# Sequel to The Book of Mindkind In The Gift of Mind Series

*Mind* is the surveyor of the universe, the timekeeper of eternity, and the curator of all creation.

Just as the self-awareness of intelligence created mind, the self-awareness of mind creates wisdom.

Mathematics is a tool and language designed and created by mind for the purpose of determining and revealing truths.

Eternity was created by mind, along with time, to allow stories to have beginnings and endings.

# **Mind &** Its Languages of Reason

William John Cox

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Mind & Its Languag

# William John Cox

# **Mind** & Its Languages of Reason

WILLIAM JOHN COX

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### **BY WILLIAM JOHN COX**

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## DEDICATION

For those who seek to comprehend the physical universe and the mind it has wrought; and

For *Galileo Galilei*, with whom I share a birthday. He was born on February 15th in 1564, and before his death in 1642, he was compelled to deny, upon threat of physical torture by the Roman Catholic Church, that the earth circles the sun. As he was led away, it is said, he murmured, "Nonetheless, it moves."

and

For *Albert Einstein*, to expand the imaginary ride of his childhood alongside a wave of light, to a preview of our universe of light—as viewed from the outside. He said, "We never cease to stand like curious children before the great mystery into which we were born."

## PREFACE

Mass is stupid. In its galactic and atomic manifestations, it mindlessly moves in relationship to all that physically surrounds it. The fate of mass is to simply move, but sometimes, under certain congenial conditions, mass produces life. Then and only then, under even more unique circumstances, life gives rise to intelligence. Finally, on the rarest occasions, mind evolves from intelligence. It becomes selfaware and contemplates time and all that surrounds it, including mass, energy, life, and its own self.

Ultimately, minds learn to identify the galactic structure of the universe, the atomic composition of its elements, and the nature of life that generates intelligence and mind. It is then—when mind becomes sufficiently mature to understand itself and can detect and predict the actions and reactions of subatomic mass it learns that microscopic particles, such as photons and electrons, can exist at more than one place at a given time.

We can now perceive the entanglement of particles and how they affect each other over distances instantaneously without regard to the speed of light. Our minds—through our sensory and measuring devices—consciously observe and thereby create the physical reality of the microscopic world that underlies all of mass, energy, and light.

The essence of quantum physics is not that it predicts where an object actually is, but, instead, it points to where the object probably will be found. The object does not exist, nor is it *there*, until our minds seek and find it there.

We are now at this place and time. We make full use of the probabilities predicted by quantum physics in our scientific endeavors; however, we do not understand how it is that conscious observation influences the physical reality of the universe we inhabit.

To liberate ourselves from the enclosed box from within which we perceive our universe and all it contains, including ourselves, we must thoughtfully consider the

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probability of three things and make reasonable assumptions from our conclusions.

It is necessary that we recognize the likelihood—not only that conscious life exists elsewhere in the universe beyond Earth—but that mind is an eternal and universal phenomenon. Mind is an essential factor whenever we concern ourselves with questions of mass, energy, and light. Without mind, the concepts of time, infinity, and eternity do not exist.

Moreover, we must come to accept that our perceivable universe is but a tiny part of an immensely larger whole, as though it were a single drop of water in a mighty, whirling hurricane, spreading its energy across a deep, vast, and limitless ocean.

Finally, we must imagine that we can pierce the singularity at the core of the infinitely small, and glimpse what lies on the other side of nothing.

If it is, in fact, true that mind arises naturally from our static universe of plasma electromagnetically spun into galaxies of stars and planets—and that mind has been seeking knowledge for all of eternity, then our own area of the plasma universe is observed by a living mind.

People of religious faith believe that everything, including ourselves, has been created, manipulated, and judged by a powerful God. If, however, mind is an enduring entity, the accumulated knowledge, wisdom, and creations of the collective intelligence of eternity far exceeds anything conceivable as a matter of religious dogma.

Today, scientists who use quantum physics accept that it has worked in every situation in which it has been tested, and most are as puzzled as the rest of us by the influence of mind in their observations. If, however, we are to create machines—such as quantum computers—enabling us to travel beyond our present perceptions, we must expand our consciousness to achieve a better understanding of mind, mass, energy, light, time, and eternity.

In these papers, we first consider mind and its language of quantum physics. Then, we will acquaint ourselves with other tools and languages our minds have created for measuring and counting things—which may be of some value in determining where we came from, where we are, and where we are going.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Before he died when I was ten years old, I would sit by my father on cooling summer evenings under a cottonwood tree as we watered the vegetable garden, and he would try to explain how everything we saw in the Texas Panhandle sky worked. He showed me how the earth spins and circles the sun, and how to stop the sun in the sky. I learned to track the phases of the moon as it circles the earth, and how to spot Venus in the sunset, and sometimes in the sunrise. Years later, I imagined holding the entire universe in one hand and squeezing it down to nothing. I have tried to learn enough about our universe of plasma and light and its place in the cosmos—before I die—to enable me share with others what I see in my mind.

# MIND

Writing in the fourth century B.C.E., Aristotle followed his scientific work, *Physics*, with a collection of philosophical writings that became known as *Metaphysics* ("after physics") to distinguish it from his work on mathematics and science. Aristotle believed the gods were essentially engaged in self-reflection as they eternally contemplated their own contemplations.

The efforts of physicists are devoted to an exploration and understanding of the physical universe and mostly leave questions of metaphysics to the philosophers. Even so, experimental data compels physicists to acknowledge the role of consciousness, or free choice, in quantum physics. The evidence is that observation not only disturbs the object to be measured, but it may actually produce the object itself. Few physicists, however, care or

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dare to experiment with the influence of consciousness.

Physicists are divided into several schools of thought regarding the metaphysical aspects of quantum physics. The majority follow the "Copenhagen" interpretation that separates the two elements. In his 1920 theory, Niels Bohr postulated that quantum particles do not exist in one state or another, but in all possible states at once. When observed, the wave form collapses, and the object is forced into a singular state where it can be identified and measured.

Most physicist accept the "realism" that such non-observable phenomena actually exist, and they believe that—since quantum physics has been demonstrated to work in every test one need not be concerned about whether or not microscopic matter has a physical reality before observation.

As a practical matter, these "realists" do not consider the role of mind, or conscious observation, to be relevant. "Antirealists" refuse to regard any theory as truth. These skeptics consider all theories, such as the

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Copenhagen interpretation, to be useful tools—until they are proven wrong.

### Quantum Physics and the Brain

One of the most intriguing areas of current research involves the application of quantum physics to determine and understand the actual mechanical processes of the brain. Inasmuch as it is composed of atoms of various elements in an abundance of molecular combinations, every atom in the brain necessarily obeys the laws of quantum physics. These laws allow quantum objects-atoms and their particles-to be in two places at once. Objects become "entangled" when they are in the strange condition of quantum superposition, whereby one object cannot be described independently of the state of the other(s), even distance. Thus far, physicists have at а entangled particles, such as photons, electrons, and superconducting electric currents.

Albert Einstein was suspicious of quantum entanglement, calling it "spooky action at a distance." Once two particles become entangled, they can be separated and caused to remotely produce action by its twin particle at a different location. A demonstration of this phenomenon was carried out by Chinese physicists in 2017 when they repeatedly beamed one of an entangled pair of photons to a satellite receiver circling above the earth at distances ranging from 500 to 1,400 kilometers. They were able to prove that the entangled protons continued to share the same existence.

An emerging field of study is being referred to as quantum biology or quantum neuroscience. It involves a combining of the biology of the brain with organic chemistry, neuroscience, and quantum and nuclear physics. Some of the evidence being accumulated regarding the effects of quantum physics in living organisms involves the ability of plants to use photosynthesis to convert the energy of sunlight into sugar. In addition, the use of a built-in "quantum compass" by migratory birds to detect the earth's magnetic fields may help these birds to navigate over long distances.

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The proposition of quantum effects may account for the numerous reports of levitation and transportation experienced by those who survive near-death experiences. What this means is that—if it is true that quantum physics prevails in the brain—its product, our mind, can survive an actual death (as its quantum information cannot be destroyed, and must be conserved). The theory also derives support from the revival of full brain function in some individuals whose bodies have stopped functioning for extended periods of time due to extreme cold, such as being submerged in freezing water.

Some of these studies have advanced a theory that consciousness is the product of quantum mechanics that takes place within brain cells. There have been claims that quantum resonance in brain microtubules relates to brain synchronization of consciousness; however, this possibility is unresolved.

Current study also includes the quantum actions of phosphorus atoms within the brain to explain the mysteries of human cognition. It has been speculated that it may be impossible to describe consciousness without using quantum physics—because nothing else can account for all the features present in conscious self-awareness. If in fact, classical physics is incapable of describing the complicated ion-conducting channels involved in the synapses between nerve cells, then the only solution is in quantum physics.

One limitation is that these studies look inward, into the interior of the physical brain—while the mind is focused outward, in aspect and effect. While it may be true that momentary quantum effects are experienced when the mind accesses its brain as a data base or uses it to chemically record thoughts and physical experiences—it is possible that the answer to where thinking actually occurs will come from an entirely different approach. Does cognition take place within the brain, or outside the physical dimensions of its brain, as far and wide-reaching as a thinking mind, or minds, may wander, wonder, or reach?

A mind reaches out as far as it can alter the future, from a helpless baby's pleading cry to its mother in the next room, to the electronic commands sent to a space probe at the edge of our solar system. In our world of computers, smart phones, and social media, the minds of most of us now encircle the earth. Our minds exist wherever they have an effect. They are free ranging and are limited only by the rigorous demands of truth. Deception is not a product of mind; it is a brainstem cancer on creativity.

The remaining question is whether the quantum-consciousness theory can be fully tested. Until then, we will continue to think about how we think. In doing so, we will be altering the very quantum processes taking place within our brains—which may allow new creative ideas on the subject, and an awareness of the changes that are taking place.

# Is Mind Separate from the Brain That Generates it?

The traditional materialist, or behaviorist, view of human consciousness—reflecting the Newtonian mechanistic era which produced

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it—sees experience, memories, thinking, and emotions as the actual electrochemical action of the neurons, axons, dendrites, and synapses of the brain cells. Much work has been done with modern imaging equipment identifying the specific areas of the brain that accomplish matters such as speech, vision, cognition, and memories.

The brain's physical system allows for rapid thinking and reactions—witness how quickly a hand jerks back from a hot stove but it does not fully account for the way our mind examines and modifies our own personalities and behaviors. Nor does it account for the instantaneous action at a distance that occurs during quantum experiments when an observing mind creates reality.

The emerging view, as expressed by philosopher David Chalmers (who was also trained in physics and mathematics), denies that consciousness can be explained by neurology alone. He postulates that information has both a physical and phenomenal aspect, and that "the emergence

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of experience goes beyond what can be derived from physical theory."

Perhaps, it when intelligence becomes selfaware and contemplates its own self, that mind—and the brain that generated it separate but remain entangled in a quantum sense. At that point in evolution, our mind begins to create and participate in the reality of our conscious and physical existence. Our mind exists, simultaneously, within the brain that generates it and wherever and whenever it has an effect.

Think about how—over the millennia our minds have modified our bodies to respond to the needs of our existence. We have developed our wonderfully clever fingers to use tools, a facile tongue for language, and we have evolved our magnificent physical abilities to run, jump, and swim to adapt to our environment and to survive its hardships.

If we can accept that our bodies were molded by our minds, we may also conclude that our brains themselves evolved in response to the needs of our minds. The changes, including the large frontal lobes of our brain

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for thinking, and our pleasurable feelings of reward at performing acts of kindness, did not arise within any one brain—at any one time but were the harmonious product of our community of minds.

### Are Human Minds Entangled?

It is said that people who have lived together for a long time begin to complete each other's sentences. It may be that close and caring relationships—in which partners come to fully trust and respect each other allow for the entanglement of minds. Certainly, we can continue to experience the presence of loved ones, hear their voice and laughter, and smell their scent, long after they have passed away.

