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God, the Logos and Evolution:
The Development of the Universe and of Life is a Progressive Expression of the Logos

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Abstract

While most religious philosophies have God directly involved in creating the Universe, Unification Thought locates all of God's creative effort in the creation of the Logos (the Word of God, Natural Law). The Logos guided the evolution of the universe up to the Origin of Man. This was (symbolically) God's 95% responsibility. The remaining 5% to complete the Purpose of Creation was Human Responsibility.

Key words: Logos, Wavefunction, Creation, Evolution, Human Origin

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The influence of abstract laws on substantial matter was mysterious in classical science, and gave rise to Nobel Laureate Eugene Wigner famous essay on "The Unreasonable Effectiveness of Mathematics in the Natural Sciences."[1] Another puzzle was the important concept of free will—if laws ruled, where was the possibility of free choice.

Quantum science indirectly solves both conundrums with its much more sophisticated understanding of the nature of matter.

1. Nature of Matter

Classical science was—and still is in high-school classes—simple materialism; matter moving about under the influence of forces in the external world of the senses. The discovery that matter was composed of atoms, atoms were composed of electrons and protons, and that matter and energy were so similar that they could be interconverted, altered the view of what matter was, but not that it was all external stuff.

Quantum science utterly shattered this simple view of existence, so much so that even after ~100 years of acquaintance with the revolution, you still encounter bemusement expressed in phrases such as "The quantum world is mind-bogglingly weird." Even one of the quantum luminaries, Nobel laureate Richard P. Feynman, admitted to being uncomfortable with the innovation in the title of his brilliant 1985 book, *QED: The Strange Theory of Light and Matter*[2] written for the layman.

We will only need to discuss one of the major changes here, proved by endless experiments: that matter has an intangible *internal* wavefunction along with the tangible *external* particle-aspect to matter.

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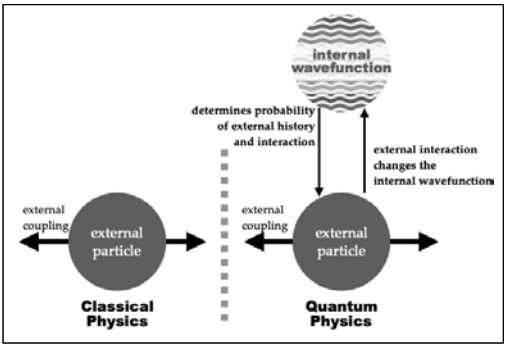
1) Eugene Wigner, Communications in Pure and Applied Mathematics, vol. 13, No. I (New York: John Wiley & Sons. 1960).

2) Richard Feynman, *QED: The Strange Theory of Light and Matter* (N.J. Princeton: Princeton University Press, 1985).

The internal wavefunction is abstract and can only be fully described by *complex* numbers—numbers with size and rotation—while the external particle can be described with the familiar *real* numbers—those with size only—used in classical physics.



It is the presence and behavior of this internal wavefunction that is so strange and weird to the classically-trained mind. In this new science, these internal and external aspects have an intimate relationship:

A. The wavefunction generates the probability of how the particle will change its state and externally interact with others.

B. The external interactions generate change in, and development of, the internal wavefunction.

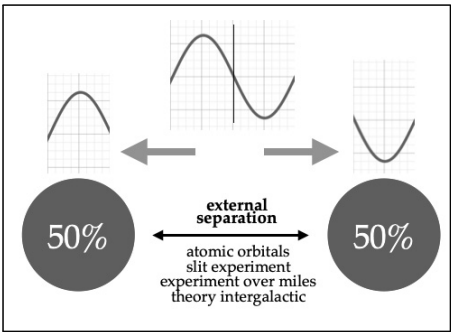
For *Unification Thought,* this is not strange or weird as its basic concept of matter is that all things have an internal *inherent directive nature* expressed in an *external form.*

1) The Wavefunction

It is important to note that quantum probability created by the wavefunction is quite different from classical probability. Thermodynamic classical concepts such as temperature and pressure are calculated probabilistically as it is impossible to follow individually the trillion trillion atoms in even a small amount of matter. Probability is used here to deal with ignorance.

Quantum probability is quite different. Its extreme power is often expressed in Gell-Mann's totalitarian principle: "Everything not forbidden is compulsory." It underlies the exclusion principle that structures the periodic table of the elements. It can support the weight of a star in a white dwarf.

What must be the strangest addition to the scientific canon and our view of reality by wavefunction probability—Einstein called it "spooky"—is the phenomenon of entanglement.



The subjectivity of the internal over the external is so powerful that it is indifferent to the spatial separation that is so significant externally. If, for instance, the wavefunction separates into two lobes, each of which generates a 50% probability that the external particle will be found there, the particle will quantum jump back-and-fore between the two lobes. It will spend 50% of the time in each lobe and zero time anywhere else. This quantum jumping is utterly indifferent to the separation of the two lobes.

Established examples of this "spooky" action at a distance are the nanometer separation between lobes in an atomic orbital; the centimeter separation in slit experiments, over 4 kilometers separation under the city of Vienna; and a record quantum teleportation over 144 kilometers between two of the Canary Islands.[3)]

Impressive as a technical feat, theory states that interstellar and intergalactic distances are just as equally ignored. The field of entanglement is in its infancy, rather like electricity when Volta made frog muscles twitch. But the coming Age of Entanglement has the

3) X.-S. Ma, A. Zeilinger et al, "Quantum teleportation over 143 kilometers…," *Nature* 489 (2012). 269-273.

potential to be just as revolutionary.[4)]

Note that this is not a phenomenon restricted to simple things like photons or electrons. For a while, the record was with buckyballs—a ball of 60 carbon atoms—but the new record is the massive molecule $C_{284}H_{190}F_{320}N_4S_{12}$.[5)] While not yet bacteria-sized— let alone human-sized—it is a good beginning.

