

Exploration

Informatics and Consciousness Transfer

Alex Vary*

Abstract

This paper suggests that the science of informatics can and should be applied to the transfer of consciousness from a living biological brain to a mechanical brain - specifically, the realization of consciousness in robots. The suggestion is motivated by the need and intellectual drive to understand and enhance biological systems and to simulate biological systems by using inorganic hardware components such as silicon-based chips, mechanical devices, artificial neural networks, and associated programming and information/signal transfer modalities. The problems of and methods for employing informatics in designing intelligent conscious robots and proxy-humanoids are discussed. The informatics approach draws together the appropriate diverse fields, including computer science, information science, cognitive science, and computational neuroscience.

Key Words: Informatics, machine consciousness, artificial neural networks, robotics, computational theory of mind, cognitive architectures, information retrieval.

Introduction

Existentialist Jean Paul Sartre wrote, “the project of human reality is . . . to be God”. . . or at least to be demigods that create improved humans or human-like beings - complete with conscious self-awareness and purposefulness. In pursuit of that project, humans endeavor to create elaborate mechanical, non-biological entities - perhaps ultimately replacing the current biological species that populates Earth with new species with superhuman strength, abilities, and powers - and superior intellect. Computer-mechanized assembly lines epitomize the stupendous success of such audaciously inventive thinking. An extreme example of this is envisioned by Ray Kurzweil in *The Singularity Is Near: When Humans Transcend Biology* [1]. Kurzweil describes the singularity as “the point at which man will become one with machine and then live eternally.” This rather impatiently and blatantly circumvents the promise of immortality offered by God for the soul. Putting aside offending God, if it were certain that a particular machine is conscious, then its constitutional and moral rights would raise legal and ethical issue needing assessment.

Ray Kurzweil in *The Paradigms and Paradoxes of Intelligence: Building a Brain* [2] believes that “we should soon have the ability to do a full human-brain neural simulation . . . to do a backup of our mind file before that.” Of course, the machine duplicate of a human brain would need a body. A disembodied brain would quickly become depressed. The inevitable requirement is then building a suitable vehicle, an artificial body, to house it. Creating a vehicle for the proxy person - for the simulated brain - is the logical follow-on to duplicating someone’s brain. The proxy might be purposely designed to be resilient and suitable for undertaking hazardous missions - a simulated

* Correspondence: Alex Vary, PhD, Retired NASA Scientist & Independent Researcher. Email: axelvary@wowway.com

astronaut sent to explore strange, forbidding, and inhospitable planets - perhaps expendable and abandoned after its mission is accomplished.

We contemplate constructing automatons which possess neural networks that mimic the human brain and which are implanted in appropriate ambulatory machines. This differs from Alan Turing, Claude Shannon and John von Neuman, who wanted simply to build thinking automatons - mechanisms which are relatively self-operating electro-mechanical devices designed to automatically follow a predetermined sequence of operations or respond to encoded instructions.

There is something missing in a neural device that merely mimics the brain. Kurzweil mused that, if brains of select people were scanned, copied and re-created in a humanoid automaton, we need to ask “just who are those ‘people’ in it?” If you ask the ‘person’ in the machine, ‘it’ might claim to be the original person, having specific memories. Although it shares memories and a personality, it just isn’t the original ‘person’ who went into a scanner and awoke as an artificial thinking entity. The ‘original’ person who was scanned would claim that the entity in the machine is an imposter because it is devoid of a unique consciousness. We need to contemplate the idea that human consciousness transcends the *machinery* of the neural system.

The informatics problem that is invoked revolves around the question: Can an individual consciousness be defined, isolated, copied, and transferred from one mind to another - to an artificial mind? If the answer is yes, then does that unique consciousness share two bodies - two virtually identical brains? Perhaps the incarnate soul remains with the original human mind, as part of the soul~spirit~body triad (discussed later). How does each brain experience and process the separate informational inputs - biological and mechanical, cognitive and social - consistent with a single overriding consciousness? This is the inverse of the well-documented instances of multiple (perhaps differently-conscious) personalities occupying the same body. Ultimately, informatics needs to assure that the artificial brain will be appropriately designed and attuned to that aspect of consciousness which is global and which transcends the neural network involved - whether biological or purely mechanical/artificial.

