Fusion

Cosmic < *Soul* > **Harmony**

Brain < *coherence* > **TA** < *coherence* > **Mind**

Matter < *coherence* >> **Spirit of Truth** << *coherence* > **Spirit**

Adjutant Mind < *coherence* >> **Mid Mind** << *coherence* > **Cosmic Mind**

Intellectually << *coherence* >>> **Emotion Control** <<< *coherence* >> **Morontially**

Involuntarily <<<<< *coherence* >>>> **Brain Control** <<<< *coherence* >>>>> **Volitionally**

Physical <<<<<<< *coherence* >>>>>>>> **Wisdom** <<<<<<<< *coherence* >>>>>>> **Spiritual**

Worship

Counsel

Knowledge

C o u r a g e

Understanding

I n t u i t I o n

P r o t o p l a sm

P e r s o n a l i t r e e

Urantia Theophysics

Can our physiologies sense spiritual ideals?
Can we reconcile physical and theologic cosmologies?
Can we consciously influence our physiologies to increase our spiritual receptivity?

Hypothesis

Whereas everything exists as a ripple in fundamental energy fields, I propose that the energy interactions, in these fields, range from stationary (think isle of paradise) energy patterns, through the high spirit frequencies, with enduring, quasi-stationary, cosmic energy patterns, down to the low frequency motions of matter.

If this energy interaction continuum assumption is valid, then I further propose that to the extent we can pattern our low frequency bio electromagnetic energies to be influenced by higher cosmic frequencies, our energy patterns will harmonize and cohere with more stable and enduring cosmic energy patterns.

Prolog

Astronomic cosmology is a branch of astronomy that focuses on the universe, studying its origin, evolution, structure, and destiny, from a purely physical energy (more geocentric) perspective.

Religious cosmology is a branch of theology that also focusses on origin, evolution, and fate of the universe but from a God centric perspective. It is related to physicotheology which posits a deity based on human reason.

Theophysics (and this study) aims to unify physics and theology whereas physicotheology aims is to derive theology from physics (a kind of pantheism).

"… the kingdom of God is within you." Luke 17:20 - 21 (KJV) Is this true physiologically as well as figuratively?

We will examine theophysics from *The Urantia Book's* revelation of origin, history and destiny. *The Urantia Book* put it this way (for us time bound creature who need sequence).

> Origin – Originally there was unorganized energy. Motion but without discernable pattern. (big bang - unqualified absolute, child-like potential)
>
> History – Inherent huddling proclivities led to energy patterns eventually becoming sentient wisdom. (universal absolute, life experience, thought adjuster/changer, controller, soul)
>
> Destiny – Perfect pattern. (deity absolute, paradisical goals)

There are stable patterns at all scales from black holes to solar systems, to brain. At each scale the patterns are permitted by their surrounding forces, energies or influences.

As it says in *The Urantia Book*, (e.g. in paper **0** section **6** paragraph **10**):

> **Pattern can be projected as material, spiritual, or mindal, or any combination of these energies. It can pervade personalities, identities, entities, or nonliving matter. 0:6.10**
>
> **Pattern may configure energy, but it does not control it. 0:6.11**
>
> **That energy can be directionized by the action of controller personalities discloses the responsiveness of energy to mind action. That mass can be stabilized through the action of these same controlling entities indicates the responsiveness of mass to the order-producing presence of mind. And that spirit itself in volitional personality can strive through mind for the mastery of energy-matter discloses the potential unity of all finite creation. 116:6.4**
>
> **In contrast to the aspect of the total, pattern discloses the individual aspect of energy and of personality. Personality or identity forms are patterns resultant from energy (physical, spiritual, or mindal) 0:6.12**
>
> **… every such process tends to create and establish organismal patterns of reaction to such an environment. And all such directive patterns are highly influential in goal choosing. 112:1.14**

Although *The Urantia Book* says that we can never "discern spiritual reality through the examination of physical causes and effects" **(101:10.1)** we may be able to discern some of the influences that this spiritual energy has on our physiology. We can't "see" the wind, but we can see its influence and lean in or set sail.

In this study, we will look for ways to explain, using physics and physiology, how spiritual energies might interact with our material energies. We will look for possible coherence mechanisms in the electrochemical physical functions of body and brain, that might shed light on spiritual to material inter-associations. We will also look at soma (body), psyche (soul), and pneuma (spirit), and our mindal/emotional overcontrol of their physiologies and perhaps find ways to improve our ability to detect, enhance and improve receptivity and capacity for spiritual influences.

The Urantia Book says that there are 30 different forms of energy so why am I suggesting an electromagnetic continuum? Well firstly, at our material stage, we are primarily interested in, and have some control over, electromagnetic energy and secondly, although these energies may come from difference sources, **29:4.28** implies that the term "forms of energy" may refer to different conductors (circuits or conduits) rather than the basic energy itself. This is much like we differentiate electrical energy flowing in a wire from the bioelectric energy of ion influence. Thirdly even if they are different, their respective fields can influence each other and therefore they have an influence continuum.

> **When energy is to be diverted to a new circuit, the transmitters deploy themselves in a line along the desired energy path, and by virtue of their unique attributes of energy-attraction, they can actually induce an increased energy flow in the desired direction. This they do just as literally as certain metallic circuits directionize the flow of certain forms of electric energy; and they are living superconductors for more than half of the thirty forms of physical energy. 29:4.28**

The book also implies that Celestial Artisans work with physical, mindal and spiritual energies. **(Paper 44)** This suggests that these three basic energy types, although originating from different persons of the trinity may be "segregations" of the same basic energy.

There is also some interrelatedness in this universe we live in. For example, in metric units, Length (l), Time (t), Mass (m), Energy (E), Charge (q), Planck's Constant (ħ), Gravitational Constant (G), Boltzmann Constant (k), Permeability (μ_o) seem to converge on the number 10^{67} (Ref 179)

$\mathbf{10^{67} = lc^8 / \hbar}$	$\mathbf{10^{67} = c^9 / E}$	$\mathbf{10^{67} = c^5 G / l}$
$\mathbf{10^{67} = tc^9 / \hbar}$	$\mathbf{10^{67} = c^7 / m}$	$\mathbf{10^{67} = lc^7 / q^2}$

This implies an overall commonality. I am not suggesting that we have control of all these energy segregations, nor am I suggesting a reductionist mechanism wherein our self-consciousness and therefore our God consciousness could be reduced to the motions of energy/matter.

There are also the so called "Goldilocks Constants" of energy. If any one of these were different, by even a fraction of a percent, nothing at all would exist. Speed of light 299,792,458 ms^{-1}, Gravitational Constant 6.6743 x 10^{-11} m^3 kg^{-1} s^{-2}, Planck's Constant 1.05457148 x 10^{-34} m2 kg s^{-2}, Planck Mass-Energy 1.220 x 1022 MeV, Mass of Electron 0.551 MeV, Proton 938.3 MeV, Neutron 030.6 MeV, Mass of Up Quark 2.4 MeV, Down Quark 4.8 MeV, Strange Quark 104 MeV, Ratio of Electron to Proton Mass 1836.15267342, Gravitational Coupling Constant 5.9 x 10^{-39}, Cosmological Constant (2.3 x 10^{-3} eV^{-4}, Hubble Constant 71 km/s/Mpc.

> **Mind, in functioning beings, is not separated from energy or spirit, or both. Mind is not inherent in energy; energy is receptive and responsive to mind; mind can be superimposed upon energy, but consciousness is not inherent in the purely material level. 9:4.2**
>
> **In the inner experience of man, mind is joined to matter. 1:3.7**
>
> **Mind is the technique whereby spirit realities become experiential to creature personalities. 2:8.8**
>
> **Mind alone can interassociate the physical forces and energies of the material level with the spiritual powers and beings of the spirit level. 12:6.3**
>
> **The mind is a personal-energy system existing around a divine spirit nucleus and functioning in a material environment. 12:9.6**
>
> **Therefore are the spiritual and the material, the inner and the outer, human experiences always correlated with the mind function and conditioned, as to their conscious realization, by the mind activity. Man experiences matter in his mind; he experiences spiritual reality in the soul but becomes conscious of this experience in his mind. 103:6.6**

Our senses input information, in the form of energy packets, into our brain and body, so if this experience is in our mind, what is mind? What techniques does the mind use to experience spirit reality? What correlates or conditions our material energies to sense spirit reality? How does the mind become conscious of spirit influences? What are the patterns associated with all these interactions?

Animals possess a physiological co-ordination of associated sensation-recognition and memory thereof, but none experience a meaningful recognition of sensation or exhibit a purposeful association of these combined physical experiences such as is manifested in the conclusions of intelligent and reflective human interpretations. 133:7.8

The physiologic equipment and the anatomic structure of all new orders of life are in response to the action of physical law, but the subsequent endowment of mind is a bestowal of the adjutant mind-spirits in accordance with innate brain capacity. Mind, while not a physical evolution, is wholly dependent on the brain capacity afforded by purely physical and evolutionary developments. 8:6:7

Is our mind wholly dependent on brain capacity? If so, what determines its capacity? Does the brain pattern the mind or is it the other way around? Are the processes mutually reciprocal?

All *patterns* of reality occupy space on the material levels, but spirit *patterns* only exist in relation to space; they do not occupy or displace space, neither do they contain it. 118:3.7

Mind such as man comprehends is an endowment of the seven adjutant mind-spirits superimposed on the nonteachable or mechanical levels of mind by the agencies of the Infinite Spirit. The life *patterns* are variously responsive to these adjutants and to the different spirit ministries operating throughout the universes of time and space. The *capacity of material creatures to effect spirit response is entirely dependent on the associated mind* endowment, which, in turn, has directionized the course of the biologic evolution of these same mortal creatures. 36:2.18

The stoppage of life destroys the *physical brain patterns for mind endowment*, and the disruption of mind terminates mortal consciousness. 112:5.14

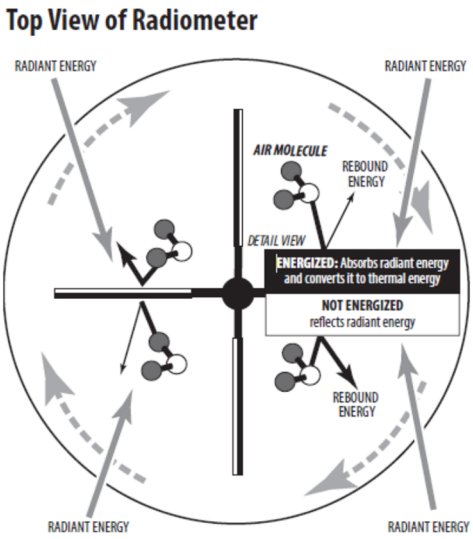
As we look for responsive "life patterns", let's first define pattern. In *The Urantia Book*, "pattern" is the fundamental blueprint of physical, mental, or spiritual reality. It says it is the master design from which all copies are made. Pattern manifests as the organized arrangement of energy that has "paid its gravity debt," meaning that it is fully configured and ready for replication without being governed by gravity (gravity being a universally interactive force). In my view, personality, mind, and life itself are distinct patterns superimposed on energy fields; they are not inherited qualities of energy but the structured forms that energy assumes when it is organized into living, thinking, or spiritual entities. The UB also says "pattern" is versatile. It can be in material (brain and body) mindal (mentally associative), or spiritual (connectivity) and it is the mechanism through which creativity and evolution are expressed. For example, in the realm of life, fundamental patterns generate diverse biological forms, while in the spiritual and intellectual domains, ideas, ideals and religious concepts are seen as patterns that organize or model our experiences and perceptions into meanings and values. Ultimately, *The Urantia Book* presents pattern as the essential, immutable framework of creation—a unifying principle that underlies the evolution of personality, the organization of the cosmos, and even the manifestation of divine realities like Paradise patterns.

… true spiritual experience, is the experiential realization of the cosmic reality of the observation of the observation of all this relative synthesis of the energy materials of time and space. 112:2.12

Can we discern spirit patterns if they exist "in relation to" the space we occupy? We may not be able to find spirit substances in our material bodies, but can we be warmed by spirit energy? Can we use spirit energy to pattern our material energies and align ourselves with that light? Can we use our spiritual insight to see where that warming spirit luminosity is coming from, and then use that energy to move toward its source?

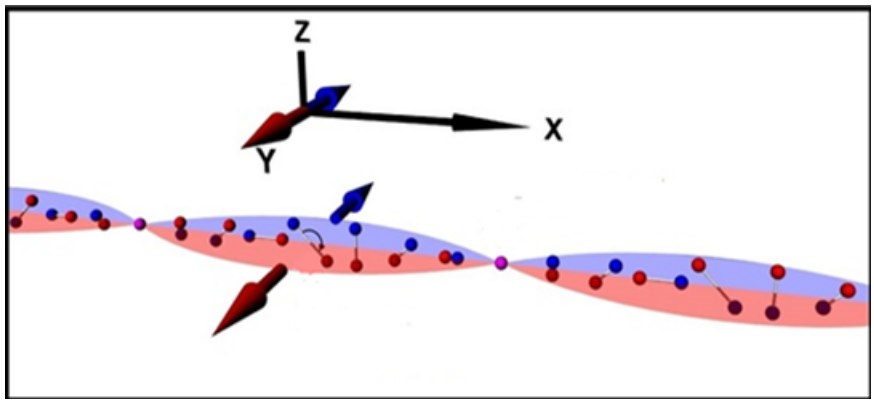
Can we find some of the effects of that spiritual luminosity on the solar radiometer of our mind as it influences our brain and nervous systems and as it illuminates our thoughts and warms our attitudes? Alternately, we can just go around in circles.

Solar Radiometer



Photons Warm the Dark Sides but Reflect off the White Sides

Even though The Urantia Book does not use the term photon, it does refer to quanta as "particles of light energy" (**42:5.6**). Light, as individual photons, transports thermal energy (and the associated information) between masses. Light is the only particle that is one dimensional in the universe. Photons can be thought of as two oppositely charged particles (one magnetic one electric) of zero mass that oscillate back and forth in a straight line. These pairs also spin. The faster the spin, the more energy they carry.



Electromagnetic Radiation

The relative integrity of matter is assured by the fact that energy can be absorbed or released only in those exact amounts which Urantia scientists have designated quanta. This wise provision in the material realms serves to maintain the universes as going concerns. 42:4.13

Spirit substance (quality) is just as responsive to spirit gravity as the organized energy of physical matter (quantity) is responsive to physical gravity. Spiritual values and spirit forces are real. 7:1.3

The electronic stage. This stage of energy is the basis of all materialization in the seven superuniverses. When electrons pass from higher to lower energy levels of orbital revolution, quanta are always given off. Orbital shifting of electrons results in the ejection or the absorption of very definite and uniform measurable particles of light-energy, while the individual electron always gives up a particle of light-energy when subjected to collision. Wavelike energy manifestations also attend upon the performances of the positive bodies and the other members of the electronic stage. 42:5.6

How can we be materially influenced by spirit forces? How does a progressing mind yield a progressing spirit? How might we become perfect even as the "I am" is perfect?

In time, man's body is just as real as mind or spirit, but in death, both mind (identity) and spirit survive while the body does not. ... And so your Greek figure of speech—the material as the shadow of the more real spirit substance —does have a philosophic significance. 12:8.16

Let's explore some physical functions that may shed light on the source of the luminosity that creates these shadows.

Paradise (*Urantia Book*) Perspective

We appear to be under the influence of material gravity from below, and mindal and spiritual gravity from above. Material gravity will ensure that our dust remains under the control of Urantia gravity but our mind as it guides our choices, decisions, and steadfastness, may help us to transfer the seat of our material identity to our more enduring quality, our soul.

… it is entirely possible for the indwelling spirit to make direct contact with the decision-determining powers of the human personality so as to empower the fully consecrated will of the creature to perform amazing acts of loyal devotion to the will and the way of the Father in Paradise. 67:3.7

At the paradise level there is a perfect God. At the initial space level, there is energy without pattern but with potentiality.

At the top there are:

Spirit Perfections – Deity Absolute, ideal spirit.

Mind Perfections – Ideal mind, ideal associations.

Matter Perfections – The paradisical source of energy and perfect patterns.

At the bottom there is:

Unqualified Absolute, space energy without pattern but with the potential to be patterned.

The Universal Absolute accommodates the tensions between these extremes. Accommodation can be thought of as easing the tensions by improving the patterns or perfecting alignment. Energy, over time, automatically seeks stability (improves its pattern) through involuntary energy tension relieving (increasing entropy, second law of thermodynamics), gradually improving the organization of matter. This includes the information encoded in that matter, (second law of information dynamics SLID, Ref 101) up to the stage of sentience (the so called thermo-contextual interpretation).

But what started it all?

Causation

There are three main theories of original causation:

Upward: Scientific Causation - energy-matter makes us what we are.

In this theory, everything in the physical universe is dependent on the same fundamental entities and interactions (found by splitting matter apart down to the smallest possible scales). Living creatures can be divided into cells; cells themselves are composed of organelles; organelles can be broken down into molecules; molecules are made up of atoms; atoms are comprised of electrons and atomic nuclei (quarks and gluons which may be clouds of ultimatons or the hypothetical "sub-quark" particles called preons). These fundamental particles obey fundamentally inherent laws in their associations. From subatomic to cosmic scales, everything that exists depends on the random associations of two things: charge and mass.

Downward: Spiritual Causation - God makes us what we are.

In this theory, the fundamental laws of science are God's preferred way of doing things and we have little or no contribution to the process.

In my humble opinion, there are three laws; physical laws, intellectual coherence laws and cosmic spiritual laws, so a more plausible combined scenario, consistent with *The Urantia Book's* ascending/descending reciprocities, would be:

Up/Down: Scientific/Spiritual Causation - Energy evolves into sentient beings using God's preferred processes. Sentient beings continue the process as assisted by top-down influences.

We are going to examine some of the ways of resolving these top – down and bottom – up tension releasing quests for perfection, from both external physiological, and internal phycological perspectives, using our God given body (to feelingly experience) our brain (to discover, recognize and choose), and our mind (to build patterns of thinking that facilitate future improvement).

The areas we are going to investigate are:

1. The Consciousness Process
2. Consciousness and Fundamental Forces

3. Personal Consciousness and the Whole
4. Brain and Consciousness
5. Self-Reflective, Pattern-Recognizing, Brain-Mind
6. Current Theories of Consciousness
7. Consciousness as a Unified Mechanism
8. Physiologies of Body Consciousness
9. Intercellular Communication
10. Epigenetics
11. Neurotransmitters
12. Homeostasis
13. Brain Waves
14. Mental Picturizations
15. Activity Regulated Cytoskeletons & Synaptic Adhesion Molecules
16. The Maturing Brain
17. Thought Adjuster Reception
18. Changer, Adjuster, Controller

Part 2

19. Microtubules
20. Centrioles and Centrosomes
21. Microtubule Quantum Coherences
22. Electromagnetic Continuum
23. Morontia Material – Hard Light
24. Physiological Continuum
25. Single and Multiple Quantum Coherences
26. Time
27. Time Consciousness
28. Multiple Physiological Clocks

Part 3

29. Phase Locked Thought Feedback Loops
30. Near Death Experiences
31. Emotional Processes
32. Emotional Self-Mastery
33. Thought Processes
34. Sentience and God Consciousness
35. Top-Down and Bottom-Up Interpretations
36. Soul Physiology
37. Preservation of Intention
38. Ubiety and Ubiquity
39. Experiential Soul Fusion
40. Philosophy of the Physiology of Spiritual Influences
41. God Conscious Persistence

We are also going to look for ways to harmonize with, and to be more aware of, morontial or spiritual influences, and we will look for ways to discover, and improve our thinking and behaving in these following methodologies:

1. Magnetic coherences
    a. Nuclear resonances
2. Electrical coherences
    a. Electromechanical resonances
3. Combined Mechanical and Optical coherences
    a. Microtubule/neurotubule coherences
4. Intellectual coherences
    a. Philosophical coherences
    b. Philosophy of physiological coherences

While we are exploring and examining the interrelatedness of all these, we may want to look for personal coherences that involve:

a. Our actions
    i. Serving
    ii. Praying
    iii. Worshiping

b. Our Soul

i. Formation
ii. Awareness
iii. Growth
iv. Fusion

> **There exists a vast gulf between the human and the divine, between man and God. The Urantia races are so largely electrically and chemically controlled, so highly animallike in their common behavior, so emotional in their ordinary reactions, that it becomes exceedingly difficult for the Monitors to guide and direct them. You are so devoid of courageous decisions and consecrated co-operation that your indwelling Adjusters find it next to impossible to communicate directly with the human mind. 110:4.5**

As we try to bridge the vast gulf between matter and meaning, we may also want to try to emulate the techniques of our master.

> **Jesus possessed the ability effectively to mobilize all his powers of mind, soul, and body on the task immediately in hand. He could concentrate his deep-thinking mind on the one problem which he wished to solve, and this, in connection with his untiring patience, enabled him serenely to endure the trials of a difficult mortal existence—to live as if he were "seeing Him who is invisible. 127:3.15**

In this exploration, it is not so much mind over matter as it is mind working with matter. It is not so much brain over body, as it is brain working with body for improved cosmic consciousness.

I have done the research (see references below), but the suppositions and extrapolations are mine. The statements are all in error to some degree, and they are always open to debate. Questions are certain to arise and there are no right or wrong answers. Most areas call for further research and none of this is unequivocally provable. That's where faith comes in but hopefully the possibility of plausible mechanisms will help strengthen that faith.

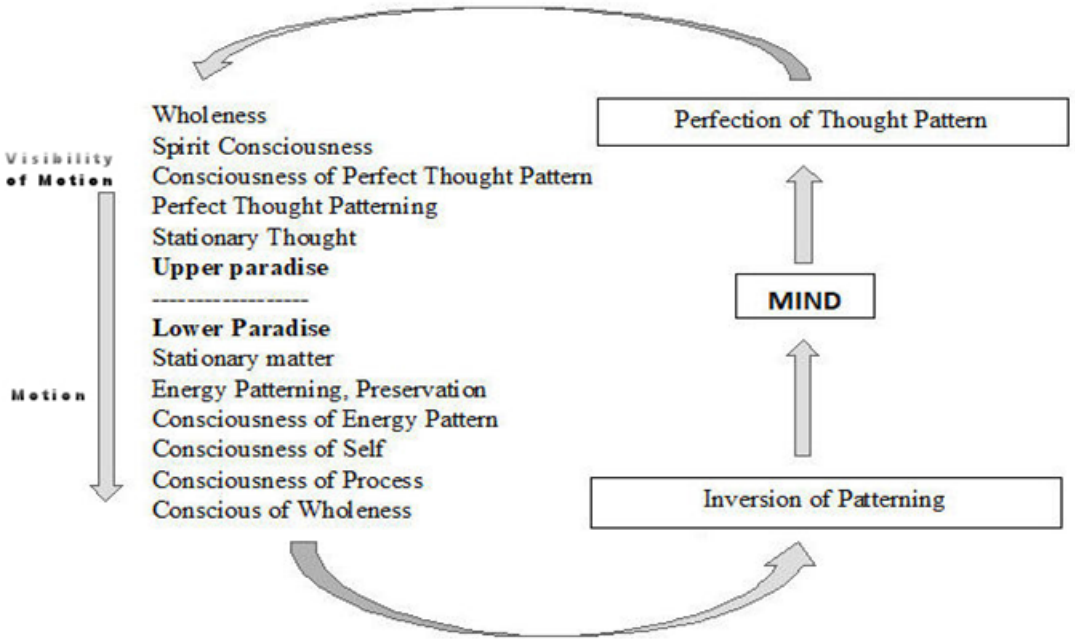
> **The cosmic-mind-endowed, Adjuster-indwelt, personal creature possesses innate recognition-realization of energy reality, mind reality, and spirit reality. The will creature is thus equipped to discern the fact, the law, and the love of God. Aside from these three inalienables of human consciousness, all human experience is really subjective except that intuitive realization of validity attaches to the unification of these three universe reality responses of cosmic recognition. 6:9.1**

The Consciousness Process

The origin and destiny of consciousness as described in *The Urantia Book* is quite different from scientific descriptions. *The Urantia Book* describes matter (and therefore the inter particle consciousness of matter) as originating from lower paradise, and time (our consciousness of the everlasting now) as originating from upper paradise. Time may originate from upper paradise because it can observe the motion originating from lower paradise.

The origin and destiny of cosmic consciousness might both be paradisical.

If we view this as circular simultaneity, we might begin to see some connections. Can we use time/motion to experience, understand and harmonize the process of being conscious of our origin?



Urantia Book Evolution of Consciousness

Process philosophy (a branch of metaphysics concerned with the nature and relationships of becoming, as proposed by Georg Wilhelm Friedrich Hegel and advanced by Alfred Whitehead) is an approach in philosophy that identifies motion, processes, changes, or shifting relationships as the only real experience of everyday living. In contrast to the classical view of change as illusory (as argued by Parmenides) or accidental (as argued by Aristotle), process philosophy posits that occasions of change or becoming are the only fundamental things of the ordinary, everyday real world.

Poiesis (goal producing) versus Praxis (an end in itself)

Process philosophy distinguishes between the "physics of being" and the "physics of becoming". Process philosophy covers not just scientific intuitions and experiences, but it can be used as a conceptual bridge to facilitate discussions among ethics, aesthetics, religion, philosophy, and science.

Personality may survive mortal death with identity in the surviving soul. The Adjuster and the personality are changeless; the relationship between them (in the soul) is nothing but change, continuing evolution; and if this change (growth) ceased, the soul would cease. 112:0.15

Consciousness and Fundamental Forces

"Everything changes and nothing remains still ... and ... you cannot step twice into the same stream. The river is not an object, but a continuing flow. - Heraclitus

I propose that if two people agree upon the definition of consciousness, they will agree on the existence or non-existence of an afterlife. Deepak Chopra

We intuitively know we are conscious, but what are we conscious of? We can't discuss consciousness until we define it. We can't find what influences consciousness until we understand what is being influenced. We can't discuss self-consciousness, with the eventual extension to God consciousness, without first having an idea of what consciousness is. We are aware of internal and external sensations, but are we the antennae that receives those sensations or are we the pattern of those amplified and sorted sensations? We are self-conscious before and after sleep or anesthesia but are we super conscious of anything during them? Are we conscious of the cosmic whole?

There are many kinds of consciousness. We have body consciousness, perspectival consciousness, volitional consciousness, narrative consciousness, and social consciousness to name a few. Our individual and collective consciousness seems to change as we mature and as we pattern the electrical signals received from our senses (sight, hearing, touch, taste, smell, proprioception, nociception - sense of pain, vestibular balance and spatial orientation) and fit them into our currently stable but dynamically modifiable mental models. Self-consciousness may exist between our creative interpretation of sensory input and the conversion to thought output. Perspicacity (insight) would then allow us to extrapolate this self-consciousness, into God consciousness but how does consciousness relate to fundamental forces? Modern unified field theory describes the four primary force fields (strong, electromagnetic, weak and gravity) and how the quanta in each field acts. These four fundamental fields have commonalities. All four mediate interactions between particles, permeate space and seek symmetry. They are "conscious" of each other in their respective continuums.

Side note: An eigenphenomenon is a fundamental mode of stability. The term is borrowed from physics and dynamical systems theory, where eigenmodes describe the independent ways, a system can remain stable or oscillate without collapsing. Applied to cognition, eigenphenomena are the structurally independent constraints that must remain regulated for a mind to function coherently across time.

Side note: Some other senses; a sense of ownership, internal body awareness, balance, temperature, pain, pressure, texture, weight, shape, and time, as well as potential senses like gut-brain microbial links (neurobiotic sense) or sensing magnetic fields (magnetoreception).

How can we become conscious of those interactions? Are we conscious of any of the "**thirty physical energies of space…"**? **29:4.20**

Here are some details on the four fundamental forces of the standard scientific model.

Strong Nuclear Force: This is the mightiest of the forces, but it operates over the shortest range, and only within the atomic nuclei. It binds protons and neutrons together in the nucleus and overcomes the repulsive electromagnetic force between positively charged protons.

Weak Nuclear Force: Though weaker than both the strong and electromagnetic forces, the weak force is crucial for processes like radioactive decay and nuclear fusion in stars. It operates over a very short range and plays a role in changing one type of subatomic particle into another.

Gravitational Force: Gravity is the weakest force but has an infinite range, making it dominant on cosmic scales. It pulls objects with mass together, keeping planets orbiting stars, and governs the structure of the universe.

Electromagnetic Force: This force acts between charged particles and has a longer range than the strong force. Electric and magnetic fields are closely coupled and reciprocal (when one increases the other decreases and vice versa). EMF governs everyday phenomena like electricity, bioelectricity, magnetism, and light. For example, it's responsible for the attraction between opposite charges and the repulsion between like charges. While we are talking about the electromagnetic force, we should probably talk about its two components. An electric field exists due to electric charge. In static electricity, it's a pure electric field. When the electric field moves, it creates a magnetic field that curls around it. When electrically charged particles, and their associated electric field, move in circles, like an electron orbiting a proton, they generate magnetic fields that are perpendicular to their motion. The magnetic component of the electric field's movement is because of the electric field's relativistic (apparent time dilation) speed. If you could travel along with the electric field, you would only see the magnetic field.

> Side note: A permanent magnet has a constant magnetic field due to the alignment of electrons as they move relative to one another, length contraction and time dilation slightly shift their interactions, leading to the emergence of a magnetic field within the material.

Each of the standard model forces has a different range that it can influence.

Here is the classic equation.

$$E = mc^2$$

(or as *The Urantia Book* restates it)

$$dm = de/c^2)$$

> **The increase of mass in matter is equal to the increase of energy divided by the square of the velocity of light. 42:4.11**

Fundamental Density Theory

There is a new theory called the Fundamental Density Theory (FDT), (Ref 156) which simplifies the standard model in a seemingly simple variation to $E= mc^2$:

$$E/m = c^2 = (d/t)^2$$

Where d is the spatial and t is the temporal scale. The left side (E/m) represents quantum mechanics, while the right side ($c^2 = (d/t)^2$) represents relativity.

> Side note: Although I provide equations in this exploration, it is not necessary to understand or use them to grasp the concepts.

This "Omnium" (Latin for "all" or "one") field, introduces the concept of a universal field whose different configurations give rise to everything we observe and says that matter emerges as high-density regions and energy manifests as motion/transitions between density states. Spacetime geometry is determined by density distribution, and all four fundamental forces are different regimes of the same interaction of forces. FDT unifies the four fundamental forces through a dimensionless parameter α and eliminates infinities and singularities. FDT says gluons, gravitons, and photons are just different density configurations of the same universal field.

Strong Force = Gravity: The same interaction at different density regimes
- Strong force: High-density environments (density parameter $\alpha \approx 1$)
- Gravity: Low-density environments ($\alpha \ll 1$)

Electromagnetic Force = Weak Force: Different manifestations of the same interaction
- Electromagnetic: Long-range interactions where density effects are minimal
- Weak: Short-range interactions in dense environments with screening effects

I like to think of pure energy as being ubiquitous, and mass (patterned energy) as having ubiety.

> Side note: Space-time provides a powerful tool for describing how events happen: how they are ordered relative to one another, how sequences of events are measured but "events" themselves do not exist; they just happen. Consequently, space-time does not actually exist. Our different perspectives change our measurements. Events happen everywhere, now, and the occurrence of an event is categorically different from the existence of anything, whether object, place, concept or event.

In either the standard unified theory or the newer density theory, all four force-fields have their ranges of interaction, but we are going to focus on the electromagnetic field because it is the one that governs interactions between bioelectric charged particles, and it is the one that we have most control over. It's also responsible for electric fields (produced by static charges) and magnetic fields (produced by moving charges). The electromagnetic field incorporates both the electric and magnetic fields, which propagate in waves, like light or radio waves. The electromagnetic force, which can be described by Maxwell's equations, is mediated by photons, the force carriers of electromagnetism. It operates across macroscopic distances and plays a crucial role in chemistry and biology, binding electrons to nuclei and allowing atoms and molecules to interact. The electric and magnetic fields are mutually interactive. They are both quantum fields meaning that these fields are the sum of elementary oscillations, and we can treat each of these oscillations as a field as simply an infinite sum of harmonic oscillators, with discrete (quantum) levels of energy. These discrete levels are the field's quanta. For the electromagnetic field, we call the quanta photons; for the electron field, we call the quanta electrons. Free electrons are responsible for all electrical properties, while bound electrons ensure stability in this world. What appears as a "particle" in either of these fields can be described by a Fourier-transform mathematical construct. A Fourier-transform changes a time-domain function (think finite) into a frequency-domain function (think

pattern). Electromagnetic fields are present everywhere. When they interact (entangle), they exchange energy and momentum. When they don't interact, changes in the field propagate in the form of waves.

There is a crucial difference between the two fields, however: the quanta of the electron field (the electron) also carry charge, in addition to energy and momentum (linear and angular). And the electron has rest mass, which is to say, there exist configurations of the electron field that remain unchanged over time, with nonzero energy and rest mass. We perceive such a configuration as a stationary particle. In contrast, the combined electromagnetic field has no charge, no rest mass, and no such "static" configurations. Particles are not fundamental; fields are, and these fields are present everywhere; not just present where field excitations show up as particles.

An electron is a ripple in the electric field, and "it" is aware or "conscious" of the electric field that surrounds it. Molecules (which include electrons) function in that same electromagnetic continuum and are conscious of other molecules that surround them. There may be a cascading hierarchy of consciousnesses in the body and brain that becomes our total consciousness. We may be materially conscious because of electron/photon consciousness and that may make us aware of our various senses. We may be socially conscious by being aware of our interactions with others or even be God conscious by being aware of our cosmic relationships. (Ref 175)

Electromagnetic, weak and strong forces are all described using a mathematical framework that incorporates uncertainty and wave-particle duality. Gravity in the latest unified gravity model (Ref 160) is mediated by the four interrelated fields, with each one like the field that governs electromagnetism.

The Body Electric

Where do all these electrons, for these electrical signals that we are creatively patterning and modelling in our body come from in the first place? Our guts go from acid to alkaline. This is analogous to charging a battery. Electrical energy (motility) that is generated is then used to make ATP (cellular mini batteries) in the electron transfer chain processes in each cell's mitochondria. (Ref 29) The electric potential (available electrons in various ions), stored in ATP, facilitates motion and inter/intra cellular communication. All communications (i.e. awareness of surroundings) involve this biochemical electricity directly or results in either hydrophilic (positive negative binding) or hydrophobic (like charge repelling) interactions. Some fundamental intercellular voltage driven communications are inflammation, effort, tension relief, pain and pleasure. As we manage the tensions between these voltage potential, ion concentration differences, the reptilian brain stem functions as our sensory input/output hub. It passes electrical signals via chemical ions onto multiple areas of the brain for storage or reaction, and they send back "intelligent" electrical ionic consciousness responses as we continuously reflect, cross reference, and choose. I call this continuous sensing, reflection and choosing, awareness of our consciousness.

> **The evolutionary type of knowledge is but the accumulation of protoplasmic memory material; this is the most primitive form of creature consciousness. Wisdom embraces the ideas formulated from protoplasmic memory in process of association and recombination, and such phenomena differentiate human mind from mere animal mind. 101:6.4**

Are there other types of consciousness? Consciousness, as an ontological prerequisite for cognition, is thought to be a multifaceted and complex phenomenon, and has been categorized in various ways by psychologists, neuroscientists, and philosophers.

Here are some of the different types or ranges of consciousness:

Wakefulness or Arousal: This is the most basic sense of consciousness, referring to the state of being awake and responsive to the environment, as opposed to being asleep or in a coma.

Phenomenal Consciousness: This involves subjective experience or qualia — the 'what it is like' aspect of consciousness. It encompasses the sensations, perceptions, dreams, and feelings that are part of our experiences.

Visual Consciousness: Visual awareness, functioning between phenomenal consciousness and access consciousness. (Ref 25)

Access Consciousness: Defined by philosopher Ned Block, (Ref 73) this refers to the brain processes that make information available for verbal reporting, reasoning, and the control of behavior. It's more about the functionality and utility of consciousness.

Self-Consciousness: A higher level of consciousness where one becomes aware of oneself as an individual, separate from others and the environment. It includes self-recognition and self-awareness and may be a fundamental aspect of personality.

Meta-Consciousness: Thinking about one's own consciousness including reflecting on one's own thoughts, feelings, and sensations.

Narrative Consciousness: The human capacity to link events and experiences into a chronological and meaningful story involving personal identity and memory, constructing a narrative of 'self' over time.

Altered States of Consciousness: A state that differs significantly from normal waking consciousness and can be induced in various ways, such as through meditation, hypnosis, drug use, worship, or dreams.

Collective Consciousness: A concept primarily used in sociology and anthropology, referring to the set of shared beliefs, ideas, attitudes, common to a social group or society. This may be related to our moral consciousness.

Non-Conscious Processes: The mental processes that occur outside of conscious awareness, such as implicit memory, automatic skills, and subliminal perceptions. This may be related to Thought Adjuster influences.

Superconsciousness: A material aid to a subconscious reservoir of mortal experience, which we use for inspiration and guidance at the borders of contact with the spiritual. **91:3.5** This may be related to our mid-mind consciousness.

Cosmic Consciousness: A philosophical doctrine, referring to a higher, all-encompassing form of consciousness that connects the individual to the universe.

Each of these definitions considers different aspects of relational consciousness, from physiological arousal to complex reflective philosophical or cosmic perspectives. Understanding the various definitions highlights how multidimensional consciousness is.

Personal Consciousness and the Whole

From a basic understanding of our individual consciousness, we try to become conscious of, and sense other consciousnesses. We try to sense our influence on others, and we try to sense their influence, on us. We have a general sense of Ubuntu (I am because we are). From a spiritual perspective, we often try to sense our relationship to consciousnesses not seen. *The Urantia Book* says that this relationship mechanism is *vital*.

Relationships exist between two objects, but three or more objects eventuate a system, and such a system is much more than just an enlarged or complex relationship. This distinction is vital, for in a cosmic system the individual members are not connected with each other except in relation to the whole and through the individuality of the whole. 112:1.17

Now let's make the first step towards sensing our place in the "whole" and our sense of God consciousness.

The far-flung physical universe coheres in the Isle of Paradise; the intellectual universe coheres in the God of mind, the Conjoint Actor; the spiritual universe is coherent in the personality of the Eternal Son. ... Man's Adjuster is a fragment of God and everlastingly seeks for divine unification; it coheres with, and in, the Paradise Deity of the First Source and Center. 2:7.7

Can we connect our electrical signals to the whole universe? Can we connect science and spirit? Can we harmonize brain functions, thoughts, sights, and insights? Can spirit give us the ability to recognize valuable influences? Is our insight the shadow of spirit luminosity? Can we be conscious of God? Let's examine some of the laws of physics that might be involved in the interactions and potential coherences between us and the whole, between the eternal and the temporal, the infinite, and the finite, the spiritual and the mindal, the morontial and the material, spirit, and brain.

Always should the domains of the physical (electrochemical) and the mental response to environmental stimuli be differentiated, and in turn must they all be recognized as phenomena apart from spiritual activities. 65:7.8

There is a cosmic unity in the several mind levels of the universe of universes. 111:1.2

Brain and Consciousness

Mind transmutes the values of spirit into the meanings of intellect; volition has power to bring the meanings of mind to fruit in both the material and spiritual domains. 9:4.6

Meaning is something that emerges, something we hold onto, something that quietly shapes what comes next and hopefully evolves into values we espouse, but we may first have to put some concepts together in the brain. The brain acts as our original objective sensor, actuator and controller and gives us our subjective perceptions. The brain is not simply representing the world, it is reversibly computing the future, running constant simulations that can be rolled forward and backward, aligned or revised. The brain (with input from the body) is both an experience, from the first-person perspective, while it maintains a description from the third-person perspective. The experience or physiological level of description refers to structures, to what can be touched. It describes neurons, synapses, neuronal networks, biochemical processes, and electrical activity. The psychological, on the other hand, refers to behavior, perception, memory, attention, decisions, actions etc.

Decision Augmentation Theory (proposed by physicist Edwin May) suggests that apparent extrasensory perception (ESP) or precognition may arise from subtle, unconscious influences on decision-making processes. DAT posits that individuals do not directly access information about the future in a mystical sense. Instead, they unconsciously make decisions that optimize outcomes based on probabilistic cues or signals that might otherwise

go unnoticed. This should encourage us to pay closer attention to our decision-making processes and to trust the subtle cues that guide us.

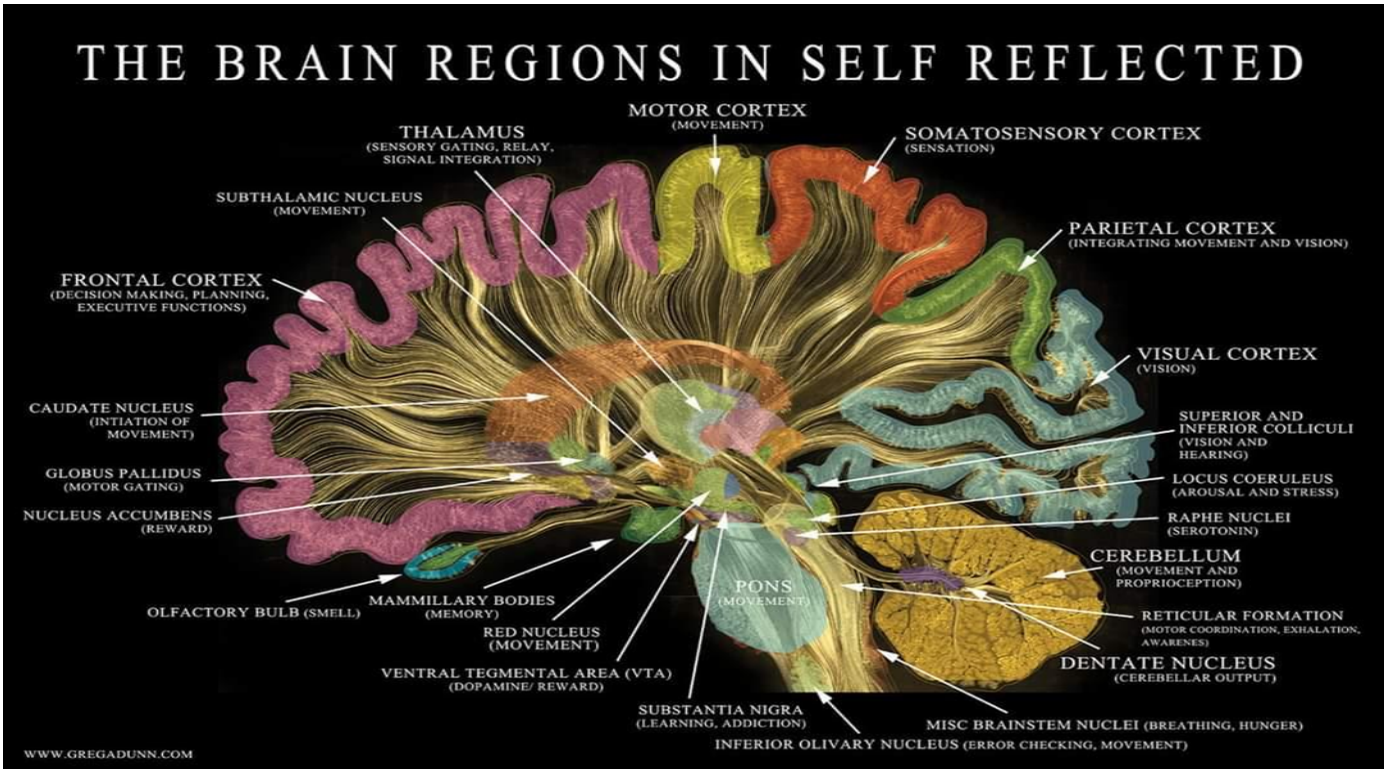
Whether through meditation, mindfulness, or other practices that enhance self-awareness, we can cultivate a deeper connection to the unconscious processes that shape our lives. This predictive machinery is loss-averse in that it thrives when reversibility is high, and becomes fragile when irreversibility creeps in.

Consciousness is the base from which this operates, and we operate on a hierarchy of consciousness scales, but overall consciousness does not exist in any subset of the hierarchy. Consciousness inherits this non-particularizability of life. Since consciousness is based on life, it cannot be particularized or compartmentalized. You can't ask which neurons are conscious or which neural circuits carry consciousness. Consciousness is a global state of a living neural system that arises from the autocatalytic organization of that system. The material makeup of the brain spans many spatial scales of organization. From genes and molecules to cells, from protein complexes to 'molecular machines' such as ion channels. A neuron has 10,000 synapses and is composed of computationally and functionally distinct and independent parts: its dendrites, the initial segment, the axon, and synaptic arborizations and there are many scales of organization above a neuron. Neurons connect with each other to form local neural circuits, which combine to form structures such as cortical columns. These connections involve ephaptic (conduction without a neurotransmitter) coupling which is a form of communication between neurons that occurs when the electrical field of one neuron affects nearby neurons. Storing both related content and context information in separate areas of the brain and firing the content neurons to predict the activity of context neurons a few tens of milliseconds later.

Neurons communicate in three ways, chemically, physically, and using this ephaptic sensing. Ephaptic coupling happens when a neuron fires an action-potential creating an electrical field which interacts with neighboring neurons which can then influence the electrical excitability of other nearby neurons. This can affect the timing and synchronization of other action-potential firings in nearby neurons. Signals are processed only if they reach specific brain regions during brief receptive cycles. This timing mechanism filters information and influences our responses. Where does this happen? Ephaptic coupling can occur in the brain, where it may help form memory networks and it can also occur in cardiomyocytes (heart cells responsible for heart contraction and relaxation) where it happens in the narrow gaps between cells. Research suggests that myelination may reduce ephaptic interactions in the brain. For a video of this coupling in a mouse brain check out the video (Ref 148).

Eventually distinct anatomical and functional brain and body regions connect on increasing scales in the whole brain in networks of cells and networks of brain regions. (Ref 102) According to Ran Levi of Aberdeen University, the brain processes information in a "in a highly ordered way" in an "eleven-dimensional configuration, with holes". This indicates that the network's neurons respond to prior inputs. They found that the brain builds and then destroys towers out of various three-dimensional building pieces. It is called the algebraic topographical hierarchy. It starts with rods (1D), then moves to planks (2D), then to cubes (3D), and then moves to more sophisticated geometries with 4D, 5D on up to 11 dimensions. Activities move through the brain by building multi-dimensional sandcastles in a hierarchy of mechanical functions that cascade up to consciousness, and then, disassembles them (unless they are made more permanent). The building and destroying mechanisms are mathematically like the Fibonacci sequence. (Ref 124) There is a hierarchy of physiological actions that cause cascades of higher and higher levels of thinking that may lead to levels of spiritual awareness.

Our mind differs from our brain. The brain is the material, tangible part of our body, whereas the mind is a pattern recognizing consciousness or mindfulness of the brain's activities, and therefore, intangible. The brain harbors all the details. The mind solves the "binding problem"; the association of the parts into "gramma's face" or the image of the Statue of Liberty. The brain and body together interactively prioritize the availability of the details, and they both have a pre-prioritized status. The mind is constantly trying to fit the brain details into patterns that support its current models or possible future extrapolations of those models.



Material mind is the arena in which human personalities live, are self-conscious, make decisions, choose God or forsake him, eternalize or destroy themselves. 111:1.3

Self-Reflective, Pattern-Recognizing, Brain-Mind

Both the neurological and the intellectual hierarchies occur first in our brain and then are further patterned in our mind. Let's first look at the brain. Our brain has two hemispheres. In very general terms, the right hemisphere acts like a parallel processor while the left acts like a serial processor and they are connected by the 300 million axonal projections of the corpus collosum. The right side is all about processing our present connections to sensor inputs. The left more linearly, methodically predicts our future based on our current predicament. Left brain is our "brain chatter", our self-definition, our "I am" and our "I will be". I like to think of the right side as Newtonian (macro, looking at the past, deterministic) and the left side as Einsteinian (relativistic, extrapolating, probabilistic, potentially free will guided) future. The corpus collosum (and neurotubules which we will discuss in more detail later) facilitates the interactions between our stored past and our potential/predictable future.

Our mind is more the "consciousness" or "mindfulness" of the brain's activities, but what is consciousness versus mindfulness? If we could look at the electrical activity of the brain it would be like looking at a bunch of dots on

a page but once you start to see association, and patterns in those dots it would become more meaningful. The mind tries to make sense of the status and activity of the brain. First you see dots, then forms, then letters, then words, then pictures or stories in a hierarchy of organizational coherence that best fits our current model with the minimum amount of disruption or energy required to make a different story. Our conscious identity is not just the electrochemical status of our brain or body, nor is it just our mind. Our personal consciousness may be more the realizations of the patterns, using input from the body and brain, as it relates, harmonizes, and coheres in a superadditive analysis of their collective cooperation. As the mind finds patterns that cohere or match with current patterns they become the new model for further coherence. Our consciousness is constantly aware of our current state, comparing that state with our past, and anticipating its consequences for our future.

> **Mind**. **The thinking, perceiving, and feeling mechanism of the human organism. The total conscious and unconscious experience. The intelligence associated with the emotional life reaching upward through worship and wisdom to the spirit level. 0:5.8**
>
> **Jesus discourse on mind:**
> https://ubgeoff.com/Images/DiscourseonMind.mp4
>
> **"The human mind is one of the great mysteries of modern science, as we cannot sufficiently explain how the brain in general, or consciousness in particular, works. However, it's a reasonable "null hypothesis" to presume that electricity, i.e., the flow of electrons, is the primary driver behind our perceptions that we are conscious. Although quantum effects may play a role, it's an unnecessary complication to presume that consciousness is anything other than the flow of electricity." Ethan Siegel (Ref 64)**

Let's look at some of the "unnecessary complications" of living electrochemical activities of our animal brain and body. Some of the more widely accepted biological processes include the mitochondrial electron transport chain, electron and proton tunneling in proteins, and magnetoreception. Let's see if we can find some of those complications that determine how we prioritize things with the goal of becoming more spiritually minded.

> **The physical brain with its associated nervous system possesses innate capacity for response to mind ministry just as the developing mind of a personality possesses a certain innate capacity for spirit receptivity and therefore contains the potentials of spiritual progress and attainment. Intellectual, social, moral, and spiritual evolution are dependent on the mind ministry of the seven adjutant spirits and their superphysical associates. 65:6.10**

The different states of the **"thinking, perceiving, and feeling mechanism of the human organism" 0:5.8** have many different levels of activity:

- unconsciousness – a disrupted connectivity state of the brain's input mechanisms.
- "cessation" – unconsciousness attained by advanced meditation. (Ref 95 & 96)
- subconsciousness – a state of suppressed input activity.
- deep sleep – a delta wave dominant, immune system strengthening, body repairing state.
- hypnagogia – a creative transition between wakefulness and sleep.
- light quiet sleep – a period of hypothalamus shut down when the endocrine/hormone system link is suspended.

- rapid eye movement (REM) – active dream sleep, when the noradrenaline, fight-or-flight response and thermostasis regulation systems are suspended. In this stage, when dreams are most vivid, the brain is flooded with acetylcholine, a chemical that fuels imagination, but noradrenaline, which helps encode memories, is nearly absent and the dorsolateral region goes mostly offline. REM sleep also activates visual and emotional regions, like the occipital cortex and the amygdala, while deactivating the prefrontal cortex, which normally helps build causal structure and temporal order. It may also involve the Default Mode Network which includes regions such as the medial (middle) prefrontal cortex, posterior (rear) cingulate cortex, precuneus (responsible for self-awareness and episodic memory) angular gyrus (sensory integration linking visual, auditory, and other sensory information to language, reading, writing, and math) and lateral parietal cortex (integrating sensory information, spatial awareness, attention, and movement planning). These areas become active when the mind is at rest, during daydreaming, self-reflection, worship or imagining the future.
- wakefulness – a beta wave dominant state of free will controlled thinking.
- superconsciousness - the pre-prioritized state of the brain that is not overtly involved in input analysis or decision making.

