledge of them, which is to settle something about objects before they are given us (Kant, 1966).

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Kant proceeded to claim space and time were categories of human understanding with no external validation. His anthropocentric epistemology became central to the birthing of quantum mechanics when Planck suggested light quanta explained the physics of blackbody radiation: light functioned as discrete particles emanating from a source in integral units because it made data intelligible to us. The elaborate edifice of quantum mechanics was constructed in less than thirty years after Planck's claim. This rendition of history is not a distortion of fact: "In our description of nature, the purpose is not to disclose the real essence of the phenomena, but only to track down, as far as possible, relations between the manifold aspects of our experience" (Bohr, 1958). Discreteness, rather than continuity, became coin of the realm.

Newtonian epistemology, as opposed to Kant's, is more plausible because it allows the union of physics to metaphysics; is inclusive rather than exclusive; does not demand a human mind to comprehend properties of the universe. According to the proposed ontology, space is always "similar and immovable" because it is the manifest expression of Absolute Space of specific Dimensionality. Similarly, time "flows equably without regard to anything external" because it is a manifest expression of Absolute Time. The fit is not exact between Newton's views and those of Inherent Duality because he was an ardent monotheist. If Global Consciousness is equated with his Single Creator, the conceptions of SpaceTime/spacetime are seamless. Universal expansion (Hubble, 1929) traces Interpassage as it progresses. Accelerated expansion (Riess *et al.*, 1998) offers supporting evidence for its continuance.

What is one to make of the "stunning success" of quantum theory? It must be successful because we made up the rules of the game based on the inherent discreteness of our sensory apparatus. Quantum mechanics yields statistical approximation of outcomes through calculation of relative probabilities for a range of outputs. Results apply to collections of molecules, not to individuals, and are literally tabulated as *expectation values*: what one expects to observe as a consequence of a set of event measurements. The *Heisenberg Uncertainty Principle* guarantees, and justifies, minimum acceptable error ranges, which vary depending upon the systemic property being examined, because human beings are discrete and fallible.

As analogy, by reviewing results of all major league baseball games played over a given number of years, and with knowledge of rules explaining how many theoretical ways the outcomes of games can be determined, one can confidently predict approximately how many games will be decided by every variation of these winning formats in a future time period of reasonable length without being able to successfully predict the outcome of any game. Quantum mechanical calculations represent self-fulfilling prophecies by measuring or calculating properties of objects according to rules tailor-made for ways we are inherently able to measure and calculate. Our senses, and the signals they send to our brains, operate discretely based upon "just noticeable differences" (Fechner, 1966), a notion remarkably similar to that of the Heisenberg Principle's rationale. Consequently, the measurement tools we construct are also based on discreteness. In reality, spacetime and forces operating within it act continuously with a complete absence of gaps (Laibelman, 2007).

To repeat: quantum mechanics should be jettisoned and replaced with a physics 'of the very small' having a similar view of gravitational force to that offered by Newton and Einstein. Contemporary physicists devote much labor to proceeding in the opposite direction through many attempts to develop quantum gravity theories. Yet, all efforts have failed tests of completeness and self-consistency thus far (Oriti, 2008). On the other hand, *Stochastic Electrodynamics Theory* uses classical notions—Newton's Gravitational and Maxwell's Electromagnetic Laws—plus an additional concept to reproduce the electronic levels present in hydrogen atoms originally determined by Neils Bohr assuming their quantization (de la Peña and Cetto, 1996; Boyer, 1975). If Stochastic Electrodynamics is able to re-interpret atomic and nuclear physics without inclusion of discrete energy quanta, then it is pertinent to know exactly what this additional concept is. It turns out to be inclusion of the zero point energy field.

If the suggestion made previously—the zero point energy field is a manifestation of Theological Space generated by Interpassage of Dual Absolutes—is correct, then it might be possible to unite the four fundamental forces of nature by addition of the zero point field. Kaluza and Klein accomplished

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just such a coalescence of gravitational force with electromagnetic force a century ago (Kaku, 1994). They used a five-parameter matrix (rows and columns) producing twenty-five combinations (5×5). Due to symmetry, ten combinations were identical to another ten, and could be ignored because they contained the same data; i.e., row A column B matched content from row B column A. This reduction left fifteen combinations: ten corresponded to Einstein's field equations for gravity in 4D spacetime plus four others matching Maxwell's field equations for electromagnetism in 3D space. The remaining term was a scalar term, but dismissed as unimportant because no physical description could be assigned.

Mathematical tensor analysis involves equations categorized by possession of certain properties expressible both mathematically and physically. If the value of a quantity does not depend on direction or spatial location, it is a *scalar* term, the lowest ranking tensor. An immediately higher-ranking term whose value does depend on directionality (place) is a *vector* (still higher-ranking terms need not be mentioned). An example often used as illustration is the distinction between mass and weight: the former is an object property identical everywhere (scalar), whereas the latter depends directly on gravitational strength in a given locale (vector).

Is the Kaluza-Klein construction plausible? While not accepted by most physicists today, at least one takes its elaboration seriously. "Spacetime resembles a spherically-symmetric subspace embedded in five dimensions" (Wesson, 2014). He conjectured that the extra term referenced the Energy of 5D Space in the guise of source for 4D matter production (Wesson and Overduin, 2013). Penzias and Wilson found the cosmic background temperature—a measure of residual vibrational energy found in the cosmic void—is the same in all directions of space (currently valued at 2.72 Kelvin) if measured over sufficiently large regions (Magueijo, 2004). Note that this value is not zero Kelvin because the universe is not a vacuum. This observation is denoted *isotropic* (same everywhere) and *homogeneous* (same throughout). The caveat "if measured over sufficiently large regions" is necessary because over localized areas, space is obviously not uniform due to the presence of galactic star clusters and smaller groupings of structural objects.

