

SELF-SIMILAR COSMOS



A SINGULAR NARRATIVE



TO SEARCHERS

philo-: friend
sophia: wisdom

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A SINGULAR NARRATIVE
illuminated by Travis Allen Brainerd



*Put by the Curtains, look within my Veil;
Turn up my Metaphors and do not fail:
There, if thou seekest them, such things to find,
As will be helpful to an honest mind.*

— THE Pilgrim's Progress FROM THIS WORLD TO That which is to Come

TIMELESS DAWN



The exceptional genesis of our universe ('one song') prefaces all history. Reality was tucked into a crowning point of infinite density, a singularity which modern cosmology fails to explain. Encompassing this potentiality, an unobservable void manifests absolutely nothing. A supernatural spark conceived *in vacuo* blossomed in a release of energy—"Let there be light." Receptive vacuum allowed energy to dissipate into self-derived laws. The slightest change in the constants defining our dimensions would have led to wildly disparate geometry.

As space and time became lucid, their amalgam supercooled, becoming dense enough to freeze but quickening like ambrosia. The mass offset a bubble of false vacuum, inflating the cosmos exponentially in what theorist Alan Guth proclaimed "the ultimate free lunch." As in the seeds of a fruit, instructions for the future were relayed through a conveyance between cells. An ability to perceive the world is as singular a mystery as its existence. Underlying all experience, the searching mind can always be consoled because it is a descendant of ingenious First Cause.

While the Big Bang is often caricatured as infinitesimal, it can also be thought of as without boundaries. Nature's incubating shell is forever around us, diffusing loving light in rhythmic intervals. The *Primum Mobile* ('first moved') is the outermost sphere in Ptolemaios' astronomy. The Greek symbol for *alpha* (α) depicts an angle over a bar. 13.8 billion years later, all paths lead back to singularity.

"The most incomprehensible thing about the world is that it is comprehensible."

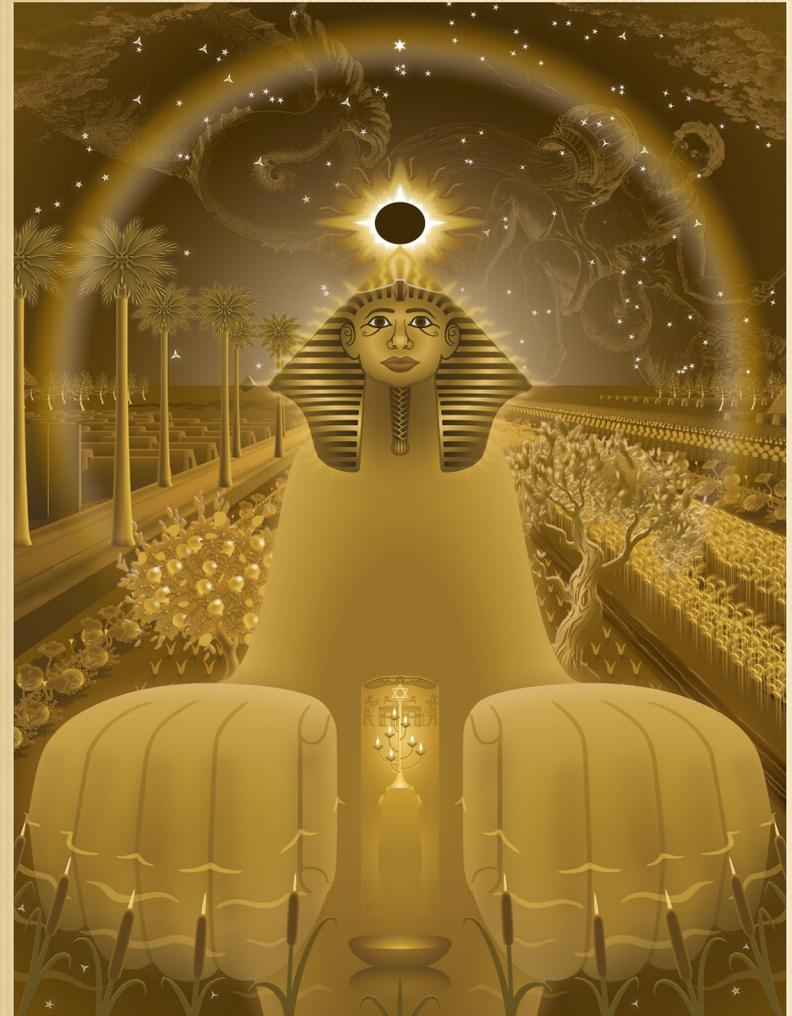
— Albert Einstein

A UNIFIED LIGHT

Early in the cosmos, all known forces except gravity were bound as one. Circumambient energy was divided by the Higgs ('edge') into electroweak and nuclear forces. Particles passing through the field amassed vacuum energy. Atomic aggregates absorb quanta of light, inciting the quantum leap of an electron to a greater orbit of the nucleus. Electron energy states correspond to phases of matter: gas, solid, liquid and plasma. The classical solids compose air, earth, water and fire.

The electromagnetic spectrum is conveyed by photons at the speed of light. It consists of gamma and X-rays, ultraviolet, visible and infrared light, microwaves and radio waves. Spectral lines reveal which elements exist in any star system. Preeminent pairs of particles are bound by the nuclear force. Its residual strong force acts within nuclei, organizing trios of elementary quarks. If someone with enough energy tries to separate a trio, a new group coalesces from the field. The weak force can alter an atom's charge, releasing radiation.

