A Guide for the Perplexed:

The Implications of recent developments in Science for Christianity!

by

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Introduction

> "In what I am writing, let no one think I am saying anything new. It is only the arrangement of my material that may be new. For it is like a game of tennis, where we both play with the same ball, but one of us uses it to better advantage. So I would like it to be said that I am simply using well-worn words in a new framework. For when familiar thoughts are rearranged, they simply present a different way of communicating the truth. So too, we can use our words.
> – Blaise Pascal (4-22)[1]

I came from a family where my father was an atheist, or at least he said he was an atheist, and so when the topic of God or religion came up he reacted very strongly and negatively to any discussion. So it never really became a topic of debate or investigation.

For a while I remember my mother taking us to the small Sunday School in the village of Mangatoki, in the South of Taranaki. It was an Anglican Church with a small wooden sanctuary that was typical of the churches built throughout rural New Zealand. It could seat a maximum of 60 people with a tiny room out the back - I think it was called the Vestry - where we had Sunday School. All I can consciously remember of these classes was the faded old picture of Jesus in white robes lifting the children, immaculately dressed as miniature adults in 1950's clothes, on to his knee. The smell of old used crayons, and the draught that came through the tongue and groove bare Rimu floor boards.

My mother persisted in taking us for a couple of year's, she even taught Sunday School for a time. It was during that time at the end of the year I was awarded a New English New Testament. It was probably for attendance since my mother had to go every week.
Finally she tired of the protests of a young boy who wanted to stay at home on the farm and help his Dad with the sheep and cattle, not to mention the horses. So through lack of support she gave up.
That concluded my early childhood exposure to the Christian faith.
At school I had an aptitude for Maths. Maths seemed to come naturally, the answers would just be there in my head for me to pluck out and put on the paper. Later I would have to learn to delineate the process of getting the answers. I was put ahead of my age because of my Maths ability. I naturally chose Science and Maths and although I was by no means brilliant, I tended to cruise, my curiosity, imagination and commitment to Science was firmly established. Thanks to one science teacher at College I had in year 12 this curiosity was nurtured. He would suggest books to read on the wonder of Science and its discoveries.
I headed off to University with a scholarship from New Zealand's largest telecommunications company (Telecom) set to study for a Degree in Electrical Engineering.

Basically I was a functional Atheist. And I would argue for that position with a sincere conviction and convinced passion that only a rather arrogant 17 year old who thinks he has the world all summed up can do!

At college level, particularly during the 60's and 70's, students were given the impression that the advances of science were so great that science had an answer for everything, including the deepest mysteries of the Universe. Religion, particularly belief in God, was superfluous. Indeed "God was dead." So whenever thoughts of life, death, beginnings and creation crossed my mind, quickly following would be a conviction that "science had the answer" and evolution explained all that!
I vividly remember standing in School Assembly listening to the moon landing and those immortal words from Neil Armstrong crackling through the speaker system. "One small step for man, one giant leap for mankind." Who could argue with that, now the stars were within reach! So naively I argued for atheism simply adopting the attitude of my father.

Dad was an atheist at an emotional level rather than through intellectual conviction. He would simply get angry when anyone talked of God. With real emotion he would raise his voice and declare, I don't have any time for that **$$@@** I don't believe in **$$@@** God. Generally after that sort of reaction, any further enquiry was finished.
It was only much later, when Dad was in his 80's, that I understood why he carried such strong emotions.
I say this because this reinforces my conviction that the way we approach belief or non-belief in God is formed from within a set of pre-suppositions that we adopt often unthinkingly, sometimes in non-rational ways, sometimes for emotional reasons, sometimes because of family background, perhaps because of cultural predispositions even maybe through a genetic pre wiring.
In my father's case, at the age of 19 he lied about his age and went to serve in World War II training as a pilot of Lancaster Bombers. In his 80's he told me he was involved in the bombing of the German city of Dresden. There the Allies circle-bombed the city, setting alight a terrible conflagration where thousands of men, women and children who, unable to escape were burned to death. Dad always carried a terrible unease and unspoken burden of guilt for this, for nearly 60 years. In those days there was no counselling, no help for young men fresh out of their teens to unpack and understand their feelings. They simply returned home scared emotionally unable to understand why they felt somehow either angry or were crippled inside.
Dad felt, "How could God allow this to happen? There is no God!" Hence his atheism! How could he deal with that gnawing guilt within? He lived in denial of it and of the one to whom he would give account!
He did, however, come to hate "Bomber Command" who ordered the attack. And for years after the war he always refused to attend the local ANZAC Day parades. Typical of many men in his generation he was also lost to the Christian faith.
I believe pre-suppositions form the unspoken basis of much belief or non-belief. They seem to form a base from which people examine the evidence before them. It explains why two people looking at the same evidence can come to two totally different conclusions.
Take for instance the evidence for design in creation, two equally sincere people can look at and study this, one will continue to hold fast to an atheistic evolutionary perspective, the other will become persuaded that there must be a Creator. Why does the same evidence, examined equally lead one to faith in a God while the other remains unconvinced and continues to place their trust in evolution? (Random processes acting over time.) It comes down to the unspoken pre-suppositions from which a person approaches the data.

This point was made clear to me through the writings of the popularist apologist and reformed philosopher Francis Schaeffer[2]. Schaeffer talked about pre-suppositions and their effect on our beliefs.
Schaeffer argued that pre-suppositions formed the foundational perspective or paradigm from which we assessed evidence. They were not necessarily arrived at through deduction and logic but are an implicit set of assumptions about the world. They form a background belief through which a person filters data and evidence. Schaeffer suggests the way to get people to change their pre-suppositions and beliefs is to push these beliefs to their logical conclusion. At this point the fallacy or logical inconsistency of their view would be clearly exposed. Then they may be prepared to doubt their beliefs and adopt a new set of pre-suppositions that better fits the facts, the nature of reality. The world around them.
He would ask the question: What would happen if you consistently lived out the consequences of your beliefs? Would that fit with that nature of the world, human beings, life and love? Or would there come a point where you will have to become inconsistent, where what you believe about life and the world and how you live in the world exposes a logical inconsistency, a discontinuity between your beliefs and action? This proves that what you believe does not fit with everyday reality and hence must be wrong. In a sense this is how the scientific method works.
For example: If you believe in atheistic evolution, you believe that random processes plus enormous amounts of time plus natural selection gave rise to every living creature. That means that philosophically there is no inherent difference between a human being and an animal, or even a cabbage for that matter. Yes, a human being is much more complex but then there is nothing about complexity that bestows increased value of itself. Thus there is no reason to treat a human with any more dignity or compassion than we would a cabbage! But the fact is, we are repelled by such a notion. We obviously treat humans differently than we treat cabbages. Thus Schaeffer would argue there is something flawed with our evolutionary pre-suppositions.

Or again: Is evolutionary philosophy, with its engine of Natural Selection, (Natural Selection being the principle that random processes through the survival of the fittest drive adaptation and development.) able to be applied consistently as a belief system for everyday life? What would the world be like if we were all 100% pure evolutionists?
That would mean applying a "winner takes all", "the strong depose the weak", "survival of the fittest" attitude to life. It would mean a society where the sick and disadvantaged would be non-survivors. I think we would all be repelled by the notion of discarding those who are the weak and vulnerable in our society. A culture that doesn't care for the weak or sick has lost its humanity. This evolutionary philosophy was the foundation of the Nazi ideology of Ayrian superiority which our society has repudiated. Using Schaeffer's principle again, this exposes a flaw in the pre-suppositions of evolution. They just can't be consistently lived. There is a disjunction which doesn't fit the nature of how we believe we should live in a caring, compassionate society.
Pre-suppositions form the foundation of what "people believe but can't prove." They represent a stance towards the world.

Popularist atheists like Richard Dawkins, who is the Charles Simonyi Professor of Public Understanding of Science at Oxford University, or Sam Harris, would have us believe they are the only ones who follow the evidence, that they are the only ones who are courageous

enough to live without any "delusions." They too stand on a set of pre-suppositions which they cannot prove. "

In fact Richard Dawkins in the book "**What we Believe but cannot Prove**" say this;

> "It is an established fact that all life on this planet is shaped by Darwinian natural selection, which also endows it with an overwhelming illusion of 'design'. I believe, but cannot prove, that the same is true all over the universe, wherever life may exist. I believe that all intelligence, or creativity, and all design, anywhere in the universe, is the direct or indirect product of a cumulative process equivalent to what we hear called Darwinian natural selection. It follows that design comes later in the universe, after a period of Darwinian evolution. Design cannot precede evolution and therefore cannot underline the universe."[3]

Clearly with this set of dogmatic pre-suppositions, Dawkins is pre-disposed to interpret the data according to his personal bias. As far as he is concerned interpreting the evidence for design in the universe as the fingerprint of a designer is automatically ruled out.

Similarly Robert Sapolsky who is Professor of Biological Sciences at Stanford University and of Neurology at Stanford's School of Medicine says this in *"What we believe but cannot Prove,"*

> "Mine will be a fairly simple, straightforward proposal of an unjustifiable belief: namely, that there is no God(s) or such a thing as a soul (whatever religiously inclined mean by that word.)[4]

Now while that may satisfy the fundamentalist atheists of our world there are others who have been prepared to examine their pre-suppositions and "follow where the evidence may lead."

This was the core motivation and commitment of the eminent former atheist and philosopher Antony Flew. In his book "**There is A God**" Antony Flew writes how this maxim first led him into atheism and a career as foremost apologist for Atheism. In fact he set the agenda for modern atheism with his 1950s essay *"Theology and Falsification"*. He was the thorn in the side of woolly Christian thinking and his books *"God and Philosophy"* and *"The Presumption of Atheism"* forced a new rigour from the responses of Theists.

Concerning *"The Presumption of Atheism"* Flew states;

> "In this I argued that the discussion about God's existence should start with a presumption of atheism, that the onus of proof must lie with the Theist. I pointed out that this approach puts the whole question of the existence of God into an entirely fresh perspective.
>
> . . To believe there is a God, we have to have good grounds for the belief. But if no such grounds are provided, there exists no sufficient reason for believing in God, and the only reasonable position is to be a negative atheist or an agnostic."[5]

In following where the evidence led, Antony Flew has come to embrace theism. Theist philosopher Alvin Plantinga remarks;

> "It speaks very well of Professor Flew's honesty. After all these years of opposing the idea of the Creator, he reverses his position on the basis of the evidence."[6]

It has been the recent discoveries of Physics and Biochemistry which have led to his re-examination of his pre-suppositions. Ironic when you consider these are the very fingerprints of design that are ruled out a-priori by other more fundamentalist atheists.