If this sounds like teleportation from science fiction or the "Beam me up, Scotty" of the *Star Trek* franchise; it is. The universe is filled with entangled pairs that have been separating for millions of years. These non-local connections that are bombarding the Earth can be thought of as God's preparation for a way for humanity to expand beyond the Earth. One challenge is *decoherence*; any interaction will alter the wavefunction and destroy the non-local connection. Two things avoid this: Outer space is so empty that particles can cross billions of miles without interacting; and the Moon has no atmosphere, so entangled particles arrive there in pristine condition. I examine this topic further in another essay.[6)]

2) Action of Natural Law

In classical physics, natural law (whatever it was; its nature was rarely discussed by scientists) was considered to act directly upon tangible, external matter. Actually, this was an unspoken assumption as there was no other place for it to work.

In the new quantum view of reality, the Natural Law (as called by scientists), the Logos (as called by Unification Thought), works solely on the internal, intangible wavefunction.

Natural Law determines the shape of the wavefunction when the system is not interacting,

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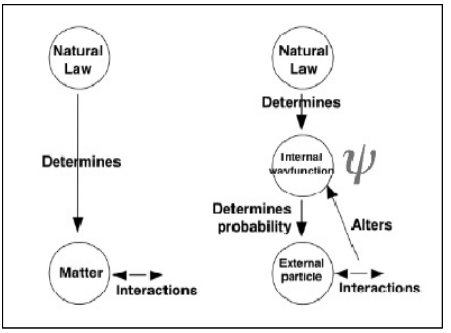
4) Louisa Gilder, *The Age of Entanglement: When Quantum Physics was Reborn* (NY: Alfred Knopf, 2008)

5) S. Eibenberger et al, Phys. Chem. Chem. Phys., 2013, 15, 14696-14700.

6) Richard L. Lewis, "Dual Characteristics and Interstellar Travel," *Unification Science* (Asan: Sun Moon University Press, 2019), 211-240.



and what change occurs there when interactions occur. For example, natural law determines the shape of the atomic orbitals (the chemist's name for the atomic wavefunction). This law is accurately described by Schrodinger's Equation where the orbital is symbolized by the Greek letter psi (Ψ). For example, it is impossible for two electrons to be in the same state. Not just a small probability, not even an infinitesimal one, but totally zero in the way that $(+1) + (-1) = 0$. It is this that underlies the Pauli Exclusion Principle that only allows two electrons of opposite spin to share an orbital. Additional ones have to be in higher orbitals.

3) Interaction

There are four basic interactions known to physics. One of these, gravity, is unique in that it involves the bending of spacetime.[7] The other three fundamental interactions—the weak nuclear force, the electromagnetic force, and the strong nuclear force—along with the other interactions studied in science, all involve the external coupling of systems with subsystems from their composite structure.

This is not so obvious for something like an electron which, in common parlance, is labeled a *fundamental particle* without an internal structure. That this is incorrect involves yet another non-classical aspect of the new science.

In classical science, existence, space, time, etc. were all considered to be smooth and continuous. Not so in modern science, rather they all come in 'pixels' (called quanta) that are so small that we cannot resolve them with our senses. Like the pixels on a

7) A. Zee, *Einstein Gravity in a Nutshell* (Princeton University Press, 2013).

computer screen, our sense of sight blends RGB pixels into smooth continuous white and a palette of a million colors.

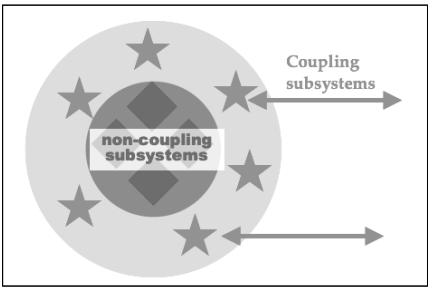
The first to notice this pixelation was Max Planck who realized that existence—called *the action* in science with dimensions of energy-in-time—was pixelated. This is so tiny—a minuscule 0.000,000,000,000,000,000,000,000,000,000,000,06 joules seconds—that we consider existence as smooth, not jumpy. In order to have a *real* existence, however, an entity has to have at least one unit of action.

To commemorate this epochal discovery, a pixel of existence is called Planck's Constant; of space a Planck Length; of time a Planck Time; etc. Every photon, from low energy radio waves to high energy gamma rays has exactly one pixel of existence, the energy, E, and time-period, T, of each photon are reciprocals that multiply to unity (in Planck units).

$$1/6E \times 6/1T = 1000/1E \times 1/1000T = 1$$

Spacetime, however, can twist into entities that exist for so brief a moment that they do not amount to a pixel of existence. These are *virtual,* not *real,* entities and the electron is surrounded by such virtual photons. Half of these are lineally polarized—and collectively called the *electric field*—while others are circularly polarized—the *magnetic field*—surrounding the electron. While they are not really *real*, the attempt to push together the N-poles of two strong magnets is a personal experience of a halo of virtual photons that refuse to share their space.

Surrounded by this halo, the electron is actually a composite system, and it can couple with virtual photons from its structure. In the same way, atoms can couple with some of their electrons, molecules with some of their atoms, cells with molecules, etc. Systems usually

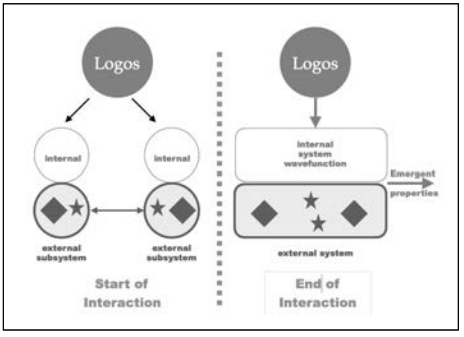


only couple with some of their subsystems—the variable subsystems—but not with others —the constant subsystems. Atoms, for instance, couple with electrons and virtual photons, but never with protons and neutrons.

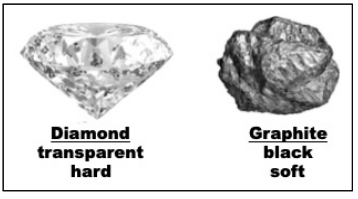
2. Systemic Hierarchy

1) System wavefunction

Systems are composed of interacting subsystems coupling with their subsystems. This interaction alters the internal aspect of the subsystems which blend together, as governed by the Logos, into the internal aspect of the systems. For example, the internal aspect of an atom—the atomic wavefunction —is the lawful blending together of the wavefunctions of the atomic nucleus and all the electrons.



