

GOD'S LOCATION IN MODERN SCIENCE

by Richard L. Lewis PhD

Ever since Darwin's divorce decree, God has been rejected by science, and the creator of life and human beings has been reduced to random chance and accident. One problem, of course, is that science explores and theorizes about objects of study. So far, science places God in the same place as Mary Poppins, creation of the human mind.

If God is to be included in science, He has to become an object of study—which is difficult if the location and object is unknown. This essay will propose a solution which will allow God to enter naturally into scientific debates. To start, we will allow religion to make a brief contribution.

It is written in the *Divine Principle* that, "God's form is also mathematical¹." The enquiring minds of scientists ask, 'Where is this form' and "What kind of mathematics?" One thing we know from religion and science is that creation comes in complementary interacting pairs, so the math of natural law will deal with pairs and collections of them.

Although it is not explicitly stated, it's quite clear from the statement that Religion places God in the same realm where mathematics resides. For science, it's an ongoing philosophical discussion between "invention" (math is human-made) and "discovery" (math as inherent to the universe).

We will assume, with *religion* and *discovery*, that the 'math realm is an aspect of the cosmos, and that God resides there and is constructed of math. This realm is intangible in both the physical and spiritual realms.

REAL MATH

What kind of math are we talking about. Clearly, the simple 'real' math we learn in grade school is not up to the task, for science has found that real math is unable to describe even a simple electron or photon of light. We will be dealing with complementary pairs in the higher math, and *real* math does not have any, so it's the foundation of the coming hierarchy, at Rank 0.

Almost all the math in the biological sciences (and *Divine Principle*) is Real Math, and it is obviously well-suited to describe certain aspects of the real world. In symbols suitable to the higher levels, (but rather meaningless on this level) we can say the real number structure is:

$$z_0 = 1$$

¹ *Divine Principle* 1975 p. 381

COMPLEX MATH, ONE PAIR

The math that can deal with one pair uses complex numbers. The pairs to which this math has been applied, for example are: linear / circular motion, internal wavefunction / external particle aspects, voltage / current in electric oscillators, etc. This math deals with a single pair as one, so it is Rank 1 in the math hierarchy.

Even scientists are so unused to this complex math, that the differences it brings to quantum physics is called 'spooky.' Quantum science is written in this complex math that deals with the complementary pair in a single number with a structure:

$$z_1 = 1 + 2e_1$$

The second component is an 'imaginary number line' orthogonal to the real numbers. in a 2D math space

This level of mathematics is quite capable of dealing with the relationship between mind and body in the simplest of entities, where the pair is wavefunction and particle. The math relation is that that the square of the internal is the probability of what the external will do.

The complex numbers have properties absent in the reals. A well-know example is the Mandelbrot set, an infinitely complex fractal in the complex plane. It is generated just by adding a multiplying a complex number.. If the result stays local, it's in the set, if it goes off, getting larger and larger, it is not in the set. These simple rules give complex results, as illustrated in this magnified tendril of the Set's border.



From the Mandelbrot Set

This is the realm of chemistry.

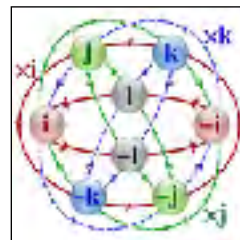
QUATERNIONS, TWO PAIRS

The next level is capable of coordinating two pairs in a single number. All four of the components are orthogonal to each other in 4D math space. Quaternions unite two pairs, so is a Rank 2 in the hierarchy. The structure of quaternions² is:

$$z_2 = 1 + 2e_1 + 3e_2 + 4e_3$$

While complex number excel at 2D patterns, quaternions are capable of creating 4D patterns that can exist in 4D spacetime. While investigation of quaternions is still in its formation stage, there are some hints of its use in biology law in the literature:

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



QUATERNION SPACE

² <https://mathematicalmysteries.org/quaternions/>

functions of a quaternion variable.³

Also, in a discussion of Dixon functions on quaternions:

What I had was an out-of-control intuition that these algebras were key to understanding {fundamental laws}...⁴

As far as life's evolution is concerned, the chemical transformations of the early earth created the volcanic vents, and the biochemical level guided their transformation into the fundamentals of biochemistry, such as Acyl Phosphate and simple sugars.