Antony Flew writes how at a symposium held at New York University in May 2004, when he was asked if recent work on the origin of life pointed to the activity of a creative Intelligence, he replied;

> Yes, I now think it does . . Almost entirely because of the DNA investigations. What I think the DNA material has done is that it has shown, by the almost unbelievable complexity of the arrangements which are needed to produce (life), that intelligence must have been involved in getting these extraordinarily diverse elements to work together. It's the enormous complexity of the number of elements and the enormous subtlety of the ways they work together. The meeting of these two parts at the right time by chance is simply minute. It is all a matter of the enormous complexity by which the results were achieved, which looked to me like the work of intelligence.[7]

This statement was part of his reflection on the reasons why earlier he announced that he now accepted the existence of a God. That surprised other participants because it transformed what was scheduled as an intense debate on theism and atheism into an exploration of the developments in modern science that seemed to uncover the handiwork of a higher intelligence.

Antony Flew comments;

> "This statement represented a major change of course for me, but it was nevertheless consistent with the principle I have embraced since the beginning of my philosophical life – of following the argument no matter where it leads."[8]

In my own life, my conversion from atheism to believing in God was nowhere near as mature or protracted. I naively began at University thinking that Science (and I) had all the answers. To my shock and surprise I discovered that Science dealt in testable theories which were often wrong and needed revising. That Science was a dynamic endeavour that developed and changed as new theories were proposed or discarded. That Science faced paradoxes and mysteries, like the Wave / Particle nature of light (Electromagnetic radiation) or the quantum enigma.[9] These ideas and what I could only conclude was the mind-bogglingly intricate design of the laws of nature and fundamental constants that seemed to underpin the universe made me doubt my rather arrogant presumption of atheism. I became a tentative believer with many questions but with a new set of pre-suppositions that opened the door to investigating the actions of God which has resulted in a lifelong adventure of loving and serving this super-intelligent, mind-bogglingly creative God. **"A Good and Beautiful God."**

I hope in reading this you will also be inclined to "follow where the evidence leads." These essays are my reflections on some of the recent developments of science and how they connect with Christian thinking about God. This is not an argument for the existence of God. That is done by far better thinkers than I. I do want to deal with some blind alleys which are used to dismiss God's reality, but by and large, I am pre-supposing the existence of God. (As is traditionally understood within the Judeo Christian Tradition – but perhaps with some questions) In this approach I want to see where the evidence leads. Is the pre-supposition of God's existence consistent with the nature of the universe? And what additional insights does the presumption of a super-intelligent creator bring to an understanding of the universe? What insights, reflections and speculations about the nature of reality, and our relation to God can we legitimately glean?

I think it is an exciting pursuit and one that could consume all our thought for a lifetime and some. So these essays will be totally inadequate, but it is my hope they will set a course for your thoughts, and cause you to ponder with wonder.
As Blaise Pascal said;

> What can be seen on earth indicates neither the total absence of God nor His manifest presence, but rather the presence of a hidden God. Everything reveals this imprint. . . He (Humans) must not see nothing at all, nor must he see enough to assume that he possesses God, but rather he must see enough to know that he has lost God. For to know that someone has lost something one must see and yet not see, and such is our natural condition.[10]

Firstly I want to deal briefly with the development of science under the heading; 'Is Science a Prodigal Son?' Then because many people believe that given enough time chance can produce anything, including intelligent life, I want to confront the issue of chance and probability, next ask if we can recover a teleological purpose, then wonder if what we see is simply in the 'eye of the beholder' then speculate as to what was 'before the beginning.' Lastly I invite you to wonder at the results of God's immortal, opening words in the drama of life; 'Let there be!'
Let the games begin!

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[1] Blaise Pascal, *The Mind on Fire*, Edited by James M. Houston. (Victor Books , Eastbourne, England, 2006), 49

[2] Schaeffer wrote the trilogy: *The God who is There* (Hodder and Stoughton London, England, 1968.) *He is There and He is not Silent,* (Inter Varsity Press ,London England 1968,) *Escape from Reason.* (Inter-Varsity Press, London, England 1968)

[3] Richard Dawkins in *What we believe but cannot Prove*, Edited by John Brockman. (London, The Free Press, 2005), 9.

[4] Robert M. Sapolsky in *What we believe but cannot Prove*, Edited by John Brockman. (London, The Free Press, 2005), 30.

[5] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 53

[6] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 72

[7] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 75

[8] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 75

[9] The **wave/ particle duality** centres around the fact that electromagnetic radiation, light, in certain instances exhibits all the characteristics of a wave and yet in other occasions acts like a discrete particle. The way light is views determines what characteristics are observed. This paradox in fundamental to physics. The **Quantum Enigma** relates to the encounter of quantum mechanics with human consciousness. "In trying to understand the atom, physicists built quantum mechanics, the most successful theory in science and the basis of one third of the West's economy. They found, to their embarrassment, that with their theory, physics encounters consciousness. See Bruce Rosenblum & Fred Kuttner, *Quantum Enigma*, (Oxford University Press, New York, NY, 2006), preface

[10] Blaise Pascal, *The Mind on Fire,* Edited by James M. Houston. (Victor Books , Eastbourne, England, 2006), 148. Blaise Pascal (1623 – 1662) earned recognition as a renowned mathematician, physicist – and a man after God's heart. As he came to the forefront of geometry and physics, he turned his considerable analytical abilities to study religion.. (From the foreword)

Is Science a Prodigal Son?

Because of the recent controversial and acrimonious debates, resulting in court cases in the United States about the legal rights and wrongs of teaching creationism and or the theory of intelligent design alongside evolutionism in Colleges and Universities there is much misinformation about the impact of Christianity on the development of science.

Generally the popular media portray the Christian Church as opposed to scientific discoveries. They continually quote the Catholic Church's opposition to Galileo's endorsement of the Heliocentric theory of planetary motion, and his reinforcing of the Copernican revolution. That is the theory that the Earth in fact moves around the sun instead of being fixed in space. This heliocentric model we are told was vehemently opposed by Christianity. We are given no historical context or told of the "faith" motivations of the early scientists. Rather the Christian faith is portrayed as "the powerful but flawed resister of scientific progress!"

I want to clarify this situation and call on some research I have done on "The Influence of Christianity on the Rise of Science until 1850" or using the title above; "Is Science a Prodigal Son?"
This will be a brief theological / historical overview showing the place of the Christian Faith and its teleology in the development of science. It will also show some of the ways Christian theologians responded to the increasing power of scientific thought and world view on Biblical interpretation.

Beginnings
The springs which gave rise to the development of science can be traced back to a variety of sources. The most important find the origins both in Greek philosophy, particularly metaphysics and also Christian conceptions about the world.
Science however did not develop on Greek soil. However much the philosophy of Pythagoras, Plato and Aristotle contributed a philosophical and logical framework for rational investigation of the world, they also contain hindrances which Christianity later removed.
One stumbling block was the Greek conception of nature which although not homogeneous, differed markedly from the Judeo Christian view.

The pre-Socratic philosophers regarded matter as divine, the very being of parts of nature were identified as gods which gave life and continually regenerated themselves.
Thales, perhaps the first Greek philosopher (c. 585 BC) regarded the world as "having a mind which is a god." Indeed he thought that 'all things' were 'full of gods'. Even when Thales asserts that the 'origin of all things is water' he is still attributing to water divine characteristics. He says, 'right through the elemental moisture there penetrates the divine power that moves it.'[1]
Pythagoras (c. 550 BC) to whom we owe the origins of mathematical theory, particularly elementary geometry,[2] regarded mathematics as a means of investigating a higher realm of reality.[3]He considered 'numbers to be real things'[4] and referred to them as divine. Pythagoras was the first philosopher to assert that the earth was not the centre of the universe. He considered the earth to be one of the stars circling around **fire** which is the centre.[5] This remarkable assertion lay in obscurity until well into the 15th century AD when Nicholas Copernicus propounded his theory of Heliocentric motion.

The Atomists, namely Leucippius and Democritus (c. 460 BC) considered 'being to be full and solid, not-being to be void and rare'.[6] The Atomists regarded everything as happening according to 'necessity'. Necessity they said is the cause of the existence of all things. Necessity, being an inherent property of atoms (compact, solid elements, infinite and indivisible, so small they allude our senses). R. Hooyhaas suggests that,

> In this Necessity we meet a vestige of the old religion.... necessity being an aspect of the universal world order which even the gods cannot violate without incurring retribution.[7]

These Atomists differed from the Pythagoreans by denying that any rational principle was 'guiding in' nature. Necessity was not regarded by these Atomists as a final cause, that is Necessity was not a plan but merely an 'inherent property of the atoms'.[8]The concepts of empty space and small solid elements which the Atomists insisted with the basis of all matter were remarkable (albeit crude) preludes to modern atomic theory. The Atomists however were concerned with philosophy not science. Von Weizsaecker points out that they 'lacked the most important ingredient of the idea of mathematical laws of nature'.[9]The Atomists as far as it is known rejected the idea of applying, or synthesising Pythagoras' theories with their concept of atoms.

Plato (429 – 348 BC)

Von Weizsaecker notes that,

> 'no Greek thinker or poet before Plato had ever uttered the idea of a creator of the world.'[10]

This is crucially important for it indicates why the ideas of Pythagoras and the Atomists failed to give rise to the experimental investigation of nature. The universe was considered to be eternal and non-created; thus it was seen as divine or at least having divine attributes – namely eternity. As we shall see later, this had positive implications, but at this stage caused a reticence to investigate 'the divine' for fear of retribution.

Plato considered this changing visible world to be but a shadowy image of the real world, that of immutable ideas. This included the world of mathematical truths or forms which referred not to circles, triangles and squares that can be drawn on a piece of papyrus, or marked with a stick in the sand, but to abstract objects that dwell in an ideal world which is the home of true forms and ideas. As Mario Livio suggests:

> Platonism in its broadest sense exposes a belief in some abstract eternal and immutable realities that are entirely independent of the transient world perceived by our senses. According to Platonism, the real existence of mathematical objects is as much an objective fact as is the existence of the universe itself.[11]

Plato regarded this changing visible world to be but a shadowy image of the real world, that of immutable ideas. Plato regarded the visible world as having an origin, that is, it wasn't eternal but has 'come-into-being' based on an eternal plan. Plato speaks of a being (the demiourgos) 'framing the universe'.[12]He says,

> The demiourgos (god) took over all that is visible –not at rest, but in discordant and unordered motion – and brought it from disorder into order, since he judged that order was in every way the better.[13]

This demiourgos, though a personal creator, should not be confused with the Judeo Christian concept of Creator. Plato's demiourgos was restricted. He had to follow a definite plan, that of the eternal 'Ideas.' Further, he had to 'frame' the universe from matter that he had not created

and which stubbornly resisted his framing efforts. Even though Plato spoke of the visible world as a creation he still regarded the matter from which it was formed as eternal. Matter and the Idea to which it was modelled were considered to be a living creature. Plato asks,

> What was the living creature in whose likeness he (the demiourgos) formed the world?[14]

This living creature is not like anything formed, but contains within itself all living creatures. The visible universe is thus 'formed in the image' of this Highest Idea, Creature-God and is thereby divine. 'That' from which the world is formed is eternal and divine. Plato further insisted that Reason had overruled 'blind necessity' in the fashioning of the universe.[15] Plato's stress on Reason and man's ability, using reason to attain knowledge was his great contribution. Unfortunately Plato failed to apply reason to the visible world. He considered it to be best applied to the realm of 'Ideas' thus Plato's estimation of investigation of the visible world was negative. Plato like the Pythagoreans before him, were directed 'away from the world'.