Objectives and Implications

Among the practical objectives of consciousness transfer is that of providing a faculty to *directly experience* the occupation and control of a specially-designed robotic body which can potentially travel to, occupy, and overcome uncongenial environments - either upon Earth or on other planets or their satellites. The premise is that consciousness is a separate entity which can be decoupled from an original biological-brain/body and transferred into a mechanical-brain/body. This implies that the original bio-brain/body remains intact but becomes an automaton - possibly a Chalmersian zombie, as described next.

Assuming that our bodies are vehicles of a transcendent consciousness, it is appropriate to consider the nature of the vehicle. Putatively, biological vehicles of consciousness are products of evolution over many millions of years - adapted and refined to experience, enjoy and endure life on Earth. Each such vehicle is primarily a survival machine with no inherent consciousness, a Chalmersian zombie: David Chalmers [3] 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 were I have neurons.” Notably, he anticipates habitats where silicon-based rather than carbon-based survival machines are needed. Robotic survival machines might be generated by informatics and programmed to respond to and survive specific environments - perhaps to replicate and evolve - without any urgent need to assume human consciousness or engage in social intercourse.

The simplest example of consciousness separated from a specific brain/body is given by Heinz Pagels [4] who writes about physicist Richard Feynman’s perpetual curiosity and his willingness to try almost anything to explore alternate reality. He tells the following story: “He was in a sensory-deprivation tank and . . . 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 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 [Feynman’s perception that] ‘out-of-the-body’ experiences no more violate physical laws than does the experience of dreaming.” Out-of-body experiences seem to verify the transcendent and separate nature of consciousness as an ‘outside’ observer. Before dealing with the informatics of consciousness transfer to a machine, the fundamental nature, attributes, and functions of consciousness need to be considered.

Entropy - Time - Consciousness

There are various aspects of consciousness generally necessary for a machine to be deemed conscious; these include awareness, memory, learning, anticipation, and subjective experience. Awareness could be one required aspect, despite many problems with the exact definition of awareness, specifically self-awareness. Conscious interaction with memory systems along with learning is needed to appreciate and adapt to novel and significant events. Anticipation includes prediction of consequences of proposed actions and prediction of consequences of probable actions by other entities. Subjective experiences or qualia are widely considered to be the hard problem of consciousness, indeed posing a challenge to the ontological thesis that everything is physical and that there is nothing that transcends the physical.

Probably, a paramount function of consciousness is that aspect of it which gives meaning to the perceived flow of time. 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 provisionally in an eternal *now*, devoid of *knowing* the flow of time. Penrose [5] 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.”

Despite the impermanence, destruction, decay, and death of biological brains there is the hint of

something remarkable: localized instances of increasing order emerging from the chaos of increasing global entropy. The increasing order is appreciated 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 of Thermodynamics 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 which is 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) - discovered and informed by a primordial global consciousness.

Human consciousness assigns meaning to time, duration, space, and distance, while ostensibly *outside* the bounds of time and space. Primordial consciousness putatively resides in a realm that transcends the material domain and time-flow phenomena. Consciousness is essentially distinct from its embodiment and material experience. Consciousness is above the fray always endeavoring to put things in order by insisting: 'this 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, icons in the figures I draw; my consciousness assigns context and nuance to my prose and poetry.