This is the realm of biochemistry.

OCTONION MATH, THREE PAIRS

The next level is capable of coordinating three pairs in a single number. All eight of the components are orthogonal to each other in 8D math space. Octonions unite three pairs, so are Rank 3 in the math hierarchy. The structure of octonions is:

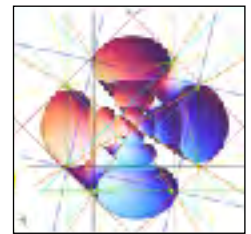
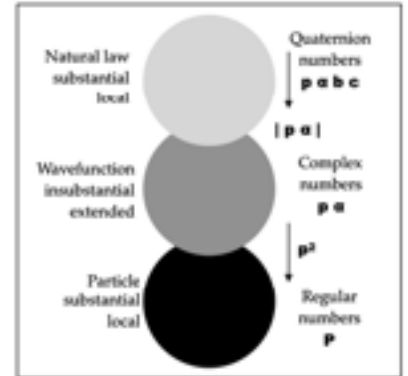
$$z_2 = 1 + 2e_1 + 3e_2 + 4e_3 + 5e_4 + 6e_5 + 7e_6 + 8e_7$$

This is an 8-dimensional number with one real part and seven "imaginary" parts, all orthogonal to each other.⁵

In nature, the third pair in natural law probably deals with electron flows, the basics of biochemical activity. Biochemistry coordinates three pairs as one unit.

While in its infancy, the properties of these numbers are being explored. One researcher has used them to bring order to the Standard Model of Fundamental Particles,⁶ while others have certain complex, non-mainstream theoretical models where octonions are used as an underlying mathematical structure to potentially explain the origins of physical constants and the organization of the periodic table.⁷

For living entities, the added pair is probably used in managing



Octonion 8D space

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

⁴ <https://www.quantamagazine.org/the-octonion-math-that-could-underpin-physics-20180720/>

⁵ <https://theoryofeverything.org/theToE/2013/06/15/connecting-the-octonion-fano-plane-to-the-atomic-elements/>

⁶ Masi, N. An exceptional G(2) extension of the Standard Model from the correspondence with Cayley–Dickson algebras automorphism groups. Sci Rep 11, 22528 (2021). <https://doi.org/10.1038/s41598-021-01814-1>

⁷ <https://theoryofeverything.org/theToE/2013/06/15/connecting-the-octonion-fano-plane-to-the-atomic-elements/>

H-bonding, upon which all the structure and functioning of all living organisms depend. We are suggesting that this level of sophistication is needed to describe metabolism, and the origin of LUCA, life's ultimate ancestor.

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This is the realm of bacteria.

SEDENION MATH, FOUR PAIRS

This level of sophistication is the sedenions, numbers that coordinates four pairs with its sixteen orthogonal components in a 16D math space. The sedenions have some unusual properties, such as numbers that multiply to zero! The reverse, of course, is creating something out of nothing, *Creatio ex nihilo* no less, a math that religion finds useful.

When the Google AI is asked for 'sedenions in biology' it reported nothing, but with "sedenions in biology" it reported':

Some theories use sedenion geometry (specifically conic sedenions) for quantum gravity, suggesting deviations from standard tensor algebra at extreme energies like the early universe.

EMERGENT PROPERTIES

We will pause in this climb up the abstract mathematical hierarchy to discuss the topic of 'Emergent Properties.' This is the well-examined of a novel property emerging in a relation of two or more interacting entities, none of which has that property.

When we look at the chemical elements we see a wide range of emergent properties, ALL of which are from the wavefunction that results for the merging of the individual wavefunctions. For hydrogen atoms, it is one proton wavefunction merging lawfully with that of one electron. The emergent property is the desperate urge to merge with another atom, hydrogen in the earliest age, so the two electrons can unite in a stable pair-bond, the goal of all electrons in all of chemistry. Those nasty radicals, we often hear about, are usually driven by a lonely electron determine to find a pair-bond, even if it means killing you.