When subsystems interact and blend their wavefunctions lawfully, the resultant systems inherit from the Logos a set of *emergent properties* that are absent in the subsystems. Neither an electron nor a proton exhibit chemical valence; when they unite, however, the property of chemical valence is inherited from the Logos. An example is carbon atoms which can interact in two different ways as subsystems and their atomic wavefunctions blend in two different lawful ways to inherit two quite different sets of emergent properties from the Logos: one opaque black and greasy graphite, the other transparent adamantine diamond. Same



stuff, different wavefunction.

While the concept of *emergent property* was one in classical science, there was no explanation of just where this novelty arose from.

2) Emergent Properties

At every level of Creation, systems come together externally in a situation where they can interact under the influence of the Logos. This can take a variable time period. Then the systems can interact by coupling with their subsystems, becoming interacting subsystems in a higher system.

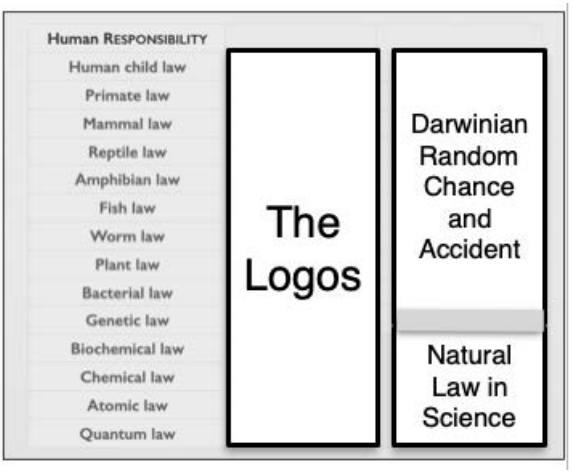
This higher system has emergent properties that are inherited from the Logos and not possessed by the subsystems. These properties can be simple, such as chemical valence and hydrogen bonding by atoms and molecules; more sophisticated such as manipulation of analog form by proteins and digital information by nucleic acids; or very sophisticated such as life in cells and mind in the animal brain.

Interacting subsystems	System	Emergent Properties
electrons & nuclei	atoms	Chemical valence
Carbon, oxygen etc. atoms	monomer molecules	Chemical activity
Amino acid monomers	Proteins	Manipulation of molecules
Nucleotide monomers	Nucleic acids	Manipulation of digital information
Proteins, nucleic acids, etc	Cells	Life
Glia & neuronal cells, etc.	Brain	Human mind

3. The Logos and Creation

In *Unification Thought*, all of God's creative effort went into the design of The Logos

and the emergent properties that would be revealed in the hierarchy of created systems. The Logos is a sophisticated expansion of the concept of 'natural law.'



Current science only recognizes Law as acting at the very simplest levels of sophistication on up to simple biochemistry. The higher levels are assigned to contingency.

If science had a dogma it would be: The Universe is fundamentally ruled by Natural Law. While most people assume that scientists view natural law as working at all levels in the hierarchy of science, this is currently not true in the life sciences where Darwinian random change, natural selection and contingency—not natural law—are thought to govern evolutionary advance.

God expressed all the levels of His nature into the Logos, except for the highest level. This level is the individual "I Am, I am Love, I am the Creator" that can only be freely expressed and cannot be preprogrammed by Law. True creativity, freely given love and development of an individual personality must be developed by the self, not by an external coercion.

God created the Logos then set it in action.

1) The Big Bang

The Logos generated the Planck-sized speck of False Vacuum[8] the Planck Moment that marked the Origin of the Universe. This concept was introduced into science in the 1980s by Alan Guth *et al* and currently is a topic of intense debate. This speck inflated exponentially, doubling every Planck Moment, exploded as the Hot Big Bang and collapsed into regular spacetime which has continued to expand to this day. This topic is explored in more detail in another essay.[9]

Even though science is exploring the dozens of states that appeared, evolved and disappeared[10] during this birth of the universe, it was essentially complete after three minutes. This natal universe was filled with hot plasma with 100,000,000,000 gamma-ray photons for each nucleon of matter. The Biblical "Let there be Light" got it correct to the billionth decimal place!

2) Elementary Entities

While most of the energy of the Big Bang was in the photons, a tiny fraction was in the twisted spacetime that we call electrons, protons, and helium nuclei (protons and neutrons) that also emerged from the maelstrom of the First Three Minutes.[11]

Modern science has discovered that the external stuff of the universe comes in two basic varieties with properties inherited from the next level of the Logos:

1. The quanta of **matter**, called fermions. Examples are the familiar electrons and the elusive quarks confined as triplets in protons and neutrons. 2. The quanta of **force**,

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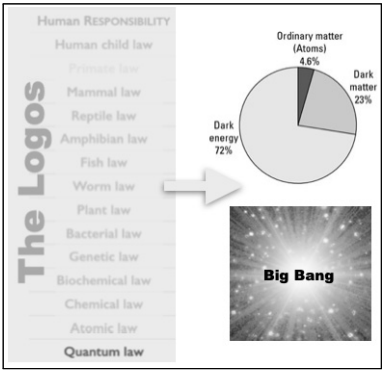
8) https://ned.ipac.caltech.edu/level5/Guth/Guth3.html.

9) Richard L. Lewis, "Bent and Twisted Spacetime," *Unification Science* (Asan: Sun Moon University Press, 2019), 19.

10) Harald Fritzsch, *The Creation of Matter: The Universe from Beginning to End* (NY: Basic Books, 1984).

11) Steven Weinberg, *The First Three Minutes: A Modern View of the Origin of the Universe* (NYC: Basic Books, 1977).

called bosons. The familiar photons of radio, light and X-rays are bosons that couple the electromagnetic force, as are the less familiar bosons of the Weak and Strong nuclear forces. Both types are important to the structure and functioning of material systems. I discuss them in detail in another essay.[12)]



It was only recently that it was discovered that this was not all that emerged from the Big Bang. First came the shock of finding that the universe had much more Dark Matter in it than the regular matter studied by science. This Dark Matter is indifferent to photons—hence its name—but reveals itself by its gravitational effects as it clumps about galaxies. Just what it is and how it is structured is a mystery that is currently under investigation.