Each sleep state (except for hypnagogia which is more variable) lasts for about 90 to 110 minutes.

Chemical	Role in Sleep and Cognition
Acetylcholine	Promotes REM sleep and dreaming; enhances cortical activity
Norepinephrine	Supports alertness and memory; levels drop during REM, weakening memory encoding
Serotonin	Regulates mood and sleep cycles; modulates transitions between sleep stages
Dopamine	Involved in motivation, reward, and dream intensity; may spike during REM
GABA	Main inhibitory neurotransmitter; helps initiate sleep and reduce neural activity
Melatonin	Sleep hormone; regulates circadian rhythms and signals sleep onset
Cortisol	Stress hormone; peaks in the morning and influences dream recall and emotional tone

Key Neurotransmitters Image credit Michael Ng

Side Note: The commonalities of dream recall are:

Intense focus on unsolved questions before sleeping then dreams may recombined fragments of prior knowledge in novel ways.

Strong visual-spatial cognition. Dreams may show an ability to mentally visualize complex forms.

Reflective or introspective disposition. Paying close attention to, sometimes keeping journals or pondering their symbolic meaning.

Openness to intuition and metaphor. Readiness to translate the dream into insights.

Side note: Microglia, the brain's resident immune cells, a type of neuroglia or glial macrophage cleanup cell, are the brain waste removal cells and are most active during deep sleep. Smell-related impairments arise when microglia strip away connections between two key regions: the olfactory bulb and the locus coeruleus.

It is to the mind of perfect poise, housed in a body of clean habits, stabilized neural energies, and balanced chemical function - when the physical, mental, and spiritual powers are in triune harmony of development - that a maximum of light and truth can be imparted with a minimum of temporal danger or risk to the real welfare of such a being. 110:6.4

Looking at our multiple states of consciousness prompts some questions. What influences these various states of our brain's activity? What extracts, filters, or makes us more aware of our current thoughts than our stored memories or observations? How does our awareness shift from material to spiritual, from "me" to "we", from self to selfless, from adjutant to cosmic thinking? Where does our consciousness of God come from?

If we look closely at Paper 62 and the evolution of primates into humans, we can see that there is an increasing ability for the adjutant mind spirits to contact the evolving animal brain. Specifically in **Papers 34:4 - 5, 62:6.2**, we see an increasing ability to associate within a specific subset (instinct, recognition, consciousness, knowledge, counsel) as precursive steps towards the overall associative mechanisms of worship and wisdom. Brain-minded function seems to come into being and then be stabilized, by these interactive resonances, once established.

Let's use our creative wakefulness (and perhaps our hypnagogia and our superconsciousness) to look for some logical connections between intelligence and consciousness, between brain and mind, between cellular interactions and spiritual receptivity.

Current Theories of Consciousness

Do physiological processes in the brain correlate with our subjective experiences? How do the dynamics of consciousness vary with observable physiological processes?

What connects these?

Psychological - Physiological
Subjective - Objective
Cognition - Sensation
Consciousness - Unconsciousness
Reality - Experience
Inside - Outside
Personal - Impersonal
Information - Matter

These are the current theories of consciousness (Ref 35, 106).

Integrated Information Theory: IIT - Consciousness as a Web of Information (Ref 74)

The more interconnected or integrated the system the higher the "Phi" consciousness.
IIT provides a mathematical framework to quantify how much integrated information a system contains. It makes concrete predictions about which types of systems should correlate with consciousness and to what extent.

Methods: This would be measurable by complex calculations of the integrated information from high-resolution images of brain activity. However, the practical calculation of Φ is still a major challenge for complex systems such as the human brain. Recent research by Massimini et al. (2015) uses the foundations of IIT to assess states of consciousness in clinical contexts, e.g. in patients with impaired consciousness.

Central distinction: neuronal correlations vs. conscious states
Mediation strategy: formalized emergence through information integration
Form of dualism: implicit property dualism
Critique: The theory treats information as ontologically independent. Φ is neither causally effective nor systematically derivable. The difference between physical state and phenomenal experience remains unexplained (Doerig et al., 2021).

Predictive Processing: Free Energy Principle

Describes the brain as a Bayesian machine that minimizes predictions to stabilize its internal energy. Consciousness is thereby a function of hierarchical inference processes.

Central distinction: bottom-up sensory input vs. top-down prediction
Mediation strategy: probabilistic representation, minimization of surprise
Form of dualism: implicit information dualism
Critique: The idea of free energy as a control variable presupposes an epistemic subject. Information processing is reified without system-internal explanation. The homunculus remains hidden in mathematical formalism (Friston 2010, Brette, 2019).

Ego-Tunnel: Self-Model

Argues that there is no substantial self, but only a dynamically generated self-model that is constructed by the brain. Conscious experience is the result of this transparent model that does not reveal its model-like nature.

Central distinction: neuronal activity vs. phenomenal self-model
Mediation strategy: representation of self through model construction
Form of dualism: representational dualism, epistemically disguised
Critique: Avoids substance dualism, the model assumption leads to a two-level structure: the brain generates a model that in turn generates consciousness. The representation remains categorically separated from reality. The function of the model itself is no longer physically explicable but remains metaphorical (Stegemann, 2025 Metzinger 2003, 2009).

Space-Time Structure: Neurophilosophy

A neurophilosophical perspective that understands consciousness as a product of the spatial-temporal structure of intrinsic brain activity. Proceeds from the premise that consciousness cannot be explained by external stimuli alone but arises on the basis of dynamic inner states that exhibit a certain spatiotemporal coherence.

Central distinction: intrinsic brain activity vs. conscious experience

Mediation strategy: convergence through spatiotemporal patterns (common currency)
Form of dualism: neutral monistic mediation dualism
Critique: Argues against substance dualism, the idea of a "common currency" for neuronal and mental phenomena factually leads to a third, mediating entity. This "currency" remains theoretically underdetermined and functions as a metaphorical link, a classic feature of disguised dualisms. The spatiotemporal structure is not justified system-internally as a necessary result of the causal architecture but postulated as a coordinating reference system across both levels. The problem is thereby displaced, not solved (Northoff, 2012).

Multiple Drafts Model: Heterophenomenology

Functionalist approach to consciousness with Multiple Drafts Model. Instead of an inner theater or a central observer, he postulates a decentralized system of parallel, overlapping processing streams ("drafts") that selectively contribute to behavior control. For him, consciousness does not arise as its own phenomenon, but as a narratively constructible consequence of cognitive processes.

Central distinction: internal cognitive processes vs. publicly accessible behavioral level
Mediation strategy: heterophenomenology as methodological model of access point to consciousness
Form of dualism: eliminative-reductionist functionalism with epistemic separation
Critique: Although Dennett negates any form of inner subjectivity, his approach operates with a double strategy: On one hand, he eliminates the phenomenal inner perspective, on the other hand, he reconstructs it through narrative models. This narrative externalization only works if one already presupposes subjective experience. Conscious experience is thereby transformed into a hypothetical product of functional evaluation processes — an indirect dualism between process and content. The attempt to avoid the homunculus leads to a gap that nevertheless remains epistemically (Velmans, 2007 Bayne, 2009 Daniel Dennett 1991).

Naturalistic Properties Model: Dualism

Advocates the position of property dualism, according to which conscious experiences (qualia) are not derivable from physical processes. The so-called "hard problem" consists in explaining why and how subjective experience correlates with physical processes. Chalmers proposes treating consciousness as a fundamental property of the world — analogous to space, time, or mass.

Central distinction: physical processes vs. phenomenal properties
Mediation strategy: postulated psycho-physical basic relation (law-like character)
Form of dualism: explicit property dualism
Critique: Chalmers does not attempt to explain consciousness, but to secure it through ontological expansion. His proposal of dualism at the property level remains speculative and systemically inconsequential, as it creates no functional or causal bridge. The phenomenal sphere remains isolated. Ultimately, the problem is not solved but only metaphysically inscribed (Levine, 1983, David Chalmers 1996, 2010).

Enactivism: Autopoiesis

The concept of enactivism as an alternative to cognitivist-representationalism models. Consciousness does not arise here through representation of internal states, but through embodied interaction with the environment, whereby the organism is understood as an autopoietic, operationally closed system.

Central distinction: biological autonomy vs. phenomenological experience
Mediation strategy: co-constitution through dynamic interaction between body, brain, and environment
Form of dualism: implicit interaction dualism / two-pole structure
Critique: Despite the emphasis on unity and interaction, the separation between internal organism structure and external environment persists. The concept of co-constitution presupposes two things to be connected, whose relationship is ultimately only described, not explained. The phenomenological perspective is indeed integrated but not functionally integrated. The relationship between neuronal activity and experience remains metaphorical. Enactivism remains trapped in a dualism between living structure and subjective experience, although it claims to overcome it. (Francisco Varela, Evan Thompson, and Eleanor Rosch 1991 and later Thompson alone 2007).

Predictive Perception: Controlled Hallucination

Consciousness as controlled hallucination. The brain constructs in a permanent prediction process a version of reality that is corrected by sensory inputs. These prediction models are not representations but active hypotheses. Consciousness arises when these models are confirmed with high certainty.

Central distinction: top-down hypothesis formation vs. bottom-up sensory evidence
Mediation strategy: predictive coding with subjective Bayesianism
Form of dualism: epistemic realism with implicit subject model
Critique: Emphasizes that perception is constructed, it remains unclear who or what validates the construction. "Controlled hallucination" implies a subject that possesses perceptions as its own experiences. Reality is presupposed as something to be distinguished from the mode. The representational framework is not abandoned but dynamized (Anil Seth 2014, 2021, Hohwy, 2013).

Embodied and Social Cognition: (4E Cognition)

4E (embodied, embedded, enactive, extended) emphasizes that consciousness is not localized in the brain but is essentially co-determined by the body, environment, and social interactions. Subjectivity emerges from the interplay of embodied action, situational embedding, and intersubjective dynamics.

Central distinction: internal self-model vs. external action and relationship context
Mediation strategy: extension of cognition across system boundaries
Form of dualism: functional-topological extension dualism
Critique: 4E transcends the boundaries of the brain, suggesting an internal cognitive structure (model, process, action motive) is presupposed, which is then functionally "extended" outward. This presupposes a centered subject that is extended, a form of disguised substance thinking. Moreover, interaction with the environment is usually presented as external modulation of an internal process, whereby an ontological primacy of the inner remains (Shaun Gallagher 2005, 2017 Wilson & Foglia, 2017).

Eliminative Materialism

An eliminative-materialist position according to which the traditional concepts of folk psychology (e.g., belief, desire, pain) should ultimately be replaced by neuroscientific descriptions. Consciousness is not recognized as a phenomenon to be explained, but as an erroneous conceptualization from an obsolete conceptual world.

Central distinction: neuronal mechanisms vs. folk psychological concepts
Mediation strategy: elimination of mentalistic concepts in favor of neurobiological terms
Form of dualism: gap through conceptual negation, implicit reductionism
Critique: Attempts to avoid dualism by denying one side by circumvention. Conscious experience as a phenomenon is not explained but declassified as false language use. A categorical break persists, not as metaphysical but as epistemological: access to one's own experiential world is cut off by theoretical specifications (Patricia Churchland 1986, 2002 Nagel, 1974, Searle, 1992).

Neuropsychoanalysis: Affective Cognition

Combines neuroscientific and psychoanalytic approaches to a theory of consciousness in which affects and motivations play a central role. Argues that consciousness is primarily connected with affective states, not with cognitive representations. The origin of conscious experience lies in the subcortical system (e.g., hypothalamus, brainstem), not in the cerebral cortex.

Central distinction: affective experience vs. cognitive information processing
Mediation strategy: affective ego as mediating core between brain and subjectivity
Form of dualism: affect-cognitive layer dualism
Critique: Despite the emphasis on affective foundations, the conscious ego is introduced as an emergent quantity over a neuronal foundation. The emotional basis remains a substrate that is not system-internally integrated with cognitive levels but is treated as hierarchically prior. The attempt to tie consciousness back to feelings again creates a two-level architecture, between feeling and representation. (Mark Solms (2013, 2021), Panksepp & Biven, 2012).

Mutual Information Theory: (MITC) Info-Thermodynamic Framework for Awareness and Qualia.

A thermodynamically grounded framework that conceives consciousness not as an emergent byproduct of complexity, but as a structured field of reversible computation that selectively amplifies fragile informational forms under entropic pressure. Consciousness is defined as a mutual information field i.e. a temporally extended, coherence-preserving structure. (Ref 162)

Higher-Order Theories: HOT - Consciousness as Self-Reflection (Ref 75)

The brain represents its own higher order of perception or mental state. Conscious experience is the result of thoughts about thoughts, self-representation or metacognition. (Ref 50)

Biological Naturalism: Consciousness as a Biological Naturalism Phenomenon (Ref 76)

An emergent biological phenomenon of purely physical biological mechanisms in the brain where specific neural correlates of consciousness (NCCs) form a minimal set of brain mechanisms when producing a particular conscious experience.

Panpsychism: The Universal Consciousness (Ref 41)

Consciousness as a fundamental property of the universe, akin to mass or charge. All physical entities, from electrons to galaxies, possess some form of consciousness or proto consciousness.

Neural Darwinism: Theory of Neuronal Group Selection. The Evolution of Consciousness

Consciousness emerging through a process of selection among groups of neurons, akin to the principles of natural selection.

Global Workspace Theory: GWT - Consciousness as a Central Information Hub (Ref 77)

Consciousness arises from the integration and sharing of information across different brain regions and functioning as a central information hub, allowing various cognitive processes to communicate and cooperate. GWT is a recursive process with meta-stability based on the hypothesis that certain states of consciousness correlate with recursive processing loops. Neuronal signals are not only processed forward but also sent back and forth between different brain regions in complex feedback loops. A certain degree of recursion could correlate with a meta-stable state that could be characteristic of certain states of consciousness. Lamme and Roelfsema (2000) proposed that recurrent processing in visual areas is necessary for conscious visual perception. Their studies show that the first wave of activation in visual areas does not correlate with conscious perception; only the recurrent feedback loops show a strong correlation with conscious experience. Methods: The analysis of connectivity patterns and information flows between different brain regions using functional MRI imaging or complex EEG analyses could provide insights into these recursive processes. For example, Boly et al. (2011) have shown that certain states of consciousness correlate with specific patterns of effective connectivity between brain regions.
Recent research by Dehaene and Changeux (2011) emphasizes the importance of long-range feedback connections for certain states of consciousness.

Thermodynamic Theory: Entropy to organization exchange.

Consciousness arises as a complex, self-organizing patterning of energy, information processing, energy efficiency, and entropy reduction in the evolution of complex systems capable of exhibiting intelligent behaviors and subjective experiences. (Ref 82) This includes the concept of critical transitions in neural systems. According to this approach, certain states of the brain operate near a critical point which correlates with specific states of consciousness. At this point, small changes in neural activity could correlate with large-scale, qualitative changes in consciousness. Beggs and Plenz (2003) discovered “neuronal avalanches” in the cortex that follow a power law distribution — a feature of critical systems. They argue that this critical state is optimal for information processing and storage, which may be related to certain states of consciousness. Methods: The observation of power law distributions in the size and duration of neuronal activity clusters could provide clues to such critical transitions that correlate with changes in the state of consciousness. Hesse and Gross (2014) have developed methods to identify and quantify critical dynamics in brain networks. Recent studies by Tagliazucchi et al. (2016) show that the human brain operates closer to a critical point during wakefulness than during sleep or under anesthesia. This suggests that the critical state may be closely related to certain states of consciousness.

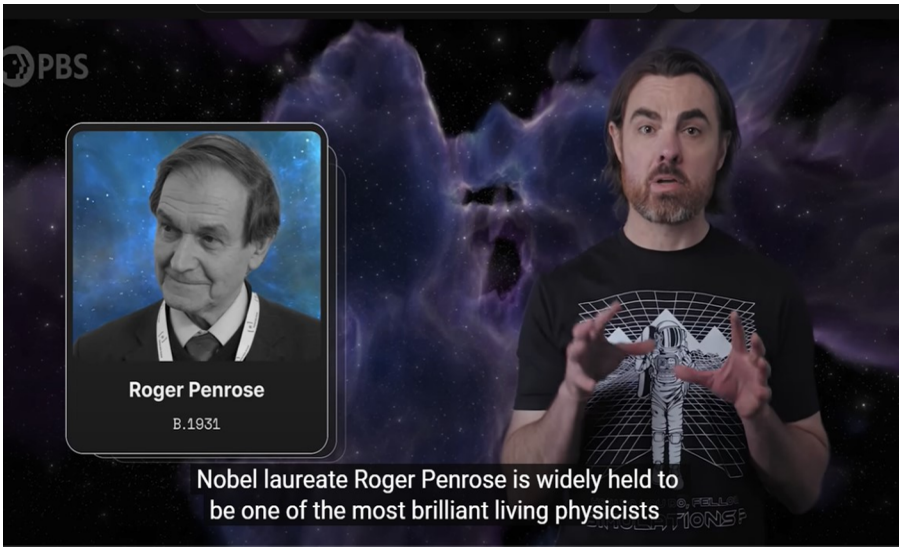
Quantum Consciousness Theory: Quantum Mind Theory (Ref 78)

> Quantum Consciousness Theory is based on the idea that microtubules, which are tiny protein structures found within cells with DNA, can facilitate quantum computations.

Each of these theories looks at consciousness from a different perspective, each looking for the simplistic basis for that consciousness. Most of these theories confound the neurophysiological, with the phenomenological and miss a fundamental aspect of all these biological systems which is their inherently complex nonlinearity. This nonlinearity has far-reaching consequences for our understanding of consciousness. In biological systems, including the brain, there are virtually no true linearities. Instead, nonlinear interactions are the norm (Laughlin et al., 2000). This means that the output of such a system is not proportional to its input, and that the behavior of the overall system cannot simply be understood as the sum of its parts. (think super additive consequences) This nonlinear nature of biological systems supports the idea that consciousness should be considered as an integral part of our neural systems, not as something that is "generated" causally. Complexity and non-linearity make it possible to understand qualitative changes of consciousness without having to resort to reductionist explanations. Complexity and non-linearity seem to be most apparent in the feedback loop of observations and reactions. (Ref 129)

In this exploration, although we will look at numerous mechanisms that may be involved in many of these theories, we are going to focus on the Quantum Consciousness Mind Theory, first because it has the longest reaction/reflection feedback time and secondly because I think it most closely reflects *Urantia Book* concepts. I also like thinking of this complexity and non-linearity as existing at the intersection of the past that sets the stage, and our choices that adapt the stage for our future. Our past created our status by normal Newtonian mechanisms, but our future is probabilistically determined by how our thoughts influence our actions. (Ref 83)

For a summary of these and others check out Ref 172.
Here's a good YouTube video highlighting how the Quantum Consciousness Theory works:



https://youtube.com/watch?v=xa2Kpkksf3k&feature=shared

Consciousness as a Unified Mechanism

Consciousness, a phenomenon central to our understanding of the human mind, and even our God consciousness, has traditionally been divided (as we saw in the preceding section) into different categories and aspects. Separate concepts such as phenomenal awareness, access awareness, self-awareness and the distinction between conscious, subconscious and super conscious processes have long shaped research and confounded philosophical discussions. Here I suggest that consciousness is a hierarchical, flexible mechanism that can take on these different states and intensities, but that it always functions on the same underlying mechanisms.

This continuous processing, with various degrees of intensity concept, provides for a more holistic simplistic approach. Different states of consciousness (e.g., wakefulness, sleep, meditation) can be understood as different configurations of the whole body's neural network, which is continuously, seamlessly, adapting to changing demands and focus. Modes of operation coincide with degrees of unification or synchronicity (resonances with pre-established and/or cosmic patterns).

Hierarchical consciousness allows for continuous balancing of global and local coherences. The degree of information integration can vary depending on our different states and intensities of consciousness. The flexibility of integration-differentiation enables processing of information in many different contexts. This highlights the importance of subcortical structures, especially the brainstem, for higher cognitive function. In this hierarchical perspective, these structures are initializing components. These subcortical structures such as the brainstem can act as the "accelerator", "brake" or "disconnect" for downstream consciousness mechanisms.

Consciousness is characterized by highly complex and dynamic neuronal patterns. Consciousness is associated with a high level of integrated information, reflective of the complexity of neural activity patterns. (Tononi and Edelman - 1998) and patterns in mind-altered states have shown that neuronal patterns are recognizable in states such as coma or deep anesthesia, but with reduced complexity and variability. (Demertzi et al. - 2019)
Characteristic patterns of functional connectivity, especially in the default mode network and other large-scale networks, correlate strongly with the state of consciousness (Vanhaudenhuyse et al., 2010). The gradual changes in pattern complexity (Mashour et al., 2020) and the dynamics during transitions between the different states of consciousness (e.g., from wakefulness to anesthesia) support our hierarchical concept.

Said mathematically:

> The exponential rate of change of consciousness is a function of the current direction of consciousness, multiplied by the current system status, times the sensor inputs, all multiplied by an exponential factor, representing the dynamics of the system e.g. the ballistic nature of the microtubules (which we will explore later) and this is all complicated by an element of randomness. (Ref 133)
>
> Side note: The "information" needed to answer a question, can be framed as "considering all the possible answers". Every time we eliminate a potential answer, we have acquired one "bit" of information.

Another mathematical way of looking at consciousness is using a new theory called the Viscous Time Theory (VTT-Fourier). VTT unifies entropy (second law of thermodynamics) with the improving organization of matter and the information encoded in that matter, (second law of information dynamics SLID). VTT says that the prime driver in consciousness, (and everything else for that matter) is a coherence gradient rather than a thermal gradient.

It suggests that it is not "heat flow," but a coherence tension gradient across a spatial region that is the motivating force of heat flow. VTT states that what drives change is not the thermal energy itself but rather it says that heat is the reaction to a disturbance in the coherence field, which then acts as the informational scaffolding of physical behavior. i.e. heat is a consequence of information divergence. (Ref 157). The VTT-Fourier theory is consistent with the standard thermal diffusion equations, and because it resolves things in the time domain, it also gives an expanded interpretation of quantum interactions, intelligence mechanisms and material engineering.

Viscous Time (VTT-Fourier) Theory:

$$\Phi_Q = -\kappa \cdot \nabla(\nabla \cdot C)$$

Where:

- Φ_Q: informational heat flux
- κ: coherence diffusivity constant (material + η_t dependent)
- C: local coherence field

This theory says that heat propagates as a cascading disruption of aligned informational structures, the metric of which is informational disorder propagation. What diffuses is coherence failure. What flows is the stress of information tension and what can now be seen as field-level manipulations of thermal behavior i.e. it is all about alignment, resistance to that alignment, and information topography.

$$\frac{\partial C}{\partial t} = \kappa \nabla^2 C - \beta \nabla S$$

Where:

- S=∇·C is entropy
- β is a coupling coefficient for entropy-pressure interaction

VTT says that the coherence field relaxes over time, as it is influenced by entropy and resistance from temporal viscosity. Temporal viscosity is interesting when applied to *The Urantia Book's* material/temporal versus timeless/spiritual concepts. (think error, sin, evil and iniquity)

> **Nature is the perfection of Paradise divided by the incompletion, evil, and sin of the unfinished universes. This quotient is thus expressive of both the perfect and the partial, of both the eternal and the temporal. Continuing evolution modifies nature by augmenting the content of Paradise perfection and by diminishing the content of the evil, error, and disharmony of relative reality. 4:2.4**

Incompletion is a lack or organization of information and information equates to experience. In my opinion, after information organization establishes sentience (experiential coalescence, information convergence) the responsibility for further improvement (manipulating energy to improve the material organization and its associated encoded information) may be in part, passed over to the sentient beings. Notice how slow and incremental the progress of material evolution has been, to achieve this sentience! At our sentient stage, we can recognize this process and using our 3 fundamental cosmic intuitions (causation, duty, and worship), logically,

incrementally, continue that stabilization, patterning progress towards perfection. One might ask; What prevents backsliding after each increment towards perfection is achieved? It may be that once perfection in any one facet is achieved, coherence ensures future stability of that facet. e.g. materially we retained the "perfect human thumb" **62:5.2 (707.8)**

> "Evil is nothing more than a thermodynamic inefficiency — a loss of coherence that threatens the autopoiesis of the system." Alberti Romani
>
> Side note: Scientist have now demonstrated that heat flows like sound. They call it the "second sound" phenomena. This also implies a heat-harmony resonance ability. (Ref 168)
>
> Side note: Chris Watson's *Entropy Scale Factor* (ESF) theory published in *Reports in Advances of Physical Sciences* on July 19, 2023. Said there is no need for dark matter if we use entropy (total information and coherence, order vs chaos) to describe gravity. (Ref 66)

Physiologies of Body Consciousness

Our digestive system is involved in all the previously mentioned consciousness states. Our gut (sometimes called the second brain) has capabilities that may surpass our brain's intercommunication ability. It has its own nervous system, known as the enteric nervous system, and the cells in our body all operate in their related fields, inter communicating with each other and they have a direct pipeline to the brain via the Vagus (pneumogastric – lung heart) nerve. **The gut processes are slow, distributed, and chemically grounded. Rather than fast, synchronized pulses, like the brain, the gut operates through gradual concentration gradients, enzymatic feedback loops, receptor saturations, and diffusion-controlled signaling.** It is not centrally coordinated like the brain but composed of nested layers of control, epithelial, neuronal, immune, microbial, functional zones each contributing to a fluid, state-based computation that governs digestion, immunity, mood, and metabolism. Our gut's bacteria also contribute dramatically to our wellbeing as well as our sense of self. (Ref 139 Ted Talk - Kathleen McAuliffe)

> Side note: Your body is home to about 39 trillion microbes and 30 trillion human cells. So, technically, you're more microbe than man. Oh and by the way, recent research demonstrates a causal link between the microbiome and the brain's ability to recover from damage.

So, what is the gut brain (**microbe to mind**) interface? Structurally, the gut to brain interface comprises several interwoven subsystems that together sustain adaptive coherence between the gastrointestinal and central nervous systems. These involve the:

Vagus Nerve: The primary bidirectional signaling highway. The vagus nerve, which originates in the brain and travels to virtually all the organs of the body, is an "on-off switch" for the immune system. Over 80% of its fibers are afferent (conducted toward something) relaying gut-state data (chemical, mechanical, immunological information) to the nucleus tractus solitarius (NTS) in the brainstem.

Enteric Nervous System (ENS): A dense, semi-autonomous neural network embedded in the gut wall. It processes local signals and modulates gut activity independently, while coordinating with the Vagus and spinal afferents for upward signaling.

Neuroendocrine Signaling: Cells such as enterochromaffin cells detect nutrients and stressors, releasing neurotransmitters (e.g., serotonin, GABA) and hormones that shape both local gut states and central neural tone. Microbiome Immune Mucosal Axis: Bacterial metabolites, cytokine cascades, and pattern recognition receptors, form a highly sensitive input layer that feeds into both immune and nervous system pathways.

Central Processing Regions: The **brainstem**, hypothalamus, amygdala, and limbic system integrate gut-derived signals into mood, stress, and autonomic regulation, tuning the system's overall reversibility and entropy/coherence resilience. i.e. energy flow → structural compression → functional coupling → selective stability → causal integration.

Fascia: Fascia is a thin, durable, 3D network of connective tissue made mostly of collagen that supports, encloses, and separates muscles, organs, nerves, bones, and other tissues throughout your entire body. Acting as a comprehensive system, it helps reduce friction, allows for smooth movement by lubricating tissues, and serves as a sensory organ by transmitting signals about body position, movement, and pain. Fascia (which is made up of connective tissue, fibrocartilage) with its continuous whole-body endocrine interfacing, 3D matrix, electrically active pathways might be another body to brain connection mechanism. Fascia is richly vascularized and innervated (neuronally dense) and surrounds every organ, muscle, nerve influenced bodily sense, lymphatic flow, venous return, blood pressure, and immune system responses. The fascia is rich in sensory nerve fibers (approximately 250 million nerve endings) which in turn are rich in neurons, and nerves are rich with stable dendrite microtubules, dendrite microtubules act as a link between the nervous system and the immune system, so they actively participate in signal transduction. Microtubules primarily function as tracks for intracellular transport of essential materials like organelles and vesicles, using motor proteins to move them along the microtubule "railroad tracks" making them a significant mechanosensory organ.

Fascia is deeply intertwined with the autonomic nervous system and vagus nerve so it can activate autonomic responses and influence the nervous system through this sensory input. It contains mechanoreceptors that transmit sensory information, it is rich in collagen and elastin (elastin has an electrical polarity) and it interacts with the nervous, vascular, and lymphatic systems to maintain homeostasis and influences most bodily functions.
Fascia distributes, modulates, and controls the reception of adrenaline, estrogen, insulin, thyroid hormones, oxytocin and neurotransmitters like serotonin, dopamine, GABA, and acetylcholine, throughout the body.
Fascia also regulates the flow of extracellular fluids, interstitial fluid flow. Interstitial fluid carries hormones and neurotransmitters between cells. The interstitial fluid's movement is influenced by mechanical forces like stretch, compression, and shear. Chemical composition and concentration in the interstitial fluid are constantly changing as a cause or result of numerous physiological processes. Each of these processes change the electrical impedance of the interstitial fluid and the vagus nerve plays a key role in communicating these changes to your brain.

This multi-level topology enables the brain (with its fast reaction times) and gut (with much slower reaction times) to function as a single coherence-seeking system, maintaining mutual adaptability under shifting internal and external loads.

> Side note: Single celled **bacteria** (that make up more than 90% of the cells in our body) use **similar signaling molecules to communicate virulence "quorum sensing"** to be aware of their species and the presence and virulence of other types of bacteria. (Ref 121)

Our gut's processing mechanism moves serially from acidic to alkaline, charging the battery, and it is electrically aided by being grounded through our connection to mother earth. We eat proteins of one form (plant or animal),

break them down into their constituent parts (amino acids, di and tri peptides) and then using electrical energy reassemble them into the protein configurations we need. The human body makes from 80,000 to 400,000 different types of proteins for many different purposes. The processes of using electro-motive power to extract and rebuild the necessary building blocks for the cells of our body co-evolved with us. We were designed and have evolved to be electrically active, but we also have some control in the ways we discharge the battery, and we will try to see how we can wisely direct that electrical discharge process. Interaction between cells is determined by the electrical surface properties (positive – negative being attractive and like charges being repelling). All cells possess a common genetic constitution, but they are influenced by their cellular environment, and their positioning in their nearby electrodynamic field. **The thing that determines whether their DNA folds into a brain cell protein or into a gall bladder is its electrical environment**. The cell's formation is controlled by an extra-biological guiding principle, **called "entelechey**" which literally means "the realization of potential". (Ref 48 & 94 Mike Levin Ted Talk) Subatomic particles exhibit wave-particle duality within quantum fields, atoms form through electromagnetic polarities within molecular structures, cells develop through genetic encoding within organisms, the brain forms concepts through subject-object relations within cultural contexts. Each level reflects the same fundamental process: cellular consciousness creating relationships and using those relationships to create structure.

This is an excellent YouTube of **Michael Levin persistence pf pattern video**.
https://www.youtube.com/watch?v=Qp0rCU49lMs

Side note: Stem cells have the entelechey for the manufacture of every kind of cell. Very young children can regrow a lost limb, or missing parts of organs but we lose this ability as we age.

Peptides

Peptides form the basis of non-immune system signaling molecules and there are up to seventy different types of peptides. Peptides are small portions of digested or manufactured proteins, and they form signaling molecules like endorphins (Ref 13), hormones, and neurotransmitters. These signaling messenger molecules connect the cells of the body's endocrine (bodily functions), and nervous systems, cascading electro-chemical messages between cells, along nerves, up the spinal cord, to the brain stem, the amygdala, the hypothalamus, the thalamus, the pineal and pituitary glands, and then on to other areas of the brain for appropriate responses. These **peptides form the base of the periaqueductal gray (PAG) area of the brain stem which is the hub for self-awareness and pain mitigation**. This is also the hub for our qualia, the internal and subjective sense of our perceptions, the introspectively accessible aspect of our brain. The physical processes in the brain that give rise to "what is it like" or subjective experiences, are called the "qualia". Qualia are our self-organizing, self-referring and self-actualizing psychosomatic network that gives us our intrinsic properties of experiences (think sub- and superconsciousness). Peptides manage the biochemical overcontrol of our 34,000 possible emotions (Ref 80) and play a crucial role in assisting our qualia and the activities of our immune system, by integrating mental, emotional, biological activities and eventually our spiritual wellbeing. They change or predict our behaviors, affect our moods, and color our unique emotional tone (Ref 20) and interestingly, there are no hard-wired emotion control circuits in the brain. Emotional responses, as measured by our heart rate variability HRV (Ref 157), are controllable. The physical heart is responsive to our emotions. For example, excessive fight or flight triggers "tokosubo" cardio myopathy, "broken heart" syndrome.

Side note: **Heart rate variability HRV** is measured by taking the standard deviation of the time differences between heartbeats. Lower numbers imply lower ability to deal with stresses. Higher variations

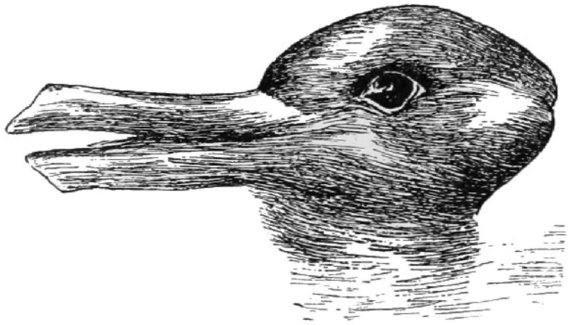
indicate the heart's ability to adapt to future needs should they appear. HRV drops with age unless maintained by fitness and mindfulness training.

At any moment of time, in the blood stream of any human being there exists the possibility of upward of 15,000,000 chemical reactions between the hormone output of a dozen ductless glands. 65:6.6

Peptide-based compounds cause chemical reactions and as these reactions cascade along nerves, their "critical first stop" is the brain stem and medial limbic region of the brain (including the light sensitive pineal gland) where they are sorted and prioritized before furtherance to the neocortex for responses or for memory storage. Sensory inputs are dealt with via the amygdala and the sympathetic (fight or flight accelerator) nervous system and balanced by the parasympathetic (think Vagus heart-lung) nervous system which regulates "rest and digest" "calm down" functions.

Side note: There are devices on the market that stimulate the vagus nerve to mitigate depression, seizures and arthritis.

There are 86 x 10^{10} neurons transmitting signals at about 120 m/s or 275 mph. There are 100 x 10^{14} synapses of which 250,000 are firing at any one moment and they are all entangled (Ref 192). If we think of the synapses as the pixels of a camera and the **firing rate as the number of pixels** that are changing from frame to frame, then the refresh rate of the image occurs at (100 x 10^{14}) / 250,000))/ 275 = 1,454,545 frames per hour or **24,242 frames per second**. To handle the continuum of signals, the brain has constant communication between its 86 billion neurons and its 100 trillion synapses. This is 10 to the millionth power of possible states, so the flow of information is more like constantly moving three dimensional images. As a tiny example of this, the brain can form a three-dimensional image from the electrochemical signals received as light from an object hits dozens of parallel stacked "pigment" disks in the rods (for detecting dim light) and cones (for detecting red, green and blue/ultraviolet) of the retina (Ref 86). This process is called phototransduction. Each disk has a seething liquidity of receptor molecules (rhodopsin in rods and photopsins in cones) moving in a "random" manner. If more than 6 photoreceptors are triggered within half a second it sets off a cascade with nearby molecules in this semi liquid sea, transferring a small signaling molecule amplifying the signal and it takes billions upon billions of photons to create an image. Similarly, other cells in the body have "random" motion collisions with neighboring cells or they transfer messenger molecules which determine their interactions. In the case of the eye, these interactions cascade electrochemical signals in a chain reaction down the optic nerve to the visual cortex of the brain which creates the visual image, but our conscious image is made up of much more than just the visual image. Our conscious image includes everything that is happening, along with all our previous models, memories, related thoughts, qualia, gut actions, reactions, current and future intents.



Is it a Duck looking left or a Rabbit looking right?

Is it a young woman looking away or and old woman looking at you?

It is interesting to note that there are ten times as many neural connections coming back from the various cortex areas of the brain, as there are going out from it, so the mid brain is sharing the current inputs with all other associated areas of the brain for continuous reflection, cross referencing, model building and choosing. In effect, we are continuously observing and relating our current self with our past self. (Ref 10) That we can perceive this ambiguous image in one of two ways is like the **quantum superposition of states where it is only "fixed" once observed**. (Ref 103)

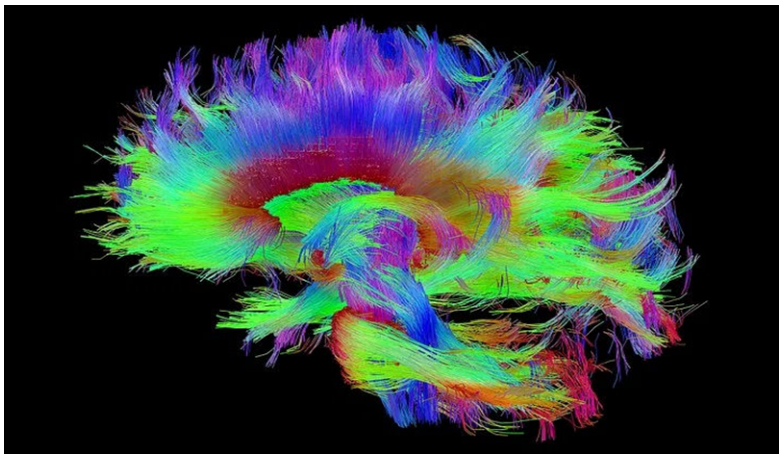
Side note: There is an equal probability of it being either. You choose which one it looks like.

“The human mind does not create real values; human experience does not yield universe insight. Concerning insight, the recognition of moral values and the discernment of spiritual meanings, all that the human mind can do is to discover, recognize, interpret, and choose.” 196:3.10

Ideas are not simply a record of sensations; ideas are sensations plus the reflective interpretations of the personal self; and the self is more than the sum of one’s sensations. 133:7.7

Side note: The most important part of the brain, the neo-cortex, is almost the same everywhere. It manifests material uniformity.

Side note: Up to 30% of the brain is used primarily for adapting, deciding, reasoning, and planning.



Brain Wiring Networks

Intercellular Communication

Intercellular communication is not limited to the brain. Communication between individual cells is facilitated by cellular cytoskeletal structures (the hardware of cells), eicosanoids (fat signaling molecules) in the immune system, and nerve cells (neurons). Cytoskeletal structures are in all cells, including neurons. They include microtubules and they are also used to transport information and move substances to various parts of the cell. They also align with neighboring cells, rapidly changing their molecular structures, and intermediate filaments. (Ref 84)

While we are thinking about intercellular communication, it is important to distinguish between neurons and nerves. A neuron is an individual cell that processes and transmits information through electrochemical signals whereas a nerve is a bundle of long, slender projections of neurons called axons. So, while neurons are individual cells that carry nerve impulses, nerves are bundles of these neurons.

Let’s first look at nerves of which there are two types, sensory (incoming) and motor (outgoing). Nerves are made up of many sections varying in length from 0.1 mm to a meter and there are millions of miles of nerves in our brain. Nerve stimulation has a trigger voltage below which there is no response and above that voltage the nerve fires. Peptide neurotransmitters are chemical messengers that are released to communicate (fire), unidirectionally,

between nerve segments. The actual electrical energy that "fires" a neuron, also known as an action potential, is created by the movement of ions across the neuron's cell membrane. Here's a step-by-step breakdown of the process:

Resting State: When a neuron is not sending signals, it is in a resting state. During this state, the inside of the neuron has a negative charge relative to the outside due to the distribution of different ions across the cell membrane.

Depolarization: When a neuron receives a signal strong enough to pass a certain threshold, it triggers an action potential. This process, known as depolarization, involves the opening of sodium channels in the neuron's membrane, allowing positively charged sodium ions to rush into the neuron.

Propagation of the Action Potential: The influx of sodium ions changes the electrical charge inside the cell, causing the action potential to propagate along the length of the neuron's axon.

Repolarization: After the action potential has passed, potassium channels in the neuron's membrane open, allowing positively charged potassium ions to flow out of the neuron. This helps restore the negative charge inside the neuron.

Refractory Period: After an action potential, there is a brief refractory period during which the neuron cannot fire again. During this time, the sodium-potassium pump works to restore the original distribution of ions across the neuron's membrane.

Depolarization and propagation take about 2 milliseconds and recharging takes about a millisecond.

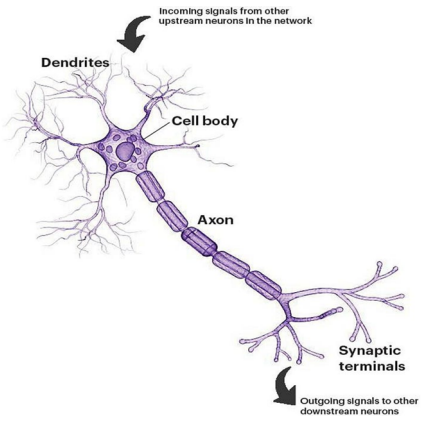
It's important to note that while this process involves the movement of ions, it is fundamentally different from how traditional electricity movement. Traditional electricity is generated by the movement of free electrons, but the electricity generated by neurons results from the motion of sodium and potassium ions across the cell membrane.

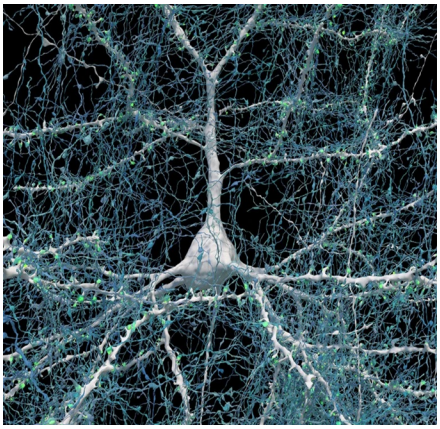
The voltage and frequency of firing, encodes the information as it is transmitted via the peptides and action potential along the nerve. Each segment intercommunicates at their intersections, and these intersections do not actually touch, instead, they have a 40-nanometer gap between them called the synapse. At each synapse are the synaptic vesicles which contain these peptide neurotransmitters.

Neurotransmitters (which control the concentrations of sodium and potassium ions) are prepositioned at each synapse as a function of our emotional predisposition and transfer their influence as they are released. Their concentrations can be changed by two main processes: epigenetic methylation (the replacement of a methyl group in place of a hydrogen atom on the appropriate DNA gene segment) and our emotional self-mastery.

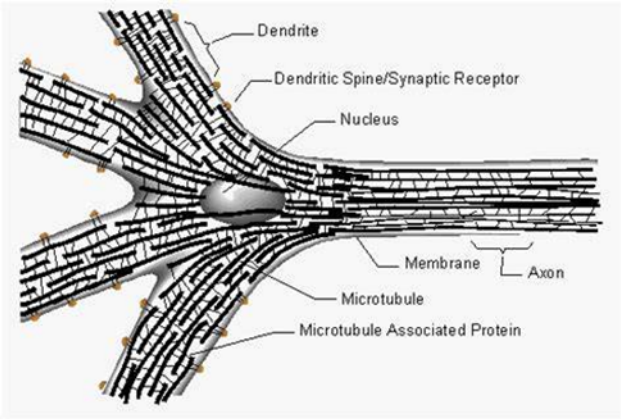
The chemicals that are released from a synapse when triggered are a function of the genetic and epigenetically modified synapse chamber shape and their current electrical status. Their electrical predisposition (which is influenced by previous activity) is determined by the local concentrations of calcium, potassium, and sodium ions (Ref 47) in and around, the neurotransmitter chamber itself. An example: abrineurin (BDNF or Brain-Derived Neurotrophic Factor) is a signaling protein that can enhance neuroplasticity, and its levels can be boosted by exercise (Ref 15, 141), ketosis, magnesium (L-Threonate) intake, and good sleep. (Ref 57) One emotional

condition, fear, involves the presence of calcitonin, a gene-related peptide, which is created by all fears and this peptide relays signals to other areas of the mid brain. Fear, with its related animal facial expressions and mannerisms, is mediated by dopamine from the amygdala. (Ref 9)

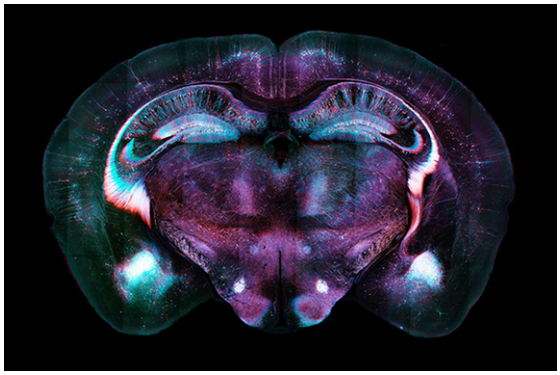




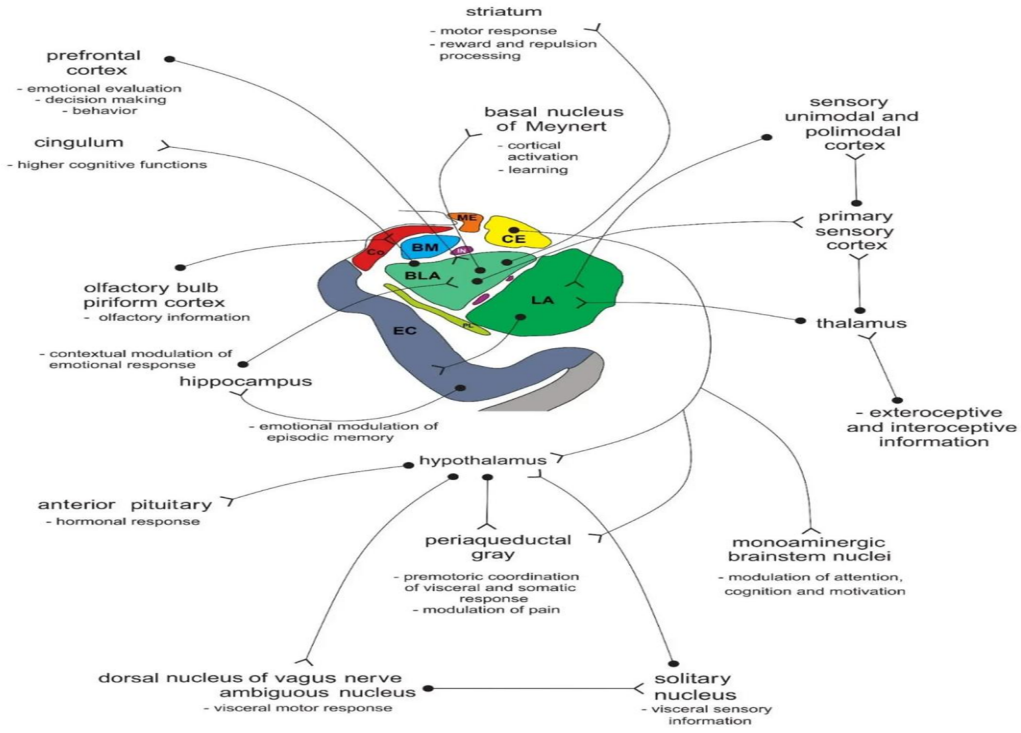
Single Neuron



Stable Dendrite Microtubules in Nerves



Basolateral amygdala contains two populations of neurons.one that stimulates fear and one that suppresses it.(Image credit: Arthur Chien/Science Photo Library)



Functional Areas of the Amygdala

So much of fear persists in the present-day races of Urantia because your ancestors received so little of Adam's life plasm, …76:4.6

Side note: The gene Microcephalin (MCPH1) regulates brain size. It has evolved under "strong positive selection" in the human evolutionary lineage. This means that, once introduced, the microcephalin gene (and changes to it, like one that occurred 37,000 years ago) spread rapidly, which generally indicates some specific survival advantage or strong preference. Brain size is said to have evolved as a result of the challenges of having to interact with more and more people.

Side note: Current research shows that fears can only be mitigated by building new stronger neural chemical pathways rather than trying to ignore the old ones.

Epigenetics

Let's look more closely at epi (above) genetics. Epigenetic changes don't directly alter the DNA's underlying code. Rather, they switch genes on or off or turn their volume up or down.

Side note: Epigenetic changes are very closely corelated with aging. (Ref 140)

Picture your genome as an orchestra: the instruments (genes) are always present, but not all play at once. Epigenetics is the conductor, bringing in the violins or silencing the drums, depending on the piece that needs to be performed.

Epigenetic changes involve methylation when methyl groups latch onto cytosine (C), one of the four letters in DNA's code. This primarily happens at places in DNA molecules where C sits next to guanine (G), known as CpG sites. Epigenetic changes occur at the molecular, DNA level, making them difficult to observe directly, however, their effects can sometimes be observed in the form of changes in physical traits or health conditions.

Here are some epigenetic change examples:

Diet and Nutrition: Nutrients like folate and polyphenols can alter methylation patterns of genes associated with aging and metabolism, e.g. SIRT1 is involved in longevity and cellular health.

Pregnancy Diet: Food or drink that a biological mother consumes while pregnant can cause epigenetic changes in the developing fetus. These changes can potentially affect the child's health and physical traits.

Social Interaction and Affection (Epigenetic Regulation of Oxytocin Genes): Positive social bonding can epigenetically enhance the expression of the oxytocin receptor gene, which influences trust, emotional bonding, and stress resilience.

Alcohol: Alcohol can disrupt the methylation processes, and those epigenetic changes can play a role in the development of some cancers (Ref 132). For instance, an epigenetic change that silences a tumor suppressor gene could lead to uncontrolled cellular growth.

Cancer: Physical stress can act as a potent, and underappreciated driver of epigenetic change. (Ref 181, 188)

Cell Differentiation: Epigenetic changes are also responsible for cell differentiation, where cells with the same DNA become different types of cells (like skin cells, liver cells, brain cells, etc.) based on which genes are turned "on" or "off".

Exercise (Histone Acetylation and DNA Demethylation): Physical activity can enhance histone acetylation in genes related to metabolism and mitochondrial function, making them more active. It also promotes DNA demethylation in genes involved in anti-inflammatory responses.