Synthesizing concepts, Kaluza-Klein's nonphysical scalar *is* Wesson-Overduin's source for matter production *is* Boyer's zero point energy field *is* Global Consciousness *is* Theological Space.

Consciousness and Self-Consciousness

The Introduction suggested five criteria for a comprehensive theory on the nature and meaning of consciousness: (1) a metaphysical component; (2) a philosophical approach grounded in both/and rather than either/or logic; (3) application to every living thing; (4) an expansive orientation beyond brain-only perspectives; (5) starting with a prior mental process than awareness. Most models presented in books and articles fulfill one or more of these requirements without committing to all five. Hence, there exists a need to justify each.

Why is at least one metaphysical element necessary? The fact there is an absence of a consensus definition for consciousness despite millennia of speculation is significant. Other words routinely used bear the same characteristic; *God, love, truth* were mentioned earlier as examples. What these terms have in common is a lack of materiality. No atoms comprise *justice* or *light*. Illustrations abound to more or less adequately convey an interpretive characterization for *electric charge* or *friendship*. Yet, none could define them, to state without equivocation what they *are.* By contrast, no difficulty exists in conclusively defining *carbon*, *cat*, *cloud*. Language popularly used without accompanying definition refers to the transcendental, to the metaphysical beyond. Science, which labors diligently against any allowance for metaphysics, is ironically one of its core advocates by invoking quantitation whenever it can be attained. What is *number*? *Six dollars* has precise meaning that can be taught to everyone, but what is a *six*? As a noun, it is unknowable in essence; as an adjective, it is replete with power. As noun, it is transcendent; as adjective, earthbound. Two plus three equals five could just as meaningfully be written 'wtcv and sklc is prmq'. Consciousness is intrinsically metaphysical.

Terminology may represent an obstructive difficulty; reference to dimensions and spaces denote familiar concepts, yet neither is completely descriptive of metaphysical reality. Inventing neologisms does not enhance understanding despite appropriation of Theological Space from Weiss. It should

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be kept in mind that Dual Absolutes are not *in* the Space they are said to occupy; they *are* the Space. Likewise, each Absolute can be conceived not solely as Energy Field, but also as Pure Conscious Alertness, as Sentient Intelligence.

If this schema is correct, Theological Space differs from Pure Conscious Alertness because it is Composite Conscious Awareness. It was given the cognomen Global Consciousness, although Universal might have been a better choice. The set of equivalencies outlined at the close of the preceding section highlights the fact that the preferred term is context-laden since it depends on whether the aspect chosen for emphasis is the metaphysical extreme (Theological Space), physical extreme (zero point energy field), or intermediary pointing towards both (Global Consciousness).

Little verbiage needs to be expended towards justifying logical both/and relationships in place of either/or choices in vogue since the days of Aristotle. The first is a process of addition, while the second is an advocacy for substitution. Comprehensiveness is the antonym of definition. The former has potentially no limit, whereas the second concerns the development of boundaries, a circumnavigation of scope. It is unsurprising that appeals to metaphysics are *ipso facto* both/and procedurally.

Most speculations on consciousness limit their treatment to human beings. This is to be expected for such a highly egocentric species, but, in part, is also due to the comparative ease with which data can be collected supporting uttered propositions. Convenience constitutes an acceptable rationale for limiting focus, but the extremes some go to in rejecting topic coverage to nonhumans is unsupportable. Theorists often seek sophisticated arguments for their positions when none are really needed; sometimes resolution is logically obvious.

All living things desire perpetuation to the maximum extent possible. It does not matter whether one interprets *desire* as thought, emotion, or mindless mechanical genetics-inspired instinct. To allege the purpose of life is death is oxymoronic. Consider the life experiences encountered by an organism in any period of evolutionary history for that type of creature. He/she/it has/had few resources to employ as aids to effective response in environments presenting a combination of unpredictable, frequently inhospitable, weather patterns along with predators/prey of various shapes, sizes, kinds of threat, and degrees of threat severity. He/she/it has/had to quickly decide to take shelter or not, and to feed, freeze, fight, or flee. To do so, every single one has/had, at minimum, a rudimentary sense of self in order to distinguish itself from everything/everyone else. If deficient, if no self-consciousness existed in the form of vigilant alertness to opportunity or danger, he/she/it could/would never act in any situation. Death would invariably ensue at some point, and probably sooner rather than later.

To facilitate decision making is the natural role assumed by physical reflexes as well as cognitive instincts, to whatever degree these are judged primitive or advanced by modern standards. Reflexes and instincts would be useless without ever-present alertness. Evolutionary survival would not transpire for sufficiently large populations of any species over sufficiently lengthy times to permit development of 'superior' analysis tools for awareness allegedly achieved by *Homo sapiens*. It is not unusual for animals to be readily granted self-consciousness, especially those considered 'big-brained': primates, cetaceans, elephants, many avian species. However, every animal is constantly alert to surroundings, especially with respect to predators, prey, potential mates. If otherwise, they would become someone else's meal or die of starvation because they could not find their own dinner in time.

Chimpanzees express intentionality through alarm calls (Schel *et al*., 2013). Orangutans plan for the future (van Schaik *et al*., 2013). Mice express pain (Langford *et al*., 2010). Rats show empathy for the pain of other rats (Nakashima *et al*., 2015). Distinct personality traits are asserted to be attributes of squid (Sinn and Moltschaniwskyj, 2005) and octopus (Mather and Anderson, 1993). This catalog, intended as partial listing only, speaks towards the presence of *mind*, which is the product of associational interactions between self-consciousness and the organism's internal organs centralizing operational control.