An even greater shock was the discovery that all this gravitationally-normal matter was a minor component; that the major component was Dark Energy that was not gravitationally-normal and thus slowing the universe's expansion, but was anti-gravitational and pushing the universe to accelerate its expansion! Dark Energy is an even bigger mystery than Dark Matter (they have similar names solely because they cannot be seen). Science is humbled (or should be) by the realization that it only comprehends 5% of the universe, the rest being a known-unknown.

Dark matter seems to play a role given the Logos in assembling the galaxies; but the role of Dark Energy is unknown. I speculate on the role of Dark Energy in God's creation in *UT Two Realms* available on request to RICHARDLLL@MAC.COM

12) Richard L. Lewis, "Bent and Twisted Spacetime." *Unification Science* (Asan: Sun Moon University Press, 2019), 23-34.

4. Chemistry

The intense gamma-rays, at a temperature of many thousands of degrees, dominated the universe for the next 300,000 years, smashing the bits of matter around and preventing them from interacting. The entire universe was like our Sun, a hot plasma of light and elementary entities.

The expansion of the universe, however, cooled off the global temperature and about 300,000 years ABB (After the Big Bang) it dropped to where first helium nuclei—2 protons, 2 neutrons—and hydrogen nuclei—a single proton—could stably interact with electrons to form the first atoms. These atoms have a well-characterized set of emergent properties from the Logos: helium delights kids by making balloons float and hydrogen atoms are important for water and as couplers in biochemical interactions.

The intense gamma rays of creation were stretched by the expansion into X-ray then UV then visible then IR and finally into the Cosmic Microwave Background Radiation (CMBR) that pervades the entire universe. While this relic "light of creation" is uniform to 1 part in 10,000, the slight variations, are being currently explored as clues to the early history of the universe.

1) Periodic Table of Elements

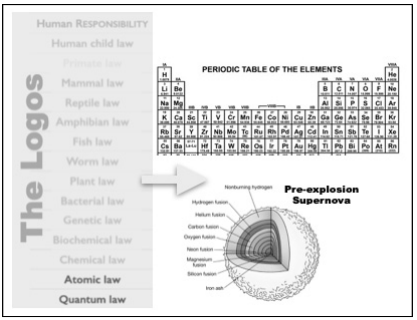
Once the light of creation had faded from view, the universe was utterly dark, until the cool hydrogen and helium atoms gravitationally condensed—with the possible assistance of Dark Matter)—into the very massive 1st generation of stars.

These stars, called *blue giants* are over 25-100 times as massive as our sun and are over 10,000 times as bright. They have much more hydrogen than our Sun, but they consume it thousands of times faster. Massive stars have lifetimes measured in millions, not billions, of years.

All stars in their youth convert hydrogen into helium, a process governed by the Weak nuclear force. Every second, our Sun converts 600 million tons of hydrogen into 596 million tons of helium—the Sun radiating away 4 million tons of energy each second!

When the hydrogen in any star is almost all used up—this will take billions of years for the Sun—the size of the star contracts and the temperature at the center rises and helium burning now takes center stage. Just how this happened was a mystery for decades, as helium is so stable that two helium-4s will not unite at all into beryllium-8, it does not exist. (Beryllium-9, however, does fine)

It took the atheist Fred Hoyle to formulate the simple logic: "I am here; I am made of carbon and oxygen; the universe started with none of it; therefore, there must be a way for helium to unite." Based on this anthropic logic, he worked out what was necessary for this and came up in the 1940s with what he called the *triple coincidence*.



1st coincidence: Hoyle assumed that although Be-8 is unstable, there must be an excited state in the Be-8 wavefunction such that was semi-stable for long enough for another He-4 to hit it and form carbon-12. He calculated what this would have to be.

2nd coincidence: The C-12 that resulted must also have an excited state that was semi-stable to contain all the energy of impact. He calculated what this would have to be. This can shed the energy and become the C-12 so central to Hoyle's life.

3rd coincidence: Finally, there must **not** be an excited state that would allow the C-12 to absorb another He-4 and become O-16—resulting in lots of oxygen, no carbon. He calculated what the state could not be.

Every one of these calculated predictions were proved correct by later experiments. In *Unification Thought*, of course, these are not coincidences, but an emergent property placed in the Logos by the Creator God. If *Unification Thought* had been around in the 1940s, a theist, not an atheist, could have predicted such a necessary emergent property of helium.

Helium fusion produces far less energy that hydrogen, and relatively rapidly the relic and 'ash' helium is used up, and the star contracts again and the internal temperature rises until some carbon is forced to become oxygen, then oxygen to fuse into silicon and finally, silicon into iron.

Each step provides less energy and lasts a shorter time resulting in an elderly star with an onion structure of various layers, as illustrated.[13)]

Iron, however, is the last step as it takes an input of energy to synthesis higher elements. Energy production—which has been holding up the weight of the star—ceases in the core and the star starts to collapse. The resultant explosion is called a *supernova,* and it can outshine a galaxy of 100 billion stars for a week or so, and so is visible across billions of lightyears. In this gigantic explosion there is energy enough to force the creation of gold, platinum, and uranium and a host of other elements beyond iron. For no good reason, astronomers call all these new additions, *metals*. (These days, the proportions are 74% H, 25% He, 1% metals)

All the carbon, oxygen, silicon, iron and the rest of the elements, are scattered into the void to metallize the pristine hydrogen & helium ready to condense into the 2nd generation of stars. All of this sequence and emergent properties were preplanned in the Logos. Nine billion years after the Big Bang, a 3rd generation star coalesced out of the clouds of metallized gas, the star we call the Sun.

13) http://astronomy.swin.edu.au/cosmos/c/core-collapse.

2) Molecules

Atoms do interact together to form molecules in outer space—e.g. astronomers report finding vast, tenuous clouds of alcohol between the stars.[14] As our Sun condensed, however, about 1% remained in orbit and fell together into a set of orbiting planets—most ending up in the distant gas giants, such as Jupiter.

Closer to the Sun, however, the hydrogen and helium blew away and the much smaller terrestrial planets solidified with the Earth in the *Goldilocks Zone* that is not too hot (Venus), not too cold (Mars), but just right for liquid water to persist. The plentiful iron sank to the core to generate a protective magnetic shroud about the earth, the plentiful silicon floated above as the mantle, and above that the water-bearing surface crust.