Aristotle (384-322 BC)

This direction of stance 'away from the world' of things was reversed by Aristotle. He believed that the realm of Ideas correlated to the visible world. Aristotle according to Richardson[16] 'had considered Pythagoras' hypothesis that the earth was not the centre of the universe but had rejected it.' He instead thought that 'the universe was spherical, and moved in rotation around the immovable earth, its centre.'[17] As we shall see, this view influenced many of the official dogmas of the Catholic Church well into the 17th century and provided a large barrier to their acceptance of astronomy.

Aristotle believed that the 'Final Cause' of the world was what he called the Prime Mover. The Prime Mover was immutable, unchanging and perfect but was not the creator of the world. Aristotle, like his predecessors considered matter to be eternal and the closer they were to the Ideas (or Forms) the more they could claim to be divine. In this sense Aristotle's geocentric view of the universe was also a cosmology. Aristotle considered that 'the heavenly spheres, the stars, the planets are intelligent eternal divine beings and that the Divine pervades throughout the whole universe'.[18] Aristotelian metaphysics considered a circle to be perfect and consequently circular motion was more divine than any other form of motion. This explains the later behaviour of Christian thinkers who, influenced by Aristotelian philosophy, resisted the views of Johann Kepler.

Aristotelian cosmology was elaborated by Ptolemy in the second century A.D. into a system of astronomical doctrines which explained the apparent motions of the sun, moon and planets, according to circular paths and pre-supposed that the earth was stationary.

The Greeks made great advances in Philosophy. These advances form the germinal seeds in the growth of Science. They believed in Reason. Habgood suggests this was their 'priceless insight'.[19] Because the Greeks regarded the universe as divine and thereby ordered they were convinced that the world made sense. Further as man was part of nature and nature was indwelt by 'the divine' they expected that man using reason, could apprehend the 'Forms' or 'Ideas' of nature. M. Jeeves comments,

> It was the firm belief in reason which was the cornerstone of Greek speculation about the origin and nature of the universe.[20]

Further, they discovered and perfected a method of deductive reasoning taking formulative steps in logic, mathematics, philosophy, biology, astronomy and physics.[21]

The Greeks however, lacked the motivation experimentally to investigate Nature, instead they used Reason to speculate about Nature and consequently imposed speculations upon Nature which observation would have shown to be false. They elevated man's reason and intuition above careful observation.

The Greeks were not concerned to 'dominate' or change Nature, indeed since they regarded it as divine, such ideas were totally disregarded. They were afraid to change nature in case they violated the gods. Further, since nature was divine, they tended to explain happenings 'teleologically', that is, with reference to the action of the gods rather than look for causal explanations.
For example, Aristotle's explained the acceleration of a falling stone by asserting;

> 'that a stone is of an earthly nature, and while it falls towards the centre of the earth, it will increase its speed, because of its impatience to get home.'[22]

The achievements of the Greeks therefore were double edged. Although their emphasis on deductive reasoning gave the initial impetus to the development of science, it eventually stifled progress. The initial assumptions of the Greeks needed questioning, reason had to be submitted to the light of observation, further; the motivation for experimental investigation had to come from elsewhere. To this extent, science needed the springs of another world view. This is where the Christian tradition is crucial. It formed the other spring which combined with the best of Greek achievements to produce the river which was to swell into the scientific revolution of the 16th and 17th centuries and which is now flowing with breathtaking speed.

The Judeo Christian world view.
In examining the Christian world view of creation it would be an oversimplification to suggest the clarification of a Biblical understanding of the world that occurred subsequent to the Reformation was as systematically understood in the period prior to the 16th century. The early Christian theologians were influenced far more by Greek conceptions than we are today. Von Weizsaecker comments that, 'Christian philosophy . . was of a Neo-Platonic character during its first 1000 years the'.[23] While this needs to be understood, Christian sources did however offer a radically different view of nature which ultimately transformed Greek conceptions.

Within the Bible was found a radical contrast to the deification of nature in pagan religion and Greek philosophy and the de-deification of nature found in the Bible.[24] Von Weizsaecker suggests that compared to Greek and Babylonian creation myths, Genesis gave a history of creation which forms an anti-mythical myth.[25] In contrast to the *demiourgos* of Plato, God, Yahweh, the Creator is free, He is a sovereign creator not bound by any pre-existent plan or 'Idea.'

Isaiah 66:2,

> [2]All these things my hand has made,
> and so all these things came to be,
> declares the LORD.[26]

Psalm 95:3-5

> [3]For the LORD is a great God,
> and a great King above all gods.
> [4]In his hand are the depths of the earth;
> the heights of the mountains are his also.

[5]The sea is his, for he made it,
and his hands formed the dry land.[27]

Unlike the Greek view of matter, the Biblical conception asserts that matter is positive, created, non-eternal, further matter, indeed all creation, is dependent upon God for its continued immediate existence.(Genesis 1:1-31, Hebrews 1:3)
Matter is not divine, nor are the heavenly bodies, they are as the writer of Genesis says, merely lights. God alone has the only claims to divinity.

Genesis 1:14-19,

[14] And God said, "Let there be lights in the expanse of the sky to separate the day from the night, and let them serve as signs to mark seasons and days and years, [15] and let them be lights in the expanse of the sky to give light on the earth." And it was so. [16] God made two great lights—the greater light to govern the day and the lesser light to govern the night. He also made the stars. [17] God set them in the expanse of the sky to give light on the earth, [18] to govern the day and the night, and to separate light from darkness. And God saw that it was good. [19] And there was evening, and there was morning—the fourth day. [28]

Psalm 104:1-2,

[1] Praise the LORD, O my soul.
O LORD my God, you are very great;
you are clothed with splendour and majesty.
[2] He wraps himself in light as with a garment;
he stretches out the heavens like a tent[29]

God and nature are distinct; Nature is merely a creation of God. It is subject to change and decay, for God alone is eternal. (1 Peter 1:23-25).

The Greeks believed nature was purposeful because of its inherent divinity. The Bible however, asserts that it is purposeful because of **who** God is. It is purposeful because He has created it and His purposeful character is reflected in it. Man, to investigate nature, can use his reason, for both man and nature are creations of the same God, but not just his reason or intuition. He is also able to investigate, experiment and observe. (Psalm 104). This fact is vitally important, because in the Bible, nature was de-deified, man need not fear investigating or changing it, for he is not violating any divinity inherent within it.

The Greeks considered man to be merely a creation in the image of the universe and thus subject to it. The Biblical conception however, saw man is the 'crown of creation', as created in the image of God. Further, humankind was given a mandate to 'subdue the earth', to 'have dominion over it.'

Genesis 1:26-31

[26]Then God said, "Let us make man in our image, after our likeness. And let them have dominion over the fish of the sea and over the birds of the heavens and over the livestock and over all the earth and over every creeping thing that creeps on the earth."
[27]So God created man in his own image,
in the image of God he created him;
male and female he created them.
[28]And God blessed them. And God said to them, "Be fruitful and multiply and fill the earth and subdue it and have dominion over the fish of the sea and over the birds of the heavens and over every living thing that moves on the earth."[30]

This meant the world was important, it was a gift to be used, tilled, studied and managed.

The antithesis between Greek philosophy and the Biblical view of Nature was to have immense consequences. Further development of science depended largely on which of these views emerged as dominant once they had combined. The struggle was not easy and the history of science up until the 18th century shows the tensions created as Greek philosophy, particularly Aristotelian, dominated the way in which the Bible was interpreted, causing many Christian theologians to oppose the tentative findings of an embryonic science.

The Medieval Period.

The medieval period and early middle ages saw increasingly the Christianization of Greek Ideas. The culture of Europe was transformed under the influence of the early Christian missionaries. This transformation was slow and arduous. Hookyaas[31] points out that although the 'Bible does not offer a philosophical or scientific system' it does however, offer a positive conception of God and man in the world. Now because the scientific method rests upon the pre-suppositions the scientist has about nature, this formed an essential cultural background, and in many cases, motivation to his investigations. But the scientists' system of logic had to come from Greek sources thus Christian Natural Philosophers of this period took over elements of Greek Philosophy. Problems arose however, because inherent within these Greek ideas were pagan religious concepts, or Cosmology which were very difficult to remove. The growth of science until the 17th century shows how these conceptions were variously included or excluded as increasingly man began to systematically attempt to observe nature.

St. Augustine (354 – 450)

Augustine's thought was formulated amid the theological controversies with the Manichaeans, Donatists and Pelagians. Against the Manichaeans he maintained that creation was not evil. He asserted that God had created the world from nothing and had also created time. Augustine was concerned to defend God's omnipotence against the Platonic ideas of a limited creator. Von Weizsacker says,

> 'Augustine reinterpreted Plato's impersonal 'Ideas' and 'Forms' and equated them with God. The Forms now became God's creative ideas according to which he made the world.'[32]

Then Augustine stressed that because man was made in God's image, he could think God's thoughts after Him, albeit only in a limited, finite way. This meant man could understand, at least substantially, the structure of creation which was God's good gift.

Later Middle Ages.

The philosophy of Aristotle re-emerged during this period. Aristotle's cosmology and philosophy was permeated through the influences of Arabian scholars. The Arabic synthesis of Aristotelian philosophy, when backed by the military power of Islam not only made the traditional Augustinian Neo-Platonism seem archaic, but threatened to 'woo the younger Christian minds into 'atheistic' doctrines.'[33] Arabic influence however was not 'all bad'. They had developed a system of decimal numeration which was essential for the mathematical tools of science. Christian belief however, was threatened, but it was in this crisis that St. Thomas Aquinas (1225 – 1274) performed what Richardson[34] terms 'his supreme feat of Christian apologetics.'