Plants are far less investigated as subjects with respect to the existence of mind, perhaps because they lack brains altogether. Nonetheless, a plant's natural ability to mount defenses against invaders

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puts its efforts towards survival on display: "In response to herbivory, plants emit specific blends of herbivore-induced plant volatiles mediating interaction between plants and arthropods, microorganisms, undamaged neighboring plants, and undamaged sites within the plant in various ecosystems" (Arimura *et al*., 2009). The volatile chemicals released vary according to plant species, herbivore species, developmental stages of plants/herbivores. In order for one's defense to adjust to type of invader, or be able to detect "undamaged neighboring plants", vegetation must be able to distinguish self from other and possess memory recall of prior contact history to know what is effective. Hypothesizing this type of response as hard-wired without alertness and awareness on the plant's part cannot stand up to scrutiny. There are too many combinations possible in a natural ecological setting to enable that degree of complexity to be indwelling from genetics alone. To believe otherwise would be like alleging knowledge of how to act towards everyone a person will ever meet is genetically implanted at conception. Plants must have mind even if lacking a conventionally recognized brain, and this fact demands self-consciousness in communication with some type of organic tissue.

A sense of self is demonstrated by unicellular microorganisms and viruses through development of antibiotic-resistant strains. These microbes might generate resistance using random genetic mutation, an uncontrolled automatic process not conducive to showing the presence of alertness, attentional focus, or awareness functions. Mutation-induced resistance is a matter of luck. However, there is a more nuanced approach to resistance: a mechanism known as *horizontal gene transfer*. In these situations, one entity steals that which is needed from another by duplicating genetic material and implanting it in its own genome. Theoretically, HGT may occur randomly, but since most changes in a lifeform's genetics are lethal, such methodology would be risky for the thief. The technique is ubiquitous throughout the microbial domain (Wu *et al*., 2023 ; Arnold *et al*., 2022), so it is rational to propose HGT is intentional; i.e., the receiving agent has reason to believe the transfer is not simply viable but beneficial. No neuron-grounded brain is at work, but risk assessment and potential efficacy against pharmaceuticals designed to eradicate them could be triggered by experience communicated from others in some unknown manner. One might speculate this "unknown manner" involves self-consciousness and Global Consciousness.

Against an obvious charge that this exposition anthropomorphizes lifeforms beyond reasonability, a countervailing thought is that resistance does spread across species. How could this be an effective process other than through knowledge transmission? How could a bacterium or virus appropriate selective portions of a genome to transfer otherwise? How could each decide where to place it in its own sequence so as to gain from the action? Trial-and-error is problematic; it would again place a premium on luck. Randomness no doubt occurs, but to suggest it is the only mechanism is unconvincing.

Self-consciousness cannot be confined to presence of brain tissue as a prerequisite for its actuality or function. That a brain may facilitate the expression of self-consciousness is undoubted. Some think the proposition of self-consciousness to be illusory; nonexistent because innately incapable of differentiation from the brain itself (Dennett, 1997). Evolutionary survival predates brain formation and proves Dennett wrong. *Epiphenomenalism* stipulates self-consciousness arises from neural circuitry but, though distinct from it, has no independent functional use. "Consciousness did not have to evolve. . . . Consciousness is not essential to highly evolved intelligent life" (Flanagan, 1997). Excluded now are not only unbrained lifeforms, but also those so endowed, yet arbitrarily conceived as not "highly evolved" on some unstated scale governed by unnamed judges. This view is a slight departure from Dennett's and wrong for the same reason. Seemingly contradicting both Dennett and Flanagan, but actually not, are those asserting human self-consciousness is a late-stage evolutionary development coinciding with expansive growth exhibited by brain cortical regions (Schwartz and Begley, 2002). Advocates discount self-consciousness being attributed to the unbrained, those retaining small brains, as well as to human fetuses/infants whose brain development has not reached the stage of adult-scale complexity. This thesis likewise fails Darwinian evolution's test for long-term survival.

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More viable theories of (self-) consciousness, though oftentimes limited in application to human beings, derive from those who seek neural correlates of consciousness; i.e., patterns of synaptic circuitry evoking phenomenological awareness (Crick and Koch, 1990). As the popular saying has it, 'correlation is not causality', which is certainly the case here. Approaches beyond invocation of the cortex/neocortex reference a thalamocortical neuronal network incorporating various components; e.g., *Global Workspace Theory* (Baars BJ *et al*., 2003 ; Baars, 1997) or *Apical Dendrite Theory* (LaBerge and Kasevich, 2007). Better, from the perspective of inclusiveness, are doctrines expanding neuron-based contributors to older structures such as cerebellum and brain stem; e.g., *Consciousness State Space Model* (Berkovich-Ohana and Glicksohn, 2014) or *Layered Reference Model of the Brain* ((Wang *et al*., 2006). Still better are those advocating roles for components beyond neurons, especially glial cells; e.g., *Conscious Electromagnetic Information Field Theory* (Lewis and MacGregor, 2010 ; McFadden, 2002).

Brain-based propositions attempt to account for all sorts of behavioral outputs. Some of the latter are clearly derivative, such as a restriction to acts related to an ability to report to self or others. "It is the achieving of the ability to make a commentary of any particular event that is what gives rise to awareness and it is what we mean by being conscious" (Weiskrantz, 1997). This construct bounds consciousness to species possessing linguistic ability. Consciousness is not synonymous with awareness, much less with being awake as opposed to asleep. On the contrary, self-consciousness awakens a mother in the middle of the night when her child is feeling ill, or a dad from slumber when an intruder is in the home.

When alien energy form becomes object by entering alertness field, the recipient transforms into subject. Differentiation between Self/self and Other/other is inevitable on Absolute/relative levels. Intrusive objects become a focus of attention. Concomitantly, analysis and categorization aspects of awareness are engaged, grounded on degree of relevance towards survival and/or general welfare using a continuum scale ranging from favorable to unfavorable. Conclusions about the nature and intentions of the invading entity can be represented both within the subject and externally towards the object through the undertaking of relevant actions. This transition through stages occurs for all living things.