Mind as Soul~Spirit~Body Triad

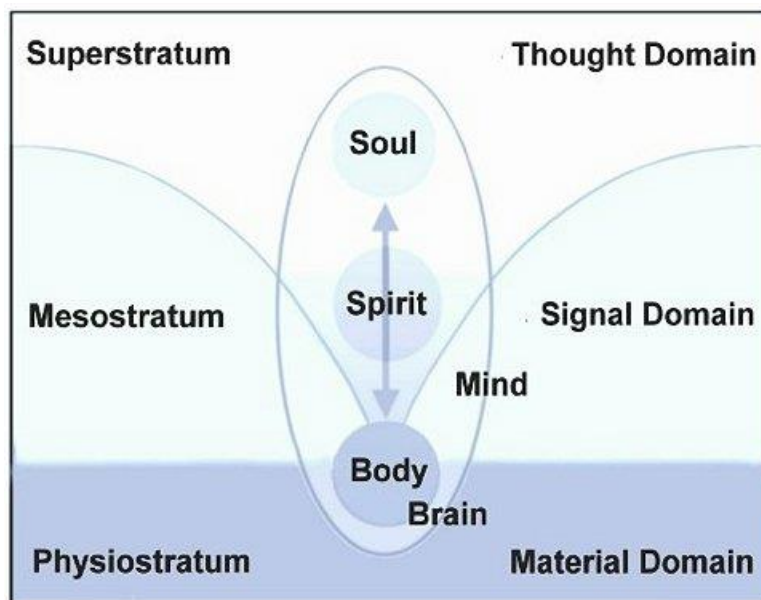


Figure 1 - Soul~spirit~body triad of mind.

It is clear that any discussion of transcendent consciousness involves the mind which in turn requires its own definition as a transcendent entity. The *mind* apparently spans three strata: (1) the *superstratum* (the transcendent domain of pure thought), (2) the *mesostratum* (the mediating

domain of information, signals, energetic fields), and (3) the *physiostratum* (the domain of spacetime and temporal-objective material reality). In this context, the mind is envisioned as extending from the superstratum continuum to the physiostratum discontinuum via signals through the mesostratum hyperspace interface, as in Figure 1.

Although the words soul and spirit have theological and ancient scriptural connotations, we adopt the notion that each individual soul is the superstratum focus of a conscious entity while the spirit is a mesostratum signal transmission modality which informs the material conscious entity - the brain/body. The brain/body is the physiostratum focus of a transcendent consciousness. The mind is defined essentially as a loop that unites the brain and soul foci via a mesostratum download/upload signal cycle. The informatics challenge is to discover how to create a mechanical proxy brain/body which emulates the living mind upload-download loop of the biological soul~spirit~body triad.

The suffix stratum connotes 'separate yet interspersed' not layering as in geological strata. The physiostratum discontinuum is conceptually a subset of the superstratum continuum. Elements of the superstratum and physiostratum commingle in the mesostratum interface. We are aware of the transcendent superstratum and mesostratum indirectly by their ubiquitous influence on the material domain primarily at the quantum level and by their influence on our consciousness and our experience of tangible realities [6].

In attempting to achieve consciousness transfer we should try to link the machine-brain to the mesostratum and thereby to a primordial higher consciousness - just as the biological-brain is linked. We should endeavor to achieve a machine-brain that is specifically designed to explore the mesostratum and retrieve the informational resources and content of the mesostratum. In this way the machine-brain would not only mimic human consciousness but serve as an experimental instrument to verify the nature of the mesostratum. With the machine-brain we could potentially tap into a cyber-space network library and hall of records or the Akashic library/record if they indeed exist as posited in theosophy and metaphysics. Such machine-brains would be sophisticated intelligence-gathering tools designed to explore the mesostratum, to meander the mesostratum, and to return new/old and some exotic and esoteric data and information.

Mesostratum Reality

According to our thesis, the mesostratum is the foundation and conveyor of the transcendent aspects of consciousness - beyond self-awareness and beyond sentience which are emergent empirical aspects of the biological brain/body. We argue that the mesostratum contains transcendent signals and fields which constitute and sustain a 'higher consciousness'.

It can be demonstrated that photons, light waves, that is, electromagnetic waves and fields, transpire in the mesostratum. This has been long evident and demonstrated by Thomas Young's double slit experiment and the Michelson–Morley interferometer experiment. Both revealed that light waves, electromagnetic waves, transpire outside the material stratum, outside the physiostratum, inside the transcendent mesostratum. In the mesostratum continuum, photons traverse decoupled from the physiostratum discontinuum, while *in transit* from a material source

to a material detector. The decoupling from the material world is evident in the *constant velocity of light* which is *independent* of the velocity of the light photon's physiostratum source/emitter - a material body.

A simple experiment reveals the reality of the mesostratum. Magnetic fields are continuumthings, intrinsically *mathematical continuum objects*, that exist only in the mesostratum. Their presence and influence is clearly demonstrated by the alignment of iron filings originally randomly scattered on a cardboard sheet just before being placed over a magnet. The tiny particles of iron line up along so-called *lines of force*, in the mesostratum hyperspace continuum, between the magnet's poles.