This proto-earth had an apocalyptic collision with a Mars-sized planetoid which splashed off crust and mantle stuff that gravitated together as the orbiting Moon.[15] While the Moon is usually admired for its beauty, it has emerged that the Moon is an essential ingredient for creating the Logos-directed Earth-Moon system as the incubator of life.[16]

This Hadean eon in the Earth's history eventually settled down to a stable planet with a water ocean and a nitrogen & carbon dioxide atmosphere. The simple water molecule—one oxygen and two hydrogens—has an astonishing array of at least 20 emergent properties derived from the Logos that make it the most significant molecule on Earth.[17] While materialistic

14) https://www.sciencealert.com/cosmic-cloud-contains-enough-alcohol-to-keep-the-world-world-drinking-for-a-billion-years.

15) https://blogs.scientificamerican.com/observations/a-new-theory-of-how-the-moon-formed/

16) Neil Comins, *What if the Moon didn't Exist* (NY: HarperCollins, 1993)

scientists can list and marvel at these emergent properties, they have no explanation for where they come from.

3) Macromolecules

The next level of system sophistication and emergent properties departs from simple chemistry and enters the realm of biochemistry. Simple molecules link together as monomers of polymers and macromolecules.

Polymers are simple, repetitive structures of a single monomer, such as the common plastic polyethylene. Macromolecules are similar but there are more than one monomer in the linkages. While life is not an emergent property of macromolecules, all living systems are composed of two key macromolecules: proteins and nucleic acids.

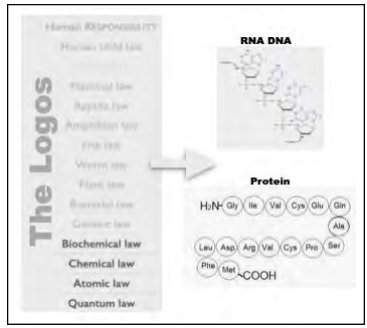
Proteins are made of monomers of the universal set of 20 amino acids linearly connected together by peptide links. The amino acids are faintly akin to the Bezier curves used in computer typography to generate characters and complex shapes. The wavefunction of each amino acid contributes a snippet to the final internal wavefunction and external shape of the folded chain, the active protein.

Each active protein has a specific set of Logos-derived emergent properties, such as a step in 'burning' sugar or an element in a cytoskeleton or a waterproof skin or a spider web, etc.

Nucleic Acids are made of monomers of the universal set of 4 nucleotide bases. Contrary to common perceptions, the most important is RNA, with DNA being a later, rather inert, and more 'waterproof' version of it. DNA is for long-term storage, while RNA is the manipulator and transporter of digital information. DNA comes in one variety, the iconic double helix, while RNA comes in dozens of different varieties—it seems a new one is uncovered every month or so—all with different roles to play. In computer

17) http://www.intelligentdesigntheory.info/unique_properties_of_water.htm.

terms, the DNA is akin to the passive hard drive, while RNA is akin to the active CPU.



The computer uses a set of 1s-complement mathematical states, 0 & 1, that can have a wide variety of external forms—pits on a metal disk, magnetic poles, electric voltage, radio waves, sound waves, etc. The nucleic acids use two sets of complementary digital states, 00 & 11 and 01 & 10, that are externally expressed as the chemical monomers Guanine & Cytosine (G & C) and Adenine & Uracil/Thymine[18] (A & U/T).

The link between stored digital information and expressed analog form was first uncovered in bacteria, where almost 100% of the linear information was translated into a linear chain of amino acids via codons of the universal Triplet Code used by all life. This is similar to the early 8-bit computer word-processors where almost all the digital store was 100% the ASCII code bytes for individual letters.

Modern 64-bit computers still use this ASCII code, but the byte is embedded in higher-level information about font, size, color, orientation etc. These extras are all stripped away when saving as Plain Text. This is similar to sophisticated life where the *exons* of Triplet Code codons are outnumbered by the non-translated *introns* containing higher levels of information used by the RNA CPU. The mRNA message that leaves the nucleus for translation into protein is Plain Text where all the introns have been removed.

To summarize: **Proteins** are master manipulators of analog form while **Nucleic Acids** are master manipulators of digital information. Every one of these emergent properties is derived from the Logos.

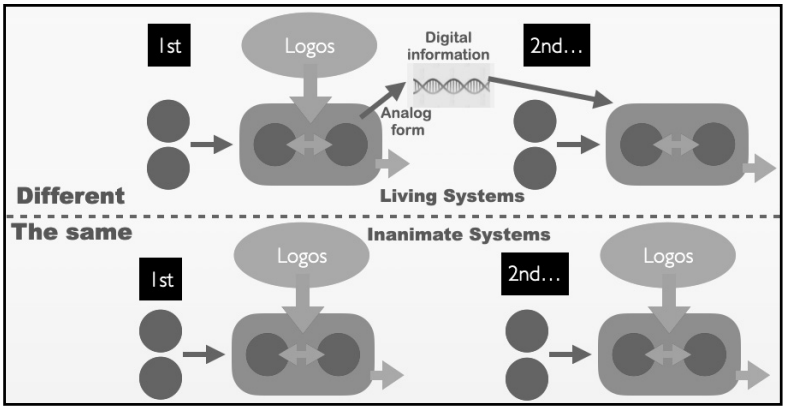
18) Thymine is Uracil with a methyl group added.

5. What is Life

Before we can discuss the next level of emergent properties—that of life—we need to understand what key property separates living systems from non-living systems. The textbooks vary in their listings, but usually include growth & development, metabolism of complex molecules from simple ones. A key property of living systems in such a list is usually reproduction (although by this criterion, neither a man or woman is alive since, in isolation, they are incapable of reproduction; only a couple is alive by this distinction). Clearly, these are all important properties, but here I want to focus on the one great difference in the origin of systems.

In non-living systems, the Origin of the very first to appear in the history of the universe is the same as the origin of the second, third… trillionth, etc. The subsystems come together and interact lawfully according to the Logos and the resultant system expresses a set of emergent properties derived from the Logos. As mentioned, the natal universe was far too hot for atoms of helium to survive. Later, there are lots of them. Logically, there must have been an Origin event, the very first helium atom to appear, even if only nanoseconds before hordes of others also emerged. The Origin event of the first and subsequent origins of all the others are essentially the same.