Picture a technologically advanced security system: the property (physical body) is surrounded by an invisible field of energy (self-consciousness). This perimeter field is always 'on', cannot malfunction, and cannot be short-circuited as long as that property is inhabited. Self-consciousness is continuously in alert status mode. If/when energy emanating from outside encounters this field, electromagnetic signals are transmitted to the control room—which may/may not be a brain—located inside said property. In animals, this signal automatically activates video cameras (eyes) as well as a sound tape-recording system (ears). In non-animals, other modes of stimulus recognition apply—probably transmitted chemically through smell and touch—though they have neither noses nor fingers. Information fed into control rooms from these systems is employed to determine possible or likely meaning related to type of intruder and degree of threat, if any, presented to the property.

For species possessing brains, neural correlates of self-consciousness, those component circuits revealing intrinsic functional alertness: reside in the oldest regions evolutionarily; are among the earliest formed paths in fetal development; display no decline in activity when the creature is sleeping. Circuitry pertaining to awareness is secondary in development to those engaged upon activated alertness. One cannot become aware unless and until he/she/it is ready to become aware, which means to be alert.

Experiments reveal a temporal gap between stimulus receipt and stimulus response, with response developed separately from, or concomitantly with, verbalized report (Libet *et al*., 1979). Stimulus receipt indicates activation of self-consciousness prior to cognized receipt. Due to Freud's influential assertion of preconscious states, psychologists categorize such phenomena as *subconscious* because they correlate the conscious state with awareness, yet realize some forms of functionality occur prior to it. Contra Freud and his followers, neither subconsciousness nor unconsciousness is real. Their usage and popularity derive from a historically mistaken notion that self-consciousness equals awareness. In the present context, the terms *subconsciousness* and *unconsciousness* are simply

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shorthand descriptions for physical conditions in which one cannot explain information sources, as well as actions undertaken in consequence of that input, at that precise moment in time.

Blanket insistence on equating consciousness with awareness underlies the apparent mystery of *blindsight*: "The blindsight subject shows . . . that his visual system is receiving some information from the blind field, and it would seem to follow that he is in an 'informational state' that registers that information. Most people are unwilling to count this informational state as a perceptual experience, or at any rate as one that is conscious" (Shoemaker, 2003). Self-conscious alertness, perception before awareness, concisely explains blindsight as well as other events in which subjects respond to environmental clues without being able to acknowledge with certainty from whence a stimulus came. This commonplace phenomenon has a well-known name, but is misunderstood with respect to mechanism of action. It's *intuition*—thoughts and feelings coming 'all-of-a-sudden' from 'out-of-the-blue' leading to 'extraordinary' outcomes in art, music, math, science (representative examples), or results in life-saving actions on behalf of yourself or another. Intuition is naught but a concise expression denoting a communication relay from Global Consciousness to self-consciousness to brain.

Self-consciousness as alertness is not restricted in usage to surveying the external environment. When turned inward, we call it *introspection*. Rosenthal's idea of self-consciousness as projecting higher-order thoughts now gains significance (Rosenthal, 1997). First-order thought indicates awareness directed towards one's immediate localized surroundings. Second-order thought is contemplatively introspective; it ponders short-term and long-term significance of occurrent events. Opportunities for higher-order thought shed light on the utility of phenomenological self-consciousness. When oriented towards external events, it is crucial for survival. Despite this vital aspect, its usage need not induce a coordinated phenomenology of *experience*, as shown by the illustration of a high-tech security system. Recognition of incoming data streams does not demand accompanying thought or feeling coincident with data acquisition, categorization, analysis, or extrapolation into action, together constituting a four-step methodology leading to attainment of knowledge (Lonergan, 1978). Literature discussions concerning zombies convey legitimate concerns: information gathering and processing are mechanistically computer-like; introspective assessment of prior and/or concurrent experiences—formation of thoughts and feelings—is not an incumbent prerequisite for maximal efficiency (Chalmers, 1996).

Introspective utility of self-consciousness does support an associated phenomenological outcome, however. To explain why, consider the postulates of group theory in mathematics. A *group* is defined as any collection of objects whose methods of interconversion from one member to another are obeyed by all members. For example, a group for footwear could include dress shoes, sneakers, sandals, slippers and so on, where members come in pairs related to each other by mirror-image symmetry converting left footwear object into right footwear object and *vice versa*. All properly defined groups must exhibit four properties: *identity*, *associativity*, *inversion*, *closure*, with only the first and last important at present. *Identity* means a process exists leaving elements in the group unchanged; *closure* means every possible transformation starting with any element in the group produces another of the original elements. Group theory applies equally to material and nonmaterial collections. Thus, a group of integers has zero as identity element for the process of addition and expresses closure in that addition of any integer group member to another integer group member produces still another integer group member.

Consider functions associated with mindfulness: introspection, thoughts, emotions, acts. In this set, introspection is the identity element. If I introspect on a thought, I do not change the nature of the thought in any manner; e.g., thinking 'the sky is blue', then thinking about the fact that I am thinking that the sky is blue does not in any way change the 'sky is blue' notion. This is an illustration of Rosenthal's higher-order thought thesis. The same outcome is observable for emotions or acts: having an emotion, or performing an act, and introspecting on either, alters neither the original emotion nor the original act.

What happens if the sequence of events is reversed? I begin to introspect on my state of being at this precise moment in time—whether I'm physically healthy, mentally unstressed, emotionally

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content, possess a relaxed posture—when a thought suddenly arises, such as 'I think I'm failing algebra'. Does this thought leave my introspective state unchanged? No. That thought will lead to another thought, such as 'I'm failing because I don't study hard enough' or 'I'm failing because the teacher goes over the material too quickly for me to grasp', and so on. The same situation holds for generating feelings and actions subsequent to a decision to introspect on one's present state: personal status is altered when followed by any thought, feeling, or act.

