## Awesome Universe! (Is it reasonable to believe in God?)

In view of the vastness of the Universe, can we find meaning? Is belief in God reasonable? Why is the human brain the most complex object that we know? Is there life after death? Who can tell us the answer?

### So big!

*Photo credit: NASA*

The first humans to orbit the moon were the three astronauts of the **Apollo 8** mission in 1968. They were taken by surprise to see the earth rising above the moon's colourless horizon. Bill Anders' iconic photo, **"Earth-rise,"** gave us a new perspective on our planet, the vastness of space, and our place in the Universe.

The **Voyager 1 and 2** space probes, launched in 1977, have surveyed the outer planets, and still continue to explore the outer reaches of our solar system. In 1990, after 12 years travelling, Voyager 1 looked back and took a last snapshot of Earth – from 6 billion kilometers distance. It shows our home as a **pale blue dot**, filling less than a single pixel!

But our solar system is only one of more than one hundred billion in our Galaxy, the Milky Way. In turn, the Milky Way is but one of more than a hundred billion galaxies in our Universe!

NASA's **James Webb Space Telescope** is now positioned in space, 1,500,000 km from earth, past the moon's orbit, on the night side of the earth. It has commenced sending exquisite images of deep space, analysing light that has been travelling for more than 13 billion years, taking us close to the beginning of time!

### The real questions!

Our minds struggle to comprehend **such vast dimensions of space and time**. The technology of discovery is recent and rapidly evolving. But the questions we ask are as old as civilization!

Our minds struggle to comprehend
such vast dimensions of space and time.

Can we find meaning and significance in our life on earth? Has the vast universe, including ourselves, come into existence and developed merely by chance? Is there an Intelligence behind the world we are discovering; an Author, Architect, Designer, Maker or Creator? Is it possible that such a Being could be knowable by us, or show concern for us? *What should a rational person believe? What can we know?*

Three thousand years ago, the Jewish King David, asked the question that still resonates today;

*"When I consider your heavens,*
*the work of your fingers,*
*the moon and the stars,*
*which you have set in place,*
*what is mankind that you are mindful of them,*
*human beings that you care for them?*
*You have made them a little lower than the angels*
*and crowned them with glory and honour."* (Psalm 8:3-5)

As we search for answers to these questions, we hope to come to conclusions or options that can at least be described as … **"It's not unreasonable … "** In view of the vastness of space, and the intricacies of life on earth, there are multiple lines of enquiry to pursue. But the central questions seem to boil down to these: - Is it possible that everything we know is the result of blind, meaningless chance and random processes, or is there a Grand Design? And if so, how can we find our part in it?

As scientists seek answers to specific questions, they hope and expect that the answers they discover will "make sense" as part of a bigger context. The best scientific breakthroughs often prove to be simple, elegant and powerful in explaining other things. So we hope that the pieces we consider will start to make sense as part of a greater jigsaw.

## A different perspective! (So small!)

It is now time to step down from the Astronomer's telescope, and move across to the microscope! From considering the largest things, we will turn to look at the smallest! We are going to consider the question of scale, and refocus on a different perspective.

Caleb Scharf, in his book, "*The Zoomable Universe"* (Atlantic Books, 2017) details **the orders of magnitude of the universe**, from the most vast, to the most minute. He starts with the limits of the observable universe, the **furthest distance** that light has had time to travel. Scharf describes the radius of the observable universe at 1.3 x $10^{27}$ m, (i.e. one hundred thousand billion, billion kilometers!) He then works his way down through the size of a galaxy like our Milky Way, ($10^{21}$m,) the size of our solar system, ($10^{17}$m,) and the size of Earth, ($10^{7}$m.)

On earth, a large city may be 100 k across. A football field is a little over 100 m wide, and a young child stands one meter tall.

Scharf continues his odyssey. Proceeding past the thickness of a human hair at one tenth of a millimetre ($10^{-4}$m), he continues to the nucleus of a human cell, ($10^{-5}$m), a protein molecule ($10^{-8}$m,) to the dimension of a single atom ($10^{-10}$m). But the atom has a nucleus and circulating electrons. The nucleus is further comprised of neutrons and protons, ($10^{-15}$m). But even the neutrons and protons are comprised of smaller particles; quarks, ($10^{-20}$m) and gluons! Can we go even smaller than that? Theoretical quantum physicists and mathematicians have calculated the Plank length as **the smallest unit of distance**. It is about $10^{-35}$m!