It may be that mind, as a product of quantum processes, continues to exist following the death of the physical body. One's mind may live on in concert with the minds of others who remember and experience the thinking and creations of the originator.

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Documented histories about multiple births, such as twins, are replete with instances of shared thoughts and feelings, although there is no demonstrable physical basis.

Let us now take an additional step and think about the nature of mind and whether the collective consciousness of humanity has resulted in a worldwide mind. Certainly, if we overcome the latent intolerant diseases of deception, hatred, and violence resulting from instinctual brain stem reactions, and objectively look down upon our modern human civilization as a whole-as though from a UFO-we will surely see that it is a marvelously collaborative and sharing society. Together, we have spanned the globe and built a powerful and interdependent world-wide network of information, communication, economic productivity, and social harmony.

Yes, it is true that the wars of humanity destroyed more than 100 million lives in the last century, but hatred can be unlearned, and the sacrifice of children can be ended. The flames on the altar of war can be quenched

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and replaced with the veneration of truth, tolerance, and wisdom.

Just as we cannot see the remote entanglement of particles in a physical sense, we cannot see, or measure, the mind surrounding the brain that generates it—unless it manifests itself in a perceptible creation. Nor can we physically perceive the mental entanglement that connects us with all other humans on Earth.

Certainly, the residual limitations of the reptilian brain stem behaviors of deception, hatred, and violence interfere with effective communication. These are latent evolutionary diseases of intolerance that infect and limit the ability of our minds, individually and collectively, to coexist in peace and to achieve our creative potential. Until we cure ourselves, by allowing our minds to free themselves from the lies and distortions experienced our bodily existence, our evolution will be retarded by injustice, crime, and war.

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### **Does Sentient Life Exist Beyond Earth?**

Questioning whether mind and its influence in quantum physics is a universal phenomenon—including the role of conscious observation at the birth of our universe—one has to wonder if self-aware life exists in other places than here on Earth.

If physicists are reluctant to delve into the free choice aspects of quantum physics, most also avoid any mention, discussion, or serious consideration of the possibility of extraterrestrial life. The risk of peer ridicule and fear of a damaged professional reputation suppresses much scientific curiosity.

Thinking more as a lawyer, however, than as a scientist, and reviewing the best evidence, we can logically consider these three issues: whether it is possible for life and mind to arise at locations other than Earth; if intergalactic communication can occur; and if humanity has been—and is being—observed by extraterrestrial minds and their machines.

With the widespread advent of radio in the early twentieth century, its inventor, Guglielmo

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Marconi, and others suggested that radio waves could be used to identify life on Mars. In 1924, when Mars was in close opposition, the U.S. Navy tethered a dirigible two miles above the ground and equipped it with a receiver to listen for Martian radio waves. A "National Radio Silence Day" was observed during which terrestrial radio transmissions were silenced for five minutes each hour. Alien messages were not detected.

Modern scientific efforts in a search for extraterrestrial intelligence (SETI) commenced in 1960 and continue to this day. The most significant projects in the United States occurred at the 1,000-foot radio telescope at the Arecibo Observatory in Puerto Rico (until it collapsed) and Project Phoenix at the nonprofit SETI Institute at Mountain View, California. China has deployed a 1,500-foot radio telescope, which has the detection of interstellar communication signals among its goals. These projects have listened to thousands of stars; however, to date, no messages have been heard.

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Launched in 2009, the Kepler Space Telescope searched for planets outside our solar system until it ran out of fuel in 2018. Analysis of data from the telescope has revealed that earth-like planets may exist around every fifth sun-like star in the Milky Way galaxy. If true, there may be as many as 25 billion habitable planets just in our galactic neighborhood.

More than 2,000 individual exoplanets have been confirmed, with an equal number of candidates under consideration. Many of these exoplanets are earth-like and orbiting in the "habitable zone" where liquid water could pool on their surfaces. These findings prove that Earth is not unique in having the potential to serve as a nursery for life, and ultimately to give rise to intelligence and mind.

In collaboration with the European Space Agency and the Canadian Space Agency, the National Aeronautics and Space Administration (NASA) plans to launch the James Webb Space Telescope in 2021. Among its tasks, the large infrared telescope with a 6.5-meter primary mirror will study the formation of

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solar systems capable of supporting life on planets like Earth.

In 1950, physicist Enrico Fermi said that, considering the size and age of the universe, many technologically advanced civilizations must exist. Regarding a lack of contact, he thought that either such life is rarer than the evidence indicates, or our own civilization is insufficiently developed to detect it. It is also possible that the distances involved are too great for intergalactic travel, or more advanced civilizations are not interested in communicating with us.

Theoretical physicist and cosmologist Stephen Hawking expressed this concern before his death: "One day, we might receive a signal from a planet like this, but we should be wary of answering back. Meeting an advanced civilization could be like Native Americans encountering Columbus. That didn't turn out so well."

Since the advent of the atomic age in 1945, there have been thousands of reported sightings of unidentified flying objects, or UFOs, all over the world, and hundreds of photographs and videos have been obtained. The United States government investigated many of these reports; however, efforts were primarily devoted to debunking, rather than verifying contact. Even so, one-quarter of the reports could not be explained away.<sup>2</sup>

If you search the Internet for "UFO News," you will likely find a report from some place on Earth every day.

Inasmuch as the air forces of the United States and other nations exist to defend their people against outside attack, their failure to acknowledge the likelihood of extraterrestrial flying objects and their active concealment of their own defenselessness are understandable. A recently released series of videos recorded by modern U.S. Navy and Air Force weapon systems, show fabulous machines exhibiting speed and maneuverability far beyond anything achievable by any contemporary terrestrial

<sup>&</sup>lt;sup>2</sup> I was raised within 15 miles of two of the best documented sightings of UFOs, the "Lubbock Lights" (1951) and the "Levelland Landings" (1957) and 175 miles from Roswell, New Mexico, where the most famous incident occurred in 1947, and where I graduated from military school 11 years later in 1958.

aircraft. These dynamic properties also exceed the ability of our existing knowledge base to explain either who, or what these UFOs are, or to identify their purpose and intentions.

Imagine, if you will, for a moment, the incredible resources available to a collective mind that has eternally witnessed the reality of infinite universe of plasma, eternally an generating galaxies of starlight and mass, and its flowering gift of mind. Examining Earth and its inhabitants, UFOs may be robots of a Mindkind, watching and listening to us. Could these UFOs have the same function as the Chinese robot now exploring the dark side of the moon, the Japanese and German-French sampling the surface of Asteroid robots Ryugu, or America's robot, Perseverance, which is crawling through the red sands of Mars seeking signs of past microbial live?

Terrestrial UFOs seem to come and go at will. They flit through *our* environments, in and out of our atmosphere and oceans, watching, caring, listening, sometimes from within, and

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sometimes from without, everything we perceive as our universe.<sup>3</sup>

### A Universe of Plasma and Light

Let our minds visualize reality in the absence of our universe of plasma and light. Imagine a limitless, black cosmic emptiness consisting of nothing. Existing everywhere within this essentially negative cosmos, the physical universe exists as a plasma within which vast vortices of electron/ion magnetic generators spin cosmic dust into vast arrays of galactic clusters, stars, and the forging of atomic mass.

Only with mind is there *time* to notice the events, and the *insight* to see the existence of our static universe of plasma without a beginning or an end. In doing so, our

<sup>&</sup>lt;sup>3</sup> Whenever two minds learn and speak the language of truth, they become more than the sum of their individual parts. The vision generated by the union of minds provides the energy, and thrill, to ride higher upon the waves of eternity, to see beyond the local ripple in this vibrant universe of plasma and light within which we spin and shimmer—in this our moment of mind.

individual minds also become a continuum from self-awareness to beyond death—as far as, and so long as, the essence and product of our minds are remembered and have an effect.

As a basic question of quantum physics, was the presence and observation by mind at the origin of human consciousness a factor in the reality of our physical existence and achieving awareness?

Mind, the quantum child born to learn, and raised to create, is attracted to the gardens of life where minds congregate to witness the epiphany of self-awareness and to experience its marvelous creations.

Mind is the surveyor of the universe, the timekeeper of eternity, and the curator of all creation. Mind endures, unfettered, within the empty cosmic mind field of eternity—even after the light and spin of its progenitor mass expires.

### **Conversing With the Watchers**

If it is true that everything we perceive as reality—whether we fully understand it—is observed by mind, we can only wonder if we will ever be able to converse with our watchers. Perhaps our human mind has always been a part of the eternal mind but has yet to become fluent in the one-word language of reason.<sup>4</sup>

The question regarding contact may not be presently answerable, but it does suggest a solution to another question about why our sentient visitors have not said hello—although it is likely we have been observed throughout our evolution. Could it be that the collective breath, knowledge, and mind of humanity exists as a fragile wave form which would collapse upon outside interference, ensuring the extinction of our species?

It is more likely we will continue to be lovingly and remotely watched, to not affect or influence our creativity—which is the essence of mind. We will remain free to evolve—or to expire—in a natural manner that is the way of mind.

Earth is a garden, a nursery, a nest, *and* a test. It provides all we need to survive until we

<sup>&</sup>lt;sup>4</sup> Truth.
outgrow the infantile brainstem intolerant diseases of deception, hatred, and violence, *or* we die off from a starvation of will.

To continue our growth to the stage of evolution where minds connect, we must willingly come together and share the responsibility of ensuring that every child worldwide—has equal access to nutrition, health care, and education. Without this essential dynamic boost of collective intellectual vitality, a failure to thrive and fly from our nest is inevitable.

Just as the self-awareness of intelligence created mind, the self-awareness of mind creates wisdom.

Physicist Freeman Dyson said that "God is what mind becomes when it has passed beyond our scale of comprehension."<sup>5</sup> He also

<sup>&</sup>lt;sup>5</sup> "The earth was without form and void, and darkness was upon the face of the deep; and the Spirit of God was moving over the face of the waters. And God said, 'Let there be light'; and there was light." Genesis 1:2-3, *The Holy Bible*.

<sup>&</sup>quot;Allah is the light of the heavens and the earth. His light may be compared to a niche that enshrines a lamp, the lamp within a crystal of star-like brilliance. . .. Light

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thought that "It would not be surprising if it should turn out that the origin and destiny of the energy in the universe cannot be completely understood in isolation from the phenomena of life and consciousness."

# Is Mind a Factor in the Calculus of Quantum Physics?

The mathematical calculations of quantum physics have been demonstrated to accurately predict the probabilities involved in the reality of the subatomic world. Mind is not directly factored into the equations; however, its presence and product are inherent in the identification and use of certain fundamental numbers in these calculations and in the creation of the calculus itself.

Equations that calculate classical relativity and the probabilities of quantum physics often

upon light; Allah guides to His light whom He will." Light, Sura 24, *The Noble Quran.* 

Hindus celebrate a festival each autumn that symbolizes the spiritual victory of light over darkness, good over evil, and knowledge over ignorance.

The last words spoken by the Buddha were "Be your own light."

make use of the number, *Pi* (3.14159265), as being representative of randomness. For example, Einstein's field equation for gravity includes eight times *Pi* divided by the speed of light to the fourth power, and *Pi* appears spontaneously in quantum formula comparing the energy states of the hydrogen atom.

Designated as *c* (*celeritas*, Latin, speed), the speed of light has been measured at approximately 186,000 miles, or 300,000 kilometers, per second. The fourth power of the speed of light, noted by Einstein, is  $8.07760871 \times 10^{33} \text{ m}^4/\text{s}^4$ . Could this be the speed of mind and quantum entanglement?

The Golden Ratio, or *Phi*, (1.6180339887) appears in the nanoscale symmetry found hidden in solid state matter. Models of quantum physics are increasingly revealing *Phi* as a harmonious marker of time.

Labeled as *e*, 2.718281828 is the natural logarithm used in physical sciences (such as solving the differential equations involved in the rate of decay of a radioactive substance) and in probability theory. The number *e* also serves as a

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natural limit on calculating mathematical increases, such as the compounding of interest.