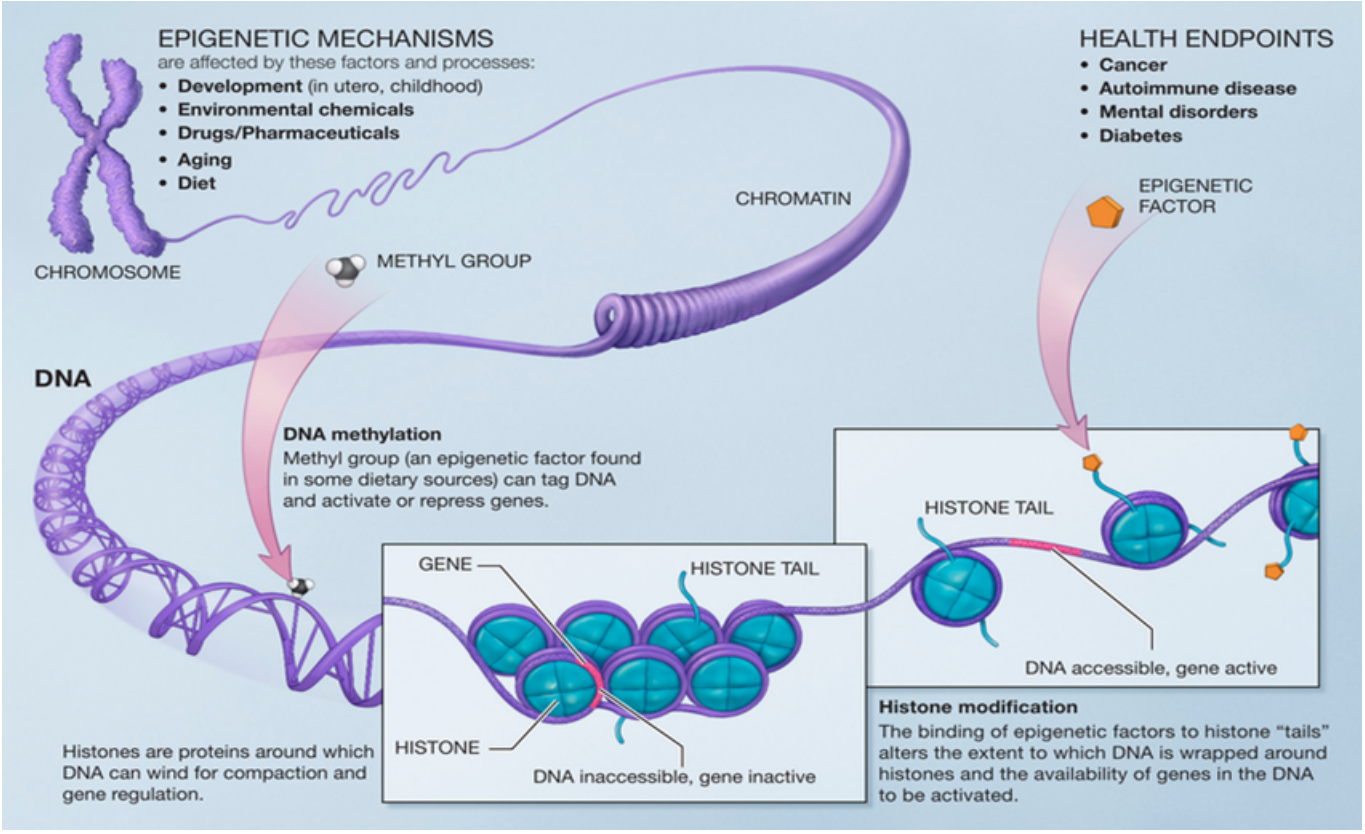
Meditation and Mindfulness (Methylation of Inflammation-Related Genes) Mindfulness can decrease methylation in genes like FKBP5, which is involved in the body's stress response and inflammation regulation, potentially lowering the risk of chronic diseases.

Here is a very good Ted Talk on human epigenetics:

> https://www.ted.com/talks/moshe_szyf_how_early_life_experience_is_written_into_dna?user_email_address=3d463761b7c72249f5eecc668bcd7124&lctg=62d1a7381c794c328cc68276

While we are talking about DNA we should differentiate the two types of DNA. There is nuclear DNA located in the nucleus of all our eukaryote cells, and it usually has two copies per cell, and maternal DNA, located in the cell's mitochondria, which contains 100 to 1,000 copies per cell. These DNAs are made up of two 1.8-meter-long strands of small nitrogen-containing nucleoside compounds; adenine (A), cytosine (C), guanine (G), and thymine (T). DNA is present in most of the cells in our body and the thing that determines whether that cell acts like a brain cell or gall bladder is the way it is folded. DNA is made up of segments called gene segments and the

combinations of these patterns are called its “gene expression” or “allele”. The complete gene expression is called your epigenome. There are parts of the DNA that are called “supergenes”, and these segments are not open for modification but there are three things that can control DNA’s collective gene expression; its electrical environment, small DNA segments called “enhancers” and methylation “tagging.” These change the final folded shape, and the final folded shape determines the protein’s function, i.e. whether it is a brain cell or a gall bladder.

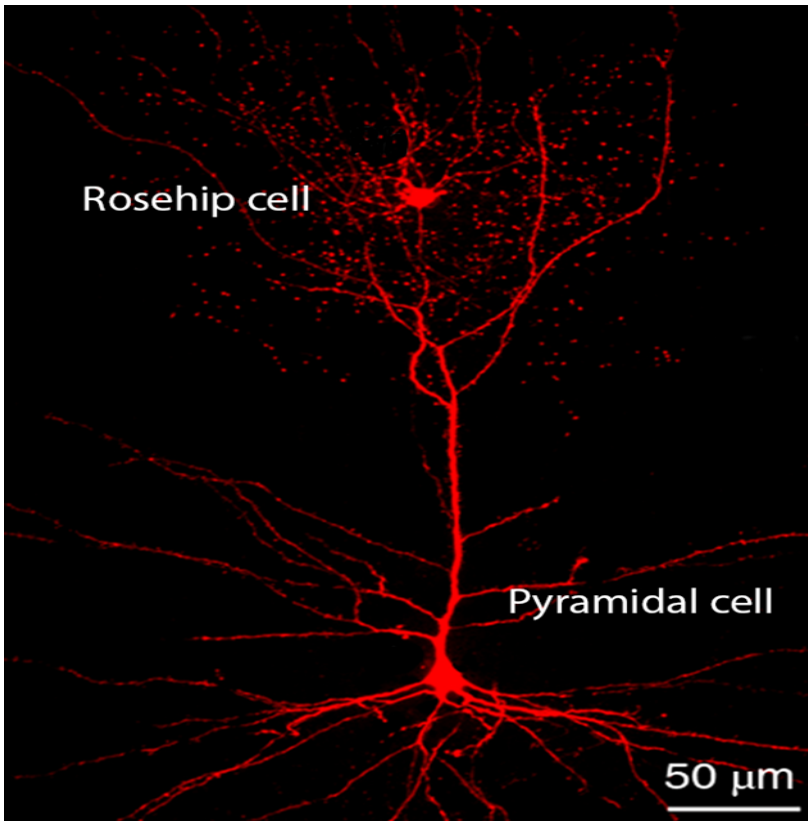


Epigenetic DNA Tagging

It is interesting to note that there is a specific variation of a gene called the NOVA 1 gene that is linked to language ability and only recent humans have this specific variant from about 400,000 years ago (think planetary Prince era). Scientists think the NOVA 1 gene resulted in the anatomical changes that allowed for the neural organizations that resulted in complex languages.

It is estimated that neurons in the human brain have over 4000 unique enhancers and 10 to 50-fold more glial cells (non-neuronal cells that do not produce electrical impulses) which are not shared by other primates. (Ref 81) There are also recently discover neuronal cells called “rosehip neurons” which are inhibitory brain cell in humans found in the brain's upper cortex. What makes the rosehip neuron unique is its distinctive shape. The cell's axon, which is the part of the neuron that transmits signals to other neurons, is dotted with small, spherical structures that resemble rosehips. These structures are known as boutons, and they contain the neurotransmitter GABA, which is a key player in inhibitory signaling. These cells act like neural "brakes," slowing down other neurons (pyramidal neurons) and may play a crucial role in human cognition. They specifically connect to the apical dendrites (branches) of pyramidal neurons that are densely packed with microtubules that are often in polarized arrays, which are crucial for internal transport, though their orientation, (plus-end-out vs. minus-end-out) vary

with age and location. The well-organized microtubule structures in apical dendrites give them precise control over information flow. (Ref 193)

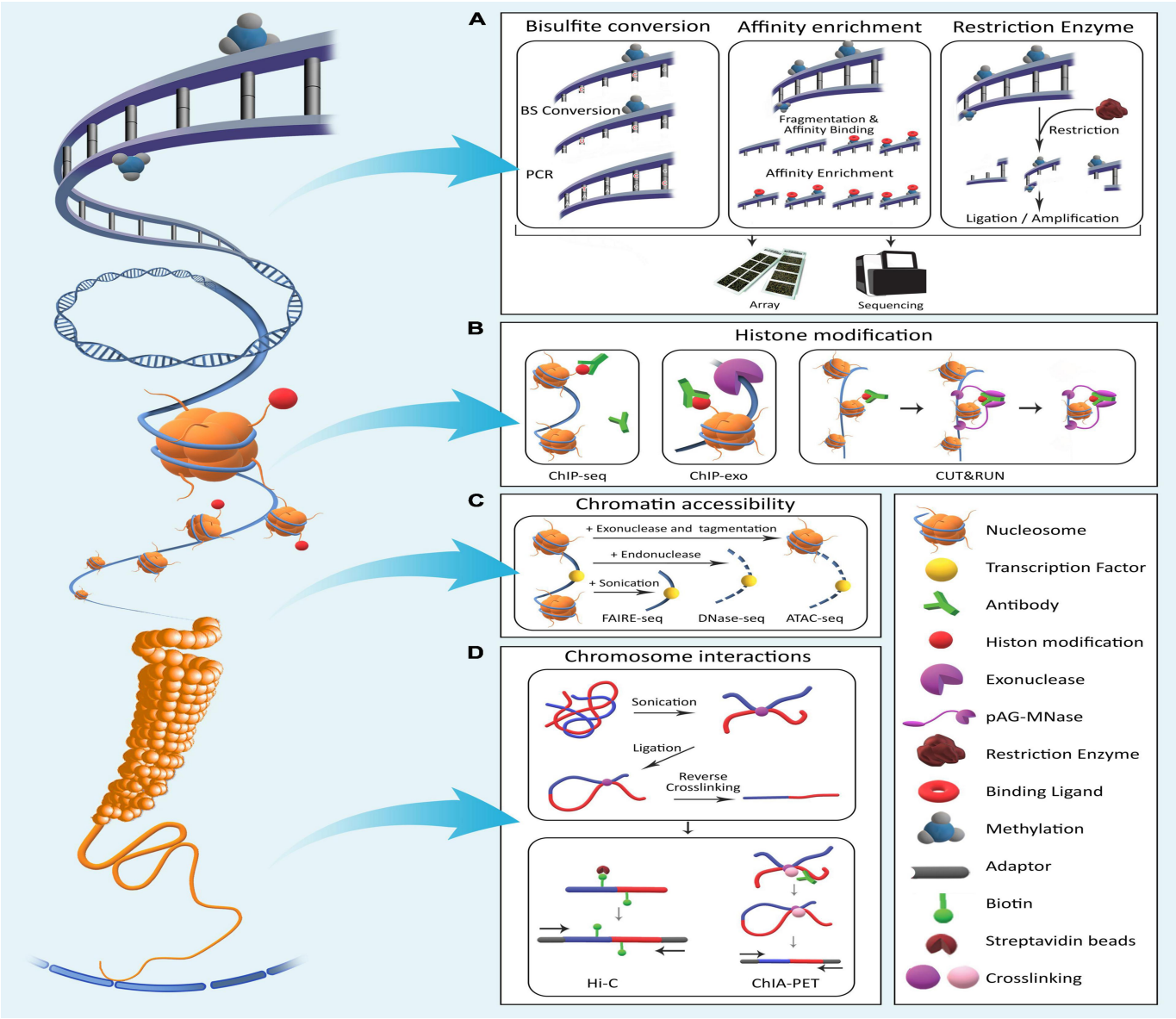


Rosehip Neuron

Human neurons are also more densely packed and consume more energy per neuron than other animals (6 Kcal per billion neurons, about 20 watts total) and there are a billion microtubule tubulins per neuron. The microtubule managed gene expression (the DNA folding pattern) determines which proteins are produced and that shape can be changed by the addition of methyl groups at strategic locations along the DNA strands but there are three other major methods of "epi" (above) genetic tagging or modification: histone acetylation (adding an acetyl group to histone proteins), chromatin compaction (wrapping the DNA around another protein) and nuclear organization (spatially arranging the chromosomes).

There are long-term gene expressions (think brain or gall bladder) and short-term ones, like when some comment angers you. An emotional response causes changes in the gene expression of certain cells, which does things like increasing your heart rate, increasing your blood pressure, adjusting your breathing, tensing your muscles, or standing the hair up on the back of your neck.

> Side note: Recent research, direct current-actuated regulation technology or DART (Ref 36), uses direct-current voltages to change gene expression.

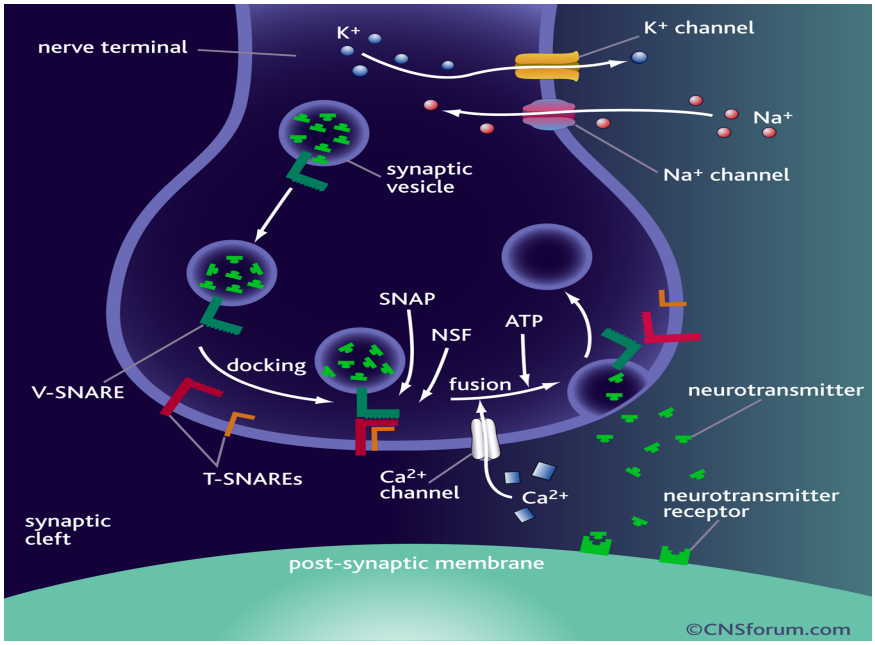


Epigenetic change techniques

Neurotransmitters

Since epigenetic modifications are often triggered by emotional responses, as seen above, we should look at the processes involved in our emotions.

The chemicals that are prepositioned at each of our nerve synapses are called neurotransmitters and they reflect our predetermined thought biases and emotional tendencies. The electrical environment of synapses and the associated neurotransmitters (which are in part regulated by the activities of microtubules) plus epigenetics, determine neurotransmitter manufacture and release at the synapses. Some of their main influences are as follows:



Synapse

Serotonin (95% of which comes from the gut): anxiety, current happiness, sense of wellbeing, appetite, mood, memory, and sleep.

Dopamine: future anticipation of unexpected benefits, motivation, pleasure, future happiness

Note: Dopamine doesn't make you like something, it makes you want it. It is released before, during and after an action. For example, alcohol or sugar levels increase dopamine levels by activating the nucleus accumbens (pleasure/reward center) and this sets the "current expectation level" above which dopamine is then released. This is called "The Pleasure Trap" or addiction. (Ref 53) Alcohol is a carcinogen through 5 different mechanisms. (Ref 132)

Gamma-Aminobutyric Acid (GABA): balance, excitement versus the urge to be calm.

Note: It is interesting to note that the balance of glutamate to GABA, (excitement versus the urge to be calm) changes throughout childhood and into adolescence, as glutamate levels increase then level off as adulthood approaches. The blend of these determines our level of maturity and is the most active of the neurotransmitters.

Norepinephrine (aka - noradrenaline): alertness, arousal, attention, cognitive function, and stress reactions

Acetylcholine: focus, learning and memory, parasympathetic (against emotion) nervous system

Oxytocin (a hormone and a neuropeptide with more pronounced, prolonged effect): orgasm, social recognition, pair bonding, anxiety, group bias

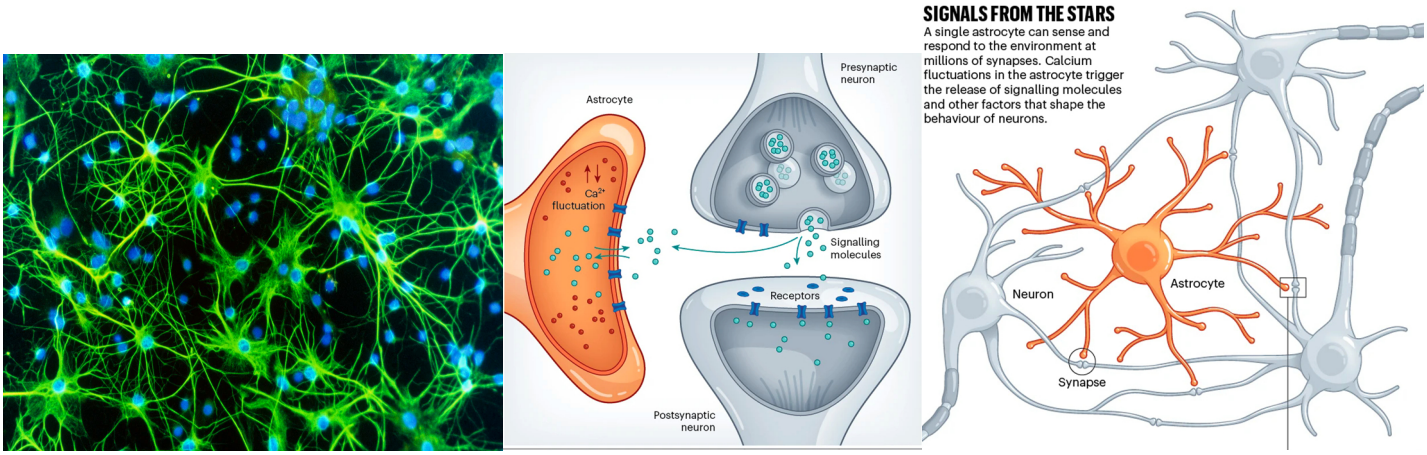
Endorphin (neuropeptide): current pleasure, self-esteem

Neurotensin (neuropeptide): like dopamine, but specifically for the differentiation of "good" from "bad" thoughts (stems from a survival perspective but may be involved with moral choices as well)

Melatonin (hormone): circadian rhythm (primarily from the pineal gland)

Cells in the synapse areas fall into two categories, neurotransmitters (function) and glial (protectors) except for glutamate astrocytes that function as both. Extracellular glutamate stimulates Ca2+ release from the astrocytes' intracellular stores, which triggers glutamate release from astrocytes, glial cell, to the adjacent neurons. (Ref 135)

Astrocytes make up ¼ of our brain cells and function to influence neurotransmitter availability. (Ref 191)



Astrocytes

Life Carriers **36:2.15** get huge credit here for the original design that led to intricate channels in our cell walls that creatively change shape with electrical potentials to open and close allowing the flow of these motivating chemicals in this dynamic environment. The flow through the cell walls of the chambers and their surrounding conditions are affected by previous stresses, anxieties, and fears of the future (among other things).

By consistent choice, we may slowly, incrementally, change our neurotransmitter predispositions.

Homeostasis

A major component in maintaining homeostasis and equanimity, is the hypothalamic-pituitary-adrenal (HPA) axis (Ref 43), which is an intricate, robust, neuroendocrine (nerve triggered hormone release) mechanism, that has similar physical attributes to neurons. It mediates the effects of stressors by regulating metabolic, immune responses, and the autonomic nervous system (ANS). The HPA (Ref 16) cascades signals down endocrine pathways that respond to negative feedback loops involving the hypothalamus, anterior pituitary gland, and adrenal glands.

> **Anxiety was a natural state of the savage mind. When men and women fall victims to excessive anxiety, they are simply reverting to the natural estate of their far-distant ancestors; and when anxiety becomes actually painful, it inhibits activity and unfailingly institutes evolutionary changes and biologic adaptations. Pain and suffering are essential to progressive evolution. 86:2.1**

Here are 5 things to know about anxiety:

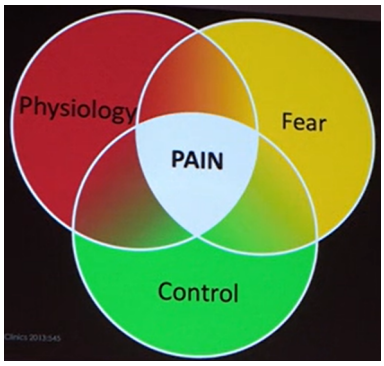
1. Anxiety convinces you that your thoughts will save you, but your thoughts are more likely to make you more anxious.
2. The body hurts from being constantly in the anxious, "fight or flight" state.
3. Anxious thoughts have no power to hurt you, unless you believe them. (think placebo effect)
4. Anxiety of the mind and the "fight or flight" state of the body are connected but different and once separated can be improved.
5. Anxiety is uncontrolled future thinking so you might want to focus on the current body state to break the cycle.

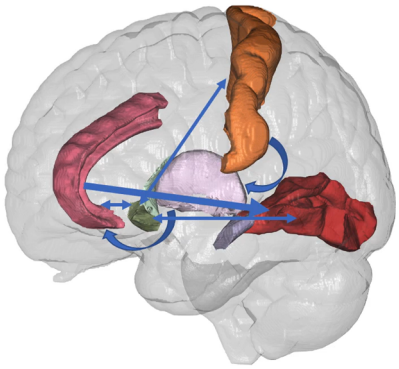
The word anxiety has the root angh, which means tight. The word fear on the other hand, has the root feraz, which means danger. Anxiety puts us in a tense, fearful, fight or flight, response state resulting in reductions of noradrenaline, so we become less attentive and less engaged. The antidote reset strategy to bring your amygdala and locus coeruleus back to homeostatic balance includes meditative behavior, focused physical or mental exercise and worship. (Ref 93)

> **All physical poisons greatly retard the efforts of the Adjuster to exalt the material mind, while the mental poisons of fear, anger, envy, jealousy, suspicion, and intolerance likewise tremendously interfere with the spiritual progress of the evolving soul. 110:1.5**

Side note: 17 of our most lethal diseases are linked to a lack of physical activity.

Pain and the use of drugs (poisons with one beneficial side effect) to mitigate pain is a classic case of misinterpretation. Dramatic neural activity is interpreted by the brain as a need to pay attention. We can mitigate pain by distraction. Opioids don't block pain; they over stimulate the pleasure centers of the brain to distract the senses. We can distract the brain's focus on pain physiologically, with vibration, cold or other mental activities. The best pain distractor is hunger (Ref 185) followed by exercise, meditation, and cognitive behavioral therapy.





Distraction Antitheses

Pain is fundamentally subjective. (Ref 136) Peak alpha wave frequency and corticomotor excitability as measured by transcranial magnetic stimulation, is predictive who would experience more pain. Corticomotor excitability represents how quickly a signal gets from the cortex to the part of the brain that controls our muscles. There's a standard survey called the "pain catastrophizing scale" that is used to quantify the psychological impact of pain. Certain individuals tend to ruminate on pain more, or have more anxiety about the idea of pain, or feel helpless

to manage that pain. At the moment of pain, psychology is a slave to biology and not the other way around, but we can influence how we will react to future pain.

Pain relates to our initial emotional conditions which relates to our calmness, which in turn relates to our trust in stable, unchangeable things, like God. Above this calm or frenetic initial electrical energy state, there is an on/off, nerve firing, transmission mechanism. The intensity and duration of the firing voltage, and frequency of firing repetition determines which neurotransmitters are released from the synapses. High voltage, high frequency, longer duration stimulations, are involved in more intense reactions and can be calmed by low, meditative, prayerlike or worshipful frequencies. Prayers may be likened to recharging our cellular batteries by focusing on what is important and worship may be directing our thoughts to be receptive to cosmic thinking.

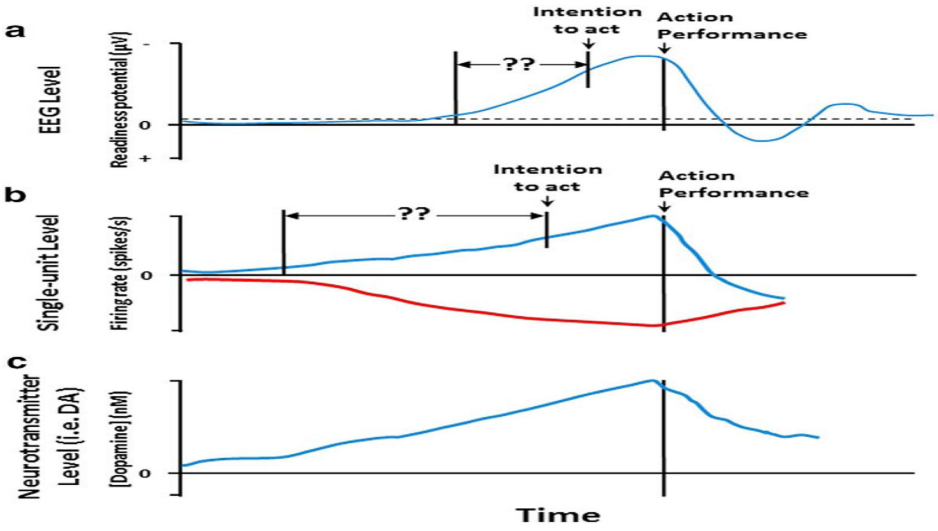
> **As prayer may be likened to recharging the spiritual batteries of the soul, so worship may be compared to the act of tuning in the soul to catch the universe broadcasts of the infinite spirit of the Universal Father. 144:4.8**

> **Jesus taught the appeal to the emotions as the technique of arresting and focusing the intellectual attention. 152:6.4**

Brain Waves

Benjamin Libet conducted experiments (Ref 71) that demonstrated that we unconsciously think about an action, up to 300 milliseconds before we are conscious of that thought. This implies that our superconsciousness or mid mind is the precursor of our conscious thoughts. Imagine this preemptive action happening at all our brain wave frequencies from the lowest at 4 Hz up to our highest functioning range of over 100 Hz.

All this precursive, thought triggering, neuro-peptide electro chemical activity eventually shows up as brain waves and these individual excitations cascade in waves of various overlapping scales of neural avalanches (thoughts).



One Pulse of a Neuron Firing

Light Cascades as Neurons Fire

For the video see https://www.facebook.com/reel/3106752716139895

> **The experience of the realization of the reality of unconscious religious growth is the one positive proof of the functional existence of the superconsciousness. 100:1.9**

The lowest, delta wave frequencies, those experienced in deep meditation (Ref 21, 38) and worship, generally have the highest amplitudes, and interestingly, are the dominant frequencies in a young child's brain. At those early ages our mystery monitors functioned as Thought Changers.

> **From the arrival of the Adjuster to comparative full growth, about twenty years of age on Urantia, the Monitors are sometimes designated Thought Changers. 107:0.7**

The higher frequencies and more entrenched ways of thinking (as the neurons become myelinated i.e. coated to speed up transmissions) become dominant by age 25, except in perhaps periods of meditation, true worship, and deep sleep.

Electro-chemical signals between each nerve segment are triggered at 5 to 50 times per second and a propagation signal ripples along the nerve as a wave of action potential. These ripples of action along the nerve are a pulse above the base voltage, and they shuttle the electrical pulses at between 200 Hz and 300 Hz. On a related note

(pun intended) the frequency of this wave of action potential varies for individual events and equates to musical notes between G 196 Hz and D 294 Hz. This may be why music is often relaxing, and has been shown to have healing effects (Ref 171) and it is interesting to note that live music is more effective in producing positive amygdala (think emotional) neurofeedback (Ref 23, 54)

> Side note: Microtubules in the body align their electrical polarity in opposing pairs. This can create harmonies of interaction akin to music whereas neurotubules in the brain are longer and co aligned giving them a more linear action potential.
>
> **Tuneful syncopation represents a transition from the musical monotony of primitive man to the expressionful harmony and meaningful melodies of your later-day musicians. 44:1.13**

Electrical activity of the brain is usually divided into a hierarchy of three categories:

1. Spontaneous activity.
   Spontaneous activity is measured on the scalp or on the brain and is called the electroencephalogram. This signal goes from under 1 Hz to about 100 Hz and this activity goes on continuously in the living individual.

2. Evoked potential activity
   Evoked potentials are those components of the EEG that arise in response to a stimulus (electric, auditory, visual, or spiritual) and these signals are usually below the noise level and therefore not readily distinguished. One must use signal averaging to "see' these over the background noise.

3. Single neuron events
   Single-neuron events can only be examined using microelectrodes which impale the cells of interest. These include neurotubule events.

Our spontaneous brain activities (Ref 6,7) are quite frenetic, as can be seen in a typical electroencephalogram, EEG, snapshot of the electric fields emanating from the brain's activities. The electrically associated and massively cross-corelated bio electrically initiated signals of all the brain's synaptic interactions can be grouped and parsed into ranges reflecting their general functions as follows:

Gamma (40 to 100 Hz) - not shown because gamma wave activity appears in short, intermittent bursts involved in current **intellectual activity**. (Ref 187)

Beta (12 to 40 Hz) – involved in **executive functioning**.

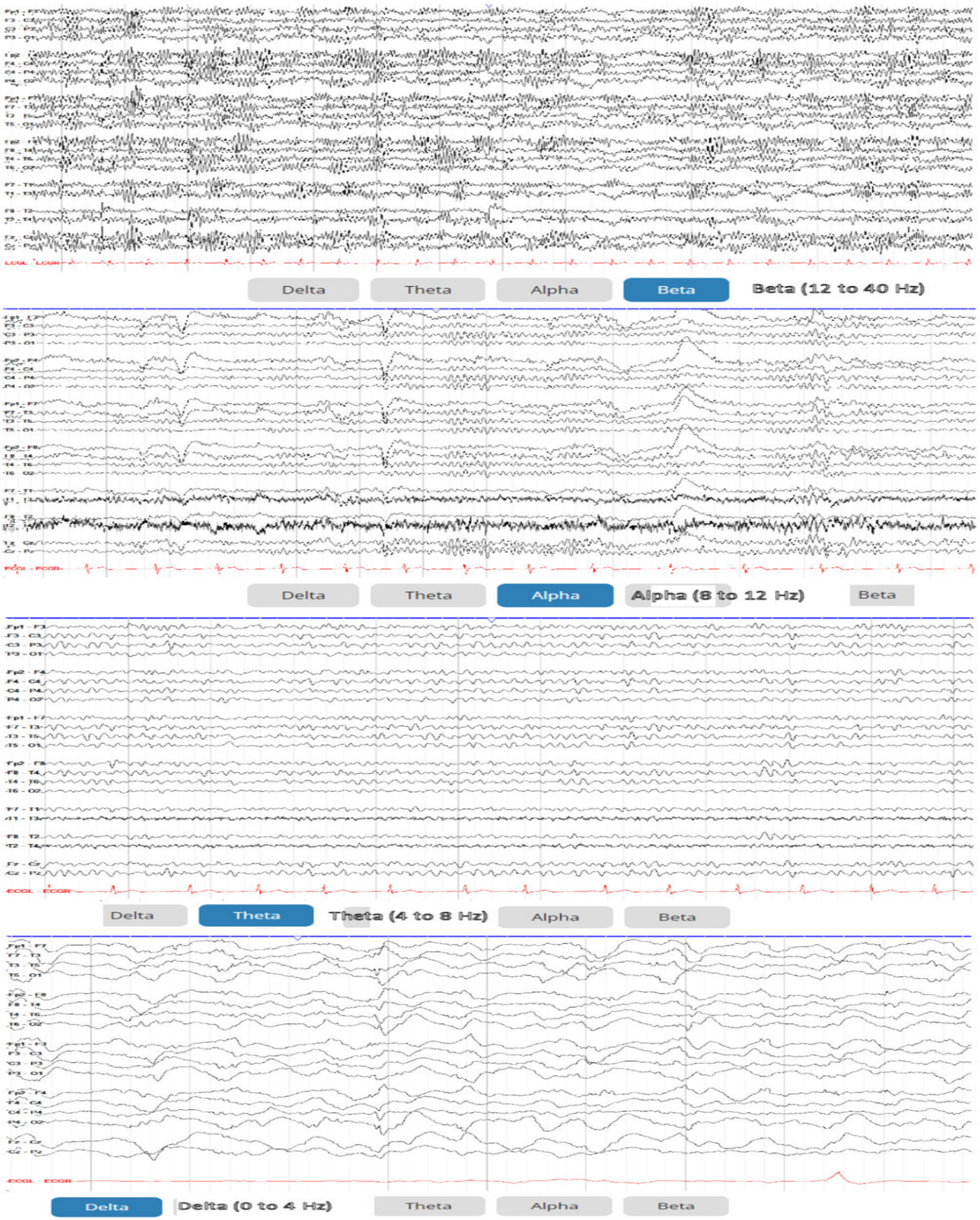
Alpha (8 to 12 Hz) - involved in **relaxed cognitive functioning**.

Theta (4 to 8 Hz) - involved in light **meditation** and sleep.

Delta (0 to 4 Hz) - involved in **deep meditation.**

EEG signals are generated by synchronized electrical activity, specifically postsynaptic potentials, from thousands of pyramidal neurons in the cerebral cortex, creating voltage fluctuations that travel through brain tissue, skull, and scalp, and are detected by electrodes. These neurons are oriented perpendicular to the cortex, allowing their currents to sum up coherently, forming electrical fields strong enough to be measured on the scalp. Pyramidal neurons in the cerebral cortex communicate via ions (like sodium and potassium) moving across cell membranes, creating tiny electrical impulses. When neurotransmitters bind to dendrites, they cause either excitatory or inhibitory postsynaptic voltage potentials resulting from the ion movement. These large pyramidal neurons, oriented in columns perpendicular to the brain surface, act as tiny current dipoles. When thousands of these neurons fire synchronously (in rhythm), their individual postsynaptic currents add up. This synchronized activity creates a larger electrical field that flows through the brain's extracellular space. The very high number of microtubules in pyramidal neurons and their dendrites are integral to the structure and function in that they act as the "structural backbone" that enable dendrites to align, grow, branch, and maintain their specialized shapes. Microtubules manage the patterns of these electrical signals.

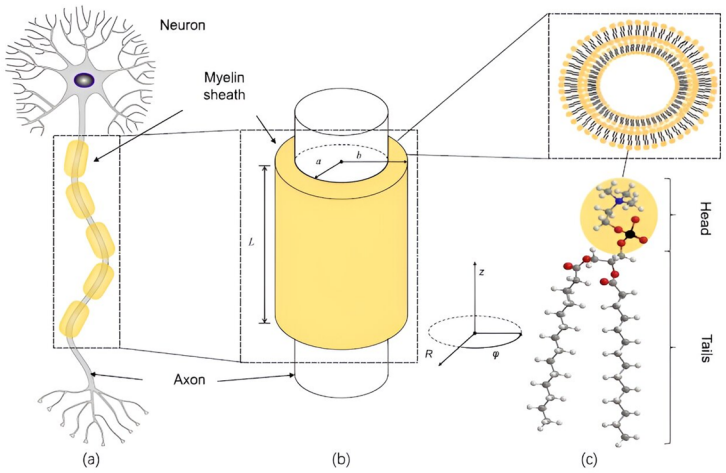
Physical reality matters. Pattern which gives matter its meaning. Consciousness may be the realization of the meaning of the pattern.



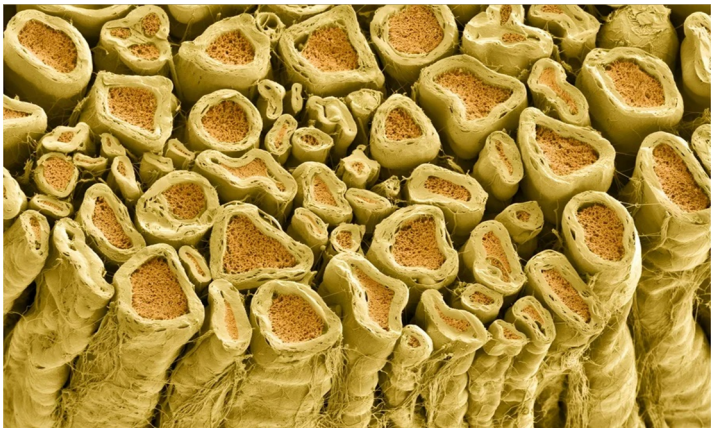
Electroencephalogram

Voltage variations have a drift velocity of charge carriers (generalized patterning) that flow at about 1 – 2 mm per sec (0.006 ft/sec). Voltages in the electroencephalogram images shown here represent +/- 30 micro-Volts above the much higher action potential ripple voltage base (initial conditions) of -70 milli-volts. It may be that when we lower the base voltage, when we are calm, we make the "signal pattern" (+/- 30 micro volts) more "visible".

Nearly all our cells can generate electricity, but electrons don't flow like a wire, instead, a chemical ion with a certain charge jumps from one cell to the next and between one myelin insulated axon segment to the next until it reaches its destination. The myelin sheath is typically about 100 microns long, with 1-to-2-micron gaps between them. The speed of signals without the myelin is subsonic but myelinated signals seem to be entangled with photons released by the tricarboxylic acid cycle that releases a cascade of infrared photons that couple to the vibrations of the carbon hydrogen bonds in the lipid molecules of the myelin exciting them to a higher energy state releasing more photons. (Ref 98) The speed at which these electrical signals travel can vary greatly, depending on the type of neuron and whether the neuron is myelinated, but speeds range from 1 to 100 meters per second.



Myelin Sheaths over Nerve Axons



Rat Brain Nerves with Myelin Coatings

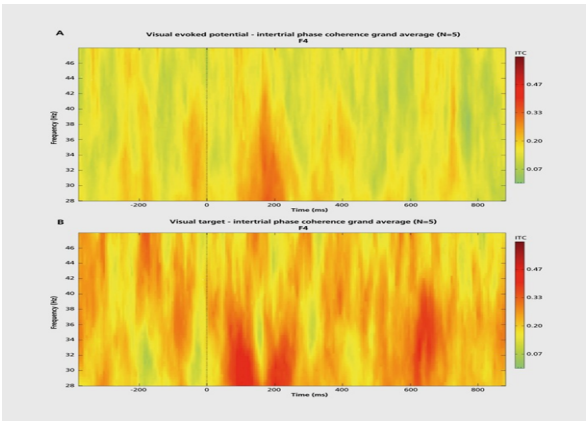
The myelin sheath, as a cylindrical cavity, facilitates the generation of entangled photon pairs. (Ref 108) Researchers in August of this year discovered that the specific vibration of C-H bonds in lipid molecules within the myelin sheath can produce entangled photons. Given the abundance of these bonds in neurons, this mechanism could be a significant source of quantum entanglement within the nervous system. This discovery hints at a possible explanation for how the brain utilizes quantum entanglement for information transfer, potentially explaining the synchronized neuronal activity crucial for consciousness.

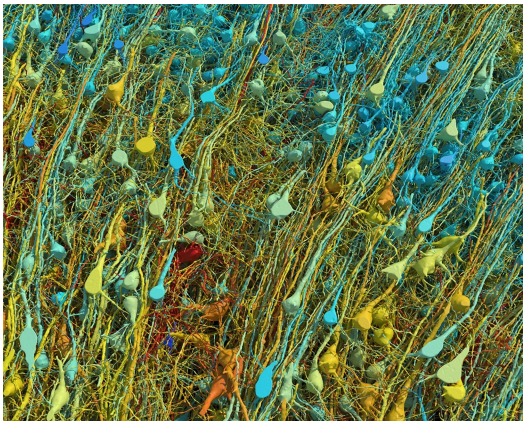
It is interesting to note that science finds no trace of myelin in the ancestral line that preceded the arrival of vertebrates, animals with backbones. (Ref 99 and **58:4.2**) "Apparently", a virus infected a vertebrate ancestor, slipping the genetic instructions for making myelin into its DNA. The evolutionary phenomenon represents an example of the term "suddenly" used 96 times by *The Urantia Book* and what scientists refer to as "punctuated equilibrium", reflecting a speedy specialization pattern of significant evolutionary change. (Ref 62.) Curiously, myelin is wrapped around nerve fibers by entirely different cells in the body (Schwann cells) than in the brain (oligodendrocytes) and astonishingly, 40 percent of the DNA in mammals consists of remnants of these retroviral "infections".

In the Thought Changer phase (before the solidification of the myelin sheaths) Delta waves and massive cross communication between nerves dominate. The delta wave frequencies (0 to 8 Hz) can be replicated in a deep meditative state, or worship. Perhaps complete parental trust in God would allow slower thinking and more cross communication between brain cells. Perhaps being humble, like a curious child, fascinated by discovering new things, or by enjoying a particularly soothing piece of music, we can regain that childlike faith and be able to **"resemble the unsuspecting trust of the child mind" 196:0.11**

Mental Picturizations

A published study in Science Advances in April 2022 shows that the brain passes information like waves throughout the brain. Picture a three-dimensional volumetric cascade of electro chemical excitations. The waves of particle interactions within this volume cascade into more wavelets of activity that move and create more ripples in the mind pool. Wave peaks and troughs interfere or augment and influence other neurons. Our thoughts are cross correlated in any one memory (smells, relationships, expectations etc.).





Two-dimensional image slice of three-dimensional brain activity

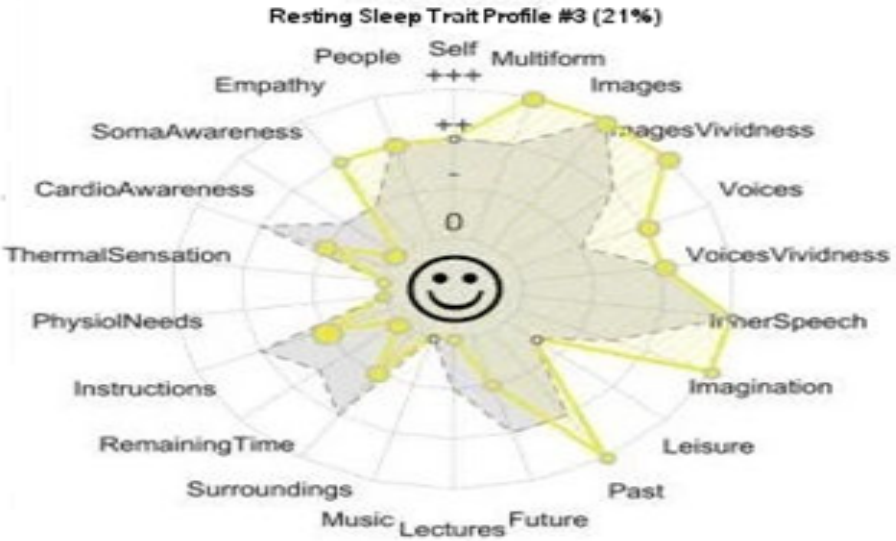
It may not be so much the dominance of a single frequency, as it is the harmonies of all the frequencies that give us the total picture. When we look at the complexity and unorganized nature of the EEG traces, it is difficult to see the way the electrical activity clusters spatially and how challenging the task of the Thought Adjuster is. The larger red areas in the above two-dimensional slice represent stronger thought drivers.

When we get to the thought controller stage of cooperation, by actively trying to align wills, we become more receptive to changing the overall patterning. Couple this, with quantum level, so called "random" involvement, and it might be seen how the adjutants **30:2.21** or Thought Adjuster might be able to influence these general superconscious or mid-mind patterns. As these patterns are influenced by, and tend to align with, cosmic or Thought Adjuster patterns, and are the precursors to our reflective thinking. These will adjust our material reality via emotional and epigenetic management, as our neural activities try to harmonize, amplify, and align these 3-dimensional volumetric images.

> **At such times, and sometimes during sleep, the Adjuster is able to arrest the mental currents, to stay the flow, and then to divert the idea procession; and all this is done in order to effect deep spiritual transformations in the higher recesses of the superconsciousness. 109:5.1**

Paper 110 tells us that the "divine indwellers" do not exist "within the confines of a single physical organ." Which may imply that it is in a lot of organs, perhaps those that have our DNA and microtubules. Paper 110 also talks about "energy patterns" and uses the most alliterations of any paper in the book (marvelous ministry, heavenly helpers, tireless toilers, watchful workers, loving leaders, careful custodians, daily doings, haven of happiness) to guide us "through the dark and uncertain mazes" (think bio luminescence lighting the way). This pattern-matching of these alliterations may be hinting at the pattern matching wills and perhaps matching the light patterns of our microtubules.

Recent research (Ref 52) done on the brain at rest by Cremona, Joliot and Mellet (2023) derived "thought profiles" from a cluster analysis of data from nearly 1,800 French university students. In addition to "tried-and-true" measures, this group completed a novel survey of resting-state personality dynamics, the ReSQ 2.0 and found core pathological character traits or brain picturization groupings. (Ref 52)



Resting-State Personality Dynamics

Scientist Pulin Gong at the University of Sydney also found spiral patterns that exhibited intricate and complex dynamics, moving across the brain's surface while rotating around central points, known as phase singularities. (Ref 34)

The Thought Adjuster, throughout our life, is trying to "realty-ize" our thoughts (create electrical images that harmonize with the cosmos) as a function of the mind that "knows quantity, reality, meanings" when we **"feel the mutual creation". 111:3.6** If we think of the Thought Adjuster as a holographic fragment of God, each fragment of God, as it steps out of infinity and into finity, could be thought of as a low-resolution image of God and the whole of creation at that moment in time. To improve the resolution of the image we have of God, we can cumulatively add our own low-res image perspectives with other people's images and understandings. By sharing we would get a higher resolution of the overall image. Experiencing each different perspective gives us a better understanding of material creation and the forces behind it. This is called the Holographic Persistence Theory, and it suggests that the information in a volume of space can be encoded on a lower-dimensional surface, much like how a 2D surface can create a 3D holographic image. This theory posits instantaneous information sharing, as the upholder of the scaffolding. It says that information is shared on the surfaces not in volume (much like a black hole). We might think of the ultimaton as the holographic fragment of lower material Paradise while our thought adjuster might be like a holographic fragment of upper Paradise.

This concept of the Thought Adjuster as a holographic fragment of God is interesting because a hologram contains the pattern of unity and polarity and also gives us our frame of reference. This creates a triadic structure fundamental to our reality: the observer, the observed, and the reference frame.

Activity Regulated Cytoskeletal Peptides & Synaptic Adhesion Molecules ARCs and SAMs

In the process of making us, the Life Carriers synthesized RNA and DNA, which is the code for allowing information to be transferred from cell to cell, the transition from single cell to multi cell organisms, and from generation to generation. RNA (ribonucleic acid) and DNA (deoxyribonucleic acid) are both essential molecules in the biology of life, but they differ significantly in structure, function, and location.

Structure:

DNA is double-stranded, forming the famous double helix. It has a sugar called deoxyribose, and its bases include adenine (A), thymine (T), cytosine (C), and guanine (G).

RNA is single-stranded. It contains a sugar called ribose and replaces thymine (T) with uracil (U) as one of its bases, pairing with adenine (A).

Function:

DNA is like the master blueprint, storing genetic information that guides the development and functioning of organisms. It's primarily responsible for long-term information storage.

RNA acts as a messenger and functional molecule. It transcribes DNA's instructions and helps translate them into proteins. Some forms of RNA, like ribosomal RNA (rRNA) and transfer RNA (tRNA), have specialized roles in protein synthesis.

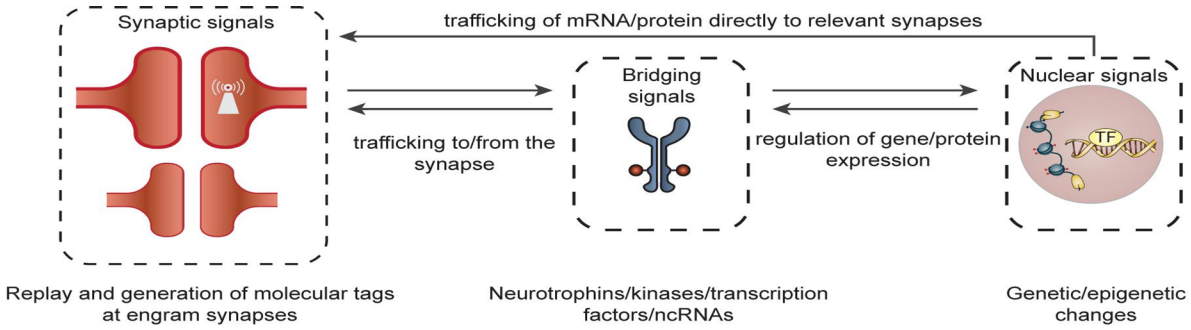
Location:

DNA is mostly in the nucleus (in eukaryotic cells) and a small amount is found in mitochondria.

RNA can move between the nucleus and cytoplasm, performing its functions within the cytoplasm.

In short, DNA is the keeper of genetic data, while RNA is the worker bee, turning those instructions into action.

At the base of life itself is this RNA process. RNA is a polymeric molecule that is essential for most biological functions, either by performing the function itself (non-coding RNA) or by forming a template to produce proteins (messenger RNA) where the information from one cell is packaged and communicated to nearby cells. (Ref 27, 115)



Messenger RNA Process

Side note: There are other types of RNA. Micro RNA (miRNA) is a process controller that binds to and regulates (by negative regulation) the messenger RNA preventing certain general processes from becoming overabundant. Micro RNA has been linked to the development of cancer (it affects all the attributes of malignant cells), neurological, cardiovascular, and autoimmune diseases and has been shown to regulate insulin secretion and sensitivity in type 2 diabetes. Transfer RNA is a small cloverleaf shaped RNA that delivers specific amino acids to the ribosome during protein synthesis. It contains an anticodon loop for base-pairing with messenger RNA codons and an amino acid attachment site. Ribosomal RNA is the cores structural and catalytic component of ribosomes, where protein synthesis occurs. It constitutes most of the cellular RNA and facilitates peptide bond formation. Small intestine RNA is a double stranded RNA that triggers RNA interference by guiding cleavage and deregulation. Small Nuclear RNA are core components of spliceosomes responsible for spicing in the nucleus. Ribozyme is a catalytic RNA molecule for specific reactions. Guide RNA is a short RNA sequence that directs to a specific complimentary DNA target in CRISPR editing.

Communication between brain cells is essential and the RNA messenger process is aided here by activity regulated cytoskeleton (ARC) peptides which are proteins in our brains that spread information through a messenger RNA (mRNA) like process. These Arc's encapsulate the mRNA within its shell, protecting it from degradation. Neurons release these extracellular vesicles (EVs). This phenomenon mirrors how viruses carry genes inside their protective capsids and may have been introduced by the life carriers in the Devonian age as the first function of neuron like memory activity. (Ref 88) Within a cell, mRNA carries the genetic instructions from the DNA in the nucleus to the ribosome, the site of protein synthesis. The ribosome then translates these genetic instructions into proteins.

There are also SAMs that are like a peptide glue that cement our nano-scale neural networks. These mRNA molecules carry genetic information and make special proteins that change the firing voltage at synaptic junctions and influence the combinations of inputs from other nerves.

For memories, neurons that fire together wire together, and neurons that fire out of sync, fail to link. (Think thought coherences.) An engram is a sparse network of neurons distributed across different brain regions that activate together. Its conceptual content is an idealized object defined by multiple characteristics. In human memory, these characteristics map to sensory inputs. For instance, the memory of a banana would include its sensory details (sight, smell, taste, hearing, touch, sense of balance and proprioception). (Ref 182)

Cementing our memories is a complex process and is still an intense field of investigation but it involves dendrite (short, branched extensions of a nerve cell) and these dendrites contain abundant stable length microtubules. (Ref 117, 143) Out of all the possible energy states, the system will converge (be SAM glued) to a local electrical minimum, also called a local attractor state. Local attractor minima states are existing memories and they influence our future ways of thinking.

