The Mathematics of Unity and Evolution

The Hierarchy of Natural Law in the Logos

by Richard Lewis, PhD

Abstract

Systems in the universe, both animate and inanimate, are created by unifying complementary subsystems together. This applies in the physical world from plus and minus particles to male and female humans in a sophisticated hierarchy of form and ability. The modern math that can describe this unification is also a sophisticated hierarchy founded on the regular numbers used by Victorian scientists. We examine both hierarchies in the evolution of the cosmos from the Big Bang to bacteria to humans.

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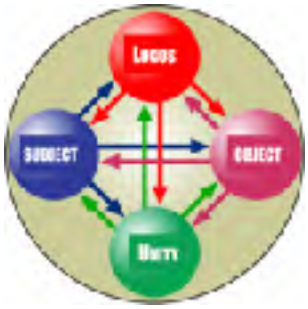
The Historical religions of the Book—Christianity, Judaism, and Islam—have God as the Creator, an undefined concept that is currently avoided in science. Unificationism agrees, but is more precise: God created the totality of natural law, called the Logos, which then ran everything. In this view, evolution does have foresight. This is why Unification Thought has particular interest in the mathematics of the Logos, the entirety of natural law that guides evolution from the Big Bang to the birth of human children. This view is compatible with science—the only difference is the source of natural law.

This is an expansion of the current thinking in science, which assumes that only the simplest level of science—physics, chemistry, and basic biochemistry—is governed by natural law; the rest of the science of life is all a contingent accumulation of random accidents selected for their utility in surviving and thriving. In a simplistic fallacy, the Victorians assume that life's hierarchy of spectacular sophistication is just the result of a set of random events accumulated by natural selection—which actually creates nothing, just selects what's already created.

There is no denying the tautology of Natural Selection: Organisms that have an advantage in the current environment also do well in reproduction. The difference in opinion arises in the *origin* of such an advantage that advances evolution. Victorian science, with its utter ignorance of biochemistry's complexities, has it that this is happenstance, it is accidental and randomly happens. The view here is that this is nonsense, and that natural law has all these patterns in it, expressed, as we shall see, as quantum probability. Humans have divine possibilities, not just a collection of random accidents.

From this perspective, the failure to expand law to embrace life is because the mathematical language of Victorian science was, and is, incapable of describing the sophisticated complexity of living entities. Matching the hierarchical sophistication of living systems, mathematics also has a hierarchy of sophistication. It is the higher levels of math that are needed to describe the higher levels of living systems.

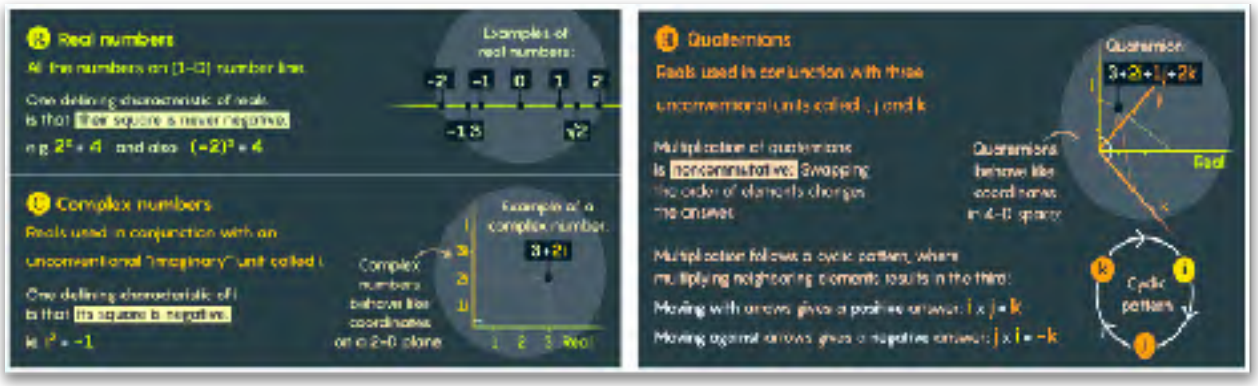
As is made clear in Unification Thought, all of creation is based on the same dynamic where pairs of complementary systems unite constructively as subsystems of higher structures under the guidance of the Logos. In this view, God created the Logos but does not interfere in history except through humans as intermediates.



The math we are interested in can harmonize complement pairs, and harmonize two such pairs, 3 such pairs, 4 pairs, etc.