Another fundamental number, h, is known as Planck's Constant, or 6.62607015 x 10<sup>-34</sup>. This infinitesimally tiny number is related to the quantization of light and matter, in that the energy of a photon is equal to h times its frequency. Also called Planck's Wall, h marks the point where nothing smaller can be presently calculated.

When millions of electrons in a superconductive "strange metal" achieve a "maximally scrambled" quantum state, an even tinier number appears. This almost invisible working number is known as *h*-bar, which is *h* divided by  $2\pi$ , equaling 1.0546 x 10<sup>-34</sup>. This tiny number represents the smallest possible physical action, and *h*-bar is also a limit on the amount and accuracy of certainty that is possible in our physical environment (given our present understanding).

Last, but not least, the imaginary number *i* is used to designate the square root of Negative One, which is difficult, if not impossible, to determine mathematically.

Conceived in the brilliant mind of Leonard Euler (for whom *e* is named) in the eighteenth century, and including five fundamental mathematical constants,  $e^{i\Box}+1=0$  is one of the most elegant equations in mathematics.

All these numbers exist in the natural order of our universe, and probably beyond. They were each identified and found to be useful by individual human minds, and minds working in concert. The calculus itself was created (or discovered) by multiple minds. Thus, mind *is* essentially integrated into all mathematical calculations regarding the universe we occupy—and in our discovery of what lies beyond.

Mathematics is a tool and language designed and created by mind for the purpose of determining and revealing truths.

One of the questions about the existence of multiple universes asked by physicists is whether others are governed by the same laws of physics as the one we observe? We will never know the answer to that question, for sure, until we achieve the ability to observe the

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infinity of endless clusters of galaxies generated within the infinite universal plasma, and to penetrate the dimensions of their physical existence.

Only 100 years ago, scientists believed that our Milky Way galaxy composed the entire universe. As we learned that the earth circles the sun, that the sun circles the galactic center, and that our galaxy moves in relation to a galaxy cluster, we assume that other filaments of the universal plasma vortex and the galaxies they produce will be governed by the same laws of physics and constant numbers as ours.

Think about this: the speed of light may be a limitation only *within* our physical universe of plasma. In the dark negative cosmos surrounding the light of galactic mass, where there is no movement to be measured, nor clocks to tick—even the fourth power of light may be irrelevant.

For mind—which is and has been everywhere, forever—there are no limits or boundaries. Mind has likely existed in the dark cosmos outside the light of galactic life generated by the dynamic universal plasma

since before the beginning of the reckoning of time. As mind has survived and expanded throughout eternity, it has surely become coequal with energy and its manifestation as mass.<sup>6</sup>

Trusting in the future and imagining our minds intertwined with an eternal mind, let's consider some additional languages of reason that will allow us to measure and count the universe of plasma we observe, *and* to construct a geometric and mathematical framework beyond that point as a limit in our imagination, allowing a mapping of negative and positive space time of everything within.

<sup>&</sup>lt;sup>6</sup> Eternity was created by mind, along with time, to allow stories to have beginnings and endings.

## MEASURING

## A Mind Experiment

Let us imagine a system of universal coordinates within which to locate our entire perceivable universe of plasma, as it extends in every direction within the eternal black cosmos. Equipped with this imaginary, but practical, tool, we can learn to identify the nature of our universe of plasma.

To do so, we start with a cube. We reduce the space within the box to its center, going through zero and then outward, inverting the collapsing box into an expanding ball. Its geometry allows for an efficient mathematical representation of all points in space and time within the sphere, the definition of its surface topography, and all points beyond.

## **Cartesian Coordinates**

It is said that René Descartes, the French philosopher and mathematician, invented his system of Cartesian Coordinates in 1619 as he lay in bed watching a fly crawl across the ceiling and fly through the air. He imagined measuring from the distance to the insect three perpendicular lines extending out from one corner of the room and being able to continually track the fly's path algebraically within the cube of his room.

The lines extending from the corner along the floor are designated +X and +Y; the floor is the X-Y plane; and the line from the corner to the ceiling becomes +Z. If the fly moves out the door, down the stairs and outside, its path can continue to be tracked using the negative lines of -X, -Y, and -Z. (Figure 1)



Descartes emerged from his bedroom convinced that a divine spirit had revealed to him a new philosophy that included the algebraic method. The gift he passed to us is the ability to define three dimensions of everything, except time.

Isaac Newton, the English philosopher, mathematician, and physicist, who formulated the laws of motion and universal gravitation, made use of Descartes's coordinates. He published a calculus in the seventeenth century to mathematically track the path of points, such as planets, that move on curves at varying speeds through *space and time*. His calculus is the foundation of modern mathematics.

Initially, the coordinates intersected at the center of the earth, with the X and Y coordinates extending out through the equator, and the Z coordinates running through the poles. From this, the calculus was able to track the observable and measurable objects in the solar system as they moved in relationship to the spinning and orbiting Earth.

As the vision of astronomers and physicists expanded beyond the Milky Way galaxy, they moved the galactic coordinate system to the center of the sun. The primary direction is aligned with the black hole at the core of the Milky Way, and the fundamental plane is approximately parallel to the galactic plane. This system allows for measurements and calculations out to the edge (or back to the origin) of our perceivable universe.

Modern calculations make use of a refined spherical coordinate system in which a point in three-dimensional space is identified by three numbers: the radial distance of that point from the center of a system of Cartesian Coordi-

nates; the polar angle ( $\Phi$ ) of that line (r); and its azimuth angle ( $\varphi$ ). (Figure 2)



## **Compressing Space Within a Box**

Let us commence our mind experiment by imagining that everything, including our entire universe, is a small ball of play putty which we can hold in the palm of our hand. If we close our fist and squeeze hard, we can imagine compressing the substance down to nothing, or zero.

To visualize this, geometrically, let us place the entirety within a box, divided into eight quadrants, or Cartesian cubes.

Vertices at the center of each face are defined by the six Cartesian axes, and there are eight additional vertices at each corner of the cube with lines extending from each corner to the center (Figure 3, A,B,C,D,E,F,G,H). The eight component cubes, or quadrants, are each separated from the others by three perpendicular X,Y&Z planes.



Along the lines extending from the eight corner vertices to the center, we can construct eight hyperbolic arcs. The concave surfaces of the hyperbolic arcs all face outward, and the inner or convex faces are aimed inward toward their defining perpendiculars, which cross at the center. (Figure 4)



If we move the eight hyperbolic arcs uniformly toward the center, we can occupy the space from each corner inward. Mathematically, calculations will break down before we reduce the space to absolute zero, but let's swing the pick of our imagination and break through "Planck's Wall" and imagine what exists on the other side of nothing.

Each hyperbolic curve and its tangents (the asymptotes) become parallel in infinity. Therefore, each hyperbolic arc will ultimately occupy all the space contained, not only within its quadrant in the box, but in its 1/8th share of everything—as far outward as the mind can comprehend. Inwardly, we can zoom down from eight directions through the center and beyond.

We can illustrate the simultaneous reduction of the quadrants through a series of less complex drawings in which simple curves are substituted for the hyperbolic curves. The first three drawings show the contracting of space from the eight corners to the center in the eight quadrants. Our universe can be imagined as a small dot (p) on a series of simple curves (AB) in the upper left-hand quadrant in each of the figures as each curve closes upon the center. (Figure 5)

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## Expanding Space with the Pi Ball

Extending these simple drawings, let us imagine the effect of going through the center of the box from eight directions at once, and to then continue outward along the inverse lines.

If we pick up our compass and locate four points halfway on the diagonals between the center of the cube and the enclosed circle, we can construct curves that intersect the diagonal points resulting in the drawing in Figure 6.



Looking at the figure, we can readily see the two-dimensional drawing appear to rise into a virtual sphere, suggesting the drawing can be transferred to the surface of a ball by inscribing six lines. (Model 1)



The six lines divide the spherical surface into 24 equal right-angle triangles. Assuming the radius of the sphere to be one, its circumference (C=2Pir) will be equal to two times *Pi*. As one half of the circumference of the sphere is divided by two equal legs and a hypotenuse, the perimeter of each triangle is necessarily equal to *Pi* times radius.

Studying the *Pi* Ball, it appears that the height on the "right" angle measured to the halfway point of the hypotenuse is equal to

one quarter of *Pi*, as four such lengths can be seen to extend along the curve halfway around the sphere. As will be demonstrated later, the ratio of the sides and height of the spherical triangle is exactly 3:3:4:2.5.

Another spherical model can be constructed by adding three more lines along the heights of the 24 right-angle triangles. These lines cut each triangle in half at the hypotenuse on a perpendicular, resulting in the three new curves all being perpendicular to each other. (Model 2)



The nine great circles now divide the sphere into 48 equal "half" triangles, and—as two sides (a leg and half hypotenuse) equal 0.5*Pi* and the height equals 0.25*Pi*—the

perimeter of each new triangle is equal to 0.75*Pi* times radius.

Since each hypotenuse was cut in half, each "leg" of the full triangle becomes a hypotenuse in the new "half" triangle. These 48 "half" triangles are defined by 26 vertices.

The six Cartesian axes still correspond to the six vertices centered on the face of an inflated cube, and of the remaining 20 vertices, eight still define the center of each Cartesian quadrant, or the corners of a box, and the last 12 divide the 90° angle between adjacent Cartesian axes in half. Thus, every pyramidal plug continues to be defined by an existing Cartesian axis, and every internal point can be measured by an associated spherical coordinate. (Figure 7)



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Just as the three positive Cartesian axes have an inverse axis, each of the 13 positive coordinates based upon the proportions of *Pi*, also has its inverse or negative representation.

## **Shapes Within Shapes**

We can readily see that the sphere is defined by all 26 vertices being of the same length; however, the same set of coordinates can also be used to define other shapes. Starting with a solid cube, the exterior surface can be inscribed with the same vertices describing 48 "half" triangles on Model 2. (Model 3)



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Next, four alternative corners can be sliced from the cube along the diagonals, revealing an internal tetrahedron, which can be similarly inscribed. (Model 4)



Finally, the pyramid-tips can be cut from the tetrahedron, revealing an internal octahedron. (Model 5) Each of these polyhedrons can be mathematically described by differing lengths of the 26 vertices.



# Solving the Proportions of the *Pi* Triangle

This paper is intended as a mathematical proof that the ratio 3:3:4:2.5 for the *Pi* Ball triangle is correct, that the perimeter of each triangle is equal to *Pi* times radius, and that the surface of the sphere is completely tiled by 24 triangles.

If A and B are two points on the surface of a sphere and C is the center, then the distance between A and B along the great circle connecting them can be determined by using the formula [d(A,B) = Ra], where R is the radius, a is the angle of ACB measured in radians and d is the distance between A and B.

To determine these distances, we can first divide each of the ratios 3:3:4:2.5 by three to reduce the length of each leg of the full triangle to one, the hypotenuse to 1.333333, and the height to 0.833333. If we divide the combined perimeter of 3.333333 by *Pi*, the producing radius would be 1.061032954.

Next, we can use the formula [a (angle) = (180 x distance) / (radius) x Pi] to determine

that the internal angle for each leg (1) is 54°, the internal angle for each hypotenuse (1.333333) is 72°, and the internal angle for each height (0.833333) is 45°. Since 2Pi radians are composed of 360 degrees, we can calculate that the internal angle of each leg is 0.942477 radians, of each hypotenuse is 1.256637 radians, and of each height is 0.785398 radians.

In addition to observing the perimeter of each "full" triangle to be equal to *Pi*, the only other known distance results from an observation of the "half" geodesic right-angle triangle in Model 2, which consists of the height, one side, and one-half of the hypotenuse of the original "full" triangle.

By observation, the former height must be equal to .25Pi (assuming a radius of one), since the circumference of the sphere demonstrated by each imaginary great circles can be seen to be exactly divided into eight such lengths. Using this known distance (and assuming a radius of one), we can use the formula [d(A,B) = Ra] to determine that the height measures 0.785398, or .25Pi—the same as  $45^{\circ}$  expressed in radians. Thus, we can conclude that the

proportion of 2.5 is the same as .25*Pi*xa and that it accurately produced the correct angle in radians.