Provisionally recognizing the reality of the mesostratum can help explain how a transcendent consciousness spawns, enables, and evolves an emergent human bio-neural consciousness. Informatics is essential for exploring the transcendent aspect of the human mind and its intimate relation to the mesostratum. This exploration is needed to ascertain that mesostratum informational consciousness signals and corresponding wavefunctions which are accessed by biological-brains may also be accessed by machine-brains.

Exploration of the mesostratum should reveal unexpected features, properties, and resources, particularly regarding modes of information storage and transfer. The mesostratum presumably has *wireless* signal origination, exchange, and transmission capabilities. 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.

Mesostratum consciousness signals have thus far not been empirically observed and measured. Application of diverse informatics methodologies may ultimately demonstrate that consciousness signals and fields contain retrievable, albeit transcendent, information. We may be soon be able to demonstrate that such informational signals and fields are associated with the zero-point-field (ZPF) energetic substratum.

Consciousness and ZPF Substratum

Joachim Keppler [7] suggests that stochastic electrodynamics (SED) provides a promising theoretical framework for consciousness signals/wavefunctions based on quantum phenomena. Keppler cites a body of neuro-physiological evidence indicating that the functioning of consciousness rests upon exactly the same principles which characterize quantum systems. Keppler's SED hypothesis opens new perspectives for consciousness research, in particular, it offers the possibility of elucidating the relationship between the brain and consciousness - and therefore information borne by energetic fields - by consciousness wavefunctions.

We shall contemplate wavefunctions as they transpire the mesostratum, carrying signals that inform consciousness. According to Hameroff and Penrose [8] the brain's cytoskeletal fine structures should be regarded as receptors - collectively as antennae, attuned to mesostratum

signals that stimulate and sustain consciousness. Cytoskeletal agglomerations in the brain may function as resonant oscillators driven by energetic signals. In empty space, devoid of neural receptors, the signals simply dissipate as quantum foam.

Informatics needs to focus on the signal source, the nature of consciousness signals/wavefunctions, and the accompanying epiphenomenon of consciousness. Clarifying the interplay of these factors requires a conceptual framework involving SED theory and the ZPF substratum - as a component of the mesostratum.

SED is based on the concept that the universal ZPF plenum is imbued with a fundamental, all-pervasive stochastic energetic field which may be viewed as an ocean of energy that permeates the universe, comprising the vacuum a plenum. Keppler argues that stochastic modifications of the ZPF parallels conscious states and that the brain makes use of a transcendent mechanism that generates these modifications. The modifications are local states of order in the inherently chaotic disordered ZPF.

The quiescent universal ZPF exhibits no correlations between stochastic individual modes, while the locally coherent ZPF exhibits a phase-locked coupling of certain sets of modes. Such a phase-locking occurs whenever a physical system reaches a coherent stable state - an *attractor* - whenever a system is in dynamic equilibrium with the ZPF. These attractors are fractal structures and are also called 'strange attractors'. The set of correlated modes depends on the resonance frequencies of the given system, so that the generated modifications (signals wavefunctions) in the ZPF are system-specific information states peculiar to the conscious states of the associated neural system. According to Keppler, the brain undergoes periodic transitions from a disordered to ordered phase - induced by appropriate stimuli - visual, tactile, auditory, etc.

In the ordered phase, the dynamics of the neural network assembly reaches an attractor, i.e., the dynamics of the assembly reflects a state of synchronized activity and high coherence among the neurons that constitute the assembly. Such patterns are the neural correlates of conscious activity. In the background locus, due to the interaction with the ZPF, these activity patterns are accompanied by ordered ZPF patterns - the point where conscious awareness and orchestration enters. The ZPF substrate is postulated as an essential component of the mesostratum and fundamental energizer of conscious orchestration.

Orchestration of Consciousness

The previous discussion requires an illustrative example showing how the SED/ZPF theory is actualized. As a primary example, consider the retina, a biological photon-detector screen, which undergoes maybe a trillion photon impingements per square centimeter per second. Each photon in-transit - whether described as a Schrödinger probability wave function or wave packet influenced by a de Broglie-Bohm pilot wave - is a mesostratum continuumthing. The neural network associated with the retina, interacting with the ZPF, orchestrates the chaos of retina-impinging photons and extracts and refreshes information about 'what is out there' - an image of the world - the objective reality that surrounds and sustains us all. But, we do not *see* the constantly refreshed image on the retina - which is made pixel by pixel - indeed

quantum-by-quantum - randomly, stochastically. We see *'what is out there'* - the result of neural orchestration - processed virtually instantaneously as an epiphenomenon of consciousness.

