

Article

Mesostratum & Human Consciousness

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Abstract

A conceptual framework is described to illustrate the transcendent nature of consciousness and its relation to the physical world. To propose and argue the transcendent nature of consciousness, one might boldly assume that it *transcends everything material* - that consciousness transcends every aspect of the material world, indeed the observable cosmos. This paper explores the ultimate nature of consciousness and suggests that human consciousness transcends its physical embodiment while interlinking quantum phenomena in neurons with a universe of pure thought. We experience it in the space-time milieu of the physical world, which provides a physiological vehicle for consciousness to put things into spatiotemporal order - to satisfy an innate intellectual urge to bring order out of chaos. At the quantum mechanical scale of human consciousness, this remarkable and enigmatic phenomenon may be explained by several quantum consciousness theories. Apparently, our transcendent consciousness consists of waves of signals that activate neural networks which orchestrate the signals into thoughts and actions. On the grand scale, it may be argued that a transcendent omnipresent consciousness is an extra-ingredient: one that preexists, specifies, and evolves tangible instrumentalities: mind/brain neural networks as its living vehicles. The proposed framework is based on deductions and information revealed primarily by waveform phenomena which are demonstrably transcendent. An essential feature of the framework is the mesostratum; a signal transmission modality. This paper suggests ways to access and explore the mesostratum and suggests necessarily nonreductionist approaches for the study and exploration of human consciousness.

Key Words: mesostratum, thought signals, information, waveforms, Plato's world, mental world, physical world, transcendent, consciousness, memes, qualia, observer.

Introduction

In *Consciousness Explained*, 1991, Daniel Dennett, wrote, "Human consciousness is just about the last surviving mystery. . . Consciousness stands alone today as a topic that often leaves even the most sophisticated thinkers tongue-tied and confused. . . . With consciousness . . . we are still in a terrible muddle. . . And, as with all the earlier mysteries, there are many who insist - and hope - that there will never be a demystification of consciousness." In *The Journal of Consciousness Studies*, 1995, David Chalmers wrote: "Consciousness poses the most baffling problems in the science of the mind. There is nothing that we know more intimately than conscious experience, but there is nothing that is harder to explain. All sorts of mental phenomena have yielded to scientific investigation in recent years, but consciousness has stubbornly resisted." The mystery of consciousness revolves around the question: How can living physical bodies in the physical world acquire such phenomena? Neither Dennett's

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reductionist approach nor Chalmers' non-reductionist approach has thus far provided the pivotal concepts needed to resolve the question. This paper suggests a transcendent mesostratum which links consciousness to the physical world.

Chalmers observes that subjective information processing invariably accompanies sensory and neural signal processing. This subjective activity arises from accumulated experience; even when lacking the cognitive cohesion that overrides the transience of sentient life events. We do not just retain visual sensations; we judge the quality of colors, the contrast of dark and light, the quality of depth in a visual field; with iconic images that are conjured up mentally, that are felt emotionally, and inspire a stream of conscious thought. What unites these states of consciousness putatively transcends and elaborates accumulated experiences.

In *The Conscious Mind: In Search of a Fundamental Theory*, David Chalmers introduced the notion of the hard problem of consciousness. According to Chalmers, the hard problem of consciousness is explaining how we experience it with respect to: (1) sensory inputs and the mysterious modes of their neural processing and (2) qualia phenomena where the processing is accompanied by ineffably subjective aspects of conscious experience (which apprehend the redness of red, the beauty of mathematical forms, love, the *selfness* experience). These phenomena are related to physical neurological brain-states, but are not identical to brain states because they are experienced but are empirically unmeasurable, unquantifiable. They are seemingly constructs of consciousness; a consciousness that assigns reality, meaning, value, quality to what is being experienced by the sentient self-aware body.

The notion of a transcendent consciousness escalates the hard problem because it is experienced indirectly, esoterically, and when experienced it is not always obvious to the unprepared or unattuned mind. By my thesis it indirectly commands the body and evaluates its experiences: it is a *motivator* and *observer* - a transcendent *occupant* the body - perhaps it is that which is usually called the subconscious. It communicates - or we communicate with it - subconsciously in subtle ways - if not by imagery or verbal exchanges then through insight, inspiration, introspection, meditation. Possibly, lucid dreaming, near death and out-of-body experiences, and certain types of hallucinations are extreme examples.

In *The Emperor's New Mind* Roger Penrose claims he receives insights from Plato's world - by my thesis from his transcendent consciousness, via the mesostratum. The initiating inspiration is essentially nonverbal. Penrose writes, "Almost all my mathematical thinking is done visually and in terms of nonverbal concepts, although the thoughts are quite often accompanied by inane and almost useless verbal commentary, such as 'that thing goes with that thing and that thing goes with that thing' . . . I often calculate using specially designed diagrams which constitute a shorthand for certain types of algebraic expression. This is not to say that I do not sometimes think in words, it is just that I find words almost useless for mathematical thinking."

Einstein, Pauli, Schrödinger, Heisenberg, Eddington, and Jeans, espoused a form mysticism that connotes communication with their transcendent consciousness. Einstein spoke of a cosmic feeling that inspired his reflections on the harmony of nature. Apparently mystical insights achieved by quiet meditative practices can be a useful guide in formulation of foundational scientific theories. Kurt Gödel spoke of the "other relation to reality" by which he could directly

perceive mathematical objects, such as infinity. Gödel was able to achieve this by adopting meditative practices. Heinrich Hertz said, “One cannot escape the feeling that these mathematical formulas have an independent existence of their own, and they are wiser than even their discoverers, that we get more out of them than was originally put into them.”

Conventional theory almost always avoids embracing transcendent phenomenon in deference to the strict guidelines of reductionist empiricism. Virtually all physics theorists and cosmologists disdain ascribing a transcendent aspect to any part of objective reality. Many adhere to the convention that reality is that which is material, tangible, observable, definable, measurable - relegating any esoteric excursions from objective reality to realms of randomness or to a probabilistic mystery or to an ethereal scrapheap of nonreductionist unprovable or unshareable subjective babble.

This paper proposes that it may be possible to make more progress in the study of consciousness and consciousness science if theorists, physics theorists, physiology theorists would tentatively concede that we are immersed in a complex transcendent universe; that we exist in a subset of an ultimately unknowable reality. We should refine existing theories to incorporate evidence of transcendent phenomena and attempt to remove mysteries by questioning and understanding. Indeed, at this juncture, we should begin questioning objective-theoretical precepts with which we may have become much too comfortable. Karl Popper wrote, “Science must begin with myths, and with the criticism of myths,” but then cautioned, “Whenever a theory appears to you as the only possible one, take this as a sign that you have neither understood the theory nor the problem which it was intended to solve.”

It is not unreasonable to contend that human consciousness transcends its physical embodiment yet somehow interlinks quantum phenomena in our neural networks with a universe of pure thought. This kind of linkage is discussed in *Information and the Nature of Reality - From Physics to Metaphysics*, a compendium of commentary by philosophers, scientists, theologians carefully contemplating about and speculating on the transcendent aspects of consciousness as a conveyor of supernal intelligence and information.

Even by acknowledging the transcendent nature of consciousness, the hard problem of consciousness may persist; and will perhaps remain permanently unresolved or be incompletely resolved. It is likely that by its *presumed* nature and definition, *transcendent consciousness is constantly evolving and reinventing itself*. The resolution offered here may be incomplete, but an inconclusive attempt is better than no attempt at all.

Primordial Consciousness

To rationalize a transcendent consciousness one needs to assume that it transcends *everything* material - every aspect of the physical world, indeed the entire observable cosmos. This bold concept suggests taking an inventory of the content and nature of the cosmos. One may begin by allowing that *our* cosmos is probably one of countless many, and that its observable content is only a minuscule subset of an unbounded transcendent universe. Star-centered planetary systems with their entourages of globular habitats, many harboring sentient self-aware life, are probably

inevitable components of any self-contained cosmos. Evidence is accumulating that uncountable putatively congenial globular habitats are diffusely dispersed throughout galaxies and the cosmos. How does it happen - what is the validity of the inference - that myriads of these globular habitats engender conscious inhabitants that explore the nature of their consciousness and ponder its role in the vastness of the cosmos?

This paper explores aspects of the proposition that our material reality is part of a greater transcendent reality in which we are immersed through our consciousness. Moreover, this paper attempts to explain the nature of the transcendent reality by positing a foundational framework. First, a review of carefully considered, highly imaginative almost mythical, concepts of primordial consciousness insights are given.