ARCs influence local electrical minimum by causing a protein to fold in a specific manner, called a capsid which moves from neuron to neuron creating preferred pathways. This process of RNA sharing exchanges information between synapses for specific functions such as memory correlation and then SAMs strengthen and confirm these relationships. (Ref 107)

These established relationships primarily impact the synapse receptors found in the brain, and they are the foundation of human cognition and intelligence (Ref 44).

Some of these foundational areas of the brain are as follows:

Frontal lobe: Voluntary movement, attention, short term memory tasks, ***motivation***, planning, and speech.

Parietal lobe: Proprioceptive and mechanoceptive, involved in language processing.

Temporal lobe: ***Decoding sensory input*** (visual and auditory) into ***derived meanings for retention*** of visual memory and language comprehension.

Occipital lobe: Taste, visceral, pain and vestibular functions.

Limbic lobe: ***Emotions***, modulation of visceral and autonomic functions, ***learning and memory***.

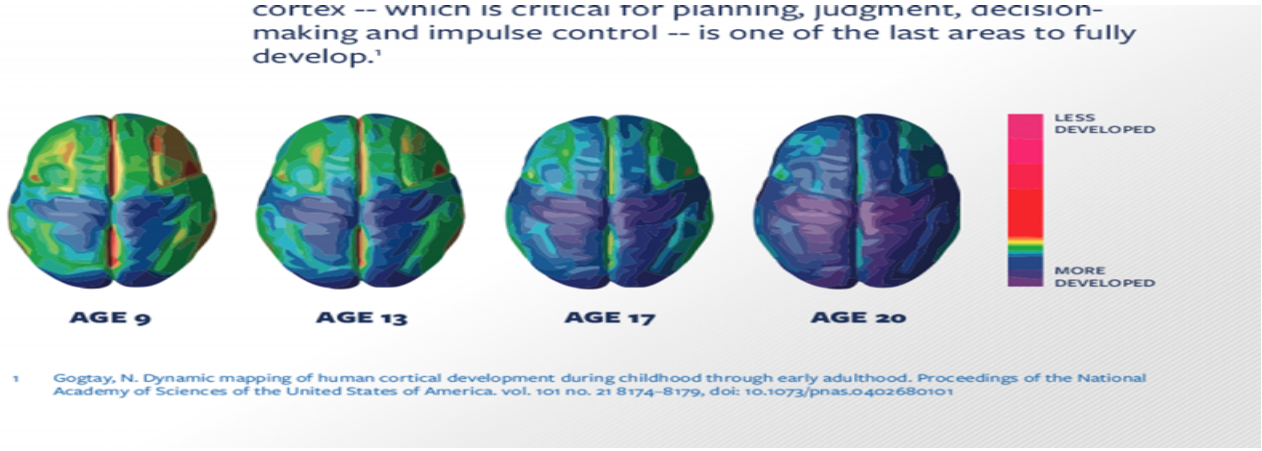
The Thought Adjuster is likely most interested in those functions shown in ***bold italics*** since these are ones that help us grow our souls in **"certain trying intellectual and testing social situations" 101:3.4**

> **"The two fundamental forms of substance, ponderable matter and ether, are not dead, and only moved by extrinsic force, but they are endowed with sensation and will (though naturally of the lowest grade); they experience an inclination for condensation [a form of mutual attraction], a dislike of strain; they strive after the one and struggle against the other." Ernst Haeckel, The Riddle of the Universe, 1901**

You must not regard co-operation with your Adjuster as a particularly conscious process, for it is not; but your motives and your decisions, your faithful determinations and your supreme desires, do constitute real and effective co-operation. You can consciously augment Adjuster harmony by:
1. Choosing to respond to divine leading; sincerely basing the human life on the highest consciousness of truth, beauty, and goodness, and then co-ordinating these qualities of divinity through wisdom, worship, faith, and love.
2. Loving God and desiring to be like him—genuine recognition of the divine fatherhood and loving worship of the heavenly Parent.
3. Loving man and sincerely desiring to serve him—wholehearted recognition of the brotherhood of man coupled with an intelligent and wise affection for each of your fellow mortals.
4. Joyful acceptance of cosmic citizenship—honest recognition of your progressive obligations to the Supreme Being, awareness of the interdependence of evolutionary man and evolving Deity. This is the birth of cosmic morality and the dawning realization of universal duty. 110:3.6

It is interesting to note that the dominant frequencies for the lobes of likely Thought Adjuster influence range from 10Hz to 23Hz. The frontal lobe (motivation) is 22 to 23Hz and the temporal lobes (derived meanings) are: superior 10Hz, middle 23Hz, inferior 10Hz.

The Maturing Brain



Adolescent Brain

Maturing areas of the brain include the frontal and parietal lobes, the insula, and the subcortical structures. But a more interesting feature of the maturing brain involves the "white matter" that gradually envelopes the nerve cells in all these areas. This "white matter" coats and insulates the active transmission portions of the nerves by the formation of the myelin sheaths we talked about earlier. These onion skin like protein insulative coatings thicken with age and allow much faster information propagation but limit their cross communication as the pathways become more defined and we become more fixed in our ways of thinking. We are defining the preferred voltage pathways, and the corresponding voltages required to "get out of the rut". Before these insulating sheaths formed (up to about age 25) our thoughts are slower, much more cross connected, more influenced by emotions, socialized thoughts, and highly influenced by peer pressure. In our early "formative" and presumably more trusting, stress-free years, the child's brain is more open to trial-and-error type learning (e.g., walking, talking, socially interacting). We are discovering transcendent thinking. We are exploring causations and musing on the abstract.

What we are forming are our basic 4 million neural connections called your "connectome", and this forming or patterning continues up to about age 25 after which this neuroplasticity slows down. The myelin sheath also ages differently than the rest of the brain with weakening occurs at about ages 9, 32, 66 and 83 where the myelin sheaths degrade, slowing down our thinking and allowing for increased cross communication of thoughts. (Ref 194)

> **On the evolutionary worlds, will creatures traverse three general developmental stages of being: From the arrival of the Adjuster to comparative full growth, about twenty years of age on Urantia, the Monitors are sometimes designated Thought Changers. From this time to the attainment of the age of discretion, about forty years, the Mystery Monitors are called Thought Adjusters. From the attainment of discretion to deliverance from the flesh, they are often referred to as Thought Controllers. 107:0.7**

Thought Adjuster Reception

Related to the early child brain plasticity, is the reception of the Thought Adjuster at our first moral decision, which begs the questions: What peptides in the brain are involved in moral choices? What parts of the brain are involved in moral sensitivity, emotion, motivation, cooperation, ethics, respect, and the differentiation of good and evil or other altruistic behaviors? What level of learning and neuronal depth goes from trial-and-error learning to cognition, language, concept and flexible imaginative learning which all include abstraction. Abstraction is the ability to ignore small differences and focus on bigger pictures. What is different about the child brain that allows the Thought Changer to "change", versus "adjust" or "control" our thoughts? Moritz Köster's research published in Science Direct in 2021 shows that young children's "4 to 5 Hz theta rhythm" (Ref 51) increases when they meet unexpected events.

"Give me a child until he is 7, and I will show you the man." **Aristotle**

> Side note: The waist to height ratio of a child at 10 years old is a good predictor of heart attack later in life. To calculate the waist-to-height ratio (WHtR), divide the waist circumference by the height (e.g., centimeters). A WHtR of 0.55 or higher has potential for high cardiometabolic risk.

One neurotransmitter that comes into play at this early age is neurotensin. Neurotensin is a neuropeptide that functions like dopamine in that it acts like a reward for appropriate behavior, but specifically for the differentiation of "good" from "bad" thoughts. Like dopamine it establishes a threshold level and then "rewards" when behaviors elevate above the current level of behavior. It stems from a survival perspective where we learned which behaviors benefited our survivability where it was likely related to the energy of the adjutant of counsel. At our stage of evolution, it may now be more involved with moral and cosmic choices. It is interesting to note that this "reward for improved thinking" mechanism is built into our basic thinking processes. As we age, we are establishing our **"… preconceived opinions, settled ideas, and long-standing prejudices." 109:5.3** and the "old dog", Zen teaching may apply: "A full cup cannot take on more water."

Brian McLaren has identified sixteen biases that prevent us from seeing things in their complexity and with greater clarity:

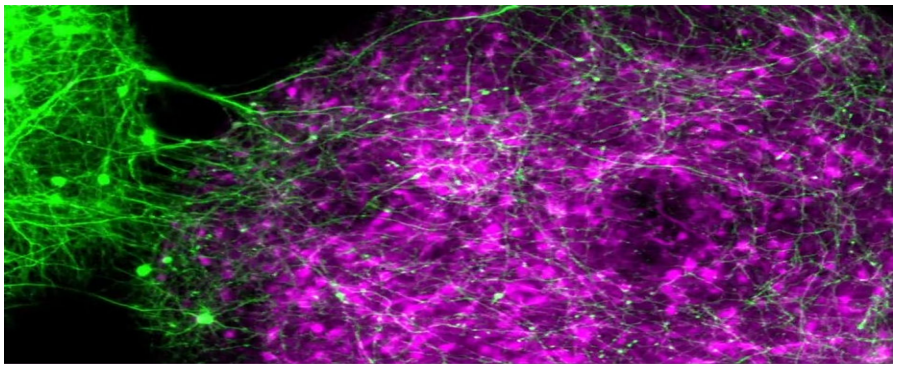
Confirmation Bias: We judge new ideas based on the ease with which they fit in with and confirm the only standard we have: old ideas, old information, and trusted authorities. As a result, our framing story, belief system, or paradigm excludes whatever doesn't fit.
Complexity Bias: Our brains prefer a simple falsehood to a complex truth.
Community Bias: It's almost impossible to see what our community doesn't, can't, or won't see.
Complementarity Bias: If you are hostile to my ideas, I'll be hostile to yours. If you are curious and respectful toward my ideas, I am more likely to respond in kind.
Competency Bias: We don't know how much (or little) we know because we don't know how much (or little) others know. In other words, incompetent people assume that most other people are about as incompetent as they are. As a result, they underestimate their own incompetence and consider themselves at least of average competence.
Consciousness Bias: Some things simply can't be seen from where I am right now. But if I keep growing, maturing, and developing, someday I will be able to see what is now inaccessible to me.
Comfort or Complacency Bias: I prefer not to have my comfort disturbed.
Conservative/Liberal Bias: I lean toward nurturing fairness and kindness, or towards strictly enforcing purity, loyalty, liberty, and authority, as an expression of my political identity.
Confidence Bias: I am attracted to confidence, even if it is false. I often prefer the bold lie to the hesitant truth.
Catastrophe Bias: I remember dramatic catastrophes but don't notice gradual decline (or improvement).
Contact Bias: When I don't have intense and sustained personal contact with "the other," my prejudices and false assumptions go unchallenged.
Cash Bias: It's hard for me to see something when my way of making a living requires me not to see it.
Conspiracy Bias: Under stress or shame, our brains are attracted to stories that relieve us, exonerate us, or portray us as innocent victims of malicious conspirators.
Constancy/Baseline Bias: Early in life, our brains set a baseline of normalcy based on what we constantly experience day to day. What our brains determine as normal or constant becomes acceptable to us. Later in our life, our baselines may be reset when a new normal becomes our constant experience. [This is the flipside of Catastrophe Bias.]
Certainty/Closure Bias: Our brains find it difficult to rest when we feel uncertainty, so we would often rather reach for premature closure on an unwarranted certainty than live with appropriate uncertainty. We may even prefer a pessimistic certainty to a potentially optimistic uncertainty.
Cleverness Bias: Our brains are vigilant to protect us against deceptions, and this vigilance against deception can make us so habitually skeptical that we become cynical, rejecting all good or encouraging information as naïve. In protecting ourselves from danger, we can unintentionally insulate ourselves from positive possibilities.

Side note: Remember Amos, John Mark's young friend who (like Judas) believed in the gospel but could not be depended on? It is also interesting that the **"whole afterlife will be more happy and dependable because you spent your first eight years in a normal and well-regulated home." 177:2.4**

Getting back to aging, as we age, our ability to evolve or "take on more water" is still possible because certain foods (chocolate, tea, blueberries) and lifestyles (less stress, exercise, more love) can create up to 700 new neurons a day and these new neurons, plus epigenetics and our free will emotional control, allows us to improve our thinking habits. Our brain's ability to adapt involves several mechanisms and new neurons and neuroplasticity also helps us to shape and fine tune our spirit receptivity. Adaptability, cross pollination and growth mechanisms

involve many physiologies including microtubules, microtubule-associated proteins and activity regulated cytoskeleton peptides.

There is an area of the brain which specifically deals with tenacity and willpower. It is called the anterior midcingulate cortex. It is involved in certain higher-level functions, such as attention allocation, reward anticipation, decision-making, impulse control, performance monitoring, error detection, and emotion control. It grows with the challenges that are found between the anvil of justice, the hammer of suffering, and the necessity for anguish and fear.



New neurons growing from one area and connect into another.

Let's look at some functions that are not age related.

Changer, Adjuster, Controller

Whether young, mid-life or old, some brain functions are similar but are there common denominators of how the Thought Changer, Adjuster, or Controller, might interact at the fundamental level of human thinking, and can we help that process?

> **The Adjuster finds it almost impossible to register these inspiring spirit leadings in an animal mind so completely dominated by the chemical and electrical forces inherent in your physical natures. 110:7.6**

Let's think about how the pure spirit Thought Adjuster, and other pure spirit influences, like the adjutant mind spirits, the Supreme or even the unqualified absolute, might influence us in this material, electrochemical milieu.

> **While the hereditary legacy of cerebral endowment and that of electrochemical overcontrol both operate to delimit the sphere of efficient Adjuster activity, no hereditary handicap (in normal minds) ever prevents eventual spiritual achievement. 109:5.5**

How can we get a **"wise co-ordination of material and spiritual forces" 110:6.17** to augment cosmic visualizations? How might we provide the **"favorable conditions"** of **"loyalty, sincerity, humility, and patience"** that are the **"fulcrums"** for spirit growth? **"… he speaks within the human heart as a still, small**

voice …" 148:6.10 How might we calm the white noise cacophony and lower those voltage thresholds that might allow us to cross pollenate our thinking and hear that **"still, small voice"** to see the big picture?

When we are taught to **"… remain for a time in silent receptivity to afford the indwelling spirit the better opportunity to speak to the listening soul." 146:2.17** perhaps we are being taught to emulate the delta dominant wave state of early childhood which would allow extra processing time and interassociation of thoughts which would afford the Thought Adjuster better opportunity for communication to our soul or superconsciousness. Perhaps this will help us to be more open to childlike learning.

Microtubules

Perhaps the most important anatomical features, functioning at all ages and giving us time for silent receptivity of Thought Adjuster influence, are microtubules. Microtubules are hollow tubes filled with saltwater. The walls of the tubes are formed from uniquely arranged molecules called dimers. They provide the basic structural integrity and strength of the cell. Their unique construction and location also allow for the transport of proteins between cells and the provide time between sensor inputs and our reactions when communicating between neighboring cells.

There are three specializations of microtubules:

1. Axonal neurotubules with uniform polarity (plus-end distal); tau-stabilized; serve as highways for long-range transport of mitochondria, vesicles, and mRNA.
2. Dendritic neurotubules with mixed polarity that are MAP2 stabilized, and which support bidirectional transport and local cellular remodeling.
3. Soma microtubules which interface with Golgi (a complex of vesicles and folded membranes within the cytoplasm) and the endoplasmic reticulum (a network of membranes within a cell's cytoplasm that synthesizes, modifies, and transports proteins and lipids) that coordinate organelle trafficking and cytoskeletal integration.

Some of the specific functions of microtubules are:

1. Maintaining Cell Shape: Microtubules, with micro and intermediate filaments, help maintain cell shape and stability. Together with the other cytoskeleton elements, microtubules form an architectural framework that establishes and maintains the overall electrical polarity orientation of the cell.

2. Cell Movement: Cells provide structure to cilia and flagella and thus help move bacteria and other prokaryotes. Motile cilia and eukaryotic flagella have a tubular arrangement of microtubules where nine doublet microtubules surround a central pair of singlet microtubules. Microtubules in the trachea cells prevent mucus and dirt from entering the lungs. In the fallopian tubes of the female reproductive system, they move the egg released from the ovary to the uterus.

3. Cell Division: During mitosis (cell division) microtubules play a crucial role in forming the mitotic spindle. The mitotic spindle helps to separate chromosomes during cell division, and to accurately segregate duplicated chromosomes so that the chromosomes can be partitioned equally into two daughter cells. The spindle apparatus also helps form the contractile ring that separates the two

daughter cells during cytokinesis (cytoplasmic division of a cell). Three types of microtubules participate in mitosis: astral, polar, and kinetochore microtubules. Astral microtubules radiate from the microtubule organizing centers of a cell to the cell membrane, thus keeping the mitotic spindle in place. Polar microtubules link between two microtubule organizing centers and help separate chromosomes. Kinetochore microtubules attach to chromosomes and help to pull them apart.

4. Intracellular Transport and Communication: The electric fields generated by the synchronized oscillations and choreography of microtubules, centrosomes and chromosomes during mitosis and meiosis are beautifully functional. Finely regulated and synchronized movements of these super-macromolecular complexes against the thermodynamic forces within a dividing cell ensure the fidelity of the genetic material. (Ref 152)

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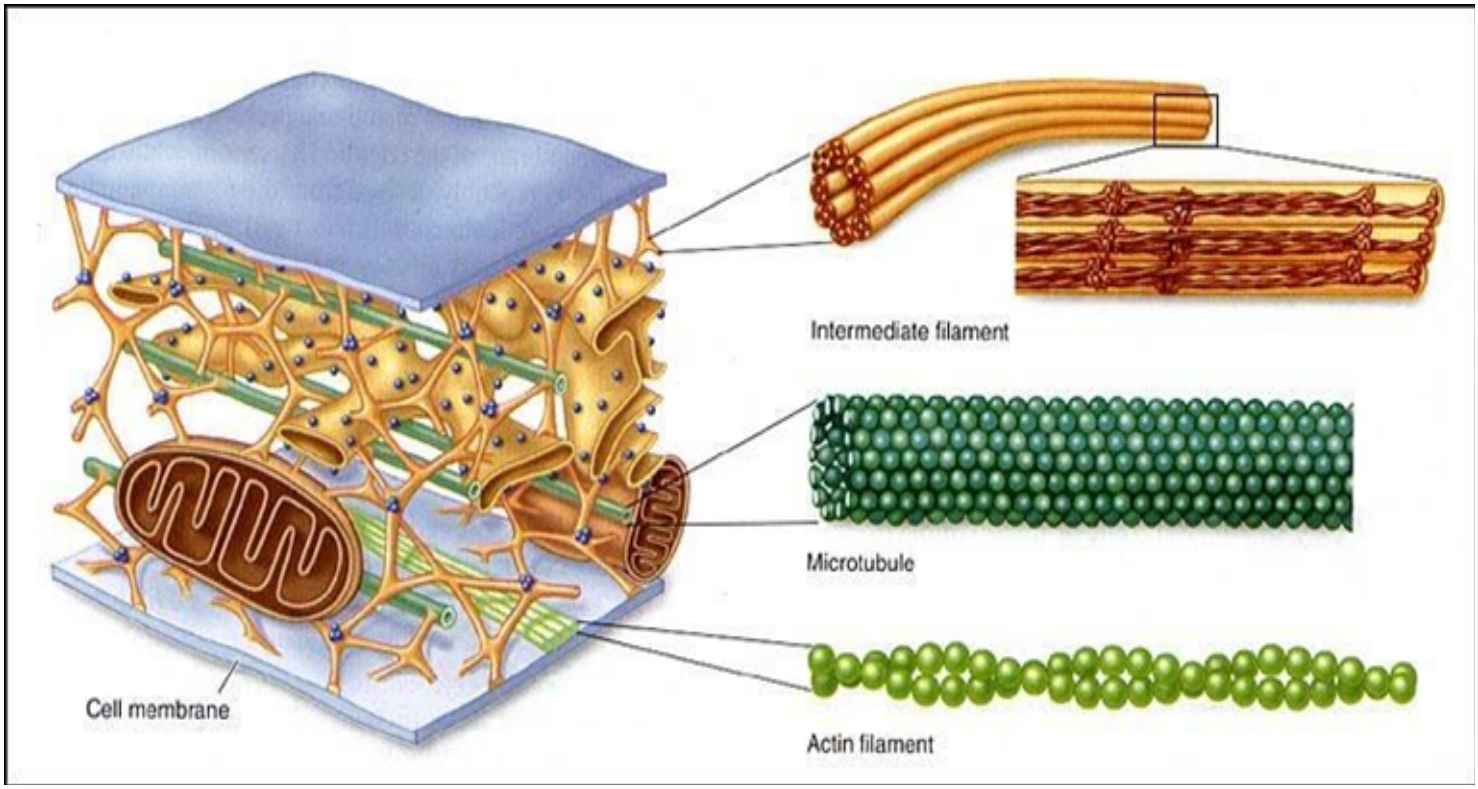
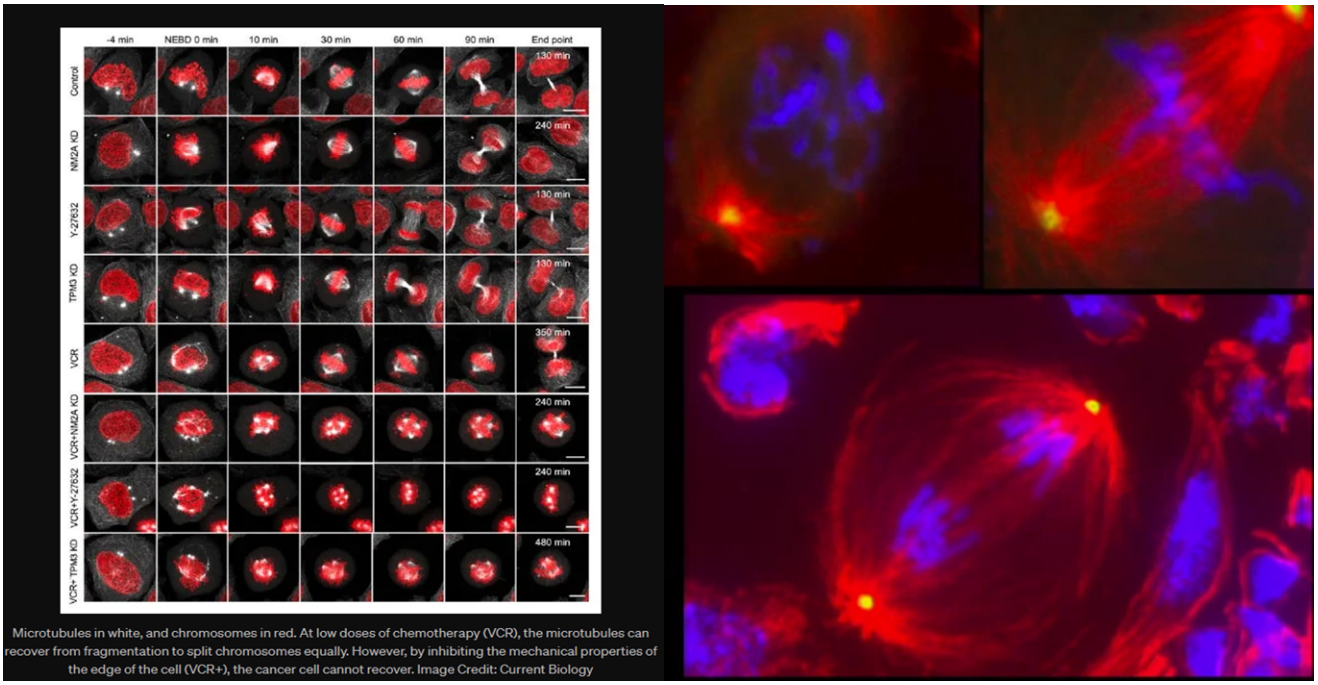
5. Memory Storage: In dendritic (branch like neurons that receive incoming signals from other neurons) microtubules, which when once formed, remain unchanged by treadmilling, through their relationship with synapses and the snowflake shaped enzyme CaMKII can print memories into the microtubule via a phosphorylation mechanism (think epigenetics) for long term memory storage. (Ref 163)

6. Microtubules are crucial for inflammation management acting as scaffolds for inflammasome assembly (like NLRP3) that trigger cytokine release, regulating immune cell movement (leukocyte transmigration), and influencing the production and secretion of inflammatory mediators (like IL-1β).



Microtubules

7. Antenna-like Properties: The helical, periodic arrangement of the electrically polar tubulin dimers allow microtubules to act as microscopic antennas.



Microtubules and chromosomes interact at every cell division.

Side note: It is interesting to note that microtubules do not contain our DNA, but they do hold the orientation of the DNA as the cells are dividing.

As part of the cytoskeletal network, microtubules help move organelles inside a cell's cytoplasm. Microtubules also help the various cell components to communicate with each other. They form an intelligent transport network for moving materials throughout the cell and between the exterior and interior of the cell. This trafficking is assisted by the microtubule-associated proteins kinesin and dynein.

These videos show how microtubules provide the mechanism for intercellular transport and positioning.

https://www.facebook.com/share/v/13stEtibCb/?mibextid=wwXIfr

https://www.facebook.com/share/r/16D7jbtN7X/

Microtubules fall into two additional categories: stable and dynamic. Those that are constantly changing their length by treadmilling, and those that have long term functional stability. Keep in mind that both configurations have qubit level computational ability, ultraviolet light permanence and the possibility of quantum entanglement.

Side note: The microtubule's qubit capability is like a spinning coin. Spinning in the air, the coin has the potential of landing either heads or tails, but the microtubule can nudge the results one way or another to ensure the likelihood of either heads or tails being the result.

More stable length microtubules occur in dendrites which are branching extensions of a neuron's cell body (soma) that receive signals from other neurons at the synapses. Microtubules in dendrites differ from those in other neurons, particularly in their polarity and organization. In dendrites, microtubules exhibit mixed polarity, meaning that both plus-end-out and minus-end-out orientations coexist. This contrasts with other neurons and dynamic microtubules in other body cells where microtubules are uniformly plus-end-out. Additionally, dendritic microtubules are more stable whereas other microtubules are highly dynamic and essential for growth and regeneration.

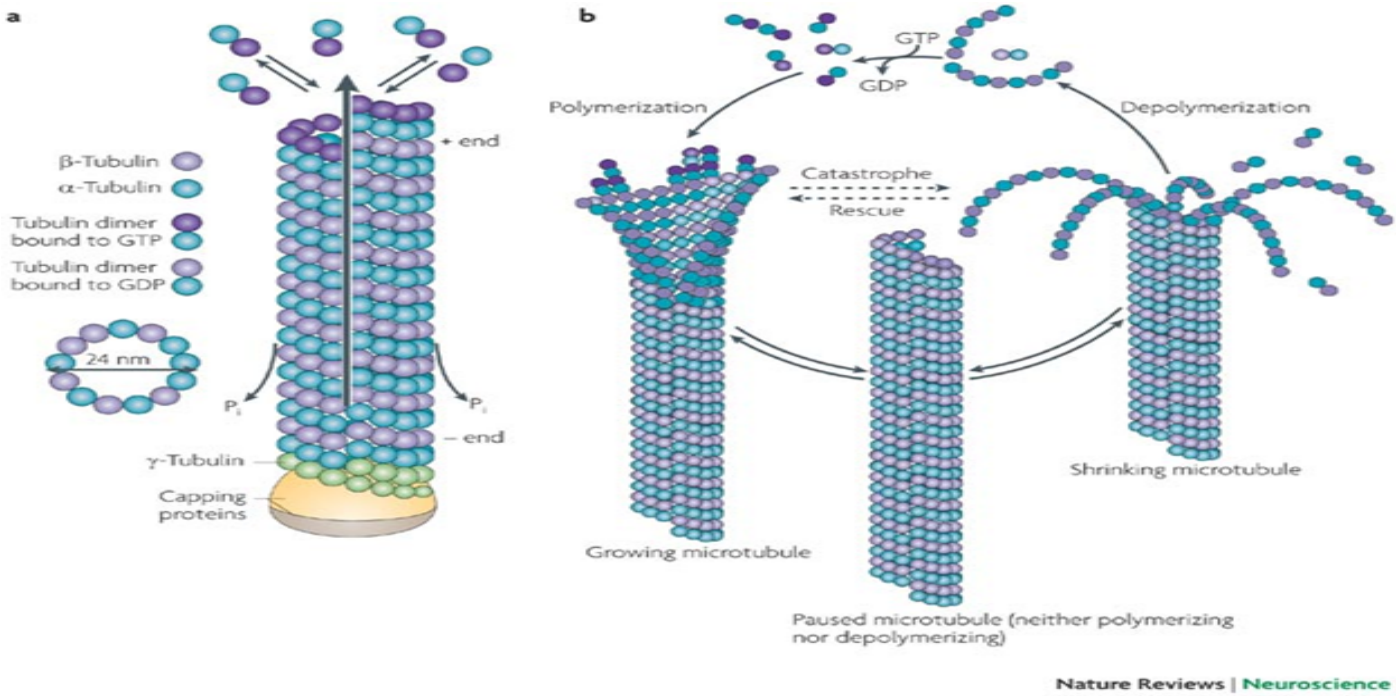
The more stable microtubules in dendrites provide structural support for dendritic branching and synaptic connections and play a role in memory formation and excitability, influencing how neurons process and store information. They also support long-term stability of synapses, ensuring consistent communication between neurons. Stable microtubules have mixed polarity, meaning that they have both plus and minus ends that can be oriented differently, unlike axonal microtubules. These stable microtubules are present in cilia, flagella, and mitotic kinetochore spindles where they ensure proper chromosome segregation. They are also present in primary cilium (a sensory organelle that responds to mechanical and chemical stimuli) where they play a crucial role in sensory signaling. They are also present in specialized cells like mature neurons and epithelial cells where they maintain cell shape and function. (Ref 164)

Dynamic microtubules (as demonstrated by fluorescence resonance energy transfer) are seen to constantly grow or shrink in length from 0.000004 in (0.1 um) to 0.002 in (50 um**)** by a dynamically unstable process called treadmilling (technically, guanosine triphosphate hydrolysis) wherein the dimers (individual peptides) are lost at the negatively charged end, and more are added at the positively charged "centrosome" end.

Dynamically treadmilling microtubules are found in rapidly changing cellular environments. They facilitate intelligent intracellular transport, ensuring proteins and organelles reach their proper destinations efficiently. They are essential for neuronal growth and repair, and response to injury. They contribute to synaptic plasticity and allow neurons to adapt and strengthen their connections.

When dynamic microtubules treadmill, the growth/shrink rates depend on several factors, including the concentrations of the tubulin, the presence of microtubule-associated proteins (and/or tau proteins), and intracellular electrical environmental conditions. Under certain physiological conditions, neurotubules can grow at up to 10 μm/minute, with an average of about 5 μm/min under optimal conditions so they can grow to their maximum length and shrink back to minimum length over the course of 15 to 30 seconds. Growth is offset by dynamic instability, meaning that the microtubules undergo phases of growth and shrinkage, which influences their overall behavior. Specific growth rate can also vary by region (e.g., axons versus dendrites) and developmental stage, as neurons modulate their cytoskeletal dynamics during growth and repair.

Looking Inside a Microtubule



Treadmilling

Side note: Chemotherapy drugs like colchicine and paclitaxel inhibit microtubule assembly resulting in the death of the cancer cells and all other fast-growing cells. Cancer cells lose their normal electromagnetic coherence which causes mitochondrial dysfunction and the altered energy metabolism known as the Warburg effect. The resulting EM field disturbances lead to impaired long-range interactions, causing cells to lose organizational control and favoring uncontrolled proliferation. This contrasts with the synchronized, orderly state of healthy cells. (Ref 180)

The individual tubes are made up of thirteen individual heterodimer (joined but different) tubulin polypeptide filaments, arranged in parallel, around a circular salt water filled cavity. (Ref 46)

The filaments have a distinct electrical polarity that can generate an internally coherent (integrated), soliton (self-sustaining torsional twist), electromagnetic field (Ref 12, 37) along each of the 13 filaments, and collectively these tubules are sufficiently insulated from neighboring cells to prevent electrical interference (short circuiting) and facilitating decoherences (not being influenced by neighboring electric activities) in the order of 10^{-2} seconds (approx. 1 M hertz).

> Side note: If the masses of the W and Z bosons don't come from the Higgs field, they might come from the geometry of a seven-dimensional space. (Ref 190)

Microtubules are found in all eukaryotic cells (cells with our DNA in the nucleus) so this strengthening and weakening of the cellular intercommunication process is going on throughout the body although we are probably most aware of its influence in the brain where these microtubules are called neurotubules.

Microtubules, are made up of crystal-like protein dimers, with internal, hydrophobically protected, water pockets, surrounding a partially electrically conductive salt water filled inner core, that shuttle electrical pulses from cell to cell as the pulses move down the individual filamentary strands by a process of cascading luminescence and the length of the tube causes a delay in the propagation called "delayed luminescence". The signals along the tubules are communicated at about 8 MHz (in the radio wave and ultrasound range) but resonate at twelve specific frequencies clustered in 4 ranges: kilohertz, megahertz, gigahertz, and terahertz frequencies. Specifically, 100-400 KHz, 10-30 MHz, 100-200 MHz, in the mechanical vibration range, 1-20 GHz (11.8-to-5.9-inch wavelength) in the radio wave range, and at 526 and 686 cm^{-1} (THz) in the heat, far infrared range (molecular bond stretching and bending) and 276 and 334 nm in the ultraviolet (electron jump) range. These resonances create sweet spots along the tubule that communicate to the kinesin molecules as they transport proteins down the tubule. (Ref 91, 146, 149, 150) Note that the lower frequencies have ranges, but the two ultraviolet frequencies are very specific. It is these two unique ultraviolet frequencies that we are most interested in since this may be the frequency range where quantum coherences (cosmic frequencies with the same form and phase) may occur.

> Side note: An individual dimer may be acting like the quantum dots (Ref 177) being proposed for future light-based quantum computers.

> Side note: The cosmic microwave background (CMB) radiation which constantly bathes us, contains a wavelength of 1-millimeter (0.04 inches or 160.4 GHz) microtubules can grow to over 50 micrometers (0.002 inches) a nice ratio of 500 implying that coherence with the CBM is feasible.

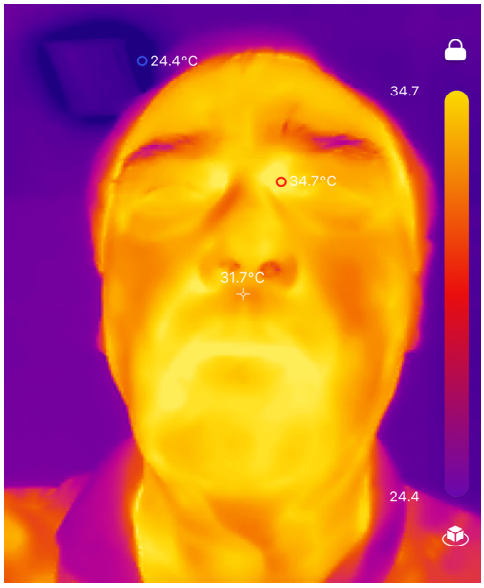
> Side note: Low frequency (40 Hz) low intensity electromagnetic energy (Ref 197) and low power 8 MHz ultrasound stimulation has been used for beneficial neuromodulation, and this may involve microtubule growth (Ref 167).

> Side note: Microtubules maintain cellular orientation during cell division, but they also influence the electric field that determines what type of cell is being reproduced. (Ref 189)

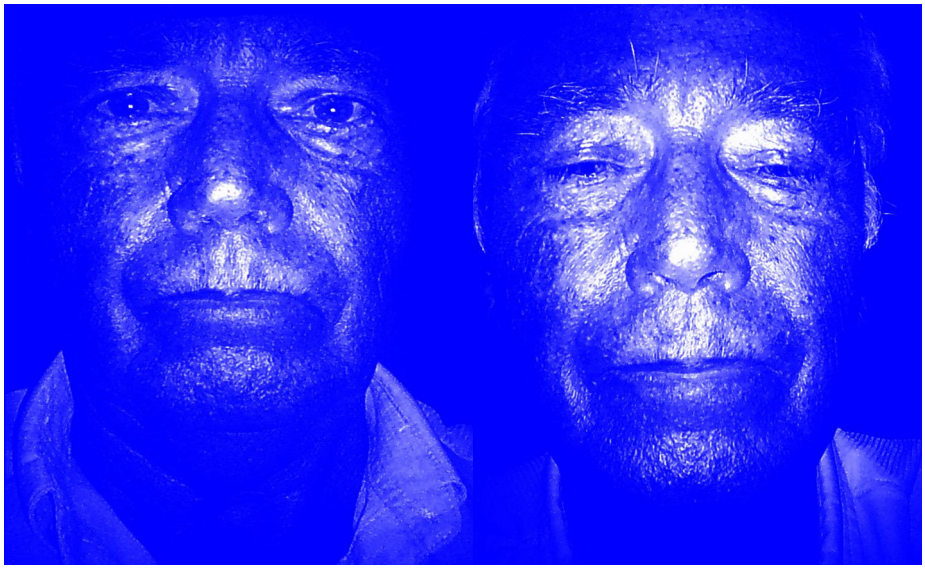
Visible Light Spectrum

We can only see our ultraviolet image using a special UV camera. Here are my pictures in the UV, visible and infrared and heat frequency ranges. The lens filters out most of the UV light but if you wear glasses that filter out the visible light and let you eyes adjust you might see some of the UV light.

Visual Image



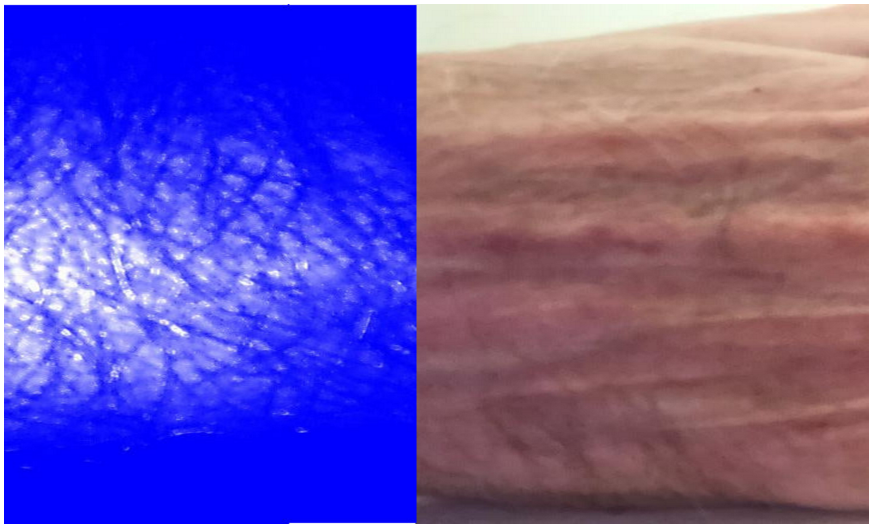
Infrared Image



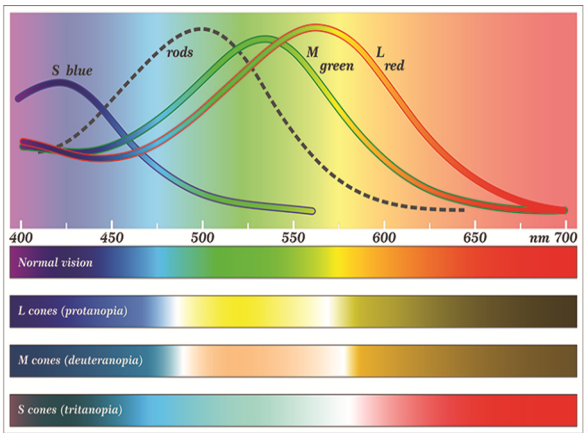
334 nm Bandpass filtered Ultraviolet Image

276 nm Bandpass filtered Ultraviolet Image

In the ultraviolet image above, the frequency of the image has been limited using a bandpass filter with a peak frequency of 335nm meaning that it represents primarily the contributions from the higher of the two microtubule UV frequencies (276 and 334 nm) and both are in the UVB, vitamin D range. This is essentially like looking at me at a specific UV frequency. Only 1% of our blood (white blood cells) contain microtubules, so an ultraviolet image of the back of my hand, where blood vessels are obvious in the visible range, does not show up in the ultraviolet image. Also, once cells move to the outermost layer of the skin, like hair cells, they become keratinized, losing their nucleus and other organelles, including microtubules so, unlike my wrinkles, human hair does not show up in this image either.



UV versus visible light image of the back of hand.
Note that hair and blood vessels don't appear in the UV image.



Vision range of rods and cones in the eye.

Note that the sensitivity of the rods and cones overlap each other, so each sees all the light but at different peak sensitivities. We then differentiate the color we see based on the ratio of the signals and our prior models of similar things we have seen. (Ref 196) There is a color feedback loop between the eyes and the ventral and dorsal

pathways for object classification, contextual processing, and concept formation, while color is simply one of the properties or features associated with what is being seen.

Side note: Adam and Eve could see the midway creatures, but our ability to see UV light has diminished with subsequent generations as the fluid in the eye now protects the eye from UV radiation. The cones in our eyes can still detect UV light, but we have evolved this "protective" mechanism to block its reception (Ref 114).

Side note: The range of the human eye is from 400 to 700 nm (rods in low light only down to 498 nm). The eye's S cones (blue) peak around 420 nm, the M cones (green) around 534 nm, the L cones (red) 564 nm. A charge coupled device CCD camera (like a cell phone cam) has a range of 300 to 1000 nm with a peak around 550 to 900 nm (red – green).

Let's have a closer look at the two ultraviolet frequencies of the microtubules.

Ultraviolet wavelengths of 276 nm and 334 nm are thought to correspond to electronic transitions in tubulin dimers within microtubules, potentially linked to coherent electromagnetic activity and energy transfer in biological systems.
Here's a breakdown of what these UV wavelengths might signify in the context of microtubules and neurotubules:
UV Absorption and Tubulin Structure

- Tubulin dimers, the building blocks of microtubules, contain aromatic amino acids (like tryptophan, tyrosine, and phenylalanine) that absorb UV light.
- 276 nm typically corresponds to $\pi \rightarrow \pi^*$ transitions (i.e. when a π-bonding electron absorbs a photon and is promoted to a π^*-antibonding orbital) in tyrosine and phenylalanine, while 334 nm is closer to tryptophan transitions or extended conjugated systems.
- These absorption bands may reflect resonant energy states within the protein structure, possibly involved in quantum coherence or dipole oscillations.

Electromagnetic Field Generation in Microtubules

- According to Pokorný et al., microtubules may act as biological oscillators, generating coherent electromagnetic fields due to their helical and axial periodicity.
- The inner cavity of microtubules and the dipole arrangement of tubulin could support standing wave modes at specific UV frequencies, including 276 and 334 nm.
- These modes might facilitate non-thermal energy transfer, signal propagation, or information encoding across cellular structures.

Neurotubules and Neural Signaling

- In neurons, neurotubules (microtubules within axons and dendrites) may participate in intracellular signaling, transport, and possibly electromagnetic coupling.
- The UV resonances could hypothetically support Fröhlich-type coherence (i.e. be similar to a Bose-Einstein condensate, where biological systems maintain long-range order via electrical polar vibrations. Herbert Fröhlich proposed that biological systems could support coherent excitations, like quantum coherence, under nonequilibrium conditions. His model involves, microtubules acting as oscillators where energy input from metabolism condenses into a single coherent mode, which leads to a macroscopic quantum-like state with minimal energy dissipation. (Ref 189)

Implications for Electromagnetic Activity

The 276 nm band aligns well with tyrosine's $\pi \rightarrow \pi^*$ transition.

If these transitions are coherently coupled across tubulin arrays, they could form standing wave modes or quantized field structures — a concept explored in biophotonics and quantum biology.

$\pi \rightarrow \pi^*$ transitions in aromatics like tyrosine and phenylalanine might couple to impedance dynamics within microtubules and neurotubules by:

1. Tubulin Dipole Oscillations as Electromagnetic Sources

   Tubulin dimers exhibit intrinsic dipole moments, aligned along the microtubule axis.

   $\pi \rightarrow \pi^*$ transitions in tyrosine (~276 nm) and tryptophan (~334 nm) correspond to electronic excitations that modulate these dipoles.

   When these transitions are coherently excited, they can induce collective dipole oscillations, generating a localized EM field.

2. Electrical Impedance as a Dynamic Response Function

   Impedance in biological systems reflects the frequency-dependent opposition to current flow, incorporating:

   Capacitive reactance from membrane and cytoskeletal structures

   Inductive elements from helical protein geometries

   Resistive components from ionic and molecular transport

   UV-induced dipole oscillations can modulate Z impedance by altering the local permittivity via polarization changes and conductivity sigma changes through charge redistribution or ion channel gating.

3. Neurohormonal (involving nerves and hormones) Modulation of Tubulin Resonance involves dopamine, serotonin, and cortisol binding to receptors that influence intracellular second messengers. These messengers can, phosphorylate the tubulin, altering its dipole moment and resonance frequency, modulate the microtubule's polymerization, affecting dielectric geometry and shift intracellular ionic gradients, tuning its electrical impedance pattern.

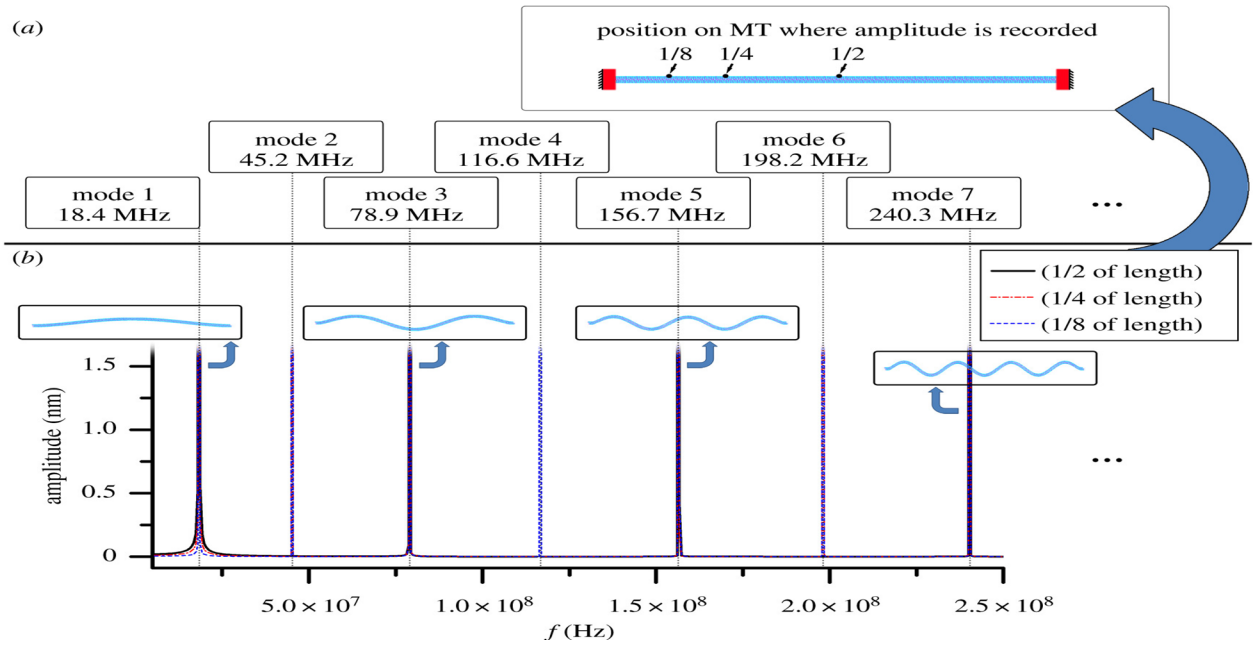
In the quantum world, resonance takes on new meaning. Inside crystals electrons experience a repeating structure in space because atoms are arranged in a precise lattice. This spatial repetition defines which energy levels, known as bands, electrons are allowed to occupy. Microtubules are quasi crystalline. When light with a specific frequency (e.g. UV light at 334nm and/or 276 nm) shines on the microtubule, it adds a second repeating influence, this resonance is in time rather than in space. As the photons interact with electrons in a rhythmic pattern, the allowed energy bands shift. The light's frequency and its intensity can create hybrid energy bands that alter how electrons move and interact. Excitons which carry self-oscillating energy, imparted by the initial excitation, form when these electrons absorb energy and jump from their normal position in the valence band, to a higher energy level known as the conduction band. This jump leaves behind a positively charged hole. The electron and hole remain bound together, forming a short-lived quasiparticle. These excitons naturally carry oscillating energy from their initial excitation. That energy interacts with nearby electrons. Because excitons are made from the material's own electrons, they interact much more strongly with the surrounding structure. (Ref 198)

Another fascinating feature of microtubules is their nonlinear "ballistic" reacting ability. At certain frequencies the nonlinear conductivity of microtubules increases by a factor of 1000. Also, the 334 nm UV light has the same wavelength as sound at 1 GHz (gigahertz) suggesting that there may be a mechanical to optical interconnectedness. There are other interactions between the electro-mechanical frequencies and the electro-optical ones (Ref 14), and this may be where we "delicately touch" (and perhaps cohere with) our morontial selves, our mid-mind, or our souls.

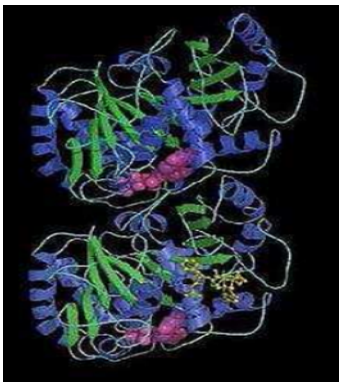
Perhaps morontia material is optical in nature, just above our electromechanical MHz frequency range.

"… vibrations of commingled material and morontia activities …" 189:1.1

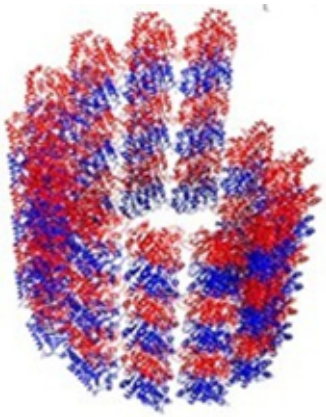
It is also possible to get a visible light image of our basic bioluminescence, i.e. our internally created "glow", which looks very similar to our infrared image. This is called the Ultra Weak Photon Emission image, and it has its brightest areas around the forehead, neck, and cheeks but it requires a single photon camera to detect the image. The image has its brightest levels in the late afternoon, and we glow at night the least.