Now, consider the nature of the trillions of photon signals impinging on the retina with its two types of photo receptors: 120 million rods and 6 to 7 million cones - the sensor elements, of the retina 'detector screen' - and their combined information content. The signal information content is much more than colors in the scene. In concert, the photons convey information about texture, brightness, distance, inter-relationships, etc. among the emitters of the photons. Perhaps a de Broglie-Bohm configuration-space guidance phenomena is at work while the photons are in transit, before reaching the retina detector screen - followed by phase-locking when the optic nerve delivers the flood of signal information to the neural network - stimulating a SED-ZPF 'stable attractor' - in turn, producing the epiphenomenon of 'seeing' the scene 'out there' in space - in the venue of objective reality.

Figure 2 may be used to conduct an experiment which illustrates how the mind - the epiphenomenon of consciousness - processes visual information supplied by the retina/optic system. Viewing the image in Figure 2 with binocular vision confirms that it is a 2-dimensional representation. By covering one eye and viewing the image, the mind, guided by consciousness, draws enough information from the image *as seen by one eye* to make it stereoscopic: For example, that the words 'Mind Orchestrated Reality' stand apart as though printed on a glass plate - and the rock cliff on the right appears as a 3-dimensional foreground object.

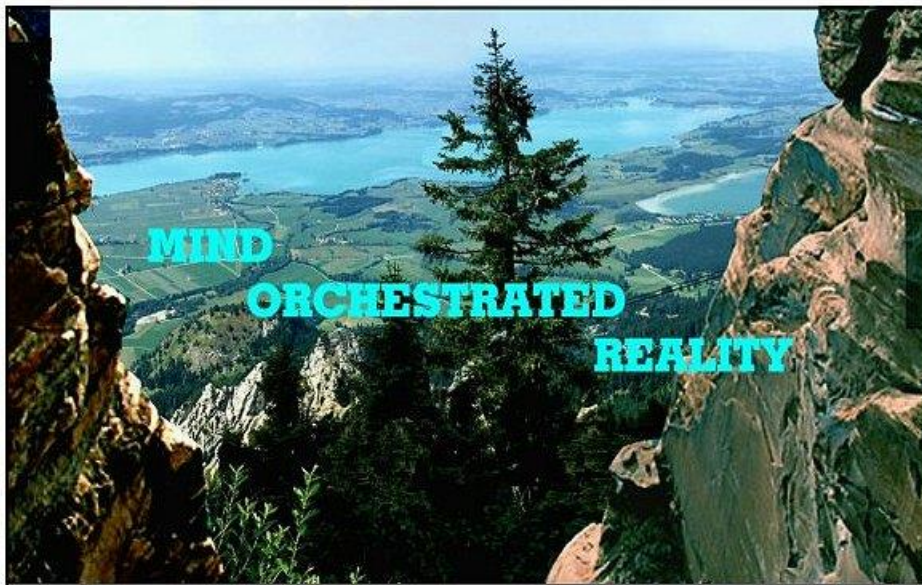


Figure 2 - Example illustrating mind-orchestrated objective reality.

This illustrates how the mind - and the epiphenomenon of consciousness - processes visual information supplied by the retina/optic system. Consciousness, interacting with the ZPF/mesostratum, orchestrates the chaos of photons from the *flat retinal image* - and extracts and refreshes information about what the image means - portrays it as an image of three-dimensional

objective reality. A prominent mystic-physicist view is that the image we 'see' is but a *projection*, a product, of our consciousness. Some notable mystics even insist that objective reality must first be observed to be real. Our higher consciousness tells us that objective reality exists 'out there' - and persists, even when unobserved.

This leads to a picture of the mind as a domain of pure information and information processing, where the confluence of signal parcels corresponds an information space that instantiates a physical neural process. As long as the information states have the right relations among them, an attractor is configured, so that everything will be topographically coherent. Information is all there is and the conscious mind is thus revealed as an abstract domain of interacting "differences and of causal and dynamic relations among those differences," according to Chalmers. Among the essential features of the conscious mind are its introspective, metaphysical, and contemplative attributes. The presence of these raises the question of whether they arise solely in the neural network or whether are they epiphenomena of consciousness which transcend the brain.