Arthur Stanley Eddington in *The Nature of the Physical World* concludes, "The stuff of the world is mind-stuff. . .The mind-stuff of the world is, of course, something more general than our individual conscious minds. . .Consciousness is not sharply defined, but fades into subconsciousness; and beyond that we must postulate something indefinite. . . yet continuous with our mental nature. . .It is difficult for the matter-of-fact physicist to accept the view that the substratum of everything is of mental character. But no one can deny that mind is the first and most direct thing in our experience, and all else is remote inference."

James Jeans exclaimed in *The Mysterious Universe*, ". . . the universe begins to look more and more like a great thought than like a great machine." Perhaps, an omniscient consciousness creates just such a great machine, the dynamic milieu of the cosmos, and then endeavors to put things into spatiotemporal order, to bring order out of chaos; as contemplated by Ilya Prigogine and Isabelle Stengers in *Order out of Chaos*.

In his foundational work *Ethics* Baruch Spinoza may well have declared: "Consciousness is one, that is, only one substance can be granted in the universe. Whatsoever is, is in Consciousness, and without Consciousness nothing can be, or be conceived. Consciousness is the indwelling and not the transient cause of all things. All things which are, are in Consciousness. Besides Consciousness there can be no substance, that is, nothing in itself external to Consciousness." I simply substituted *Consciousness* for *God* in Spinoza's original seventeenth century declaration. This recasts Spinoza's profound insight about the nature of the universe and emphasizes his contention that God is an abstract and impersonal entity. One might say God *is* a transcendent omniscient consciousness (a consciousness which humans and perhaps other sentient creatures share).

It may be that such an omniscient transcendent consciousness needs the tangible and that its tangible manifestations need consciousness, to apprehend order in chaos, perhaps at least locally, to bring order out of chaos. This creative aspect of consciousness was articulated by John Archibald Wheeler as, "We are participators in bringing into being not only the near and here but the far away and long ago. We are in this sense, participators in bringing about something of the universe in the distant past." (*At Home in the Universe*) He was, I suggest, echoing the previous adaptation of Spinoza's insight and asserting our presumed primordial participation in and our emanation from a universal consciousness and therefore our involvement in a grand cosmic scenario of creativity in malleable portions of objective reality.

Ludwig Boltzmann hypothesized a self-aware entity that arises due to random fluctuations out of a state of cosmic chaos. This entity, named the Boltzmann brain, putatively arose spontaneously to produce the current level of cosmic organization with its multitude of individual self-aware entities. Boltzmann never specified *in what* or *in what manner* the random fluctuations arose, but asserts for every cosmos with the level of organization we see in ours, there should be an enormous number of Boltzmann brains floating around in as yet utterly unorganized environments. This concept anticipates the idea, discussed later, that Boltzmann brains are not ‘hard-wired’ neural entities but coherent informational signal parcels.

One way to look at the Boltzmann brain is that it requires a reversal of entropy. This leads to the paradox of how a seemingly chaotic cosmos can produce isolated pockets of order and organization - a localized reversal of entropy. This organized entity is spawned as pockets of order out of chaos - an ethereal brain or mind. It becomes self-aware and contemplates its origin and its mission within the entropy-generating milieu that spawned it. Boltzmann should have further considered whether the process was really a random fluctuation as opposed to the awakening of a primordial transcendent consciousness predisposed to the deliberate design of thinking entities which are distinct from their chaotic milieu.

Even if design were absent, a question still remains: Is the emergence of the thoughtful transcendent brain perhaps predestined or potentiated by parameters inherent to the chaotic milieu? Indeed, this brain-like activity implies the emergence of intelligent signals devoid of and not requiring a physical neural network, or any ‘hard wiring’ at all. It will be clear that the mesostratum demonstrably supports such transcendent signals and waveforms independently of the physiostratum.

In *What is Life?* Erwin Schrödinger described a theoretical awakened, growing, evolving potentiality as utilizing *negentropy*. Schrödinger elaborates on the marvelous faculty of living organisms, to delay decay towards thermodynamic equilibrium (heat death) by feeding upon negative entropy, attracting, consuming a stream of negative entropy into itself - to compensate the entropy increase it produces by living and maintaining itself on a stationary and fairly low entropy level. The physical results of this negentropy are sentient thinking creatures and beings endowed with the capacity to contain consciousness.

From Eddington to Spinoza, from Boltzmann to Schrödinger, are we being enthralled with some masterfully conceived mythology or perhaps being exposed to primordial *memories* and/or *reflections* of a transcendent consciousness - to which special individuals have better access than most? There is no empirical foundation for Boltzmann brains or Schrödinger’s negentropy or Wheeler’s participatory cosmos builders. Of course, there are but a few who would dare question the currently accepted mythology of the beginning and minutely detailed history of the Big Bang. After all, the mathematics is consistent and beautiful (more about that later).

A virtually unchallengeable observation is that it requires an immense dynamic cosmos and a tremendous amount of time to produce minuscule pockets of intelligent consciousness on congenial life-friendly globular habitats. According to Stephen Hawking it also requires a grand design. In *The Grand Design* Stephen Hawking explains how “. . . understanding of the laws

governing us and our universe [may] lead to a unique theory that predicts and describes a vast universe full of the amazing variety that we see.” Hawking’s *laws of the universe* are putatively so exquisitely formulated that they govern the assembly of the cosmos down to the minutest details of forces, fields, and quantum particles.

Hawking does not explain where the grand design and laws of the universe originate and reside; how they initiate the cosmos. He avoids suggesting a consciousness that conceives and directs the process. Hawking advocates the idea that, “Spontaneous creation is the reason there is something rather than nothing, why the universe exists, why we exist. It is not necessary to invoke God to light the blue touch paper and set the universe going.” But, implicit in Hawking’s *universal laws and grand design* is the conjecture that they *preexist* the emergence of the material cosmos.

Hawking eschews God as a first cause and prefers instead what might be termed Darwinian cosmology. He espouses a *multi-universe* concept because it allows the means by which a particular finely tuned universe, such as ours, may evolve and survive as one among many, if it is fit to survive. In their struggle to survive, some universes may succeed, others may fail. Some enjoy extended lives, while many collapse, become extinct due to poor or profligate use of available resources beyond permissible parameters. The most interesting of those fit to survive are universes possessing physical properties that produce environments for evolving and sustaining self-aware beings like us.

Quantum electrodynamic scientists and cosmologists are ironically content with the notion that the entire material content of the cosmos popped out of a transcendent void. The nature of this void and its tangible products are interesting because human consciousness is one of those products. This omnipotent void has been described by Heinz Pagels in his book *Perfect Symmetry* as, “The most complete void that we can imagine . . . no space, time or matter. It is . . . without place, without duration or eternity, without number . . . yet this unthinkable void converts itself into the plenum of existence . . . a necessary consequence of physical laws.” Pagels then wonders, “Where are these laws written into the void?” and he then infers, “It would seem that even the void is subject to law, a logic that existed prior to time and space.” Or as Stephen Hawking implies in *The Grand Design* - laws that *preexist* the emergence of the material cosmos.

This paper contends that Heinz Pagels’ *universal void* is the *mesostratum*, a transcendent substrate, which contains the physics, logic, design, energy and infinite dormant potentialities needed to spawn the cosmos - perhaps uncountable coexisting cosmoses. These dormant potentialities may include an infinitude of extra dimensions as well as a continuum of compact dimensions postulated in quantum theory, superstring theory, and Edward Witten’s M-theory. Seemingly, the void contains a library of all possible instructions, signals, waveforms, formulae, and processes for the formation of countless habitable worlds, complemented with consciousness endowed beings. This transcendent aspect of the *mesostratum* facilities - in concert with our experiencing the material world - sets the stage for exploring the contemporary state of consciousness.

Penrose and Platonic Reality

Rather than speculating on the beginning, evolution, and complex history of a cosmic consciousness, this paper contemplates contemporary local manifestation and attributes of consciousness that may be accessed individually. It will be seen that these local manifestation and attributes can be explained in terms of the physical sciences, in particular in terms of quantum mechanical wavefunction phenomena that transpire in the mesostratum of which Plato's world as described by Roger Penrose is simply a subset.