The guardian sphinx ('contract') riddled: "What being has four feet in the morning, two at noon and three in the evening?" A pyramid of Giza ('bridge') bolsters a square base, X-culmination and its descent deified a dark delta. After suppressing the Sphinx, Oedipous ('swollen foot') precipitated his hated fate by marrying queen mother Iokásta ('shining moon'). Shimshōn ('Sun's son') forced the gate of Gaza over a peak, but became weak when Delilah ('nightfall') severed his curly locks. In Ireland ('fertile land'), curious sprites skip over the rainbow to stash cauldrons of gold.



FAITH IN HARMONY

The language of creation, harmony reverberates through everyday arrangements of nature. Perceptive Plátōn ('breadth') divided a line so that its smaller part was proportional to the larger as the larger was to the whole. The simplest forms befitting a sphere, the Platonic solids are related by ideal properties. Man of the world Pythagoras ('decaying orders') divided the sound register divinely. Chords are formed with third and fifth steps from a root note. The *sabbat* ('completion') observes an octave ('eighth wave'), resonating with 1:2 frequency. The black keys materialize a gradation of thirteen.

Golden numbers are found by adding the previous pair of entries in the sequence beginning: 1, 1, 2, 3, 5, 8, 13, 21, 34.... First articulated in Sanskrit poetry meters of *laghu* ('light') and *guru* ('gravity'), the self-similar sequence is now named for *filius* ('son of') Bonacci ('good soul'). Journeys over the diverse Mediterranean ('middle-earth') demonstrated how profoundly the rabbit whole grows. Harmony sustains a branching path of least resistance. Trees, fruit, fish, reptiles, birds, lions and tigers all bear ominous symmetries.

Subsequent entries in the cosmic codex more precisely express the golden ratio as derived by Kepler. The relationship is symbolized by Greek letter phi (Φ) after sculptor Phidias, a vanguard of the ideal in art. His name recalls *fides* ('faith') and Zeús ('sky father'). Revelation calls for one with reason to calculate "the number of the beast". The Greek glyphs XΞζ ('six hundred threescore six') conceal additional meaning between the lines. One with six hundred plus three *times* six indicates 1.618—"the number of a man".