A simple molecular example is water, with its host of properties essential to life and living, none of which are properties of hydrogen or oxygen molecule alone.

If it seems a coincidence that all the emergent properties the elements of life are perfectly suited to their roles; it is not. For the Logos is constructed top-down, all the

lower levels are designed to have just these particular qualities. The Logos not only has the patterns of life and living, it also has the paths of evolution worked out in detail.
Hypercomplex math

HYPERCOMPLEX MATH

We are now at the boundary between the known and the known unknown in both math and science. So far we have seen, at least in physics, in order to deal with a new level of sophistication a new level of math is need to describe it. Only when complex numbers were introduced was science able to successfully describe the fundamentals of matter and light.

For example, the genius of Newton in the 1600s was unable to describe partial reflection off a plate glass window, or why it changed with the thickness of the plate. However, with complex numbers—as unknown to Newton then as to most Americans today) the solution is a very simple exercise in math.

Einstein, on the other hand, had the language of modern math to describe his General Relativity with. When God ‘spoke’ His word about algae, the language was at Rank 5.

From Quantum Physics, we learn that natural laws create the probability, not actuality, of structures and functions.

To guide us further, we will use two simple axioms:

- 1. Each leap in life’s sophistication requires a leap in math sophistication.**
- 2. The pathways from simple to sophisticated are made probable by natural law**

This is speculative, but open to improvement as our biological understanding increases. So we now need a brief overview of known biological history and the quantum Leaps (QL) that occurred along the way:

QL1 The early Earth cooled so the ocean formed over the cooling lava. These two interacted forming many volcanic vents. Black smokers and white smoker vents developed, perfused with chemicals activated when water and hot lava interact. The ancestor of all life was, apparently, an organic film in a white smoker volcanic vent about 4 billion years ago.⁸ This was LUCA, whose ‘food’ was activated hydrogen from the vent.

QL2 From LUCA, descended the two tribes of bacteria that ruled the earth for two billion years, and are still extant. Now away from the natal vent food, these descendants had to manage energy by proton gradients and protein ‘wires’ to make ATP. The Logos

⁸ Lane, Nick 2009, *The Origin of Life* in Life Ascending, Norton NYC, pp. 8-33

offered two ways to do this, and both were taken. This is a leap in sophistication, requiring sophisticated math.

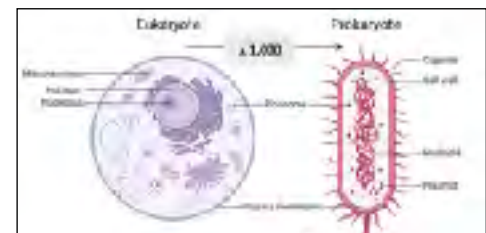
QL3 For the next billion years or so, the two bacterial races transformed the Earth—they created our oxygen environment—and communally cooperated in creating layered stromatolite structures in the ocean. In this protective environment, a very un-Darwinist symbiosis occurred.



Stromatolite section

Two lineages developed metabolically in such an environment. One was a metabolically robust archaea—they colorize Yellowstone. The other was an energy manipulating eubacteria—such as the cheese making lactic acid bacteria.

In human terms, the archaea domesticated the eubacteria, feeding and milking them. Then, one cosmically momentous day three billion years ago, the archaea enfolded the eubacteria entirely. They became the mitochondria that power our cells to this day.



Division of Life

This was the quantum leap from bacterial to eukaryote cells. From this union—the Last Eukaryote Common Ancestor—are descended all protists, fungi, plants, animals, and humans.

This was a major quantum jump in life's sophistication, and it requires another level of math sophistication.