We can use the same logic (assuming a radius of one) to also measure the hypotenuse and two legs of the full triangle. If the hypotenuse's internal angle is 1.256637 (72° expressed in radians) we can conclude that the distance of the hypotenuse is 1.256637. And, if the internal angle of each leg is 0.942477 (54° expressed in radians) we can determine that the distance of each leg is 0.942477. When the distances of two legs and the hypotenuse are added together, the result is 3.141591, or *Pi*.

To prove the proportions are correct, we can first calculate the area of each individual geodesic triangle by using the formula [a (area) =  $r^2(A+B+C)-Pi$ ], in which A, B, and C are the angles measured in radians at the vertices on the surface of the sphere.

From observation, we can see that each triangle has two 60° and one 90° angles. Since each radian is equal to 0.0174532 degrees, we can establish that A and B are equal to 1.047197 radians and C is equal to 1.570796

radians, for a total of 3.66519 radians. When *Pi* is subtracted, and assuming a radius of one, the remainder is 0.523597, the area of each "full" triangle.

Finally, we can use the formula [a (area) =  $4Pir^2$ ] to establish the area of a sphere with a radius of one to be 12.566370. If we divide the total area by 24, we find that each "full" triangle has an area of 0.523598, the same result we obtained above.

Thus, it can be mathematically proven that 24 geodesic triangles having sides equal to *Pi* times radius with proportions of 3:3:4:2.5 completely tile the surface of a sphere, and are, therefore, equal and congruent.

## Spherical-Vertex Coordinates

Other than for interesting lines and pretty colors (and perhaps the construction of sturdy domes), does the *Pi* Ball offer any practical benefit?

One answer to that question may lie in the ability of the solution to define the topography of any given object—of every size and shape—from the infinitely small to the

universally large. Moreover, it can define every point within, and beyond, the object.

Looking back at the spherical Models 1 and 2, we can visualize them as inflating balloons in a low vacuum. We can watch the lighted tips of the surface vertices slowly extending outward, and constantly moving further apart, as the whole of the coherent positive is inhaled by the entirety of the incoherent negative.

The 24 triangles of Model 1 are defined by 14 vertices, any adjoining three of which have a perpendicular, or right-angle, relationship to each other at every distance from the center to the surface. Therefore, any point within each three-dimensional pyramidal plug can be defined by reference to the three adjacent vertex lines, in conjunction with three Cartesian axes, using spherical coordinates. (Figure 8, ABC)



To allow for expansion and to compensate for the increasing distances between vertices, we can recall that any triangle can be divided into four equal triangles by drawing three lines connecting the half point of each side, and each succeeding triangle can again be divided in the same manner *ad infinitum*. (Figure 9)



Accordingly, each triangle on the surface of any object can be subdivided as needed into an infinite number of smaller triangles, resulting in additional vertices. All vertices can be identified by a spherical coordinate, as each has a set angular relationship to fixed Cartesian Coordinates.

As the distance increases from the center of any object, more triangles and vertices can be added to intensely define its surface topography, irrespective of variations—and every point within its interior space.

Any object may be accurately represented by a coherent strategy of geometric representation based upon a rational subdivision of each *Pi*-based triangle and a corresponding increase in the number of vertices required to plot the object, as well as the distance of each vertex from the center. (Figure 10)



## Universal (UN) Coordinates

Reflecting upon our original mind experiment, do we now have enough information to design a coordinate system beyond our perceived universe, within which to orient ourselves and to commence exploration?

When the Newtonian coordinate system (originally placed at the center of the earth) evolved to galactic coordinates originating in the center of the sun, the new system was based on the galactic plane of the Milky Way and a line that extends to the black hole that lurks at its center.

Accordingly, the earth's location and movement in space is presently determined by references to the sun using externally generated galactic longitudes and latitudes (as though we are still on a sailing ship navigating the Seven Seas in the eighteenth century).

If, however, we establish the zero and Cartesian coordinates at the center of the Milky Way's "black hole" vortex, on its primary planes, we can invert the cube and

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generate universal spherical coordinates. With this, we can begin to mathematically locate and track everything from the spin, tilt, and orbit of the earth—up through the surrounding Milky Way mass and dark matter, out beyond our home galaxy—and to chart our way through the dark cosmos.

Once we orient our coordinates, we can be anywhere, at any time, wherever and whenever we choose to be, and we can always find our way home in space and time.

With our expanding system of universal coordinates in place, we next beta test a mathematical language of reason designed to count the elements of universal coordinates, and everything else.

## COUNTING

## How Do Computers Count?

We are accustomed to using base 10, or decimal, numbers for calculations, primarily because we have four fingers and a thumb on each hand. The ancient Babylonians are believed to have used the three spaces divided by the knuckles of the four fingers on one hand for a total of 12, which was repeated and tracked by the five fingers of the other hand in the manner of an abacus. From five times 12 they created a base-60 numerical system<sup>7</sup> which gave us our 24-hour day, 60-minute hour, and

<sup>&</sup>lt;sup>7</sup> Since 60 is a rich composite number having many factors, which are themselves composite, calculations that relied on fractions were able to achieve sophisticated results. Written in clay with Cuneiform symbols around 1700 BCE, the formula for finding the square root of two translates as:  $1 + 24/60 + 51/60^2 + 10/60^3 = 1.41421296$ . This is very close to the modern value of 1.41421356.

360-degree circle. Calculations can be, and are, performed using other number bases as well.

All modern computers use binary, or basetwo, numbers to represent the value of the bits and bytes of information stored in their memories. The base-two numbers of one and zero—or plus and minus—are used to show that an electronic switch is either on or off, or that an electrical signal is high or low.

The coding of computer operating software also makes use of base-eight (octal) and base-16 (hexadecimal) numbers. Octal is designated as 1,2,3,4,5,6,7,10.

Created to allow computers to communicate with each other, the 16-base ASCII (American Standard Code for Information Interchange) system inserts the letters A, B, C, D, E, and F between nine and ten. Thus, whether you use an Apple computer or Windows, Gmail or MSN, and irrespective of the web browser you rely on, they will all display and perform as intended on all appropriate devices.

Programmers use ASCII characters to translate binary numbers into coding language,

## Counting

such as substituting A for binary 1010 (equal to decimal 10). ASCII numbers are also used in coding to represent the keys on the computer keyboard. For example, the \* (asterisk) is represented by 2A (twenty A), which is the same as the decimal number 42. In addition, a combination of six hexadecimal numbers is used to replace sets of equivalent binary numbers in specifying mixed values in the True Color scheme.

ASCII is favored by programmers, as it allows them to code four binary digits (a "nibble") into each hex number as half of a "byte" of eight. These bytes are then organized into larger 16, 32, 64, 128, and even 256-bit operations.

Scientists working on programming languages for quantum computers designate the superposition of "qubits" in formula by a series of stacks of four numbers. In superposition, qubits can represent 0, 1, or 0 *and* 1 at the same time. Thus, two qubits can represent four binary numbers at once, and three qubits can represent eight numbers.

Reportedly, those who perform calculations of higher numbers frequently find that they must introduce 16 into an equation to sort it out. It is said that it is impossible to calculate the square roots of *Pi* without using a base-16 language.<sup>8</sup>

## Universal (UN) Numbers

It is possible to calculate problems in all numbering systems, but one can readily see the practical difficulty in adding, subtracting, multiplying, and dividing in bases other than our familiar 10, without the aid of computers. But what if we had evolved to have seven fingers and a thumb on each hand? Would we have named each of the digits and ended up with a 16-base system? What would have been the effect of us having done so?

<sup>&</sup>lt;sup>8</sup> It was after I imagined the Pi Ball and began to construct physical models that I found it increasingly difficult to describe the basics of the geometry in less than 16 numbers. Thus, it was one day around 1980, I was sitting in a hotel room in Washington, DC looking out the window at the Capitol building, escaping reality by counting the elements of a Pi Ball model. I imagined inserting special symbols for  $2^2$ , and I first reasoned in the language of Universal (UN) Mathematics.

## Counting

The answer is that we would have, fortunately, a far more logical and harmonious mathematic language. Indeed, base-16 could be the universal standard.

The primary purpose of this paper is to articulate and document the language of Universal (UN) Numbers. We begin by organizing our familiar decimal numbers into four  $2^2$  sets consisting of U, N, S (*star*), and C (*see*). The old numbers resonate within the natural powers of two, 1,2,3,U, 4,5,6,N, 7,8,9,S, C,X,W,10.<sup>9</sup>

We retain the natural spoken harmony of our <u>10</u>-finger language, and we maintain the relative ratio of existing numbers to the new 10. We must, however, learn a few new symbols, such as a "1U," "1S," and "1C" and new terms like UTeens, StarTeens, and SeeTeens.

<sup>&</sup>lt;sup>9</sup> To avoid confusion, hereinafter all base-<u>ten</u> expressions (except the numbering of figures and tables) will be <u>underlined</u>. Large base-<u>ten</u> numbers will continue to be separated by commas, and *UN* numbers will be *italicized* and separated by colons (:).
Our fingers can still help us keep track. Use your right forefinger to count the <u>five</u> fingers and thumb of your left hand *three* times and complete the count with a right "thumbs up" for a total of 10 (<u>16</u>).

Ancients who wrote about mathematics were enraptured with the beauty of arithmetic, and they were captivated by its utility. It quickly becomes apparent that calculations are greatly simplified in an elegant <u>16</u>-base numbering system in which 2+2=U, U+U=N, N+N=10, or  $2^2=U$ ,  $2^3=N$ ,  $2^U=10$ , and in which <u>16</u>=10, and <u>64</u>=U0.

Figure 11 shows how the new symbols, U, N, S, C, X and W, are handwritten. The curved numbers are reminiscent of the geometric figures previously used to demonstrate the contraction and expansion of space.



In learning to use these new numbers we must accustom and reorient ourselves to certain words and symbols. Thus, when we hear "four," we presently associate it with <u>four</u> fingers or whatever the reference is, but that is no longer the case—the thumb is now included in *four*. At least initially, one must suspend our habitual association, as mental muscle memory adjusts to "*four*" meaning <u>five</u>. The numerical concept of what was formerly "<u>four</u>" is now represented by U, as  $2^2$ , and <u>eight</u> has become N, as  $2^3$ 

Before doing any calculations in UN, it is helpful to construct a multiplication matrix. Color was added to Table 1 to illuminate the values and relationship of the different numbers.



Table 2 provides a simple addition and subtraction table that is handy when counting UN numbers.



A derivation table of equivalent values helps convert large base-<u>ten</u> numbers to UN. (Table 3)<sup>10</sup>

<sup>&</sup>lt;sup>10</sup> A free *UN* calculator by Brian Norberto Gonzalez, who also programmed the computer-generated models of *UN* Geometry, can be accessed at <u>https://williamjohncox.com/UNCalculator.txt</u>. Operation requires a <u>free download of Python</u> <u>Software</u>, and renaming the downloaded file extension from "txt" to "pyw."

			<u>10</u> 1	<u>10</u> <sup>2</sup>	<u>10</u> 3	<u>10</u> 4	<u>10</u> 5
1	=	1	8	5U	3XN	2:610	1N:580
2	=	2	10	SN	6C0	U:X20	30:CU0
3	=	3	1X	128	99N	6:430	U7:3X0
4	=	U	2N	170	W80	7:SU0	51:8N0
5	-	4	32	1WU	1:3NN	S:340	68:120
6	=	5	38	24N	1:660	X:850	72:680
7	=	6	U5	298	1:94N	11:160	88:X50
8	=	N	40	320	1:WU0	13:NN0	S3:400
9	=	7	48	3NU	2:32N	14:W70	C9:980

# Rounding Off Pi

Traditionally, Pi (3.14159265359) is understood to be the relationship of circles and spheres to their radii. Another way of viewing Pi is to see that it represents the concept of randomness itself.<sup>11</sup>

If we select a needle and draw a series of parallel straight lines on paper separated by a distance greater than the length of the needle and repeatedly drop the needle on the paper, after a long time and many tosses, the number of needles that touch one of the lines will be

<sup>&</sup>lt;sup>11</sup> Prior to the Internet and before his death, I once spent time on the telephone with Dr. Petr Beckmann, the author of A History of  $\Box$  (Pi), as he graciously discussed ways to ascertain the value of Pi in base <u>16</u>. His History remains an invaluable resource, and his willingness to help me, even in his blind old age, to understand Pi was encouraging.

equal to *Pi*, when divided into the total number of attempts.