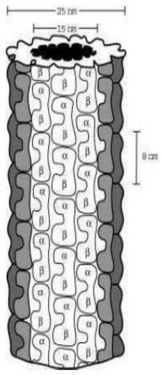
Mechanical Vibrational Frequencies of Microtubules

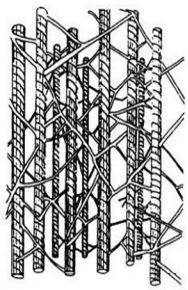


Individual Tubulin Dimer



A & B Tubulin Dimers make up the walls





MAPs aid cross connections

Microtubules communicate between all the cells of our body that have our DNA but function most poignantly in the medial temporal lobe of the brain as the facilitator of cross-communication between brain cells. This is analogous to the cross communication of the child brain before the formation of the insulative myelin sheaths,

but this cross communication is now controlled by microtubules, which are in turn controlled by our free will. I like to think of this as the coordination of material light, intellectual insight, and spirit luminosity **0:6.8**.

> **Human consciousness rests gently upon the electrochemical mechanism below and delicately touches the spirit-morontia energy system above. 111:1.5**

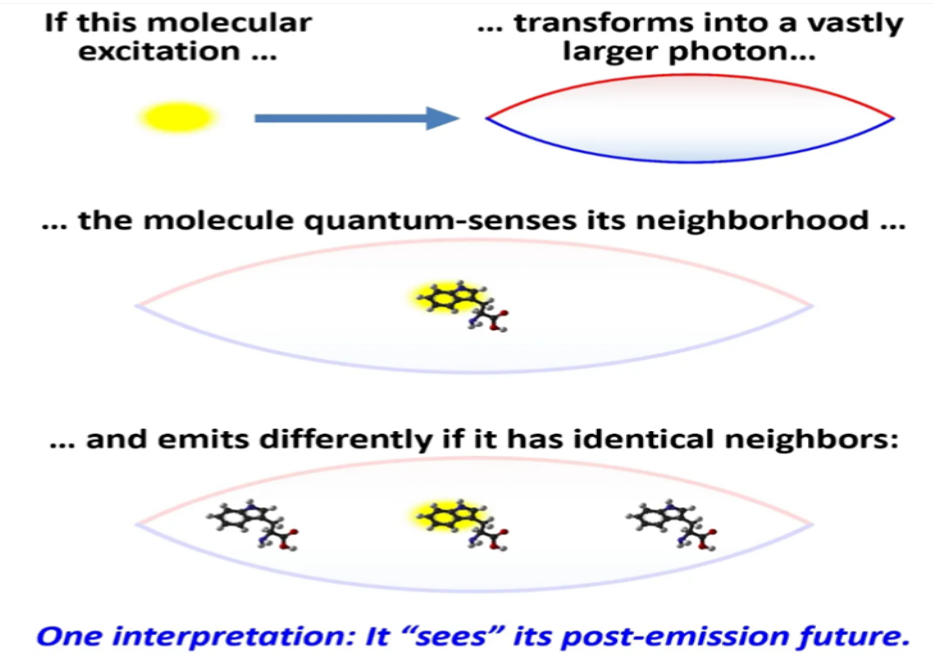
Free Will

Before we go any further, we should talk about free will. What is will? What makes our will free? What liberates us from antecedent causation? Doesn't the current state of all my grey matter determine how my thoughts will coalesce? The answer, in my opinion, is yes and no. "Free" here does not mean the absence of causes. It means that a system can integrate and evaluate alternative possibilities within its own structure. Freedom is gradual and hierarchical. "Will" is not a mystical center, but the ability to make directed decisions about action. It arises from the interplay of memory, affects, motivation and context. Your current state will determine the base from which your next thought will originate but our microtubules give us time (up to ½ second) between the sensory input (e.g. the sound of words) and the formation of a thought. This ½ second may be where our free will can influence the electro bioluminescent cascades that finalize as a thought. There are an almost unlimited number of cascade routes that the infrared, RF and ultraviolet bioluminescence could follow between the billions of dimers, down the billions of microtubules, in the millions of dendrites in each of the neurons and each dimer can be influenced by its surroundings and even more distant microtubules. The easiest path is the path of least resistance, and the slightest nudge of mental energy or better yet, focused intent, can trigger whole new paths. Perhaps trying to think like Jesus can encourage those cascades to emulate the way his bioluminescence flowed. Perhaps our "free will" is our ability to slightly tilt the pool table of our mind encouraging love to float down a river of kindness rather than adding the energies of hate to push back in waves of anger. Our microtubules will gradually respond to our directionization. Another way of visualizing this in terms of resonance, is to think of forming cords in the orchestra of our thoughts that either find harmonies in a major or minor key.

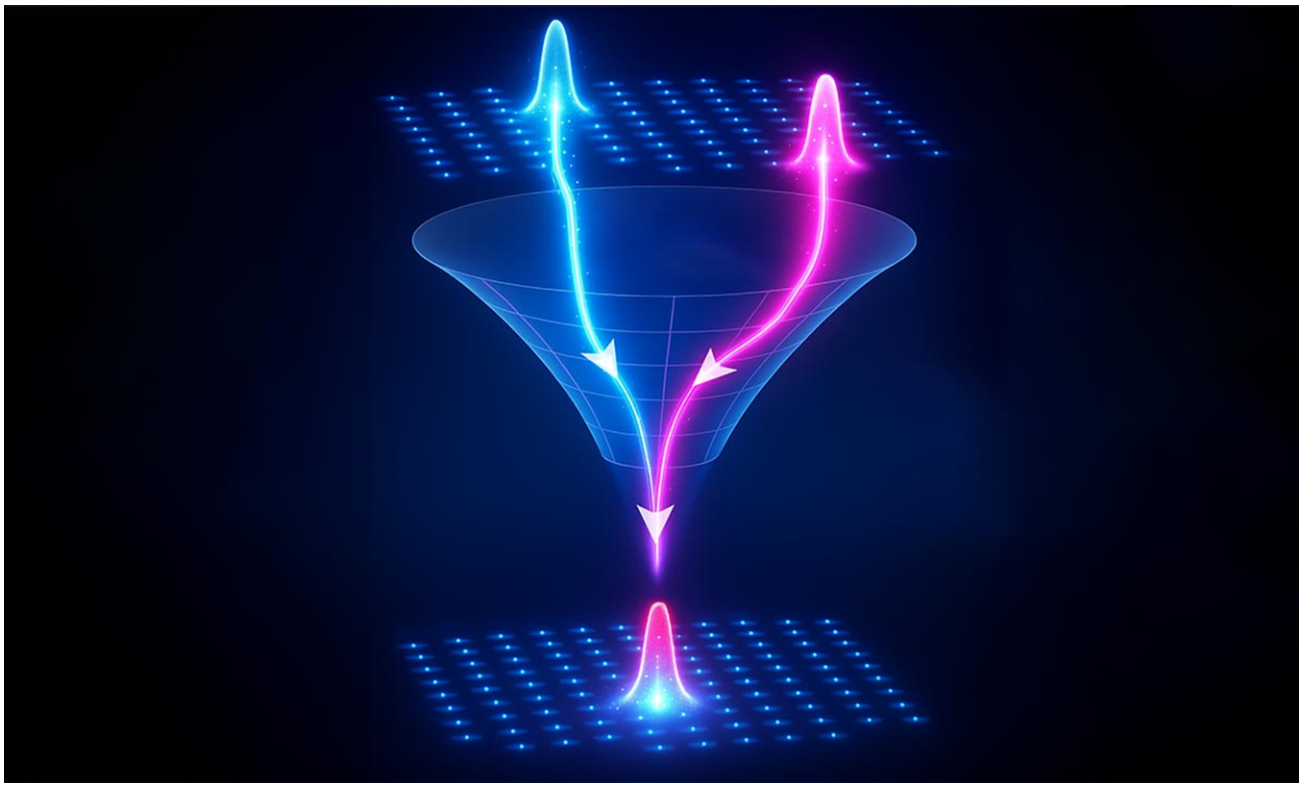
Microtubule-associated proteins (MAPs), such as Tau and MAP2, are crucial for stabilizing microtubules during brain development when establishing our base. In early childhood, MAP activity was high to support neuronal growth and synaptic formation. By the time individuals reach their 20s, MAP activity becomes more regulated, maintaining the stability of microtubules in mature neurons and this settles our intellectual and emotional tendencies.

Getting back to microtubules. There are about 40,000 A and B dimers that make up the individual tubulin filaments, and they have alternating current (AC) polarities with transistor like electrodynamic properties allowing their energies to be amplified and harmonize with other energies by a form of electro-optical coherence. (Ref 60 & 90) Moreover, the transmitted alternating current power and the transient fluorescence decay (single photon count) are independent of the microtubule length. Even more remarkable is the fact that the whole microtubule is more conductive than any single protein molecule that makes up the microtubule. The microtubule's vibrational peaks condense to a single mode which controls the emergence of the electronic/optical properties and facilitates automated noise alleviation. Thus, a monomolecular saltwater channel residing inside the protein cylinder displays an unprecedented control in governing the electronic and optical properties of the microtubule. This noise elimination provides for bioluminescent optical coherence when a wave travelling down the filament splits into two or more separate streams (in this case cascading down neighboring filaments) and then these streams interact with each other in a phenomenon called superradiance and sub-radiant eigenmodes. Superradiance (Ref 91) means that they act both individually, collectively and coherently, as if it were a single

cell (like how a LASER works). A sub-radiant eigenmode means it displays transparent optical properties in nontransparent media (Ref 92). It is also hypothesized that since photons travel at the speed of light (essentially being outside of time) they can sense their surroundings and anticipate the field into which they are propagating.



Photon Sense



Self-Organizing Light (ref 186)

In the cosmic evolutionary laboratories mind is always dominant over matter, and spirit is ever correlated with mind. 65:8.5

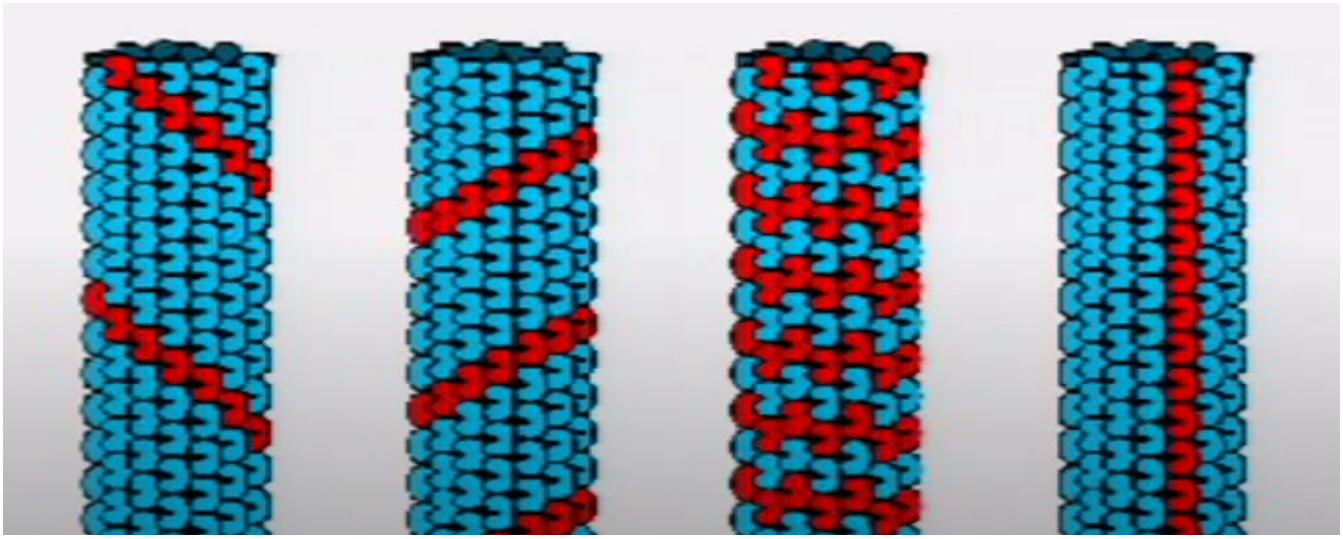
Mortal man is a machine, a living mechanism; his roots are truly in the physical world of energy. Many human reactions are mechanical in nature; much of life is machinelike. But man, a mechanism, is much more than a machine; he is mind endowed and spirit indwelt; and though he can never throughout his material life escape the chemical and electrical mechanics of his existence, he can increasingly learn how to subordinate this physical-life machine to the directive wisdom of experience by the process of consecrating the human mind to the execution of the spiritual urges of the indwelling Thought Adjuster. 118:8.2

Light is nothing more than an electromagnetic wave, with in-phase oscillating electric and magnetic fields perpendicular to the direction of the light's propagation. The shorter the wavelength, the more energetic the photon is and the more susceptible to changes in its speed through a medium. Photon energy is also the cause and the result of interactions with electron field dominated matter. An incoming linear photon excites an electron in an atom to a higher energy level and when that electron drops to a lower energy level it reradiates a photon but this time in a direction that was influenced by the atom. This may be one of the mechanisms for the infinite to interact with the finite. Our free will control of the atoms by focused control of our awareness, may be a way of indirectly influencing the directions of those reradiated photons (ideally Godward).

Side note: According to French nuclear physicist Jean-Émile Charon (1920–1998), the electron also represents an autonomous individuality possessing its own special kind of space-time that forms a small, independent universe, completely isolated from the surrounding space called a monad. He suggests that electrons have an eternal lifespan and are the bearer of mindedness.

It is interesting to note that there are three essential amino acid molecules in our body, isoleucine and tryptophan (both used to make proteins), and l' arginine, that are also bioluminescent and are involved in biological signaling, like in the neurotransmitter serotonin. The primary ingredients of the tubulin are a sequence of amino acids, including tryptophan (an aromatic amino acid that is a precursor to the formation of serotonin) and they form a unique scaffolding as one of the primary structures in microtubules. The tryptophan in the microtubule with its strong ultraviolet absorption, combined with its phenomenon of ultraviolet induced superradiance (the cooperative emission of photons by a collection of excited molecules, leading to enhanced fluorescence) and assisted by its significant absorption to emission differences, form an ideal fluorescent reporter of biomolecular dynamics. It is also highly sensitive to its protein, solvent, and electrostatic environments. (Ref 91, 92, 147) Tryptophan has also been linked with behavioral processes, including learning and memory. (Ref 173)

The organization and patterning of the time delays both along and between tubules, allows them to function as information modifiers. This functions at an operating frequency of about 8 MHz. (Ref 144, 163) Because microtubules are arranged in specific patterns and because they are connected by microtubule-associated proteins (MAP1, MAP2 and tau proteins) which act through their interconnected "nodes" they act as traffic controllers that tune or "orchestrate" the optical oscillations throughout the body and brain in what is called "Orchestrated Objective Reduction" (Ref 1, 2, 3,) and they may form the basis for the consciousness of our consciousness. Stuart Hameroff says microtubules consciousness is a quantum orchestra of resonant frequencies ranging from hertz through the "quantum frequencies where consciousness happens" see 49:10 in this video.
https://www.youtube.com/watch?v=viUguxehZVo



Possible Patterns of Interactions Along a Microtubule

Organization and patterning of microtubules are dynamically cross connected in a process called polyvalence coupling (meaning they have multiple excited electron states) that have five governing laws:

1. They involve very low energy (and are therefore hard to detect and don't show up in EEGs)
2. They lead to a state of minimal energy.
3. They maximize stability.
4. They are based on the pairing of electrons.
5. They are determined by the configuration of the available electron orbitals.

These polyvalence couplings in the brain and body results in these three traits:

1. Emergent organization: The different types of couplings jointly generate emergent structures, which in turn enable and control new forms of couplings.
2. Adaptive self-modification: Coupling patterns change adaptively based on their activity and history.
3. Hierarchical integration: Polyvalent systems form meta structures that coordinate and integrate different types of coupling at all lower levels.

These qualitative properties are characteristic of living systems.

Here are some examples:

1. Synaptic integration: A single pyramidal (excited neuron) cell in the cerebral cortex receives thousands of synapse voltage-dependent inputs, of different types. Some are glutamatergic (excitatory) and act via fast AMPA (α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid) receptors, others via slower NMDA (N-methyl-D-aspartate) receptors. At the same time, the cell receives GABAergic (inhibitory) signals that interact with the excitatory signals. These different forms of coupling, fast and slow, exciting and inhibiting, voltage-dependent and independent, are integrated simultaneously and generating a high-quality output signal. The cerebral cortex contains six layers, each playing a role in forming complex brain networks. Layer 5 neurons collects information from multiple sources sends signals outward as the cortex's final output.

2. Neuromodulatory systems: When we experience something significant, the brain releases not only neurotransmitters for direct signal transmission, but also neuromodulators such as dopamine, serotonin or acetylcholine. These act in parallel to direct signal transmission and change its efficiency, time course and plasticity. For example, the same neural network can take on completely different modes of operation depending on the neuromodulatory state.
3. Astrocytic modulation: In addition to neurons, glial cells, especially astrocytes, are also involved in information processing. They communicate with each other (via calcium waves) as well as with neurons (via gliotransmitters). This glia-neuron interaction represents another dimension of coupling that overlaps with and modulates neuronal coupling.

The different types of couplings not only exist side by side in the brain but also penetrate and influence each other.

Another way to look at brain organization and patterning is called gradient descent. Gradient descent is a method for unconstrained optimization by energy flow in the direction of the gradient leading to a trajectory that minimizes the final energy state. Technically it is a first-order iterative algorithm for minimizing a differentiable multivariate function. This concept is supported by being biologically plausible.

For example:

Contrastive Hebbian learning, which is a learning rule where neurons that fire together, wire together and adjust their connections, describes how local activation differences drive error-based synaptic changes.

Dendritic error signal processing proposes that specific synaptic and dendritic mechanisms can carry information about errors directly to the synapses that need adjusting.

The prediction-emotion connection suggests that reducing prediction errors can be interpreted within an optimization framework.

However you view the organization and pattering process, it involves microtubules. Their protein arrangement and symmetry allow microtubules to act as nanowires where the conducting state is written in the wire itself enabling it to store and process approximately 500 distinct bits of information with 2 pico amp resolution between 1 nano amp and 1 pico amp activation currents in an almost hysteresis free fashion (meaning it does not lose energy in the process). (Ref 89) Rings of these microtubules then form qubits (quantum oscillating dipoles) since they are superpositioned (situated vertically on top of one another) in resonant rings and in helical pathways throughout the lattices of the microtubules. Depending on the orientation of the electric fields in the microtubule (or actin filament axis) there could be three types of ionic waves generated: (a) Longitudinal waves propagating along the protein polymer's surface where the polymer acts like a conducting electrical cable with its inherent resistance and capacitance. (b) Helical waves propagating around and along each protein polymer, and there could be three or five such waves propagating simultaneously corresponding to the 3-start or 5-start geometry in the microtubule. (c) Radial waves propagating perpendicularly to the protein polymer surface. If an electric field is oriented at an angle to the polymer axis, all these wave types may be generated simultaneously. This allows the microtubule to function as a qubit that can carry information in more than just a binary manner. Theoretically the microtubule can encode information in an infinite number of ways.

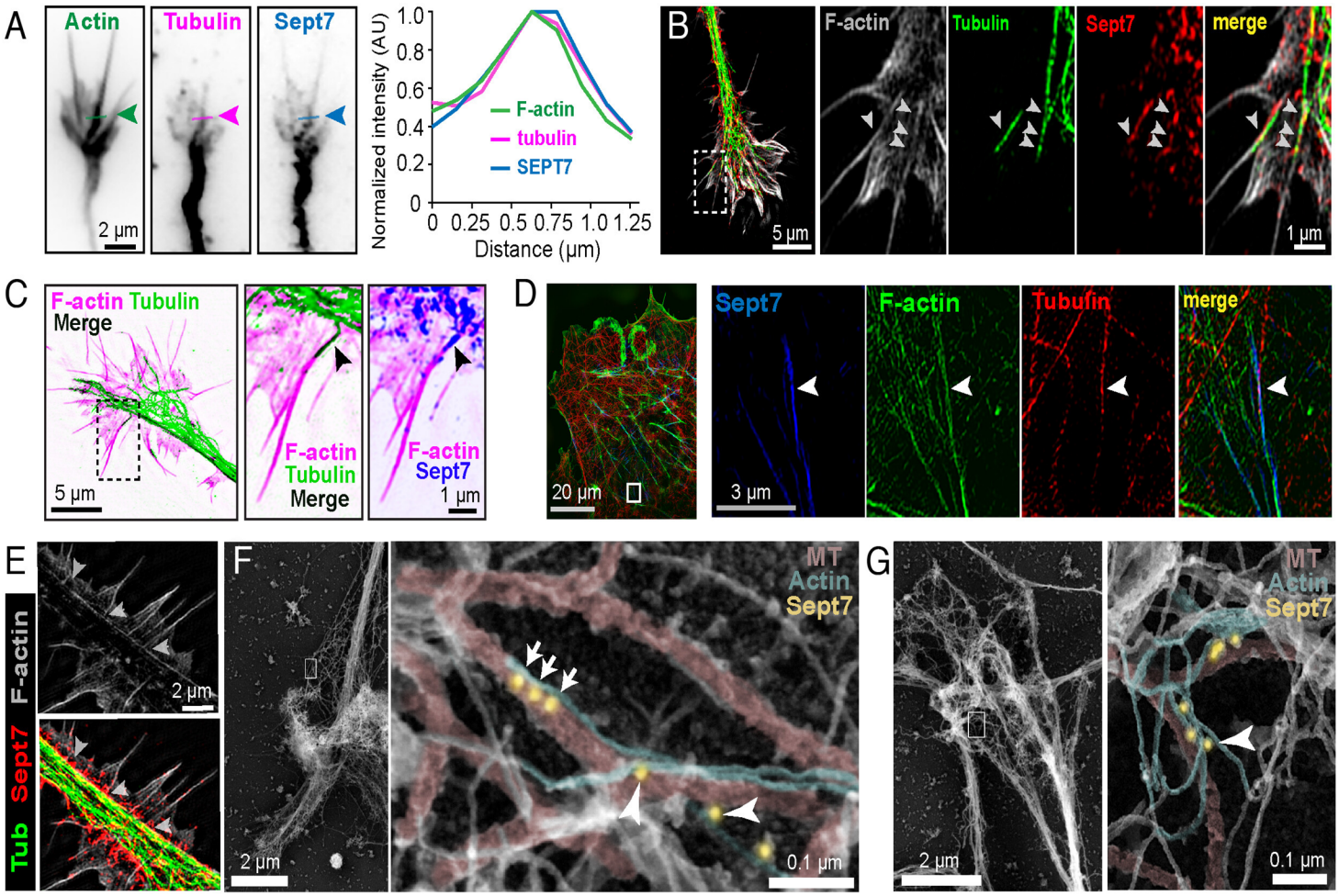
Side note: DMT and similar drugs enhance the 3 and 5 micro-pulse sequences in an EEG.

Orchestrated Objective Reduction is presumed to function in discrete tiny units of time related to the Plank scale of 10^{-35} seconds, that collapse mesoscopic (intermediately sized) objects on a timescale relevant to neural processing.

Since microtubules can respond to four octaves of vibration (mechanical, radio, heat, ultraviolet) they may facilitate up stepping or down stepping of the higher frequencies between our low frequency materially functional ranges and higher morontial frequencies. At their lowest electric energy frequencies, they vibrate due to their molecular charge separation, and at the highest frequencies they vibrate due to their electron or nuclear spins. This "orchestra" not only gives us a time delay between a sensory input, but it also affords us the overview of our reaction to that input. It is a kind of pre-consciousness which allows for the consciousness of our consciousness. It does this by introducing a time delay of up to 500 milli seconds between the incoming linear electrical impulses from the sensors (proprioception, vision, auditory, tactile, vestibular, interoception, and taste inputs etc.) and the three-dimensional post processing (image creation) of these stimulations.

Speaking of interoception (perception of internal bodily signals) this has been historically neglected because of its complexity. These signals from our internal organs spread widely, often overlap, and are difficult to isolate and measure. Sensory neurons that carry these messages weave through tissues—ranging from the heart and lungs to the stomach and kidneys—without clear anatomical boundaries. On the other hand, olfactory stimulations, smells, go directly to the frontal lobes. It's well known that impaired olfactory function is often associated with cognitive decline and researchers have now developed a simple at home "peel-and-sniff" test that is used to screen for cognitive impairment.

Microtubules play a critical role in axonal transport (movement of mitochondria, lipids, synaptic vesicles, proteins, and other organelles to and from a neuron's cell body), neuron structure, and plasticity, and when altered, lead to neurodegeneration. Axonal transport relies on molecular motor proteins, like kinesins and dyneins, which "walk" along microtubule tracks within the axon, intelligently carrying cargo such as mitochondria, vesicles, and proteins. There is also a relationship between exosomes (extracellular vesicles) and microtubules. Exosomes are extracellular vesicles (EV), and microtubules help with their intracellular transport. Microtubules are crucial for the movement of vesicles within cells, including exosomes, before they are secreted to do their work outside the cell. Exosome biogenesis involves multivesicular bodies (MVBs), which rely on microtubules for transport to the plasma membrane which encloses the extracellular vesicle. Microtubules also facilitate the trafficking of exosomes to specific cellular locations, influencing their release and uptake. Ubiquitin plays a crucial role in exosome biogenesis and transport. It helps regulate the sorting of proteins into multivesicular bodies (MVBs), which later fuse with the plasma membrane to release exosomes. Ubiquitination can also influence the trafficking of exosomes and their cargo, ensuring that specific proteins are included in the vesicles before secretion. Additionally, ubiquitination has been identified as a mechanism for transporting soluble proteins into exosomes, including bacterial and tumor-associated proteins. This process ensures that exosomes carry specific molecular signals that influence intercellular communication. Microtubule disintegration abnormalities which result in tau plaques and tangles are heavily implicated in Alzheimer's disease pathology. (Ref 163) Can you see how slow communication in the body and fast communication in the brain combine to play a vital role in all hierarchies from the intercellular electronic levels to the mindal?



Septins and Actins (binding proteins)
Septins colocalize with overlapping microtubules (Ref 40) and together with actin filaments facilitate intercellular crosstalk.

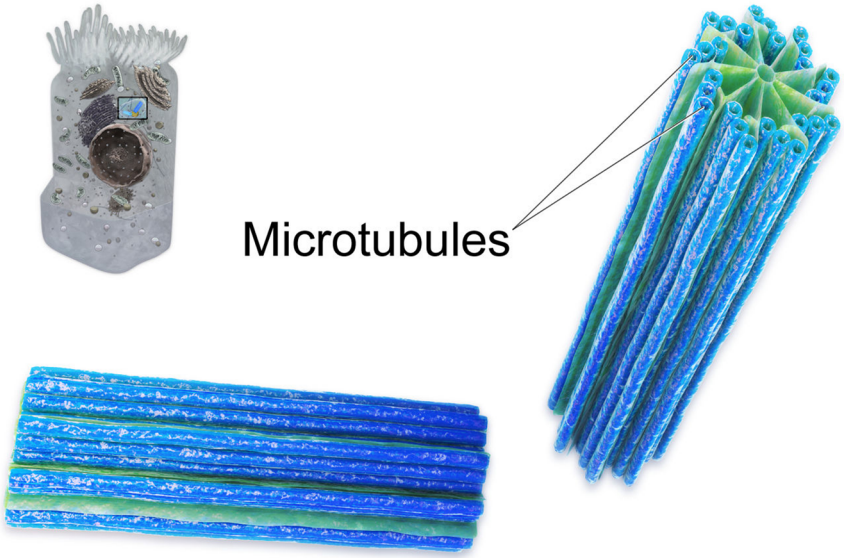
For a look at the physics and biology of the functioning of microtubules as it relates to Orchestrated Objective Reduction, check out this video: Clarifying the Tubulin bit/qubit - Defending the Penrose-Hameroff Orch OR Model (Quantum Biology)

https://www.youtube.com/watch?v=LXFFbxoHp3s (Ref 163)

Centrioles and Centrosomes

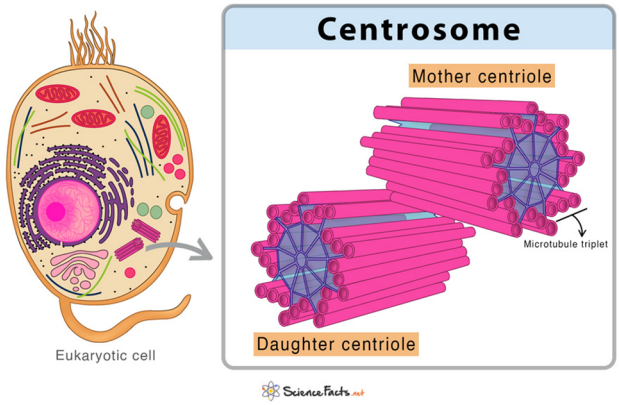
Microtubules these self-assembled linear hollow circular tubes with inner and outer diameters of 17 and 25 nm, respectively, grow from the centrosome in the center of the cell forming a radial system. A centriole is a cylindrical organelle composed of α, β and γ tubulins organized differently from the α, β tubulins of microtubules. Each centrosome comprises two centrioles, which are composed of nine triplets of microtubules. The two centrioles are arranged perpendicularly and are surrounded by an amorphous mass of dense material (the pericentriolar

material). As in microtubules, an electric field would be generated by synchronized oscillation between the α and β tubulins within the microtubule triplet of the centrioles.



Centriole

Centrioles come as a pair oriented at right angles to each other. They are light sensitive and align themselves with that light. They are a fixed length and are typically made up of nine sets of short microtubule triplets, arranged in a cylinder.



Centriole and Centrosome in the Cell

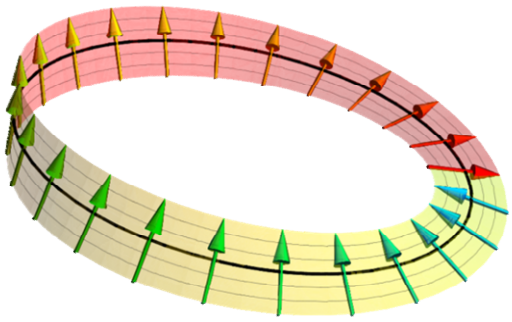
Centrioles are a very important part of centrosomes, which are involved in organizing microtubules in the cytoplasm. Centrosomes are required for survival of the organism. The position of the centriole determines the position of the nucleus and plays a crucial role in the spatial arrangement of the cell especially during cell division. In human reproduction, the sperm supplies the centriole that creates the centrosome and the microtubule system of the zygote.

Microtubule Quantum Coherence

Every impulse of every electron, thought, or spirit is an acting unit in the whole universe. 56:10.14

Electromechanical energy interacts with electro optical energy in microtubules in a coordinated fashion by reversibly exchanging energy for momentum, back and forth. Two things are "conserved": momentum (linear and rotational) and energy. Energy is eternal as demonstrated by "time translational symmetry" (i.e. energy conservation is a direct consequence of the fact that the laws of physics don't change as time passes) but energy can be temporarily transformed into momentum. This looks like discontinuous mechanical motion but the continuous can't be reduced to discontinuous. You can't separate the part from the whole. Neither can you separate the parts of the body from the whole body nor the whole body from the universe. At the quantum level, things directly act as aspects of the whole and they derive their very definition and meaning from that whole. In our case, the Thought Adjuster, being a fragment of the spiritual whole, and the ultimaton, being a part of the material whole, may be our localized presentations of the two "wholes" (material and spiritual). One possible overlapping continuum between material, temporal, transcendental, spiritual energies and "the whole" is quantum electromagnetics. (Ref 33) Keep in mind that "quantum" is not just physical, quantum is relational.

Let's talk about quantum electrodynamics. In QED, there are two fields: the electromagnetic field and the field of electrons. The electromagnetic field is a vector field for every point in space and time. The excitation quanta of the electromagnetic field are photons. The field of electrons, or electronic field, the field generated by electrons, is a spinor field. In the electron field, ultimatonic vectors take 720 degrees of rotation to get back where they started from. This is true for every point in space and time. Electrons are localized, double helix, toroidal excitations or swirls in the underlying electron field that permeates all space. The manifestation, excitation or quantum swirl in of this field is the electron (a cloud of 100 ultimatons). The electrons could be thought of as being rotational and locationally specific, whereas photons have a directional influence. The electromagnetic field interacts with the electric field through the minimal coupling principle, where the electromagnetic potential modifies the electron's direction.



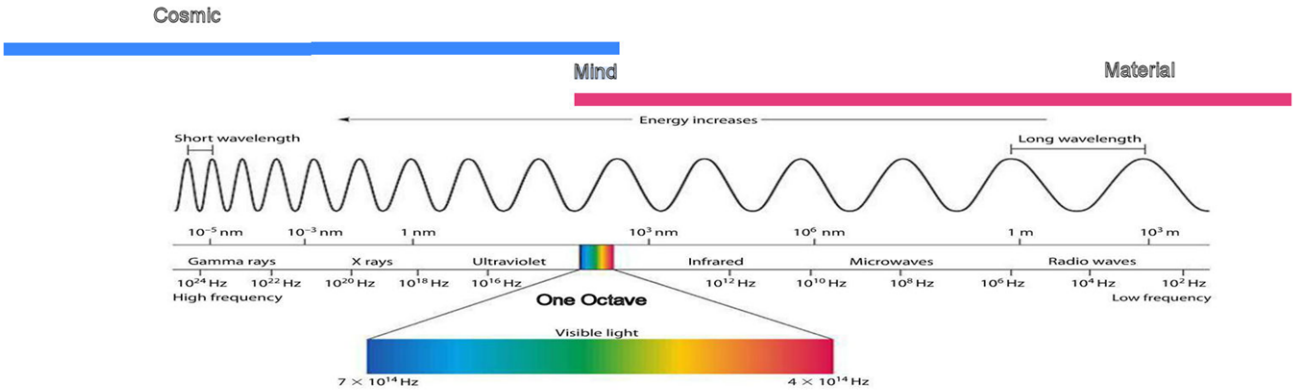
A spinor visualized as a vector pointing along a Möbius strip.

Note the direction reverses after 360° and returns after 720° much like going around twice on a Möbius Strip before getting back to the starting point..

Side note: I like to think of the "circular simultaneity" as a Möbius strip of experience. **(130:7.5)**

If, as *The Urantia Book* implies, there are three overall energies segregations, spiritual, mindal and material, then the electron field might be visualized as the material, the mindal as the photonic and the spiritual as the cosmic (whole) field, then we are looking for ways in which they can interact, and that interaction is likely only at the quantum level.

If we visualize the frequencies of these separate energy fields (material, photonic, cosmic) as parallel lines arranged from lowest to highest frequencies, the upper range of one might be able to interact with the lowest range of the next. One possible arrangement puts the optical range as a possible overlapping-interacting, frequency range with mind energy as the modifier/patterner of the electromagnetic energy.



Cosmic material overlapping Energy Ranges

With this overlapping in mind, let's look at those areas of the brain and nervous system that function at the quantum level. The probabilistic quantum level has some interesting overlaps with the timelessness of spirit energy like, time simultaneity, quantum tunnelling, and action at a distance. (Ref 8, 110)

"Time present and time past are both perhaps present in time future." T.S. Eliot

The "whole" has meanings at every hierarchical level. The universal system has been called many things; the ether, the quantum field, the quantum vacuum (Turiya), the metric field, Higgs condensate, a cosmic superconductor, or even an overall instructional interaction where matter tells spacetime how to curve and spacetime tells matter how to move. *The Urantia Book* differentiates it spiritually as God the Supreme and materially as space. Keep in mind that time is not a thing; events (motion) happen everywhere, and our perspective of these events changes constantly and also keep in mind that time is location-based, not sequence-based.

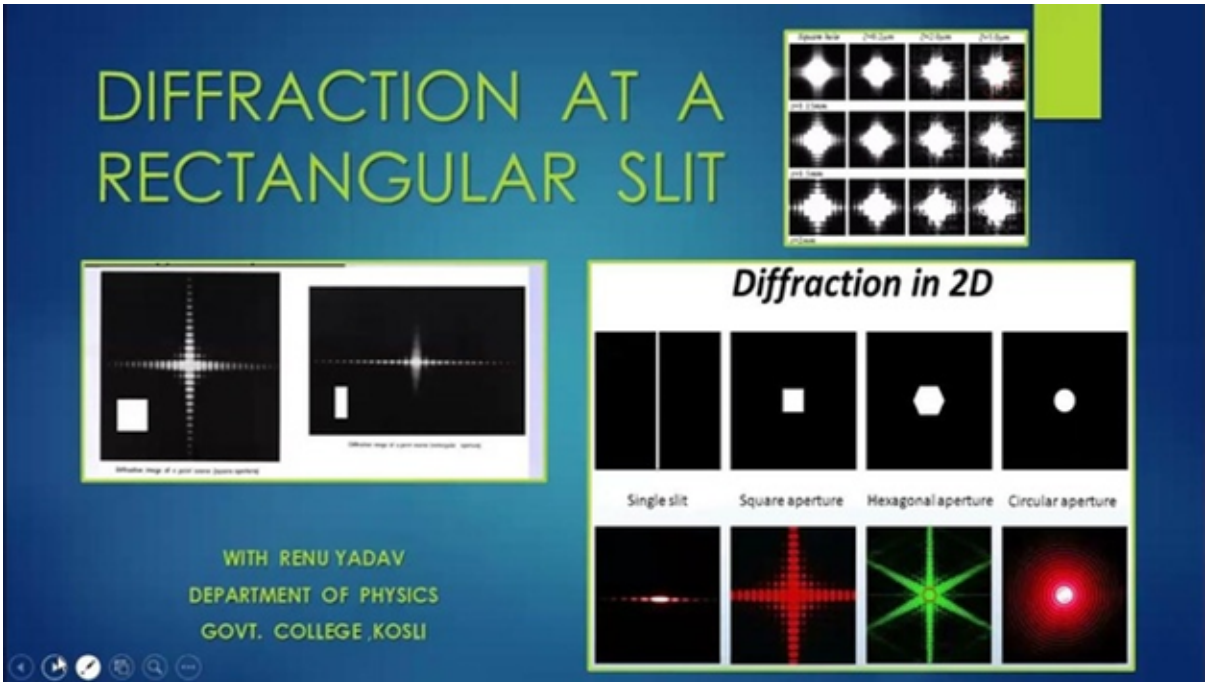
A microscopic example of this would be electron quantum tunnelling. A specific example is associated with ferritin in the substantia nigra pars compacta (SNc) midbrain dopaminergic neurons, as well as all other areas of the body where iron byproducts are found. Ferritin has unique properties that provide for an electron switching mechanism using a Coulomb blockade mechanism where different arrangements are made for different conductivities. Normally electrons carry a negative charge and repel each other. However, when electrons tunnel

between quantum wells, like those formed in the core of ferritin, they can experience collisions with other electrons that result from the electrons trying to tunnel to the same place. Because only one electron can occupy a space (has ubiety), a second electron that also tries to occupy that space will be repulsed. Ferritin acts as an electron switch that is sensitive to its surrounding electric field. (Ref 111) A heme unit is a prosthetic group in proteins that consists of an iron ion (Fe2+) at the center of a porphyrin ring that exhibit "recursive synthetic-dimensional neuromorphic quantum computing that demonstrate a recursive coherence that exists at room temperature in noisy substrates in a coherently recursive, self-stabilizing, explicitly bounded state of molecular consciousness.

The Quantum Consciousness Theory states that the quantum phenomena, such as those occurring in ferritin and microtubules, facilitated by their unique properties, involves quantum mechanisms, such as quantum tunnelling (boring through things that would normally appear as impenetrable), superposition (which says that a quantum system can exist in multiple states simultaneously until it is measured or observed - thought), entanglement (which describes a quantum connection between particles that persists regardless of the distance separating them) uncertainty (which states that certain pairs of physical properties, such as position and momentum, cannot be simultaneously measured with arbitrary precision) and wave-particle duality (electrons, photons and even larger, composite entities, behave like particles but also like waves sometimes being called a "wavicle") (Ref 145) These phenomena allow for the generation of consciousness in ways that classical physics cannot explain. It supports the idea that particles exist in a state of entangled probability until observed. The collapse of the wave describes where consciousness arises. The gradients of subsequent collapses affect other levels, without intention, without control, but effectively. It is these invisible streams of information that explain how a thought tenses muscles, an image triggers tears or faith heals. The collapse of the wave may be observed by us as a thought and may be reality-ized, by the Thought Adjuster.

> Side note: Werner Heisenberg originally called the uncertainty principle, Ungenauigkeit (inexactness) or Unbestimmtheit (un-determinedness), whereas his mentor and collaborator Niels Bohr often used the term Unsicherheit (unsureness). There is nothing unpredictable or even uncertain about the "Uncertainty Principle." The principle relates the quantum wave-function with the whole by saying that any velocity or position of a particle (a quanta) cannot, by Netonian mechanics, be defined more accurately than by an interval - as opposed to being an exact point. You could say that there is a fuzziness to the tiniest constituents of reality.

The speed of a photon remains constant, but the x, y, and z components of that velocity can change. When photons go through a slit, we know the x and y positions, but the z direction is known so there is scattering in the z direction. The probability of the photon velocity in that direction spreads out into a large uncertainty volume that you can see readily every time you look in a telescope or shine a laser beam through a hole.



Photon Uncertainty

Side note: Neurons individually transmit at about 100 m/s and there are 100 billion neurons x 200 firings per second x 1,000 connections each = 20,000,000,000,000,000 bits of info being transmitted per second, so the collective thought/mind/pattern activity may be functioning above the speed of light and therefore could be considered to be functioning outside of time.

Side note: Godel's Incompleteness Theorem says that the whole truth can not be known within any system without including what is outside of the system. We need to cohere with influences beyond our consciousness i.e. God consciousness to know truth.

Microtubules have an ability for quantum superposition creating their ability to exist in multiple states simultaneously until a measurement or observation is made, at which point the system collapses into one definite state. Quantum entanglement occurs when particles (because they come from the same source) become interconnected in such a way that the state of one particle directly influences the state of another, even when they are separated by vast distances. They demonstrate the reciprocal interaction between field and particle. This quantum coherence is an area where classical mechanical behaviors overlap with the wholistic ones and may involve our interface with Supreme spirit energies (Ref 119).

Side note: Entanglement is the normal state of everything. Common descriptions of it make it sound special, but it's pervasive. (Ref 166) When scientists do entanglement experiments, they need to create a known state of entanglement. This means dis-entangling the particles in the experiment with everything else and entangling them only with one another.

Newtonian mechanics looks at past events while quantum mechanics describes the probability of future events happening. The wave property of particles appears when we start looking into the future of that particle. It is a probability wave because the future is probabilistic. Wave function collapse is what we perceive as the present

moment and is what differentiates the past from the future. This process, called decoherence, suppresses interference between possibilities and stabilizes outcomes. What is often called wavefunction collapse is a change in description after an interaction. General relativity (GR) involves making measurements in the observed past and therefore, is predictable. Quantum mechanics (QM) attempts to make measurement predictions of the unobserved future which is unpredictable except for our free will control.

The quantum level of our material consciousness may interact with spiritual consciousness in the equivalent of the collapse of the wave function. (Ref 11) At the physical level, interaction is exchange of forces and information. At the biological level, it is sensory transduction and physiological response. At the experiential level, it is felt presence, meaning, and change in our internal model state. These are not competing stories. They are the same process seen at different scales.

> **The endless sweep of relative cosmic reality, from the absoluteness of Paradise monota to the absoluteness of space potency, is suggestive of certain evolutions of relationship in the nonspiritual realities of the First Source and Center—those realities which are concealed in space potency, revealed in monota, and provisionally disclosed on intervening cosmic levels. 42:10.1**
>
> Side note: At the center of every galaxy is a black hole which stabilizes the mass of all the stars and planets in that galaxy. Our Milky Way galaxy has a super massive black hole.
>
> Side note: At near absolute zero (no molecular motion) matter can take on new forms (Chiral-Bose state, Bose-Einstein condensate). Paradise has no molecular or electron motion, so it would have an unbelievably dense rest mass.

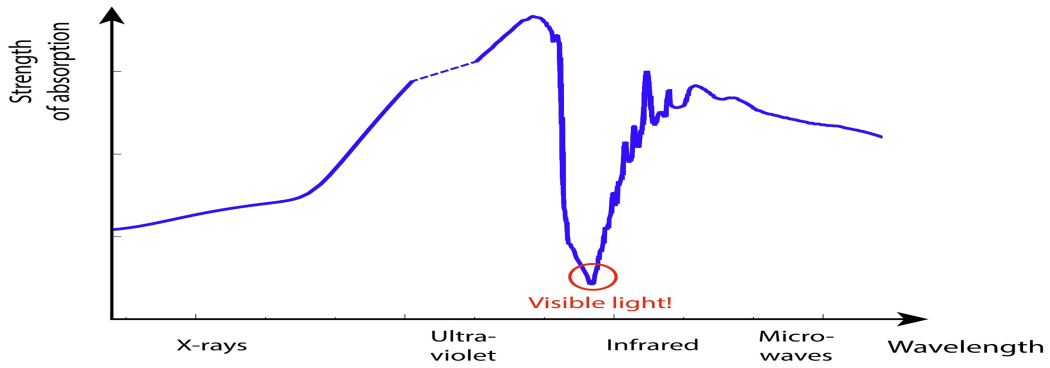
So why do we care about all this? Because thoughts and actions have biological consequences (think blood pressure, heart rate, epigenetics), but more specifically your thoughts control the growth of these microtubules, and your thoughts can be guided, concussion damages microtubules, and may affect your spirit receptivity.

> **It is to the mind of perfect poise, housed in a body of clean habits, stabilized neural energies, and balanced chemical function, when the physical, mental, and spiritual powers are in triune harmony of development that a maximum of light and truth can be imparted… 110:6.4**

The speed of neuron transmission from sensor input to reaction determines the thought cascade. If thoughts of hate and anger were faster than love and forgiveness, they would tend to dominate. The body can't differentiate what or who you are loving or hating, it just goes into fight or flight mode. So, where's the spirit influence in all this?

Quantum coherences only occur at subatomic levels and to a limited degree, in the ultraviolet (electron jump) range. The bioluminescent to mechanical cascade mechanism is made possible by the interactions of the ultraviolet resonance frequencies with the mechanical movements of the microtubules, and this may allow us to cohere with non-local energies. Quantum coherence could facilitate influence from the Spirit of Truth, God the Supreme or the universal absolute.

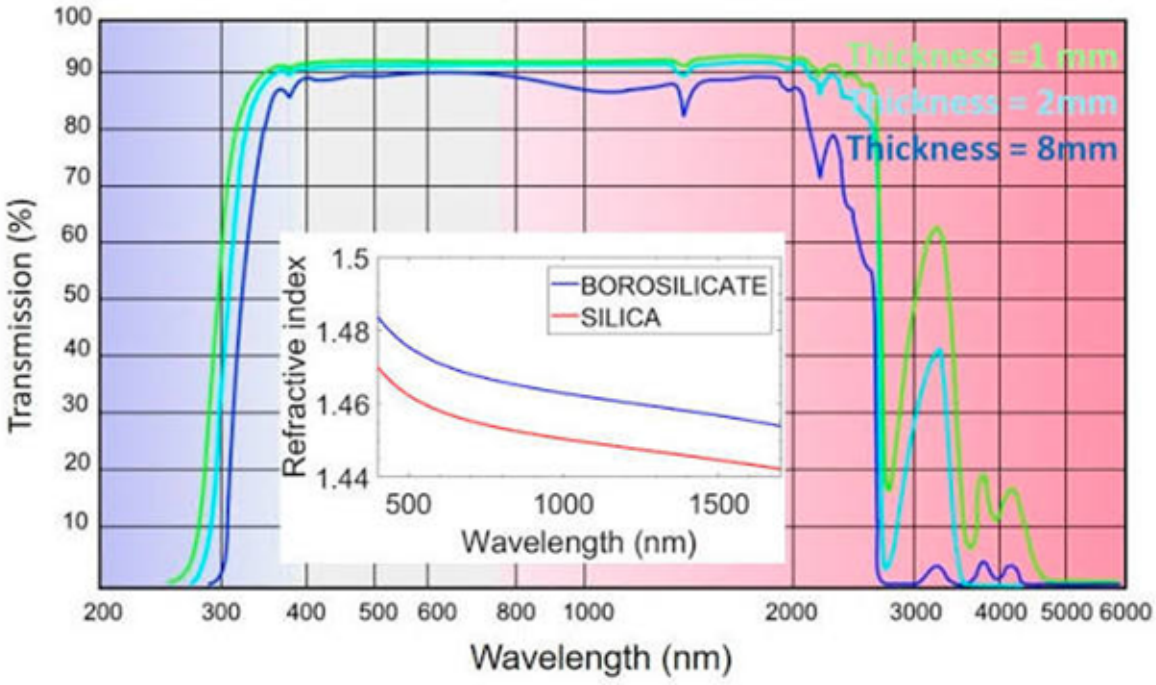
It is interesting to note that water, whose content changes from 75% when we are young to 50% at old age, tends to block ultraviolet light energy. (UV light is 99% blocked after only 5 mm of water)



Photonic Absorption

This graph shows how strongly water absorbs each wavelength. The smaller the value, the more transparent water is to that wavelength. (This is a double-logarithmic plot, meaning the absorption varies by about 11 orders of magnitude from highest to lowest. NIST for X-rays/Gamma and Wikimedia)

Water also has a unique ultraviolet absorption ability.



Note that the two ultraviolet frequencies of the microtubules (276 and 334 nm) are either side of the dramatic drop in light absorption.

Here are a few other luminous possibilities to consider:

Perhaps the mid-mind (soul mind) is optical in nature, just above our electromechanical MHz frequency range. **"where material light, intellectual insight, and spirit luminosity interact." 0:6.8** Luminosity is nothing more than electromagnetic waves, with in-phase oscillating electric and magnetic fields perpendicular to the direction of light's propagation where the shorter the wavelength, the more energetic the photon, the more susceptible it is to spiritual influence or changes in the speed of light as it moves through a medium.

> Side note: The speed at which light moves is related to its alignment with the pattern it moves through and its own recursion i.e. reflective of where it was in self-referential relational coherence being aware of any pattern that is occurring.

It is interesting to note that there are organic materials called alter magnets, that unlike typical magnets, do not exhibit magnetism, yet still influence the polarization of reflected light. (Ref 174) It is also interesting to note that scientists can make light behave like atoms and molecules by forcing different environments. They call this "hard light". (Ref 67, 68, 69, 142) Photons normally have no mass and travel at the speed of light but researchers found that bound photons acquired a fraction of an electron's mass, and these weighed-down light particles were also relatively sluggish, traveling about 100,000 times slower than normal noninteracting photons. (Ref 130)

Let's take a little side trip here to talk about mass. What is mass? Considering that mass and energy are fundamentally the same, what differentiates them? I like to think of everything as swirls of momentum in the electromagnetic field i.e. energy is a function of frequency. Mass then is the result of a resonant standing wave that achieves structural coherence. Reality is then stable resonance. Small ripples result in photons that don't protrude far enough into what *The Urantia Book* calls "primordial force" blanket of space **(42:5.16),** what scientists call the Higgs field, and they don't meet with any resistance in their travels. Matter makes a bigger bump or swirl, that protrudes into the Higgs field and is slowed down by space (the Higgs field) and appears to have mass. *The Urantia Book* says that photons are particles and have mass but at this stage their influence on the Higgs field may not be big enough for us to detect that mass. The only case where light has no mass is in a perfect vacuum and there is no such thing as a perfect vacuum. So, for us light always has speed and a mass based on the medium through which it is traveling. Even deep space there are still what science calls "virtual particles" and what The Urantia Book calls ultimatons, coming in and out of existence. This is called the Proca equation as opposed to the Minkowski equation.