For this reason, meditation practice for the purpose of attaining mystical insight always preaches control over thoughts and emotions as critically important steps in the process. The aim for one-pointed concentration is to prevent or eliminate changes of state: "Depth-mystical experiences result . . . from a radical 're-collecting' of the senses and a 'purging' of the mind of all dispositional and cognitive content, especially any sense of 'I'.' The resulting one-pointedness produces a stillness of mind where all sensory-conceptual apparatuses are in total abeyance" (Jones, 1993).

What if we omit consideration of self-conscious introspection and explore how those remaining elements operate on each other? If thought is followed by emotion, does it leave the thought unchanged? How about act followed by thought, or other possible combinations? Again, the answer is 'no'. Thinking 'I'm a good shortstop' followed by 'I'm proud of my skills' leads to a different state, a different attitude than before the second thought entered my mind. Without exhaustively vocalizing all permutations, a set consisting of introspecting, thinking, emoting, behaving elements fails to exhibit the property of closure. Although the introduced thought, emotion, or action can subsequently be deemed a member of this set, one never returns to the *original* state with which the group began, which is the operative definition of closure. New thoughts, feelings, behaviors are unavoidable consequences; the set is continuously adding members. This is not an original insight. James accurately described it as a "stream of consciousness" (James, 1910), and its occurrence is precisely the situation Jones cautioned meditators to attempt to avoid.

Phenomenological experience, in conjunction with self-conscious introspection on those events, allows individuals to grow beyond their original programming. Introspection begets personal progress. Zombie computers cannot accomplish this. Their functions form a proper group exhibiting both identity and closure; by considering data absent experiential phenomenology, new information is not admissible. Self-consciousness for every living creature makes phenomenology possible through alertness to external stimuli, and significant through alertness to internal stimuli.

Information and Knowledge

Once upon a time, we were quick to discount the possibility any creature other than us was able to develop, much less act upon, thoughts and feelings. While we are still reluctant to give credence to its application to the vast majority of animal species—none at all to plants or microorganisms—there is no credible reason to draw some arbitrary division between haves and have nots. Ethological investigations of animal behavior suggest many species display at least minimal characteristics of mind (Keim, 2024 ; Grandin and Johnson, 2005 ; Griffin, 1992). Plants also display features indicative of self-consciousness (Brenner *et al*., 2006 ; Thompkins and Bird, 1973). "Plants participate in the cosmic soul life, and, indeed, have their own souls. . . . Plants do not attend as we do, and the consciousness attending the vegetative process may be blunt, but perhaps consciousness is more vital the wider its diffusion" (Fechner, 1924). Can it be proven microbes possess minds? The idea may seem extreme, but they do exhibit preferences critical for adaptive survival (Baluška and Reber, 2019 ; Reddy and Pereira, 2017).

Leaving aside complexities pertaining to assignment of nonhuman self-consciousness and mind, forthcoming discussion will focus on human beings. Attribution to other living things is probable in broad strokes. The proceeding section asserted mind operated through chemical and electromagnetic channels. Outside the body, but in close proximity, is an electromagnetic field called an *aura* (Fraser, 1992 ; Moss, 1974):

> In the physical body there are two primary electrical systems. One is the well-known alternating electric current of the nervous system, the brain, neurons, and the nerves, which causes muscle contraction, nerve transmission, glandular secretion, and sensation. The

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> other is a newly discovered electromagnetic system . . . emanating from atoms and cells. This energy has been called an aura. It is continuous, while all the other body electric recordings of heart, brain, and muscle are off-and-on signals . . . The human field absorbs and throws off energy dynamically. It interacts with and influences matter, whereas fields associated with inert matter react passively (Hunt, 1989).

Plants have auras also, detectable through *Kirlian photography* (Kirlian, 1949). This controversial visualization technique has been replicated (Inyushin and Gritsenko, 1968), but also discounted as an effect caused by hydration around surfaces (Boyers and Tiller, 1973). Behavioral psychologists reference auras as p*ersonal space* most noticeable in responses to interactions with other people, and whether they welcome or resist its invasion (Dosey and Meisels, 1969).

Despite skepticism in some quarters, auras might be indicators of self-contained zero point energy fields capable of interaction with objects in the natural environment in order to acquire information in the form of electromagnetic impulses. It can also be posited to directly interact with Theological Space, in the same manner for the same reason, under mystical experience-producing situations. Global Consciousness and self-consciousness are an integrated pair. For conventional information-gathering pathways, signals are transmitted to the somatosensory system, our central nervous system with its peripheral sense organs, and subsequently redirected to the brain for processing using the aforesaid four-step approach of acquisition, categorization, analysis, extrapolation. For atypical information-gathering sessions leading to psychic or mystical experiences, acquired electromagnetic signals bypass surface sensory organs and are transmitted directly to the brain for processing.

One controversy concerning the detailed mechanism for processing these signals pertains to their impact on a given neuron. Some theorists propose that the total number of ‘on’ signals reaching a neuron in a given time allows for synaptic crossing by chemical messengers and downstream conductance of that signal, while others propose the interval pattern of successive ones (on) and zeros (off) over a given time period determines synaptic transmission of the incoming signal (Rieke *et al*., 1997). The either/or nature of the dispute is counterproductive: both absolute number and interval pattern probably have implications for signal processing and transmission. One possibility is that the absolute number of ‘on’ signals per unit time activates the neuron's chemical machinery, while the pattern of ones and zeros over time determines which particular synapses of that neuron transmit signals to their nearest neighbors.

There is a third feature of incoming electromagnetic signals: strength or intensity, as indicated by the amplitude of the passing energy wave. Amplitude variation could be a technique self-consciousness uses to partition signals between those needing immediate attention for active response and those that do not, which can be stored for later introspective analysis at a leisurely pace. Are all organisms capable of introspection? Probably not at this time; the natural environment is still too ‘present tense’ for most; living is a minute-to-minute proposition. They do, however, have the potential for introspection since memory of their own history is obvious from subsequent actions in all species. Whether these lifeforms can recall thoughts and feelings contemporaneous with those prior acts is questionable, and the answer is probably case-dependent.