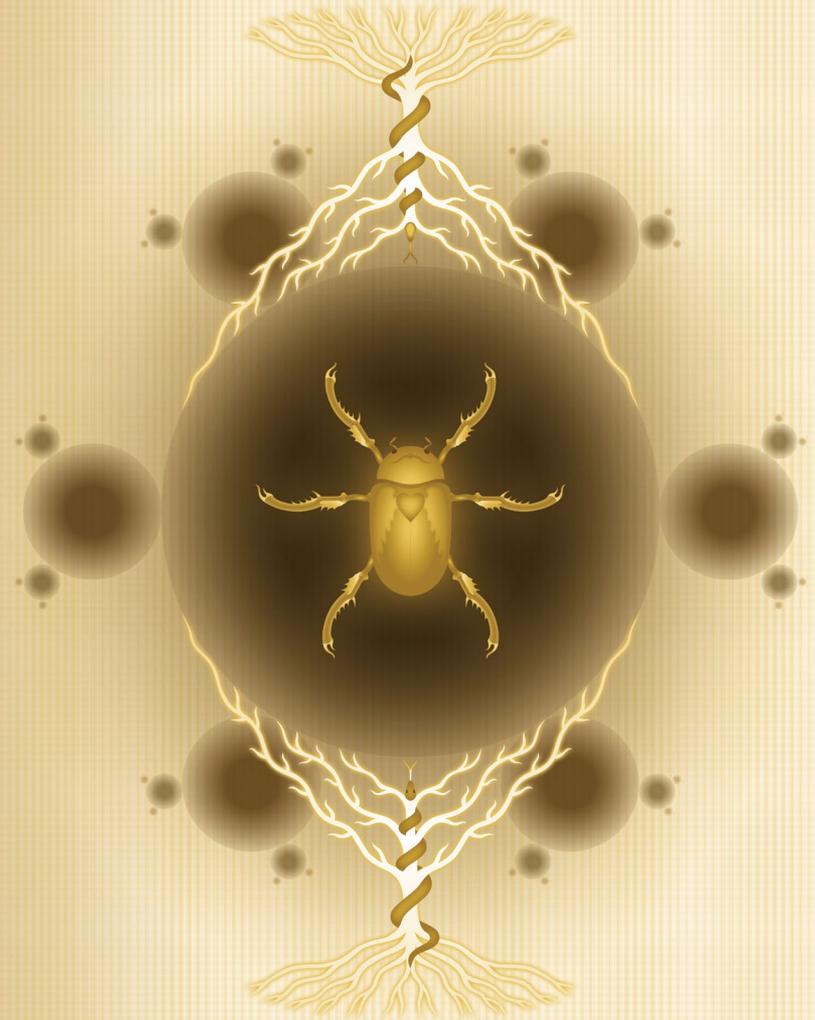


CONSTANT EQUILIBRIUM

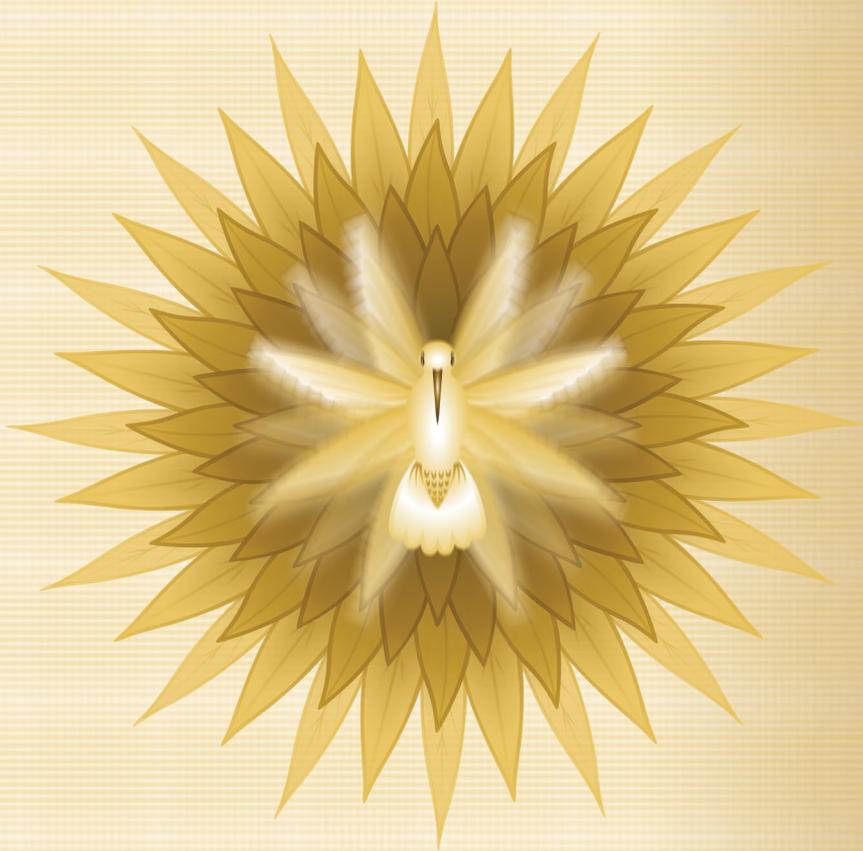
In reciprocal nature, lightning is always followed by thunder. The concentration of electricity into plasma displaces a vacuum. Sound waves accelerate with reduced resistance, building up in a sonic boom. The dramatic increase in frequency is due to the Doppler effect, in which a siren's serenade moves relative to the observer. Hubble's observation of distant receding galaxies revealed that the universe was expanding away from us billions of years ago. Prehistoric light finally reaching our system has been 'redshifted' to a lower frequency.

Einstein predicted a 'cosmological constant' of vacuum energy to counteract gravity, incensing the universe's expansion. The wave-path taken by light is a cone, occupying one-third the volume of a cylinder with equal radius. Energy expanded uniformly expresses a vestigial sphere. The proportion of light to dark energy in the cosmic microwave background is closely anticipated by a 1:2 ratio. The disparity between two-thirds (66.6%) and the measured percentage falls within the amount of distortion allowed by gravitational lensing.

Luminiferous aether ('light air') is the primordial quintessence convertible to the solids. Egyptian deity Nun ('discharge') upheld a scarab who rolled the Sun around like a ball of dung. An antagonistic red dragon swept a third of the stars down to Earth. A cell from dormant Adam ('red soil') was formed into his seductive spouse Chavah ('life'). The Black Stone of Mecca showed them where to kindle an altar. The cherubim ('near ones') guard Eden ('delight') with swords of fire turning in all directions.



A FATED ENTROPY



Breaking of symmetry has produced all the matter in the universe, which will logically continue toward an era of maximum decay. The escalation of disorder is called entropy and directs the arrow of time. Increasing the distribution of a volume—its *rarefication*—naturally ends in disarray. Fortunately, thermodynamic, magnetic and gravitational forces make objects denser, restoring order and thwarting entropy. Clusters of atoms labeled ‘phonons’ rock in agitations of sound and roll circulations of heat. This expenditure sometimes resonates in whispers of sweet nothings when frequencies induce a standing wave pattern, heightening a system’s pressure.

The juxtaposition of harmonized notes results in an additional auditory tone. In 1940, the voice of Puget Sound had the resonant power to topple an entire bridge. All bodies have inherent structural frequencies which can be cultivated or overwhelmed. Guidance is needed for crucial exposure to individually fitting overtones. For those who suffer, discord may be consonant. Soothing music and expeditions into nature can heal the soul. The simple soliloquy of a breeze might say to subsist and flow freely. Casting away your anxiety, you might remember that what you need most costs little.

The writing on the wall of Belshazzar (‘nothing protects the king’) prophesied: “Whole, whole, balanced and wanting, dividing.” In a Native American origin story, the world-weaving Spider Woman brings her people to the third plane. A hummingbird offers fire for warmth, but all comes to an end when ‘sorcerers’ bring evil. Happily, the tribe escapes through hollow reeds to the fourth dimension, where they presently live.

CURVED SPACETIME

As early as 1632, Galileo demonstrated the relativity of motion: a cannonball dropped from a sailing ship will continue falling along with it, rather than directly toward the Earth. The boat serves as the cannonball's 'inertial reference frame'. The theory of universal gravitation put forth by Isaac Newton remains exceedingly accurate in predicting the attraction between bodies. It proves that gravity increases with higher mass and becomes weaker over distance.