The Origin event of the first of a living system is essentially the same as non-living systems—a set of subsystems come together and interact lawfully according to the Logos. The resulting living system has a set of emergent properties derived from the Logos. In living systems, however, this analog pattern of external interaction is converted into digital information and written for storage and long-term transmission down a lineage. The origin events of the second, third… trillionth examples of this living system are now radically different: the digital information is translated to guide the subsystems as they interact to recreate the analog form. The resultant system reflects the Logos and has the same set of emergent properties as the Original Ancestor.



In non-living systems, the Logos directs all origins. In living systems, the Logos only directs the Origin of the first such system, stored digital information plays this role in all the origins of such subsequent systems.

Unification Thought has no problem with the ~3 billion-year- history of life on Earth and its evolution over time. It agrees with the scientific description of the *What, When and Where* of life's evolution. It departs, however, from the Darwinian theory of *How* it evolved. The modern synthesis of Darwin's idea with genetics is based on the Central Dogma that information flow is one way.; DNA to RNA to protein to analog form. That evolution occurs when random change happens to the DNA, and when expressed as change in analog form, is selected for fitness to survive and thrive in the current environment.

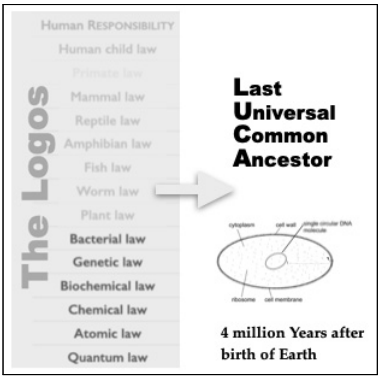
The discovery of enzymes that contradict the Dogma, that copy the information from ephemeral RNA onto long-lasting DNA—600 varieties of which reside in the human genome—and the role of the new science of epigenetics in converting analog form into digital information for and transmission down a lineage is discussed in my essay *Evolution and Epigenetics* available on request to RICHARDLLL@MAC.COM.

Unification Thought and epigenetic science are more in tune with Lamarckism, ideas

proposed by a contemporary of Darwin, where learnt skills are passed down a lineage. Such developments suggest that a new view of evolution to replace Darwinism will be a post-modern synthesis of Lamarckism and Epigenetics, and that information flow will involve the writing, as well as the reading, of digital information.

1) First Life

In the following sections, we will briefly describe the What and When of the evolution of life on Earth. The actual Origin event of the first and simplest living system is a current topic of intense debate. There is general consensus, however, that there must have been a Last Universal Common Ancestor (LUCA) from which all living systems are descended—all bacteria, protists, fungi, plants, and animals.



This supposition is the only logical explanation for all that is universal in all life: nucleic acids of a universal set of four D-monomers, proteins of a universal set of twenty L-monomers, a proton-motive force for manipulating chemical energy, a bi-lipid membrane to separate water into inner and outer, the universal method for manipulating sugars by phosphorylation, the use of energetic ATP to drive uphill chemical transformations, etc. It is unreasonable to assume that this universal set of emergent properties were inherited from the Logos separately by many different lineages at separate times.

LUCA appeared about 4 million years After the Formation of the Earth (AFE) after what must have been a long sequence of changes and advancement. Nobel Laureate Christian de Duve notes in his excellent book[19] on the *What and When* of evolution,

that each step in this sequence must have been probable, not improbable. Prof. de Duve was impelled when writing, by the mainstream Modern Synthesis, to accept random chance materialism, but his distaste for it often appears in his prose. That each step was probable is in accord with a view that embraces the wavefunction and the Logos.

The many descendants of LUCA diverged and developed and filled the oceans with prokaryotes, the technical term for bacteria and others that have no nucleus or internal membranes delineating internal compartments.

Bacteria ruled the Earth for the next 2 billion years of Earth's history (and still do from some viewpoints) and made an epochal step in evolution. For the first 500 million years of this period, LUCA and all descendants used simple chemical sources for the energy they need to thrive. Then, guided by the Logos, a complex molecule was synthesized that could trap the photons of light streaming from the Sun in excited electrons (usually from magnesium) that were channeled into a proton-motive cascade that could generate ATP and liberate hydrogen from water.

This was the advent of chlorophyll and photosynthetic, ATP-driven combination of carbon dioxide with hydrogen to form carbohydrates. The waste product, oxygen, flooded the atmosphere and eventually converted it from nitrogen/carbon dioxide to the nitrogen/oxygen one we delight in to this day. As planned in the Logos, this transformation allowed the later emergence of the reverse process: oxidizing carbohydrates to water and CO_2 and capturing the energy, by proton-motive force, in ATP, a process we humans are utterly dependent on.

In this indirect fashion, the Logos directs the energy liberated by the Sun to power all human life and development. All these remarkable emergent properties were derived from the Logos and captured in digital information. Many of the basics of our metabolism bear a remarkable similarity to those that first emerged in bacteria billions of years

19) Christian de Duve, *Vital Dust: Life as a Cosmic Imperative* (NY: Basic Books, 1995)

ago and transferred down the ages to us.

2) Sophisticated Life

The next major advance in sophistication was the advent of eukaryotes that, unlike the much smaller prokaryotes, have a plethora of internal membranes that divide the interior small specialized compartments; the major one being the nucleus. This isolated the DNA, the shroud of active RNA and all the digital manipulation apart from all the analog protein manipulation happening in the rest of the cell.

We mentioned earlier that the eukaryote nucleus is like a sophisticated computer, where simple Triplet Code exons are embedded in higher-level information introns which is stripped away before assembling protein. To those raised in the simple genetics of prokaryotes, this was all nonsense and labeled *Junk DNA*. This concept is now in the dustbin of science concepts, along with phlogiston and the earth-centered solar system.[20)]

Just how that transition occurred is still debatable as many remarkable additions—such as the Logos-derived cytoskeleton and phagocytosis—emerged with little prokaryote precursors. Relatively quickly a eukaryote domesticated, so to speak, a prokaryote within which all the manipulation of energy processes were concentrated. This domesticated bacteria became the ancestor of all the mitochondria that power almost all eukaryote cells and multicellular life.