Recall the example previously given of situations in hostile environments prior to expansion of a cortex. It is probable nearly all signals were high amplitude messages requiring instantaneous decision-making and action. Only when humanity attained some degree of mastery over climate and predators did neural circuitry develop providing for long-term memory storage and slow-paced introspective analyses. Cortical growth is said to originate when animal evolution extended past the rodent population 90−100 million years ago (Rakic, 2009). Humans developed beyond chimpanzees just seven million years ago, so current capability for introspection may or may not extend to our closest primate relative.

Signal transmission caused by bridging intersynaptic junctions involving a combination of organic neurotransmitters and inorganic ions is still of the ones and zeros variety, meaning signals are either sent through a given neuron or not. Nowhere in the brain does this set of electrical on/off movements contain meaning. That development is a consequence of mind activity establishing a

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value table to decipher the signals being processed. Where do value tables originate? From formal education, phenomenal experience revisited through memory, plus imaginative intuition combined and recombined in endless iterative fashion befitting a set of functions not exhibiting group closure. After collections of signals passing through a given circuit are linked with meaning from the value table—the linkage also is a mind function—then thoughts, emotions, actions ensue guided by that introspective interpretation.

If these roughly-sketched mechanistic ideas are sound, then still needing explanation is the direct pathway for transmission from Theological Space to self-consciousness to brain for events culminating in psychic or mystical experiences. Telepathy and clairvoyance involve data transmission from person to person in the former, or person to object in the latter. Information traveling through Theological Space is instantaneous. Global Consciousness is everywhere and everywhen: here/now in spacetime terms; "spooky action at a distance" in Einstein's language (Born, 1971). Disconnected points with respect to spacetime distances are conjoined in Theological Space. Ascribing both psychic and mystical occurrences to Global Consciousness provides mechanism and justification for their eventuation. Information contained in any portion of the zero point energy field is available to the entire field simultaneously.

The Internet offers a model: each web page contains data uploaded from a single specific locale; regardless of where anyone is in the world, if they can connect to the Internet, they can download that information. Furthermore, multiple individuals can download that same item at the same time. The 'Cloud' feature of the Internet, where data files created on a local machine are stored for future access, also serves as a fit symbol for personalized analog memory links. Although digital memory traces are primarily stored in an individual hippocampus, analog memory—joining digital memory with value table— is found in a person's auric field. Global Consciousness is the 'Cloud' for the entire community of sentient lifeforms.

Consider telepathy as a multistep process: (1) person A thinks a specific thought; (2) that thought, an analog notion, is converted by person A's mind into a digital binary code composed of electromagnetic ones and zeros; (3) self-consciousness uploads the sequence to Global Consciousness; (4) that signal is downloaded by person B, or more precisely, his/her self-consciousness accesses Global Consciousness; (5) the process then reverses in that person B's mind reconverts the digital signal into an analog meaning by using his/her personal value table. Since no Time has passed for Composite Conscious Awareness, the transfer from person A to person B is immediate. This mechanism explains how telepathy is oftentimes misinterpreted: the two individuals do not necessarily share the same value table responsible for instilling meaning to the binary code.

Mystical experience is partially similar to psychic phenomena, but different in one major respect. While both utilize signal transmission through Global Consciousness, the source of mystical phenomena is Theological Space, whereas the ultimate source of a psychic event is a person or object within normal spacetime. Numinous events are phenomenologically rare with numerous epistemological implications. Based on the assigned mechanism, it is plausible to believe the process in its entirety may be entertained by other sentient lifeforms, which also have associated self-consciousness and mind.

Intentional mystical experiences are classifiable depending upon the generic type of methodology employed. They are diametrically opposed in terms of the manner in which one's personal energy field is oriented. Perhaps someone makes a deliberate attempt to induce numinous acts through intensive effort in contemplating the nature of reality. This is an approach favored by Aristotle, Jewish Kabbalists, Christian Contemplatives, Islamic Sufis, Rinzai School Zen Buddhists. Alternatively, someone makes a deliberate attempt to induce mystical acts through pursuit of an absence of contemplation, an approach championed by Taoists, Soto School Zen Buddhists, Indian Buddhists, Veda¯ntic Hinduism (Fischer, 1971).

A third path to mystical experience exists: spontaneous openings to Theological Space devoid of intentionality on the part of the individual to whom it occurs. For some recipients, mystical experience has salutary effects because he/she already has a solid ego structure in place; i.e., is not overwhelmed by the information obtained and is able to place it into some beneficial context. For

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others, the experience leads to psychopathology. They are incapable of incorporating incoming information in a healthy manner. Those afflicted may bifurcate brain function in self-protection, minimizing any need to simultaneously consider contrasting paradigmatic models on the nature of reality. Psychopathological schizophrenic conditions are compounded with paranoid tendencies in rare instances: an unsought source of mystical input is construed as 'demons from beyond out to get them' (Saver and Rabin, 1997).

Whether informational signals induce routine thought, emotion, behavior or unusual psychic and mystical phenomenal experience, all methods of data input occur in part by mathematical principles derived from communication theory (Shannon, 1998). A central concept is *message entropy*: the greater the number of ways a given set of ones and zeros can be arranged, the greater the amount of information potentially extractable. In illustration, a combination of one 'on' with one 'off' signal allows for two permutations (01 or 10). Since there are two permutations, the entropy of this message is $\log_2 2 = 1$ data bit, where $\log_2$ is used because it is a binary code, and $2^1 = 2$. Shannon claimed systems with the largest information capacity are most desirable and characterized by the highest number of data bits that can be handled per second.