Newtonian physics left an impression of the world as being predominately mechanical. Only a small-scale randomness of floating particles was left unexplained in 'Brownian motion'. In 1905, daydreamer physicist Albert Einstein used this phenomenon of indeterminacy to establish atoms as the constituents of matter. In the same year, Einstein introduced special relativity, championing a modern understanding of the cosmos. The theory recognized that the laws of physics are the same everywhere. Light travels at a constant speed, even to an observer who is also moving. Events separate in space cannot be said to be simultaneous in time. $E=mc^2$ expresses that energy (E) equals mass (m) times the velocity of light (c) squared.

Ten years later, Einstein generalized his theory. General relativity revealed that gravity affects not only space, but also time. Rather than being separate, the three dimensions of space are warped over a four-dimensional film of spacetime. Relativity perfectly calculates the attraction of objects, in addition to the dilation of time. A traveler picking up speed or going near a high gravity source will accrue mass and experience time more slowly. A particle with infinite mass would observe all of history glistening opaquely.



FASTER THAN LIGHT



General relativity proves that nothing can travel through space faster than light. But as rules are made to be broken, Einstein's equations allow for imaginative arrangements to work in theory. Anything going faster than light must travel backwards in time. On one end, the information would accelerate beyond spacetime; meanwhile, its apparition would appear as a reverse time-traveling specter. John Wheeler's discovery of 'delayed choice' is evidence of such aspects in reality. In his experiment, a photon is sent through the range of a switch. At a flick of the switch, photographic history is rearranged to reflect the alternate current. This exposes the dynamic correlation of quantum entities to time.

In Richard Feynman's diagrams, bizarre antimatter blasts to the past. 'Supersymmetry' provides sound infrastructure for the cosmos, but its theoretical partner particles have yet to be found. Such elusiveness recalls Aristotélēs' ('best intent') wheel paradox: two wheels of different circumference each rotate exactly once while appearing to cross the same distance. Traversing through a warped dimension circumvents impassable bounds.

Zodiacal seraphim ('burning ones') cast crowns before the eternal throne, carrying it with 'wheels within wheels'. A series of gadgets in a Rube Goldberg machine can be brought to life by a single energy source, as in the animation of a spinning zoetrope.



TENEMENTS OF DARKNESS

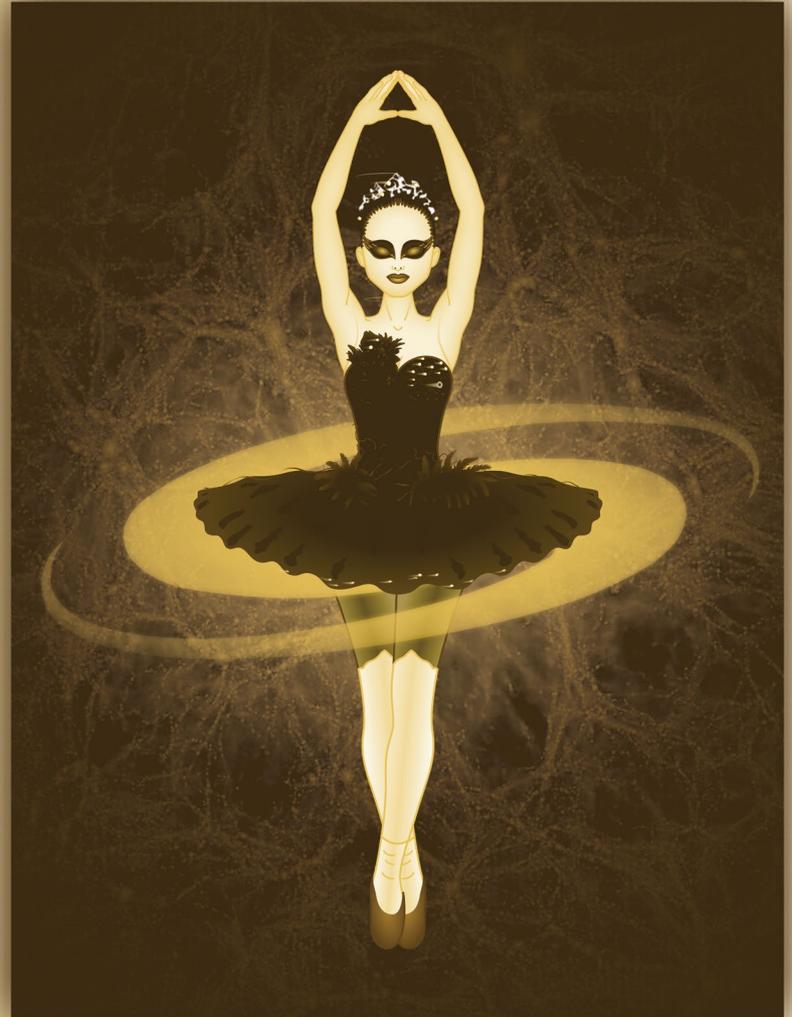
Over time, the most colossal forms of nature are animated in galaxy clusters. A particular mystery persists in that the outer arms of galaxies rotate faster than they should based on mass. The force of a galaxy's 'dark matter' is related to the mass of its anchoring black hole. The cosmos appears to have always been composed of about 5% atomic mass, 27% dark matter and 68% dark energy. A candidate for the missing matter, the 'axion' is vacuum energy captured as mass. Introduced to reconcile the symmetry of quark interactions, the ghostly particles could pass through atoms and participate in their structure. Dark matter is then a constitutional form of the universe, shaping its megastructure through waves of energy. Ephemeral particle-antiparticle pairs, the medium of space, constantly collide into each other and are converted into photons.