> Perhaps we should feel not so insignificant, after all!

**The world we inhabit, and experience** with our unaided senses is in the range of a few kilometres down to a fraction of a millimeter. So as humans, we find ourselves about half way between the size of the observable universe ($10^{27}$m) and the smallest unit that we know, ($10^{-35}$m) (using a logarithmic scale.)

Perhaps we should feel **not so insignificant, after all**! It turns out that we live somewhere near the mid-point of an amazing range of orders of magnitude that describe our universe. We could argue that as humans, we are, indeed, **in the centre of things!**

## Where do we fit into this picture?

As I consider our place in this vast "Awsome Universe", **my overwhelming sense of smallness is arrested** by this popular observation;

***"The most complex object in the known universe is the human brain!!"***

Here is a striking fact. There is nothing else that we know of in the entire universe that shows such complexity as our brains. How easily we take them for granted! It is our brains

that enable us to perceive the reality of our existence, to explore our world, to relate to each other and to ask the questions about the origin and meaning of life!

We may consider the human brain to be the culmination of the phenomenon of life on earth, based on the amazing development of the living cell.

## The Story so far…

But before we consider the brain, let's briefly review **the story of our journey to existence as humans,** as we presently understand it!

In 1927, Georges Lemaitre, a Belgian priest, physicist and astronomer, was the first person to demonstrate that the universe was expanding. (This was confirmed two years later by the more widely-recognised American astronomer, Edwin Hubble.) Extrapolating backwards led Lemaitre to the realization that everything had a beginning at a single point in time, contradicting the previous assumption that the universe was eternal and static. This new hypothesis, later called the Big Bang theory, is consistent with the Biblical view that the world had a beginning, when God created it.

The work of scientists in many different fields of science has converged to give some consensus on the history of the universe, and the age of the universe, (13.8 billion years.)

Here is my brief, simplified summary of this 'history of the Universe.'

> *In the beginning, time, matter and energy came into existence, suddenly, in an instant. It was like a big bang! It happened 13.8 billion years ago! The simplest elements, Hydrogen and Helium, were the first atoms, (and remain the most prevalent elements in existence.) The strength of gravity, and the other fundamental forces were operating (at precisely the right values) to enable matter to come together as stars. Here, under enormous pressure and heat, atoms fused, and new elements formed. So the ninety-four naturally occurring elements of the Periodic Table gradually materialized. Some stars ended their lives as supernovas, exploding with great force and light, and dispersing these elements throughout space.*
>
> *Our galaxy, the Milky Way, was generated. Our Sun, our home planet Earth, and our Moon took shape. The chemicals of biology, (including proteins, carbohydrates, lipids, and DNA,) came into existence, based on the unique chemical properties of carbon. The living cell was formed, and life began on Earth. Complex forms of life evolved. Eventually, we – the humans – arrived!*
>
> *The search for knowledge and meaning was on!*

## Between 'the Beginning of Everything' and the Human Brain, there are a few questions to consider!

### Question One - How do we explain the fine-tuned universe?

(The Anthropic Principle or the Goldilocks effect.) The precise value of each of the constants of various fundamental physical forces is a prerequisite for the existence of the universe as we know it, and for life on earth. The strength of the force of gravity is one of these constants. It appears that the laws of Nature, and the value of the constants, exist without variation throughout the universe, and without change over prolonged time. (These laws and constants thus form a non-material reality, a package of information, independent of the physical universe they regulate!)

> "It's as if there are a large number of dials that have to be tuned to within extremely narrow limits for life to be possible in our universe."
>
> – Alvin Plantinga

Is there a source of these physical laws and these constants – the so-called laws of "Nature?" What is the significance of this 'fine tuning?'

As **Stephen Hawkins** has noted, *"The laws of science, as we know them at present, contain many fundamental numbers, like the size of the electric charge of the electron and the ratio of the masses of the proton and the electron. … The remarkable fact is that the values of these numbers seem to have been very finely adjusted to make possible the development of life."* (Stephen Hawkins, 1988, *A brief history of time*. Bantam Books)

Christian philosopher, **Alvin Plantinga**, argues; *"One reaction to these apparent enormous coincidences is to see them as substantiating the theistic claim that the universe has been created by a personal God, and as offering the material for a properly restrained theistic argument – hence the fine-tuning argument. It's as if there are a large number of dials that have to be tuned to within extremely narrow limits for life to be possible in our universe. It is extremely unlikely that this should happen by chance, but much more likely that this should happen, if there is such a person as God."* (Alvin Platinga, "The Dawkins Confusion: Naturalism *ad absurdum*." Christianity today, March/April 2007)

## Question Two - "Running down, or winding up?"

The second law of thermodynamics can be stated in many ways. One classic definition is; "*In a closed system, entropy always increases over time."* (In Thermodynamics, **entropy** refers to randomness, disorder, disorganisation or chaos at a molecular level.)