Thought Signals and Mesostratum Exploration

A parallel between information conveyed by photon signals and other kinds of signals which may carry conscious thought and ideas may exist, but this is far less easily illustrated. As a start, we contemplate Roger Penrose's accounts of drawing mathematical ideas from Plato's *world of perfect forms*. Penrose [9] argues that we discover the laws of nature in Plato's world, which by our definition is integral to the mesostratum. 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 (spheres) from the approximations that we see around us in the world of physical things (imperfect spheroidal planets). Penrose asks, "Does this not point to something outside ourselves?" Penrose's advocacy of Plato's world figures prominently as a predecessor to the concept of the mesostratum - as a realm or domain of consciousness *outside ourselves*.

Penrose asserts a remarkable interplay and communication among the triad he designates as the *Platonic*, *Mental*, and *Physical* worlds. He elaborates on his own experience with Platonic world and its relation to the physical and mental worlds: The interplay is manifested by the manner in which mathematical discoveries, experimental results, and human consciousness are intertwined. As a physics theoretician, Penrose limits his interest to Plato's world of mathematical concepts. Penrose [10] 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!"

Albert Einstein, Wolfgang Pauli, Erwin Schrödinger, Werner Heisenberg, Arthur Eddington, James Jeans, espoused a form meditation that connotes communication with their transcendent consciousness and the mesostratum. Einstein spoke of a cosmic feeling that inspired his reflections

on the harmony of nature. Apparently profound insights achieved by quiet meditative practices, such as Einstein's *thought experiments*, 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."

There is an abundance of such anecdotal citations, each of which reveals a pervasive truth: what one draws from the mesostratum, from one's transcendent consciousness, may be discordant and chaotic and invariably needs to be unraveled, organized. Arguably, the best instrument for exploring the mesostratum is the human mind; specifically of those individuals who possess unique abilities to exercise their transcendent higher consciousness. Such individuals are rare but apparently they apprehend and perceive order in the chaotic mesostratum signals either by force of will or effortlessly and then they organize, report, and utilize the experience. These special individuals have an extraordinary faculty to bring order out of the chaos of mesostratum signals and to fashion products or accomplishments which are celebrated by the world. Some outstanding examples are prodigies or savants like Wolfgang Mozart, John von Neuman, Friedrich Nietzsche, Srinivasa Ramanujan, Edgar Cayce, and Emmanuel Swedenborg.

Mesostratum Experiencing and Exploration

Mozart 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. Our thesis is that Mozart's music was literally 'out there' in the mesostratum; to which he had immediate access and his higher consciousness realized and delivered the music.

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. 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. Although von Neuman's brain may have been a profoundly unbounded and essentially 'hard-wired' repository of learned and original data, still we should allow that he simply had access to the 'Akashic library' to what

we now term the mesostratum records and knowledge repository - via 'download-upload' signals, as depicted in Figure 1.

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. . . 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." Again, we shall allow ourselves to posit a higher consciousness which not only 'orchestrates' but 'conducts' the Nietzsche ensemble in the midst of which it resides.

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 unconventional 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. 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." Ramanujan's apparent deep access to mesostratum mathematical resources makes Penrose's access to Plato's world seem trivial and tenuous.

Edgar Cayce was recognized as wonder in the medical community because of his ability to diagnose and specify a treatment for gravely ill people often hundreds of miles away through his out-of-body experiences. Cayce was able to gain esoteric information through more frequent OBEs than documented for anyone else. Cayce used self-hypnosis to induce OBEs. While in self-induced trances, Cayce made over ten thousand journeys into what we term the mesostratum and what Cayce termed the spirit realm. He claimed that he was able to access virtually unlimited information by visiting the so-called 'hall of records'. Cayce perceived that his subconscious mind (which he identified as the soul) would leave his body and explore the "dimension where all subconscious minds are connected" - a 'dimension' similar in description to Carl Jung's 'collective unconsciousness'. Cayce's and Jung's terminology anticipates the concept of the soul~spirit~body triad and its relation to the superstratum-mesostratum 'dimension' as depicted in Figure 1.