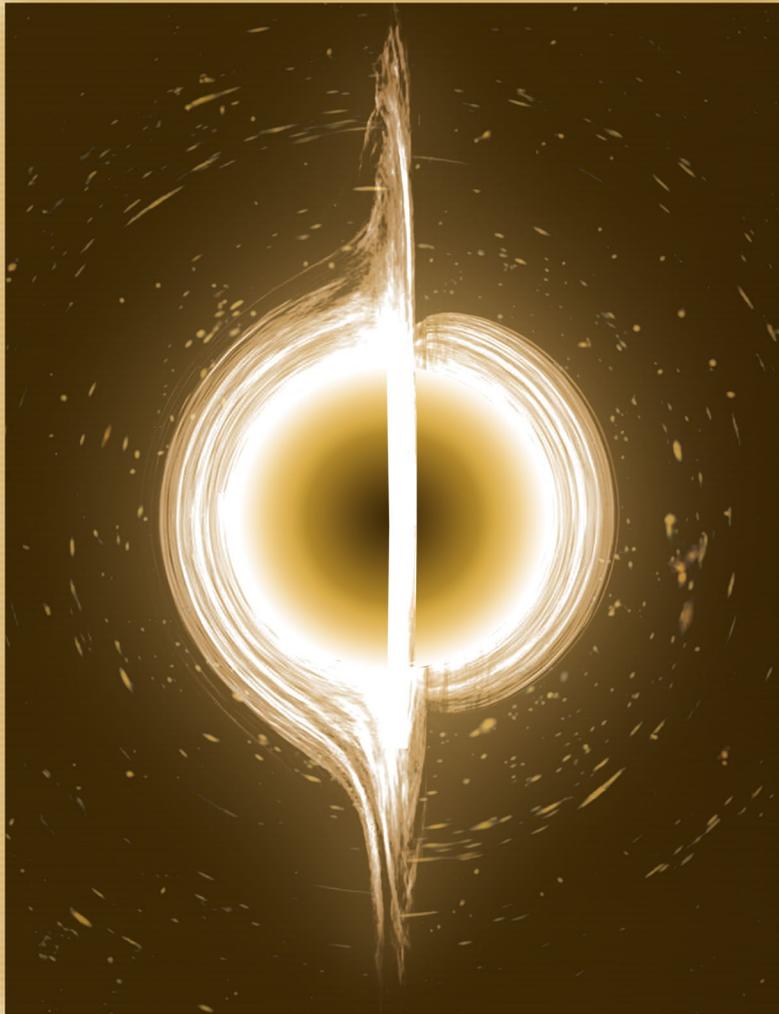
A future revolution may reveal that eddies of spacetime accumulate from an inertial reference frame. Relativistic waves produce 'quantum foam' upon which mass surfs. Satellites stay in orbit via their centrifugal motion, *rising above* gravity's pull; Ballerinas harness angular momentum to spin indefinitely; sheer potential is converted into action, maintaining equilibrium. Dark matter emerges as a 'fictitious force' of how energy relates.



"Zeús is an infinite sphere whose center is everywhere, circumference nowhere."

—Hermes ó Trismegistus ('amassed amidst the three great masts')





BLACK HOLE PATRONAGE

When a substantial celestial body collapses under its excessive weight, it implodes into a black hole of no volume. Energy becomes so relatively accelerated it seems to converge to a point anomaly. The axes of reality unwind the weave of the cosmos into a one-dimensional strand. Embryonic star clusters are gravitated toward one another by their palpably attractive centers. Merging black holes emit a chirp-like gravitational wave.

In the 1970s, Stephen Hawking predicted that black holes release quantum radiation, allowing them to evaporate. After decades of equations he elaborated the possibility of hairs of light emanating along dilated frames. Black holes bring time to a stop at their event horizon, a perfectly incredible point of reference. The holographic principle alleges the projection of a field from a gravitational horizon. When a black hole's spin rate squared is Φ of light's speed, it reaches maximum baking temperature. Going any higher would expose a 'naked singularity'.