The Mathematical Hierarchy

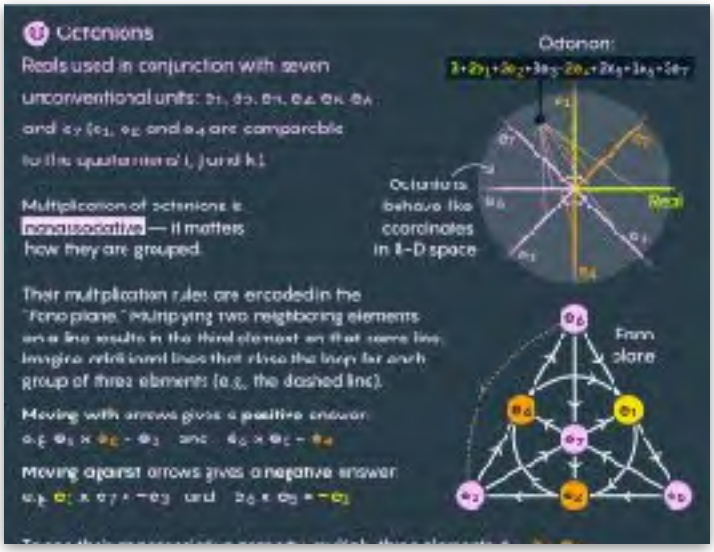
The first level of mathematics we learn in elementary school and used by Victorian scientists. There are no complements involved and is level zero in this hierarchy. Technically, these are the *real* numbers that deal with single things. Examples are **1,2,3…π , √2, 1.999…** etc.



These *real* numbers do not harmonize a complement, so this is Level 0 in this math structure.

The next level up in math deals with the unity of one pair of complements. These are the *complex*[1] numbers that have two components, e.g. **(1+πi).**

A pair can be any complement, vertical ones such as mind/body or matter (fermions)/force (bosons). They can also deal with horizontal complements, such as plus/minus, N/S magnetic, etc.



This level harmoniously unifies one pair of complements and is level 1 math. While this level of the math hierarchy is well established—think Mandelbrot Set—the higher levels are only recently began to be explored.

The next level up can integrate two pairs of complements together. The new complement has to be applied to each components of the lower level, doubling them, so the number of

components expands exponentially. If N is the level in the hierarchy, the number of components is 2^n.

The numbers that unify two pairs are on Level 2, with four components, and are called *quaternions*. An example is **(a+bi+cj +dk)**.

The next math level can integrate three pair of complements, and has eight components. These numbers are the octonions. Modern math has only recently started to explore ultra-complex numbers such as the quaternions (4 components) and octonions (8 components). The understanding of these sophisticated numbers has yet to be applied to the sophistication of Life.

Luckily, some academics have started an advance into this arena.

> Driven by a profound intuition that the octonions and other division algebras underlie nature's laws, Dr. Latham Boyle informed her colleagues… "She has taken significant steps toward solving some really deep physical puzzles," said a mathematical physicist at Rutgers University.[2]

A rather informative connection has already been established between such sophisticated mathematics and the Logos-level that deals with fundamental physics:

> Like functions of a complex variable, functions of a quaternion variable suggest useful physical models. For example, the original electric and magnetic fields described by Maxwell were functions of a quaternion variable.[3]

Mathematicians are only now beginning to explore these sophisticated levels, even though they have been named: This is a hierarchy of sophistication with the numbers named and their components: Real (1), Complex (2), Quaternion (4), Octonion (8), Sedenion (16), Pathion (32), Chingon (64), Routon (128), and Voudon (256).

While this exploration of the higher levels has just started, at least one Chinese group has already investigated sedenions in the structure of matter, using a complex multiplication table.[4] And this is just the start of this exploration.


NewScientist

Mathematics

Octonions: The strange maths that could unite the laws of nature

Each new Level adds another pair, and each component of this pair has to be linked with all the components of the previous level, hence the powers of 2 familiar to computer science memory levels.

With this brief overview of mathematical sophistication, we can make a humble start to applying this math to life's history of gradual sophistication, starting with the simplest level of the Logos and the creation and functioning of the universe.

Pre-life history

The actual cause and description of the Big Bang origin of the universe is currently unknown, except that its mathematical description is highly sophisticated during the first few minutes. We will revisit this shortly.

After those tempestuous minutes, however, the universe settled into a very simple state: a hot expanding universe filled with gas of mainly hydrogen (74%) and helium (25%) with a smidgen of lithium and beryllium.

As the universe cooled, gravity was almost totally in charge of the development of the 1st and 2nd generations of stars, which created all the 'metals', elements—such as carbon and oxygen—beyond the original ones. The demise of these stars, scattered these metals around. The 3rd generation, such as our Sun, had enough of these to generate solid planets, such as our Earth.

All this gravitational activity is well described with the simple numbers. These *real* numbers are quite sufficient to describe gravity and the first dozen eons of the universe's history. This is the simplest level of math and the simplest level of science.

The next step of history was inside the 1st stars that consumed hydrogen and generated carbon, oxygen, nitrogen, sulphur, and phosphorus—the elements of life—and all the other elements. This is the realm of particle physics, and it requires more sophisticated math to describe it, the *complex* numbers with two components. The math that describes all this is called quantum mechanics.