Later still, a similar domestication occurred of a photosynthetic bacteria which became the ancestors of the plant chloroplasts that power all green plants and trap CO_2 into the food for life.

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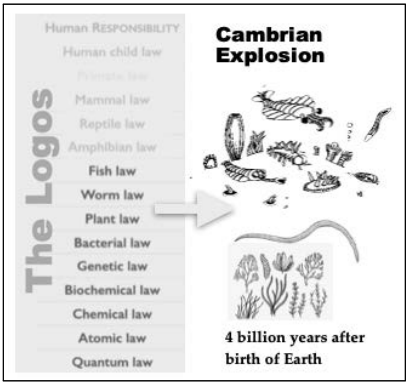
20) See, however, my caveat in *UT Center of Universe* listed in Essays on Unification Science.

3) Multicellular Ocean Organisms

About 580 million years ago, there occurred a sudden and dramatic change. The ocean biome—for the land was bare and barren—changed in a geologically brief period from a community of bacteria and single-cell protists (such as yeast) to a jungle of multi-celled plants, such as seaweeds, and animals—both predators and prey emerged in the ocean.



During this *Cambrian Explosion*, all the major animal body plans of current animals were established along with some that went extinct after playing their role in the scheme of history. It remains an open question just what allowed for this remarkable injection of new forms from the Logos. Some favor high oxygen, others perfected eyes, etc.

Luckily for paleontologists (but not for the inhabitants) great swaths of the ocean floor were smothered in fine silt, entombing the inhabitants; later compressed into a fine-grained shale that preserved exquisite detail; later still lifted up by tectonic movements to become part of the Canadian Rockies in British Columbia; and not so long ago stumbled upon by Prof. Walcott who recognized its importance.[21]

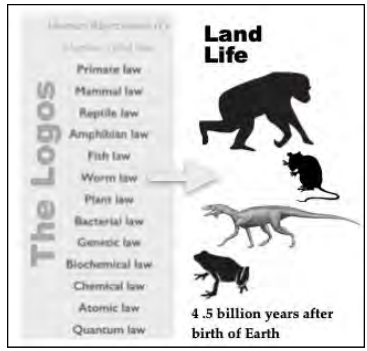
4) Land Animals

Following this period of innovation, the ocean was populated by fish—first the cartilaginous ones like dogfish and sharks, then the bony fish like cod and tuna.

Some left the salty ocean with new emergent properties that allowed them to thrive

21) Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History* (NY: W. W. Norton & Co., 1990).

in freshwater, and some of these tentatively explored dry land where plants and insects had already set up home.



These amphibians still reproduced in water until the advance of the amniotic membraned egg allowed the reptiles, the dinosaurs, and others to cut themselves off from reliance on water to reproduce.

The next advances derived from the Logos were the mammals, with the placenta to internally nourish the egg and the mammary glands to feed the young. The most sophisticated of these were the primates with large brains, dexterous limbs, and social clan structures with prolonged parental care.

5) Pre-human Hominids

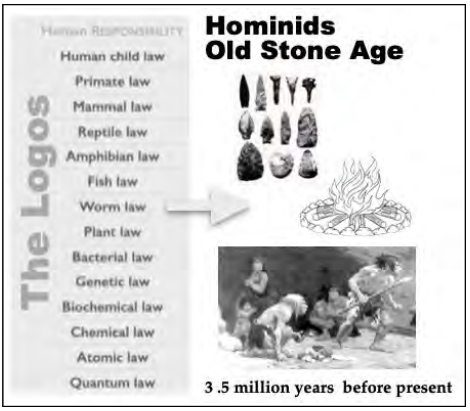
The final level of sophistication derived from the Logos was the advent of the hominids. These had dexterous hands, could walk upright, had large brains and simple language.

We can equate the period in which the hominids were the most sophisticated of the primates with the Paleolithic age (Old Stone Age), which lasted about 2,500,000 years. The cultural changes over this vast stretch time were very slow and incremental, with the controlled use of fire appearing just 400,000 years ago. The sophistication of the stone implements, for example, hardly changed over millions of years. Stasis and equilibrium were the rule.

Archeological evidence exists that shows that they buried their dead and eventually had mastery of fire for cooking. They were communal (clan and tribal level) and probably had a pre-language (pidgin) of simple nouns and verbs. They fashioned simple stone and bone tools, and were successful hunters and could fend of predators such as the

great cats.

The habitations were caves, and nourishment was gained by hunting and gathering. The fossilized Laetoli footprints left in 3,000,000-year-old volcanic ash, footprints of a pre-Neanderthal male, a female, and a child[22], suggest that pair-bonding reproduction was already established at this early stage.



Their capacities were equivalent to those of a six-year-old child in an adult-looking body.

6. Human Origin

The Logos had almost completed its task at this point and was almost fully expressed in the pre-human hominids. The final step was the coming together of the subsystems that make up infants with the emergent property from the Logos of the full human capacity.

The maturation of these infants into the *creative, I am, loving personality* that is the image of God needed an extra input not possible from the lawful Logos—which could only create robotic beings.

This extra input needed to complete the Purpose of Creation is called the Human Portion of Responsibility in Unification Thought. Neither God nor the Logos can fulfill this extra input of responsibility. The evidence of history is that this responsibility was

22) http://www.pbs.org/wgbh/evolution/library/07/1/l_071_03.html.

not fulfilled, and humans were reduced to intelligent and creative animals.

The multimillion-year stasis of the Old Stone Age was punctuated by the emergence of Man and the start of the Neolithic age ~100,000 years before the present (YBP) and was in full swing ~50,000 YBP. The stone and bone shaping of tools was much more sophisticated and decorated. They had a true language of syntax and grammar. The hunter-gatherer stage developed into that of agriculture and the domestication of animals >20,000 YBP and, most distressingly, the earliest evidence of a multi-person battle is 14,000 YBP.[23)]

Habitations beyond caves were developed. The discovery of how to smelt copper from its ores and how to create its alloy, bronze, marked the end of the Neolithic and the start of the Bronze Age ~15,000 YBP. Writing was developed soon after. Unlike the million-year stasis of the Old Stone Age, innovative change over thousands of years was the rule in the New.