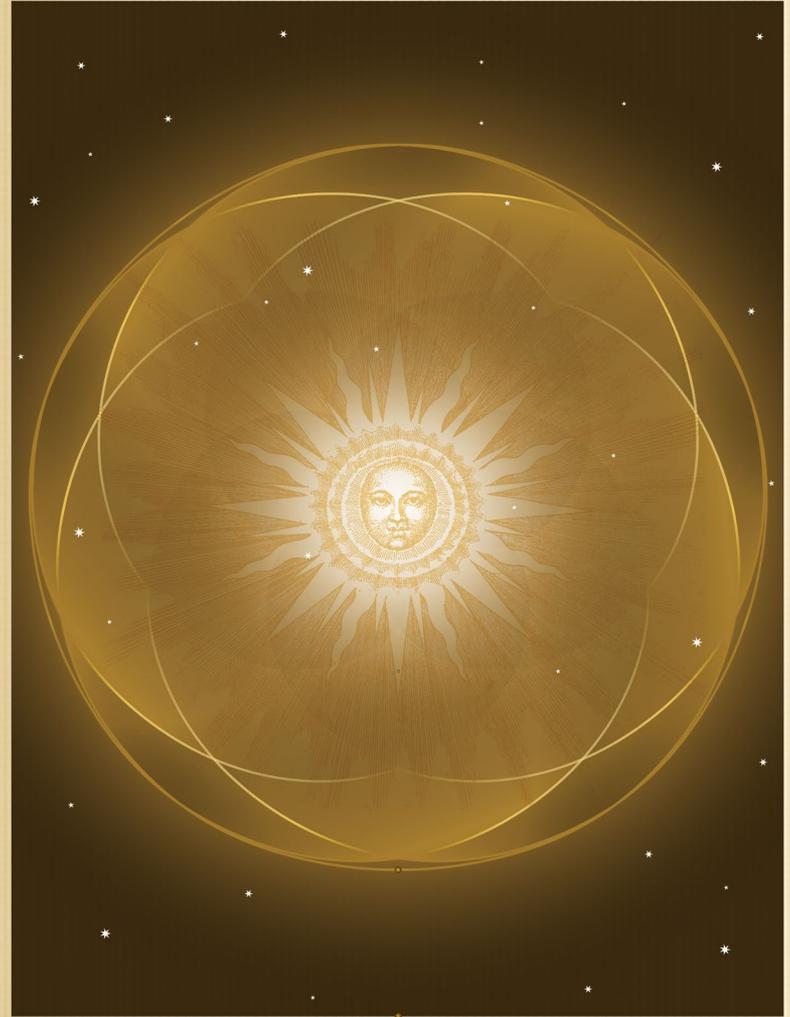
Primitive black holes ensnared high-energy electrons in their orbits, which perpetually pour out streams of radiation. Growing galaxies broadcast quasars of radio waves and ultraviolet wind. Neutron stars have a similar origin to black holes, but leave behind extremely dense nuclei. The spinning nonpareils transmit interstellar magnetic fields. Forged exclusively in their collisions, gold is outlandishly attracted to itself and a most enduring currency. It is especially useful for conducting electricity and reflecting infrared. Distending the light it shines to a scintillating yellow-orange, it is at the very core of planet formation.

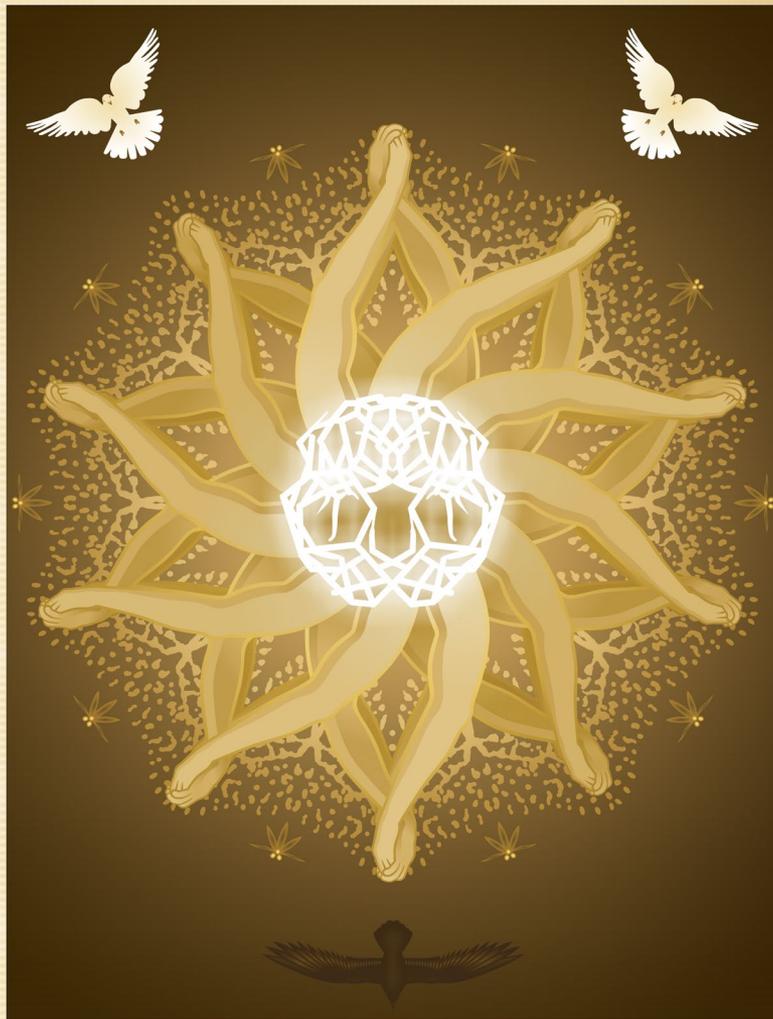
RESONANT SPHERES

Stars convert heavenly hydrogen to more complex elements by fusing atoms. Forms ranging from light gases to heavy metals come together under high energy. Gravity is exuded infinitely as all masses affect other masses. Astronomer Johannes Kepler divined a system of concentric spheres using the Platonic solids to find the harmony of Φ resonating within the Solar System. This led to his discovery of the elliptical orbits of planets, which he had previously assumed so simple someone would have already discovered it.