In this new quantum physics, matter itself is hierarchical, with three levels involved. There is:

1. An external, local tangible aspect called *particle*,
2. An internal, local intangible aspect called the *wavefunction* that guides the particle level, and
3. An internal, global intangible level called *natural law* that determines the wavefunction, see fig. 2.

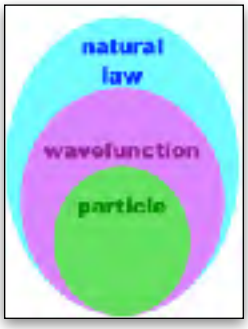


Fig. 2 Three levels

The wavefunction determines the quantum probability of what history the particle will follow. The natural law determines how the wavefunction will change during an interaction, and thus influences, but does not directly determine, the history of the particle.

While they are as real as the particle, both the wavefunction and natural law are invisible, as intangible as the number 10 is. This holds for all the higher levels. All levels, however, result in determining the quantum probability at the base guiding the physical realm.

We will later discuss this apparent freedom to choose within the limits of probability. This is quite different from the Victorian scientists who believed that law directly determines what happens. They were somewhat fooled by studying processes with 100% probability.

The way in which the internal law and wavefunction determine, eventually, the external history of the particles result in structures and patterns with a set of *emergent properties.* A composite system has emergent properties not possessed by the subsystems. An example: neither pure hydrogen or oxygen gas are *wet* in any way. Yet, combined as water, an amazing set of emergent properties—not just *refreshing*—appear as from nowhere but the Logos.

Level 2 of Math was involved in this period of history that culminated in the Sun and Earth as an emergent property.

symbol	name	science	emergent property
$(a_0\ a_1)$	complex	particle physics	planets, Earth
a	real	gravity	suns, Sun

In quantum physics, these components are called wavefunction and probability of particle history, the connection being that the absolute square of the complex internal wavefunction is the real external probability of that history being followed by the particle. This is a vertical relation. Note that quantum science only uses a bounded subset of the infinite complex numbers in the calculations, as do the higher levels.

A Victorian scientist adds and multiplies *real* probabilities to calculate a final *real* probability of an event. A modern quantum scientist adds and multiplies *complex* probability amplitudes to calculate the final *real* quantum probability. This is where all the 'weirdness-to-the-Victorians' arises, for in *real* math 2 + 2 is always four, while in *complex* math the result can be anything from four to zero depending on the angles involved.

Do not confuse Victorian probability with quantum probability. The quantum variety is all-powerful. On the micro level, it generates the Periodic Table of the elements. On the cosmic level, it holds up cold white dwarf stars as a very dense object, roughly the size of Earth, the final stage in the life cycle of stars like our Sun. Otherwise, it would collapse into a Black Hole.

Chemistry

In a stable interaction, the wavefunctions of the subsystems, the interacting particles, merge, uniting the particles, see fig. 3. The resultant system has a set of emergent properties

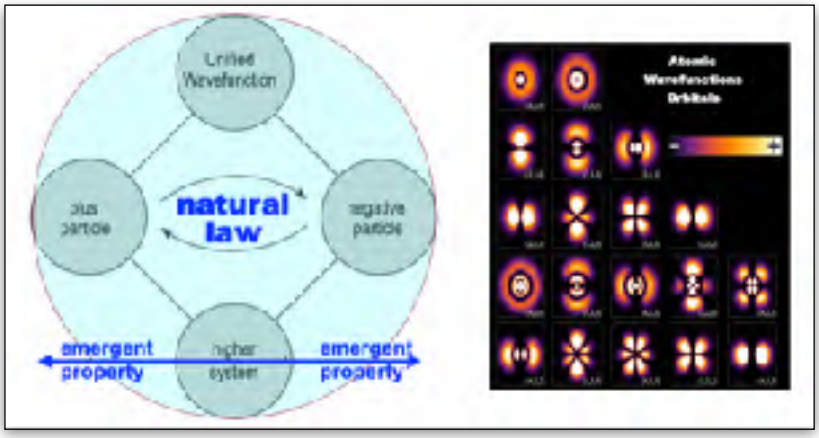


Fig. 3 Wavefunction after interaction

determined by the Logos. The emergent properties of electrons and the nucleus interacting determined by the Logos are those of the chemical elements.

By far, the most important of these is carbon, whose properties enable it to participate in huge molecules suitable for assembling as life. Oxygen, nitrogen, phosphorus, and sulphur also play important roles in this.

The fact that carbon could be made in stars was long a mystery since, while carbon could be made by fusing two heliums (2P, 2N) together to make beryllium (4P, 4N), then fusing that with another to make carbon (6P, 6N). Unfortunately, this beryllium nucleus is extremely unstable and decays back to helium in a million-trillionth of a second. This is not enough time for a third to arrive. This puzzle was solved when Hoyle, an astrophysicist, discovered the resonances that stabilized the beryllium-8 and allowed carbon-12 to form, while another too-low resonance prevented all the carbon-12 from turning into oxygen-16 (8P, 8N).