This game of deriving *Pi* became known as the Monte Carlo Method and was attempted during the eighteenth and nineteenth centuries, both actually and mathematically. In a more recent computer simulation, the method produced a value of 3.1417 after 1,000,000 computer generated tosses.

The Monte Carlo Method was the beginning of probability theory—which is at the heart of quantum physics. What was once considered to be exact is now seen as the mean value of unlimited random events, such as the probabilistic laws of quantum mechanics. Thus, the number *Pi* appears very frequently in the calculations of probability theory, as well as in all areas of higher mathematics.

The value of Pi is the first problem we must solve to beta test UN numbers. We can start with the ancient base-<u>10</u> fraction <u>22</u>/<u>7</u>.

In the third century B.C.E., the classical Greek scholar Archimedes of Syracuse used rudimentary algebra to construct <u>two</u> imaginary polygons of <u>96</u> sides inside and outside a circle to determine that the value of Pi stood between the product of <u>3 10/71 and 3</u> <u>1/7</u> (which results in <u>22/7</u>).

Solving the fraction produces an approximation of Pi as <u>3.142857142857</u>.... When the fraction is converted to UN, it becomes 15/6, which produces 3.2U72U72U7....

The product of the fraction continues to repeat the same series of numbers over and over in both languages; however, in UN, the product rolls over every <u>three</u> places rather than every <u>six</u> in base <u>10</u>. The double of this number is 5.U72U72U72..., and one half is 1.72U72U72U.... The same series, in a different order, defines the decimal notation of each.<sup>12</sup>

<sup>&</sup>lt;sup>12</sup> It was the summer of 1982. Exhausted from prosecuting the Holocaust Case, I was house sitting a friend's place on the sand at Seal Beach. I was studying a model of the *Pi* Ball, trying to figure out the ratio of the sides of its basic triangle (which has a perimeter of *Pi* times radius). I asked a high school math teacher who lived next door how I might calculate *Pi* in base <u>16</u>, and he suggested I start with converting the ancient formula, 22/7. I did.

As the sun set over the Pacific that beautiful Southern California day, I converted the fraction to UN and first

Further study of 0.2U7 reveals that, when multiplied by *six*, it produces 0.WWW, and if 0.2U7, 0.U72, and 0.72U are added together, the result is again 0.WWW. Moreover, 0.2U7multiplied by three produces 0.5C9, a series that also defines its multiplication by *four* (0.95C) and by *five* (0.C95).

Returning to base-<u>10</u>, we find that this result is a function of the ancient fraction itself—which is a part of its magic, *i.e.*,  $0.142857 \ge 0.285714$ ,  $\ge 3 = 0.428571$ ,  $\ge 4 = 0.571428$ ,  $\ge 5 = 0.714285$ ,  $\ge 6 = 0.857142$ ,  $\ge 7 = 0.9999999$ .

After Archimedes, mathematicians and geometers struggled for hundreds of years with increasingly complex polygons, taking shorter and shorter tangents around the outside of circles, striving always to find the perfect ratio of two numbers to terminate the equation. It required the use of trigonometric functions

connected these marvelous little geometric *Pi* numbers to the *Pi* Ball. It was for me a spiritual moment akin to what Descartes may have felt when he first imagined his coordinates. A similar experience occurred when I was able to prove—years later—that the ratio of the triangle sides is exactly *3:3:U*. and logarithms to help several different individuals identify the fraction  $\frac{355}{113}$  as producing correctly the first six digits of *Pi*.

The fraction 355/113 reduces to a value of  $3.14159\ 29203\ 53982$ , or one slightly higher than true *Pi*. When converted to *UN*, the fraction 153/61 yields  $3.2U3W5W0\ 2U3W5W0$ .... Just as the original fraction 355/113 produced *Pi* accurately to the first <u>six</u> decimal places, the same ratio in *UN* results in the first <u>five</u> places.

Further extensions of the UN value of Pi can be achieved by using the inverse convergents of a continued fraction created in 1767 by Johann Lambert to prove the irrationality of Pi. Following the fraction 355/113 are others of increasing complexity. For example, the fraction 80143857/25510582 can be converted to US5X4W1/1N4U295, which produces 3.2U3W58NNN, or the first nine UN places of Pi.

The fact that N (which in UN occupies the same halfway place as <u>five</u> in a base-<u>10</u> system) repeats itself at the <u>7</u>th, <u>8</u>th, and <u>9</u>th places offers the intriguing possibility that this

expression may provide a logical rounding off of *Pi*.<sup>13</sup>

Incredibly, the value of Pi has now been calculated to ten trillion places in base <u>10</u>. Analyzing very long strings of Pi reveals that the frequency of the various numbers is uniformly distributed. A frequency analysis of the first ten million places revealed that each digit appeared about one million times.

Astrophysicists engaged in interplanetary navigation limit Pi to <u>15</u> places, which is the same numerical value as W in UN. Calculating the circumference of a circle having a diameter of the known size of the observable universe (<u>46</u> billion light years) to an accuracy equal to the diameter of a hydrogen atom would only require <u>39</u> digits of *Pi*.

The number N in UN is the mean of all random numbers expressed in the eternal extension of *Pi*; therefore, the UN expression of *Pi*, 3.2U3W58NNN, represents a highly

<sup>&</sup>lt;sup>13</sup> In base-<u>10</u> Pi, a number does not repeat itself three times until the <u>153</u>rd place (*i.e.* <u>1,1,1</u>).

practical quantification of *Pi* for most calculations.

## Phi, the Golden Proportion

*Phi* is a lovely representation of the internal harmony of numbers and their expression in nature. It has fascinated mathematicians, artists, musicians, architects, and biologists for thousands of years.

It is no surprise that *Phi* has attracted the attention of quantum physicists to whom it appears that *Phi* is a constant produced by time. Holding a seashell, we can see in each spiral how the animal lived and grew over time, and we can feel how each spiral became larger with each season, growing by a combination of the two previous seasons.<sup>14</sup>

We can understand why *Phi* is associated with time when we look at how the Fibonacci series unfolds: 1+1=2, 1+2=3, 2+3=5, 3+5=8, etc. Each growth cycle, whether in a

<sup>&</sup>lt;sup>14</sup> Dr. Mario Livio's excellent book, *The Golden Ratio: The Story of Phi, the World's Most Astonishing Number,* is kept constantly at hand.

sunflower or pinecone, is a combination of the two previous cycles. As a melodious marker of time, the series provides the exact value of *Phi* when we divide the *1S*th (<u>28</u>th) number by the *19*th (<u>27</u>th) (*6C:N94/UC:763* = *1.7X366797*).

We can also see the Golden Proportion (or Ratio) as a rectangle, whose sides have a length-to-width ratio equal to the Golden Proportion.

If we then imagine that the long side is the short side of another golden rectangle, we can begin to build adjacent rectangles in an endless fashion. These rectangles then define a continuous logarithmic spiral, which we can see demonstrated in nature in the spiral galaxies—such as our Milky Way—or in a sunflower or seashell. Whenever there is natural growth according to a geometric progression, the result is a logarithmic spiral. (Figure 12)

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Another way of building a logarithmic spiral is to start with a simple right-angle triangle with sides of <u>one</u>, <u>one</u> and the square root of <u>two</u>. If we then construct another right-angle triangle, using the hypotenuse of the square root of <u>two</u> as the base and continuing with a side of <u>one</u>, the next hypotenuse will be equal to the square root of <u>three</u>. If we continue to construct triangles in this manner, the result will be a logarithmic spiral, consisting of *10 UN* triangles that demonstrate the square roots of all numbers between <u>two</u> and <u>16</u>. (Figure 13)

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To directly calculate the Golden Proportion in UN we can use the same formula as in base <u>10</u>,  $(Phi = (1+\sqrt{5})/2)$ . Thus, if we first calculate the square root of <u>five</u>, or *four* in UN to be 2.3S5XW362, then add one, and divide by two, the result is the Golden Proportion, 1.7X366797.

The UN Golden Proportion squared is 2.7X366797, sharing the identical decimal extension, and its square root is 1.U4831U587. As an irrational number like *Pi*, the "decimal" places of *Phi*, those of its root, and its square, can be extended further; however, it is the first

<u>eight</u>, or N places that are pertinent to their function as a ratio.

From all of this we can see that the melody of the Golden Proportion displays the same harmony in UN as it does in base <u>10</u>.

## Prime Numbers

If you recall, a prime number is a whole number greater than one, which can only be divided by one and itself, and therefore has no other factors. In another beta test of *UN*, we can construct a sieve through which to sift out its non-prime numbers. (Table 4) The sieve reveals that the same numbers are found to be (prime), as in base <u>10</u>, and the same numbers fall through the sieve.

# The Limits and Successive Square Roots of *e*

As we have learned, the small number *e* imposes a limit at a point where further mathematical operations become fruitless. Over time, change tends to stabilize at the value of 2.718281828.

A more difficult beta test of *UN* is to derive the value for *e* using Newton's continuing equation:  $e = 2 + 1/2! + 1/3! + 1/4! + 1/5! + ....^{15}$ 

Using Tables 1 and 2, the answer was laboriously hand calculated over a period of days

<sup>&</sup>lt;sup>15</sup> The symbol "?" means that the number preceding it is factored, such as  $\underline{3!} = (\underline{1x}\underline{2x}\underline{3}) = \underline{6}$ .

through <u>20</u> places; however only the first *eight* places were later found to be without error. A computerized computation through the first <u>23</u> places is 2.96X14152N8XC28589W614NN.

Like Pi, the number e, is believed to be a "normal" irrational number in that the frequency of distribution of its fractional numbers is uniform. In other words, everything after the first N, and almost certainly by the second set of NN, becomes random, with a mean of N.

Here's an interesting discovery using a digital calculator. If we reduce the successive square roots of e, the roots slowly work downward until we arrive at 1.000000002 and then 1.000000001 before achieving unity at one.<sup>16</sup>

<sup>&</sup>lt;sup>16</sup> Around the time while I was originally working on *e*, I had online access to a free calculator on the Internet that allowed me to derive squares and square roots in multiple base languages.

With nothing better to do one day, I was idly deriving successive square roots of e in different bases when I discovered the series of <u>nine</u> successive square roots of e in all the two square (2<sup>2</sup>) base languages.

Then, if we successively square 1.000000001 in UN, we find that the true value of *e*, correct to the first <u>six</u> decimal places, is achieved at its <u>36</u>th or 2U'd operation. The same result does not occur in base-<u>10</u>.

In base 2, the value of *e* is 10.101110000, which results from <u>nine</u> successive squaring.

In base  $\underline{4}$ , the value of *e* is 2.231332013, which results from <u>18</u> successive squaring.

In base <u>8</u>, the value of e is 2.557605213, which results from <u>27</u> successive squaring.

In base <u>10</u>, the value of *e* is <u>2.718281828</u>; however, <u>30</u> successive squares leads to an inaccurate result of <u>2.926309006</u>.

In base <u>12</u>, the value of e is 2.87523606A; however successive squaring, like base 10, does not come close, with <u>32</u> operations leading to 2.370421463.