Thomas Aquinas

Aquinas took the Aristotelian metaphysical categories and 'by standing it on its head'[35] transformed it into an instrument for the defence of Christian truth. Knowles suggests Aquinas created the 'first original philosophical system of the Christian centuries.'[36] So well did Aquinas accomplish his task that even though his ideas were condemned by members of his own Dominican Order[37] his arguments soon supplanted Augustine's Neo-Platonic synthesis. With this rediscovery of Aristotle came the rediscovery of Greek 'natural science'[38] which was appropriated by Christians with enthusiasm.[39]

While Aquinas transformed certain elements of Aristotelian philosophy, Hooykaas insists that,

> The Biblical world view during the Middle Ages was only superimposed on, and did not overcome the Aristotelian conception. . of a semi-independent nature.[40]

God's activity in Nature now tended to be conceived of in terms of a super-natural overruling of it. Further, Aristotle's 'a priori' proof that the heavens must have eternal circular motions around a fixed and immovable earth was also incorporated along with much other 'Natural Philosophy' into Christian doctrines.

Although I think Richardson overstates the issue by saying, 'Aristotle's work had come to dominate the thought of Christendom at the zenith of its medieval development,'[41] the fact that Aquinas' Aristotelian synthesis was influential cannot be denied. This synthesis was so pervasive that later, when the new science began to challenge and overthrow Aristotelian cosmology, it seemed to many Scholastic Philosophers (but not to the Christian scientists) to involve the rejection of Biblical revelation. Before science, as we know it, which by the time of Nicholas Copernicus (1472-1543) was beginning to emerge, could develop fully the metaphysical conceptions which had been incorporated into much Christian dogma had to be discarded. This development and the tensions created I want to develop next.

In summary .

The growing conception that matter was created, independent of the control of gods except the one God and a positive gift, arose from the Christianizing of Greek ideas. This provided a conducive climate and the motivation necessary for the development of science.
However many of the Greek metaphysical assertions about Cosmology and Natural Science which had been accepted by the church, first had to be discarded for this conducive climate to continue and Science develop beyond embryonic stages.

Consolidation

Influenced by the rising Christian culture within Europe and the new estimation given to manual work, interest and observing and changing nature developed. Previously, because of the scornful attitude of the Greeks to manual labour, little incentive existed for the educated to interest themselves in manipulating nature.

The Greeks had regarded the world in 'organic terms', it was seen as a 'divine animal'.
Hookyaas points out that, the consequence of this;

> Belief that it was illicit to compete with Nature (by attempting to change it) in fact 'would be trespassing on the bounds of a realm that Nature reserves for herself.'[42]

We saw earlier that this was thought likely to bring 'divine' vengeance. Any involvement in mechanics was regarded as going against Nature, hence even simple technology such as levers was treated with suspicion. Rudimentary science (mechanics, astronomy, chemistry, alchemy) was considered to be connected with magic since it appeared to be trying to cheat Nature.[43]

The rise of science coincided with the mechanisation of this organic world view and the development of crude technology necessary for experimentation. Those who subscribed to the Aristotelians' conceptions feared that the new mechanical ideas would lead to atheism. Others however, suggested that regarding the world according to theories of matter and motion gave more glory to God than the Christianized Aristotelian notions of a 'cosmic animal' called Nature.[44] Hookyaas suggests that the development of science from Copernicus to Newton has rightly been termed the mechanisation of the world view.[45] The Christian conception of nature as the creation of a sovereign transcendent God and man as made in His image with a mandate to have dominion over nature aided this transformation of world view. This transformation however was not smooth. Those in the church committed to an Aristotelian world view formed strong opposition and even a brilliant Christian astronomer like Johann Kepler vacillated between the two world views.[46] The tide however had turned and within two centuries a mechanistic view prevailed.[47]

The importance of Manual work.

As noted previously, the Christianization of Europe and the transformation of world view combined with a new estimation of manual work. This further aided the development of an experimentally based science crucial to the whole scientific method. Theory had to be tested by observation otherwise it would have been 'left in the air' with Aristotelian speculation. Reason had to be submitted to empirical observation for science to develop. Before theory could be tested though, the means of testing had to be produced and in this context, with the crude technology of the 16th and 17th centuries, the relative estimation of manual labour by the culture was formative.

Two conditions had to be met before experimental science could develop.[48] Firstly it had to receive moral sanction, that is, not be considered an illicit pursuit. Secondly, it had to receive social sanction, that is, be considered worthwhile. Thus although the growth of experimental science was undoubtedly affected by other factors such as, economics, trade and the threat of war, it was also related to the religious and social estimation of manual work.

The Greeks had considered manual labour to be fit only for slaves. Hence the educated and philosophers shunned experimentation. As a consequence the fruits of reason were not joined to the fruits of empiricism since the crude tools for systematic observation were scorned.

The Christian estimation of manual work was radically different. Within the Old Testament work was highly esteemed. After the "fall" it was the toil and unfruitfulness of labour that was the curse, not work itself. (Genesis 3) Manual skill was considered to be a gift from God. For example, the building of the tabernacle in the wilderness. (Exodus 36:1ff). All Jewish Rabbis had to learn a trade. Jesus was a carpenter and many of his followers were manual workers. Thus, Biblically, manual work was never considered dishonourable, far from it. Manual work is seen as the context in which Christians live in worshipful obedience to God. (Ephesians 4:28,)[49] For example, the Apostle Paul writing to the Thessalonians says in;

1 Thessalonians 4:10-12,

> But we urge you, brothers, to do this more and more, [11]and to aspire to live quietly, and to mind your own affairs, and to work with your hands, as we instructed you, [12]so that you may walk properly before outsiders and be dependent on no one.[50]

During the Middle Ages, although Aristotelian scholasticism was a constant barrier technology did develop. After 1050, watermills were used in industry. Roger Bacon (1214-1292) an English Franciscan who studied mirrors and lenses emphasized the need for an experimental science. Experimentation was so important to him that he joined the Franciscans in order to obtain the experimental equipment he required.[51] This example also highlights the fact that during this period the Monasteries were 'the' centres of scholarship. Scientific experimentation thus began to become the pursuit of a few nobleman, monks, and clergy.
Hookyaas notes that,

> Peter of Maricourt's 'Letter on the Magnet' (1269) demanded of the artificer in experimental science not only a knowledge of theory but also the possession of manual skill, which would enable him to correct errors which he could never have with physical and mathematical knowledge alone.'[52]

A new synthesis between reason and experiment was occurring.[53] This was to continue throughout the Reformation, as long as experimental work received religious sanction. I want to now focus on some crucial figures in a story.

Nicholas Copernicus (1473-1543)
Copernicus was a Polish doctor and astronomer. His book, which many suggest marks the beginning of the modern scientific era[54] was published under the sponsorship of the Lutheran Prince Albrecht (Albert) of Prussia. In a sense two Revolutions of thought coincided, the Reformation with Luther (1483-1546) and Calvin (1509-1564), and the scientific revolution sparked off by Copernicus.

In 'Des Revolutionibus' Copernicus propounded the heliocentric view of the world. He said,

> 'in the midst of all dwells the sun . . Sitting on the royal throne, he rules the family of planets which turn around him . . We thus find in this arrangement an admirable harmony of the world.'[55]

The principal appeal of Copernicus' theory was its greater geometrical simplicity. However, Von Weizsacker also suggests that the newness of his theory and its obvious reaction to the old Aristotelian-Ptolemaic geocentric theory contributed to its appeal[56] But of those theologians educated within the Neo- Aristotelian Christian tradition the Copernican theory created problems. It raised the question of the relationship of science to what they regarded within the philosophic framework to be the obvious statements of Scripture on the centrality of the earth and the movement of the sun.

Richardson insists the conflict scientists like Copernicus faced was "not a struggle between science and religion, but between science and the old Aristotelian pseudo scientific philosophy."[57] While this is true, I think he oversimplifies the problem for other factors were important. Aristotelian philosophy had only in part been Christianized and as a consequence the accepted interpretation of Scripture 'appeared' to be contradicted by the new scientists. Further, the Roman Catholic Church was attempting to deal with the Reformation and this 'new science' appeared to have Reformation connections.[58] At this stage, the attitude of Protestantism to 'new science' was largely one of acceptance. We must realise however, as Dillenberger rightly notes that 'at this stage Copernicus's arguments were not conclusive, many

unreligious men also opposed them'.[59] For the important Reformation personalities, there was as yet, no compelling reason for accepting the Copernican system. Genuine evidence had to await the work of Kepler in the early 17th century. At this stage, the choice was not between two established scientific theories, but between world-views, the Aristotelian one representing the status quo.

Luther in Calvin's view of Scripture.

In the context of the debates that are raging about the use of Genesis 1 and its interpretation as a basis or not, for a science of the beginnings it is essential for us to briefly analyse Luther and Calvin's view of Scripture. If they were to be open to 'new science' their interpretation of Scripture had to be such that it resolved the problems felt by those insisting that the Heliocentric theory was contrary to Scripture, particularly Genesis 1, Psalm 93 and Joshua 10:12,13.

For both Luther in Calvin, 'the Bible took authority from its Christological centre'.[60] They interpreted scripture on matters of science in such a way as to leave the door open to the acceptance of new theories.[61] Indeed Calvin's view of common grace gave Science a positive function, for it became a means to the truth used by the Holy Spirit. Calvin in fact, rebukes 'certain fanatics' who 'furiously declaim against the sciences and claim that such knowledge only puffs men up, not recognizing that it is of the greatest advantage for the common life'.[62] Hooykaas maintains that Calvin continually testified to a 'positive appreciation of scientific research as something that penetrated deeper into the wonders of nature than did mere contemplation'.[63]

Concerning whether Scripture spoke authoritatively on matters of Science, Calvin followed an 'Accommodation Theory' of the inspiration of Scripture. Forstman suggest this is his most widely used Exegetical tool.[64] Thus, Moses, the Psalmist and the Prophets frequently spoken according to the obvious way of comprehending and were not concerned with making scientific statements about the stars.[65] Hence although Calvin stressed the inspiration and authority of Scripture, his views on accommodation allowed considerable interpretive freedom on astronomical (scientific) matters.[66] This sort of openness provided a conducive climate for science to develop and in part explains why so many scientists were Protestant. For example, Philip Von Lansbergen (1561-1632) was both a strict Calvinist and propagator of Copernicanism.[67]

Science was also given a theological context, that of enriching and enlivening one's adoration of God. The aim of true Science was to 'reveal the marvellous works of God.'