Roger Penrose, argues that we discover the laws of nature in Plato's world of perfect forms. He elaborates on his own experience with Plato's world and diagrams its relation to the physical world and the mental world in *The Emperor's New Mind* and *The Road to Reality - A Complete Guide to the Laws of the Universe*. Does Plato's world actually exist, in any meaningful sense? Penrose affirms: "This was an extraordinary idea for its time, and . . . is indeed an immensely valuable one. It tells us to be careful to distinguish the precise mathematical entities from the approximations that we see around us in the world of physical things. . . . Does this not point to something outside ourselves, with a reality that lies beyond what each individual can achieve?" (*The Road to Reality*).

Penrose concludes that the Platonic world of perfect forms exists and that nature and the mind draws from and depends upon its inexhaustible reservoir of ideal entities. Although perfect forms are not found in the physical world, there is ample evidence that nature utilizes the mathematical objects and formulae of Plato's world. Penrose asserts a remarkable interplay and communication among the triplet he designates as the Platonic, mental, and physical worlds. The interplay is manifested by the manner in which mathematical discoveries, experimental results, the concrete world, and human consciousness are intertwined via the transcendent aspect of Plato's world of perfect mathematical forms/objects.

Certainly, mathematicians and physics theorists draw upon these resources, usually unknowingly, attributing their innate brilliance. Putatively, there is an osmotic interface between Plato's world and the physical world; an interface and process that elevates individual consciousness far beyond its material integument. This conceptual interface can facilitate exploring the interplay of intangible and tangible aspects of the universe and examining how human consciousness fits into a preternatural milieu. I'm intrigued by and eagerly explore the notion that human consciousness, indeed my consciousness, transcends its ambulating integument and its neural network boundaries and potentially partakes in Plato's world.

As a physics theoretician, Penrose prefers to limit his interest to Plato's world of mathematical concepts. In *The Emperor's New Mind*, he writes, "I imagine that whenever the mind perceives a mathematical idea it makes contact with Plato's world of mathematical concepts. . . . When one 'sees' a mathematical truth, one's consciousness breaks through into this world of ideas, and makes direct contact with it. . . . When mathematicians communicate, this is made possible by each one having a *direct route to truth*, the consciousness of each being in a position to perceive

mathematical truths directly, through this process of 'seeing.' . . . The mental images that each one has, when making this Platonic contact, might be rather different in each case, but communication is possible because each is directly in contact with the *same* eternally existing Platonic world!"

Penrose and some other prominent mathematicians believe that truly beautiful mathematical findings come only after a visit to the Platonic world of mathematical objects. Apparently, only a few mathematicians and theoretical physicists are able to have such a highly irregular experience as visiting the Platonic world. Most mathematicians and physicists can neither understand nor accept Penrose's Platonic position. The irony is that when mathematicians and physics theorists describe phenomena that govern physical and subatomic interactions (such as the flow of electricity, magnetic attraction/repulsion, electron orbitals, quantum probabilities, wave functions, etc.) they describe purely mathematical objects that ostensibly exist only in Plato's world, indeed in the mesostratum - which I propose is a transcendent hyperspace continuum - the energetic substrate of our physical world, the physiostratum. A corresponding paradigm shift is needed; which would allow physicists to comfortably regard the mesostratum continuum as complementary to particulate physical reality, which it demonstrably is!

Most consciousness theorists working toward a science of consciousness justifiedly abide by the methods of the physical sciences that have proven so precisely successful in dealing with the tangible world and the exotic world of quantum electrodynamic phenomena. But, there is a problem of uncertainty even in that stalwart realm. It is worth noting Richard Feynman's summation regarding the peculiar behavior of elementary particles throughout the cosmos. Feynman wrote, "While I am describing to you *how* Nature works, you won't understand *why* Nature works that way. But you see, nobody understands that. I can't explain why Nature works in this peculiar way." . . . "The theory of quantum electrodynamics describes Nature as absurd from the point of view of common sense. And yet it agrees fully with experiment. So I hope you can accept Nature as She is — absurd." (*QED - The Strange Theory of Light and Matter*)

As an example of the absurdity, Feynman cites the "strange phenomenon of partial reflection" of photons which "wave theory cannot explain." When discrete quantum 'particles' impinge on a reflective surface, they are mathematically described as continuous waves. Quantum electrodynamics describes the propagation of light energy in terms of wavefunctions - of photon waves, but the price of this is a retreat to calculating *only the probability* that a photon will be reflected or transmitted in a particular way . . . "without offering a good model of how it actually happens."

Although agreeing with experiment, quantum electrodynamic mathematics (often described as beautiful, because beautiful mathematics seems preferable, precise, and just right) still does not explain the exact nature of the *quantumthings* that behave, according to Feynman, so absurdly. This paper offers a conceptual framework that attempts to remove the absurdity that vexed Feynman; it offers a Chalmeresque extra ingredient which promises to break the logjam imposed by some hard science dogmas. The extra ingredient is the transcendent mesostratum.

Feynman's frustration is exemplified by the measurement problem associated with the transit of a quantum particle, say a photon, from source to detector which evolves according to the Schrödinger wavefunction and *spreads out* in space. But actual measurement in physical reality finds it deposited at a unique spot on a detector surface. The measurement does something to the process under examination. That something is unanticipated by the wavefunction, it is called *wavefunction collapse*. In this paper I adopt the notion that consciousness involves wavefunctions of thoughts, ideas, images, music, and many other kinds of esoteric signals; and that these impinge (*collapse*) on and are processed in concert by the brain's neural network receptors, as described by the Penrose-Hameroff orchestrated Objective Reduction (OR) theory.

Penrose (*Shadows of the Mind*) suggests that the key to understanding consciousness may lie in reconciling quantum theory with general relativity; that *quantum-gravitational* effects not yet understood may be responsible for the collapse of the quantum wave function. Collaborating with Stuart Hameroff (*Toward a Science of Consciousness*), Penrose suggests that human cognition may depend on quantum wavefunction collapses in microtubules, the cytoskeletons of a neuron. Penrose and Hameroff suspect that wavefunction collapse in microtubules may be the physical-neurological basis of conscious experience. This is analogous to light-wavefunction collapses on the retina (perhaps of the order of trillions per square centimeter per second) which produce, replenish, and sustain the dynamical images we *see*. According to the Penrose-Hameroff theory, wavefunction collapses may be detected by gravitational agglomerations, that is, specific organizations of microtubule neural networks and associations.

However, wavefunction collapses are an auxiliary issue. Attention should be given to the wavefunction prior to its collapse, while it spans the mesostratum, carrying signals that inform consciousness. Cytoskeletal agglomerations should be regarded as receptors, collectively as antennae, attuned to transcendent mesostratum signals that form and sustain consciousness. Cytoskeletal agglomerations in the brain might function as resonant oscillators driven by energetic signals which emanate from the mesostratum. In free space, devoid of these receptor agglomerations, the signals simply dissipate as quantum foam.

The issue needing elucidation is the signal source, the origin of consciousness wavefunctions - the esoteric signals that produce and accompany the phenomena of consciousness. Resolution of this issue requires a conceptual framework or model that establishes the relation among the mesostratum (the Platonic world), the physical world, and the mental world of consciousness (of pure thought or of the origin thought-signals/wavefunctions).

Mesostratum Reality

I posit the mesostratum in place of ether, which early in the last century was considered a substance that carries light waves (this was disproved and abandoned). It can be demonstrated that light waves, indeed all electromagnetic waves and fields, transpire in the mesostratum (a hyperspace, not a substance, transcending gravitational physicality by definition). This reality has been staring the physics community in the face since Thomas Young's double slit experiment and the Michelson-Morley interferometer experiment.

It is clear that any discussion of transcendent consciousness involves the mind, which in turn requires its own definition as a transcendent entity. I unabashedly define the *mind* as a triad of *soul ~ spirit ~ body* spanning three strata: (1) the *superstratum* (the transcendent domain of pure thought), (2) the *mesostratum* (the mediating domain of information, signals, energetic fields, and indeed Platonic perfect forms, templates, patterns), and (3) the *physiostratum* (the material domain of spacetime and temporal objective reality). In this context, *soul or core of being* is an individualized focus of a transcendent consciousness while *spirit* is a conveyor of signals (information) between soul and body. The soul/core reaches from the superstratum to the body/brain in the physiostratum via signals through the mesostratum interface.