The pattern appears to be that in base  $\underline{2}$ , it takes <u>nine</u> operations of successive squaring to produce the correct value of *e*. In base  $\underline{4}$ , it takes <u>18</u>; in base <u>8</u>, it takes <u>27</u>; and in base <u>16</u>, or *UN* numbers, it takes <u>36</u> operations. These are the <u>1st</u>, <u>2nd</u>, <u>3rd</u>, and <u>4th</u> multiples of <u>nine</u>.

Thus, successive squaring of 1.000000001 only leads to exact *e*, in bases <u>2</u>, <u>4</u>, <u>8</u>, and <u>16</u>, all being either <u>two</u> or the powers of <u>two</u>.

In a base <u>32</u> language, 1.000000001, successively squared <u>45</u> (<u>5x9</u>) times should produce the value of *e*, as should successive squaring <u>54</u> (<u>6x9</u>) times in base <u>64</u>.<sup>17</sup>

Inasmuch as e is the natural logarithm used in modern mathematics, the rational connection between the powers of two (2<sup>2</sup>) mathematical languages, and their exact relationship to the square roots of e, may be of some utility in creating a calculator using these successive square roots in a system of fractional numbers to accommodate the calculation of negative numbers.

<sup>&</sup>lt;sup>17</sup> Dr. Eli Maor, the author of the masterful book, *e: the Story of a Number*, kindly reviewed an early draft of my mathematical papers, including the successive  $\sqrt{e}$ discovery. He commented that achieving *e* after multiple squaring was simply the nature of *e*. Later, I realized that the value of the discovery might be in the successive square roots of *e*, rather than *e* being one of the successive squares of 1.000000001. That little number appears to play a foundational role in the  $\sqrt{e} 2^2$ bases.

## **Elemental Numbers**

We earlier learned how the ancient magical fraction 22/7 converted to UN produces an approximate value of 3.2U72U7 for *Pi*. A division of 0.2U7 by two reveals the elegant little fractional number, 0.12UN.

If we perform calculations in UN using these numbers, we will occasionally notice the appearance of another small number, 0.0S3. We find that *three* times 0.0S3 equals 0.2U7, and 14 (21) times 0.0S3 equals .WWW.

A reduction of these fractional numbers, such as 0.0S3, 0.12UN, and 0.2U7 reveals they are all multiples of an even smaller base number, 0.010U. For example, 0.12UNresults from 12 (<u>18</u>) times 0.010U, S (<u>12</u>) times 0.010U creates 0.0S3, and WS (252) times 0.010U equals 0.WWW.

Comparing these UN "decimal" numbers to their base-<u>10</u> equivalents, we find the result to be far more complicated and much less interesting. For example, 0.2U7 converts to <u>0.0714285</u>, a third of which (0.0S3) is <u>0.947619</u>, and the equivalent of <u>0.010U</u> is <u>0.00396825</u>. Most telling, the lovely little number <u>0.12UN</u> is the same as the very boring <u>0.03571425</u>.

There is a mathematical richness in these fractional Archimedean numbers in that they are in harmony with *Pi* and *Phi*, and with their factors.

While it is true that mathematical calculations can take place in every base language, one can readily see that a base-<u>16</u> language produces a far more economical and logical expression of fractional numbers than base <u>10</u>, and that UN numbers are much more elegant and useful than the same values expressed in ASCII.

# CALCULATING

Assume, for reasons difficult for most to comprehend, that the following calculation of complex numbers defines the square root of Negative One,  $\sqrt{-1}$ . It is said to be arduous—if not impossible—to calculate the roots of complex negative numbers. Therefore, the  $\sqrt{-1}$  is represented in calculations by the imaginary number *i*.<sup>18</sup>

<sup>&</sup>lt;sup>18</sup> Even though I have little or no formal training in higher mathematics, and without fully understanding many of its functions, I often wonder about physical and mathematical matters. I seek to simplify problems that interest me, and I strive to learn enough to derive a sensible solution. Finally, to clear my mind, I write down my findings, so I can forget about the issue and amuse myself with something new and different.

Almost 40 years have passed since I first imagined UN geometry and numbers. Although I still speak the language of mathematics as a sojourner in a foreign land, I continue to think about logical ways to organize and calculate all numbers, including the negative and complex.

It was only recently that I finally conceded that the

# $(0,1) \cdot$

What if—instead of relying on an imaginary square root of Negative One—we create a comprehensive, imaginary computerized calculator driven by artificial intelligence that facilitates the actual computation of all negative numbers, including the square root of negative one?

Let's start by building an imaginary block of positive numbers upon a solid foundation, starting with a square marble cornerstone deeply carved with a one plus, "1+."

Recall the discovery that the successive square roots of *e* always resolve down to 1.000000001, in all  $2^2$  number bases, through sets of <u>nine</u> successive square roots. The series commences in base 2 at <u>nine</u>, b4 at 18, b8 at 27, b16 at 36, b32 at 45, and b64 at 54

calculation of negative UN numbers, like *i*, had to be imaginary, rather than real. With that realization, the final pieces of the puzzle fell out of the box and onto the table, and I was able to complete this paper about the calculator I imagine.

#### Calculating

successive squares that always lands on precise e. The uniform progression by <u>nines</u> only occurs in  $2^2$  number systems.

Let us designate the tiny decimal fractional number 0.000000001 as the "one plus," 1+, or "eit". The eit is defined as a precise root of e, in every 2<sup>2</sup> mathematical base, and it integrates all these bases mathematically.

Let us imagine growing the tiny little *eit*, 0.000000001 into a great big little number. Adding it almost a trillion times creates an almost one: 0.WWWWWWWWW. All it needs is another 0.000000001 to become a whole Positive One.

The one plus, 1+ is a foundational number. Not only is *eit* a root of *e*, but it, and the entire progressive system of  $2^2$  numbers can be fundamentally organized and calculated by a system of logarithms and exponents based on *e* and the *eit*.<sup>19</sup>

<sup>&</sup>lt;sup>19</sup> A logarithm is the power to which a number must be raised to get another number. Thus, <u>ten</u> to the second power (exponent),  $10^2 = 100$ . Logarithms allow for the easier addition and subtraction of exponents, rather than more difficult problems of multiplication and

We have now identified and demonstrated 0.000000001 as the *one plus* (1+) as an element of the Positive One. So, let's return to the left side of the calculator and see if we can make some sense of the Negative One (-1).

Balancing the positive UN number system on the right, we can now imagine an opposite, but related, schematic of fractional counters on the left. These fractional counters can be used as a tool to identify the roots of —1 and other negative numbers.

We need not create inverse fractional negative numbers for each of the zillions of imaginable positive numbers. We need only create a logical way to identify the place where an inverse proximate fractional negative number may be found, if needed.

division of large numbers.

Scientific calculations, such as the decay of uranium, rely on logarithms where the rate of change is proportional to the quantity itself. If e is used as the base, the exponential function is equal to its own derivative.

Since the advent of electronic calculators, logarithm tables (and slide rules) are less useful; however, their logic continues to underlie mathematical calculations.

#### Calculating

Just as probabilities are imposed on the right side of the equation, "proximates" are required on the left. On the right, we measure what is, and on the left, we measure what is not. We multiply Positive One, +1 on the right, and we divide Negative One, —1 on the left.

On the positive plane of the calculator, Positive One is represented by *One*. On the negative plane, Negative One is represented by *0.WWWWWWWWWW*, which is composed of *WS* (252) elements of the base number *0.010U*. We can call this little fractional counter a *one minus*, or *iit* ("i-it").

To identify reciprocal negative numbers, we can create a logical WS- (252)-base mathematical language using these small, <u>four-</u> place fractional counters as symbolic digits. The *iit* counting series begins: .010U, .020N, .030S, .0U10, .041U, .051N, .061S, .0N20, .072U... and ends: .W9X0, .WSXU, .WCXN, .WXXS, .WWW0. The left *two* digits continue to advance sequentially, and the right *two* advance in sets of U.

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Using these symbolic counters, we can construct a matrix of these WS (252) fractional counters which can be subdivided into a logical system of fractional blocks having a rich mathematical relationship. (See Matrix 2.)

Among these fractional factors (as in the successive square roots of *e*) the number *seven* (<u>nine</u>) quickly appears. We see that 2U (<u>36</u>) divided by *seven* (<u>nine</u>) equals U (<u>four</u>), and that 100 (<u>252</u>) divided by *seven* (<u>nine</u>), equals 1S (<u>28</u>).

To subdivide the matrix into its fundamental configuration, we can divide WS (252) UN six (seven) for 2U (36). We can subdivide Matrix 2 by 2U (36) red lines into its basic configuration of sets of six (seven).

If we turn off the red dividers, we can imagine a different fundamental division of the matrix by 1S (28) equal subsets of *seven* (nine), which we can display with green lines.

In other logical subdivisions, we can evenly divide the matrix into 6X sets of *two*, 4U sets of *three*, 3W sets of *U*, 28 sets of *five*, 14sets of *S*, and 12 sets of *X*, simply by changing the colors and locations of the dividing lines.

#### Calculating

The negative matrix of fractional *iit* numbers is now logically organized into the subsets of *two, three, U, five, six, seven, S*, and *X*. These sets may be used to represent the factors and roots of negative numbers, *and the organization may be useful in coding instructions to binary computers*.<sup>20</sup>

Adding U more counters for a total of 100 symbols, the series .WWW0, 1.00WU, 1.01WN, 1.02WS, concludes with 1.0U00.

Now, instead of a  $\sqrt{e-2^2}$  positive number system conservatively erected on a marble cornerstone carved with the *one plus*, 1+, we are going to erect a giant, flashy neon sign for the *one minus*, 1- composed of 100 (256) unique symbolic counters, .010U through 1.0U00.

Expanding upon the concept of the multiplication matrix demonstrated in Table 1, imagine a plane consisting of a wall-sized, square grid of illuminated *iit* counters in boxes,

<sup>&</sup>lt;sup>20</sup> Recall how easily the Sumerian base-<u>60</u> language produced an amazingly accurate value for the square root of two and imagine the mathematical possibilities abundant in a fractional base-<u>252</u> system, each with <u>four</u> sub numbers.

with the fractional-number set extending 100 places across the top and down the left side, and with their elements filling in all the blank boxes, down to the bottom right-hand corner. The entire matrix of 1:000 (65,536) counters include the factors of these logically related fractional numbers.

After testing the fractional counters with a few calculations, we can imagine turning their lights off, and reprogramming the same matrix with the lights of the whole numbers, one through 100 (256) and with all their elements filled in.

If the digits on our wall of numbers are lighted during calculations, we can imagine the same boxes lighting up when multiplying the whole numbers or dividing the fractional counters. As far as the computer is concerned, it is the physical relationship of the elements, and not their symbols, that instructs the computer where to go.

The calculator should be capable of providing an unlimited supply of imaginary proximate fractional counters to represent, if

#### Calculating

called upon, the reciprocal negative inverse of every imaginable positive number.

Let us take another look at the positive plane of the calculator where something interesting appears in the powers of two that confirm the rationality of UN numbers. Now, the value of conversion to UN becomes crystal clear: 256 = 100, 512 = 200, 1,024 = 400, 2,048 = 800, and 4,096 = 1:000. (See Matrix 1.)

An improved ability to manipulate gigantic numbers could help solve one of the impediments to the construction of a working quantum computer. "A useful quantum computer *needs to process a set of continuous parameters that is larger than the number of subatomic particles in the observable universe.*"<sup>21</sup> (emphasis added)

There is no limit to the availability of probable positive and proximate negative numbers required to count everything we can ever imagine, or hope to discover, in or about our universe or eternity. These numbers will

<sup>&</sup>lt;sup>21</sup> Dyakonov, Mikhail, "The Case Against Quantum Computing," *IEEE Spectrum*, November 15, 2018.

allow us to surf the waves we are making, as the massive electromagnetic filaments of our universe of plasma and light pulsate through the cold, dark cosmic nothingness.

Let's stir up our imaginary mathematical recipe by integrating the two planes of the calculator. If we look down at the two matrices from directly above, we will see the top edges superimposed perpendicularly at their half points (+).