Francis Bacon (1561-1626) exemplifies the theological context of science. He vigorously attacked the authority of the Aristotelian world view and its speculative philosophy. Bacon insisted that it was 'useless for the discovery of the sciences',[68] and was the reason 'vulgar and hurtful' notions were venerated.[69] Bacon championed carefully planned experiment and systematic research as the pathway to true knowledge about nature. He distrusted hypotheses, imagination and even reason itself. He said that the method which;

> "Constructs its axioms from the senses and particulars, by ascending continually and gradually, till it finally arrives at the most general axioms, (this) is the true but un-attempted way."[70]

This 'inductive method' based on empirical inquiry greatly influenced the development of Science and indeed the theological method of Christendom, particularly the American Calvinists as we shall see later.[71] Briggs notes that nearly two centuries after his death, Bacon was venerated by many scientists as 'the prophet of the new Science'.[72]

Bacon regarded scientific research as a duty of Christian love. The 'new Science' was a means of rescuing humankind from the continual fear of the powers of nature. It was a means of restoring humanity's dominion over nature: Science he said was a 'divinely inspired work'.[73]

The openness of Calvin and Luther to science was not universal in Protestantism. In Europe, P. Melanchthan (1497-1560) a contemporary of Luther, defended the Aristotelian-Ptolemaic geocentric system. Dillenberger notes that after the death of these Reformers the tendency arose for some to claim inerrancy of the Bible with respect to science (particularly astronomy) as well as for theology.[74] They began treating the Bible as an infallible scientific textbook. After 1590, with the rising Protestant Scholasticism, came a new emphasis on explicit metaphysics. In this case, it was claimed, metaphysics was subordinate to a Biblical perspective. This new emphasis provided a helpful framework in which to establish the unity of all sciences but many were like Calvinist J. Alsted (1588 – 1638) who uncritically enshrined Aristotle's metaphysics and 'buttressed the Aristotelian-Ptolemaic world view with a profusion of Biblical texts'.[75] This meant that the geocentric picture could not be denied without challenging the whole authority of the Bible, the very basis of Christianity. In this case, Scripture had unconsciously been subjected to metaphysics – that of Aristotle, rather than being interpreted according to its own logic or the intention of the original author's (as says one of the hermeneutic rules we follow today!) or even Christologically as Luther and Calvin. The basis had now been laid for systematic Protestant opposition to new Science. We can see echoes of this in the debates and disputes that rage today over the teaching of evolution and / or creationism in schools.
This historical opposition was by no means universal. As we have seen, Francis Bacon spoke out strongly against the Aristotelian world-view and Bacon's views were warmly received by the English Puritans.[76]

Galileo and Kepler

The scientific discoveries of Galileo Galilei (1564-1642) and Johanne Kepler (1571-1630) heightened the tensions present in Europe. The logical outcome of a theology subsumed by a foreign metaphysics meant that this new Science was regarded by many as a threat.[77] Both of these men were devout Christians[78] whose motivation for scientific investigation came from their devotion to God. Kepler regarded formulating a mathematical understanding of the world an act of adoration and worship, a thinking of God's thoughts after Him.[79]

Galileo was a 'good and devout Catholic' who wanted to convince the Catholic Church that the Copernican view was true and was not contrary to the Catholic Faith.[80]

A revolution in thinking however, was occurring. Galileo showed the planets were of the same order as the earth.[81] Thus a fundamental tenant of Aristotelian metaphysics, namely the incorruptibility and perfection of the heavens was destroyed. Both Galileo and Kepler applied mathematics to the world and by using mechanics, explained a motion of the planets systematically. Kepler effectively explained their motion in terms of elliptical orbits thus denying the 'perfect' circular orbits of the Ptolemaic System. Both were convinced mathematics explain Nature in a way which best correlated to reality.[82] Their conviction came from their Christian faith. Kepler in his letter to Maestlin on April 19, 1597 wrote;[83]

> '. . . Then man will at least measure the power of his mind on the true scale, and will realise that God, who founded everything in the world according to the norm of quantity (mathematics) also has endowed man with a mind which can comprehend these norms.'

Kepler believed mathematics disclosed the unity in and through the apparent chaos, uncovering the actual structure and nature of God's creation. They assumed that 'Nature' was like a book to be read and that it was just as important and indeed, on scientific matters, more precise than the 'book of Scripture'. Galileo held that;

> 'it was necessary for the Bible in order to be accommodated to the understanding of every man to speak many things which appear to differ from the 'absolute truth' as far as the bare meaning of the words is concerned.'[84]

We detect here something of the 'faith' Galileo had in his mathematical models and also his attitude to Scripture, which he considered to contain mysteries. Galileo considered his mathematical theories to yield the 'absolute' truth. By saying this, he inadvertently tended to narrow the conception of truth to that which is scientifically correct.

Galileo, as Von Weizsaecker[85] in my opinion correctly notes, took a courageous step of faith. He began to describe the world, not as we experience it but according to the most simple mathematical model. The form in which the model (or Law) was stated never held in actual experience but was mathematically simple. He thereby **'reduced'** the complexity of phenomena by mathematical analysis into simple elements. A remarkable new doorway was opened, one in which scientific experiment differed from everyday experience in that it worked inductively from a mathematical theory which raised questions. The answers were then interpreted within this paradigm. The nature of 'common sense' was now a reduced, or dissected by experimental science using mathematics into manageable reality.[86]

This 'new way of thinking' is best illustrated by comparing Aristotle's and Galileo's explanation of falling objects.[87] Aristotle said that heavy objects fall fast and light objects fall slowly. (This is actually what everyday or commonsense experience tells us, compare a piece of paper and a lump of lead.) Galileo however, said no. All bodies fall with equal acceleration and thus after a given time will have the same velocity. 'Everyday' experience disproves this, but Galileo suggested that friction accounted for the discrepancy and that in a vacuum the objects would act according to his theory. Galileo however, was unable to produce a vacuum.[88] His theory turned up a new hypothesis (that of a vacuum) and the mathematical explanation of friction.

Inherent in the above example is a remarkable principle within the new science. It advanced because of creative and courageous hypotheses that generated ways of verification or falsification. Science then requires faith, faith in the outcome of further investigations.[89]

The Catholic Church recovering from the Reformation, wanting to re-establish its authority and committed to an Aristotelian metaphysics placed Galileo's theories on the Index. The Inquisition and 1616 condemned the Copernican doctrines and in 1632 Galileo's book *'Dialogue Concerning the Two Chief Systems of the World'* suffered the same fate. Galileo recanted and instead of execution received life imprisonment. Here we see clearly the conflict between philosophies. Both sides believed in Christ. Their conflict arose over the use of Scripture. The Inquisition considered their interpretation of Scripture, with its inherent Aristotelian metaphysics, should function as a control in deciding which scientific theories were acceptable. Galileo on the other hand, considered Scripture had no explicit authority on matters such as astronomy.

The situation amongst Protestants and England

The relation between science and theology and England was very different, particularly amongst the Puritans in the mid 17th century. They had already rejected Rome and Aristotle and were generally positive towards science.[90] Even in Europe this was so. Hooykaas[91] notes that during this period, 82% of the scientists were Protestant even though they formed only 40% of the population. In 1663, 62% of the members of the Royal Society had Puritan origins even though Puritans were a tiny minority of the population. Such scientists were exemplified by Robert Boyle (1627 – 1691).

Boyle accepted a mechanical interpretation of material reality but strongly resisted its reductionistic implications. He was the first to see the need for viewing the world on different levels of reality. Boyle considered the discernible order to be as mysterious as the miraculous. He suggested that science should be subordinate to theology not in method but with regard to its **total** understanding of life. Dillenberger comments of Boyle;

> 'At no point did theology dictate the form of a scientific question or the context of the answer. His religious views entered only as he opposed **philosophical assumptions** which were not necessarily inherent in the new Science and which appeared antithetical to a Christian understanding of the world.'[92]

During this period however, the inductive use of experimental observation begin to determine the views of science quite apart from any 'overt' philosophical tradition. The door was opened to the **method** of the new Science becoming a philosophy which would question and even reject the world view which was presupposed during its birth. This door was flung open with Isaac Newton.

Isaac Newton

Isaac Newton (1642 – 1727), president of the Royal Society from 1703-1727, was a committed Christian who although he held some unorthodox views[93] believed that every discovery he made was communicated to him by the Holy Spirit.[94] Newton's Christian faith motivated his scientific endeavours which he considered a 'garden and given to him to cultivate'.

Newton's achievement was to bring heaven and earth together under the so called 'universal law of gravitation' thus making a 'unified' scientific world view possible. Newton affirmed a mechanical explanation of the world, but simultaneously asserted God's free activity in the world. He insisted upon a mathematical description of Nature, but equally insisted that the origin or first cause of the world was necessary to answer questions of meaning and purpose and could not be mechanically understood. The problem was – these questions were not scientific. Further, Newton tended to call upon God as an explanation for scientific questions he couldn't solve.[95]

Although Newton personally took 'ultimate' questions seriously his synthesis of previous scientific investigation was more restricted in that ultimate questions were laid aside. He felt it necessary to restrict himself to a description of mathematical laws of nature.[96] His theories laid aside metaphysical questions. E. Burt however, rightly points out that metaphysical questions cannot be suppressed;

> 'The choice is always between a conscious metaphysics and metaphysical views which either make the method a metaphysic or unconsciously absorb assumptions from the surrounding world.'[97]

Newton fell into the latter category. His successors who were not Christians fell into the former category. They regarded Newton's theory as supporting a totally mechanistic world-view. This

'new Science' itself had become a philosophy which could not only disregard but dismiss the Christian world-view once integrally associated with it.[98] Until the late 19th century, the Neo-Newtonian system (Cartesian metaphysics) became itself an unchallenged world-view. The tripartite of world-view of heaven, earth and hell in which every man could have meaning, purpose and a destiny was destroyed. Space and time are now interpreted, not symbolically or pictorially as previously, but as spatial and infinite. Reality explained only in terms of mathematical laws was considered true. Hence the concept of truth was thus narrowed to only that which could be scientifically established or mathematically derived. We can illustrate this by showing how the 'true' description of a rainbow was no longer considered to be God's creation, symbolic of His faithful covenant, or even the mystery in grandeur of colour but simply as nothing but the refraction of light. Reality now seemed to become reduced, and less real.

Summary of this section.

The conception of an ordered and reasonable creation, the social and moral convictions which motivated the early scientists and provided a climate conducive to science's development were gifts of Christianity to the modern world.

Now the result of these gifts could be used against it, and it is into this ethos that a Christian response has to be made.

The watershed.