Among the most eminent and elaborate accounts of mesostratum exploration is that given by Emmanuel Swedenborg in his insightful work *Heaven and Hell*. Swedenborg's description of his mesostratum explorations influenced Johann Wolfgang von Goethe, Ralph Waldo Emerson, and Jorge Luis Borges, among others. Swedenborg, born in 1688, was the Leonardo da Vinci of his era. In his early years he studied science and was the leading mathematician in Sweden. When he

reached middle age, Swedenborg developed the ability to enter deep trances. He described out-of-body experiences during which he visited what appeared to him to be heaven - where he conversed with 'angels' and 'spirits'. Swedenborg experienced things so profound and inspiring that he became famous for his accounts and inspired Immanuel Kant to write a book on Swedenborg entitled *Dreams of a Spirit-Seer*. Swedenborg, according to his accounts, was privileged to visit vast and celestially beautiful cities in a transcendent realm - ethereal vistas with architectures brilliant, luminous, magnificent and sublimely beautiful - places "of staggering architectural design, so beautiful that you would say this is the home and the source of the art itself." Swedenborg filled almost twenty volumes with his experiences, and on his deathbed was asked if there was anything he wanted to recant. He earnestly replied: "Everything that I have written is as true as you now behold me."

The foregoing anecdotal accounts do not verify the existence or operational properties of the mesostratum. Instead, the soul~spirit~body triad and superstratum-mesostratum-physiostratum concept provide a model that should help explain prodigious intellectual feats and esoteric experiences of those involved. Swedenborg and Cayce may have misinterpreted the message and meaning of their vivid and deeply felt experiences, but the model provides a context within which we can assess and interpret their reported experiences - which reveal something about the nature of a higher consciousness and its interaction with neural systems. The model simply offers a starting point for informatics in the development of consciousness transfer methods.

Mesostratum Communication

The informatics of consciousness transfer would benefit from the assumed reservoir of information in the mesostratum. Retrieving the information will require an appropriate vocabulary and syntax - or information transfer formalism and modality. Apparently, the language is non-verbal - as in Roger Penrose's account, where he claims he receives insights from Plato's world and the communication is essentially non-verbal [11]. Penrose writes, "Almost all my mathematical thinking is done visually and in terms of non-verbal 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."

It is conjectured that mesostratum consciousness/thought/information modalities are essentially collections of signals consisting of attractor modules. In the mesostratum an attractor module may be a set of numerical quantities toward which localized dynamic systems (neural system components) tend to evolve. Even for a wide variety of starting conditions, a given system will evolve toward the attractor and remain close to it even if slightly disturbed. In the mesostratum an attractor is a region in n-dimensional hyperspace. An attractor can be point-like, a finite set of points, a curve, a multi-dimensional manifold, or a Mandelbrot set: a complex fractal structure, a strange attractor. Defining, describing, and deciphering attractors populating the mesostratum should be among the primary objectives of informatics theory applied to consciousness. Describing attractors of chaotic dynamical systems has been one of the achievements of chaos

theory.

It must be noted that mesostratum consciousness attractors will arise only as epiphenomena in conjunction and concert with dynamic physiostratum systems: neural networks and their component cells. The specific informatics approach needed is to construct experimental mechanical-brains that emulate the capability of biological-brains to activate, detect, and resonate with mesostratum attractors. The initial step will require mechanical-brain simulation of biological-brain neural network topology. This assumes that global neural properties and dynamics may be contrived by various forms of abstract engineering and programming.

The alternative is studying select living biological-brains to discover features and attributes which are active during mesostratum communications - to 'tune in' on those communications and dialogues. This approach should employ the trance-like or self-hypnotic states assumed by accomplished mesostratum communicators like Roger Penrose, Kurt Gödel, Friedrich Nietzsche, Edgar Cayce, and Emmanuel Swedenborg.

Conclusion

A paramount achievement of informatics applied to consciousness transfer would be in providing the ability to advantageously manipulate our nature, making us more powerful, self-sufficient and advancing knowledge of our transcendent nature. Ultimately, we may build machines, indeed proxy humanoids, that surpass our biological limitations and which our brains, spirits, souls, and consciousness will be eager to occupy. Might we then choose to discard our cumbersome fleshy integument and become artificial Olympians?

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