The main burden of this paper is to demonstrate the reality of the mesostratum and, at least provisionally, as a concept that can help explain how a transcendent consciousness spawns, enables, and evolves human consciousness. A leap of blind faith is not needed for accepting the idea of the transcendent aspect of a human mind nor the existence of a transcendent mesostratum that mediates between the physiostratum and superstratum, between body and soul. One need simply observe that just as Platonic perfect forms and mathematical objects exist, Schrödinger wavefunctions, electron orbitals, probability functions, magnetic fields, electromagnetic waves, light waves, and other such *continuumthings* exist; and the mesostratum exists and is *necessary to subsume them*. It is apparent that mesostratum continuumthings like informational signals and mathematical objects transpire *outside* and *independently* of the particulate physiostratum and its discontinuous granular spacetime.

Lee Smolin, in *Three Roads to Quantum Gravity* notes that, according to loop quantum gravity, there is an atomic structure to space, describable in terms of the nodal spin networks invented by Roger Penrose (*The Road to Reality*). Smolin acknowledges that the most improbable and puzzling aspect of this atomized space is its apparent smooth and continuous nature. Smolin explains the smoothness by proposing that the granularity of space and concordant discontinuity of time are on the scale of Planck length (10^{-33} centimeter) and Planck interval (10^{-43} second). We, by default, regard spacetime as a smooth uninterrupted mathematical continuum while *that* attribute resides *only* in the mesostratum hyperspace continuum.

Continuumthings, like Plato's perfect forms, can only exist in the mesostratum hyperspace. Continuumthings are energetic and influence/govern the dynamic behavior of gravitational agglomerations of quantumthings in the physiostratum. Schrödinger's wavefunction, is a continuumthing; it is essentially a mathematical invention that predicts probabilities regarding the quantum state changes of an energetic signal system with respect to time and space. The reality of the wavefunction is unquestioned because it describes the evolution of the quantum system's state very well. The endpoint event, which is detected - which is consciously experienced and observed in the physiostratum - is a wavefunction collapse during which according to John von Neuman, 'a miracle happens!' The miracle is that a specific quantumthing suddenly appears here after being emitted way over there. The mystery is what happens while the quantumthing is in transit in the mesostratum, decoupled from the physiostratum, before being redelivered to the physiostratum. The wavefunction evolution scenario - which plays out entirely

in the mesostratum - is empirically unmeasurable; the collapse alone is manifest, when a quantumthing suddenly lands in a physiostratum gravitational agglomeration of quantumthings and is *observed* - is detected/measured.

Since the mesostratum waveform evolution scenario is not observed, it may be declared to be a non-reality, reinforcing the notion that the only reality is one that is *observed and measured*. One might muse that neither the mesostratum nor wavefunction are objectively real and are therefore sufficiently transcendent to be dismissed by reductionists, empiricists, naturalists. More difficult is the acceptance of radical concepts such as the superstratum ~ mesostratum ~ physiostratum model. This model and its auxiliary paradigms are nevertheless useful because they help explain the operation of strings, quantum entanglement, non-locality, superluminality, and other esoteric phenomena in terms of transcendent continuumthings in the mesostratum hyperspace, as explained by Vary in *My Universe - A Transcendent Reality*.

String theory is being developed to describe the nature of quantum particles and gravitational agglomerations. In theory, strings are basic physical entities - different vibrational states of which represent the different elementary particles. A string can be visualized as a mathematical object in mesostratum hyperspace. In some versions of string theory, strings generate two dimensional extended objects called branes (an apocope of *membranes*). Theorists posit multi-dimensional manifolds, mathematical objects, that require many more than just four dimensions in mesostratum hyperspace (*Shape of Inner Space*, Shing-Tung Yau). In string and M-theory these extra, six or more dimensions, are 'infinitesimal'. String theorists say that these extra dimensions are not observed because they 'curl' up tightly in physiostratum spacetime. My thesis holds that they are unobservable simply because they are continuumthings in the mesostratum that cannot exist in the physiostratum particulate spacetime. Although additions of higher-order branes, manifolds, dimensions seem arbitrary, they are essential for the mathematical consistency of string theory and because they help link the five different kinds of string theory.

The superstratum and physiostratum commingle transparently in the mesostratum while each exists within its own unique domain. The physiostratum is conceptually a subset of the superstratum. Suffice it to say that we are aware of transcendent domains not as an objective realities, but indirectly because of their ubiquitous influence on material domains primarily at the quantum level; and perhaps their influence on our experience of consciousness. The mesostratum's transcendent reality is demonstrated by considering *photons in transit*. When photons (light wave packets) traverse the mesostratum, they are decoupled from the physiostratum while *in transit* from a physiostratum source/emitter to a physiostratum receptor/detector (photo emulsion, CCD array, or human retina). The decoupling is self-evident because the *velocity of light* is a constant independent of the velocity of the photon source/emitter. This was famously demonstrated by the Michelson–Morley experiment in 1887. Photons (light waves, electromagnetic radiations) return to the physiostratum objective reality as quanta of energy - absorbed by agglomerate gravitational matter. This exemplifies the Penrose-Hameroff notion of orchestrated objective reduction (OR). When ORs (light wavefunction

collapses) occur on human retinæ the result is quickly orchestrated as repeatedly refreshed images perceived by the brain.

I suspect the mesostratum is an osmotic interface between the transcendent Plato's world and the physical world, indeed, it is a dynamic substrate that elevates individual consciousness far beyond its material integument. This conceptual interface can serve well in examining the interplay of intangible and tangible aspects of the universe and examining how human consciousness fits into a preternatural milieu. I'm intrigued by and eagerly explore the notion that human consciousness, indeed my consciousness, transcends its ambulating integument and its neural network boundaries.

The mesostratum interface may be taken as the ZPF (zero point field) substrate, the theoretically omnipresent pervasive quantum foam, an energetic substrate. The concept of zero point energy was developed by Albert Einstein and Otto Stern in 1913, as a corrective term added to a zero grounded formula developed by Max Planck in 1900. Zero point energy is the lowest possible energy that a quantum mechanical physical system may have; it is the energy of its ground state. All quantum-mechanical systems putatively undergo fluctuations - even in their ground state - have a zero-point energy - a consequence of their wave-like nature.

Joachim Keppler (*Frontiers in Psychology* 4:242, 2013) suggests that neural network interactions with the all-pervasive ZPF signal radiation is the fundamental mechanism for consciousness. These interactions allow acquisition of ZPF information states that may even result in localized modifications of the ZPF itself. The essential function of this mechanism is the formation of stable attractors; cohesive dynamic systems with a set of physical properties toward which the systems tend to evolve. When realized physically in a neural network, the attractor may be a fractal structure known as a strange attractor. Depictions of attractors associated with chaotic dynamical systems have been one of the achievements of chaos theory. This complements the notion that a key function of consciousness is bringing order out of chaos. According to Keppler, suitable quantum waveform inputs induce a transition to an ordered phase that prompts a neural network assembly to become an attractor; a perfectly synchronized pattern of conscious activity; Penrose-Hameroff orchestrated objective reduction. Given this scenario, the ZPF is an eminently suitable candidate as the substrate of consciousness. The ZPF is clearly a feature and attribute of the mesostratum; as it is defined in framework/model given in this paper.

Consciousness and Entelechy

Taken together, the cumulate sense of all the preceding implies that consciousness is inseparable from the minutest neuron to the grandest aspects of the universe - that consciousness is not only the result of assembling and evolving the material cosmos but the essential entelechial driving force that materializes and mediates between the cosmos and thinking entities in it! "Instead of

tying consciousness completely and utterly to the material structure of the brain,” Joachim Keppler suggests “that the universe is imbued with an all-pervasive substrate of consciousness and explains how the brain shapes this substrate in a causally closed functional chain, thus opening up entirely new perspectives for consciousness research.” (*Frontiers in Psychology* 4:242, published online Apr 30, 2013)

We might admit that all self-aware conscious beings and entities - perhaps even genetic entities in living cells, like Richard Dawkins’ *intelligent* genes, possess an imprint of a primordial consciousness. Resultant entelechy is clearly attested by the trillion cell colonies comprising the human body - cells that differentiate, organize, communicate, and cooperate to evolve and refine a suitable housing and vehicle for a self-aware, contemplative, and conscious entity.

The current reductionist convention is that human consciousness is a *lately emerging* neural attribute which is approaching a pinnacle. This unjustifiably belittles the consciousness and keen intellect of our prehistoric primitive forebears. Let us admit the profound product of their basic intellectual accomplishments, despite their ante-evolutionary crude superficial appearance, naturally selectively-evolved, to cope with often inhospitable environments thrust on them. Working from the stony ground upwards with what was available, they laboriously innovated and set the stage for the comfort and leisure that Socrates, Shakespeare, Mozart, and Steve Jobs enjoyed in more recent times in more accommodating environments.