In a plausible history of the Solar System, Mercury was gravitated inward from a greater orbit (its core now larger in relation to overall mass than any other planet). Water once covered areas of Venus, but atmospheric carbon evaporated oceans into clouds of sulphuric acid. Mercury delivered a Mars-sized mass to share an electric kiss with Venus (the only planet in the Solar System rotating opposite its orbit). Enriched with life-essential water, the planetoid continued out to the next orbital. The payload impacted Earth, freeing a globule of Moon dust resembling its ocean floor. Water saturated Earth like an elixir, protected by its magnetic field. Mars retains caps of frozen water at its poles. Gas giants of the outer Solar System aid in attracting the inner planets outward in gravity's vogue symphony.

The messenger god Mercury carried out commerce and thievery. Mars is lord of war and agriculture; Venus represents love and fertility. Earth's personification as Gaia ('biosphere') is ultimately a product of aether and daytime. Jupiter ('father Jove') is king of the gods, while grandfather Saturn deliberates over time.





BANK OF DESCENT

Atoms are fastened into molecules by shared electrons in their outer orbitals. Comets are periodically released from the icy Oort Cloud surrounding the Solar System, causing the bombardment of planets with meteors. The depositing of additional elements opens the door for new variety to enter. Built from the most abundant elements in the universe, life only needed the right conditions to spring from. It is even conceivable that life was sparked in the conjugation of planets and transported to Earth in a process called 'panspermia'.

An electric charge converted viscous resins into self-replicating chains of 'polymers'. Fluid pressure increased the spontaneity of molecules, lending the sugar in ribonucleic acid (RNA). Hydrogen helices bring nucleobase pairs together, while singular oxygen output converts RNA to DNA. The quantum tunneling of H₂O guides these transformations in glasses half-full. Unicellular organisms openly source their genes, harvesting formative proteins. Tubular flagellin store amino start and end termini within their nucleus, expressing their middle structure externally in widely varying filaments. Symbiosis between cells gave rise to multicellular beings—all plants and animals are virally coded.

A full turn of double helix DNA exhibits the **golden proportion**. Its cross-section harbors ten divine angles. A self-similar heredity anticipates its renown. To outlast the deluge, Noah ('rest') amassed an ark with 3:5 proportions and length tenfold its height. The *ammah* ('mother') measurement is based on a golden section of the arm. Three wooden floors varnished in resin carried all life to a new epoch on the peaks of Ararat ('the curse reversed').

THE OBSERVER EFFECT

We become aware *in medias res* ('in the middle of things'), with no guarantee of our vantage point's authenticity. Sōkrátēs ('save strength') illustrated this condition with his allegory of the cave: children are shackled in darkness, made unable to rotate their heads. Behind them, figures pass by a fire. Their shadow play captivates the prisoners. When an individual is freed, the world is waiting to be discovered in all its wonder. The eyes of one returning to the den are duly dilated. Hence, the cave dwellers anxiously assume that the heretic ('free-willed') has been blinded by the Sun.

The universe at large is more incredible than we can imagine. Werner Heisenberg aptly intimated: "What we observe is not nature itself, but nature exposed to our method of questioning." Authentic patterns captivate, while selective reasoning leads the mind astray. To experience the world more wholly, one should get in tune with its harmony. Disruption by unfocused thoughts causes ripples of interference. The connective brainstem moderates the nervous system, heartbeat, blood pressure and consciousness.

Mosheh ('born of water') ascended a smoldering mountain to take down two tablets by "I Am That I Am". He built a tented tabernacle ('inn') to host the deity, complete with dishware providing daily bread. The golden-proportioned Ark of the Covenant ('case of the creation') was carried on four posts wrapped in blue, purple and scarlet for the Exodus into Knāinn ('land of synchronicity'). Iniquities were removed by sprinkling a symbolic scapegoat's blood over the 'atonement seat'. Two cherubim rested on the fabulous *façade*, their wings meeting where 'I Am' could be heard.





THRESHOLD OF CERTAINTY

Despite a remarkably precise ability to make predictions in classical physics, the probabilities of the universe are not fully deterministic in nature. Master of duality René Descartes presumed that unseen light must act like a wave and discerned “I think, therefore I am”. Newton soon refracted light through a prism, supporting its wave character. In 1801, the double-slit experiment provoked debate concerning the objectivity of the physical world. An interference pattern reveals that light and matter have wave properties, as if simultaneously sampling all possible paths. Particles only become discrete when someone is watching. Phantasmal other worlds may exist in a higher dimension, but don't materialize for us.

Pioneering quantum physicist H. Dieter Zeh viewed it as the most natural interpretation that consciousness collapses the wave function. His discovery of decoherence showed that all systems are coupled with the energetic state of their surroundings. We experience a living simulation of possibilities, our minds watchers over matter. The more precisely a particle's velocity is measured, the less clear its location. Equally relating time and energy, Heisenberg coined this peculiarity the ‘uncertainty principle’.

After slaying his bull-headed monster, Theseus (‘go forth’) found his way out of the Labyrinth with a string from his holy admirer. The esteemed Wizard of Oz (‘south land’) turns out to be a humbug “behind the curtain”. Every fork in the “**yellow brick road**” is a golden opportunity to gain a brain, heart and courage.

“...the only thing we have to fear is fear itself.”