Entropy as a measure of potential information content in a transmitted message of a given length was borrowed from statistical thermodynamics, where it was an indicator of randomness associated with assigning locations to individual molecules in contained 3D space. Shannon, intentionally or unwittingly, inverted entropy's conceptual significance. Closed systems spontaneously seek their highest entropic state, meaning the application of work energy is needed to maintain system orderliness. In communication, the goal became to maximize entropy to establish useful information flow. The thermodynamic approach is in accord with mystical practice involving either active contemplation or passive meditation. The goal of those practices is to decrease entropy through focused effort, reducing the flux of a person's mental and emotional states, thereby enhancing likelihood of a temporary union of self-consciousness and Global Consciousness, with the human aura being the nexus for contact.

This metaphysical pathway offers a theory expansion beyond the 'psycho' portion of Fechner's psychophysical approach to unraveling the mystery of self-consciousness (Fechner, 1966). He believed it possible to elucidate mathematical formulae uniting physical brain operation with metaphysical operation of self-consciousness. All psychophysical experiments in the literature pertain only to the brain portion of the relationship. The metaphysical side of the collaboration is not open to scientific documentation; only reports traditionally discounted as 'anecdotal' may attest to its reality.

Thorough dissection of the mathematics pertinent to interaction between Theological Space and self-consciousness is not yet possible, although some qualitative and partially quantitative remarks can be made regarding parameters involved. Exemplar factors are commonplace physical notions: Energy/energy expended; volume of Space/space targeted; time elapsed. Psychological determinants for interaction and its efficacy will likely depend on willfulness, focus, confidence, perseverance. Self-consciousness must align with an 'operating frequency' of Global Consciousness in order to communicate with Theological Space for purposes of data transmission. For reasons detailed elsewhere, a theta wave of 7–8 Hertz is postulated to be the frequency needed to attain *resonance* (Laibelman. 2007). It is virtually certain other species will utilize different, possibly individually unique, resonant frequencies. If a link is established, a quantitative variable such as mental concentration (the amount of Energy directed towards data acquisition per cubic meter of Space) factors into the success of transmission and receipt. It also seems probable mathematical laws delineating information transference depend on modality; e.g., mathematical laws for telepathy will be moderately different from those for creative intuition.

Consciousness channel capacity governs "the rate at which information flows into consciousness" (Walker, 2000). Of course, he meant human self-consciousness. Based on visual perception of pictures and the amount of data each picture typically contains, he estimated rate of flow as fifty million bits per second. This estimate refers to awareness, not to basal self-conscious alertness. Channel capacity, the amount in data bits that can be held, would be larger because we select out of a vast quantity of

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input a much smaller subset as objects for awareness. Rate may not alter based on whether the originating source is transcendental or material because the rate limiting factor is brain processing time for incoming data.

What is the ultimate purpose for acquiring information leading to knowledge obtained through any conceivable channel, whether kinesthetic, emotional, cognitive, psychic, or mystical?

Metaphysical Teleology and Physical Cosmology

Data acquisition coupled to methodical processes by which it is turned into knowledge enables everyone to introspect on meaning(s) derivable from this acquired knowledge. Introspection operates not just on primary data sources (sensory input), but also on secondary information gleaned from phenomenal experience undergone when acquiring that data. Since permutations obtained from introspection, thinking, feeling, and acting do not constitute a closed group of transformations, people undergo natural processes of mental evolution. A developmental goal, not predictably predestined, is for individuals to participate in resolution of the cosmological crisis instigated by origination of the universe.

It is unclear, even to cosmologists, exactly what an expanding universe signifies. Some conceive it as implying stars move farther apart. To others, it suggests the volume of space is increasing, as if space were analogous to the surface of a balloon growing in size as more air is pumped into it. From the first perspective, space is immoveable and stars relocate; the contrasting orientation depicts space as mutable while star positions are permanently fixed. Under either scenario, the density of astral material is reduced from what it was pre-(accelerated) expansion.

Despite ambiguity, two potential teleological outcomes exist—the Theory of Inherent Duality—for physical cosmologic and metaphysical Cosmogonic reality. The first is continued Interpassage leading to ongoing universal expansion until an unknown future Time/time when the process is complete, producing a permanent end state with no further adjustments. The second option leads to cessation of Interpassage due to reversal of expansion, followed by an onset of contraction until an unknown future Time/time when the process is halted, which would be equivalent to universal closure (Laibelman, 2000).

On the cosmological level, teleological resolution is portrayed as a function of available matter (or its equivalent energy) density and its numerical ratio to (greater or smaller than) the critical density (Carroll, 2001). Contemporary theory presumes the amount of present mass found in the universe is a permanently fixed parameter. If incorrect, any ratio calculus must incorporate potential sources of matter production. Universe closure due to gravitation's attractive force is inevitable if actual density exceeds critical density. If insufficient, expansion due to dark energy's repulsive force is a foregone conclusion. At Cosmogonic extremes, Dual Absolutes will undergo full (100%) Separation or Union; cosmologically, the universe is, correspondingly, closed or open.

Matter density is calculated as a sum of contributions from actual particle masses of astrophysical objects (stars, planets, moons, asteroids), photonic light energy convertible to mass, dark matter existing at/near the central core of most star galaxies. It is unfortunate dark matter and dark energy bear the same adjectival label because they have nothing in common. Dark matter of unknown composition interacts poorly, or not at all, with light energy, and therefore cannot be detected with available instrumentation. Its existence is inferred from experimental measurements of luminosity from supernova explosions; cosmic microwave background studies of mass inhomogeneity; evaluation of gravitational lensing effects from galactic clusters. Since dark matter responds to the gravitational force, it is an agent for universal closure. Data from a variety of sources leads to several conclusions (Turner, 2022 ; Hinshaw, 2009):

- although photonic light was the dominant form of energy in the earliest times of the universe, it is a negligible contributor to total energy density at the present time;
- energy density from matter (normal plus dark) present in the universe today is ~27% of the energy critical density;
- ~73% of the remaining current energy density is due to dark energy-propelled universe expansion;

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- total all-source energy density is virtually identical to (99.9% of) the critical energy density

The last point means that if current cosmological theory is correct, all available sources of energy are accounted for. However, this conclusion may be false for several reasons. First, regardless of whether space continues to expand or eventually contracts, volume change must affect vacuum energy density as well as matter energy density values. Cosmological constant Λ symbolizes vacuum energy present in the guise of dark energy. It must represent an adjustable parameter; Λ as cosmological *constant* is a historic misnomer introduced because Einstein thought the universe incapable of change. Significant variation in Λ magnitude could imply General Relativity equations need revision, or conceivably be replaced with new formulae and new theoretical foundations.