Entropy - Time - Consciousness

Probably, a paramount function of consciousness is that aspect of it which gives meaning to the perceived ‘flow of time’. Roger Penrose in *Shadows of the Mind* remarks that, “One of the most striking and immediate features of conscious perception is the passage of time. It is something so familiar to us that it comes as a shock to learn that our wonderfully precise theories of the behavior of the physical world have had, up to this point, virtually nothing to say about it . . .” or why time needs to *flow* at all. The brain/body consists of a collection of ticking bio-clocks but, like the cuckoo clock on my wall, knows not what time it is. The configuration of the cuckoo clock hands at any instant depend on my setting of the pendulum bob. Like the cuckoo clock, the brain perseveres, in an eternal *now*, devoid of *knowing* the flow of time.

Human consciousness assigns meaning to duration and distance, while ostensibly *outside* its perception of time and space. This underlies the time paradox pondered by Penrose simply because consciousness resides in a realm that transcends the material domain of time consuming phenomena. Consciousness is distinct from mathematical manipulation and measurement of spatiotemporal Cartesian coordinates so descriptive of our embodiment and experiments. Consciousness is ‘above the fray’ always endeavoring to put things in order by insisting: ‘this must have happened before that happened’ - ‘this belongs here, that belongs there’ - ‘this thing

persists even when it is not observed'. It is my consciousness that puts these words in the order you see; my consciousness writes equations that describe physical phenomena; my consciousness arranges lines, symbols, and icons in figures I draw; my consciousness assigns context and nuance to my prose and poetry.

Roger Penrose in *Cycles of Time* comments on the relation between the flow of time and the increase of entropy. Penrose posits that in its initial state the cosmos exhibited an extremely low state of entropy, that is, a high state of order. Entropy has subsequently increased continually with time, in accordance with the precept of the Second Law of Thermodynamics. Penrose points out that “. . . our experience of the passage of time is dependent upon an increasing entropy as part of what constitutes our conscious feeling of the passage of time; so whatever time direction we believe to be the 'future' must be that in which entropy increases.” Penrose argues, “our psychological experiences of the passage of time would always be such that the Second Law holds true, irrespective of the physical direction of the progression of entropy.” Our conscious experiences of time is such that the Second Law always holds true and thus establishes the relation between time and entropy.

Penrose admits that although, “According to the Second Law, things are getting progressively more and more random with time . . . this represents merely an overwhelming probability, not quite an absolute.” Despite the impermanence, destruction or decay of pockets of living thinking matter, there is the hint of something remarkable: instances of increasing order that continually emerge from the chaos of the overwhelming global entropy. The increasing order is appreciated and perhaps augmented by conscious observation and contemplation.

Let an egg drop from a table and crash asunder on the floor. We do not expect the egg to self-assemble because that is inconsistent with the Second Law and would be such an enormously improbable sequence of events that we can simply reject it as a realistic possibility. This contrived incident (egg crashing asunder) is simply the interruption of a non-random process destined to produce an increasingly organized living entity that, given the right circumstances, could become the founder of a dynasty of purposeful, self-aware, replicating living things. What is exemplified in this case is a pocket of negentropy in the midst of increasing entropy (time flow) - seemingly directed and informed by an entelechial consciousness.

In *The Purpose-Guided Universe* Bernard Haisch suggests, “If consciousness is the basis of reality, then it is plausible that a transcendent consciousness is the underlying cause of the Universe.” Haisch concludes that “. . . this great intelligence is the seeking of experience in a physical realm.” He then laments that there is but “circumstantial evidence for the existence of a transcendent intelligence.” I suggest there is ample evidence of a transcendent reality (and transcendent consciousness) when we admit the role human consciousness plays in that remarkable reality. That role is evident in the way consciousness deals with time and entropy; as

it fosters and *observes* order emerging from chaos. Would a non-conscious, random process have the capacity to *observe* and evaluate positive *progress* and *degree* of organization and order?

Selfness - Consciousness

A seemingly convoluted, but not unreasonable, question is: How does consciousness proceed scientifically to study and explain itself? During the twentieth Toward a Science of Consciousness conference plenary session, Deepak Chopra posed the question as: “Is the brain now studying the brain?” - its nature and origin? A parallel question is: How and where should a study of *conscious selfness* start? The term *conscious selfness* combines two aspects of being - the transcendent and temporal (in that order). Perhaps we should first ask: Are there agents of consciousness-imbuement in the mesostratum; agents that *explore and exploit* available vehicles - suitable hosts? Chalmers reverses the question by asking, “Is consciousness logically subservient on the physical?” He argues against this neural/reductionist proposition by insisting that “consciousness is simply not to be characterized as a functional property” and that, “No explanation given wholly in physical terms can ever account for the emergence of conscious experience.”

In *Gödel, Escher, Bach* Douglas Hofstadter points out, “. . . ultimately, we cannot understand our own mind/brains [selfness]. . . . just as we cannot see our faces with our own eyes . . .” Hofstadter asks, “is it not inconceivable to expect that we cannot mirror our complete mental [conscious] structures in the [neural processes] which carry them out?” According to Hofstadter, Gödel’s Theorem suggests, “that once the ability to represent your own structure has reached a certain critical point . . . it guarantees that you can never represent yourself totally.” The challenge is to develop the vocabulary, terminology, and linguistic instrumentalities appropriate for the definitive explaining of consciousness. However, language is an imperfect instrumentality. This deficiency shows up in attempts to forge a combination of reductionist and non-reductionist language to elucidate consciousness. In *The Conscious Mind*, David Chalmers suggests that consciousness might be best formulated as approximate collections of propositions; or as bounding attributes; indeed, as metaphors of things in the physiostratum.

Douglas Hofstadter points out that many words and symbols may carry more than their ordinary meaning. They act as *exciters*, as *stimuli*, that affect and modify nearby symbols, nearby words. Current consciousness literature is filled with terminology that excites arguments about relationships among concepts implied by the terminology. This often takes the form of classifying ideas, labeling the ideas, and then arguing about the labels; as exemplified by arguments about René Descartes’ notion of *mind/body dualism*.

Chalmers writes, “It might be supposed that there could eventually be a reductive . . . technique that explained something other than the structure and function [of consciousness] but it is very hard to see how this could be possible, given that the laws of physics are ultimately cast in terms of structure and dynamics. The existence of consciousness will always be a further fact relative to structural dynamic facts, and so will always be unexplained by a physical account. . . . For an explanation of consciousness . . . we need only give up on a reductive explanation [and seek a] very different sort of explanation, requiring some radical changes in the way we think about the structure of the world.” (*The Conscious Mind*)

Assuming that we are embodiments of a transcendent consciousness, it is appropriate to consider the nature of that embodiment. Putatively, the embodiment (the living vehicle) of our consciousness is the product of evolution over many millions of earth years; adapted and refined to endure and enjoy earthly habitats - at times pleasant, at times turbulent. Our embodiment is primarily a *survival machine* with no inherent consciousness, a Chalmersian zombie. In *The Conscious Mind* David Chalmers describes an isomorph, “A zombie [that] is just something physically identical to me but which has no conscious experience - all is dark inside.” Chalmers also considers a silicon isomorph “who is organized like me but who has silicon chips where I have neurons.” Notably, he anticipates habitats where silicon-based rather than carbon-based survival machines prevail. In any case, survival machines are somehow programmed to respond to and survive their environments, to replicate and evolve, without any urgent need to assume human consciousness or engage in social intercourse.

Daniel Dennett (in *Consciousness Explained*) concludes that, “Our brains . . . weren't designed (except for some very recent peripheral organs) for word processing, but now a large portion - perhaps even the lion's share - of the activity that takes place in adult human brains is involved in a sort of word processing: speech production and comprehension, and the serial rehearsal and rearrangement of linguistic items, or better, their neural surrogates. . . . But still . . . All this has little or nothing to do with consciousness!” Perhaps, but after all, the first duty of the survival machine is self-maintenance and maintenance of its surroundings and infrastructure for ambulation, securing and consuming food, digestion, habitat construction, security, reproduction, and concomitant social intercourse. Language and linguistic items appear as addends for declaring selfness and appurtenances for some sort of emergent consciousness.