Moving our view down and looking at the positive and negative matrices face on, we find each on its own vertical plane, perpendicular to and facing one-half of the other. The matrix paddles rotate on a center axis and are bisected at their equator by an invisible horizontal perpendicular plane, dividing the space surrounding the paired matrices into a set of Cartesian Coordinates.

We can now imagine the matrix paddles of flashing positive and negative numbers, and neon dividing lines, spinning the waves of their probable and proximate numbers within reverse spinning, transparent spheres. Calculating



Replacing Cartesian with universal spherical coordinates in the center of the UN geometric sphere, every lighted number, including its sub numbers—every conceivable element in both matrices—can be specifically identified by a unique spherical coordinate point.

The spinning lighted elements can be seen circling and penetrating the other matrix at a probable and proximal point where inversion takes place in the autonomous AI brain of the computer.

The calculator may be imaginary, but computers programmed with matrix coordinates and calibrated constant reference

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numbers, should be capable of making proximately correct calculations, with far less difficulty than at present.

Independent of the ability of UN to simplify calculations, the use of UN as a coding language should simplify and multiply the tools available to programmers and machine learning applications.

Prime numbers and *e* are constant throughout the calculator, but each matrix plane has its own value of *Pi* and *Phi* to calibrate the sets of negative and positive numbers. Each element has its own rational relationship to *Pi* and *Phi*.

Correlated by these constant numbers, the imaginary UN calculator may reliably produce less complicated and more practical mathematical solutions with a reasonable degree of accuracy—irrespective of the magnitude of the problem.

Using probable whole numbers in the positive matrix and proximate fractional counters in the negative matrix, inverse and simultaneous calculations should be possible. One side is retrogressive from

#### Calculating

0.WWWWWWWWW, and the other is progressive from 1.000000001.

Negative One has the same proximate numerical value as Positive One. The difference between the two is not zero, but the infinitesimal 0.00000001—tipped to the positive side. The imaginary zero doesn't count—there is only the adjacent negative and positive ones.

Recall that the component set of rational fractional counters within Negative One derives from Archimedes' calculation of Pi using <u>22/7</u>. This fraction was already ancient in his day, as it had served as the basic plan of the Great Pyramid (which incorporates the geometric values of both Pi and Phi).

In UN, the proximate geometric value of Pi is 3.2U7; its square is 5.U72; and one half is 1.72U. These fractional numbers add up to 0.WWW, and they all resolve down to 0.010U, the *iit*, which itself adds up WS times to 0.WWW0.

If we multiply *iit* 12 (<u>18</u>) times, 0.010U becomes the very elegant 0.12UN, and 0.12UN times X (<u>14</u>) produces 0.WWW.

Composed of *S* ("*star*") *iits*, a sparkling little number, 0.0S3 (point zero star three) appears. Three times 0.0S3 produces 0.2U7, and 14 (21) times 0.0S3 equals 0.WWW.

The fractional base can define proximate numbers for *Pi* and *Phi*. Thus, geometric *Pi* equals 3.2U7, which is 2W5 times 0.010U. Using another ancient fraction, <u>14/11</u>, we get the proximate geometric square root of the Golden Proportion ( $\varphi$ ). Converted to UN,  $\sqrt{\varphi} = X/9 = 1.U4C16U4C$ .

*Phi* appears (along with *Pi*) in the Fibonacci series as a fraction, which produces the exact scientific Golden Ratio in UN as 1.7X366797. Its square is 2.7X366797 (having the identical decimal sequence), and the square root of *Phi* is 1.U4831U587. The geometrical fractional square root is 1.U4C16U4C.

Whole UN numbers in the positive matrix share the fractional harmony; however, the "rounded off" scientific values for *Pi* (3.2U3W58NNN) and *Phi* (1.7X366797) are foundational. As such, they serve as a positive calibration of their negative geometric counterparts. The calculator assumes the

#### Calculating

proximate equivalence of these numbers to simplify equations and to balance the books.

Both sides of the calculator share the same prime numbers, and both rely on the same constant value for e, 2.96X14152N, including its successive square roots. Both UN Pi and eessentially round off at N, and Phi is only significant as a ratio for N (8) places.

The negative matrix starts out at the top with a large fractional number and works downward in small bits of *iit*, while the positive matrix starts out with a very small positive number and works upward, one *eit* at a time—all according to the logarithms of *e and eit*, the harmony of *Phi*, and the probabilities of *Pi*.
# FORMULATING

Can we demonstrate, in a useful formula, what we have been thinking about in these papers?

We can "cube" energy (E) by multiplying it by itself three times to encapsulate the entirety of energy within a mathematical cube governed by the randomness of *Pi*.

Then, on the mass side, we can balance the equation by increasing mass (M) N (<u>eight</u>) times to encompass its entirety within a mathematical cube limited by *e*.

Einstein magnified gravity by  $\underline{8\pi}$  and divided the product by the speed of light to the <u>fourth</u> power, to reduce these factors in his field equations. Now that we are cubing energy and increasing mass <u>eight</u> times, are we also free to reverse Einstein's reduction of light speed? What happens if we refocus the speed of light (C) to its U<sup>th</sup> (fourth) power?

Moving at the <u>fourth</u> power of light, how long do you think it would take you to cross the estimated <u>880,000,000,000,000,000,000</u>,000 kilometers spanning the diameter of our observable universe? Perhaps as quick as <u>3.6</u> seconds!

The difference between the speeds of light may depend if the observer is on the inside, or on the outside, of the universe, while holding the stopwatch. The difference is a matter of perspective. Perhaps a more accurate way of looking at light is to see its speed (C) within our universe of plasma as the <u>fourth</u> successive square root of its true speed,  $v\sqrt{C}$ .

Time does not exist beyond the living plasma in the negative dark cosmos. There are no clocks ticking, nor does speed have limits.

Just the idea that our perceived galactic universe could become almost instantaneously accessible will forever change the way we look at our place and time. We will no longer be from here and now; we will be everywhere and then, and we will have always been there—and here.

Everything we have discovered about the constant numbers establishes that *Pi* and *e* are integral to the physical description of energy

### Calculating

and mass. So, what if we multiply E by *Pi* and M by *e*? Energy on the left will be composed of pieces of *Pi*, and Mass on the right will be composed of bits of *e*.

By establishing essential values for the two primary factors of the equation, we can account for the participation of mind in establishing outside working boundaries for energy and mass.

An imaginary formula equating mind with energy *and* mass, establishing a framework outside our perceived universe of plasma, might read:

# $(\square E)^{3} = N(eM)C^{U}$

# CONTEMPLATING

Sitting here alone in my study in the quiet, dark, early morning hours, listening to the crickets outside the window, trying to recapture the images that flowed through the dream that pulled me from my bed and the side of my wife, I imagine our physical universe of light and struggle for the words to describe what I envision with and within my mind. This book opened with the idea that mass is stupid, but, as we've learned, its progeny is mind, which is brilliant—and enduring.

In about 4.5 billion years, our Milky Way galaxy will merge with Andromeda, our closest galactic neighbor. The two dynamos at their cores will become one, but there are such vast distances between their stars that few, if any, will ever actually collide. The only sadness will be the breakup of the bars of our lovely Milky Way spiral, as they disintegrate into a larger elliptical galaxy.

#### Mind & Its Languages of Reason

Even if we survive the galactic union, this warm water garden we call Earth will probably be destroyed at about the same time, when our sun consumes all its core hydrogen, and its helium begins to burn. Sol will balloon into a "red giant," expanding out as far as Earth's orbit before collapsing into a "white dwarf" star. It, and its residual solar system, will orbit about—in the merged galaxy—every 200 million years, or so, for a very long time to come.<sup>22</sup>

The minds generated by our universal mass will, however, endure, along with everything they ever imagined or created. Unimpeded, the soul of our minds will live on eternally to observe other galactic gardens of life and mind, and to watch, nurture, and love the minds they generate, and their creations.

<sup>&</sup>lt;sup>22</sup> In my imagination, I sometimes wonder if there could be only one such star and planet in each galaxy. Out of the multitude, there may be only one warm yellow star near the edge of a spiral galaxy, orbited by a warm water planet, itself circled by a large silver moon to drive the tides of its oceans, washing the land, and giving rise to life and mind. Even so, there are at least 100 billion, and as many as 2 trillion galaxies in our universe of plasma and light—more than enough to start a conversation.

#### Contemplating

It is mind—the observer of the movement, relativity, and probabilities of mass—that creates the dimension of time, the reality of eternity, and the rewards of learning, love, and joy.

As we gather here on Earth at the dawn of a new millennium, our science and mathematics have provided us with marvelous tools allowing us to look outward through space and time to perceive an unlimited, static universe of plasma without a beginning or end.

We have walked on the moon, landed rovers on Mars, and sent probes to the edge of our solar system. Machines now permit us to peer inside the molecules, atoms, and particles that compose the elements of our existence, and all we behold. Other devices scan our brains and reveal the physical processes by which we experience life, language, and emotions.

Our technology has provided all of this and much more, including a longer and easier life for most. It has also handed us the means of our self-destruction. We now stand at the brink of human extinction due to environmental, economic, political, militaristic, and philosophical threats. Destroying our environment and the

### Mind & Its Languages of Reason

continued manufacture and deployment of atomic, biological, and chemical weapons cannot help but have a bad ending for the future of our children and the survival of human society.

Whether we die off or fly beyond the stars lies entirely within our own minds, and it is there that responsibility resides. The choices to be made are ours, and ours alone. The time, however, for decision-making is now upon us, and we will either unite and survive, or we shall perish separately. There is no escape from this reality, but alternative futures are always available, each depending upon the choices we make—right now.

~wjc

## MATRIX 1

# THE POWERS OF *TWO* AND THE VALUE OF *ONE PLUS* IN BASE-<u>10</u> AND *UN*

Powers	Base 10 and U	1+ = √e		
2 <sup>1</sup>	2	2	7 ( <u>9)</u>	
2 <sup>2</sup>	4	U	12 ( <u>18)</u>	
2 <sup>3</sup>	8	N	19 ( <u>27)</u>	
2 <sup>0</sup>	16	10	2U ( <u>36</u> )	
2 <sup>4</sup>	<u>32</u>	20	2C ( <u>45)</u>	
2 <sup>5</sup>	64	U0	35 ( <u>54</u> )	
2 <sup>6</sup>	128	N0	3W ( <u>63</u> )	
2 <sup>N</sup>	256	100	UN ( <u>72</u> )	
2 <sup>7</sup>	<u>512</u>	200	41 ( <u>81</u> )	
2 <sup>8</sup>	<u>1,024</u>	U00	48 ( <u>90)</u>	
2 <sup>9</sup>	<u>2,048</u>	N00	53 ( <u>99)</u>	
2 <sup>S</sup>	<u>4,096</u>	1:000	5S ( <u>108</u> )	
2 <sup>C</sup>	8,192	2:000	64 ( <u>117</u> )	
2 <sup>X</sup>	16,384	U:000	6X ( <u>126</u> )	
2 <sup>W</sup>	32,768	N:000	N6 ( <u>135</u> )	
2 <sup>10</sup>	65,536	10:000	70 ( <u>144</u> )	
2 <sup>11</sup>	<u>131,072</u>	20:000	77 ( <u>153</u> )	
2 <sup>12</sup>	<u>262,144</u>	U0:000	82 ( <u>162</u> )	
2 <sup>13</sup>	<u>524,288</u>	N0:000	89 ( <u>171</u> )	
2 <sup>1U</sup>	<u>1,048,576</u>	100:000	9U ( <u>180</u> )	
2 <sup>14</sup>	2,097,152	200:000	9C ( <u>189</u> )	
2 <sup>15</sup>	4,194,304	U00:000	S5 ( <u>198)</u>	
2 <sup>16</sup>	8,388,608	N00:000	SW ( <u>207</u> )	
2 <sup>1N</sup>	16,777,216	1:000:000	C9 ( <u>216</u> )	
2 <sup>17</sup>	<u>33,554,432</u>	2:000:000	X1 ( <u>225)</u>	
2 <sup>18</sup>	67,108,864	U:000:000	X8 ( <u>234)</u>	
2 <sup>19</sup>	134,217,728	N:000:000	W3 ( <u>243)</u>	
2 <sup>15</sup>	268,435,456	10:000:000	WS ( <u>252</u> )	
2 <sup>1C</sup>	<u>536,870,912</u>	20:000:000	104 ( <u>261)</u>	
2 <sup>1X</sup>	<u>1,073,741,824</u>	U0:000:000	10X ( <u>270</u> )	
2 <sup>1W</sup>	<u>2,147,483,648</u>	N0:000:000	117 ( <u>279</u> )	
2 <sup>20</sup>	4,294,967,296	100:000:000	120 (288)	