The result of Newton's new synthesis was revolutionary, particularly amongst the intelligentsia.[99] The way in which many viewed the doctrines of Orthodox Christianity was radically affected. As the results of scientific discoveries were popularised, their stress on rational explanation and mathematical description lead to disbelief by the educated in witchcraft, astrology and the miracles of Christianity. As a consequence, the influence of Christianity on society was weakened. A paradoxical situation now existed. Protestant Christianity had in part, given birth to the new science, but now as the scientific world-view began to take hold on the educated, religion was beginning to be regarded as a hindrance to scientific advancement. In Europe this was particularly due to Bernard de Fontenelle[100] (1657-1757) who popularised scientific discoveries in clear and simple terms, but being a sceptic, gave them an anti-religious slant. Thus, although the majority of 17th Century scientists were pious men, the result of their labours were *interpreted* in such a way as to contribute to: a secularisation of world-view, a rejection of the mysterious in nature, a basic mistrust of 'received authority' whether the dogmas of the church, philosophy, or the tenants of revealed religion. This change led to an unbridled optimism. Robin Briggs[101] suggests the mood of the 18th century was one of 'materialistic self assurance' where 'belief in the progress and the power of human reason' spurred on by the triumphs of the new science reached a peak. God was reduced to being at best an absentee landlord or divine clockmaker.

Briggs states;

> 'the 18th century was an age in which there was a widely held belief in human perfectibility, based on an essentially mechanistic conception not only of the universe, but of men's bodies and souls'.[102]

This optimism, coupled with a belief in human reason, stimulated philosophers to speculate anew about the universe and humankind's existence.

These philosophers were increasingly sceptical of traditional Christianity.[103] For example, Kant (1724-1804) aimed to strip Christianity of such extras 'as faith and belief in a supernatural God,'[104] and replace it with a religion that was palatable to 'Enlightenment man'. A crisis situation now existed for Christianity. This 'new philosophy' was rapidly becoming the world-

view of the educated. If the church was to maintain credence among the educated and influence upon the masses, an apologetic defence of its traditional beliefs was urgently required.

Space does not permit a full account of this defence. We will however, briefly analyse how the conservative Presbyterians in America responded to this challenge. This example will illustrate the pervasiveness of the new scientific philosophy and its increasing influence even on the method of theology as Christian thinkers attempted to present orthodox belief in a way acceptable to a culture captivated by science. In many ways this defence became a paradigm for the way Christian Apologetics responded to a scientific world view. This approach is seen today in two ways. In the constructive way apologists in this 21st Century are approaching science and are following 'where the evidence' leads and coming to a new confident defence of the Christian Faith. And less constructively in a type of literalism which forces on to the Bible scientific categories which the original authors never intended and which amongst many people is a reason for ridiculing the Christian Faith. Let's return to our story.

The conservative, or 'Old School' Presbyterians as Bozeman calls them[105] resisted the rising tide of optimism about man and his capacities and in 1837 reaffirmed their allegiance to the Westminster doctrines of 1643-1646. While the 'Old School' Presbyterians accepted the revivals of the Great Awakening between 1725 and 1760 and subscribed to the Evangelical doctrine of 'new birth' they rigorously resisted its anti-intellectual tendencies. Bozeman[106] notes how during the period 1812-1860 the Old School Presbyterians maintained a high respect for learning. Their attitude was that;

> '. . . as science advances, and the range of human thought is extended, the Ministers of religion should be able to keep an even pace, with the best thought of their fellow citizens.'[107]

It is not common knowledge but the great Universities in the United States like Harvard, Yale, Princeton, were founded by Old School Presbyterians.
They were open an enthusiastic towards the flood of scientific discoveries. The 'Old School' leaders were intensely interested in the 'unfolding panorama of natural science' and saw it as their duty to present the Christian message in harmony with existing assumptions about the nature of the world and the human mind.[108] Christianity rather than being the significant factor in framing man's conception of the world, now had to accommodate to the categories in method of the 'new philosophy'. These Presbyterian Churchmen found a way not only to evade the attacks of those who sought to enlist the 'scientific revolution' as a weapon in the intellectual battle against religion but also to reassert the tenets of traditional Calvinism in a way which was plausibly attuned to the American intelligentsia.

These churchmen harnessed the epistemology and method of the 'New Science' and placed it into a Christian perspective. As Bozeman notes;

> 'How better to formulate a mission to the increasingly 'scientific' intellect of educated America than to exhibit Christian Theology is a royal example of the inductive philosophy.'[109]

The orthodox tenets of Calvinism were defended as the logical result of vigorous inductive research of the contents of Scripture. Doctrine, they suggested, was established by the same method and rigour as the generalisations from which the 'Newtonian world view' was based.

Theology rather than being regarded as the 'poor cousin' in intellectual discussions was considered the 'Queen of the Sciences.' These 'Old School' churchmen enshrined "Baconian Philosophy' that is the 'Inductive Method' as the method of Theology.[110]
Baconianism became influential in America through the Scottish Realist Philosophy of Thomas Reid (1710 – 1798) and D. Stewart (1758-1828). They linked Bacon and Newtonian together as the supreme example of scientific inquiry. Newton, they said, had merely 'doggedly adhered' to the 'rules of philosophizing' called induction, laid down by Bacon.[111] Realist philosophy and Baconianism had by 1820 consolidated its hold on the American mind. Bozeman notes how by 1850, the scientific community itself did almost 'ritual homage to Baconian philosophy'.[112]

From 1830 the Baconian systematization of Christian theology was quickly defused through conservative American Presbyterianism. Hence, we get the term 'Systematic Theology.' The theologians even used 'induction' to test the findings of science. C. H. Hodge writes,

> 'Inductive research, consistently refining and reconstructing its generalisations, was a self-correcting system and could be left alone as long as it did not presume to assault religious belief. But when science 'transcends those limits' . . . . and pits 'crude and hasty generalisations' against fundamental facts of Scripture, then the 'friends of religion may wisely rebuke its intrusion.'[113]

Hodge could assert this because he, along with others of the 'Old School', were convinced of the unity of knowledge based upon a Christian epistemology. They wouldn't admit any possibility of an actual discrepancy between the **facts** of Scripture and the **facts** of Science. Any discrepancy that did arise, they said, arose because of a forsaking of the careful, disciplined, and humble use of induction. Hodge applied this principle to Theology as well as science.[114]

Science, working within the limits of Baconian induction, was not regarded as a threat but was seen as an ally demonstrating the design, care and order of creation. Science, they said, had a doxological purpose for in the face of the nearness, graciousness and rationality of God exhibited in Nature, the mind was stunned and 'left with no recourse but to praise'.[115] The scientist was but a 'worshipper elucidating the Divine Creation'.

During this period this attitude served to preserve humility and meaning in American science. It charged many with optimism and thus the motivation to undertake scientific research as an authentic 'calling'. Nowhere else in the history of science and religion were there two fused so closely in mutual support. Bozeman suggests a 'virtual assimilation of Science to Orthodox Protestantism had been achieved'.[116] Science had been rendered Protestant and the Bible one of the many 'facts' the scientist must consult before making a generalisation about Nature.

Inductive philosophy forbade the exclusion of any relevant fact from its generalisations and so the scientist who ignored the Bible could be regarded as having apostatized from the fundamental principles of inductive science. In this way the 'Old School' Presbyterians simultaneously reinforced the authority of the Bible in scientific matters and produced a persuasive basis from which to call 'Secular Science' which 'contradicted' the Bible 'infidel.'

These Calvinists however, had become more literalistic than Calvin. They had neglected his 'accommodation' theory and had made the Bible a literal infallible authority on scientific matters. In this way, they sowed the seeds of their eventual demise and with it the rejection of the Bible's authority and more than just 'scientific matters'. They had appropriated Baconian induction as their hermeneutic principle. The task of the theologian therefore, was not to

explicate the meaning of Biblical passages within their context, but to 'mould them into a logical series of order so that a Christian theology could be created'.[117] The theologian and exegete were regarded as scientists of the Word. They investigated the **facts** of Scripture just as the natural scientist analysed the **facts** of Nature. They said just;

> 'As the phenomena of the material world are not to be judged, but seen, so the mysteries of heaven are not to be judged, but apprehended.'[118]

The authority of the Bible was brilliantly enhanced by the use of induction. Just as a natural scientist had to accept the data of nature, so the exegete using 'the Scientific Method of Induction' was obligated to accept **all** the facts of Scripture, 'even the mysterious elements'. In this way, the Old School Presbyterians attacked those rationalists 'who reduce theology to that which man's reason could approve'. They were able simultaneously to affirm the doctrines of orthodox Calvinism and yet still maintain credence amongst the scientifically fascinated intelligentsia. This was their strength. Their synthesis of Baconian methodology with the Christian Faith represents a remarkably creative attempt by churchmen convinced that the 'Word of God' should motivate, control and provide the context for scientific activity. Without this basis they realise that science would soon fall into secularism.

Their ultimate failure however, lay in their **rigid** use of 'Baconian induction'. They were more empirical than later scientists of the 19th century. Baconian induction proved inadequate. By its insistence that hypotheses must originate from immediate observable facts, by its mistrust of mathematical abstraction and theoretical explanations, by its exclusion of intuition and deduction, Baconian philosophy was soon outgrown by the onrush of scientific discovery. As is now more fully appreciated, science develops not only by the systematic use of careful induction, but also by creative hypotheses, intuitive hunches and courageous deductions which you later tested.[119]

Thomas Kuhn in his book **'The Structure of Scientific Revolution'**, argues that science is heavily influenced by non rational procedures. He insists that science is not the steady cumulative acquisition of knowledge (as Baconian induction suggests) but rather is a series of peaceful interludes punctuated by intellectually violent revolutions.[120] The 'Old School' Presbyterians in attempting to save late 18th and early 19th century science for doxology, and by interpreting the Bible according to strict Baconian induction 'unwittingly fixed a time bomb' to the synthesis of faith and knowledge. In a sense they had done what the scholastics before them had done, but this time, instead of Aristotelian metaphysics being synthesised with the Christian faith, it was Baconian empiricism. As science swept beyond Baconianism, as it did with concepts like uniform motion, momentum, force, the 'old school' synthesis being rigidly based on Baconianism, could not adapt. Consequently as Bozeman notes;

> 'Their position was to become less and less tenable from the standpoint of the actual science and thereby less effective either as a control over scientific heresy or as an approach to further doxology as the century progressed.'[121]

Because of this they lost contact with the scientific learning of their time and the Biblical world-view was moved to the periphery of society. As in Europe, secularism became and still is the pervasive world-view of our time. Science now came to be regarded if not as an enemy of orthodox faith, at least a threat to it; certainly it was not the doxological ally the conservative Presbyterians had originally wanted.