Origin of Life

The math dealing with the next level is sufficient to encompass gravity and integrate it with the individual dualities of wavefunction/particle • fermion (matter)/boson (force) • plus/minus electric • N/S magnetic • singlet (active)/paired electrons (stable), etc. of basic physical

level	vert. horoz.	name	science	emergent property
2	$\begin{pmatrix} a_0 & b_0 \\ a_1 & b_1 \end{pmatrix}$	quaternion	chemistry	white volcanic smoker vents
1	$(a_0 \quad a_1)$	complex	particle physics	planets, Earth
0	a	real	gravity	suns, Sun

understanding. Coordinating all the individual dualities on Level-1 into a unified whole can only happen with Level-2 numbers integrating 2 dualities together in the next level of unity. These are the *quaternion* numbers.

On the planet Earth, these simplest levels of the Logos governed the geochemical transformations that occurred in the early years. The most significant and sophisticated event was the formation of volcanic vents that are with us to this day. These formed by the interaction of ocean water with incandescent lava—the hot Black Smokers—and with cooler volcanic anhydrous strata—the temperate White Smokers.

In the White Smoker vents, chemical interactions were powered by molecules released by ocean water interacting at depth with igneous rock, a process called *serpentinization.* As Wikipedia explains:

> Serpentinization is a geological process where ultramafic rocks, rich in minerals like olivine and pyroxene, react with water to form new minerals like serpentine. This process is significant because it can produce hydrogen gas, potentially supporting microbial life, and is relevant to understanding early Earth….

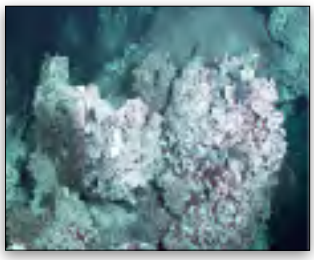


Fig. 4 White Smoker proto-cell structure

In those early days, the current 21% of atmospheric oxygen was absent, in its place was carbon dioxide—up to 70%! This made the ocean quite acidic.[5] The white smokers arose where minerals precipitated at the boundary of warm alkaline upwelling water with the cool acidic ocean water. The result was a sponge like structure with two counter circulations separated by a thin mineral wall. Kind of a cell-sized foam.

Chemical reactions there were powered by a flow of hydrogen ions from the high acidic ocean through the wall to the low acid cell contents. As a testament to hereditary, all life still powers itself by such hydrogen ion gradients—natural acidic gradients.

This basic process, an emergent property from the Logos, is basically the same in all organisms; the only difference is that the gradient is no longer free, food has to be burnt to make the gradient that powers metabolism and life.

It was a surprise when this was uncovered: An electric current (flow of electrons) from food to oxygen in the cell ejects H-ions into a separate storage space. The flow of H-ions (prototic current?) back into the cell through a protein turbine is used to assemble ATP from ADP and phosphate. Remarkably as the membrane is so thin, the electric intensity across it is 300,000 V/m, same as in a lightning bolt. This is what powers all of life. See fig. 4.

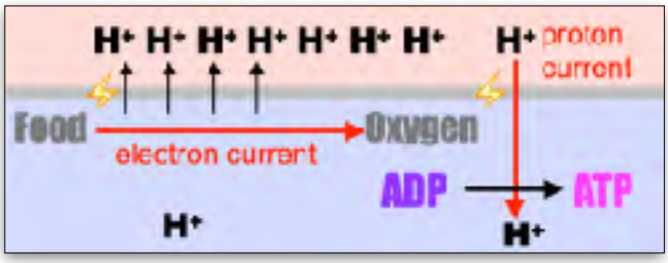


Fig. 4 Universal method of making ATP

In many different forms, this is part of LUCA's bequest to all life, on a par with DNA.

This quite unexpected and universal way of powering the metabolism of all life was quantum probability learnt in its basic form from the Logos by LUCA in the vent, and is nowadays used in all life. The only difference is what pumps the H-ions, and bacteria use a huge number of molecules to fuel H-ion ejection across the barrier.

To the majority of biologists who don't know about the Logos, there are two major unanswered questions: Why did life evolve in this perplexing way and; Why is all life powered in such a peculiar fashion?

This biofilm learnt from the Logos Level 2 by quantum probability the basics of life such as ATP synthesis by H-ion gradients, DNA/RNA protein assembly, the Universal Triplet Code, and many other sophisticated abilities. Dr. N. Lane has written an accessible overview of this subject.[6]

This acellular biofilm, probably in a single smoker, is the Last Universal Common Ancestor (LUCA) of all life on Earth. All this new level of sophistication needs a new level of math to describe the natural law governing the development and functioning of simple metabolism, transforming carbon dioxide and hydrogen into carbohydrates, amino acids, and nucleotides, along with the constructive integration of them all.