Numerical adjustments to Λ due to volume-dependent change can be evaluated in the same manner the Hubble parameter, once thought constant, is now acknowledged to be time dependent. Research has been published on temporal variance of other supposedly fixed quantities: the speed of light in a vacuum; Newton's gravitational constant; the ratio of electron to proton mass (Chiba, 2011 / 2002). Changes are quantitatively microscopic on the order of 10^{-11}–10^{-15} per year since the universe's origin. One consequence of adjustments in so-called constants of nature is an inability to make definitive predictions with respect to the universe's evolutionary future (Terazawa, 2014). Quantities for Hubble's parameter, speed of light, and gravitational constant are included in the formula for calculating critical density, so the degree of difference between mass density and critical density is in flux even if no additional mass comes into existence.

This leads directly to a second reason for doubting correctness of contemporary views on teleology. One solution to teleological uncertainty is to overturn the assumption no new particle creation is possible (Chakraborty, 2014). At this juncture, sentient lifeforms enter the picture. Neither Space is able to dictate a Cosmogonic/cosmologic endpoint. If either could, they would not then be Absolute Pure Consciousness differing in Energy *type*, as opposed to Energy *potency*:

> If it were then objected, that the existence of two deities would necessitate an imperfection in both of them, in so far as one deity would be unable to influence the province of the other, the objection would be met by the reply that this inability need not be considered a defect in either of them; for that which is not included within the sphere of action of a being can of course not be performed by that being, and an agent is not deficient in power if it is unable to perform what is intrinsically impossible (Maimonides, 1956).

It has been shown that individual humans (and by analogy, eventually other living creatures) may undergo a natural process of mental evolution because self-conscious introspection coupled to thoughts, feelings, actions established through phenomenological experience allows each to elicit novel thoughts, feelings, actions in unceasingly iterative fashion. Evolution is a procedure allowing living things to pass on beneficial knowledge gains to future generations. As participants in collective conscious intelligence, all life may aid resolution of the astrophysical crisis by willfully altering matter density in either direction to ensure cosmological openness or closure. This idea could be accomplished in the manner already posited by particle physicists: provoke fluctuations in the zero point energy field of sufficient intensity to introduce matter or antimatter particles asymmetrically such that one form dominates. If added matter exceeds added antimatter, mass density grows in value; if net antimatter is produced, matter is removed from the universe. The first outcome orients teleology toward Separation/closure; the second tilts the balance more towards Union/openness.

It will take concerted effort by all sentient creatures to determine teleological finality. This means resolution is postponed until an imponderably long future time is reached because all sentient entities must achieve a position where communal action is realistic. Unless each organism possesses freedom to evolve appropriately, a participatory role is impossible. Fortunately, freedom is guaranteed because Dual Absolutes are equipotent. As products of Composite Conscious Awareness, living things possess willful intentionality as inalienable traits. Communal action also necessarily demands a means to communicate across species.

A third reason to question the trend towards an open universe as unalterable derives from a gain of greater clarity as to the construction of dark matter. Although no candidates have gained the astrophysical community's allegiance, a breakthrough may occur permitting direct detection. In that

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case, we may find the amount of dark matter is vastly greater than has been supposed, and possibly sufficient to decisively narrow the gap between matter density and criticality.

Fourth, the age of the universe could be far greater than the 13.8 billion years calculated because its size may exceed the detectable light cone distance by which its chronological lower bound is set. It is conceivable advances in instrumentation might push that visionary limit to reveal significant extension of our universe's size and age. Although increasing size would serve to decrease both key density values, it would also lead to reduction of the magnitude of the Hubble parameter—galaxies would appear to recede from Earth at a slower rate—which would lessen the critical density without affecting the matter density.

An outgrowth of the fourth possibility raises a fifth. Just as our solar system is situated on a spiral arm of the Milky Way far from the galactic center 26,000 light years (~1.5×10^{16} miles) away, our visible universe could be at an extreme distance from the center of a light cone-extended universe. In that case, it is possible the Big Bang plus Inflation paradigm (Guth, 1998) is still continuing; i.e., there is a vast mass of still undiscovered matter congregating closer to the actual origination point. It is impossible to assess whether the mass and volume absent from present calculations would combine to enhance or attenuate measurements pertinent to matter density relative to crucial density.

In parallel with creation myths proclaiming an everlasting universe that had no birth and will have no death, any discovery of 'missing mass' may lead to an eternal equilibrium state where matter and critical density magnitudes are exactly in balance; i.e., radiant light energy density (and/or its material equivalent) and dark energy density each represent 50% of the total energy budget. This state would also constitute Union, but different from one in which the dark energy contribution is 2.7× (73% / 27%) that of matter.

A host of hypothetical queries follows: (1) If the *status quo* 73% / 27% is maintained indefinitely, does the postulated mirror universe express an identical ratio in the opposite direction with a majority of matter density contributing to the total energy budget? (2) If Separation/closure is ultimate destiny, what becomes of creature existence? At one extreme, with zero percent dark energy present in our universe, self-conscious lifeforms cease to exist. Would intelligent and wise lifeforms opt for their own demise? (3) With teleological outcomes other than 100% / 0% (in either direction) or 73% / 27%, what would be the nature of properties expressed in the physics and biology of such universes?

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