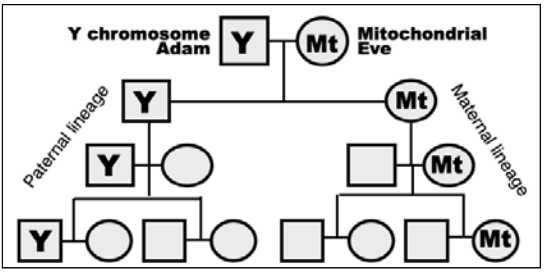
1) When and Where

Assuming a new set of emergent properties happened at the origin of humankind; when and where did it happen?

The location of the Origin of Man, the Garden of Eden, has been roughly established by three lines of evidence that are all in essential agreement. These are the study of the female lineage using mitochondria, the study of the male lineage using the Y-chromosome, and the spread of languages around the world.

The history of the human female lineage is tracked by tracing the spread of genetic markers on the mitochondrial chromosome which is passed down the female lineage from mother to daughter. The mitochondria are not passed on by males. If a mitochondrion does make it from the sperm into the egg, it is immediately surrounded and destroyed.

23) http://en.wikipedia.org/wiki/Cemetery_117.



The pattern of human migration that emerged from these studies was that the female lineage started off in East Africa, then humans spread south into Africa and north to the rest of the world. This original female is called "mitochondrial Eve" in the literature.

The history of the male lineage is tracked by tracing the spread of genetic markers on the Y chromosome which is passed solely down the male line from father to son, and is not passed on to females. The pattern of human migration emerged was that it started off in East Africa, then the humans spread south into Africa and north to the rest of the world. This original male is called the "Y-chromosome Adam."

The materialistic view of gradual speciation has the mitochondrial Eve and the Y-chromosome Adam were members of a "small breeding population." The unified view of a directed, specific mechanism for speciation has that this population was as small as two.

> Now, let me talk about the history regarding Adam's birth. Did Adam have a belly button or not? You must know it. Without a belly button, where was he born from? Adam had a navel cord, and he had a mother.
>
> Sun Myung Moon, The Blessed Family, 1999 winter issue

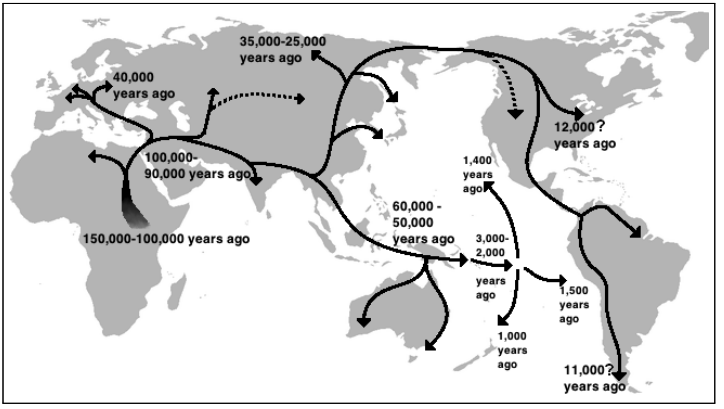
For a while, it looked as if this genetic Adam and Eve existed far apart in time, but advances in genetic chronology have now placed them close together in time: "Now, two major studies of modern humans' Y chromosomes suggest that 'Y-chromosome Adam' and 'mitochondrial Eve' may have lived around the same time after all… 180,000 to 200,000 years ago."[24]

24) https://www.nature.com/news/genetic-adam-and-eve-did-not-live-too-far-apart-in-time-1.13478

Language has changed over time and migration, and seems to have a single origin. Many linguists believe all human languages derived from a single tongue spoken in East Africa around 50,000 years ago.[25]

The study of how language has changed over time as humans migrated from East Africa shows a similar pattern to the genetic studies:

"A new linguistic analysis attempts to rewrite the story of Babel by borrowing from the methods of genetic analysis—and finds that modern language originated in sub-Saharan Africa and spread across the world with migrating human populations."[26]



All three lines of investigation suggest that the Eden into which the first humans were born was in East Africa less than 100,000 years ago. Genetic analysis of the genes for skin color indicate that the first humans were black, and that the yellow and white pigmentation arose much later as human migration progressed.

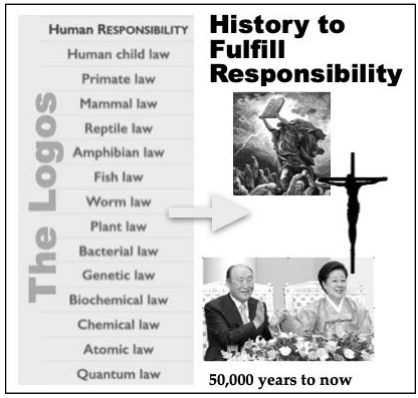
There is evidence that different races of hominid commingled on the route to Human, including races adapted to water as well as other races adapted to forest and

25) https://www.livescience.com/16541-original-human-language-yoda-sounded.html.

26) http://aminotes.tumblr.com/post/4633090702/evolution-of-language-tested-with-genetic.

savanna. The advantages that occur in such 'miscegenation' is known as 'hybrid vigor' in practical genetics.

2) Fulfill Responsibility



We are now leaving the realm of science and entering the realm of religion. All religions state that something went wrong at this crucial time of the Origin. Be it Pandora's box of the Greeks, or the Forbidden Fruit in the Judeo-Christian Bible; the original plan failed.

The Divine Principle,[27] the religious counterpart of Unification Thought,[28] explains that the first human pair failed their Portion of Responsibility. Without this, humans developed as intelligent, creative animals ruled by the animal brain that did not have the capacity to love as God loves.

The concept of Original Sin that has infected the human race ever since is compatible with epigenetics and psychology where dysfunctional parents raise dysfunctional children who become, in turn, dysfunctional parents. The Bible records a racial memory that the very first fratricidal murder occurred in the first family.

The *Divine Principle* states that religious history is the ongoing attempt at Recreation and the fulfillment of Human Responsibility. It explains the Old, New, and Completed Testament Ages in terms of this insight.

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27) Rev. Sun Myung Moon, *Exposition of the Divine Principle* (NY: HSA-UWC, 2006).

28) Sang Hun Lee, *New Essentials of Unification Thought: Head-Wing Thought* (NY: HSA-UWC, 2014).

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