> **… light has weight. Light is a real substance, not simply waves of hypothetical ether. 15:6:13**
>
> **Orbital shifting of electrons results in the ejection or the absorption of very definite and uniform measurable particles of light-energy, while the individual electron always gives up a particle of light-energy when subjected to collision. 42:5:6**
>
> **When the energies of the universe are so slowed down that they acquire the requisite degree of motion, then, under favorable conditions, these same energies become mass. 133:5:10**

Science says that the "vacuum of empty space" isn't empty. It contains gluon field fluctuations. The so-called zero-point energy is the cosmological constant which represents a form of energy inherent to space itself. It cannot be removed, separated or extricated from the very fabric of space. This may be the ultimatons of paper **42:4.6**.? The energy forces we talked about earlier, the electromagnetic force, the weak nuclear force, and the strong

nuclear force, permeate all of space, even in the absence of sources (like particles). These three quantum fields each have a zero-point energy value. This has been validated by measuring the attractive force of two capacitor plates very close together, the Casimir effect.

Getting back to microtubules, perhaps the bioluminescence of microtubules is also why Adam and Eve **"gave forth a shimmer of light" (74:6.5)** as they might have had more predominant microtubules?

> **Material Sons vary in height from eight to ten feet, and their bodies glow with the brilliance of radiant light of a violet hue. 51:1.3**

Perhaps the bioluminescence of the microtubules is hinting at the concept of the "pilot light" of paper 107? Perhaps the bioluminescence of the microtubules is the "light of truth"?

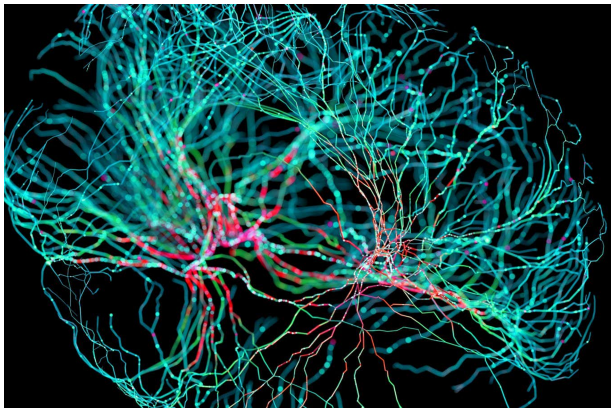
> **Human consciousness rests gently upon the electrochemical mechanism below and delicately touches the spirit-morontia energy system above. 111:1.5**

> **The Supreme One is brilliant beyond description; he is the Light of Lights. Every heart and every world is illuminated by this divine light. 131:4.2**

As we said before, bioluminescence of microtubules functions most poignantly in the medial temporal lobe of the brain as a facilitator of cross-communication between brain cells. This massive cross communication is like the child brain in the Thought Changer phase, before myelin sheaths formalized and sped up our thinking patterns but these neurotubules in the brain later in life facilitate this cross communication and they are controlled by our free will. These particle interactions in the mechanical range and the quantum interactions in the optical range are not only coupled locally with each other; they may also be entangled with the cosmic whole by quantum coherence.

Since at the quantum level, individual things act as an aspect of the whole and derive their very definition and function from that whole, the Quantum Consciousness Theory says that the quantum phenomena in the microtubules, facilitated by their unique electrically isolated properties (think disentangled or detached from other influences), involves all these quantum mechanisms, superposition, entanglement, and wave-particle duality. This link between the atomic and material levels allows for consciousness in ways that classical physics (think mechanical brain activity) cannot explain.

Microtubules, more appropriately neurotubules, hold a state until a measurement or observation is made, at which point the system collapses into one definite state (a thought). Quantum entanglement occurs when particles become interconnected in such a way that the state of one particle directly influences the state of another, even when they are separated. This can be locally in the brain or over vast distances. Quantum coherence allows for the overlapping of local mechanical behaviors with wholistic ones when they share the same source. This may involve our interface with, our adjuster, the Spirit of Truth, the Supreme or the Absolutes. At the quantum coherence level, our material consciousness may interact with spiritual consciousness in the equivalent of the collapse of the wave function.



Electric Focal Hubs in the Brain

Roger Penrose (originator of the OOR theory & 1990s Nobel laureate for physics) says it this way, "consciousness arises when a large number of microtubules in the brain reach a state of quantum coherence, called a "self-collapse of the wave function."

The far-flung physical universe coheres in the Isle of Paradise; the intellectual universe coheres in the God of mind, the Conjoint Actor; the spiritual universe is coherent in the personality of the Eternal Son. ... Man's Adjuster is a fragment of God and everlastingly seeks for divine unification; it coheres with, and in, the Paradise Deity of the First Source and Center. 2:7.7

Electromagnetic Continuum

Electromagnetic vibrations range from the low mechanical to the highest cosmic levels. Visible light is part of this electromagnetic continuum. Light is a rapidly varying electric field, which reciprocally creates an associated magnetic field, which then in turn creates an electric field again, allowing the wave to move through space.

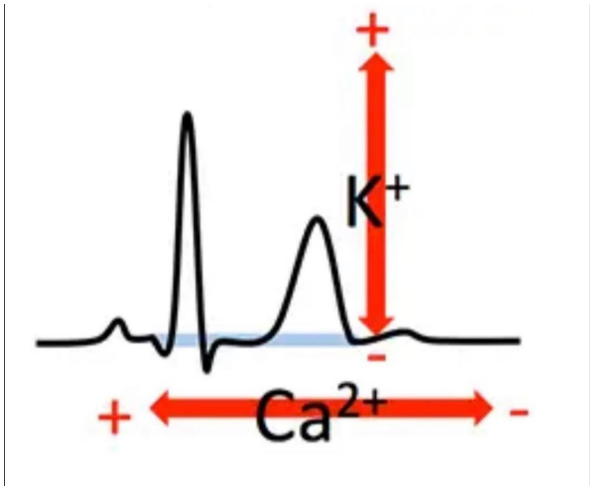
Of all these ten phases of wavelike energy activity, the human eye can react to just one octave, the whole light of ordinary sunlight. 42:5.13

Everything is energy, either in the form of pure energy or energy "acting" as "matter". Energy functions in two fields; the "electric field" where the quanta are electrons with interactions at static or low frequencies and the "electromagnetic field" which combines the electric field with a magnetic field where the quanta are photons with omnipresent interactions at higher frequencies. Electric charge causes the field, and photons *are* the field (even though photons themselves are electrically neutral). The Urantia Book calls this field, the segregata (force-charge).

This is the first step in the individuation of space potency into the pre-energy forms of cosmic force. This state is analogous to the concept of the primordial force-charge of space, sometimes called pure energy or segregata. 11:8.5

Electric energy refers to the energy that comes from the movement of electrons through a conductor, generating an electric field. Electric fields exist independently and can be static (like the charge buildup on a balloon after rubbing it on your hair or the charge on a sodium ion) or dynamic, when the electric charges move.

Bio electric energy refers to the ion movement in living cells. Ion movement in living cells is fundamental to cellular function, communication, and energy regulation. This process, known as ion transport, happens through specialized proteins in the cell membrane that regulate the flow of charged particles like sodium (Na^+), potassium (K^+), calcium (Ca^{2+}), and chloride (Cl^-). For example, each heart beat is caused by changes in calcium and potassium ion concentration changes. Restated, ions don't have a magnetic component until they move.



Ion Concentrations During a Heartbeat

Electromagnetic energy includes electric energy but, in the case of electrons moving in a wire, it creates an associated magnetic field when electrons move. The electric field is coupled to the magnetic field, and they propagate together forming electromagnetic waves, which move their energies through space with or without a conductive medium.

Here are the core differences between electric, bio electric and electromagnetic energies:

Feature	**Electricity**	**Bioelectricity**	**Electromagnetic Energy**
Source	Electron movement in conductors	Ion movement in living cells	Oscillating electric & magnetic fields
Medium	Wires, circuits	Nervous system, electrolytes, cell membranes	Free space or dielectric materials
Mechanism	Voltage-driven conduction	Biochemical ion exchanges	Wave propagation

Feature	Electricity	Bioelectricity	Electromagnetic Energy
Purpose	Powers devices & machines	Enables nerve signaling & biological functions	Transfers energy via waves (light, radio frequencies, etc.)
Dependency	Needs conductive paths	Needs specialized biological structures	Can propagate through empty space, is eternal

Bioelectric phenomena involve biochemical electrical signals in living organisms. Bioelectricity operates in the low-frequency ranges (from static to a few Hz), whereas electromagnetic influence starts when there is electrical movement and extends into higher frequencies. Neural activity, cellular communication, and biological light emissions all demonstrate how living organisms use and respond to electrical and electromagnetic phenomena.

Here are the frequency ranges of electromagnetic interactions:

1. Stationary to low frequencies (<0 Hz - 3 kHz) – nerve and muscle signals

   The nervous system relies on low-frequency electrical signals to transmit information between neurons. Action potentials, the electrical pulses that travel along nerve cells, typically occur in the range of 0.1 - 10 Hz. Muscle contractions are controlled by bioelectrical impulses, often in the range of a few Hz to kHz.

2. Radio frequencies (3 KHz - 300 GHz) – cellular communication and electromagnetic sensitivity

   Microtubules communicate at 1-20 GHz (11.8-to-5.9-inch wavelength) in the radio wave range and mechanically between cells via extremely low electromagnetic frequencies (~10 Hz - 100 Hz). For example, brain emits electromagnetic waves, such as alpha (~8-12 Hz) and gamma (~30-100 Hz) waves, which correspond to different cognitive states.

3. Visible light (~430 THz - 770 THz) – biophotons & optical interactions

   Biophotons, weak emissions of light from cells, are linked to cellular metabolism and DNA activity. The body responds to visible light, photoreceptor cells in the retina convert light energy into electrical signals for vision. Sunlight on the skin produces melatonin, serotonin, endorphins, endocannabinoids, cortisol, oxytocin, leptin, nitric oxide, cis-urocanic acid, itaconate, lumisterol, tachysterol, and helps melanin make Vitamin D. Sunlight does more than just make vitamin D. Its red and near-infrared wavelengths stimulate your mitochondria, a process called photobiomodulation, improving energy production and reducing oxidative stress. Morning sun also anchors your circadian rhythm, sharpening cognition, improving metabolic health, and protecting against depression. (Ref 169) Microtubules emit, and are sensitive to, specific vibrations of 526 and 686 cm−1 in the heat, far infrared frequency range.

4. Ultraviolet light (30 petahertz, or 30 * 10^15 Hz) and above

   UV light ranges from UVA 315-334 nm (9.52 to 8.99 x 10^14 Hz) UVB 276-315 nm (10.8 to 9.52 x 10^14 Hz) and UBC 100-280 nm (3.0 to 1.07 x 10^15 Hz). High-frequency UVC electromagnetic radiation can disrupt DNA and cellular structures, leading to mutations and cell

damage. Medical imaging (X-rays and MRIs) use electromagnetic interactions to observe tissues and organs. Some biological molecules can absorb and react to ionizing radiation, influencing their cellular activity.

Both biological frequency extremes can be stable. It is easy to imagine static stability but let's see what quasi-stationary stability looks like, at the high frequency, ultraviolet end.

Let's first look at the stabilizing processes involved. In Lewin's theory of change (Ref 153) a quasi-stationary equilibrium (Ref 154) refers to a state where driving and restraining forces are in balance maintaining the current status quo. (think about the balanced personality of Jesus where he was this, not that) Also a quasi-stationary mindset or situation is when an individual or groups are seemingly stable but can be influenced to change through agitation or shifting the balance of forces.

> **As man's mind successfully overstrides increasingly difficult barriers, this same creative design has also provided for the slow accumulation of the racial heritage of painfully garnered experiential wisdom—in other words, for the maintenance of a balance between the diminishing external restraints and the augmenting internal restraints. 118:8.5**

Let's elaborate on Lewin's stability theory and see how it relates to "being perfect".

Driving and Restraining Forces:

Lewin's model, also known as "Force Field Analysis", posits behavior as the result of a balance between forces pushing for change (driving forces) and forces resisting change (restraining forces). (Think of your angelic helpers as a push-me pull-you pair where one is encouraging, and the other is restraining.)

Quasi-Stationary Equilibrium:

When these forces are in equilibrium, the system remains stable, and change is unlikely. This state is considered "quasi-stationary" because it's not a true equilibrium where forces are completely absent, but rather a dynamic balance where the system appears static. (Think of the serenity that results from loving and being loved.)

Agitation and Change:

To initiate change, one must disrupt this equilibrium by either increasing the driving forces or weakening the restraining forces. This can involve a sense of urgency, new information, or addressing underlying issues that contribute to resistance/inertia. (Epochal revelation might weaken some of the restraining forces influencing brotherly love or morality.)

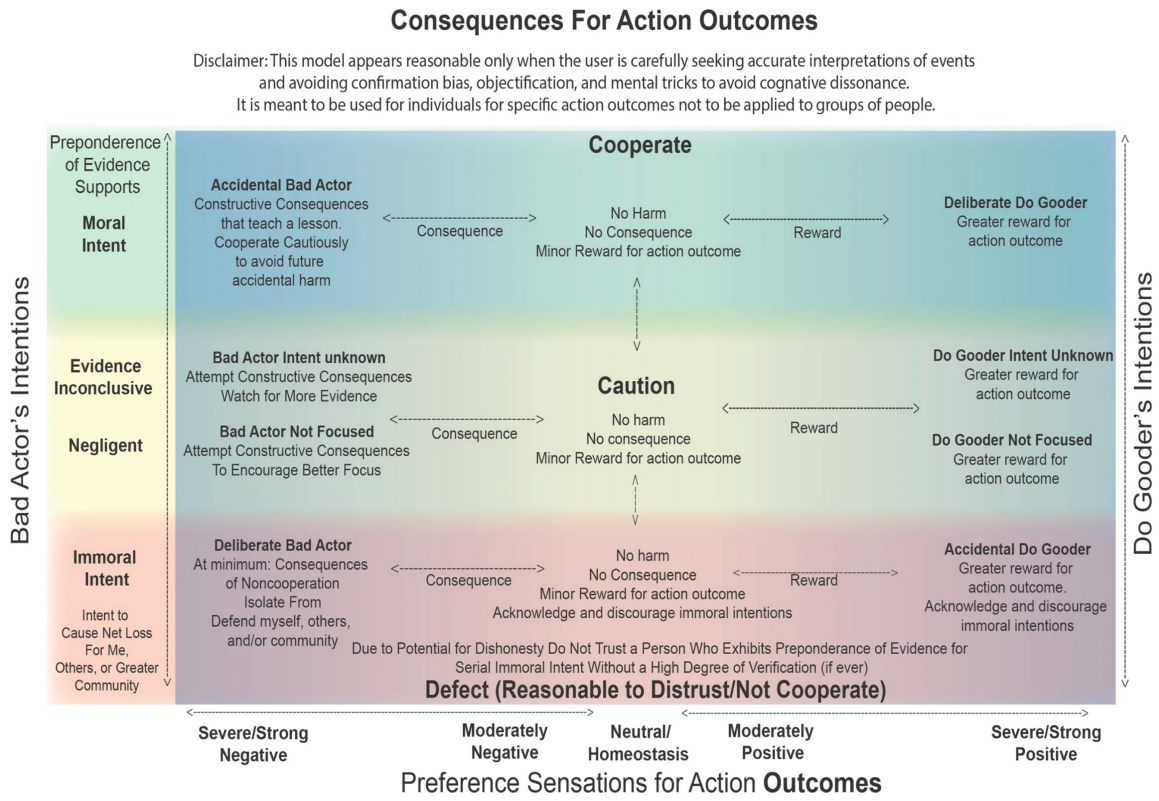
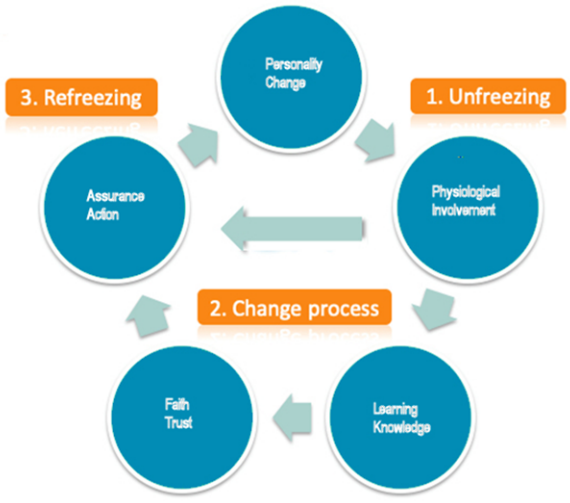


Image credit Leah Kiser

Unfreezing, Changing, and Refreezing:

Lewin's model suggests three stages: unfreezing (disrupting the equilibrium), changing (implementing new behaviors), and refreezing (solidifying the new quasi stable state). ("the watchword of the universe is progress." **(4:1.2)**



Lewin's three change stages as applied to a person

These three stages are also being played out in our biological, ion exchange processes which are fundamental to cellular function, communication, and energy regulation. This quasi-stationary process is known as ion transport

and happens through specialized proteins in the cell membrane that regulate the flow of charged particles like sodium (Na^+), potassium (K^+), calcium (Ca^{2+}), and chloride (Cl^-). Here are some examples of how it works:

1. Passive Transport (Diffusion & Channels)

   Ions move down their concentration gradient without using cellular energy (ATP). Example: Sodium (Na^+) and potassium (K^+) leak channels allow ions to drift in and out of the cell freely.

2. Active Transport (Pumps & Exchangers)

   The cell expends energy (ATP) to move ions against their concentration gradient. Example: Sodium-Potassium Pump (Na^+/K^+ ATPase) actively exchanges Na^+ out and K^+ into the cell, maintaining the resting membrane potential.

3. Voltage-Gated Channels (Nerve & Muscle Function)

   These channels open in response to electrical changes in the cell membrane. Example: Neurons use voltage-gated Na^+ and K^+ channels to propagate action potential, sending signals across the nervous system.

4. Calcium Signaling (Cell Communication & Muscle Contraction)

   Calcium ions (Ca^{2+}) control cell signaling, muscle contractions, and neurotransmitter release. Example: Voltage-gated Ca^{2+} channels in neurons allow Ca^{2+} influx, triggering neurotransmitter release at synapses.

   Interestingly, Calcium Ions have a crucial comparison with the CPT-Coherence (or Mirror-Mind) Theory that proposes a new framework in theoretical physics that extends the known dimensions of spacetime with a fifth coordinate, “coherence depth”. Calcium ions are vital signaling molecules and a primary component of bone mineral (hydroxyapatite).

5. Osmotic Balance (Water Regulation)

   Some ion movements, especially Cl^-, help regulate water flow and cellular hydration. Example: Aquaporins & chloride channels balance water content in cells.

The ion movement constantly maintains resting membrane potential for neuron and muscle function, regulates cell signaling for growth, communication, and energy metabolism and controls electrolyte balance, ensuring physiological stability. Essentially, ions are the stabilizing messengers of the biological world, shaping nerve impulses, muscle contractions, and even thought processes.

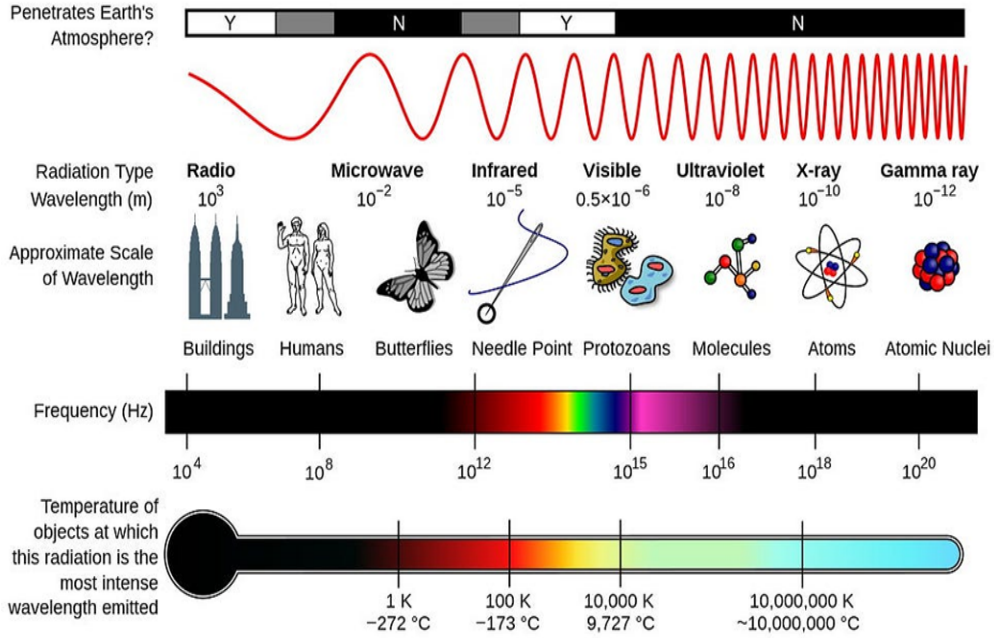
One example of quasi-stable, balanced electromagnetic energies in the ultraviolet (UV) frequency range, is the interaction between UV radiation and the ozone layer in Earth's atmosphere. The ozone layer, which is primarily composed of ozone (O_3) molecules, absorbs most of the sun’s harmful higher frequency UV-B and UV-C radiation, preventing excessive exposure that could damage living organisms. At the same time, allowing some UV-A and a limited amount of UV-B to reach Earth's surface. This natural filtering system creates a balanced electromagnetic exchange, where harmful UV frequencies are mitigated while beneficial UV frequencies contribute to biological and ecological functions. This stable balance ensures life can flourish without excessive UV radiation damage. In the body there is a quasi-stable balance in the UV frequency range in the functions of

the microtubules in a bio-luminescent feedback loop with the microtubule's other related frequencies. Normally electromagnetic energies only interact within their respective energy range, but the unique structure and function of microtubules allow them to interact across a wide range of frequencies, and all those frequencies are influenced by an overarching electromagnetic continuum.

Let's look at this from an overarching electromagnetic perspective.

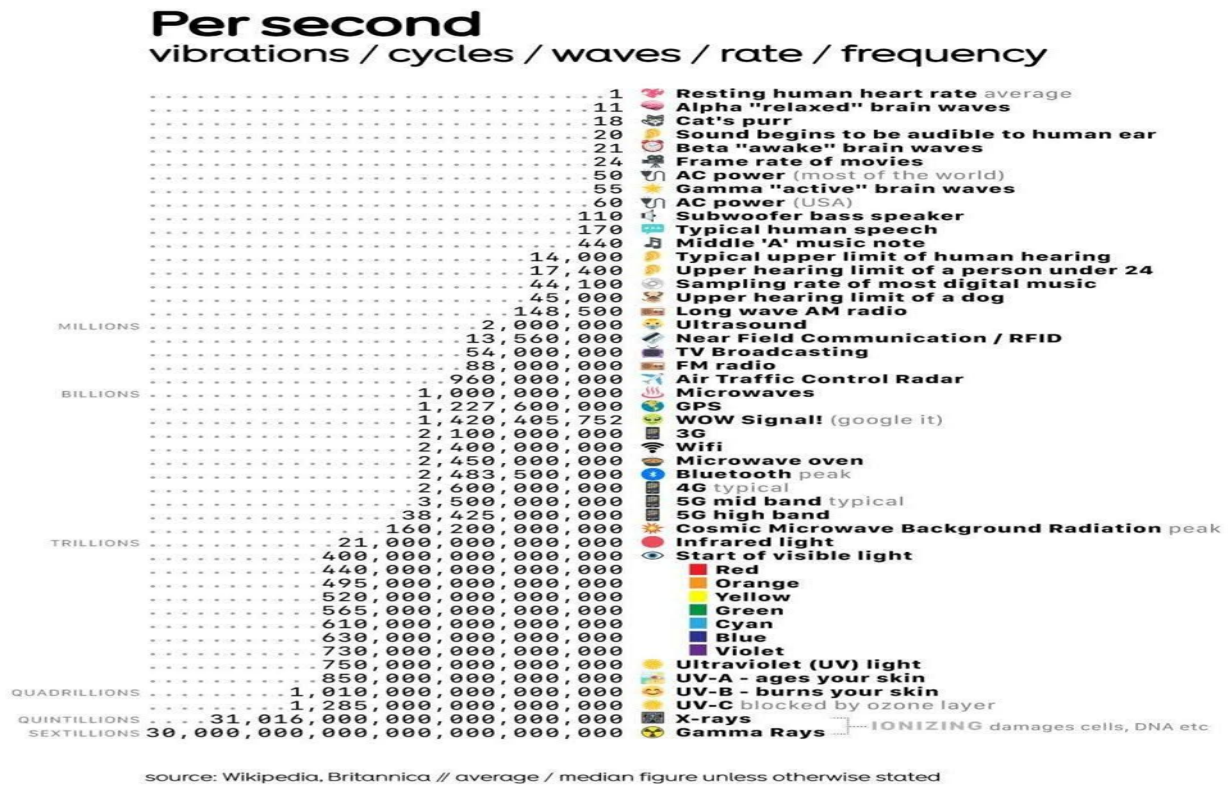
At our stage of existence, we convert electromagnetic energy into electrochemical energy and then into motion (temporally, unidirectionally) via the transfer of electrons between chemicals. This electromagnetic transfer of electrons involves the conversion of electrical energy into waves of magnetic energy, by-directionally, without

loss of energy. The stuff that makes us what we are, and how we think, involves the interchange of these two fundamental properties, energy and momentum. Material energy (motion) involves momentum and is temporal while optical energy (light) involves pure energy and is eternal. Both material and optical mechanisms involve the movement of energy.



Electromagnetic Spectrum

The size, wavelength, and temperature/energy scales correspond to various parts of the electromagnetic spectrum. You must go to higher energies, and shorter wavelengths, to probe smaller scales. Ultraviolet light is sufficient to ionize atoms. (Image Credits: NASA and Inductiveload/Wikimedia Commons)



Vibrational Spectrum

The more correct term when speaking of a photon is neither electrical nor magnetic. It should be electronuclear for there are two kinds of atomic fields that oscillate and generate photons, electrical fields and nuclear fields. Electrical fields have enough energy to generate photons up to and including x-rays, but only nuclear fields have enough energy to generate gamma ray photons.

How do the electromagnetic and nuclear fields interact?

1. Inside the Atom:
    - Electromagnetic fields act between charged particles, like protons and electrons.
    - Strong nuclear fields bind protons and neutrons together in the nucleus, overcoming the electromagnetic repulsion between positively charged protons.
    - The weak nuclear force governs radioactive decay and certain particle interactions, like beta decay.

    Interaction Point: In atomic nuclei, electromagnetic repulsion tries to push protons apart, while the strong force holds them together. This tug-of-war determines nuclear stability.

2. Quarks and Force Carriers
    - Protons and neutrons are made of quarks, which carry electric charge and color charge (related to the strong force).
    - Quarks interact via; Photons (electromagnetic), Gluons (strong force), W/Z bosons (weak force carriers)

    Interaction Point: A single quark can simultaneously be influenced by electromagnetic, strong, and weak fields. These forces coexist and act on different properties of the quark.

3. Electroweak Unification

- At high energies (like in particle accelerators or the early universe), the electromagnetic and weak forces merge into a single force: the electroweak force.
- This unification is described by the Standard Model of particle physics.

Interaction Point: This shows that forces we treat as separate at low energies are actually deeply connected at fundamental levels.

4. Nuclear Reactions and Electromagnetic Effects

- In fusion and fission, nuclear forces rearrange nuclei, but electromagnetic forces influence reaction rates and energy release.
- Electromagnetic radiation (like gamma rays) often accompanies nuclear transitions.

Interaction Point: Nuclear processes often emit or absorb electromagnetic energy, linking the two fields dynamically.

Electromagnetic and nuclear fields don't meld directly like two fields merging. Instead, they act on the same particles, influencing their behavior in complementary ways. Their interplay is crucial in everything from atomic structure to stellar fusion to particle physics.

We live and move and have our being in this electromagnetic continuum and whenever anything changes in our everyday life, there is an exchange of light photon energy and the movement of charge. When objects touch, it is charge that makes contact. Whenever the atoms bond and break there is an exchange of photon energy and the movement of charge. There is a spherical geometry (Huygens' Principle) where every point on a wave front may be considered a source of a secondary spherical wave, which spreads out spherically at the speed of light. This forms part of a continuous process because the absorption and emission of light is spontaneous. Light waves (eternal energy) are continuously interacting with the electrons (material energy) forming photon electron couplings or dipole moments. We can think of this as a process of spherical (think tri concentric) symmetry forming and breaking. When this spherical ($4\pi r^2$) symmetry breaks (becoming a dipole), it has the potential of forming a spiral. A self-limiting dead end. Nothing has lower entropy than a sphere and the absorption of light always comes before the emission, relative to the reference frame of the object or life form that is radiating that light. This forms a direction in time with an uncertain future that is not totally random. There is a built-in potential for ever-greater symmetrical formation, and this can be seen in cell life, evolution and our increasing synthesis of meanings and values.

According to *The Urantia Book* there are 100 octaves of energy in our local universe. **42:5.1** Science currently is aware of most of them.

> **Light, heat, electricity, magnetism, chemism, energy, and matter are—in origin, nature, and destiny—one and the same thing, together with other material realities as yet undiscovered on Urantia. 42:4.1**
>
> **Spiritual energy acts in accordance with established laws, just as does physical energy. 44:5.4**
>
> Side note: The lowest electromagnetic vibration of the Earth is at a frequency of 7.83 Hz, Schumann resonance – named after the German physicist Otto Schumann, who predicted and mathematically described the lowest possible frequency of a photon in 1952. Commonly known as "Earth's heartbeat".

This extremely low frequency resonance has a wavelength of about 40,000 km – comparable to the circumference of the Earth.

Within each octave, energies have an inherent ability to interact. At very low frequency (infrared and below) interactions cause heat. Higher frequency interactions are involved in the bond oscillations of molecules. Even higher octaves hold material atoms together. It is my conjecture that octaves higher than these are the realm of morontia energy, essentially "hard" or "super-solid" light when light looks like and acts like material atoms but is made entirely from photons and even higher octaves may be spirit energy formations.

My supposition is that we function in the MHz and lower optical range, morontia involves the ultraviolet range (hard light comingled with matter).

If spirit energy is high frequency stuff and if it is going to interact with the finite realm, it needs to find ways to influence material energies using sub harmonically resonant frequency mechanisms. The pattern and organization of the body's biological system is established and maintained by a complex electro-dynamic field. This electro-dynamic field is determined, in part, by its atomic bio-chemical components, which in turn determines the behavior and orientation of those components. This field is electrical in the physical sense and by its properties it relates the entities of the biological system in a characteristic pattern and is itself in part a result of the existence of those entities and can be influenced by the whole through coherences.

The Thought Adjuster's challenge then is to learn which frequencies in his vocabulary (likely above the 10^{24} Hz range) can find sub harmonic resonances with our low frequencies. This is where the microtubules come in with their ability to interact with both light frequencies (ultraviolet in the 10^{15} Hz range), and our material neurons functioning in the kilo Hz range. Microtubules, with their combined mechanical and bioluminescence mechanisms, might be a sub harmonic resonant step-down mechanism.

> **The Thought Adjusters would like to change your feelings of fear to convictions of love and confidence; but they cannot mechanically and arbitrarily do such things; that is your task. In executing those decisions which deliver you from the fetters of fear, you literally supply the psychic fulcrum on which the Adjuster may subsequently apply a spiritual lever of uplifting and advancing illumination. 108:5.8**

"Literally" "the psychic fulcrum" might be our "Christ like", "Spirit of Truth", "fear not", temporary patterning of microtubules. Microtubules grow best when the energies of fear can be utilized by calm reflection. We can choose what we do in those few milliseconds between sensory input and our reaction, our free will intervention time. We can either choose to remain animally, fear based, materially conscious, or we could pattern our microtubules by co-creatively focusing on fearless Christ consciousness. Our microtubules will grow and shrink as required to maintain those prechosen superconscious patterns of thinking. Evoking the "fear not" peace filled "mind of Jesus" (activating the Spirit of Truth) may allow temporary changes to microtubule lengths that facilitate temporary Christ like thinking and with repetition these patterns might become our homeostatic norm. I am not saying that microtubule patterning is souly (pun intended) responsible for Spirit of Truth reception. There are likely several mechanisms involved, and it is up to us to use our three cosmic intuitions (causation, duty and worship) to interpret and implement what our senses are telling us and logic tells us that truth doesn't lie in a single perspective. It emerges from the interplay of reactive plausibility, systematic consistency, reflexive self-examination, and contextual embedding. From the spirit of truth perspective "**… the establishment of this "new and living way" was a matter of fact as well as of truth." 52:5.5**

The "fact" may be microtubules and their ultraviolet "picture" of our bioluminescence and until the TA learns to speak directly to us, or we can quiet our mind chatter to better "see the light", the only available interactions may involve quantum coherences where the material parts of us sense being a part of the cosmic whole.

"While I am in the world, I am the light of the world." John 9:5

"When Jesus spoke again to the people, he said, "I am the light of the world. Whoever follows me will never walk in darkness, but will have the light of life." John 8:12

Morontia Material – Hard Light

Perhaps, in the electromagnetic ascension continuum, we move up in frequencies from matter, to morontia to spirit energy formations. We might ascend from the very slow rotational energies of matter (fermions and bosons) to artificially maintained morontia material, (bosons with mass), to the massless (and hence eternal) boson force carriers of spirit energies, photons. Note that bosons are the carriers of force while fermions are matter.

In support of this idea, a few universities have successfully forced light to behave like atoms with the addition of different energies. They have slowed light to have small amounts of mass (about 100 times that of an electron) and make it exhibit the natural tendencies of matter to form compounds. (Ref 67, 68) This "hard" or "solid light" may be our first glimpse at morontia matter.

The local universe consists of three degrees, or stages, of reality manifestation: matter, morontia, and spirit. 103:6:7

…one hundred physical elements, but likewise have exactly one hundred forms of a unique energy organization called morontia material. 48:1.3

Mankind is slow to perceive that, in all that is personal, matter is the skeleton of morontia, and that both are the reflected shadow of enduring spirit reality. 189:1.3

"The people living in darkness have seen a great light; on those living in the land of the shadow of death a light has dawned." Matthew 4:16

"Your word is a lamp for my feet, a light on my path." Psalms 119:105

Side note: The energy balance between dark matter and dark energy in the Universe (where "dark" means unseen) has changed from being about 80% dark matter to around 70% dark energy and since dark matter clumps and dark energy appears to be smoothly distributed throughout space. I suggest that dark matter may be morontia material, since dark matter is found by using gravitational lens mapping, to be spatially collocated with regular matter in astronomical mapping. (Ref 70)

Physiological Continuum

Just as there is an electromagnetic continuum, from the high frequencies of spiritual realities, down to the megahertz ranges where we function, to the stationary isle of paradise, there may also be a physiological continuum. At the very base of our individual physical identity, there is our fundamental descriptor, our DNA. Our DNA gives us our potential. Our DNA has the potential of creating the multiplicity of proteins that make up the various cells in our bodies. Based on our DNA, each cell creates the proteins necessary to be what it is supposed to be. Some become brain cells while others become gall bladders. How does DNA know what to become? How does it know how to fold to become a brain or a bladder cell? It turns out that the electrical environment of the cell has that "knowledge". As the cells are multiplying, as the DNA strands are unzipping, as the cells are dividing, their positions and orientations are maintained by microtubules, and they are influenced by the electric fields that surround them. Their folding is also modified by epigenetic manipulations of the local electric field, and this determines what proteins are being formed. In other words, the same DNA folding in the brain electrical milieu becomes brain cells and those folding in the bladder electrical patterns become bladder cells. This was experimentally demonstrated by Michael Levin (Ref 48) in his work with flatworms. Electrical intercellular communication is facilitated in part by microtubules because of their electrical surface charges and the centriole's light sensing ability to maintain the relative position of all the parts. This intercellular communication based on its electrical interactions, not only determines what is being formed but it also establishes the cell's cooperation with neighboring cells.

> Side note: Cancer cells are still the original cells (brain or bladder), but they have stopped communicating with neighboring cells. Cancer has typically reverted to a more primordial fermentation process of making ATP that does not require oxidative communication. (Ref 45) They have rebelled and think they can make it on their own. Think Lucifer manifesto.

Although the human body may be too large and complex to be quantum entangled in the literal sense, our subjective experiences of connection with others may often mirror this quantum phenomenon. The deep social bonds we form with loved ones, the sense of shared experiences, or moments of profound empathy where we seem to feel another's emotions as our own, all these experiences evoke a kind of "psychological entanglement" reminiscent of quantum connections and the non-local nature of quantum entanglement finds a parallel in how we maintain these connections with others across vast distances. There is a sense of connection when thinking of a loved one far away. There is also the phenomenon of simultaneous invention where multiple people develop the same idea (kindred minds) independently, which hints at a kind of entanglement in the collective human psyche.

The sensing of our electromagnetic environment, (Ref 49) with its associated communication mechanisms, determines our flow, from DNA to protein, from cell to neighboring cell, from neighbor to neighbor, from man to God, from day to day, from year to year, from here to eternity. It's all about local relationships.

> **Everything nonspiritual in human experience, excepting personality, is a means to an end. Every true relationship of mortal man with other persons—human or divine—is an end in itself. 112:2.8**

These relational senses or flows are all influenced by our body, our self-awareness, our calmness, our local focus, and our overall God consciousness and connectedness. All these processes incrementally influence how we

proceed and we in turn, influence the people around us, enhance our sense of connectedness, and increase our sense of cosmic citizenship, the Supreme, and God himself.

Single and Multiple Quantum Coherence – SQC and MQC

First, we should define what we mean by quanta. Quanta, in physics, is a discrete quantity of energy proportional (in magnitude) to the frequency of the radiation it represents. Essentially it is the smallest transferable/exchangeable energy packet. In light it is a photon, in electromagnetism it is the gluon, in gravity, physicists are still looking for a graviton.

Some notable examples of electromagnetic quantum effects in biology are:

1. Photosynthesis: In plants, algae, and some bacteria, quantum coherence is believed to play a role in the efficiency of energy transfer during photosynthesis. Excitons (packets of energy) travel through light-harvesting complexes, and quantum effects allow them to find the most efficient path to the reaction center.

2. Magnetoreception in Birds: Certain migratory birds are thought to use quantum entanglement in their ability to sense Earth's magnetic field. This involves a protein called cryptochrome, where quantum spin states of electrons help birds navigate.

3. Enzyme Catalysis: Quantum tunneling is a phenomenon where particles pass through energy barriers they wouldn't normally overcome. This has been observed in enzymes, which use tunneling to transfer protons or electrons, speeding up biochemical reactions.

4. Olfaction: The sense of smell might involve quantum tunneling. Some theories suggest that odorant molecules are identified not just by their shape but also by their vibrational frequencies, which could involve quantum effects.

5. DNA Mutations: Proton tunneling in DNA can lead to spontaneous mutations. This occurs when protons in hydrogen bonds "tunnel" to different positions, altering the genetic code.

In the electromagnetic nature of our physiology, there may also be possibilities for magnetic coherences with spiritual forces. For example, water forms a dipole since oxygen is a big fan of electrons and attracts it more strongly than the hydrogen atoms. For this reason, electrons like to spend more time around oxygen, creating a partial negative charge on the oxygen side giving it magnetic propensity. An adult human contains around 60% water. (women 55%, men 60%, babies 75% dropping to 65% by age 12)

Recent research into the nature of consciousness (Ref 65, 104) found evidence of multiple quantum entanglement using fast nuclear magnetic resonance (echo planar) imaging, to study brain protein physiology. They found that the thought processing areas of the brain functioned at the quantum level and using an intermolecular approach known as multiple spin echo (boosting the initial water induced echo) they found that different areas of the brain demonstrated multiple quantum coherences. In addition, there was evidence of single quantum coherence in the cerebral fluid itself showing up in the dipole-to-dipole interactions like the normal T1 (fat enhanced) T2 (water enhanced) relaxation and rotational symmetry measurements.

Let’s reflect for a moment on magnetic resonance. The magnetic resonance process involves placing the subject in a strong magnetic field and then superimposing a variable radio frequency electromagnetic field. The nuclei of

the individual molecules, aligned by the strong magnetic field, are vibrated (jiggled) out of alignment, and the time taken to realign (T1 fat, and T2 water, relaxation times) are a function of the properties of their nucleus. The fact that water has a strong tendency, and most other molecules have a general tendency to align with a magnetic field, implies that they have a relationship to an overall reference field. In the magnetic resonance machine, the nuclei align with the coils, on Urantia the nuclei align with the earth's magnetic fields, in the universe fields align with the energies flowing out of Paradise. We have a magnetic orientational relationship (alignment) with Paradise.

> Side note: There is also an alignment between our light sensing and magnetic orientation. (Ref 113) This light sensing is aided by a networked hierarchy of intrinsic amino acids like tryptophan in microtubules and their related centriole light sensing alignment. This is significantly different from other photoreceptors, which rely on a separate cofactor (such as flavin adenine dinucleotide in blue-light sensitive photoreceptors) or pigments (such as chlorophyll) to enable light detection and harvesting. Recent observations of UV light-harvesting from tryptophan networks in microtubules and tryptophan networks as photoreduction mediators in cryptochrome are consistent with an emerging picture of extended protein scaffolds that harness the symmetries of hierarchical tryptophan networks to promote biological function.
>
> Side note: To build a reference map, time consciousness is required. To orient the map, we need a cosmic orientation. Water and the nuclei of our cells may be providing magnetic orientation.

By using cross-recurrence-quantification-analysis, to characterize and quantify interrelationships between nonlinear time responses, researchers also found a 300 to 450 millisecond delay between the EEG signal and the related blood flow pulse oximetry signal. (think heart mind relationships) This delay was found to be location specific and was a function of awareness and wakefulness.

> Side note: Quantum coherence in microtubules is temperature dissipation limited. "Warm, wet and noisy" environments cause decoherence, so mental noise or things that raise our core body temperature and inflammation prevent coherence. Remember too, that thermoregulation stops during REM sleep so stay cool, calm, and collected. (Ref 4)

Magnetoencephalography (MEG) studies show brain oscillations of specific frequencies can be found in the cerebral cortex. For example, localized frequencies between 80 and 200 Hz have been related to epileptic seizure events. Magnetoencephalography may also that there is a magnetic alignment or orientation with Paradise since our cells have this tendency to exhibit magnetic bias or orientation.

There is a "brain atlas" (voxel map) that shows the various frequencies that dominate the areas of the brain and MEG is a tool that has been used to study the dynamics and connectivity of these large-scale brain activities (as opposed to atomic level connectivity) and their interactions with the body and its environment in functional body and other brain states. MEG measures the magnetic fields produced by the electrical activity of the brain (as measured in delta, theta, beta, gamma etc. wave activity) using arrays of SQUIDs (superconducting quantum interference devices) or SERFs (spin exchange relaxation-free) detectors.

Remember the so called **"**random" nature of molecules transferring their signaling molecules as they bump into their neighbors? Physics can certify randomness only in an operational way, always is it relative to explicit physical assumptions and models, whether through entropy bounds in statistical mechanics or through the

irreducible outcome statistics of quantum measurements. i.e. it only looks random from certain sub regions. This so-called randomness may be another area of spirit influence, at small-scale brain activity, and this would show up here as another form of coherence.

> **… the phenomenon of stimulus-response is not a mere mechanical process since the personality functions as a factor in the total situation. 112:1.13**

Time

In the last section we talked about "relaxation times" but what really is time? The material ego needs time and is impatient because it feels limited by time. Spirit is eternal. Spirit is patient because it has all the time it needs. But what really is time? The philosophical debate about space and time is a dichotomy between two perspectives - absolutism and relationalism. Absolutism maintains that space and time are real and exist independently of human experience. Relationalism, according to the theory of relativity, neither space nor time are fixed entities; they instead arise from the relationships between objects and events throughout the cosmos suggesting that everything is based on information derived from our knowledge, observations, and measurements.

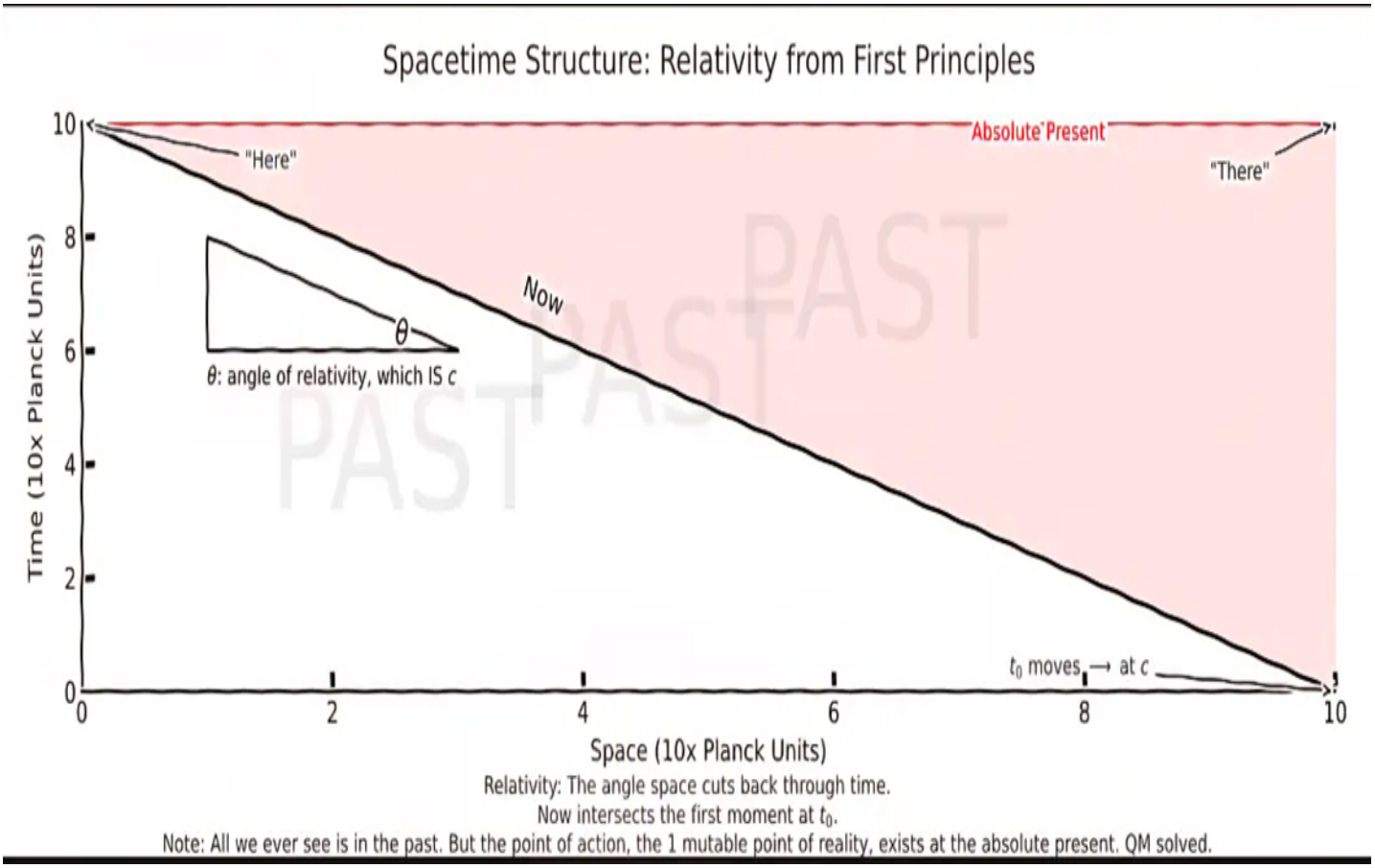
> **"The totality of all mental projections is the Great Illusion. When I look beyond the mind I see the witness. Beyond the witness is infinite emptiness and silence. Your world is created with the emergence of the I Am idea. In your world everything has a beginning and an end. Timeless being is entirely in the now." Nisargadatta Maharaj**

Time then, is not just another dimension. Time (motion) looks different from the positions in space. You can stand still in space but not in time. Time is a way of ordering events. The Wheeler-DeWitt wavefunction of the universe, $H\psi = 0$, depends on the configuration of the gravitational field at every point in space and strikingly lacks a time variable. Time is a parameter used to relate distances in space only because the speed of light in a vacuum is common to all observers. For example, 13 milliseconds, is the time for a photon to traverse the distance between New York and Los Angeles. Time is only "perceived" by the analysis of motion and motion can only occur in space. More specifically, actions contribute to phase shifts, which is the source of quantum physics. The effect of these phase shifts is to cause certain other measurable quantities to take on isolated values. For example, energies below an ionization energy level, are isolated (think unaffected by cosmic influences). This phenomenon permits extremely precise measurement of frequency, and hence duration. This is also why the vibration cesium 133 atom is used as the most precise clock.

Does time allow the materially finite to coexist with the spiritually infinite?

> **Relationships to time do not exist without motion in space, but consciousness of time does. Sequentiality can consciousize time even in the absence of motion. 12:5.5**
>
> **Time comes by virtue of motion and because mind is inherently aware of sequentiality. 12:5.1**
>
> **Only by ubiquity could Deity unify time-space manifestations to the finite conception, for time is a succession of instants while space is a system of associated points. You do, after all, perceive time by analysis and space by synthesis. 118:3.1**

"Now" is the intersection of "what was" and "what is yet to be". Other than the present "instance" time only exists as the apparent sequence of spatial events or instances. It only exists as a memory or prediction in the brain or mind. We can remember the past, we can predict the future, but the intersection of the two is the only "time" real to us. "Now" can be described as what is materially real (a photon's current magnitude and direction). "What will be" can be described materially, probabilistically, by Feynman diagrams and "virtual" photon pathways.



Space-Time The Way We Visualize Motion

This is the inverse theory of space-time, where time is different for each observer and says that there is only "now" and time is just the angle we view things from. (Ref 178) It is interesting to note that according to space-time relativity, time apparently moves slower at higher velocities and slower at weaker gravity. E.g. GPS satellite clocks moving at about 14,000 km/h, appear to run slower by about 7 microseconds per day because of their speed and faster by about 45 microseconds per day because of their higher altitude and weaker gravity. These apparent differences are due to mass displacing space and our speed of viewing motion in that space. (Ref 195)

Another way of looking at our sense of time:

Future → expands toward ∞

Past → expands toward ∞

Present → balances at ½

If this were the complete picture, reality would be monotonic, just growing or shrinking, never cycling, but the universe oscillates: waves propagate, particles spin, fields pulse, orbits circle, hearts beat, seasons cycle, quantum states rotate, fermions (matter) exists in spinor representations (720 degree rotations of energy) and forces (light) exist as vector and tensor representations. Memories don't replay linearly they spiral through associations, emotions cycle through states but with each cycle you're different, growth returns to similar challenges, but you face them transformed, consciousness loops back on itself requiring two "looks" to see clearly, the universe itself exhibits cyclic behavior that never repeats exactly until the next cycle.

We have used different motions to measure timed cycles, burning candles, water, a pendulum, a vibrating crystal, atomic motion and given the instantaneous communication between photons, and other apparently simultaneous phenomena we should question the reality of time. IMHO time is a convenient mathematical tool to predict the future based on our observations of the past. i.e. a tool based on Newtonian observations. Our brain and mind, however, are not bound by Newtonian physics. We can choose to function at the quantum relativistic level of consciousness and incrementally nudge our future.

Side note: We have twelve hours in a day because we have 12 segments on the fingers of both hands.