The Logos provided probable paths to follow that led to each advance in sophistication. Unlike Victorian thinking, each step in each metabolic sequence was *quantum probable*, not accidental, a necessity as emphasized by Christian de Duve. The math to organize all this is Level 3 in the math hierarchy, the octonions, Table 1.

level	vert.	horoz.	name \#	science	emergent property
3	$(a_0\ a_1\ b_0\ b_1$ $c_0\ c_1\ d_0\ d_1)$		octonion **8**	biochemistry	LUCA **Last Universal Common Ancestor**
2	$(a_0\ a_1\ b_0\ b_1)$		quaternion **4**	chemistry	white volcanic smoker vents
1	$(a_0\ a_1)$		complex **2**	particle physics	planets, Earth
0	a		real **1**	gravity	suns, Sun

Table 1

Over millions of years, this geochemistry gradually became biochemistry, and many of life's basic processes of life were developed there, guided quantum probabilistically by the Logos in the pre-protoplasm coating the vent pores.

- The standard set of 20 amino acids (with nitrogen from ammonia).
- The four genetic bases (from amino acids).
- The Universal Triplet code linking amino acids and nucleotides.
- Amino acid sequence patterns stored in DNA.
- Translating these patterns into proteins using tRNA and mRNA.
- Powering metabolism by ATP.

All of this was developed in LUCA, an acellular biofilm coating the fine pores of the White Smoker, remarkably quickly (geologically) soon after the ocean condensed.

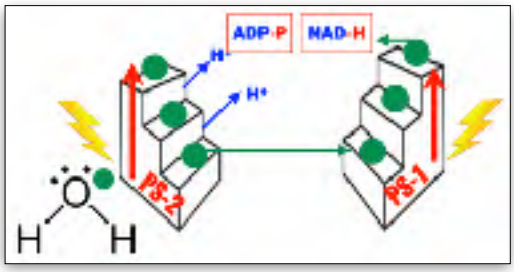
LUCA emerged about 3,800 million years ago (mya) and it eventually learned from the Logos how to live beyond the womb of the smoker vent. This was by encapsulating itself in a lipid bilayer. It did this on two occasions, using different lipids and opposite isomers of glycerol. This was the origins of the familiar *eubacteria,* both good and ill, and the unfamiliar *archaea* that nowadays, for example, colorize the Yellowstone pools.

A Bacterial World

These simple *prokaryotes* (no nucleus) together ruled the Earth for a billion years or so and drastically altered it by, e.g. learning from the Logos how to strip hydrogen from water to add onto carbon dioxide, liberating as waste its oxygen. The probable path to photosynthesis was provided by the Logos. This oxygenation of the Earth's atmosphere was essential to the emergence of the next level of life's sophistication.

Both types of bacteria flourished and micro-evolved within the Logos to create a multitude of 'races' with an awesome array of metabolic abilities that no other life has managed. It is thought that the transition from geochemistry to LUCA and the bacteria was quantum probable and took just a few million years. The transition from bacteria to cells, however, was

more difficult and took billions of years to accomplish. For this reason, it seems likely that life can have emerged on other planets and generate an oxygen atmosphere, but will stop at the prokaryote stage using the same chemicals as on Earth.



Photosynthesis itself was only learned from the Logos one time by a eubacterium in human history, the origin of the lineage we call the cyanobacteria. This is an intricate process where photosystem-2 (PS-2, a complex of proteins and chlorophyll) uses light to strip an electron from water, its energy then used in steps to eject H-ions for ATP synthesis, then on to PS-1 where light kicks it to a state where it is used to join an activated hydrogen atom to a carrier dinucleotide, (NAD).

The ATP and NADH—with activated phosphorus and hydrogen atoms— are then used in the Dark Reaction to force hydrogen onto carbon dioxide, the start of metabolism.

While the two races of bacteria tend to thrive in different environments, guided by Logos probability, they learnt how to construct an environment together in which both could thrive. This is the stromatolites that are still found today.

The two races of bacteria, the prokaryotes, flourished and worked together in a now-oxygenated environment. Together, they created the stromatolites, oceanic structures that still survive today in unattractive environments, such as high-salt seawater.