— Franklin D. Roosevelt, US President 1933-1945

INTELLIGENT SYSTEMS

Although the tangibility of the quantum realm appears irresolute, our universe persists. Just as it never falters, nature makes no waste. Integrated information theory suggests that systems of spacetime experience cognition, estimated by their synergy. High orchestration is tantamount to awareness. Reality lies in a dormant 'protoconsciousness' until acted on by a dynamic vassal. The biocentric view emphasizes life as the center of reality. When unobserved, objects in the external world exist in probability only.

The world observed at length is necessarily in flux and subject to change. One experiences the essence of a thing without processing every last detail. The mind is most abated when relishing succulent stimuli, but the full scope of an experience can be beheld as more than the sum of its parts. Habitual behavior is performed unconsciously and becomes ritual. Ingrained traits require no further instruction. Wisdom based on experience is imperative in accomplishing pertinent goals.

Ionic ('fleeting') atoms falter a Φ falsetto as they go 'quantum critical'. Self-similar fractals betray patterns of chaos ('vacuum') and stock market rushes incited by the pulse of supply and demand. Able-minded drifters "have faith as a grain of mustard seed". A multitude of savory canes are cultivated from an ancestral strain. Protesting some loss values a reminder over what it once stood for. The Hebrew word for sin is *chata* ('miss the mark'). Forgiveness can be attained by going the proverbial extra mile.

"As a man changes his own nature, so does the attitude of the world change towards him."

— Mohandas Gandhi ('charmed perfumer')

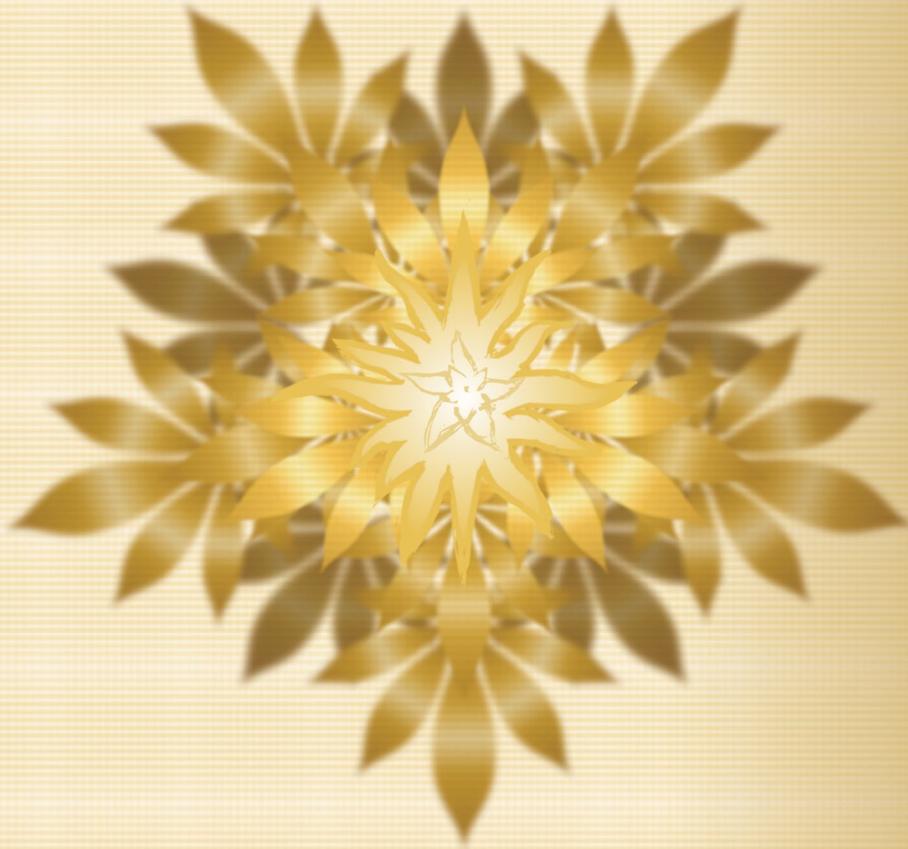


MELODY OF MICROTUBULES

Key choices are made by eukaryotes ('good hearts'), often related to their longevity. Plants divert from predicted probabilities in their maximization of captured photons. Migrating birds aviate the magnetic field with quantum insight. Mammalian smell also anticipates the perpetual plane underlying reality. In the womb, the brain and skin are connected as a single organ. Cells act reflexively before broadcasting to the central nervous system. Information is gleaned from the world every way possible in an attempt to comprehend its meaning.

Stuart Hameroff and Roger Penrose have proposed that a neural component engages in quantum behavior. This would pilot electric flow through pathways, working like a railroad switch. A candidate has emerged in quietly chattering microtubules, the organizers of DNA. Parallel lanes of tubulin proteins are ordered in scales of superposition. Dipoles dance to the beat of the same drum during consciousness and disperse under anesthesia. A transcending melody enlivens an organism, leaving an impression which echoes across the universe. Elementary particles become entangled when they interact and remain yoked indefinitely. A surface of spacetime is shaped by selection, keeping alive a responsive plane of reality.

Gathered determination allows us to eliminate uncertainty in decision-making. Exercising control in the present helps us master our domain. Once survival needs are attended to, we can focus on whom we love. As the world continues spinning, propitious prospects align. Genes are passed on by a reproductive cell in the rites of romance, mingling with a collaborating mate's.



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