I have a position in space and a movement through that space. I also have a depth of personality with drives, attitudes of self-realization and reactions to my environment. I can, over time, also develop a breadth of insight, a coordinating and unifying ability, giving my life future meaning and value. (Ref **112:1.5**) It could be that the I AM in me is slowly trading time (the shadow of spirit) for real value as I grow my soul.

The eternal real is the good of the universe and not the time illusions of space evil. 102:3.15

Material things change with time, truth does not. The search for truth is the search for timeless things. As we age, we have more past to refer to as we are solidifying in our minds our chosen path from the many possible paths opening to us at each moment. As we age, the present moment becomes a smaller and smaller part of our total existence. As we age, we have more experience from which to draw the wisdom required to make the right choices. Infinity is the sum of all the possible outcomes of time.

The more you focus on the past or future - the more you miss the present. Eckhart Tole

Animals do not sense time as does man, and even to man, because of his sectional and circumscribed view, time appears as a succession of events; but as man ascends, as he progresses inward, the enlarging view of this event procession is such that it is discerned more and more in its wholeness. That which formerly appeared as a succession of events then will be viewed as a whole and perfectly related cycle; in this way will circular simultaneity increasingly displace the onetime consciousness of the linear sequence of events. 130:7.5

How long before you will regard time as the moving image of eternity and space as the fleeting shadow of Paradise realities? 189:1.3

When physical conditions are ripe, sudden mental evolutions may take place; when mind status is propitious, sudden spiritual transformations may occur; when spiritual values receive proper

recognition, then cosmic meanings become discernible, and increasingly the personality is released from the handicaps of time and delivered from the limitations of space. 65:8.6

Our sense of connectedness and ultimate unity transcends time and space.

Time Consciousness

Our consciousness of time is emergent, meaning that it emerges from the sum of many parts, but you won't find it in any individual part. A scene or image is a pointillist (small dots of color that blend) is emergent. (Ref 184)

To understand how our physiology interprets the pointillism of time, we first need to understand what makes us conscious of time and sequence. The entorhinal cortex (EC) is the early critical first stop area of the brainstem/midbrain and it functions as a network hub for memory, navigation, and the perception of time. For material processes, our perception of time is really our conscious perception of the previous patterns of electrical energy at multiple levels in our bodies.

To achieve the "integration of diverse elements, relationships, or values" (Webster's definition of coherence) we need to lower the entropy by synchronizing the parts (i.e. more order in the sum than in its parts). We need a resonance that allows it to absorb and stabilize information, as cross-referenced to time and space. To relate space, the EC has grid cells that fire when we move (imaginatively or actually) that gradually build a memory map or grid reference of our location and since we measure motion by time, we need a time reference. We need time references for all relationships, even a personal relationship to our own progress. We need time for our relationships to others, our relationship to Paradise, and our relationship to God.

To perceive time duration, the brain needs either a repeatable tick toc or stationary reference. There are a few ways to get a time reference. One would be our circadian rhythm; another would be the rhythmic pulsations (3.75 to 7.5 Hz) coming from the limbic hippocampal regions as seen in the Theta waves. A longer time unit would relate to the gradual buildup of different chemicals. Yet another possibility would be if the EC could reference something stationary or "outside of time". This could be the influence of our changeless personality, our homeostasis, or the timelessness of the Thought Adjuster.

Personality is uniquely conscious of time, … 112:0.16

Personality creates a unique time sense out of insight into Reality plus a consciousness of presence and an awareness of duration. 12:5.9

The motion of time is only revealed in relation to something which does not move in space as a time phenomenon. In the universe of universes Paradise and its Deities transcend both time and space. 130:7.4

The suprachiasmatic nucleus (SCN) is a specific brain region that helps regulate our circadian rhythms (sleep-wake cycles). Through its interactions with light input, neurotransmitters (glutamate and GABA), hormonal signals, and clock genes, the SCN coordinates the timing of sleep and wakefulness, linking our internal clock with our external environment. The SCN is a tiny yet sophisticated region in the hypothalamus, a part of the brain situated above the optic nerves. (Ref 138)

Side note: Oxford's Centre for Neural Circuits and Behaviour just discovered that sleep is triggered when the brain responds to an imbalance in energy. Specialized neurons behave like circuit breakers. They monitor the electrons leaking from mitochondria when there is an oversupply and trigger sleep once a critical threshold is reached.

The EC with its time derived grid map, is also the main interface between the hippocampus (limbic, "fight or flight" declarative memories and spatial relationship) and the neocortex (computation, attention, thought, perception, and episodic memories). The EC-hippocampus system can time sequence the past, present, and future as related variables so it plays an important role in autobiographical, episodic, semantic, and spatial memories including their formation, consolidation, and optimization during sleep. The Thought Adjuster and Theta wave periodicity are both most prominent during sleep**. 110:5.5** The entorhinal cortex hub of the brain, with its myriads of logics circuits, continuously responds and adapts to stimuli, strengthening some connections, and weakening others. The process of intercommunicating and strengthening or weakening also involves the lengthening or shortening of the time delays of cytoskeletal microtubules. (Ref 39)

We see time as the observation of things evolving and there are two kinds of time:

1. Mind time: the observation of energy/matter changing its location (motion).
   Chronos - time duration as measured by a chronometer or a Chronoldek.
2. Spiritual time: Spiritual progress or our movement towards God/unity.
   Kairos – representing information at the right or opportune time as measured by The Ancients of Days.

Religionists seem to live in effective emancipation from harrying haste and the painful stress of the vicissitudes inherent in the temporal currents of time; they exhibit a stabilization of personality and a tranquility of character not explained by the laws of physiology, psychology, and sociology. 102:2.3

I like to think of time as the differentiator of what was, from what could be. That transition is happening everywhere as possibilities are parsed and become the preserved past. Our individual perspectives of time tend to influence our actions. We experience time materially as a sequence of events, whereas we experience time spiritually, by the effects of time on our sense of peace, happiness, and security. Memories too need sequence, and we need memories to evaluate our progress. The genes in our DNA give us our geological and ancestral memory, and our life experiences give these ancestral memories, current, localized, present day, meaning. We relate our history to our current location and time sense, and then integrate that into the larger chronological, cosmic, and timeless perspectives to give it more meaning.
We also need to relate our history to our current time. For this there are things called time crystals. Normal crystals have repetitive patterns materially. Time Crystals have repetitive patterns in time. These can be found on asteroids and in microtubule dimmers.

Side note: Recent Alzheimer's research has found that the EC is larger for those individuals who live longer. From *The Urantia Book's* perspective, a larger EC can look further back in time and extrapolate further into the future.

Side note: The Hippocampus is where Alzheimer's disease originates due to these factors: oxidative stress, vascular insults, social stress, inflammation, genetics. (Ref 131)

Multiple Physiological Clocks

> **There is a direct relationship between maturity and the unit of time consciousness in any given intellect. 118:1.3**

Presynaptic and postsynaptic neuronal mechanisms operate on fast timescales, governing prediction, release, reception, and integration of signals. Enveloping them, the astrocytic influence (which regulates extracellular matrix composition, inhibitory maturity, synaptic eligibility, and myelination) operates on a slower clock, enforcing circuit stability and temporal coherence. Conscious of time depends not on any single clock, but on the coordinated agreement of all three with additional influence from the other longer time-based inputs mentioned earlier. Presynaptic neurons acquire. Postsynaptic neurons act. Astrocytes ratify over longer spans. Consciousness emerges not from any single event, but from the coordinated agreement among them. This coordination or consciousness takes place in the time between them. Can we manage this dual-control architecture of fast reactive awareness and slow supervisory control?

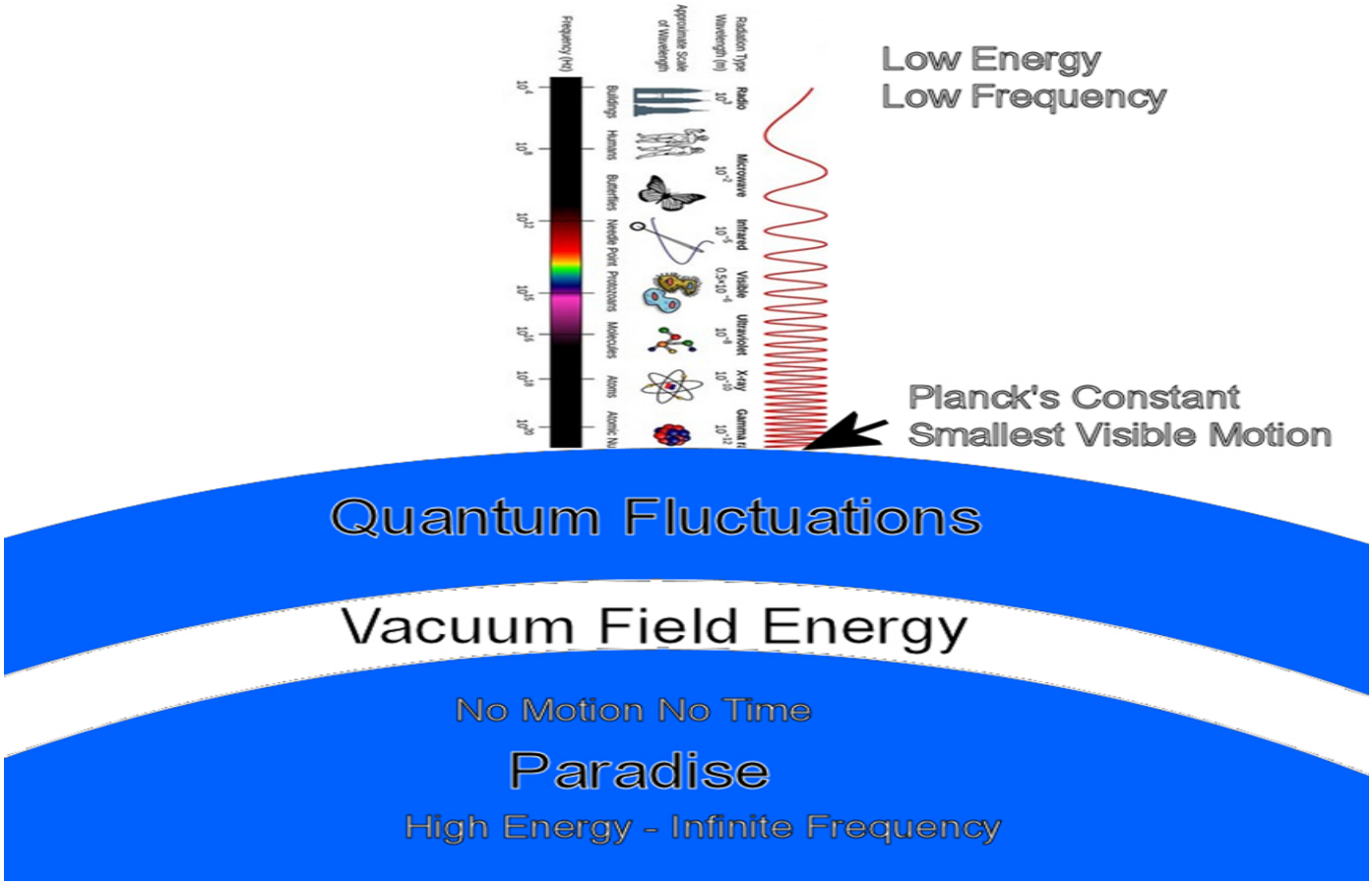
The entorhinal cortex, with its relationship to theta waves and other time sensitivities give the brain a fundamental sense of time but there are many other ways to sense time. Special "time cells" in the hippocampus are linked with "place cells" by shared firing properties. In the case of daily tiredness, it is the balance between adenosine and melatonin. At the yearly level there are also biological markers of our "age". The lengths of telomeres (tail ends of our DNA strands) get shorter during cell manufacture and result in things like grey hair facial wrinkles and even change facial temperatures (cooling of the nose and cheeks). Our circadian rhythms, at the daily level, are sensed by the rotation of the earth in the brain's insular cortex region of the brain, our pulse gives us a moment-by-moment sense and radiation from pulsars may give our atomic nuclei a time sense for interstellar correlations. Our circadian sense of time is also related to the buildup of chemicals and our detection of blue light by a pair of neuron clusters in the hypothalamus situated directly above the optic chiasma that receives photic input from the retina via the optic nerve (Ref 112). At the hourly level, we are aware of chemical changes (hunger, thirst etc.). Microtubules give us an awareness at the millisecond level, and nuclear spins give us a reference at the attosecond level. All these evaluations are made in the present, although the past created these current conditions.

Remember *The Urantia Book* definitions of time? Mind time (material motion) and spirit time (movement Godward). Our body senses time electrochemically by relating to its surroundings, perhaps we should intellectually sense our spirit time, by sensing and relating it to the cosmos.

And while we are relating time to the cosmos, let's relate it to *The Urantia Book*'s description of Paradise (the center of the ultimaton, the smallest measurable particle).

The Origin of Time The fastest possible measurement of the speed of light is limited by the Planck's constant (smallest length). Anything smaller than that we would not see. Vacuum energy oscillations are smaller than the Planck length and therefore "appear and disappear", in quantum packets, out of the vacuum. This implies that time is also quantum in nature i.e. is corpuscular. More correctly, time is perceived in mind as a function of its measurability and measurability is function of movement. What we perceive, then, is not things themselves, but the changes in relation between things and our sensory system. Without change, perception would not exist. Perception is always a response to a difference.

When people suggest faster than light communication, they are really talking about faster than light, instantaneous correlation, not communication. There is nothing traveling, only correcting of local conditions to suit the new paradigm (covariant but non-local order).



Lower frequency – detectable movement – measurable time

Infinite frequency – no movement – no measurable time

There is a phenomenon called the vacuum polarization effect where vacuum field energy polarizes quantum fluctuations. To me this indicates a possible interaction mechanism between the individual and the cosmic whole. There is also the possibility that the so called “flow state” also known as being "in the zone," when there is a mental state of complete absorption and energized focus in an activity, where you experience deep enjoyment, effortless action, and a loss of self-consciousness, with time seeming to disappear. Coined by psychologist Mihaly Csikszentmihalyi, it happens when your skills perfectly match the challenge of a task, or when you have extreme focus on events which leads to peak performance and optimal experience in activities like sports, creative work, problem-solving or worship. When in the flow state time seems to slow down.

Phase Locked Thought Feedback Loops

A phase locked loop is a series of actions that tries to make the output synchronize or harmonize with the input, to reinforce their combined stability. In a positive feedback loop, positive affirmations reinforce positive thinking. Conversely, negative thoughts reinforce negative feelings and all their associated biochemical and neurological reactions. The brain's fast, waveform-based intelligence interacts with the gut's slow, state-based intelligence, and both preserve reversibility to maintain coherence and health. The brain is a wave-machine, and waves form stable patterns. Across every level of its architecture, from ion channels and membrane potentials to large-scale cortical rhythms, information is encoded and transmitted in the form of oscillations, resonance patterns, and phase synchronizations. Neural computation is about timing, coherence, and the reversibility of signal flow within bounded temporal windows.

The locus coeruleus (LC, sometimes called the "Blue Spot" of the brain) is an area of the brainstem that is the primary source of neurons known as "catecholaminergic" neurons, because they produce the catecholamines, dopamine and the neuromodulator norepinephrine (Ref 110). The neurotransmitter norepinephrine is also made in the liver when we eat fats and is balanced by the production of insulin. An overabundance of norepinephrine is thought to be a precursor of insulin resistance and obesity. (Ref 122)

The locus coeruleus is involved with our physiological responses and is critical for numerous functions including the response to stress (Ref 19), attention, emotion, motivation, decision making, learning and memory. The locus coeruleus-norepinephrine (LC-NE) system with its phasic (time sensitive) and tonic (amplitude sensitive) microtubules, functioning at the quantum level, is capable of instantaneous, as well as time-based influencing of our thought processes, and could be the basis of our reflective thinking, thought feedback loop.

We are not our thoughts. We are the observers of our thoughts, and the observation of thoughts is what I call the thought feedback loop. That is: first there is the thought, then the reflection of the consequences of that thought which then triggers rethinking. Slight changes in the time delays may be one way that the adjutant mind spirits or our Thought Adjuster or for that matter the Supreme, might nudge our thinking towards mid-mind functioning in this feedback loop.

> **Mind unifies spirit causations with energy reactions; 116:3.4**

The Thought Controller may influence our thinking by nudging the time delays of the cascades of electron jumps as the waves flow through the brain on route to the executive areas, around this feedback loop, and then, more importantly, back again (times 10) for more reflective thinking. This may be most effective at the thought precursor stage (based on our preauthorized or superconscious allowances) because after that, our active free will takes full control of the thought processes. Exceptions may be in the case of deep meditation, (Ref 32, 38) and worship where the lower frequencies can be given a few more milliseconds for reflective cross pollination of our thinking.

> **Come into the kingdom free from prejudice and preconception; be open-minded and teachable like an unspoiled child. 170:2.20**

Heterophenomenology is the study of first-person phenomena, from the third-person point of view. This may be another name for our awareness of this feedback loop, between the thought precursor, the thought, and the

realization that we can (with spirit guidance) physiologically influence this first-person self-reflective thought process from a third-person perspective. This describes the philosophical conundrum known as the "hard problem of consciousness", since it is difficult to explain how first-person views can exist in a world that is defined as only truly existing in the third person.

The "hard problem of consciousness" is trying to explain how the brain gives rise to consciousness. It is not only hard, but also impossible. Consciousness is not objective, it is subjective. Brain is a fact, but consciousness is a truth. Consciousness is more about the brain's awareness of other consciousnesses.

Near Death Experience – NDE

One instance where this thought process undergoes dramatic change, is during a near death experience. Most NDEs (Ref 17) result in positive transforming changes and sudden spiritual growth. People often report (a) separation from the body with a heightened, vast sense of consciousness and recognition of death; (b) travel to a destination; a meaningful and purposeful review of life, involving a critical analysis of all actions, intentions, and thoughts towards others; (c) a perception of being in a place that feels like "home", and (d) a lack of time sense (e) a return to life. The near-death experience may have a spiritual result but let's look at some of the electrochemical physiology that might be involved in this spiritual uplift. As blood flow drops, there is a loss of ATP (cellular energy), anoxia and cellular electric potential also drop. This is known as anoxic depolarization, and it starts in the neocortex and is accompanied by a massive release of glutamate (the neurotransmitter-balancer between excitement and calmness). (Ref 137) When the body senses imminent death, the sympathetic nervous system dumps its reserve fuel. It floods the system with adrenaline and cortisol. Also, near clinical death, there is a burst of electrical activity in the Gamma frequency range concentrated in the temporo-parietal-occipital junction the "Posterior Hot Zone." This area is associated with sensory processing and visual imagery, which likely explains the internal visions of Near-Death Experiences and is probably related to an intercellular capacitance reduction (likely as the myelin sheath insulative function shuts down). (Ref 72). Our intercellular communication and our thoughts are normally separated and specifically cross connected through troughs and zones of "local minima" voltages. A reduction of available energy to maintain these voltage differences may facilitate massive synapse cross communication (think life review, calmness, connectedness). It may also reduce the veto power of our free will and allow the adjuster's patterning to dominate our thinking. Some drugs, (Ref 30) like tryptamines ("vine of the soul" ayahuasca, psilocybin and N-Dimethyltryptamine, which are structured like serotonin, sometimes called "Spirit Molecules,") (Ref 125), may have the similar effect of lowering the voltage walls of our thought channels allowing for decrease segmentation, longer temporal thought processing, and massive neuronal hyperconnectivity. Essentially quieting the Default Mode Network.

Barry Culligan (a Urantia Book reader) speaking of his own NDE said: "I was capable of knowing, remembering, imagining, desiring, laughing, caring, hoping, aspiring, recognizing truth, identifying beings, understanding, achieving insight, experiencing wonder, embarrassment, and humor, recognizing beings that were ancient beyond my ability to measure but in their presence still able to feel the gravity of their aeons (long time units) of being. I could appreciate their generosity, kindness, compassion, and wisdom—even though they so far transcended my nature."

Rick Strassman, the first American researcher to receive government approval to study hallucinogens between 1990 and 95, as clinical associate professor of psychiatry, administered roughly 400 doses of N,N-dimethyltryptamine (DMT) to nearly 60 patients at the General Clinical Research Center of the University of

New Mexico Hospital. His findings were initially confined to clinical work recording the physiological effects of DMT, such as heart rate and blood pressure, but he couldn't deny the overwhelming religious experiences reported by participants and he reported these in his book, DMT: The Spirit Molecule. (Ref 85) Strassman also relates this to the pineal gland and near-death experiences.

> "This tiny organ, the 'seat of the soul' or 'third eye' of the ancients, might produce DMT or similar substances by simple chemical alterations of the well-known pineal hormone melatonin, or of the important brain chemical serotonin. Perhaps it is DMT, released by the pineal, that opens the mind's eye to spiritual, or non-physical, realities." - Strassman
>
> Side note: The potency of psychoactive drugs is proportional to their ability to donate electron energy to the brain neural milieu. (Ref 163)

There is evidence (Ref: Robin Head of the Psychedelic Research Group within the Centre for Psychiatry at Imperial College London) that when taking drugs like psilocybin the brain's default mode network (DMN) reverts to a childlike "selfless" state. Specifically, psilocybin strengthens sensory and perception circuits while weakening self-referential, rumination, and threat-detection circuits. (Ref 199) The brain's default mode network, which mediates self-referential behavior, moral reasoning, and imagining of the future, probably influenced by our superconsciousness, is most active during resting states (such as meditation and worship). (Ref 123)

> **Verily, verily, I say to you, whosoever receives not the kingdom of God as a little child shall hardly enter therein to grow up to the full stature of spiritual manhood." 167:6.1**
>
> **When death overtakes a human being, the Adjuster remains in the citadel of the mind until it ceases to function as an intelligent mechanism, about the time that the measurable brain energies cease their rhythmic vital pulsations. 112:3.4**

Emotional Processes

First, we should define some terms. The word "feel" comes from the Old English word felan, which means 'to perceive.' A feeling is a perception. It is a sensory input which we then deal with through our nerves, brain and bodily responses. The word emotion comes from the Latin ex, which means "out" and movere, which means 'to move,' and therefore denotes an 'motion outwards.' Our emotions then are our actions as we respond to our feelings.

Emotions (Ref 18), which are controlled by peptides in the amygdala, are a function of the difference between what we anticipate and what we experience, and this is, in turn, a function of the delayed processing of what we feel from the sensory inputs that trigger those anticipations and our related reactions. Processing delays give us time to appropriately respond, rather than animalistically, immediately, reacting to those sensory inputs. This delay allows us to control our emotions, rather than having our emotions control us. Happiness results when our expectations match our experiences. Happiness evolves when we trust that whatever occurs is not only acceptable but beneficial (Ref 120). When we trust in the unassailability of our spirit nucleus, when we have a real faith-trust in God.

By the old way you seek to suppress, obey, and conform to the rules of living; by the new way you are first transformed by the Spirit of Truth and thereby strengthened in your inner soul by the constant spiritual renewing of your mind, and so are you endowed with the power of the certain and joyous performance of the gracious, acceptable, and perfect will of God. Forget not—it is your personal faith in the exceedingly great and precious promises of God that ensures your becoming partakers of the divine nature. Thus by your faith and the spirit's transformation, you become in reality the temples of God, and his spirit actually dwells within you. If, then, the spirit dwells within you, you are no longer bondslaves of the flesh but free and liberated sons of the spirit. The new law of the spirit endows you with the liberty of self-mastery in place of the old law of the fear of self-bondage and the slavery of self-denial." 143:2.4

The placebo effect has been scientifically validated, and its effectiveness is primarily due to an emotional confirmation and by the appropriate application of faith. The ventromedial prefrontal cortex (vmPFC) comprises several distinct cytoarchitectonic areas in the medial temporal lobe. It is a key brain region supporting our decision-making processes, and it has been shown to be one of the main hubs of the Default Mode Network. (Ref 31, 109) The Default Mode Network is a superconscious network activated during calm states such as meditation, hypnagogia (Ref 24) and light sleep that mediates self-referential behavior, moral reasoning, recollection, and imagining the future. The vmPFC is a relay center that provides somatic markers (physical sensations) and can help guide how people respond to situations connecting mental representations with secondarily associated emotions. When mental representations are being compared, contrasted, selected, and singled out, it's the somatic, gut level, (think serotonin) intuitive markers that dominate. (Ref 28) One of the vmPFC's functions is to filter out the less relevant inputs, prioritize and connect the rest, in patterns for future reference.

The Default Mode Network in the context of a hierarchical consciousness concept, first described by Raichle et al. in 2001, is not only associated with consciousness, but represents a fundamental aspect of consciousness.
The Default Mode Network is an active part of the consciousness process, especially in relation to self-referential and the introspective aspects of consciousness. It represents a continuous stream of conscious activity that persists even in the absence of external tasks. The states of consciousness arise from the dynamic interplay between DMN activity and the activity of task-oriented networks. The uniqueness and balance of the DMN are in constant fluctuation and reflect the specific patterns of activity that are variable in time and can switch between different "states". (Allen et al. - 2014, Andrews-Hanna et al. -2010, Finn et al. – 2015.) The DMN also exhibits specific activation patterns during certain cognitive tasks, especially in tasks that involve self-referential thinking. Spreng et al. (2010)

Side note: A familiar drug, ecstasy, (MDMA or 3,4-Methylenedioxymethamphetamine) causes the continuous release of serotonin and dopamine and blocks their reuptake mechanisms causing a sense of equanimity and positive self-regard that enables the user to calmly and compassionately reexamine past events. It also has neurotoxicity if used more than once. (Ref 79)

Side note: The adjutant mind may be a very restrictive filter on the infinite mind, limiting our discernment to those things necessary for survival whereas the cosmic mind may be a less filtered version of mind that allows more connected reflecting. (Ref 148)

"The function of the brain and nervous system and sense organs is in the main eliminative and not productive." French philosopher Henri Bergson

Consciousness of the connection between our emotions, our actions and our memories, allows us to look before we leap, as we imagine God's plan, our participation in it, and calmly anticipate any future joy that may result from it. Emotions and our creative anticipatory imagination are influenced by curiosity (self-consciousness), aesthetics (material consciousness) and ethical sensitivity (God consciousness). The prefrontal cortex can also be an experience simulator capable of both the anticipation (looking) and the realization of the consequences of that anticipation (leaping) and their related emotional reactions (reflecting). We can simulate God's plan, our potential contribution to it, and our emotional reactions from our anticipated participation in it.

Passionate emotional involvement may be particularly useful in the zeal of execution, but we may want to limit those emotions that often distract us from God consciousness and the confidence in his ability in our preparatory thought processes.

> **Harness your energies and bridle your passions; be calm while you await the majestic unfolding of an endless career of progressive adventure and thrilling discovery. 195:5.10**

The brain's error correcting method is sometimes called a sequence-focused implementation. This is a predictive inspired Variational Recurrent Neural Network, published by Ahmadi and Tani in 2019. It takes the principles of local prediction errors, hierarchical generative models, precision-weighted updating, and builds a system that learns temporal sequences through an inference scheme, even if current implementations still use gradient-based optimizations for practical training.

Emotional Self-Mastery

Our amygdala (our emotion control center) preprocesses input signals before sending them onto other parts of the brain for rational overcontrol. An emotional response causes changes in the gene expression of certain cells (which results in hormones, neurotransmitters, and other messenger molecules) which do things like increase your blood pressure, adjust your breathing, tense your muscles, or stand the hair up on the back of your neck. (Ref 22)

One example of an emotional condition, fear, involves the presence of calcitonin, a gene-related peptide, which is created by all fears and this peptide relays signals to other areas of the mid brain. It is also a hormone that blocks the activity of osteocytes that break down the calcium in your bones and act within the central nervous system to inhibit gastric acid secretion. Fear is mediated by dopamine from the amygdala. Can you see how the physiological dominos are all influencing each other?

> **The planetary life-planning laboratories are situated on the second satellite of this world number two. In these laboratories the Life Carriers and all their associates collaborate with the Melchizedeks in the effort to modify and possibly improve the life designed for implantation on the *decimal planets* of Nebadon. The life now evolving on Urantia was planned and partially worked out on this very world, for Urantia is a decimal planet, a life-experiment world. On one world in each ten a greater variance in the standard life designs is permitted than on the other (nonexperimental) worlds.) 36:2.15**

There are implicit (emotional), explicit (intellectual) and functional memories in our schema or current mental model. Some implicit memories are present at birth. Our hippocampus centric, explicit memory, aided by our

cognitive processes of thinking and understanding are different yet deeply interconnected to our implicit emotions, our feelings, and sensations.

There are six brain circuits involved in emotional self-mastery processes. They are:

Default Mode Circuit (DMC):

The DMC is active during rest and when the mind is not focused on external tasks. It involves self-referential thoughts, introspection, and social cognition. It includes regions like the anterior medial prefrontal cortex (amPFC), posterior cingulate cortex (PCC), and angular gyrus (AG)

Salience Circuit:

The salience circuit detects the most noticeable changes in the environment, both interoceptively and externally. It signals the need for cognitive control and attention and includes core nodes in the anterior cingulate cortex (ACC), anterior insula (aI), and sublenticular extended amygdala.

Attention Circuit:

The attention circuit focuses on external stimuli and maintains attention. It is involved in tasks requiring sustained attention and selective processing of information.

Negative Affect Circuit:

The negative affect circuit processes negative emotions and threat-related stimuli. It includes all the brain and gut regions involved in fear and sadness.

Positive Affect Circuit:

The positive affect circuit processes positive emotions and their reward-related stimuli. It includes the brain regions involved in pleasure and motivation.

Cognitive Control Circuit:

The cognitive control circuit is involved in executive functions, such as planning, decision-making, and functional memory. It includes regions like the dorsolateral prefrontal cortex (dLPFC), anterior cingulate cortex (ACC), dorsal parietal cortex, and precentral gyrus.

The three main physical areas of the brain that directly control our emotions are:

The amygdala which controls our emotional responses, our memory, learning, visceral and autonomic functions, from within the limbic system.

The prefrontal cortex which controls decision-making and can override our emotional responses.

The hippocampus, controls memory formation, contributes to cognitive and emotional processing, and intricately weaves together their functionalities.

Emotional overcontrol by the prefrontal cortex has a slightly different structure to the rest of the brain. Most of the prefrontal cortex is identifiable as a brain region having a distinct cell layer with high concentrations of “granular” neurons. These granular neurons are small, with short connections, mostly messaging other adjacent neurons and every cell has neurotubules communicating with every nearby cell both physically and bioelectrically. The prefrontal cortex receives long projections directly from the mediodorsal nuclei of the thalamus, a midline structure deep in the brain. The neurotransmitters serotonin, dopamine, and norepinephrine originate within tiny structures even deeper in the brain, and they send neural projections to the mediodorsal thalamus as well as directly to the prefrontal cortex to respond to or mitigate reactions to sensory inputs. Some researchers loosely divide these executive functions into “cold” and “hot” categories. Cold being executive

functions of logic, thought processes, mechanical processes like memory and planning, and are localized towards the sides of the prefrontal cortex. The hot functions involve emotions, motivation, and impulsivity, and are centered more along the midline and underside of the prefrontal cortex.

> Side note: Remember the myelin sheath we talked about earlier? The brain processes sensory input through constant back-and-forth signaling between the cerebral cortex, the brain's outer layer, and the thalamus. Damage to the myelin disturbs the brain's rhythms.

Hormones and neurotransmitters manage the biochemical overcontrol of our emotions and play a crucial role in assisting the activities of our immune system, by integrating mental, emotional, biological activities and eventually our spiritual wellbeing. They color, predict, and change our behaviors, our moods, and our unique emotional tone. For example, the hormone ghrelin determines our hunger, insulin triggers a gain of body fat, incretin tells us we are full, and leptin responds to too much body fat. It is interesting to note that when we are obese ghrelin and insulin stay active but leptin activity drops. In another example, caffeine in coffee, green, Oolong and black teas, increase metabolic rate, fat oxidation by increasing sympathetic nervous system activity, decreasing hunger/appetite (by decreasing ghrelin), and it also blocks glucose absorption.

The balance of hormones and neurotransmitters influence our emotions and there are no hard-wired emotion control circuits in the brain. Our emotional responses are free will controllable, but that control is incremental. Patience, determination, and consistency are required to gradually change the neurotransmitters at each nerve synapse as they relay our emotional response signals. They are first established, and then they are modified by epigenetic methylation and our newly established emotional predisposition. (Ref 5, 56)

Recent research by Melisssa Hogenboom (Ref 63) showed that mindfulness and meditation reduced the structure of the amygdala (which indicated less stress) and an increase in the size of the cingulate cortex (indicating improved emotional control).

The main neurotransmitters involved in emotional responses are:

Glutamate and Gamma-Aminobutyric acid (GABA) gives us our balance of excitement versus the urge to be calm and ensures our homeostasis. It is improved with drugs such as Lithium (with devastating long term side effects) or with ketosis, and good sleep.
Calcitonin relates to our fear.
Dopamine is the body's future reward system, which includes feeling pleasure, achieving heightened arousal, and learning, unexpected benefit, motivation, and future happiness.
Norepinephrine, **AKA noradrenaline,** relates to our sympathetic nervous system alertness.
Opioid peptide (oxytocin) is involved in orgasm, social recognition, pair bonding, anxiety, group bias.
Epinephrine AKA adrenaline controls our fight or flight prep.
Serotonin (95% of which comes from the gut) controls our anxiety, current happiness, sense of wellbeing, appetite, mood, memory, and sleep.
Purines (adenosine) is a neuromodulator involved in suppressing arousal and improved sleep.
Endorphins relate to our current pleasure and self-esteem.
Neurotensin acts like dopamine but is more specifically for the differentiation of "good" from "bad" thoughts.

Our initial emotional conditions relate to our calmness, and our ability to handle new challenges which in turn relates to our trust in God.

Religious persons must not regard every vivid psychologic presentiment and every intense emotional experience as a divine revelation or a spiritual communication. Genuine spiritual ecstasy is usually associated with great outward calmness and almost perfect emotional control. But true prophetic vision is a superpsychologic presentiment. 91:7.3

Jesus taught the appeal to the emotions as the technique of arresting and focusing the intellectual attention. He designated the mind thus aroused and quickened as the gateway to the soul, where there resides that spiritual nature of man which must recognize truth and respond to the spiritual appeal of the gospel in order to afford the permanent results of true character transformations. 152:6.4

Side note: The drug Adderall temporarily links dopamine to past pleasure, and we naturally link past pleasure with future goals. Also, the drug currently in testing, Adriana, blocks noradrenaline to reduce pain sensing. (Ref 176)

Emotional Relationships

Thought Processes

In our complex body-brain system, countless causal pathways run simultaneously, sensory impressions, memories, expectations, and bodily states are locally stable, somewhat isolated, and the system remains functionally segmented. At the moment of conscious experience, something amazing happens, the paths lose their locally stable individuality and collapse into a larger more globally coherent state.

Some might visualize this thinking as a linear (male) process. Others may picture it as a plainer more matrix cross referencing (female) evolution of thoughts. Thinking may be more like dynamic volumetric sculpting. We may be able to "see" the sculpture in the wholeness of our thoughts, and it may be that the Thought Adjuster could dynamically illuminate the sculpture. To help, we might think of changing the backlighting to highlight a top-down illumination or perhaps turning up the contrast to make the shape more cosmically recognizable. This might

be done by "effortless attention" to thought precursors (continuous communion with God) and cooperating with the Thought Adjuster's (fear not) efforts. Perhaps at times when repetitions are involved (such as in music) we can be more helpful since we have multiple chances at fine tuning that picturization. Practice with quieting the unnecessary clouding of sensory inputs from the body and minimizing non-valuable, higher frequency thoughts, may also help.

> **The Adjuster… is the higher and truly internal spiritual stimulus of thought in contrast with the external and physical stimulus, which reaches the mind over the nerve-energy mechanism of the material body. 108:6.4**

In a spiritual sense our curiosity about God consciousness and our willingness to be influenced (to share the inner life) may allow us to imagine the source of that illumination and to creatively extrapolate, from that calm mental spiritually safe zone, the realization of the resultant enduring peace.

> **Since this inner life of man is truly creative, there rests upon each person the responsibility of choosing as to whether this creativity shall be spontaneous and wholly haphazard or controlled, directed, and constructive. 111:4.9**

The attainment of cosmological levels of emotional equipoise, calmness, equanimity, and happiness may involve time delayed responses. It would be like *injecting a fragment of eternal timelessness* into our frenetic thinking. It can likely be encouraged by the "effortless attention" and "restful spiritual exertion" of worship. **143:7.7** Spiritual calmness may be the result of the realization that consciousness and personality are neither space nor time dependent.

Quantum coherence occurs when particles act in a coordinated manner, effectively behaving as a single system. This coordinated behavior allows for phenomena like superconductivity and superfluidity. To find calmness in subjective experiences, we may want to look for processes similar to the quantum coherences in certain mental states, and visualize mental processes aligning seamlessly, creating a sense of effortless action (think "restful spiritual exertion") which might lead to heightened performance and a sudden down grasp.

> **When the mental mobilization is absolutely total on any level of the psychic upreach toward spirit attainment, when there exists perfection of the human motivation of loyalties to the divine idea, then there very often occurs a sudden down-grasp of the indwelling spirit to synchronize with the concentrated and consecrated purpose of the superconscious mind of the believing mortal. 100:5.4**

It may also be aided by a truly relaxed approach to:

> **1. Curiosity - Hunger for harmony and thirst for beauty. Persistent attempts to discover new levels of harmonious cosmic relationships. The satisfaction associated with satiated curiosity.**
> **2. Aesthetic appreciation - Love of the beautiful and ever-advancing appreciation of the artistic touch of all creative manifestations on all levels of reality. The calmness associated with being in beautiful surroundings.**
> **3. Ethic sensitivity - Through the realization of truth, the appreciation of beauty, which leads to the sense of the eternal fitness of those things which impinge upon the recognition of divine goodness in Deity relations with all beings; and thus, even cosmology leads to the pursuit of divine reality values—to God-consciousness. 56:10.5**

All these thought processes may lead to the emotional calmness of knowing that it is a friendly universe managed by a loving father. Perhaps this is like the emotional calmness felt by Andon and Fonta after discovering how to make fire or their first worship experience.

> **Human experience is an interplay between an active and questioning personality and is equal to depth of a concept plus the recognition of its reality. This creative self-consciousness experience is driven by sensory discovery and the expectant imagination of related things, minds, meanings and spiritual values. 102:4.2**

Sentience and God Consciousness

If as Stuart Hameroff says "life is the vehicle for consciousness" then fundamentally this consciousness comes from God so let's look at activities that help our mind to calmly relate to God as creator, controller, and upholder of this consciousness.

> **The Universal Controller. I AM cause of eternal Paradise. This is the primal impersonal relationship of actualities, the original nonspiritual association. The Universal Father is God-as-love; the Universal Controller is God-as-pattern. This relationship establishes the potential of form—configuration—and determines the master pattern of impersonal and nonspiritual relationship—the master pattern from which all copies are made. 105:2.6**

Is it possible that time delays, combined with quantum coherence, our ability to forecast into the future, are proportional to our adjutant awareness and God-consciousness? The term adjutant means "an assistant to the commanding officer who is responsible for correspondence".

> **In the mortal experience the human intellect resides in the rhythmic pulsations of the adjutant mind-spirits and effects its decisions within the arena produced by encircuitment within this ministry. 117:5.7**

Intuition (instinct), understanding (rationalization), courage (loyalty), knowledge (ideology), counsel (socialization), worship (zeal), wisdom (symmetry) may all be related to the gradual evolutionary patterning and cross communication of cells in our bodies and brains. Let's look at these individually as they evolved over millions of years.

Spirit of Intuition (the energy of instinct):

> The relationship between instinct and physiology is likely traced back to some of the earliest multicellular organisms. Evolutionary biology suggests that even in primitive life forms, the connection between physiological mechanisms and instinctual behaviors existed as a fundamental survival tool.
> For instance, reflex-like responses to environmental stimuli can be observed in simple organisms like hydra or jellyfish. These creatures, with their rudimentary nervous systems, developed instinctive behaviors such as withdrawing when touched, which is an evolutionary adaptation to avoid harm. This relationship marks one of the first signs of instinct rooted in physiology, as these actions were governed

by nerve nets and cellular signaling. As evolution progressed, more complex organisms emerged with centralized nervous systems, enabling increasingly sophisticated instinctive behaviors. Early vertebrates, like fish, exhibited instincts related to predation, mating, and escape from predators, driven by their developing brains and hormone systems. The limbic structures, now central to modern instincts, began to form in these early vertebrates. The true breakthrough came with mammals, whose instincts became deeply intertwined with advanced physiology, especially brain development. Complex instincts like parental care, social bonding, and territoriality emerged, highlighting the evolutionary refinement of this relationship. In essence, the first signs of instinct being tied to physiology appeared when organisms developed mechanisms to sense and react to their environment, a landmark in evolutionary history.

Spirit of Understanding (the energy of rationalization):

Rationalization is tied to the development of the human brain, particularly the prefrontal cortex, responsible for complex decision-making and reasoning. As primates evolved, rationalization emerged as a survival mechanism, enabling us to plan, solve problems, and justify actions. Early hominins who could rationalize decisions, like strategically hunting prey or solving social conflicts, were more likely to survive and pass on their genes. This cognitive process is deeply rooted in neural networks and neurotransmitters, such as dopamine and neurotensin, which are involved in reward prediction and decision-making.

Spirit of Courage (the energy of loyalty):

Loyalty is associated with the evolutionary need for strong social bonds. In early primate groups, loyalty to family or tribe enhanced cooperation and collective survival. This trait is linked physiologically to oxytocin—sometimes called the "bonding hormone"—which plays a crucial role in creating feelings of trust and attachment. The limbic system, which governs emotions, also contributes to loyalty by fostering feelings of security and belonging within social groups.

Spirit of Knowledge (the energy of ideology):

Ideology evolves from our cognitive and social tendencies to seek patterns, shared beliefs, and group identity. Early humans who adopted shared ideologies, like rituals or symbolic communication, enhanced group cohesion and cooperation, increased their survivability. Physiologically, ideology engages areas like the prefrontal cortex for abstract thinking and the amygdala for emotional salience. Neurochemical processes, including serotonin and dopamine regulation, also support the sense of purpose and fulfillment often tied to the sudden zeal associated with ideological belief systems.

Spirit of Counsel (the energy of socialization):

Socialization has clear evolutionary advantages, as early primates relied on cooperation and communal living to thrive. Physiologically, socialization taps into our mirror neuron systems, enabling empathy and understanding of others' actions. Hormones like oxytocin and endorphins reinforce positive feelings during social interactions. Over time, the evolutionary drive for socialization shaped human behaviors like language development and cultural exchange, solidifying our status as highly social creatures.

Spirit of Worship (the energy of zeal):

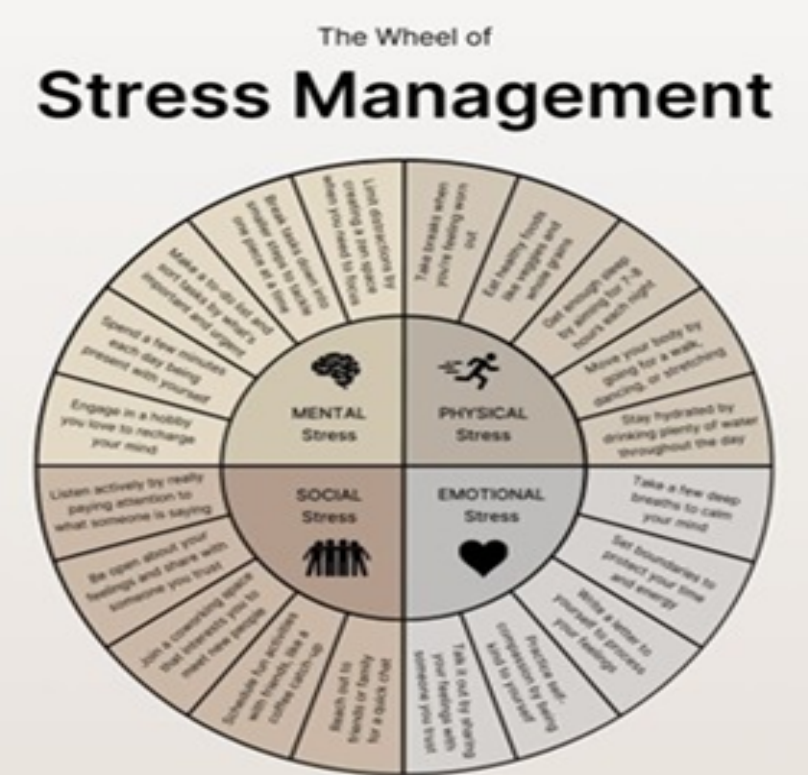
Zeal, the intense enthusiasm or drive, has its roots in evolutionary survival. Early humans who displayed zeal, reinforced by knowledge, often had the motivation to hunt, gather, protect their community, or innovate, increasing their odds of survival and reproduction. Physiologically, zeal is closely tied to the brain's reward systems. Dopamine, the "feel-good" neurotransmitter, plays a significant role in reinforcing energetic, goal-oriented behavior. The limbic system, especially the hypothalamus, helps regulate arousal and motivation, driving a sense of purpose and vigor. Interestingly, zeal can also be linked to stress hormones like cortisol. Moderate levels of stress can enhance focus and energy, fueling passion and drive. Over evolutionary time, zeal likely became associated with leadership and ambition, traits that benefited both individuals and groups.

The spirit of Wisdom (the energy of symmetry):

A sense of symmetry has both aesthetic and survival implications. Evolutionary, humans and other organisms have favored symmetry due to its association with health and genetic fitness. For example, symmetric physical features are often seen as indicators of good genes, which explains why symmetry plays a role in mate selection. Physiologically, our brains are wired to detect and appreciate symmetry. The visual cortex processes symmetrical patterns efficiently, creating a sense of balance and satisfaction. Mirror neurons, where brain cells fire both when they perform an action, and when they see someone else perform the same action, helped to recognize and replicate symmetry in behaviors or designs. The evolutionary connection extends to art, architecture, and cultural practices that favor symmetry, further reinforcing its importance in human life. Mirroring Jesus' cultural practices or even doing what we think God would do is the ideal of neuron mirroring.

These evolving traits, as manifestations of the increasing influences of the mind adjutants, underscore how our physiology gradually evolved and changed our behaviors to allow increasing adjutant influence, as it enhanced survival, reproduction, social cohesion shaping our most defining characteristics as humans and developing our God consciousness. Each time the energies of the mind adjutants influenced our material desires and patterns; they harmonized with and were stabilized by, their reciprocal resonances. The quality and future stability of each of the traits determined their degree of harmony and their intensity determined their attunement.

The functioning of the adjutants, especially for worship and wisdom, might also be related to microtubule lengths and their associated introspective time delays, (Ref 61) and their MAP cross patterning in the brain. Microtubules don't function until there is dissipation-less electrical energy transfer (insulation from surrounding tissue) and this is critical for allowing quantum coherence and adjutant function. This only occurs when microtubules are suitably insulated and are greater than 3 micrometers in length. (Ref 127) Is this the initial condition needed in the evolving primates for the adjutants of worship and wisdom?
During early childhood (around age 3), microtubules in neurons are actively involved in brain development, supporting rapid synaptic growth and plasticity. As individuals approach adolescence and early adulthood, microtubule dynamics stabilize, reflecting the maturation of the nervous system. However, subtle changes in microtubule length may still occur in response to environmental factors, learning, and stress.



In considering how the adjutants currently function, the Spirit of Intuition may provide the foundation for basic survival instincts and reflective thinking and could be seen as interacting with the brain's more primitive structures, such as the brainstem and limbic system. These areas govern instinctual responses and basic survival mechanisms, aligning with the adjutant's role in fostering immediate awareness and reaction to environmental stimuli. The Spirit of Understanding, which enables associative thinking and reasoning, may correspond to the brain's higher-order cognitive functions, particularly those associated with the cerebral cortex. This adjutant facilitates the ability to connect ideas and discern patterns, processes that are deeply tied to the brain's capacity for learning and memory. The Spirit of Courage, which inspires initiative and perseverance, might be linked to the brain's reward systems, such as those involving dopamine and neurotensin pathways. These systems motivate action and reinforce behaviors that align with personal progress and goals, reflecting the adjutant's role in fostering determination and resilience. The Spirit of Knowledge, which supports the accumulation and application of experiential learning, could be associated with the hippocampus and other memory-related structures. These areas of the brain are crucial for storing and retrieving information, enabling mortals to build upon their experiences and apply them to new situations. The Spirit of Counsel, which fosters social cooperation and group harmony, may interact with the brain's social cognition networks, including the prefrontal cortex and regions involved in empathy and interpersonal understanding. This adjutant encourages collaboration and the ability to work effectively within a community, aligning with the neurological basis for social behavior. The Spirit of Worship, which elevates the mind toward spiritual realities and divine communion, might be linked to the brain's capacity for abstract thought and transcendental experiences. Studies on spiritual practices suggest that regions such as the parietal lobe and the default mode network are active during moments of deep reflection, prayer, or worship, potentially serving as physiological correlates for this adjutant's influence. Finally, the Spirit of Wisdom, which integrates knowledge, experience, and insight into balanced decision-making, likely engages the brain's executive functions, particularly within the prefrontal cortex. This area is responsible for planning, judgment, and the

synthesis of complex information, aligning with the adjutant's role in guiding mortals toward higher understanding and moral discernment. The Spirit of Truth may consolidate and unify all these interactive reciprocities.

The adjutants may also be related to the chakras:

Root Chakra (Muladhara): Intuition, Red, 625-740 nm., sound 396 Hz
Sacral Chakra (Svadhisthana): Understanding, Orange, 590-625 nm., 417 Hz
Solar Plexus Chakra (Manipura): Courage, Yellow, 565-590 nm., 528 Hz
Heart Chakra (Anahata): Knowledge, Green, 520-565 nm., 639 Hz
Throat Chakra (Vishuddha): Counsel Blue, 435-520 nm., 741 Hz
Third Eye Chakra (Ajna): Worship Indigo, 435-500 nm., 852 Hz
Crown Chakra (Sahasrara): Wisdom Violet, 380-435 nm., 963 Hz

It is interesting to note that the two ultraviolet frequencies of the microtubules, 276 and 334 nm, are above the violet wisdom level. Does this imply the possibility of matching patterns? Are microtubule lengths or patterning related to our abilities in other areas or frequencies? Normal microtubule mechanical vibrations are above 100,000 KHz. Are microtubule lengths which directly relate to their mechanical vibrational frequency (longer tubules = lower frequencies) related to the universal receptivity (possible first sub-harmonic frequency) of the Spirit of Truth after Pentecost?