Another crude rendering might be; "*Everything runs down, until someone winds it up again!"* Water runs downhill. My coffee becomes cold, until I reheat it. Everything degenerates. Everything goes to an average lower energy state, (or increased entropy.)

But as we survey the story of the universe, we see that from the sudden beginning, **things have been progressing to complexity.** Stars formed, and produced all the elements. Chemical compounds formed, and complex biological molecules became organised into the complicated structures of living cells. The evolution of complex life forms proceeded, up to our own existence as humans. This involved the storage and replication of increasingly complex packages of coded genetic information regulating the function of cells, and the development of the brain and its amazing computing capacity. Humans have developed language, and increasingly sophisticated technology, which has now enabled us to stand on the moon, land robots on Mars, and peer into distant space. (Unfortunately we have not stopped causing harm to each other!)

> "Our universe is both running down and running up!"
>
> – John Smart

The progressive increase in complexity, this 'fashioning of sophisticated intricacy', appears to represent the input of information, design and energy from 'outside the system.' The source of this external input reflects the possibility, even probability, of an external force, a designer, an Architect, a Creator exerting influence running counter to the tendency to degeneration, adding value, designing, engineering, maintaining and supplying energy and information. An alternative explanation is the operation of "random change leading to complexity" over extreme time scales. But that would tend to contradict the second law of thermodynamics!
The Universe as it has developed is certainly an object of awe and wonder. To me, the explanation of a designer is more reasonable than the operation of blind chance.

Futurist John Smart has summarised it; "**our universe is both running down** (growing in entropy) **and running up** (growing in knowledge, intelligence, and abilities.)"

## Question 3 – Why is Earth a suitable planet for the development of life?

Our planet seems of little significance in the vastness of the universe, but clearly Earth is the host of life, and possibly the only one!

Eight planets orbit our sun. The inner four, Mercury, Venus, Earth and Mars are the rocky planets. The outer planets are the gas giants, Jupiter, and Saturn, and the ice giants, Uranus and Neptune. (Pluto was reclassified, in 2006, as a dwarf planet, along with others including Ceres and Eris.) Lying between Venus, and Mars, Earth occupies the 'habitable' or Goldilocks zone, where the temperature is not too hot, like Venus, and not too cold, like Mars, "but just right!"

Many other factors also contribute to Earth being suitable for life as we know it to develop. Here are some of them! The presence of liquid water is dependent on the right temperature and atmospheric pressure. The large amount of liquid water on the surface of the earth is necessary, but the movements of tectonic plates allow mountains to rise above sea-level, so that the earth's surface is not all ocean. After water, comprising hydrogen and oxygen, other chemical elements required for life include carbon, nitrogen, sulphur and phosphorus. The earth's molten core gives eruptions of gas to form our atmosphere.

Earth's strong magnetic field, caused by the flow of molten iron in the outer core, and the rotation of earth on its axis, protects us from dangerous cosmic rays, and prevents our atmosphere being stripped away by solar winds, as happened on Mars.

Our twin planet, the moon, stabilises the motion of the earth. Jupiter's mass attracts many of the meteors away from our orbit that might otherwise harm the earth, (as happened to cause the extinction of the dinosaurs.)

Other planets? In the last thirty years over 5,000 planets have been discovered beyond our Solar System, orbiting other suns. Some of these exoplanets appear to be in habitable zones, like the Earth. Will they show signs of life? If the conditions are right, is it inevitable that life will develop over sufficient time, or is Earth a special case?

These questions fascinate us, but whether or not life is discovered on other planets, the existence of life on our planet Earth is truly a thing of wonder and awe.

> "… the matter of the Cosmos has become alive and aware." – Carl Sagan.