Of course the Newtonian mechanistic world view with its inherent reductionism and the optimism of science as the herald of a new utopia has been challenged and damaged (some say destroyed) since the rise of modern Physics. I have argued however that modern Science was the child of the Christianisation of Europe and a developing Biblical World view. As science developed it began to challenge the very foundations that gave it birth. Many of the subsequent scientists and philosophers of science had no time for the established church or the Christian Faith and used the scientific method to garnish their authority and challenge the basis of religion. For example it is generally accepted that the scientific research of someone like Charles Darwin was later used by Thomas Huxley[122] and the Humanist[123] philosophers[124] to further move Christianity to the periphery of intellectual thought. The result was that science has lost its original doxological purpose and the teleology that gave it birth.

The response of the Christian Church to the all pervasiveness of Science has been varied and can be summarised under five general categories.

1. **Accommodation,** which could also be called 'a systematic sell out'. Here the elements of the Christian faith which are deemed unacceptable or unpalatable to a positivistic science are dismissed as unimportant or radically reinterpreted. This was the attitude of many of the 'higher critics' in Biblical criticism who sought to radically reinterpret any accounts of miracles or the supernatural. This radical, historically-based German nineteenth-century Biblical criticism of the Hegelians; David Friedrich Strauss and Ludwig Feuerbach sought to demythologize the Bible of all miracles. Generally they were called the liberals in their interpretation of Scripture. Culminating in the 1960's with the 'Death of God' movement.[125]
2. **Complementarity,** where science and religion are said to have different functions. Science is able to answer the **how** of questions – religion can answer the **why** questions. Their functions not being mutually exclusive but rather giving complementary views of reality. In more recent years this is described as the layer cake model. Each interpretation of reality is one of the layers of the cake that makes up what is real. To obtain a 'whole, complete picture' one needs all the layers. I want to deal with this more fully in the section re-discovering a teleological purpose.[126] It would be fair to say that this is the view of many who would call themselves 'Theistic Evolutionists'. Francis S Collins who wrote the book ***The Language of God*** and is the head of the Human Genome Project has renamed this, The Bio- Logos movement.
3. **The Preconditional view,** in which faith is seen as a necessary condition for arriving at a fully comprehensive, coherent and consistent body of theories in the sciences. This view was classically expressed by Augustine and Anselm in the phrase 'credo ut intelligum'. It is asserted that without faith in God, some element of creation is absolutized instead. This view in a modified form is, I think, expressed by Herman Dooyeweerd. Dooyeweerd argues that absolultizing is the way all idolatrous philosophy proceeds. He says 'the absolutization of a special synthetically grasped modal aspect is the source of all – 'isms' in the theoretical picture of reality'.[127] The attempt then must be consistently made to reduce all other aspects to mere modalities (aspects) of the absolutized one. For example the reduction of a description of reality in 'Logic positivism' to nothing but photons and electrons obeying mathematical laws. Donald MacKay calls this a 'nothing buttery philosophy'.
4. **The Incorporationalist view.** This was the view of the 'Old School Presbyterians'. Here the doctrinal content of faith is seen to be part of the foundational certitudes and must be taken into account by Science. This is the view of the Creationist school of scientists in Conservative Evangelicalism. In this case a particular 'scientific' interpretation of the

chronology of Genesis 1 and the 24 hour periods claimed to be represented there are incorporated into a science of the beginnings. In this case a particular theology of inspiration and thus its implications for interpreting Genesis 1 are incorporated as foundational in any scientific paradigm.

5. The last position does not assume the truth or the necessity of temporal scientific certitudes. It says, that although the universe has a lawful structure, (God may well be an infinitely brilliant mathematician- who has structured into the universe by His ever present Word.) scientific knowledge of that structure is forever tentative and subject to change. It suggests that more than one scientific theory may be consistent with Christian belief since the Word of God continually structuring creation is more expansive than the Word of God inscripturated in the Bible. Because of this, one's basic commitment should not be a source of the scientists' data (as in (4) above or any – ism) since the scientists' data should not be ordered in a preconceived conceptual structure that does not do justice to the lawfulness of creation.[128] Basically this view says that the paradigms of science change and must remain open to change. This is certainly proving to be the case with the challenges that Quantum Mechanics brings to our perception of reality. The old Newtonian view of an objective reality 'out there' has crumbled under the onslaught of the Quantum Enigma as we will see in a later section.

In summary:
This brief historical overview has shown that Science developed from both Greek in Christian sources. We have seen that the Biblical conception of an independent, positive, ordered and created universe provided both a climate conducive to, and the motivation necessary for, the growth of Science. We have noted the tension created when this Biblical world-view was combined first with Aristotelian metaphysics. And we have seen how the synthesis not only hindered Science but created barriers to its acceptance by scholastic theologians.

The positive contribution of the Reformation was that it undermined the 'given' authorities. We have seen how, at their best, Protestants were open and supportive of the new Science. Further the hermeneutic principles of Calvin encouraged Protestant acceptance of Science and stimulated many Protestants to regard 'scientific experimentation' as their calling.
Some however, by buttressing Aristotelian metaphysics with Biblical texts unwittingly laid the foundations for a misplaced Protestant opposition to Science. The majority of early scientists however were pious Christians who saw no such opposition once the limits of both Science and religion, particularly the Biblical interpretation, were understood.

A scientific methodology emerged from the work of Francis Bacon and men turned from speculation and deduction to careful observation of nature. This method (induction) was greeted optimistically and with Newton's brilliant synthesis the Scientific Revolution emerged. A new world-view began to arise and this soon gripped the minds of the intelligentsia. This was characterised by a mistrust of doctrinaire authorities, enthusiastic empiricism, a mechanical conception of reality, and a conviction of the absolute veracity of scientific 'proofs'. A crisis now existed for the Christian Church. The predominant world-view was changing. Christian concepts, from which Science grew, were now being shifted to the periphery of the popular consciousness.

The attempt by the 'Old School' Presbyterians to arrest this trend was only partially successful. Although they succeeded, for a time in engaging the American Intelligentsia they had rigidly interpreted the Bible through a misrepresented and alien methodology; that of Inductive

Science, and this ultimately resulted in a hermeneutic which treated the Bible as an infallible 'Scientific' textbook. This made them inflexible to many new scientific discoveries which 'appeared' to contradict the 'Science' in Scripture. Being unable to adapt, their effect on Science and the general world view diminished.

Even though their effect on Science was only temporary, they represent an instructive example of Christians convinced that the Word of God should influence and control every aspect of human life including Science. We can learn much from their approach both positive and negative.

In the 21st Century, as we seek to communicate the Christian faith into a scientific and secularised society, knowledge of the development of science should protect us from intimidation, for I hope it has been demonstrated that Science is in part the child of Christianity. It could be called a prodigal son! Even though the, Scientific Method, once established as a means of investigation is able to be 'lifted out' of its original cultural context and used in other cultures where it never originated, it remains an historical fact that Science developed within a Christianized culture and quite rightly should be periodically reminded of its roots.

This would firstly serve to undercut much of the ill- conceived conflict created between Science and Christianity by the atheistic polemicists who are bursting into print today and seem to have become the darlings of a secular media. As we have seen a Biblical world view has been an ally to science.
Secondly, it helps to expose the real sources of conflict, that is, when the Scientific Method transcends its own methodological limits and is propounded as a metaphysic or world-view that excludes everything but a mathematically reduced picture of reality.

This brief historical analysis at the beginning of my reflections, should also warn us against solutions that impose upon Scripture, in the name of modernity, a metaphysical or methodology that obscures the intention of the original Biblical writers. This means we must beware of erroneously claiming 'Scientific Authority' for Biblical writers who were born in and were writing or speaking in a totally different context. Equally however we must avoid diminishing the authority of Scripture because it does not speak in 21st century scientific categories. Further, this over view should caution us against surrendering orthodox Christian beliefs to modern Science.[129] They were the beliefs which transformed Greek philosophy and medieval Europe, thus providing the cultural context and motivation from which Science grew.

Today, many commentators are suggesting that the scientific enterprise exists under a shadow of pessimism. The young are disillusioned and finding careers elsewhere.[130] Instead of being considered the rescuer of humanity from the 'fear of nature's powers' or the restorer of human dignity, Science is regarded as a polluter of the environment and a threat to the human spirit.

Science is suffering from a crisis of motivation. Could it be that it once again needs the motivation that stimulated the pious scientists of the 17th and 18th century to regard their researches as humble and dutiful worship? It may well be that the Scientific Enterprise in becoming the pervasive world view has displaced the wider cultural context from which it arose and thus the Biblical world-view that endowed it with dignity, meaning and purpose.

If this is so, then science has become a prodigal son which needs re-clothing with new meaning and doxological purpose.

My next sections will show some other factors that appear to be bringing this about or at least give us reason to hope.