QL4 The protists—single cells like an ameba—ruled the planet for a while, until about one and a half billion years ago, fossils resembling primitive seaweed appear, followed later by the diversion into fungi, plant and animal lineages. The timing of these is barely fossilized, and timing is uncertain.⁹

This quantum leap to multicellularity, sticking together after duplication, and cooperating in feeding etc. This is a quantum leap in sophistication.

QL5 Simple worms followed, appearing about a billion years ago. Our own first hours in the womb repeat the pattern. First a many-celled sphere, then a hole in the sphere as mouth/anus, then secondly another hole which becomes the anus in one lineage (insects), and the mouth in our lineage.

These two lineages explored the possibilities open to them in



Two paths of development

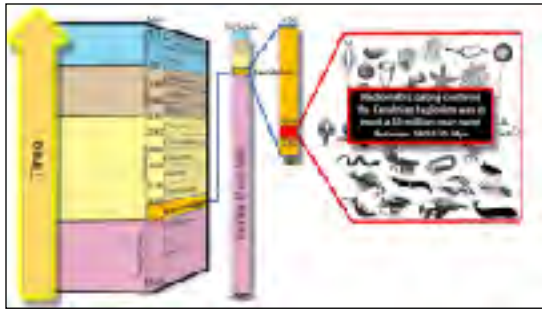
⁹ <https://www.newscientist.com/article/dn17453-timeline-the-evolution-of-life/#:~:text=1.6 billion years ago,lending support to this idea.>

the Logos, all leading up to another quantum leap.

DEVELOPMENT OF LIFE

Now, rather than overwhelmed reader with the details of all the incredible complexity that is to follow, I shall withdraw from writing for awhile and just use pictures to give a sense of what happened in each quantum jump in sophistication.