Cosmologist and Astronomer Carl Sagan comments about our planet! *"Welcome to the planet Earth – a place of blue nitrogen skies, oceans of liquid water, cool forests and soft meadows, a world positively rippling with life. In the cosmic perspective it is, as I have said, poignantly beautiful and rare; but it is also, for the moment, unique. In all our journeying through space and time, it is, so far, the only world on which we know with certainty that the*

*matter of the Cosmos has become alive and aware*." (Carl Sagan, ***Cosmos***, 1980, Abacus press, p25.)

As part of that world of life, we ourselves search for a satisfying explanation of our existence.

## Question Four – Where did those complex compounds come from?

Life on earth is possible because of the **existence of complex biochemical compounds**, mostly based on carbon. They include proteins, lipids, carbohydrates and the self-replicating, code-carrying molecule DNA. (The simplest organic compounds, including amino acids, have been found to exist outside earth, e.g. on meteorites and asteroids. But the more complex biochemical compounds have, so far, been found only on earth, manufactured by living cells.)

Which comes first, the protein or the cell?!

Many types of protein are required in the living cell, enabling a wide range of functions. Proteins include collagen, the main component of tendons and ligaments, myoglobin enabling muscles to contract, haemoglobin to transport oxygen from the lungs to the tissues of the body, enzymes to promote chemical reactions, hormones to regulate body systems and antibodies to fight infection.

Alpha amino acids are the basic units of proteins. Proteins are built of chains of hundreds (or even thousands!) of these amino acids. The specific sequence of the amino acids determines the shape and function of each protein in the cell. A single cell may manufacture over a thousand different proteins, each performing a different function.
Proteins are manufactured in ribosomes within the cell by complex nano-machines, under the direction of the code in DNA, translated via mRNA.

Here is the classic dilemma! To put it at its simplest; - cells are made of proteins and proteins are manufactured by cells. So the obvious question comes to us, (like the chicken and egg puzzle;) **which comes first**, the protein or the cell?!

## Question Five - The basic unit of life, a world in a single cell.

The cell is the basic unit of life on earth. Single-celled life-forms, like bacteria or yeast cells, or the complete range of multicellular plants and animals, all have in common THE LIVING CELL!

We are made of cells. Our life is dependent on the activity of plant and animal cells!

The oxygen we breathe has been generated by photosynthesis in the living cells of plants on land, and phytoplankton in the oceans. My entire diet, - cereal, fruit and vegetables, spices, meat and fish, dairy and eggs, - is derived from the living cells of plants and animals. (Even my drink, whether beer or wine, tea or coffee – with milk and sugar - comes from the cells of plants and animals!) My clothes might include wool, cotton, linen or leather, and perhaps a touch of silk, all made by living cells. The frame and floor of my house is made of timber, provided by the cells of trees. My comfortable chair is made of timber and leather. My book and newspaper is made of paper, derived from timber.

The cell is an awesome organisation – like a factory, or a city - a complex hive of activity in a package between one tenth and one hundredth of a millimetre! The cell manufactures thousands of chemicals, in thousands of chemical reactions, enhanced by enzymes made in the cell, coordinated to build, power, protect, repair, reproduce and perform other specific functions.

The cell is an awesome organisation – like a factory, or a city - a complex hive of activity in a microscopic package.

The Krebs cycle, (the citric acid or TCA cycle,) is only one example of a series of complex, integrated chemical reactions taking place in the cell. It consists of ten separate chemical reactions, mediated by nine specific enzymes, and is used to release stored energy from the breakdown of carbohydrates, fats and protein. The Krebs cycle is integrated with other complex chemical cycles in the cell.

The cell has multiple sub-units or organelles, serving the various functions of the cell, including the mitochondria to provide energy from glucose, the ribosomes to manufacture proteins, and the nucleus to carry and reproduce the DNA that regulates all the functions of the cell.

The cell membrane forms a sophisticated wall, containing and protecting the contents, while selectively allowing ions and chemicals entry and exit. It consists of a sandwich of two phospholipid layers, with the incorporation of stabilizing cholesterol molecules, and protein 'gateways' to allow larger molecules to pass into and out of the cell.

Even the most primitive cells, of simple bacteria, are surrounded by this plasma membrane with its complex structure and function, enclosing this complex 'beehive of chemical activity.' ("Sophisticated intricacy" indeed!)

So, how did the awesome structure and function of the cell develop? Is it the product of exquisite design, or of some incredibly unlikely series of accidental events?

## Question Six -The Mystery of Information.

Life on earth is based on information!