Inclinations toward declaring selfness [identity] prevail even in rudimentary creatures. Commenting on the ‘reality of selves’ Daniel Dennett (in *Consciousness Explained*) asks us to, “Think of Ishmael, in *Moby Dick*. ‘Call me Ishmael’ is the way the text opens, and we oblige. We don't call the text Ishmael, and we don't call Melville Ishmael. Who or what do we call Ishmael? We call Ishmael Ishmael, the wonderful fictional character to be found in the pages of *Moby Dick*. . . . ‘Call me Dan,’ you hear from my lips, and you oblige, not by calling my lips Dan, or my body Dan, but by calling me Dan, the . . . fiction created . . . not by me but by my

brain, acting in concert over the years with my parents and siblings and friends. . . I may have been created by the social process . . . (I must have been, if I didn't exist before my birth) but what the process created is a real self, not a mere fictional character!" Here exemplified is the socially-processed self-declared automaton who employs the linguistic tools and other means at his disposal to declare selfness.

Dennett dismisses the notion of a selfness having existed before birth, as a fiction, “. . . an organization of information that has structured your body's control system (or, to put it in its more usual provocative form, if what you are is the program that runs on your brain's computer), then you could in principle survive the death of your body as intact as a program can survive the destruction of the computer on which it was created and first run.” He characterizes this notion as a *hankering for immortality*; indeed, as if a computer program could hanker for self-perpetuation, or anything beyond its ken. But, one might allow for installation of a self-preservation program in a human survival machine which is also endowed with a self-aware, conscious brain.

Are there agents of consciousness-imbuement in the mesostratum; agents that *explore and exploit* available habitats for suitable hosts? Chalmers reverses the question by asking, “Is consciousness logically subservient on the physical?” He chooses to argue against this reductive proposition by insisting that “consciousness is simply not to be characterized as a functional property” and that, “No explanation given wholly in physical terms can ever account for the emergence of conscious experience.” The implication is that non-physical agencies, maybe mesostratum agencies, participate in the appearance and evolution of human consciousness. The contention here is that the participation is via an download-upload cycles. If mesostratum agencies modulate physiostratum entities (humans) then these entities may reciprocally access, explore, and modulate resources in the mesostratum. Examples of the access to and interactions with the mesostratum, mostly anecdotal, but sometimes experimentally demonstrable, are legion.

Heinz Pagels in *Perfect Symmetry*, writes of his friend Richard Feynman's perpetual curiosity and his willingness to try almost anything to explore reality. He tells the following story: “He was in a sensory-deprivation tank and had an exo-somatic experience - he felt that he came ‘out of his body’ and saw the body lying before him. To test the reality of his experience he tried moving his arm, and indeed he saw his arm on his body move. As he described this, he said he then became concerned that he might remain out of his body and decided to return to it.” When Pagels asked what he made of his experience, Feynman said, “I didn't see *no* laws of physics getting violated.” Pagels concludes, “Indeed, the reliable accounts of such experiences that I have read, as well as my own experience, confirm his perception: ‘out-of-the-body’ experiences no more violate physical laws than does the experience of dreaming.”

Out-of-body experiences of Feynman, Pagels, and many others appear to testify to that aspect of human consciousness (mind) which, under specific conditions, seemingly gains access to the mesostratum, and from which vantage consciousness may perceive physical reality afar and apart from being entrained in it. Perhaps the most remarkable feature of out-of-body experiences like Feynman's is the visual image that presents without light signals or retinæ to receive them. Does an image need to form on the retina? Are retinæ needed, for the mind to experience real world images (or seemingly real, vivid hallucinations)? The answer is in the phenomenon of mind as an instrumentality which assembles and edits sensory information into a coherent whole. The mind and consciousness apparently interact to create the lucidity of out-of-the-body images and experiences.

Kenneth Ring, in *Lessons from the Light* reports on a survey where, “. . . 80 percent of our thirty-one blind respondents claimed to be able to see during their NDEs or OBEs, and . . . often told us that they could see objects and persons in the physical world, as well as features of otherworldly settings the visual perceptions . . . were extremely clear and detailed, especially when they found themselves in the otherworldly portions of their near-death journeys.”. . . “I know I could see and I was supposed to be blind. . . I could see details.” This reinforces the notion that ‘seeing’ is a construct not only of the of the brain and its neural network but also of mind-consciousness assembling signals into meaningful images. Does the mesostratum have resources that provide signals that stimulate the brain to form real world images, such as those that blind people could not possibly have experienced but nevertheless *see* during NDEs or OBEs?

The answer seems to be that, even in the absence of real world stimuli, a reservoir of systems of, ostensibly previously uploaded, signals exists in the mesostratum, accessible literally on demand to consciousness and editorial processes of the brain. According to Daniel Dennett in *Consciousness Explained*, “These editorial processes occur over large fractions of a second, during which time various additions, incorporations, emendations, and overwritings of content can occur, in various orders. We don't directly experience what happens on our retinas, in our ears, on the surface of our skin. What we actually experience is a product of many processes of interpretation - editorial processes, in effect. They take in relatively raw and one-sided representations, and yield collated, revised, enhanced representations, and they take place in the streams of activity occurring in various parts of the brain.” What is the nature of (presumed mesostratum) signal systems that stimulate these editorial activities?

According to Dennett, thousands of memes, mostly borne by language, but also by wordless images and other data structures, take up residence in an individual brain, shaping its tendencies and thereby turning it into a conscious mind. Memes are akin to Marvin Minsky's *agents* or *homunculi*, which come in all sizes, from giant talented specialists down to meme-sized agents (polymemes, micromemes, and many others). Minsky's homunculi, agents, or subroutines are prominent in artificial intelligence and generally in computer science. There are theories about

how Minsky's homunculi-agents-subroutines interact and develop to form coalitions, hierarchies, bureaucracies, and so forth (*The Society of the Mind*).

Dennett and Minsky are among those who dispute the notion of *qualia* - the subjective or qualitative properties of experiences that seemingly transcend the brain-resident memes or agents they propose. Their basic idea is that each subjective task is controlled by an agent and then multi-level hierarchies of agents which produce complex, sophisticated levels of consciousness. But these do not really explain *qualia* experiences such as anger, envy, fear, euphoria, ennui, or the mystery of music.

A mystery lies within the mind that assembles sensory perceptions of the music into a coherent reality. Deepak Chopra in *Quantum Healing* gives an example of the mystery. He writes, consider “. . . a pianist playing a Chopin etude. Where is the music? You can find it at many levels - in the vibrating strings, the trip of the hammers, the fingers striking the keys, the black marks on the paper, or the nerve impulses produced in the player's brain. But all of these are just codes; the reality of music is the shimmering, beautiful, invisible form that haunts our memories without ever being present in the physical world.”

Our mind assembles sensory perceptions into a coherent reality by organizing patterns that mingle in the brain. These patterns seemingly attest to an interplay of our mesostratum spirit and physiostratum. There is a parallel between music and linguistics; both are presented to recipient minds by signal modalities of the mesostratum. We depend on select human recipients with refined mental faculties and capacities to articulate, to assemble, in appropriate media and forms, by musical notation, performance, speech, or written language, representations of those tenuous shimmering sensations that challenge and transcend temporal description.

This leads to a picture of the mind as a domain of pure information, where each meme parcel corresponds an information space that instantiates a physical process. As long as the information states have the right relations among them, everything will be as it needs to be. Information is all there is. The conscious mind (the essence of selfness) is thus pictured as an abstract domain of interacting “differences and of causal and dynamic relations among those differences,” according to Chalmers. Among the chief features of the conscious mind are its introspective, metaphysical, and entelechial attributes. The presence of these raises the question of whether they arise solely in one's neural network or do they imply influences that transcend the brain.

Mesostratum Exploration

This section considers incentives and some techniques for studying and explaining consciousness by virtual exploration the mesostratum. Exploration of the mesostratum should reveal unexpected

features, properties, and resources, particularly regarding modes of information storage and transfer. Wi-Fi (wireless fidelity) is the technology that allows electronic devices to exchange information on the internet wirelessly using electromagnetic waves. The mesostratum presumably has similar *wireless* signal origination, exchange and transmission capabilities. The mesostratum signals and dynamic fields which transmit information and energy are not necessarily restricted to electromagnetic waves and fields. It is inadvisable to exclude the possibility of other kinds of signals; signals far stranger than the familiar electromagnetic waves that figure so pervasively in terrestrial technologies and cosmic phenomena. There are conjectured forces and phenomena, such as de Broglie - Bohm mesostratum 'wavefunctions' that 'pilot' quantum 'entities' in transit. Schrödinger wavefunctions, strong and weak nuclear forces, also perhaps psychic phenomena, inspiration, epiphanies, and similar purely mesostratum phenomena cannot be explained solely in terms of easily detectable electromagnetic signals.