## MATRIX 2

## THE UN FRACTIONAL COUNTERS

	7						. 1 01 100
~	•						- 1.0000
b	• .2U70	• .U720	• .5C90	• .72U0	• .95C0	• .C950	• .WWW0
	<ul> <li>.23NS</li> </ul>	<ul> <li>.UN1S</li> </ul>	<ul> <li>.5S8S</li> </ul>	<ul> <li>.713S</li> </ul>	<ul> <li>.94SS</li> </ul>	<ul> <li>.C84S</li> </ul>	<ul> <li>.wxws</li> </ul>
	<ul> <li>.22NN</li> </ul>	<ul> <li>.U61N</li> </ul>	<ul> <li>.598N</li> </ul>	<ul> <li>.703N</li> </ul>	<ul> <li>.9USN</li> </ul>	<ul> <li>.C74N</li> </ul>	<ul> <li>.WCWN</li> </ul>
	<ul> <li>.21NU</li> </ul>	<ul> <li>.U51U</li> </ul>	<ul> <li>.588U</li> </ul>	<ul> <li>.NW3U</li> </ul>	<ul> <li>.93SU</li> </ul>	<ul> <li>.CN4U</li> </ul>	<ul> <li>.wswu</li> </ul>
	• .20N0	• .U410	• .5780	<ul> <li>.NX30</li> </ul>	·.92S0	<ul> <li>.C640</li> </ul>	<ul> <li>.W9X0</li> </ul>
	<ul> <li>.1W6S</li> </ul>	<ul> <li>.UU0S</li> </ul>	<ul> <li>.5N7S</li> </ul>	<ul> <li>.NC2S</li> </ul>	<ul> <li>.919S</li> </ul>	<ul> <li>.C5US</li> </ul>	<ul> <li>.W8CS</li> </ul>
	<ul> <li>.1X6N</li> </ul>	<ul> <li>.U30N</li> </ul>	<ul> <li>.567N</li> </ul>	<ul> <li>.NS2N</li> </ul>	<ul> <li>.909N</li> </ul>	<ul> <li>.C4UN</li> </ul>	• .W7CN
	<ul> <li>.1C6U</li> </ul>	<ul> <li>.U20U</li> </ul>	<ul> <li>.557U</li> </ul>	<ul> <li>.N92U</li> </ul>	• .8W9U	<ul> <li>.cuuu</li> </ul>	<ul> <li>.WNCU</li> </ul>
	<ul> <li>.1S60</li> </ul>	•.U100	• .5470	<ul> <li>.N820</li> </ul>	<ul> <li>.8X90</li> </ul>	•.C3U0	<ul> <li>.W6C0</li> </ul>
	<ul> <li>.195S</li> </ul>	<ul> <li>.3WWS</li> </ul>	<ul> <li>.5UNS</li> </ul>	<ul> <li>.N71S</li> </ul>	<ul> <li>.8C8S</li> </ul>	• .C23S	<ul> <li>.W5SS</li> </ul>
	<ul> <li>.185N</li> </ul>	<ul> <li>.3XWN</li> </ul>	<ul> <li>.53NN</li> </ul>	<ul> <li>.NN1N</li> </ul>	<ul> <li>.8S8N</li> </ul>	<ul> <li>.C13N</li> </ul>	<ul> <li>.W4SN</li> </ul>
	• .175U	<ul> <li>.3CWU</li> </ul>	<ul> <li>.52NU</li> </ul>	<ul> <li>.N61U</li> </ul>	<ul> <li>.898U</li> </ul>	<ul> <li>.C03U</li> </ul>	<ul> <li>.wusu</li> </ul>
	•.1N50	<ul> <li>.3SW0</li> </ul>	•.51N0	<ul> <li>.N510</li> </ul>	• .8880	• .SW30	•.W3S0
	• .164S	• .39XS	• .506S	<ul> <li>.N40S</li> </ul>	• .877S	<ul> <li>.SX2S</li> </ul>	• .W29S
	• .154N	<ul> <li>.38XN</li> </ul>	<ul> <li>.4W6N</li> </ul>	<ul> <li>.NUON</li> </ul>	<ul> <li>.8N7N</li> </ul>	<ul> <li>.SC2N</li> </ul>	<ul> <li>.W19N</li> </ul>
	• .144U	<ul> <li>.37XU</li> </ul>	<ul> <li>.4X6U</li> </ul>	<ul> <li>.N30U</li> </ul>	<ul> <li>.867U</li> </ul>	<ul> <li>.SS2U</li> </ul>	• .W09U
	• .1U40	<ul> <li>.3NX0</li> </ul>	<ul> <li>.4C60</li> </ul>	<ul> <li>.N200</li> </ul>	• .8570	<ul> <li>.S920</li> </ul>	• .XW90
	<ul> <li>.13US</li> </ul>	• .36CS	<ul> <li>.4S5S</li> </ul>	<ul> <li>.NOWS</li> </ul>	<ul> <li>.84NS</li> </ul>	<ul> <li>.S81S</li> </ul>	• .XX8S
	<ul> <li>.12UN</li> </ul>	<ul> <li>.35CN</li> </ul>	<ul> <li>.495N</li> </ul>	<ul> <li>.6WWN</li> </ul>	<ul> <li>.8UNN</li> </ul>	<ul> <li>.S71N</li> </ul>	<ul> <li>.XC8N</li> </ul>
	<ul> <li>.11UU</li> </ul>	<ul> <li>.34CU</li> </ul>	<ul> <li>.485U</li> </ul>	<ul> <li>.6XWU</li> </ul>	<ul> <li>.83NU</li> </ul>	<ul> <li>.SN1U</li> </ul>	<ul> <li>.XS8U</li> </ul>
	•.10U0	<ul> <li>.3UC0</li> </ul>	<ul> <li>.4750</li> </ul>	• .6CW0	• .82N0	<ul> <li>.S610</li> </ul>	<ul> <li>.X980</li> </ul>
	• .0W3S	<ul> <li>.33SS</li> </ul>	<ul> <li>.4N4S</li> </ul>	<ul> <li>.6SXS</li> </ul>	· .826S	<ul> <li>.S50S</li> </ul>	<ul> <li>.X87S</li> </ul>
	<ul> <li>.0X3N</li> </ul>	<ul> <li>.32SN</li> </ul>	<ul> <li>.464N</li> </ul>	<ul> <li>.69XN</li> </ul>	<ul> <li>.806N</li> </ul>	<ul> <li>.S40N</li> </ul>	<ul> <li>.X77N</li> </ul>
	<ul> <li>.0C3U</li> </ul>	<ul> <li>.31SU</li> </ul>	• .454U	<ul> <li>.68XU</li> </ul>	<ul> <li>.7W6U</li> </ul>	<ul> <li>.SU0U</li> </ul>	• .XN7U
	·.0S30	<ul> <li>.30S0</li> </ul>	• .4440	• .67X0	<ul> <li>.7X60</li> </ul>	<ul> <li>.S300</li> </ul>	<ul> <li>.X670</li> </ul>
	· .092S	<ul> <li>.2W9S</li> </ul>	<ul> <li>.4UUS</li> </ul>	<ul> <li>.6NCX</li> </ul>	<ul> <li>.7C5S</li> </ul>	<ul> <li>.S1WS</li> </ul>	<ul> <li>.X5NS</li> </ul>
	<ul> <li>.082N</li> </ul>	<ul> <li>.2X9N</li> </ul>	<ul> <li>.43UN</li> </ul>	<ul> <li>.66CN</li> </ul>	<ul> <li>.7S5N</li> </ul>	<ul> <li>.SOWN</li> </ul>	<ul> <li>.X4NN</li> </ul>
	• .072U	<ul> <li>.2C9U</li> </ul>	<ul> <li>.42UU</li> </ul>	• .65CU	<ul> <li>.795U</li> </ul>	• .9WWU	<ul> <li>.XUNU</li> </ul>
	<ul> <li>.0N20</li> </ul>	<ul> <li>.2S90</li> </ul>	• .41U0	<ul> <li>.64C0</li> </ul>	<ul> <li>.7850</li> </ul>	• .9XW0	• .X3N0
	• .061S	<ul> <li>.298S</li> </ul>	· .403S	<ul> <li>.6USS</li> </ul>	• .774S	<ul> <li>.9CXS</li> </ul>	• .X26S
	• .051N	<ul> <li>.288N</li> </ul>	<ul> <li>.UW3N</li> </ul>	<ul> <li>.63SN</li> </ul>	<ul> <li>.7N4N</li> </ul>	<ul> <li>.9SXN</li> </ul>	<ul> <li>.X16N</li> </ul>
	• .041U	<ul> <li>.278U</li> </ul>	<ul> <li>.UX3U</li> </ul>	<ul> <li>.62SU</li> </ul>	• .764U	• .99XU	• .X06U
	• .0U10	<ul> <li>.2N80</li> </ul>	<ul> <li>.UC30</li> </ul>	•.61S0	• .7540	• .98X0	<ul> <li>.CW60</li> </ul>
	· .030S	· .267S	<ul> <li>.US2S</li> </ul>	· .609S	• .74US	• .97CS	• .CX5S
	• .020N	<ul> <li>.257N</li> </ul>	<ul> <li>.U92N</li> </ul>	<ul> <li>.5W9N</li> </ul>	• .7UUN	<ul> <li>.9NCN</li> </ul>	<ul> <li>.CC5N</li> </ul>
lit	• .010U (1-)	<ul> <li>.247U</li> </ul>	<ul> <li>.U82U</li> </ul>	<ul> <li>.5X9U</li> </ul>	<ul> <li>.73UU</li> </ul>	<ul> <li>.96CU</li> </ul>	<ul> <li>.CS5U</li> </ul>

# ATTRIBUTIONS AND RESERVATIONS

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# WILLIAM JOHN COX

For more than 45 years, William John Cox has written extensively on law, politics, philosophy, and the human condition. During this time, he has vigorously pursued a career in law enforcement, public policy, and the law.



As a young police officer, Cox wrote the Role of the Police in America as a part of the "New Breed" movement to define and professionalize law enforcement. As an attorney, he worked for the U.S. Department of Justice to implement national criminal justice standards and goals, prosecuted cases for the Los Angeles County District Attorney's Office, and operated a public interest law practice primarily dedicated to the defense of young people.

### Mind & Its Languages of Reason

Cox volunteered *pro bono* services in several landmark legal cases. In 1979, he filed a class-action lawsuit on behalf of all citizens directly in the U.S. Supreme Court alleging that the government no longer represented the voters who elected it.

In 1981, representing a Jewish survivor of Auschwitz, Cox investigated and successfully sued a group of radical right-wing organizations that denied the Holocaust. He later represented a secret client and arranged the publication of almost 1,800 photographs of ancient Dead Sea Scrolls that had been suppressed for more than 40 years.

Cox concluded his legal career in 2007 as a Supervising Trial Counsel for the State Bar of California, where he prosecuted dishonest lawyers and criminal gangs engaged in the illegal practice of law.

Continuing to contemplate public policy, political, and philosophical matters since his retirement, Cox has been writing books and creating Internet websites. His digital autobiography is at WilliamJohnCox.com, where his books, articles, videos, and photographs can be downloaded without cost.