At the cellular level, all the functions of the living cell are controlled by the information encoded in the DNA. Three components of this information system are; the DNA molecule, the language of DNA, and the encoded information.

The molecule; The structure of the DNA molecule was first discovered in 1953 by Francis Crick, and James Watson, based on work by Rosalind Franklin and Maurice Wilkins. It was shown to be the famous double helix, or 'twisted ladder' structure; two entwined helices, and paired organic bases (guanine with cytosine and thymine with adenine.) The sequence of these base units carries the code for genetic information. In reproduction, the two strands of DNA separate, and replicate themselves, preserving the sequence of base units, thus preserving and reproducing the code. The DNA molecule is thus a self-replicating code carrier!

The language of DNA has its own alphabet, vocabulary and grammar. The four bases form the alphabet. A codon is a three-letter sequence or word which codes for an individual amino acid. For example, the DNA codon, GAT, (guanine – adenine - thymine,) codes for the amino acid, Aspartate. The sequence of the many hundreds of amino acids determines the nature of the protein. Other parts of the code previously considered 'junk DNA' are now known to activate or suppress the function of other genes. So the grammar of DNA is being deciphered, in the rapidly expanding science of genomics.

> The language of DNA seems to be a non-material phenomenon existing independently of the structures it regulates.

The language of DNA seems to be constant across the entire range of plant and animal species, and over the time-span of life on earth. Like the universal constants and the 'Laws of Nature', the language of DNA seems to be a non-material phenomenon existing independently of the physical structures it controls.

Human languages can be shown to have evolved. But this language appears to "just be there!" I ask myself, "Where did the language of DNA come from?"

The Message! The DNA molecule, and the DNA language, are the equipment that carries the coded information of the genome in the nucleus of every cell. In human cells, the human

genome contains a sequence of 3.2 Gb of coded information, held in the nucleus of each cell, a structure with a diameter less than one thousandth of a millimetre!

Physician and geneticist, **Francis Collins**, led the team that sequenced the entire human genome, completed in 2000. As a medical student, he began to seriously investigate Christianity when a patient challenged him with the question; "What do you believe, Doctor?" He writes about his faith journey in his book, "**The language of God**." (Francis Collins; *The Language of God; a Scientist presents Evidence for Belief.* Free Press; 2006*)*

That leads us to question seven!

## Question seven; But who wrote the code?!!

***Information does not generate itself by random processes***. Information is produced by Intelligence, giving rise to Intellectual Property rights. These are represented by copyright, patents and titles. Authors, artists, musicians and inventors will assert the right to be acknowledged as the creators and producers of their work. Thus, it is normal for a writer to state at the beginning of a book "the author asserts the moral right to be acknowledged as the creator of this work." In this way, a person's name represents themselves, so the copyright symbol, ©, placed beside their name, represents their person. (My name is on the bottom of this page!)

This reminds me that Jesus taught us to pray, *"Our Father in heaven, Your Name be honoured."* As I enjoy the wonders of the world around me, I imagine a copyright sign, "© The Creator!" at the bottom of every picture I capture in my mind, representing the fact that behind the 'Wonders of Nature' there is a Source of the design, who should be acknowledged and honoured.

***© The Creator!***

***© The Designer!***

***© The Maker!***

Behind the 'Wonders of Nature' there is a Source of the design, who should be acknowledged and honoured.

The **SETI** project, or **S**earch for **E**xtra-**T**errestrial **I**ntelligence, searches for Intelligent Life beyond Earth, by analysing signals from outer space. It must separate random signals, (noise

or static) from an actual signal or message that conveys meaning that could not be produced by random forces and would indicate the existence of intelligent life beyond Earth.

Let's imagine an astronaut landing on the Moon, or on Mars, or on a distant planet. He is surprised to find an information package, in some form, (whether book, manual, memory stick, CD or website!) It turns out to be the complete specifications for the design, construction, maintenance and repair of his own spaceship! He would surely conclude that some Intelligent Being had preceded him in his visit, and that this parcel of meaningful and useful knowledge did not happen by chance.

Now let's imagine that he finds another information package. This one contains 3.2 Gb of information which turns out to be the complete specifications for the design, manufacture, maintenance and repair of a human person! He has discovered a copy of "the human genome!" As described above, it has its own language with a four-letter alphabet, a vocabulary of three letter words or codons representing 20 different amino acids, and a grammar which is being studied by genomic researchers.