The mesostratum should be presumed to have more kinds of signal and information content than those needed to sustain the mundane microscopic and macroscopic aspects of the physiostratum of our experience. This comes close to suggesting that human consciousness consists essentially of signal and information exchange between the superstratum and physiostratum via the mesostratum. If this suggestion holds then what is the instrumentality or medium of information exchange and implementation? Perhaps the answer incorporates microtubules, the cytoskeletons of neurons, as suggested by Penrose, Hameroff, and their colleagues.

Brains have evolved entrance and exit pathways for consciousness signals/waveforms, vehicles of thought and language, which become modified or enhanced by replicating entities that Richard Dawkins terms memes. In *The Selfish Gene*, Dawkins urges us to take the idea of meme evolution literally. Memes are replicating ideas. Not just simple ideas, but often quite complex cultural templates that form themselves into distinct units that influence and engender genetic evolution. Physiologically, they produce alleles, alternative genes, that compete with existing genes and when successful, cause hereditary variations. The original genes will attempt to repudiate these newcomers, but after many replications, successful alleles may prevail in a new branch of species evolution. The framework/model proposed in this paper suggests that memes are informational waveforms in the transcendent mesostratum, which influence genes in the physiostratum.

Daniel Dennett, in *Consciousness Explained*, asserts that, "Human consciousness is itself a huge complex of memes . . . that can be understood as the operation of a von Neumannesque virtual machine . . ." - a virtual computer that vastly enhances the powers of the organic hardware on which it is implemented, on a receptive human brain, for example. "The transformation of a human brain by infestations of memes [may produce] a major alteration . . . of that organ. . . [which] would account for huge differences in the competence of that brain, instantly recognizable in behavior, and significant in any experimental contexts." Dennett's *complex of*

memes is analogous to computer software linguistics and operands, based on John von Neumann architectures, which evolved from his imaginative abstract thought experiment.

A thought experiment abstractly considers some hypothesis, theory, or principle for the purpose of thinking through its consequences; probably by accessing helpful mesostratum resources. Albert Einstein pursued a thought experiment that famously led to equations of state for spacetime which strongly suggest that spacetime may be assumed to be a special kind of deformable substance endowed with properties similar to the ones of three dimensional materials. The peculiarity of deformable spacetime is that it is realizable only as a mesostratum continuum entity. The significance of Einstein's thought experiment is that it evolved into the mathematics which describes the gravitational behavior of physiostratum objects in granular spacetime. This hints that one can access and explore the mesostratum via thought experiments to gain understanding of and explaining the physiostratum. The question then is: What is the nature of the communication with and information retrieval from the mesostratum? Roger Penrose furnishes an answer based on his contact with Plato's world, as described previously.

Mozart literally composed works in his head, without writing down the notes. He could retain entire acts of an opera in his memory. According to his wife Constanze, he wrote relatively simple works, like opera recitatives or ballroom minuets as if he were writing a letter. Regarding portions of his opera, *Idomeneo*, Mozart wrote to his father that "everything has been composed, but not yet written down." Often, when he was scheduled to play in an ensemble performing one of his new works, he simply skipped writing out his own part. Once, the Emperor Joseph looked over Mozart's shoulder and was astonished to see that his sheet music was completely blank. "Where is your part?" he asked Mozart. The preoccupied composer simply tapped his forehead, "There," he replied. (Robert Greenberg, *Chamber Music of Mozart*)

Srinivasa Ramanujan, was to mathematics what Mozart was to music. His genius was almost mystical. Born in India in the late nineteenth century, Ramanujan came from a poor family and had only a limited education. He more or less taught himself mathematics and being isolated from mainstream academic life, he approached the subject in a very conventional manner. Ramanujan wrote down a great many theorems without proof, some of them of a very peculiar nature that would not normally have occurred to more conventional mathematicians. Ramanujan, formally uneducated, isolated from the scientific world, rediscovered many great mathematical theorems that had been discovered thru centuries in Europe. (Robert Kanigel, *The Man Who Knew Infinity*)

Eventually some of Ramanujan's results came to the attention of Cambridge mathematician Godfrey Hardy, who was astonished. "I have never seen anything in the least like them before," he commented, "A single look at them is enough to show that they could only be written down by mathematician of the highest class." Hardy was able to prove some of Ramanujan's theorems

by deploying the full range of his own considerable mathematical skills, but only with the greatest difficulty; other results defeated him completely.

Friedrich Nietzsche describes the remarkable mode in which he created *Zarathustra*: "One hears - one does not seek; one takes - one does not ask who gives - a thought suddenly flashes up like lightning, it comes with necessity, unhesitatingly - I have never had any choice in the matter. . . Everything happens quite involuntarily, as if in a tempestuous outburst of freedom, of absoluteness, of power and divinity. The involuntariness of the figures and similes is the most remarkable thing; one loses all perception of what constitutes the figure and what constitutes the simile; everything seems to present itself as the readiest, the coretest and the simplest means of expression." Nietzsche could not totally abandon the sense that he was being used as an instrument for putting inspired notions into concrete form: "If one had the smallest vestige of superstition in one, it would hardly be possible to set aside completely the idea that one is the mere incarnation, mouthpiece or medium of an almighty power." (*Nietzsche Archives*) The art and endowment of Nietzsche was his ability to summon the language that encased the thoughts thrust upon him, ostensibly overcoming Arthur Schopenhauer's concern that a thought once written is lost: "Thoughts die the moment they are embodied by words." The evidence seems to be that expressed thoughts have a life of their own.

One can presumably put things into the mesostratum as well as draw from it, so that one uploads to as well as downloads from, say, Plato's portion of the mesostratum. Thoughts expressed, written materials, images, innovations, music, mathematical objects and formulae are perhaps promptly subsumed by and retained in the mesostratum library of resources for retrieval by the next explorer. The written word and other tangible products of thought are not simply literary formats but formative; inspiring development of new thoughts, conjectures, innovations; and maybe some fecund Dennett-Dawkins memes.

Prodigious savants exemplify the global, apparently transcendent, nature of neural signaling phenomena in the brain/mind/mesostratum. The pejorative 'idiot savant' refers to illiterates; 'prodigious savant' is preferred for the genera being discussed. Their legendary mathematical feats are difficult to explain in terms of a neural network that stores information like a computer memory. Daniel Tammet, a 'high-functioning savant' with an above average IQ, can process and respond to social cues normally. He has written several books describing in detail what he sees in his mind and how it allows him to do the things he does. Tammet became famous for breaking the European record when he recited Pi to 22,514 decimal places. Tammet's savantism includes a form of synesthesia: where, in his mind, numbers take various shapes and textures that aid in their manipulation. A number's 'bumpiness' for example indicates whether or not it is prime.

Are 20-digit prime numbers are wired into a brain's hemispheres; are autistic savants 'wired' with prime number-generating algorithms? Apparently, the savants brain, under some conditions has transcendent access to these numbers and is able to recognize them immediately. The question is whether the source accessed is in the brain or beyond it. Some investigators appeal to principles of quantum physics to explain savantism. These theories postulate *fields of information* that influence neurons in the same way that electromagnetic fields influence electrons. In theory, a savant's brain receives this information directly from a global source forming these fields of information. Prodigious savants apparently tap into a mesostratum information field that they do not understand; they simply automatically repeat what they receive.

“So far as can be observed, the savant has not acquired, could not acquire, and is quite incapable of acquiring, the information that he so liberally dispenses. If we furnish the savant with the proper stimulus, a question about [his] specialty, he gives the appropriate response, but can't furnish himself with that stimulus . . . and can't move beyond his narrow limits.” (Joseph C. Pearce, *Evolution's End*) “It must be stressed that these individuals typically are not interested in discovering new problems or in solving venerable old ones, or even in observing how other people have solved them . . . savants do not seek to use mathematics to help them in other areas of daily life or tackle scientific puzzles, instead, they have mastered a series of maneuvers that enable them to stand out.” (Howard Gardner *Frames of Mind*,)

John von Neumann was a pure and applied mathematician, a polymath, who made major contributions to a number of fields including, functional analysis, topology, numerical analysis, mathematical formulations of quantum mechanics, game theory, computer science and architecture, linear programming, self-replicating machinery, stochastic computing, statistics He was prolific in all the fields he addressed, performing savant-like feats of memorization, recall, and instantaneous mathematical calculations; which, unlike most prodigious savants, he did because he had specific goals and practical objectives. Von Neumann's ability to instantaneously perform complex operations in his head stunned other mathematicians. . . “von Neumann's speed was awe-inspiring”. . . “keeping up with him was impossible.” . . . One of his remarkable abilities was his power of absolute recall . . . von Neumann was able on once reading a book or article to quote it back verbatim; moreover, he could do it years later without hesitation. Was von Neumann's savantism due solely to an agile brain or did he also have access to *fields of information* that influenced his neurons?