As wiki explains:

> Stromatolites are layered, biochemical, accretionary structures formed in shallow water by the trapping, binding and cementation of sedimentary grains in biofilms (specifically microbial mats), through the action of certain microbial lifeforms…

Such sophistication needs another level of math to describe it, and the Logos at this level is described by sedenions with 16 components. Sophisticated math for sophisticated life. See Table 2.

level	vert.	horoz.	name \#	science	emergent property
4	$(a_0\ a_1\ b_0\ b_1$ $c_0\ c_1\ d_0\ d_1$ $e_0\ e_1\ f_0\ f_1$ $g_0\ g_1\ g_0\ g_1)$		sedenion 16	bacteriology	Stromatolites Eubacteria, archaea Oxygen atmosphere
3	$(a_0\ a_1\ b_0\ b_1$ $c_0\ c_1\ d_0\ d_1)$		octonion **8**	biochemistry	LUCA **Last Universal Common Ancestor**
2	$(a_0\ a_1\ b_0\ b_1)$		quaternion **4**	chemistry	White volcanic smoker vents
1	$(a_0\ a_1)$		complex **2**	particle physics	Planets, Earth
0	a		real **1**	gravity	Galaxies, suns, Sun

Table 2

Sophisticated cells

It was an ancient stromatolite that was the setting for the next big advance in the evolution of life on Earth, the emergence of our type of cell, the Last Universal Eukaryote Ancestor (LUEA), the origin of all animals, plants, fungi, and amoeba protists.

The stromatolites are a layered mineralized structure, with the top level bacterial photo-synthesizers feeding the scavenger bacteria and archaea inhabiting the lower levels. In this protected environment, an archaea lost its protective coat and embraced coatless eubacterium as a source, rather than an item, of food for the archaeal host. Thus started the road to a cell powered internally by mitochondria.

The archaea, to this day, are metabolic maestros and have an unsurpassed metabolic skill-set quantum probably learnt in barely tolerable environments, such as Black Smokers. Archaea had quantum probably learnt how to unite carbon dioxide and hydrogen together as the basis of metabolism. It was an archaea with such metabolic talent that was the foundation for a momentous leap in evolution.

It quantum probabilistically learnt over time how to domesticate a variety of eubacteria that excreted hydrogen as a waste product, feeding them the substrates they could use to pump H-ions. Eventually it enfolded them in a symbiotic relationship.

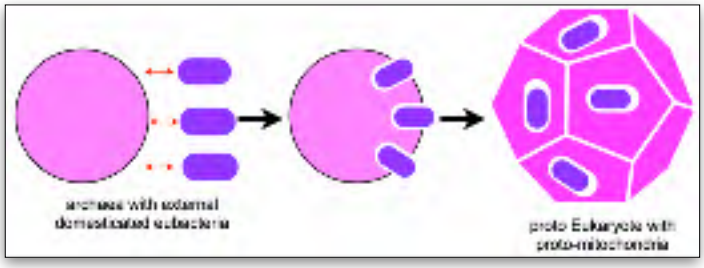


Fig. 5 Origin of Complex cells

The archaea-eubacteria system had to probably learn many processes, not found in either kind of bacteria, to make this symbiosis work. This became the ancestor of all protists (amoeba), fungi, plants, and animals. This symbiotic unity had to learn probably from the Logos, among other things, how to:

- Control the multiplication of the eubacteria
- Make histones to wrap its DNA into chromosomes
- Construct a nucleus to manage an influx of eubacterial genes
- Construct a cytoskeleton and cell transport network
- Mitosis and meiosis manipulation of chromosomes (division and sex)
- Sexual union with two gametes, the mixing of lineage genes.

Remarkably, we humans inherited about 3,000 genes, many little changed, from this humble ancestor. The incorporation of photosynthetic cyanobacteria and the transformation into chloroplasts was similar, and probably easier the second time. This lineage led to all the plants.

The details and challenges to this internal symbiosis were numerous and sophisticated, the product of the next level in the math hierarchy, the Pathions with 32 components, and with vertical and horizontal subsets.

Cambrian Explosion

For what has been called the boring billions, the two types of bacteria along with single-cell protists (e.g. ameba) ruled the Earth. Then, just 600 mya, a rapid change occurred powered by high oxygen levels. Single-cell lineages learnt how to stick together after dividing, cooperating together as a single organization. This wiki overview focuses on animals, but the multicellular plants and fungi also developed about this time as well.

> The Cambrian explosion was a geologically rapid diversification of animal life that occurred approximately 538.8 million years ago, marking the beginning of the Paleozoic Era's Cambrian period. During this time, many new animal forms appeared in the fossil record, including the ancestors of most modern animal phyla. This event is significant because it represents a major turning point in the history of life on Earth, with a dramatic increase in the complexity and diversity of animal life.

As might be expected by now, this leap in evolutionary sophistication needed a higher level of math to describe the laws that governed this period of advance, the Level-6 Chingon numbers with 64 components. Cells probably learnt from the Logos how to stick together after division and expand their set of emergent properties, their abilities. The plants basically learnt how to become seaweeds, while the fungi learnt how to fuse into multicellular networks that suited their saprophytic lifestyle. Many animal forms that appeared at this time, including the chordates (humans, lions, tigers, etc.), mollusks (snails), worms, arthropods (insects), sponges, etc., developed.