When he reports this finding to his base on earth, he is told that the human genome is well known. The information has been well studied, and the common view is that it has developed by random chance over a very long period – 3.7 billion years, in fact. He finds this hard to believe! Not so much the length of time, but that it developed without input by an Intelligence. His primary school children are learning coding, and he understands that the games and other programs they are learning to write will not generate themselves, even in a thousand years. In fact, his children take great pride in their creative work. Our space explorer believes that no random process can produce intelligent, meaningful code. (This is the underlying principle of the SETI project.) He looks for a copyright sign attached to his information package, and determines to search until he finds the Author of the code!

Oxford Maths professor, ***John Lennox,*** has argued that the existence of the information contained in DNA is evidence of a Creative Intelligence responsible for the developement of life on Earth. He argues that mathematically it is not feasible that random forces could produce such a detailed message, in the time available. (see John Lennox; *God's Undertaker - Has science buried God?* Chapter 10, Lion; 2009.)

## Question Eight – The Mystery of Life Itself!

As medical students, we spent many months learning human anatomy by dissecting a cadaver; the preserved body of a deceased human. The anatomy was intact for us to study and learn; the bones and ligaments, muscles and tendons, arteries and nerves were all in their places. But the biochemical reactions in every cell had ceased. The heart, lungs, kidney and liver were no longer active. The brain was shut down; - its vast memory store no longer accessible. The personality, the character, the individual who had inhabited this body for many years was no longer in residence! The owner had "left the building!"

What is this mysterious force called life? What is the difference between a living being, and the dead remains when life has ceased? How did this life begin in the first living cell? Can it all be convincingly explained by chance, or is there a better explanation that makes sense of 'the whole picture?'

What is this mysterious force called life?

**The origin of life!** One hypothesis for the origin of life is that lightning operated on a "primeval soup" of amino acids, in a suitable atmosphere to produce the first poly-peptides, the precursers to proteins. Somehow this set off the evolution of the first "primitive bacteria," as the first step in the evolution of all forms of life, both plants and animals. But the complexity of even the most basic cell, the need for a nucleic acid data base to regulate the many biochemical reactions and reproduction of the cell, the requirement for functioning DNA replication to provide the genetic variation that is the engine of evolution, and the mysterious switch-on of "*LIFE*" combine to make this explanation far from adequate to explain the beginning of life.

The Google article on Abiogenesis expresses it this way. "*The challenge for abiogenesis (origin of life) researchers is to explain how such a complex and tightly-interlinked system could develop by evolutionary steps, as at first sight all its parts are necessary to enable it to function. For example, a cell, whether the LUCA (last universal common ancestor) or in a modern organism, copies its DNA with the DNA polymerase enzyme, which is in turn produced by translating the DNA polymerase gene in the DNA. Neither the enzyme nor the DNA can be produced without the other."*

While scientists search for possible mechanisms to explain the beginnings of life, another overview comes from the Hebrew account of creation in the book of Genesis; *"The Lord God formed the man from the dust of the ground and breathed into his nostrils the breath of life, and the man became a living being."* (Gen 2:7) We may read this description as a beautiful poetic statement of the ultimate causation of life; -the role of a Creator behind the evolution of life on earth. To me, this view is just as rational and in fact more intellectually satisfying than the idea that such complexity at successive levels of organisation 'just happened!"

## Question Nine – How do we explain the brain?!

At last, we come to the human brain; the most complex object in the universe that we know.

Our brain weighs on average 1.5 kg, about 2% of our body mass, but consumes 20% of our energy usage! It is estimated there are 86 billion functioning nerve cells or neurons in the brain, supported by a similar number of glial cells. Each neuron may have 15,000 synapses, or connections with neighboring cells, giving a total of something in the order of *1,000 trillion interconnections* in a vast network between these cells! A nerve cell may transmit over 500 nerve signals per second! This results in a staggering capacity for storing and processing information.

Bill Bryson describes it like this: - *"A morsel of cortex 1 cubic millimetre in size – about the size of one grain of sand – could hold 2,000 terabytes of information, enough to store all the movies ever made! Altogether, the human brain is estimated to hold something in the order of 200 exabytes of information, roughly equal to the entire digital content of today's world, according to Nature Neuroscience."* (Bill Bryson; *The Body, a Guide for Occupants,* Doubleday, 2019, p 50)

This results in a staggering capacity for storing and processing information.