This discussion regarding mesostratum exploration suggests an undercurrent of some mysticism, but that perception should be balanced against productive insights that may lead to clarification of the nature of consciousness. It is worth noting that many of the world's finest thinkers, including notable scientists such as Einstein, Pauli, Schrödinger, Heisenberg, Gödel, Eddington, and Jeans, espoused forms of mysticism which sparked their enlightenment; benefitting the

world with insights that they drew from their explorations around and within the bounties of the mesostratum. Their methods of mesostratum exploration varied, but their findings all hint at transcendent attributes of their consciousness.

A current, essentially academic, objective has to do with efforts to improve the biological ‘survival machine’ that houses human consciousness; to make it more efficient, more rugged, and more durable. An audaciously extreme example of this is envisioned by Ray Kurzweil in *The Singularity Is Near: When Humans Transcend Biology*. He describes the singularity as a point at which man becomes one with a machine that lives *eternally*, by means of non-biological repair and replication. Kurzweil’s plan is to initially make a device, an ambulatory machine that mimics and perhaps duplicates the human brain/body that exhibits consciousness, or an approximation of consciousness. Chalmers concluded that there do not appear to be any in-principle barriers to ambitions, like those of Kurzweil, to implant *conscious* artificial intelligence in a machine.

Roger Penrose, in attempting to unravel the mystery of consciousness and its biological-physical mechanism, notes that apparently, “the phenomenon of *consciousness* can arise only in the presence of some non-computational physical processes taking place in the brain.” In Penrose’s lexicon non-computational means non-algorithmic, that is, not amenable to being programmed on a computer. He maintains that intelligence, understanding, awareness, and hence, consciousness is beyond the capabilities of a device such as a computer which presumably cannot be programmed to duplicate the human brain. (*Shadows of the Mind*)

Computation deals with abstract objects: mathematical objects in mathematical space, in Plato’s world, which resides in the mesostratum. Computational systems in the physiostratum are tangible objects, physically embodied and interacting causally with other objects in the physiostratum. Chalmers in *The Conscious Mind* observes that, “. . . we want to use the theory of computation to draw conclusions about concrete objects in the real world. To do this, we need a bridge between the abstract and concrete domains.” . . . “This bridge is the notion of *implementation*: the relation between abstract computational objects . . . and physical systems that holds when a physical system ‘realizes’ a computation, or when a computation ‘describes’ a physical system. . . . Natural systems such as the human brain are often said to implement computations . . . Computational descriptions are used to make sense of physical systems in all sorts of domains. Whenever this happens, a notion of implementation is implicitly or explicitly doing the work.”

The computation/implementation bridge envisioned by Chalmers would be incomplete unless it had access to mesostratum resources; like the mathematical space, driving energy, and signal resources mentioned in the previous section. The problem then becomes how memes or microchip-based computational devices might emulate the human brain’s access to the

mesostratum. If we are clever enough to figure out the appropriate computational algorithms, techniques, and devices; the question is: Will the result be like an idiot savant, autistic savant, prodigious savant, or like a von Neumann matured self-driven prodigy? Any one of these alternatives may turn out to be just a remarkable automaton, perhaps with access to mesostratum signals, but without the drive of consciousness. Duplicating the human brain and its aura of consciousness - beyond mere self-awareness and response to its environment - will require quantum devices that access *the presumed higher level signals* that emanate from the superstratum.

A byproduct of the Kurzweil duplicate brain machine or the Chalmers computational machine might turn out to be a useful device for empirical exploration of the mesostratum. Such a device might report upon or just demonstrate attributes of the mesostratum, given that appropriate signal modes are discovered and applied. Lacking such specifically engineered mind-mimicking devices, we should in the interim devise techniques that employ capabilities of gifted humans, prodigious savants; or perhaps employ much less complex biological instrumentalities to access, explore, and exploit mesostratum resources.

The meme/gene cycle suggests itself as a ready-made biological instrumentality; the cycle already resides in interactions which span the mesostratum/physiostratum. We routinely change gene morphology using plant modification, selective animal breeding, and laboratory techniques that alter various aspects of genes. A radical approach would be implantation of memes in the mesostratum or meme manipulation by, as yet, unspecified methods. The implantation might be accomplished by simulated neural networks that access and modulate mesostratum resources. Or, mesostratum access and meme manipulation may be done by canonical means: by utilizing meditative practices or the minds of gifted and inspired thinkers. By whatever means, successful meme manipulation could produce alleles, the alternative forms of genes that usually arise through mutations such as those responsible for hereditary variations. With this plan, salutary brain mutations might arise through exploratory meme/gene cycles and successive generational manipulations.

Consciousness Machinery

The essential feature of the superstratum ~ mesostratum ~ physiostratum framework is the mesostratum; a signal transmission modality between the transcendent and temporal. The framework and mesostratum metaphorically constitute the infrastructure and the machinery, respectively, of human consciousness. The framework may also provide a basis for elucidating the transcendent aspects of human consciousness and its putative role in evolving the cosmos and the provincial complex flora and fauna that populate planet Earth - a basis underlying John Archibald Wheeler's singular 'it from bit' notion, that is, a primordial *something* materializing from pure thought!

Wheeler's rather surrealistic notion needs a framework, a consciousness machinery, simply to show how the cosmos got started; how things got rolling at the beginning. Thereafter, the framework provides the upload-download facilities that maintain and enable transcendent human consciousness and its participatory role, as conceived by Wheeler. In the current epoch, the consciousness machinery provides an avenue of access, a metaphorical Jacob's ladder to the superstratum of pure thought. It also provides for refining the human survival machine, its brain/mind, and perhaps its environment. The consciousness machinery should satisfy the call for inventing a science of consciousness that establishes predictive protocols and powers that put it on par with the physical sciences. The mesostratum machinery imagined here offers an exploratory linkage from a superstratum transcendent continuum to a physiostratum temporal discontinuum.

Conclusions

Transcendent consciousness needs to be studied as more than just a penumbral aspect of the material brain illuminated by palpable signals and sensations. Consciousness science necessarily studies phenomena for which some empirical experiential data exist, but where primarily anecdotal data abound and present as subjective experiences. The meanings of those data are ordinarily apprehended by introspection, inference, deduction; often based on theoretical or fortuitous *indicators*. The indicators are like puzzle pieces, which during assembly, increasingly reveal the total picture. It may be that, in the current epoch, perhaps no laboratory system or no one has the capacity to view the total picture; the torrent of information may be overwhelming for the unprepared or insufficiently evolved mind.

This paper presumes the transcendent nature of human consciousness and its perhaps somewhat limited access to supernal information. Comprehension of the transcendence of consciousness can be aided by assuming the reality of a superstratum ~ mesostratum ~ physiostratum ternion and associated download-upload loops connecting mind and body. This presumes our minds are simultaneously in a transcendent superstratum and material physiostratum. The supernal aspect of human conscious experience is explainable if it is presumed to be mediated by signal loops that circulate through the mesostratum interface; connecting superstratum and physiostratum phenomena.

Normal mental contact with a transcendent consciousness, with the mesostratum, as with Roger Penrose's contact with Plato's world, is likely to be so bland and unremarkable that it is barely noticeable. One may need to train oneself to recognize flashes of insight when they occur - these are likely to come at odd moments - but not at all like Friedrich Nietzsche's flood of input or

Mozart's engulfment in music. Afterwards, hours of research may be needed to pursue the implications of the information or insights gained.

The foundation for perceiving a transcendent reality begins with quantum phenomena by means of which we may empirically observe evidence of an intertwining of the transcendent and temporal. A demonstrable factor is that quantum wavefunctions are signals that reside entirely in the mesostratum. From this perspective we may deduce an information transfer process that joins ethereal transcendent reality with coagulate material reality, consciousness with physical being - via a signal-transmitting mesostratum. Empirical methodology and mind-mimicking devices for sensing, collating, and interpreting mesostratum signals are suggested for research studies and mesostratum exploration. Perhaps the best device is the trained human mind.

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