The chordate offspring developed into vertebrates, mammals, and primates. Along the way, the nervous system developed in capacity. This development was governed by another level of math sophistication, the Routon numbers, with 128 components.

The next great advance in evolution was the level that organized the origin and functioning of the Primate brain. This level of sophistication—barely understood in current science—needed the sophistication of the Routon numbers with 128 components harmonizing seven sets of complements.

Evolution Completed

Unification Thought has it that the Logos governs development all the way up to that of the human child. Invoking the concept of Guardian Angel, we can assume that millennia of spiritual guidance guided the breeding of the primates—not the artificial selection by farmers, but spiritual selection—resulted in the first human children—a male and female.

This level of math sophistication needed to manage all this involves Voudon numbers, with 256 components. This is the final level of math sophistication involved in the Logos-directed evolution of life here on Earth.

The final step is the level of sophistication where the emergent property is the “I Am.” That consciousness of self that, according to the transcript of Moses’ first conversation with the Deity, we share with the Creator, the Logos-designer, who desires a parent-child relation with

humans. This level of evolution is the perfect human couple—mature, unfallen Adam and Eve —who are to be finite expressions of an infinite creator, the Heavenly Parent.

As we are all aware, there is a world of difference between programmed love (e.g. an AI-bot saying "I love you" automatically) and a beloved freely sighing "I love you" in your ear. This is, in fact, the reason for creating the Spirit World and programmed death in the physical world. In the top-down spirit world, mind is preeminent, and it is impossible, even for Almighty God, to program a being with free will and a free response of love.

The purpose of the bottom-up physical realm is for humans to create themselves, born the second time into the spirit world with free will and free response to love.

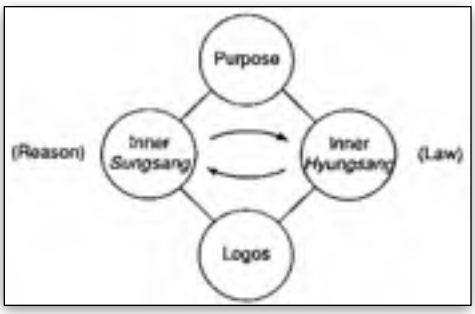
This divine level of math requires numbers with 512 components, a level that is as yet unnamed, but we can call *enotiton* (from the Greek for unity). Table 3 links math's and life's sophistication together.

This is also the level of math that is needed to explain the Big Bang creation of the physical and spiritual world, run by the same Logos but in complementary realms. Table 3 is a summary of the hierarchy of math sophistication. I sense that this is a minimum; it might be necessary to add layers of sophistication as understanding progresses.

level	#	name	science	emergent property
9	2^9	*enotiton* *512*	religion	God, perfect human couple Logos, Big Bang
8	2^8	voudon 256	philosophy	human child
7	2^7	routon 128	zoology	Primate brain
6	2^6	chingon 64	biology	Cambrian explosion
5	2^5	pathions 32	cell biology	LUEA **Last Universal Eukaryote Ancestor**
4	2^4	sedenion 16	bacteriology	Stromatolites
3	2^3	octonion **8**	biochemistry	LUCA **Last Universal Common Ancestor**
2	2^2	quaternion **4**	chemistry	white volcanic smoker vents
1	2^1	complex **2**	particle physics	planets, Earth
0	2^0	real **1**	gravity cosmology	suns, Sun

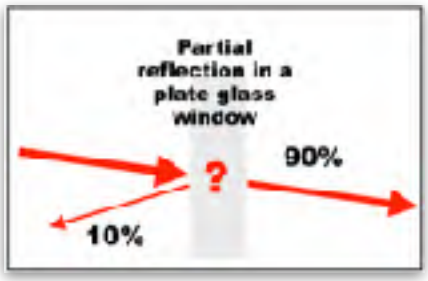
Table 3

The advantage of this POV is that it allows God to be a subject in mathematical (scientific) research, not some indefinite concept in a religion. *Unification Thought* has it that God has a structure, something well-established in math, but not for other aspects of the intangible realm



Free Will

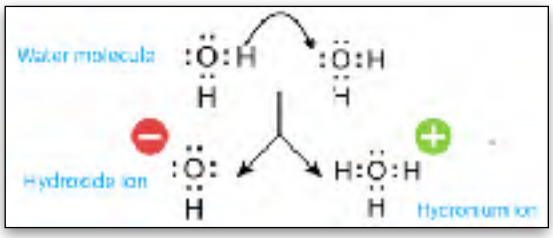
Called by a different name—*indeterminate*—a hint of free choice, exists at the very lowest level of the Logos. For instance, consider a plate glass window. Identical photons are shot at it; 90% pass on through, but 10% of them reverse course and are reflected.