The brain functions at multiple levels. At its core, the brain stem controls the most basic functions of life; breathing, the heart rate, sleep and temperature control.

Large parts of the brain are devoted to processing and interpreting the input signals from the eyes and the other sense organs, and controlling our muscles in response. (Home computers also allocate large resources to graphics programs!) The simple action of running requires coordination of visual imaging, spatial awareness, proprioception, (knowing where our feet are) muscle contraction, secondary muscle relaxation, balance and coordination. The cerebellum coordinates the movements of the muscles, balance and equilibrium. Language, memory and mood are other complex functions of the brain, involving elaborate interconnections between different structures within the brain. The higher functions of the human brain allow thought, perception and self-awareness.

All of these functions we share with other members of the animal kingdom, especially the higher primates. But is it true that we are nothing more than 'naked apes?!"

Consciousness, creativity, appreciation of beauty, and a highly developed capacity for discovery and invention set us apart, and enable us to search for meaning. We also have a

capacity to make moral choices;  to choose love or hate, vengeance or forgiveness, war or peace, deception or integrity, serving or using others, taking or giving, building or destroying.

With our brains we can ask the profound questions; 'Is there a Creator? Can we know our Maker? Or is our life merely the unlikely sum of infinite chances?'

Oxford Mathematics Professor, John Lennox, summarises the basic issue. "*Either human intelligence owes its origin to mindless matter; or there is a Creator. It is strange that some people claim it is their intelligence that leads them to prefer the first to the second."* (johnlennox.org)

## Question Ten; Behind the Curtain of Death, the Ultimate Question;

As we stand at a grave side, and watch the earthly remains of a loved one being lowered to their final resting place in the earth, we face the ultimate question and reality check; is there life after death?

Jesus answers the question with a Yes!

The phenomenon of after-death communications from deceased loved ones to bereaved partners has been frequently described. As a family doctor, I have been privileged to hear several patients describe such an experience. They were convinced they had felt the comforting presence of the deceased partner over a period of minutes or hours in the few days after the death. The event was very real to them, but the experience was entirely subjective. There was no  physical embrace, no sharing of food or drink, but the bereaved were comforted. As a listener, I had no reason to doubt their experience, but there was no objective evidence to help me judge these events as evidence for life after death.

Is there life after death?  Jesus answers Yes!

The resurrection apppearances of Jesus were not like that! They were of a different order, and changed the world. When Jesus appeared to his disciples on the third day after his public execution, he spoke audible words and invited them to touch his wounds, and watch him eat some food. Luke records the conversation! (Lk 24:36-43) "Look at my hands and my feet. It is I myself! Touch me and see; a ghost does not have flesh and bones, as you see I have."

But can we believe this resurrection story as an historical event? The credibility of the witnesses who described meeting the Risen Jesus, along with the evidence of the empty tomb, and the failure to produce a body, is backed up by the change in the lives of the early disciples, and the rise of the Christian Church itself! The disciples were changed from their initial despair and fear to confident preachers who faced persecution and death for their testimony.

I find the story of Thomas very true-to-life and encouraging. He was the disciple who refused to believe that Jesus had risen, "unless I can see him for myself, and touch his wounds with my own hands!" (see also "Faith, reason and evidence.") **The resurrection is an historical, yet supernatural event.** The evidence for it can be examined as a court examines evidence of past events. Yet its reality gives us the key to understanding our existence.

## Does God speak to us?

Jesus claims to be the connection between the awesome universe, and the meaning of my life. He presents the Creator, "maker of heaven and earth", as a Being who can be known as Father, and then claims, "I am the Way, the Truth and the Life. No-one comes to the Father, except by me." (John 14:6) He speaks with credibility and authority.

In the understanding of the disciples, and generations of Christians since then, the resurrection of Jesus after his execution vindicates his claims, and allows us to make sense of our existence.

## Reasonable Conclusion!

In this essay I have considered the Awesome Universe, the human brain, and the resurrection of Jesus.

The Apostles' Creed has been recited by Christians through the Centuries as a statement of belief. It still echoes in Christian Churches throughout the world today. The opening words of the creed summarise **my reasonable conclusion…**

***"I believe in God, the Father Almighty, Creator of Heaven and earth;***

***and in Jesus Christ, His only Son Our Lord, …"***

FURTHER READING; John Lennox, *Cosmic Chemistry - Do God and Science mix?* Lion Hudson 2021

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