QL6 Cambrian Explosion¹⁰ 500 mya



Origin of almost every animal form, including us vertebrates

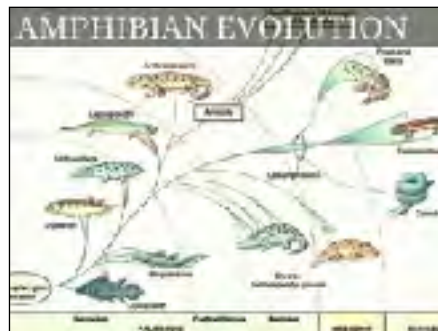


Cambrian Explosion fossils in the Burgess shale

QL7 Dry Land, Amphibians 370mya¹¹

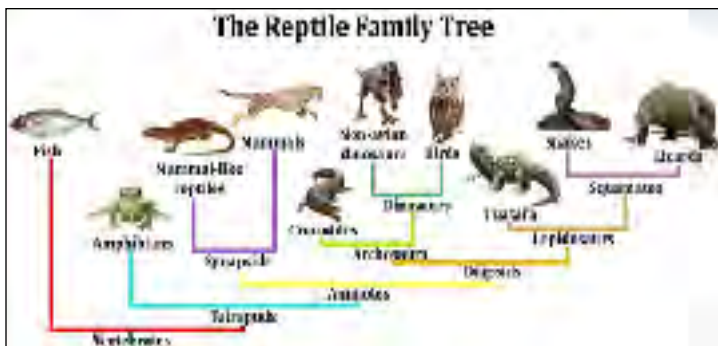


Animal transition from ocean to land

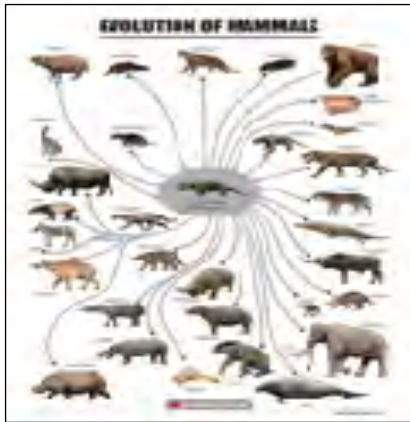


Amphibians on land

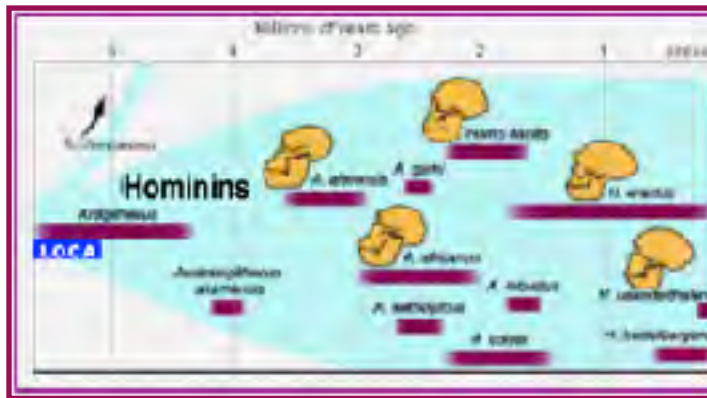
QL8 Reptiles¹², Dinosaurs¹³ 300 mya



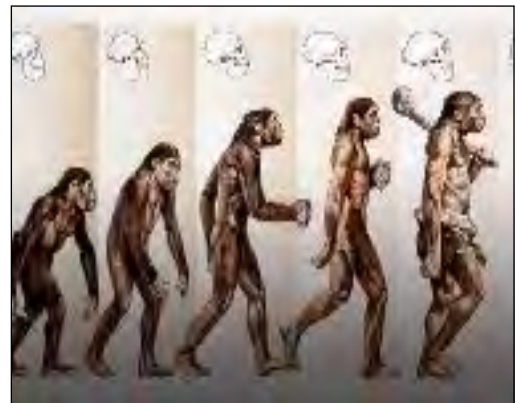
QL9 Mammals 250 mya



QL10 Hominins Africa 5mya

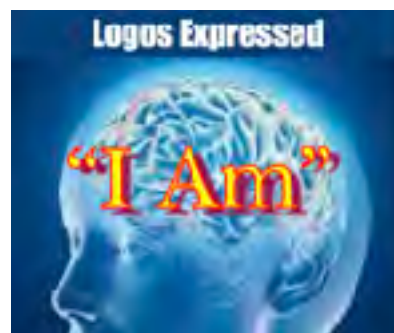


Hominin Evolution in Africa



Artist impressions of Hominins

QL11 The Logos, The human "I Am" 50,000 years ago



QL12 God, the Divine "I Am"

We have a few clues to understanding where and what God is. Christianity insists on an intelligent Creator. Science demurs, but claims that the "I Am" of consciousness is

generated in our brains. Unfortunately, it has not an iota of explanation of how or where this occurs. Moses reported that God was insistent their conversation that He to had an “I Am,” but also gave no clue, to how and where this occurred.



The view here seems to indicate that God is an emergent property of the higher mathematics, which should energize both academics and theologians to ponder higher mathematics.

What we have described so far is what science and math knows almost 500 years after Copernicus kicked off the Scientific Revolution. Seeing the pace of change, this is just a minimum to the actual sophistication. Perhaps LUCA juggled 6 rather than 3 pairs as the Logos provided the probable path for biochemistry to transition to Life.

Can mathematics handle an unlimited number of components? What are the emergent properties of the unexplored levels of hypercomplex math? Many questions for enquiring minds to explore in the upcoming centuries.

So, to answer those questions at the start.

God's location is the abstract space where math resides.

God's 'stuff' is hypercomplex math, and its emergent properties are God's properties.

SOPHISTICATED MATHEMATICS AND LIFE

Rank	Dimensions	named	
14	16,384		Divine "I Am"
13	8192		Human "I Am", Logos
12	4096		Hominint
11	2048		Mammals
10	1024		Reptiles
9	512		Amphibians
8	256		Fish
7	128		Worms
6	64		Plants
5	32		Algae, Fungi
4	16	<i>Sedenion</i>	Eukaryote
3	8	<i>Octonion</i>	Bacteria
2	4	<i>Quaternion</i>	Biochemistry
1	2	<i>Complex</i>	Chemistry
0	0	<i>Real</i>	Physics