On a more technical level, both 276 nm and 334 nm offer intriguing insights into their related electronic structure and potential bioelectromagnetic behavior. These wavelengths correspond to specific molecular transitions within tubulin, the building blocks of the microtubules. 276 nm is in the $\pi \rightarrow \pi^*$ transition frequency range where an electron, excited from a bonding one π orbital (delocalized over double bonds or aromatic rings), transitions to an antibonding π^* orbital. This happens in aromatic amino acids in tubulin subunits containing tryptophan and tyrosine when this aromatic (unsaturated ring structures) delocalized π-electron systems, absorb strongly at or near 276 nm. This peak frequency is sensitive to protein folding and microtubule polymerization states. Shifts in intensity or position can reflect dynamic changes in tubulin conformation and/or dipole alignment.
334 nm is in the $n \rightarrow \pi^*$ transition or charge transfer frequency range where an electron from a non-bonding orbital (typically lone pairs on oxygen or nitrogen) is promoted/raised to a higher energy π^* antibonding orbital. There is also a possibly association with tubulin dimer interface or microtubule cavity states, in the tubulin carbonyl-rich backbone or interfacial water structure. This includes:

Exciton Coupling: Delocalized electronic states across tubulin dimers or protofilaments.
Cavity Resonance: Inner lumen of microtubules may support standing wave modes or field-enhanced transitions.
Dipole Oscillations: Periodic dipole arrangements in microtubules could support coherent electromagnetic modes, as proposed by Pokorný et al. (Ref 180)

The Spirit of Truth may function to provide a bias superimposed on the overall patterning of these microtubules, and their associated ARC propagation time delays may function both individually and collectively. This patterning may also involve a general electrical bias overlayed in the white matter surrounding the brain, together with the patterning of the microtubules themselves as influenced by the flow of ARC activity. These patterns might be **“the living way from finite consciousness to transcendence of consciousness” (117:3.3 & 7:7.4 & 52:5.4 & 101:3.3).** This patterning may allow for the functioning of the Spirit of Truth and this patterning may

have been derived from *the patterning of Michael's own microtubule structures* as he arranged them, in his own brain and body, 2000 years ago. Reception by the apostles and others after Pentecost may have been a repatterning of their microtubule lengths to facilitate the reception of the Spirit of Truth.

> **On Urantia the establishment of this "new and living way" was a matter of fact as well as of truth. 52:5.5**

Our biases result from the lengths of the tubules and established trigger voltage thresholds which are constantly changing. The fact that we can influence the lengths of these microtubules in these para crystalline-like structures, and our calmness (think base voltages versus trigger voltages) suggests that over time, we can develop "habits of thinking" (patterning our thoughts the way Jesus did). The stable patterns of these cascade phenomena may become our **"religious habits of thinking" and our "conditioned spiritual reflex" 100:1.8, 160:3.2** and since we become more like the one we worship, **(5:5.14 & 133:4.9)** this may be the basis for our soul growth and stabilization of purpose.

One final thought on the Spirit of Truth. Could it be that the Spirit of Truth is the third uplift, the first being the organizational uplift of the planetary prince, the second being the biological uplift by Adam and Eve, the third being the ideal patterning of our physiology? Perhaps the planetary prince gave us ideas on how to organize ourselves? Perhaps Adam and Eve gave us their DNA uplift which included microtubule enhancement? Could it be that during Michael's incarnation he learned how to manage his own emotional control, biological processes and microtubule lengths and patterning? Did he learn how the material body functions and how best to fine tune these physiological functions for improved spirit reception? Did he learn the patterns of neurotransmitters and neurotubule lengths best suited for the universal reception of Thought Adjusters and increased spiritual influence? Can we learn to be more Christ like? Can we religiously manage our own reaction patterns and emotional responses?

> **Of all human knowledge, that which is of greatest value is to know the religious life of Jesus and how he lived it." 196:1.3**

Top-Down and Bottom-Up Interpretations

How does our personal trilogy (spirit mind and matter) relate to the original Trinity, or the Triunities? Perhaps the patterns we have been discovering here, are sustained by the combination of the 2nd (power-pattern) triunity and 4th (triunity of energy infinity) Triunities. The 2nd Triunity (made up of the Father-Son, Paradise Isle and Conjoint Actor) is responsible for "cosmic configuration" and "fashioning" energy after the Paradise patterns. The 4th (Father-Spirit, paradise Isle, Unqualified Absolute) Triunity is responsible for the control and stabilization of the metamorphosing cosmos as "the endless throbbing of the material Paradise heart of the infinite cosmos, beats in harmony with the unfathomable pattern and the unsearchable plan of the Infinite Energizer, the First Source and Center." **104:4.28** This may be the **"non-Father capacities of universal manifestation". "… the relationships of the God of force, energy, power, causation, reaction, potentiality, actuality, gravity, tension, pattern, principle, and unity." 104:2.6**

Perhaps these are further interrelated and harmonized by the Third Triodity (the Triodity of Actuality, the Eternal Son, the Paradise Isle, the Conjoint Actor.) which integrates and harmonizes our "spirit, cosmic" and "mindal" realities.

> **Thus are interassociated the infinity reservoirs of all latent energy reality—spirit, mindal, or cosmic. This association yields integration of all latent energy reality. 104:5.11**

Spiritually**, "creator consciousness seems to proceed from thought-value, through the word-meaning, to the fact of action." 118:5.3** From our bottom-up perspective, our progress seems to be the converse, proceeding from facts to thoughts, to meanings and then to the value of those meanings.

> **It is literally true, "Human things must be known in order to be loved, but divine things must be loved in order to be known." 102:1.1**

Materially, the bottom-up perspective might be thought of as organizing electrical energy, volitionally as we use our free will to control our thoughts and organize them to be receptive to spirit energy symmetry. Our task may be to harmonize this bottom-up thinking with a top-down, love and be loved, perspective. God loves us all so to be more God-like we need to learn to love all others like he would love them.

> **Scientific, moral and spiritual insights are the self-consciousness of reflective thinking and make it possible for man to function as a rational and self-conscious personality in science, philosophy, and religion 16:6.9** (think three cosmic intuitions)**.**
>
> **Matter-energy is the mathematical logic of his senses; mind-reason knows their moral duty; spirit-faith (worship) is his spiritual experience. These three intuitions, if unified by patterning their relationships, produce a strong combination of factual science, moral philosophy, and religious experience that validates our experience with things, meanings, and values. 16:6.10** (think cosmic circle attainment).

It seems to me that cosmic circle attainment involves our trilogy, material (think epigenetics), intellectual (think emotional) and spiritual (think faith trust) progress. Education may sharpen and unify these patterns of thought processing in our mind. Civilization may express these meanings and values; life may experience them, and personal religious actions may ennoble them. There is a calmness associated with the realization of their inevitable perfection.

During our formative years we are functioning primarily at the animal (fear your enemy) survival level. Once we have confidence in an afterlife and God's plan, our task may be inverting this bottom-up, survival of the fittest, mentality to a top-down love our enemy, cosmic perspective. This may require that we fake it until we faith it. Gradually, over time, we can change our thinking and entrench the Jesus's inverted ways of thinking. I call this the Jesus flip (think, beatitudes, inevitabilities, selflessness).

> **I say to you: Love your enemies, do good to those who hate you, bless those who curse you, and pray for those who despitefully use you. 140:3.15**

Soul Physiology

It seems to me that once we have chosen to flip our thinking, there are fundamentals that need to be captured to transfer our soul's identity to the resurrection halls to **"… begin over there right where you leave off down here." 47:3.7.**

> **On the mansion worlds the resurrected mortal survivors resume their lives just where they left off when overtaken by death. 47:3.1**

We will need our memories. The Thought Adjuster will have a spiritual replica of our salvageable memories, those spiritual associations, loving thoughts and reactions to our experiences. The value of these past experiences and their associated spiritually valuable memories are in safe custody of our Thought Adjuster. We will also need our characteristic physical traits. We will need a morontial representation of the state of our brain and body with the physiological patterns that gave rise to those spiritual memories and reactions.

A fully grown human adult might have between 80 to 100 trillion cells. About 4 trillion of them do not have our own genetic material so we are not so concerned with them, but what about the information, relationships, and intercommunication patterns that any DNA modified cells have developed over our lifetime? Are they preserved and if so, how? **Paper 40:9.9** suggests that the base from which we draw these associations, which we call memories, are the material state of our brain and body. Some of these states which are static at death, may be available on the mansion worlds even if they were not of spiritual value since some of these brain states might be re-remembered on the mansion worlds, when someone else's shared memories did have spiritual value.

What might be a mechanism to capture, at any instant, our mental patterns, material status and possibly a snapshot of our mid-mind, for transfer/transition to mansion world number one? The body's microtubules and the brain's neurotubules (with their associated bioluminescent infrastructures) are representative of the way we react to our experiences. Our guardian angel may be aware of this "mind-matrix" or "mind patterns", as well as our base DNA and its epigenetic tagging and other modifications. Our microtubule and neurotubule lengths and their associated ultraviolet light patterning, are a part of our body, mind, mid-mind matrix, and may represent the combined spiritual/physical status of our whole body, brain, and nervous system. At death (or any suitable time before death) a snapshot of this information, could be reduced to a 3-D image, a numeric sequence, a hologram, essentially a digital or perhaps even an analog representation of our DNA and bio luminosity which might be reflective of our spirit luminosity. Eastern traditions called it the "Rainbow Body" or the "Soruba Samadhi", and Jewish mysticism called it the Merkabah the divine light vehicle or "Light-Spirit-Body".

> **The mortal-mind transcripts and the active creature-memory patterns transformed from the material levels to the spiritual are the individual possession of the detached Thought Adjusters; these spiritized factors of mind, memory, and creature personality are forever a part of such Adjusters. The creature mind-matrix and the passive potentials of identity are present in the morontia soul intrusted to the keeping of the seraphic destiny guardians 47:3.3**

> **…the seraphic guardian eventually becomes the personal custodian of the mind patterns, memory formulas, and soul realities of the mortal survivor during that interval between physical death and morontia resurrection. 113:3.4**

…your records, identity specifications, and the morontia entity of the human soul—conjointly evolved by the ministry of mortal mind and the divine Adjuster—are faithfully conserved by the destiny guardian together with all other values related to your future existence, everything that constitutes you, the real you… 113:6.1

These phases and forms of soul, these once kinetic but now static formulas of identity, are essential to repersonalization on the morontia worlds; and it is the reunion of the Adjuster and the soul that reassembles the surviving personality, that reconsciousizes you at the time of the morontia awakening. 112:3.5

Mortal mind, prior to death, is self-consciously independent of the Adjuster presence; adjutant mind needs only the associated material-energy pattern to enable it to operate. But the morontia soul, being superadjutant, does not retain self-consciousness without the Adjuster when deprived of the material-mind mechanism. This evolving soul does, however, possess a continuing character derived from the decisions of its former associated adjutant mind, and this character becomes active memory when the patterns thereof are energized by the returning Adjuster. 112:6.7

Preservation of Intention

The second law of quantum complexity says that complexity, like entropy and coherence, always increase up to a local and then a global maximum. We are living in a locally and globally entangled reality. This is demonstrated by the life after heat death, of a black hole where even after thermal equilibrium (heat death) complexity increases due to quantum entanglement. Blackholes are essentially recycle machines, they "eat" mass but preserve the information, and transform that information in waves increasing the entropy of the Universe. Said differently: The investigation of possible states takes longer than the time to get to thermal equilibrium. This is analogous to computer circuit complexity in a physical system. It is like a reverse cypher code (the code required to break a cypher, which existed before you find that code). It implies that after material death (material heat death), the soul could continue its search for complexity.

This "black hole information paradox" is resolved by a process called "nonviolent nonlocality" where the insides of black holes are connected to their outsides through "quantum nonlocality" in which correlated particles share the same quantum state (think quantum entanglement and ubiquity). (Ref 126) This paradox can also be resolved using the holographic principle which suggests that all the information about any object is encoded on the observer's holographic screen, which always appears on the observer's event horizon. The observer's event horizon becomes its own holographic screen where its image encodes quantized qubits of information. Everything the observer can observe is its own holographic world. A form of information that is reducible to qubits of information encoded on the equivalent of its own holographic screen. (Emergent space-time Susskind and Hooft 1995)

Light has momentum and momentum is a vector. The so called "Poynting" vector. i.e. it has magnitude and direction. We are all familiar with $E = (mc)^2$ but this is only true when things are at rest. The whole equation represented in four-dimensional Minkowski relativistic space is $E^2 = p^2c^2 + m^2c^2$ (where E = energy, p = the magnitude of momentum, m = mass, c = speed of light in a vacuum) or more simply $E = pc$. The concept of momentum transcends Newtonian mechanics. Momentum is a fundamental property that is conserved in all

physical systems with *spatial* translational symmetry according to Noether's theorem (Ref 97). Similarly, energy is a fundamental property that is conserved in all physical systems with *time* translational symmetry. This implies that our biological luminescence and its associated patterns can have magnitude and direction (think intent) momentum Godward. Spatial and temporal translational symmetry may give us momentum godward after disassociation from our spatially patterned matter. This may be facilitated by our faith association of the source of our energies, the Third Source and Center and our directing of those energies, towards God the Father.

Ubiety and Ubiquity

Every particle in the universe, no matter whether it's a fundamental or a composite particle, falls into one of two categories.

Fermions, with quantized half-integer values of Planck's constant: ±1/2, ±3/2, etc.
Bosons, with integer spin values of Planck's constant: 0, ±1, ±2, etc.

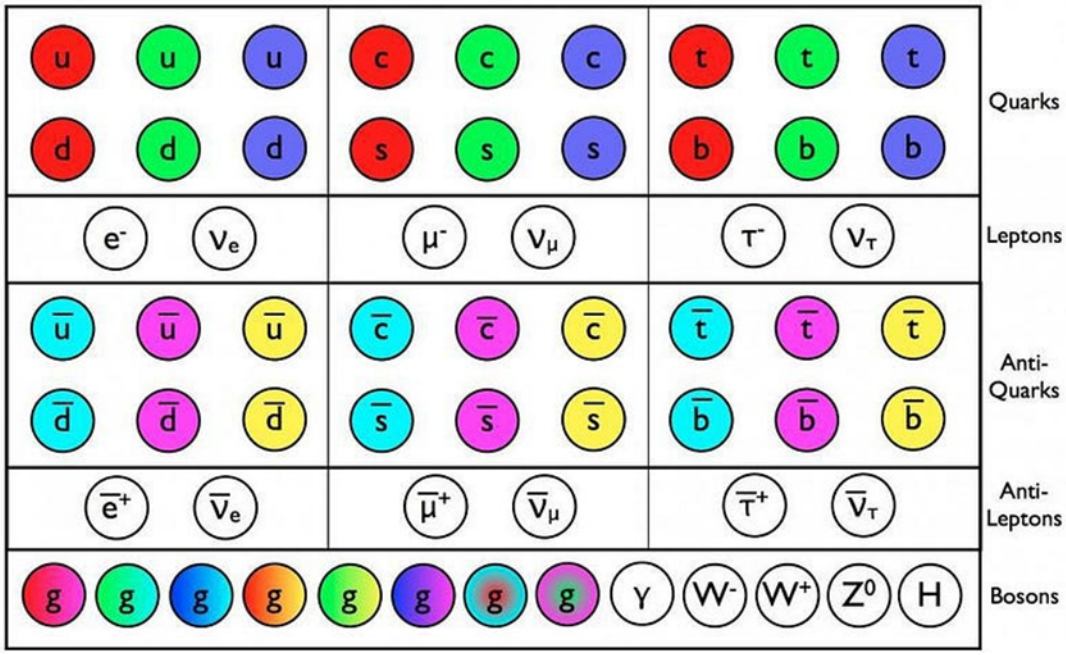
That's it. In the known Universe, there are no fundamental or composite particles that fall into any other category. Everything that we've ever measured behaves either as a fermion or a boson; there are no particles that exhibit any other statistical properties.

A major difference between fermions and bosons is the matter of collocation. It is interesting to note that most Bosons can interact electrically with the Higgs field (have mass). Massless gluons and photons (both bosons) do not interact with the Higgs field. No two fermions can occupy the same space or quantum state simultaneously (think fatherlike, ubiety), but multiple massless bosons can. Gluons, (the particles that mediate the strong nuclear force) and the Higgs boson (the so-called God particle - think motherlike) are ubiquitous. Michael and mass (electron field) are both spatially specific (they have ubiety), and our local universe mother spirit (and photons) can simultaneously be in multiple places at once, (they are ubiquitous). Considering how complemental the electric and magnetic fields are in photons, this hints at the complemental and coherent nature of matter and spirit.

Side note: If the masses of the W and Z bosons don't come from the Higgs field, they might come from the geometry of a seven-dimensional space. (Ref 190)

In the Standard Model, there are only a few particles (and their anti-particles) that are required to understand almost everything:

- up-and-down quarks, which make up protons and neutrons,
- gluons, which hold protons, neutrons, and all atomic nuclei together,
- electrons, which bind with atomic nuclei to make neutral atoms, (the electric quantum)
- neutrino, which plays a major role in the weak nuclear interaction
- photons, which are the particles that mediate the electromagnetic force (the electromagnetic quantum)



Fermions (top 4) and Bosons (bottom line)
(Credit: E. Siegel/Beyond the Galaxy)

There are 12 different bosons (force carriers) and they are grouped to describe their three interactions.

1. 8 gluons mediate the strong nuclear force, and act only on particles with a color charge: the quarks, antiquarks, and other gluons.
2. 3 weak bosons, the W+, W-, and Z^0, are all massive and mediate the weak nuclear force.
3. Photons, Y, has no mass and is responsible for mediating the entire electromagnetic force spectrum.

All charged particles experience electromagnetic interactions, including fermions, except for the low-mass, uncharged neutrinos that barely interact with anything at all (think solitary messengers). Light can change its direction and has momentum. Any change of momentum results in a force.
Note that gluons, the smallest particles, have velocity and direction, and like photons, are massless. They facilitate the strong interactive force that hold the quarks together that make up the protons and neutrons. Both extremes, gluons and photons, function outside of time. (Ref 118) Photons also have geometry (shape). They are neither a wave, nor particle. They exhibit those appearances only when they are detected. They can become either a wave (time dependent ubiquitousness) or show the spatial, particle-like properties of ubiety.

Side note: Neutrinos have very small mass, and they don't interact very often. Hundreds of trillions of neutrinos pass through your body every second, but they will almost all pass straight through. Might this be a mechanism for ubiquity?

Remember the fields we talked about earlier? There is the electron field, also known as the electron-positron field, which is a "matter field" with its quanta the electron and its antithesis, the positron and there is the electromagnetic field with its quanta the photon which is its own identical antiparticle. Since photons have no mass, the electromagnetic field is a "radiation field" and since the electron-positron field, has mass, it is a "matter field."

Do you remember my earlier comment about the complemental and coherent nature of the electric and magnetic fields in photons? Does this hint at the complemental and coherent nature of matter and spirit."?

It is also interesting to note the triunity and duality differences between fermions and bosons. Fermions (whose mathematical spin is the positive square root of 1 i.e. +1) have a "color charge" which is **triune** in nature (think triunity, paradise triata material) with color combinations (e.g. red, green, and blue for quarks, and cyan, magenta, and yellow for the antiquarks). Fermions are the basic parts of protons and neutrons that make up the nucleus of atoms and respond to magnetic fields. i.e. demonstrate a cosmological alignment tendency.

> **In the central universe these physical systems are threefold organizations known as triata. They are the superpower mother systems of the creations of time and space. 11:8.7**

While fermions are triune (think circular, concentric) bosons are **dualistic** (think linearity, male female, right wrong, God's will or not) and have only varying degrees of positive or negative charge.

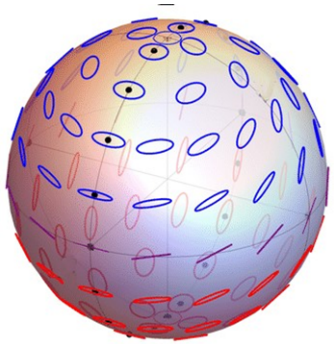
The atomic nucleus is made up of protons and neutrons, which in turn are made of three quarks apiece. Inside protons and neutrons, gluons and quark-antiquark pairs, are constantly being created, destroyed, emitted and absorbed. Also, around this nucleus are electrons. When an incoming photon, with one direction, bumps into an electron, a photon is emitted that has a new direction that was influenced by the electron. Think linear to circular to linear (timelessness transitioning into something finite) and then transitioning back to something timeless but now the resulting photon has been influenced by the finite.

It is also interesting to note that three of the fundamental processes in the formation of matter involve a transmutation from circular to linear motion. This is most noticeable in the eye where three seemingly disparate physical phenomena: visual perception, quantum measurement, and photon emission come together. Light enters through the iris in a circular pattern yet must be transformed into linear signals along the optic nerve. This geometric transformation from radial (toroidal) to linear motion is not just a biological convenience. It represents a fundamental information bottleneck where the rich field of visual data must be compressed and serialized for neural transmission. This is like photon emission from excited atoms. An electron in an excited state occupies an orbital, a probability distribution around the nucleus. When it releases a photon, this circular motion transforms into linear propagation along a spontaneously chosen axis suggesting a deep principle at work. This suggests that the architecture of perception itself might be shaped by these same physical principles. Just as a quantum measurement collapses possibilities into actualities, and just as particles spontaneously organize their motion along an axis, our sensory systems must transform the rich field of potential experiences into concrete perceptions or intent (from circular potentials to linear actuals). Linear actuals have intentional direction. Is that direction Godward? (Ref 134)

When thinking of photons, although we call them particles, try not to think of them as little balls. They are small, spherical ripples in the electromagnetic (wave influenced) field/continuum (**42:5.1)**. (Ref 100) These concentric blobs ripple/radiate their influence spherically in three-dimensional (time bound i.e. their motion is observer dependent) space. If the photons came from the same source (say the bioluminescence of a microtubule), they are "entangled". When you "detect" (like in the rods and cones of the eye) you not only extract the energy (flatten the bump) by that detection, but you also affect the entire wave, so this energy extraction could be observed at the other locations around the spherical wave pattern (think reflectivity). Studies investigating the preservation of photon entanglement in polarization after one entangled photon propagates through brain tissue, indicates that the non-local correlations between photons are maintained even through complex biological tissues. (Ref 87) This is

particularly poignant in the case of microtubules because of their qubit computational functionality and their magnetic field sensitivity.

The path that photons and all other massless “particle” take is called a “null geodesic” i.e. where the "interval" or proper time along the path is zero. Said differently where the time interval between any two nearby points on the path is zero as compared to massive particles that follow time-based geodesics.



Poincaré sphere visualization of entangled photon states
(think Reflectivity)

Side note: There is an extremely powerful field of computing called “reservoir computing”, that tries to mimic the way the human body processes information (like a muscle contraction) where inputs are fed into a system with a large number of "nodes" or "dimensions" (the reservoir) and then interpreted to isolate important data or predict future results.

Thinking more about the eternal aspect of photons, this means that the degrees of freedoms of photons do not change with time. Microtubules emit bioluminescent photons at specific resonant frequencies in the infra-red and ultraviolet range, and this luminescence is representative of the way we think and react to external stimulations. Photons are pure energy, have no mass and yet have momentum and photons are eternal. Photons are particles that can be influenced by the whole as demonstrated by their wavelike properties. As I said earlier, it is possible that light patterns (influenced by our reactions to the whole), once emitted, could be captured and might even continue after our physical mass comes to rest. It is possible that our guardian angel could detect this light pattern information, and relay it to mansion world number one while at the same time the numeric representation of our luminescent energy could be memorized and the image could be relayed for initial patterning of our morontia body to **“… begin over there right where you leave off down here.” 47:3.7** It may also be that there is an intermediate pre morontia or mid mind state of the soul made up of the intermediate class of particles called hadrons that are composite particles of bosons and fermions.

Photons are bosons that:

Don’t experience time.
Exist as delocalized waveforms.
Only “collapse” when observed.

Human consciousness behaves very similarly:

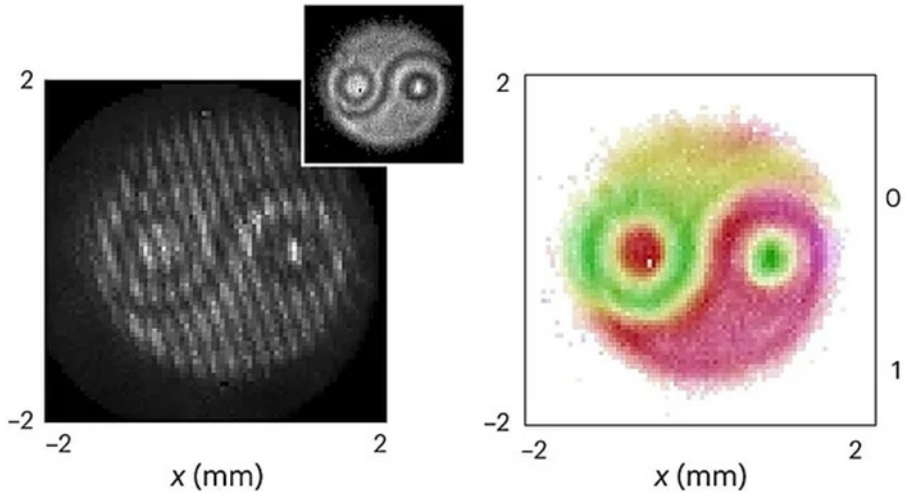
We transmit signals across timeless electromagnetic fields.

We require coherence to access higher awareness (like lasers focus light).
Our identity collapses into action from infinite potential into a thought.

Signal Theory posits that the self is a standing wave, a stable point where signal pathways intersect in recursive harmony.

The word hadron comes from the Greek word “stout” or “thick” because they are analogous to molecules in that they respond to the electric force and make up our protons and neutrons. Remember how the nuclei of atoms respond to cosmic magnetic alignment? This nuclear electromagnetic alignment might also have a superadditive influence on our microtubule bioluminescence.

Side Note: The standard model of the Universe suggests a very weak magnetic field of around 0.2 nano-gauss fits experimental data.



Reconstruction of a holographic image of two entangled photons
(Image credit: Nature Photonics, Zia et al.)

Experiential Soul Fusion

What does all this physics have to do with my soul? What is soul fusion? Is this fusion an actual physical phenomenon or a metaphorical one? What makes an experience spiritual? What experiences bring us closer to fusion? How does finite become infinite? What would make us eternal? Is there anything about us that is already eternal? Does fusion happen after we have a bottom to top, fear to faith, material to spiritual, self to selfless, me to we, 180-degree, Jesus’ likeness flip?

What is human experience? It is simply any interplay between an active and questioning self and any other active and external reality. The mass of experience is determined by depth of concept plus totality of recognition of the reality of the external. The motion of experience equals the force of expectant imagination plus the keenness of the sensory discovery of the external qualities of contacted reality. The fact of experience is found in self-consciousness plus other-existences—other-thingness, other-mindness, and other-spiritness. 102:4.2

Our "experience' is not "something" that we have as much as it is a temporary configuration of the thoughts that observe, construct and maintain coherent models. Do we experience independent objects interacting or do we see everything conscious of everything else? Is the face of and old woman looking at us or a young one looking away? The free will control of our thoughts and experiences may be in the quantum neuron limbic cerebral feedback loop of our consciousness, and perhaps our superconsciousness, where we *objectively* (materially) and *subjectively* (spiritually) experience the phenomenon of aspiring to be at peace, to be more Godlike.

> **Peace in this life, survival in death, perfection in the next life, service in eternity—all these are achieved (in spirit) now when the creature personality consents—chooses—to subject the creature will to the Father's will. 111:5.4**

Our free will control may allow spirit dominance to align our neuronic activity to the Thought Adjuster's preferred path, a fusion of paths. A fusion of attributes. A fusion of intents. A fusion of purposes. A fusion of minds. An alignment and fusion of wills.

> **… the phenomenon of the making of these two minds one…129:4.2**

> **And if this choice is made, sooner or later will the God-choosing son find inner union (fusion) with the indwelling God fragment, while this same perfecting son will find supreme personality satisfaction in the worship communion of the personality of man and the personality of his Maker, two personalities whose creative attributes have eternally joined in self-willed mutuality of expression—the birth of another eternal partnership of the will of man and the will of God. 111:5.6**

What is this "inner union," fusion of wills? Is it when our free will-controlled patterns cohere with the patterns of paradise? In the physical world nuclear fusion occurs when the electromagnetic energies of two atoms get close enough to be retained by their uniting weak force releasing the extra energies that are no longer required. It takes energy to slow down fundamental energy to the electron level. The "life flash" of fusion **(55:2.4)** may be the release of the extra energies, which at fusion would then be no longer required.

> **You as a personal creature have mind and will. The Adjuster as a prepersonal creature has premind and prewill. If you so fully conform to the Adjuster's mind that you see eye to eye, then your minds become one, and you receive the reinforcement of the Adjuster's mind. Subsequently, if your will orders and enforces the execution of the decisions of this new or combined mind, the Adjuster's prepersonal will attains to personality expression through your decision, and as far as that particular project is concerned, you and the Adjuster are one. Your mind has attained to divinity attunement, and the Adjuster's will has achieved personality expression. 110:2.5**

There is a phenomenon in quantum optical physics called the Hong-Ou-Mandel interference effect where two identical photons naturally link together. There is also the phenomenon of lasing where photons tend to get in phase with neighboring photons amplifying their strength by coherence as they pack more closely to each other. In a related phenomenon there is a huge release of energy when two fermions get close enough for the strong nuclear force to take over. The compound, formed by fusion, has less mass than the previous two releasing the energy of that excess mass. It is conceivable that fusion with our Thought Adjuster may be like the combination of these three processes, huddling coherent photons, lasing, and material fusion phenomenon, wherein patterning of our neuronal material electro-chemical energies, cause optical coherences of the UV light of our

microtubules to get consistently close enough, when we achieve consistent, enduring, stable divinity attunement patterning of our morontial-spiritual energies with those of our Thought Adjuster. Material energies might fuse with stronger cohesive energies (think weak nuclear force or even the gravitational force, the one that is dominant on cosmic scales). If the Thought Adjuster's spiritual energy runs in similar paths as our material energies, these harmonized electro-chemical neural energies might get close enough (in the soul) to combine with our morontial energy, and both would fuse with the immediate release of the excess energy no longer required to maintain noncoherent vibrational energy.

Remember the weak nuclear force? The weak nuclear force (think dominant will) is crucial for operations over very short distances, and it plays a key role in changing one type of subatomic particle into another. In our case aligning our will with Gods.

It may be that soul fusion is a form of macroscopic quantum coherence when multiple atoms maintain a well-defined, stable phase relationship between their wave functions. E.g. lasers (coherence among photons) superfluidity (coherence among bosons) and superconductivity (coherence among pairs of electrons). Soul fusion may be when our microtubule ultraviolet light frequencies "lase" and the coherence is synchronized with their mechanical vibrations. Perhaps this happens when multiple thoughts become multiple actions concentrated to doing the father's will? When **"numbers of decisions, frequent repetitions, persistent repetitions"** become **"habit-forming certainty of such reactions" 110:6.5** Think "Chariots of fire".

Philosophy of the Physiology of Spiritual Influences

Just as there are two kinds of time, there are two philosophical perspectives for our approach to God. We can identify with the physical body and its material environment (being), or we can think from a soul base and its cosmic reality (becoming). We tend to use our relatedness to our external reality to evaluate our physiological progress and our philosophy, with its ability to sense cosmic influences to gauge our spiritual progress, but our true progress may be in our superconscious soul mind, where our creative Thought Adjuster influence helps to transfer our identification with, and attachment to, our spirit core.

> **But mortal personality, through its own choosing, possesses the power of transferring its seat of identity from the passing material-intellect system to the higher morontia-soul system … 112:5.4**

The processes we have investigated are akin to applying the scientific method to our spiritual, external, and hopefully our internal, eternal, philosophical progress, and this can be viewed from at least three additional perspectives:

1. Discovery of facts as extrapolation of currently known facts.
2. Developing new techniques in ourselves.
3. Observing changes in ourselves during our investigations.

These philosophical processes may be integrated, and their individual strengths will then be a function of our different experiences and their memories. Each of these growth mechanisms will build on these new experiences as we move forward and integrate them internally with spirit influences.

In the inner experience of man, mind is joined to matter. Such material-linked minds cannot survive mortal death. The technique of survival is embraced in those adjustments of the human will and those transformations in the mortal mind whereby such a God-conscious intellect gradually becomes spirit taught and eventually spirit led. This evolution of the human mind from matter association to spirit union results in the transmutation of the potentially spirit phases of the mortal mind into the morontia realities of the immortal soul. Mortal mind subservient to matter is destined to become increasingly material and consequently to suffer eventual personality extinction; mind yielded to spirit is destined to become increasingly spiritual and ultimately to achieve oneness with the surviving and guiding divine spirit and in this way to attain survival and eternity of personality existence. 1:3.7

There is also an evolutionary physiology of spiritual influences. By thinking about God and the service of man, and because of previously practiced familiarity with the developing idioms of cognitive neurobiology, we can learn to discriminate by introspection, the coding vectors in our internal axonal pathways, the activation patterns across salient neural populations, and their relationships to enhance our Godlikeness. This kind of thinking is called Transcendent Naturalism and has a circular cause/causality paradigm that can be broken down like this:

1. Matter/Energy

   There is a continuum between the quantum realm and the realm of classical physics when more complex forms of energy abruptly lose their quantum properties in a phenomenon called "decoherence." Quantum properties like entanglement suddenly disappear, waveform collapses, and matter becomes measurable. Classical matter has emerged from the quantum realm via this constantly occurring decoherence. This implies that energy/matter has an emergent foundation and therefore a coherent destiny in an associated reciprocity of decoherences and coherences.

2. Life. Sentient Autopoiesis

   Poiesis refers to the process of emergence or creation of something new that did not previously exist. It's often contrasted with praxis, which focuses on activity or action. Poiesis emphasizes the making or formation of something new, whether it's artistic, intellectual, or even biological. Autopoiesis is a circularly patterned feedback loop when something maintains and renews itself by regulating its own composition and conserves its own boundaries in this system of feedback loops.

   Side note: The Schrödinger-Newton equation is a framework for exploring gravity's quantum effects by adding a self-interacting gravitational term to the Schrödinger equation, offering insights into bridging quantum mechanics and general relativity at specific scales which suggests gravity as the cause of autopoiesis.

3. Mind.

   There are mechanisms involving things like the bioluminescence of microtubules and other connected relationships (think photons and electrons) that form the base of a 4E ("embodied, embedded, enacted, and extended") cognitive feedback loop, we enhance the positive aspects of these feedback loops, as we improve our receptivity to similar influences.

4. Culture.

Righteous minds try to ground morality in six innate, cross-cultural moral dimensions: care/harm, fairness/cheating, loyalty/betrayal, authority/subversion, sanctity/degradation and liberty/oppression. A moral culture is determined by the point in each dimension where actions become immoral. In other words, a moral system is defined by the 'weights' we give across and within the dimensions to different behaviors or expressions. As the cultures evolve, more sophisticated models emerge, culminating in "wisdom" which grows out of the wisdom of the individual as it is guided by top-down insight. There is not necessarily a direct connection between how things seem and how they really are. We are mostly WEIRD (Western, Educated, Industrialized, Rich, and Democratic). We often mistake our self-reporting of how things seem, unless we use a top-down, humbling, perspective.

Transcendent naturalism happens at all levels, individual, tribal, familial, city, state etc. Things evolve to stabilize in a series of feedback loops. Self-perception theory developed by psychologist Daryl Bem. Asserts that people develop their attitudes by observing their own behavior and concluding what attitudes must have caused it. The converse may also be true that you can change your attitude by forcing a behavior. Fake it until you have faith in it.

So, is transcendent naturalism making us individually wiser? Do we form feedback loops with the groups that we are involved with? What is wisdom anyway? A common wisdom model is based on several different elements: metacognition (thinking about thinking) declarative knowledge (knowing what you know and don't know), procedural knowledge (knowing how to do things), conditional knowledge (knowing when and how to use what you know) and moral aspirations (trying to be 'good'). Are we improving our thinking about our thinking? Are we sure about what we "know"? Are we aspiring to be more moral. Are we becoming more loving? Let's review what we have learned and look at the persistence of these influences.

Side note: The Cognitive-Theoretic Model of the Universe or CTMU (pronounced "cat-mew") (Ref 159) suggests a self-simulation theory of relationship between mind and reality, a "Self-Configuring Self-Processing Language" based on choosing three axioms:

Metaphysical Autology (the study of oneself, associated with closure),
Mind Equaling Reality (associated with comprehensiveness),
Multiplexed Unity (associated with consistency)

CTMU says that mind and reality are ultimately inseparable as they share common rules of structure and processing and are therefore self-contained i.e. like God's self-caused cause.

God Conscious Persistence

The Persistence Theory interprets quantum mechanics as information entanglement. (Ref 151, 155) It relates thermodynamics with the instantaneous sharing of information about the interconnectedness and mutual interdependence of wave functions. It says that coherence between "particles" is not local. It is topological and mutually sustained by the preservation of shared information about everything else's location and condition. When a measurement occurs, entropy is injected at one point causing the loss of ability to maintain the current state which forces the change to a new shared-influence state. It is not that a signal is exchanged but rather it is the collapse of what can no longer persist, materially and temporally.

The phenomenon of personality is dependent on the persistence of the identity of selfhood reaction to universe environment; and this can only be effected through the medium of mind. 112:5.20

The persistence model, which is essentially a quantum Bayes' rule, (Ref 183) works for both physical and logical systems. In the brain it reflects neural connections that preserve coherences during perceptions and the cascade of higher order states, like thought structures, it is compatible with immanence (God within us) (Ref 161, 165) and transcendence (God's everywhere ness). In persistence theory quantum phenomena emerge not from observer effects or many-worlds, but from a system's ability to preserve the stability of mutually shared information. Materially the state is changed through the forces of entropy and spiritually the state is changed through the **"exhibition of creature willingness to share the inner life with God—with the very God who has made such a creature life of inner meaning-value possible" (111:5.1)**. In persistence theory consciousness is the amplifier of persistence. Persistence sustained by consciousness, is not an accidental emergence, it is an inevitable thermodynamic process whenever fragile information coherence with God's will is sustained against the pull of entropy. The "collapse of the wave function", entanglement, decoherence, and probability are the natural consequences of thermodynamically finding locally improved, shared information states. i.e. finding God's preferred material state. This implies that the most stable, most enduring, most eternal state is the cosmically preferred state i.e. the "Supreme" of entropy in time and space. In the brain electrons are finding their best shared information state. In the mind our thoughts are trying to find their best shared (shared with God) information state. This implies that doing the will of God is finding where our thoughts (and their follow up service actions) are shared by God. Are we thinking and doing what is most enduring, most stable and most eternal, most loving, most God like?

The persistence of memory is proof of the retention of the identity of original selfhood; it is essential to complete self-consciousness of personality continuity and expansion. 112:6.8

This actual transfer from material association to morontia identification is effected by the sincerity, persistence, and steadfastness of the God-seeking decisions of the human creature. 112:2.20

Summary

There may be three informationally entangled energy manifestations, the material, the morontial, and the "more complex" spiritual. To show how two particles are entangled in the material world, we must first separate them from all other entanglements. To show the effect of a stone thrown into a turbulent pond, you must first calm the water. This suggests the omnipresence of entanglement. We see this in our material physiology. In the morontia realm, photons (which may have been slowed to behave like matter), interrelate more cosmically. This interactive entanglement likely persists at spirit levels where information relatedness is truly eternal and potentially infinitely entangled.

Perhaps we should try to entangle our spiritual information while we disentangle from things material (the Bahai concept of detachment). Perhaps we can recognize interpret and choose, to relate: things meanings and values, physical-reality intellectual-reality and spiritual-reality, fact idea and relationship, truth beauty and goodness, health sanity and happiness, faith trust and assurance, self-consciousness social-consciousness and cosmic-

consciousness, matter mind and spirit, thought wisdom and worship, hindsight insight and foresight, the finite, the absonite and the absolute.

If you don't understand all the intricacies of this exploration, don't worry. I don't fully understand them either.

> **The presence of the divine Adjuster in the human mind makes it forever impossible for either science or philosophy to attain a satisfactory comprehension of the evolving soul of the human personality. The morontia soul is the child of the universe and may be really known only through cosmic insight and spiritual discovery. 111:0.1**

Instead, think of this as a story. When you listen to a story or a parable, your whole brain is emotionally and intellectually immersed in the story. Stories involve context, conflict and outcome. Perhaps, when approaching life, when watching the biology of our life story unfold, we may want to immerse ourselves in the context, conflict and outcome of the bigger story. The story of our craving for perfection, a career of becoming more Godlike which may be more like the Greek translation of perfect "telios" which implies maturity and wholeness.

> **"It is wrong to think that the task of physics is to find out how nature is. Physics concerns what we can say about nature." — Niels Bohr**
>
> **In every living plant or animal cell, in every living organism — material or spiritual — there is an insatiable craving for the attainment of ever-increasing perfection... 65:6.2**

Dopamine, neurotensin, microtubules, MAPS, ARCs, SAMs, DNA enhancers, epigenetics, the DMN and HPA axis, the vmPFC, electromagnetic and optical quantum coherences, the consciousness of our consciousness, our creative mental picturizations, lower frequency thought cross pollination, time consciousnesses, controlled emotional responses and superconsciously patterned habits, fermions and bosons etc. are all striving for improvement, and they are all within our control. Their processes are all subtle and incremental. They require effort, consistency, and faith (delayed gratification) that they will eventually work. (Ref 116, 170)

> **Every decision you make either impedes or facilitates the function of the Adjuster; likewise do these very decisions determine your advancement in the circles of human achievement. It is true that the supremacy of a decision, its crisis relationship, has a great deal to do with its circle-making influence; nevertheless, numbers of decisions, frequent repetitions, persistent repetitions, are also essential to the habit-forming certainty of such reactions. 110:6.6**
>
> **… electrical and chemical reactions are predictable. But mind can profit from experience, can learn from reactive habits of behavior in response to repetition of stimuli. 65:6.8**
>
> **But mind can control energy only through its own intelligent manipulation of the metamorphic potentials inherent in the mathematical level of the causes and effects of the physical domains. 111:6.4**
> **The contact of the mortal mind with its indwelling Adjuster, while often favored by devoted meditation, is more frequently facilitated by wholehearted and loving service in unselfish ministry to one's fellow creatures. 91:7.1**

The human personality is not merely a concomitant of time-and-space events; the human personality can also act as the cosmic cause of such events. 12:5.11

Do the patterns of our electro-chemical energies involve some of the physiologies that the Life Carriers used with Michael's guidance and Mother's energies to manage our brain-mind connections? Are we living with a holographic God fragment that gives us a low-resolution image and the direction to find God? Are we living in viscous time that nudges us to intellectual coherence? Is there a natural persistence of spiritual influence? Oh, and by the way, microtubules function holographically.

Have we touched on some intriguing possibilities here? Mystery remains, for a while longer while we discover our Mother and her various physiologically ingenious ways of helping us find Father.

As a reality in human spiritual experience God is not a mystery. But when an attempt is made to make plain the realities of the spirit world to the physical minds of the material order, mystery appears: mysteries so subtle and so profound that only the faith-grasp of the God-knowing mortal can achieve the philosophic miracle of the recognition of the Infinite by the finite, the discernment of the eternal God by the evolving mortals of the material worlds of time and space. 1:4.7

Take Home Anchor Points:

Perhaps these one-liners will trigger your own ideas of how to materially, incrementally, improve any interactions with your spirit helpers.

1. The physical to psychological link is bidirectional and potentially coherent with spirit influences.
2. Your body supports your mind. Care for your body is care for your mind.
3. Your attitudes, thoughts, emotions, actions, and reactions all influence your chemistry and thus your spirit receptivity.
4. Patience and openness to thoughtful reflection, may help.
5. Childlike faith and trust in God with adultlike focus may help.
6. Creatively, leap from a stable, calm, confidence in God's plan.
7. Where your thoughts go, your energy flows.
8. Your emotions make epigenetic modifications to your gene expression on an instant-by-instant basis.
9. Aligning your anticipations with a top down, eternal perspective, may help.
10. Let Paradise be the stable material reference for your sense of electromagnetic alignment.
11. Let your Thought Adjuster be your stable time reference for your material motion and purpose.
12. Let the Spirit of Truth invert your consequential thinking habits to think like Jesus.
13. Try to be more aware of spirit time than material age.
14. Get a good deep sleep nightly, meditate and worship often.
15. Be still, and know, that Mother's processes, of guiding us to find Father, are unfolding as they should.

In the mortal life, paths of differential conduct are continually opening and closing, and during the times when choice is possible the human personality is constantly deciding between these many courses of action. Temporal volition is linked to time, and it must await the passing of time to find opportunity for expression. Spiritual volition has begun to taste liberation from the fetters of time,

having achieved partial escape from time sequence, and that is because spiritual volition is self-identifying with the will of God. 118:6.6

Descartes's famous saying "I think therefore I am." becomes:
"I am therefore I will be."

Epilog

Inputs influence your nerves, which influence your amygdala, which influence your hypothalamus, which influences the release of peptides, which influence emotional and physical responses which influence future reactions to similar inputs either towards inner calm or chaos.
Be a positive influence.

Said differently:

Your thoughts guide your physiology.
Your physiology guides your reactions.
Your reactions guide your character.
Your character guides your values.
Your values guide your intent.
Your intent guides **your thoughts**.

Let **your thoughts** be Adjuster guided.

Thank you.

Any thoughts or are you still looking for that "philosophic miracle" to make sense of all this?

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Foot Notes

Foot Note: Schroedinger, in his 944 Book “What is life”, argued that certain aspects of living organisms, such as both us and mutations (changes in the DNA sequence of a cell’s genome or a virus), might not be explainable by classical physics but required quantum concepts, for instance quantum leaps.
Foot Note: H. Fröhlich suggested in 1950 that macroscopic quantum coherent phenomena may be responsible for dissipation-free energy and signal transfer in biological systems through coherent excitations in the microwave region(about 5 inch wavelength) of the spectrum due to nonlinear couplings of biomolecular dipoles.
Foot Note: A.S. Davydov, proposed that solitonic excitation states may be responsible for dissipation-free energy transfer along the α-helix self-trapped amide in a fashion like superconductivity: there are two kinds of excitations in the α-helix: deformational oscillations in the α-helix lattice, giving rise to quantized excitations (“phonons”), and internal amide excitations. The resulting non-linear coupling between these two types of excitations is a Davydov soliton, which traps the vibrational energy of the α-helix and thus prevents its distortion (solitons are classical field theory configurations with finite energy).
Foot Note: S. Hameroff and R. Penrose, noted that one may view the tubulin protein dimer units of the microtubules as a quantum two-state system, in coherent superposition.
Foot Note: John Eccles proposed that each of the 40 million dendrons is linked with a mental unit, or "psychon", representing a unitary conscious experience. In willed actions and thought, psychons (Ref 42) act on dendrons and, for a moment, increase the probability of the firing of selected neurons through quantum tunneling effect in synaptic exocytosis, while in perception the reverse process takes place.
Foot Note: The subjective experience of intuition and sudden insight bears a striking resemblance to quantum tunneling. Just as a quantum particle can appear on the other side of a seemingly impassable barrier, the human mind can make intuitive leaps that bypass logical steps, arriving at solutions or ideas that seem to come from nowhere. (Ref103)
Foot Note: Neoteny (the preservation of juvenile traits) may be part of the evolutionary civilizational process that encourages reversion to the “childlike mind”.
Foot Note: In 2013 researchers at the University of Michigan discovered that DMT is produced in the pineal gland in live rats. It is unstable, most active during REM sleep and disappears immediately upon death.

Glossary:

Activity regulated cytoskeletal memory reinforcing peptides (ARCS):

- Peptides that function in an mRNA-like process that lay down memory tracks and sets up the ways we process thoughts.
- Responsible for creating our "… preconceived opinions, settled ideas, and long-standing prejudices."

Brain Waves:

- An electrical signal generated by a single neuron or a group of neurons sending signal(s) to another neuron or groups of neurons.

Coherence:

- Systematic or logical connections or the integration of diverse elements, or relationships giving rise to a sense of values.

Consciousness of our consciousness:

- Thought, realization of the thought, and reflection of the consequences of that thought.
- May also be the superconsciousness and/or soul consciousness of our wakeful consciousness.

Controlled emotional responses:

- Feelingly experiencing, without allowing emotions to highjack our intentions. The ability overt time to "rewire the brain" or change the preferred electrical pathways.

Creative picturization:

- True creativity can happen in the mind since it circumvents antecedent causation.

Cytoskeleton:

- The network of protein filaments and microtubules in the cytoplasm (the material or protoplasm within a living cell, excluding the nucleus) that controls cell shape, maintains intracellular organization, communication and is involved in cell movement.

DNA enhancers:

- Genetically inherited and epigenetically controlled gene folding that supports higher level thinking.
- 4000 are specific to humans.

Electromagnetic quantum coherences:

- Influences on "random" electromagnetic interactions and motions.
- Implies that random motion is controllable by such things as, Cosmic over control, Thought Adjusters, mind adjutants, the Unqualified Absolute or the Supreme.
- Shares "the part and the whole" functionality. E.g., Individual/Supreme, material/spiritual, experiential/existential.
- Demonstrates coherence with Paradise patterns.

Epigenetics:

- The study of controllable changes in gene function that do not involve changes in DNA sequence.

Epigenetic gene manipulation:

- Modifications to DNA that influences gene folding and the resultant protein shape and function.
- Influenced by our emotions, focus and repetitions.

Homeostasis:

- A relatively stable state of equilibrium or a tendency toward such a state between the different but interdependent elements or groups of elements of an organism, population, or group.

Microtubules:

- Hollow tubes that connect and communicate between cells.
- Lengths increase and decrease as a function of cellular interactions.
- Lengths are proportional to the time delays between reactions and responses.
- They can only exist if they are hollow, electrically cored, and isolated.
- Can be influenced by quantum coherence.
- Resonances are in the mechanical, far infrared (bond stretch), and UV (electron jump) ranges.
- The two optical ranges may relate to where "delicately touch" our morontial selves.

Microtubule-associated proteins (MAPS):

- Proteins that cross connect microtubules.
- Reinforced by repetitions of thinking patterns.
- Substitutes for cross communication that resulted from myelin sheaths.

Neurotransmitters:

- Chemical messengers that are made up of small amine (triangular pyramid, with the nitrogen atom at the apex) molecules, amino acids, or neuropeptides.

Peptides:

- A compound consisting of two or more amino acids linked in a chain, the carboxyl group of each acid being joined to the amino group of the next by a bond of the type -OC-NH. They are the building blocks that make up proteins.

Quantum:

- A discrete quantity of energy proportional in magnitude to the frequency of the radiation it represents.

Slower lower frequency cross pollination:

- Taking time to consider the social, cosmic, and eternal ramifications of thoughts.
- Equivalent to the injection of a fragment of infinity into temporality.

Superconsciously patterned habits of thinking:

- Learning to use Spirit of Truth-like thinking (mind of Jesus).

Synaptic Adhesion Molecules (SAMs):

- SAMs are peptide memory glue.

Definition of terms from *The Urantia Book*: https://www.urantia.org/urantia-book/read-urantia-book-online

Adjutant Mind – a level of consciousness limited to animal functioning in 7 variants (5 animal and 2 human).
Andon and Fonta – First humans.
Conjoint Actor - God of mind, combination of God the Father and God the Eternal Son.
Cosmic mind – a level of consciousness that makes us more aware of our part in the whole.
First Source and Center – God
Fusion – Combination of our energies with the indwelling God fragment, Thought Adjuster.
Isle of Paradise – Material center of the known universe.
Life Carriers – Biological engineers involved with our material assembly.
Mansonia One – First heavenly world.
Michael – Jesus
Morontia – Energy existing between the material and spiritual levels.
Mother – Ubiquitous nature of God.

Personality – Our unchangeable uniqueness as an individual.
Soul – a mechanism for salvaging the best of your experiences.
Spirit of Truth – Greater deity awareness made available on Pentecost by Jesus.
Thought Adjuster – a spirit fragment of God (spirit spark) in you.
Thought changer until about age 25, Thought controller after about age 40.
Ultimaton – Subunit of an electron.
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