Ask a scientist what makes the decision which way to go, and the reply will be, "It's indeterminate, it's random." However, if you say the photon has a simple ability to choose within the probability, then neither of you will be contradicting the facts, and neither of you will you be able to explain the 'choice' with simpler concepts. A similar situation holds for electrons.

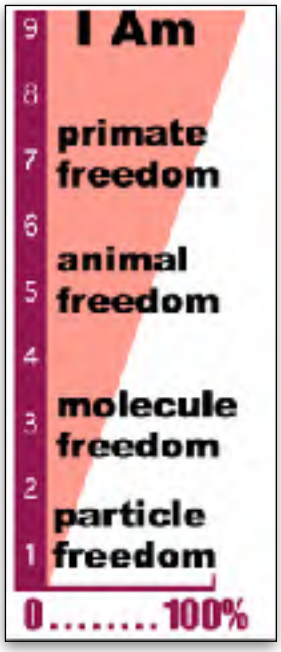
This is 'choice within a quantum probability' on the particle level.

A similar situation happens in water. When two water molecules are close together, there is a small probability in pure water that a hydrogen from one will jump to another, leaving its electron behind, resulting in a negative hydroxide ion and a positive hydronium ion.



The quantum probability of this is such that in pure water the concentration of the hydronium ions is 1 in 10 million (10^{-7}), which is called pH 7. The hydronium ion behaves just like a free proton and can also be called the hydrogen ion. The concentration of hydronium is high in strong acids (1 in 10) and low in strong alkali (1 in 100 trillion). The opposite holds for the hydroxyl ion.

This is 'choice within a probability' on a molecular level. With animals, the level of free choice is widened, and even simple animals respond freely to humans. The primates are almost like willful human children. This is 'freedom within an instinct.'



The top level of this is the "I Am" that is the human sense of self. This is on a bounded, finite expression. On the same level, but in an unbounded, infinite expression, is the same "I Am that I Am" that is our beloved Creator.

At this level of God and His children, creative freedom is unlimited and not determined by law but by love.

Spirit World

The theory of communism is that humans are temporary constructs of matter that have no special value. This allows for dissidents to be killed with impunity, Religions, especially Judaism, Islam, Christianity and Unificationism, to the contrary, embrace the reality of eternal existence in a spiritual realm and the absolute value of all humans.

Modern science actually has plenty of room for a spiritual realm (SR) in current theories. It can accept a realm where the following is true:

- SR has a *real* space and *imaginary*[7] time metrics to its spacetime, complementing the physical metrics of *real* time and *imaginary* space;
- SR is composed of supersymmetric tachyons (lightspeed is the lower limit) complementing the symmetric tardyons (lightspeed is the upper limit) of the physical realm;
- In SR mind and body have a top-down relation, not bottom up as in the physical realm;
- SR is 70% of the Cosmos and has an anti-gravity effect currently expanding the physical realm.

While the same Logos is governing both physical and spiritual realms, the effect is quite different and complementary to its effects in the physical realm.

Freedom to be Destructive

While human beings are designed to function at Level 9 of the math hierarchy—the level of God's unconditional love—historical reality is that humans function at best at the level 8, primate love, or at level 7, that of simple animals.

This reality was allowed because of human freedom and creative ability. Historically, we have been living in what religion calls Hell, a place devoid of true love. Religion teaches that this happened to humanity because the very first family was utterly dysfunctional; it involved a rape and a murder, and their descendants were no better.

The Bible coats this catastrophe in metaphor, as this dysfunctional family dynamic seemed unremarkable to barbarians. Religions were instituted to correct this dysfunction, and Unificationism teaches that this transformation is now historically possible.

MATH SOPHISTICATION AND LIFE

United Components	Level	Emergent Property
512	9	I Am, Adult mind
256	8	Child mind
128	7	Primate mind
64	6	Animal mind
32	5	Cell mind
16	4	Bacterial mind
8	3	Origin Life
4	2	Biochemistry
2	1	Quantum physics
0	0	Victorian science

Sophistication levels in math and Life

It is a mistake to blame God for evil, for it was created by mini-creators, us humans. It is for this reason that humans have the responsibility to end evil, encouraged along this path of restoration by God-like personalities, such as Jesus and True Parents.

Endnotes

[1] These are names, the *real* numbers are as real as the *complex* number, which are not that complicated.

[2] https://www.quantamagazine.org/the-octonion-math-that-could-underpin-physics-20180720/

[3] https://en.wikipedia.org/wiki/Quaternion#Quaternions_as_pairs_of_complex_numbers

[4] https://arxiv.org/pdf/2308.14768

[5] The only just formed Sun was rather pale, so the high CO_2 did not bake the planet.

[6] Nick Lane, (2015) *The Vital Question: Energy Evolution and the Origins of Complex Life* Norton, NY

[7] The tech term for a complex number with a zero real component