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[1] R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 30
[2] For example, Pythagoras is theorem, 'the square of the hypotenuse is equal to the sum of the squares of the opposite sides for a right angled triangle.'
[3] R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 37
[4] R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 39
[5] R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 39
[6] R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 54
[7] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 2-3
[8] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 2
[9] C. F. Von Weizsacker, *The Relevance of Science* (Collins, London 1964) 70
[10] C. F. Von Weizsacker, *The Relevance of Science* (Collins, London 1964) 73
[11] Mario Livio, *Is God a Mathematician?* (Simon and Schuster, New York, NY. 2009) 36
[12] Plato: "Timaeus" (29) in R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 243.
[13] Plato: "Timaeus" (30) in R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 243.
[14] Plato: "Timaeus" (30) in R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 244.
[15] Plato: "Timaeus" (48) in R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 248.
[16] A. Richardson, *The Bible in the Age of Science* (S.C.M. Press, London, 1961) 10
[17] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 5
[18] Aristotle: *Metaphysics* (1074B) in R E Allen, ed. *Greek Philosophy: Thales to Aristotle* (The Free Press, New York, 1966) 357.
[19] J. Habgood, *Religion and Science* (Mills and Boon, London, 1964) 14
[20] M. Jeeves, *The Scientific Enterprise and Christian Faith* (Tyndale Press, London 1969) 11
[21] M. Jeeves, *The Scientific Enterprise and Christian Faith* (Tyndale Press, London 1969) 13
[22] A. Koestler, *The Sleepwalkers: A history of Man's Changing vision of the Universe* (Penguin Press, London, 1959) 111
[23] C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 85. E.G. Augustine was influenced by Platonic categories.
[24] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 7
[25] C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 50-51
[26] The Holy Bible, *English Standard Version* (Crossways Bible, Good News Publishers Wheaton IL) 2001
[27] The Holy Bible, *English Standard Version* (Crossways Bible, Good News Publishers Wheaton IL) 2001
[28] The Holy Bible, *New International Version* (Bible Society of Australia, NSW,) 1973
[29] The Holy Bible, *New International Version* (Bible Society of Australia, NSW,) 1973
[30] The Holy Bible, *English Standard Version* (Crossways Bible, Good News Publishers Wheaton IL) 2001
[31] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 12
[32] C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 88.
[33] A. Richardson, *The Bible in the Age of Science* (S.C.M. Press, London, 1961) 11
[34] A. Richardson, *The Bible in the Age of Science* (S.C.M. Press, London, 1961) 11
[35] D. Knowles, *The Historical Context of the Philosophical Works of St. Thomas Aquinas.* (Blackfriars Publications, Aquin Press, London 1958) The Aquinas Society of London. Aquinas Paper No. 30, 8
[36] D. Knowles, *The Historical Context of the Philosophical Works of St. Thomas Aquinas.* (Blackfriars Publications, Aquin Press, London 1958) The Aquinas Society of London. Aquinas Paper No. 30, 9
[37] The Bishop of Paris (Etienne Temier) in 1277. In seeking to preserve the sovereignty and Freedom of God he condemned the suggestion that God could not make empty space, that he could not create new species, that he could not make more than one planetary system and that he could not give other than circular motions to the heavenly bodies – in R. Hooykaas, *Philosophia Libera: Christian Faith and the Freedom of Science*, (Tyndale Press, London, 1957) 16.
[38] A. Koestler, *The Sleepwalkers: A history of Man's Changing vision of the Universe* (Penguin Press, London, 1959) 112, and A. Richardson, *The Bible in the Age of Science* (S.C.M. Press, London, 1961) 16 point out that Greek science was really 'pseudo science'. Aristotle was not concerned with empirical (inductive) observation as modern science is, but with a priori assertions about the world (deduction).
[39] M Deannesley, *The History of the Mediaeval Church 590-1500* (Methven And Company Ltd. London, 1950) 174

[40] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 13. and E. Gilson The Christian Philosophy of St. Thomas Aquinas, (Victor Gollancz Ltd., London, 1957) 7, Gilson notes how St. Thomas' theological work, included notations directly borrowed by him from Aristotle, even when he subjected them to no modification. 7

[41] A. Richardson, *The Bible in the Age of Science* (S.C.M. Press, London, 1961) 10

[42] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 56

[43] Many of the early scientists did not help matters because they were involved in astrology. This may have been a reason why church officials treated astronomy with great suspicion. J Dillenberger, *Protestant Thought and Natural Science* (Collins, London 1960) 92, notes that R. Recorde (1551) the first defender of Copernicanism in England, T. Brigges the first English Copernican astronomer and mathematician, T. Brahe (1546-1601) the brilliant astronomer who synthesised a compromise system with Copernicanism and Johannes Kepler the brilliant mathematician who propounded the theory of elliptical planetary motion –all these scientists supplemented their incomes by astrology.

[44] E.G. Robert Boyle in the 17th century.

[45] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 13

[46] Hooykaas records Kepler's quandary, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 62, Kepler in 1597 held an organistic view, in 16O5 a mechanistic, and 1619 he had returned to an organistic, then in 1621 reverted to a mechanistic model.

[47] A mechanistic world view during the 16th and 17th centuries was not the crude mechanism of later centuries. God was still conceived as being providentially active in the world sustaining and guiding it. The door however, was unlocked to the possibility of deism, the clockwork universe and an absentee creator God.

[48] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 75

[49] W. Neil, *The Moffat New Testament Commentaries: Thessalonians* (Hodder and Stoughton, London. 1950) 87-88

[50] The Holy Bible, *New International Version* (Bible Society of Australia, NSW,) 1973

[51] R.G. Clouse. - Roger Bacon in *The New International Dictionary of the Christian Church*, ed. J. D. Douglas (The Paternoster Press, Exeter Great Britain 1974) 95

[52] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 86

[53] The alchemists particularly gave important place to experiment. They were proud of the coal dust on the hands and called themselves 'philosophers through fire'.

[54] R. E. D. Clark Nicolas, Copernicus in *The New International Dictionary of the Christian Church*, ed. J. D. Douglas (The Paternoster Press, Exeter Great Britain 1974) 262

[55] N. Copernicus, Des Revolutionibus: Bk. 1 Ch 10 in A. Koestler, *The Sleepwalkers: A history of Man's Changing vision of the Universe* (Penguin Press, London, 1959) 196

[56] C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 101

[57] A. Richardson, *The Bible in the Age of Science* (S.C.M. Press, London, 1961) 16

[58] The fact that Copernicus' book was sponsored by a Lutheran prince would not have these the Catholic church's suspicions.

[59] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 27-28

[60] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 32

[61] A Kuyper, *Lectures on Calvinism* (Associated Publishers and Authors, Grand Rapids, (n.d.) 67-86. Kuyper argues that Calvinism had a positive effect on science in four ways;

a) By its conviction about God's fore-ordering of creation produced a love for science.
b) It restored to science its proper domain with its high estimation of temporal existence.
c) It delivered science from the control of the repressive 'Roman Church'.
d) It provided a framework in which the unity of science could be sustained. Although I think Kuyper overstates his case, his points are worthy of attention.

[62] J Calvin, *Calvin's Commentaries Vol 11 Romans – Galatians* (Associated Publishers and Authors, Wilmington, (n.d.) 1 Corinthians 8, 1629

[63] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 106

[64] H. Jackson Forstman, *Word and Spirit: Calvin's Doctrine of Biblical Authority* (Stanford University Press, Stanford, 1962) 13f,16.

[65] Calvin had no view of the cultural limitations of Biblical writers and believed if they wanted to, they could have made 'scientific' statements.

[66] R. C. Prust, *Was Calvin a Biblical Literalist?* Scottish Journal of Theology Vol. 20. No. 7. 1967, 326.

[67] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 123

[68] F Bacon, *Novum Organum, The Physical and Metaphysical Work s of Lord Bacon including Novum Organum*, (George Bell and Sons, London, 1891) Bk. 1. Aph xi 384.

[69] F Bacon, *Novum Organum, The Physical and Metaphysical Work s of Lord Bacon including Novum Organum*, (George Bell and Sons, London, 1891) Bk. 1 Aph xii 385, also Aph xiii-xix 385 -386

[70] F Bacon, *Novum Organum, The Physical and Metaphysical Work s of Lord Bacon including Novum Organum*, (George Bell and Sons, London, 189) Bk. 1 Aph. Xix 386

[71] Bacon himself resists the intrusion of 'matters divine' into the content of natural philosophy IE Natural Science. He states, ' . . To build a system of natural philosophy on the first chapter of Genesis, the book of Job, and other parts of Scripture is folly. This folly is therefore to be prevented and restrained because not only fantastical philosophy, but heretical religion spring from the absurd mixture of matters divine and human'. Bk. 1 Aph LXV. Bacon's reasons were to protect both science and religion from error. This resistance to making scripture an authority on science was reversed by many Protestants and as we shall see later with the American conservative Presbyterians. This position on scripture which many would say is a folly and is exemplified by the seven 24 hours day creationists.

[72] R. Briggs, *The Scientific Revolution of the Seventeenth Century*, (Longman Group Ltd., London, 1969) 58

[73] F Bacon, *Novum Organum, The Physical and Metaphysical Work s of Lord Bacon including Novum Organum*, (George Bell and Sons, London, 1891) 20.

[74] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 50

[75] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 58

[76] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 94 (E.G. John Wilkins 1614-1672)

[77] R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 130-132 suggests that although 'anti-Copernicanism' did exist in Europe this wasn't a major factor since Copernicanism was still able to be taught in Protestant Universities.

[78] Kepler considered himself a Lutheran although some of his theological views were suspect. See J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 83

[79] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 84

[80] C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 108

[81] By focusing his telescope on the heavens, Galileo observed innumerably more stars than previously thought possible –this bolstered the neo Copernican idea of the infinity of the universe. Further, Galileo observed craters and mountains on the Moon and sun spots on the sun. See J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 78, and A. Koestler, *The Sleepwalkers: A history of Man's Changing vision of the Universe* (Penguin Press, London, 1959) 368ff, 379-80, 435-6, 484-6.

[82] Their reason for this was an implicit Christian epistemological. God made everything. Humankind was made in God's image and can understand all created things. See C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 107

[83] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 82

[84] Galileo Galilei, *Dialogue Concerning the Two Chief World Systems*, (University of California Press, 1953) 183

[85] C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 104

[86] Manageable that is for the systematic investigation and manipulation of nature.

[87] C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 104

[88] Galileo's inability to prove his theory scientifically was one of the reasons the Catholic Inquisition condemned him. They demanded that Galileo not assert more than he could prove. Galileo appears to have ignored Kepler's proof of the Copernican theory. C. F. Von Weizsacker, The Relevance of Science (Collins, London 1964) 110

[89] These are early scientists 'faith' was based upon their Christian Epistemology in Ontology.

[90] I disagree with R. Briggs, *The Scientific Revolution of the Seventeenth Century*, (Longman Group Ltd., London, 1969) 84 – who says the effects of the Puritans were unconstructive.

[91] Hooykaas unequivocally affirms that Puritanism provided a climate conducive to science. They were convinced that religious and scientific enlightenment must go together and held that religion should penetrate, illuminate and revolutionise science. They held utopian expectations that disease and disaster would disappear. See R. Hooykaas, *Religion and the Rise of Modern Science* (Scottish Academic Press, London, 1972) 139-147.

[92] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 116 (my emphasis)

[93] For example, even though an Anglican, he rejected infant baptism and considered scripture taught Arianism.

[94] R. E. D. Clark, Isaac Newton in *The New International Dictionary of the Christian Church*, ed. J. D. Douglas (The Paternoster Press, Exeter Great Britain 1974) 704

[95] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 122

[96] J Dillenberger, *Protestant Thought and Natural Science* (Collins, London , 1960) 119

[97] E. Burt, *The Metaphysical Foundations of Modern Physical Science* (Routledge and Kegan Paul, London, 1951) 226

[98] This was the firm belief of many humanistic scientists after Newton.

[99] Alan G R Smith, *Science and Society in the Sixteenth and Seventeenth Centuries* (Thames and Hudson, London, 1972) 178. Smith notes the influence of science on the intelligentsia but also suggests there is no evidence, that by 1700 the new scientific ideas had had any effects on the minds of French and English peasants who still held to the tenants of orthodox Christianity.

[100] Alan G R Smith, *Science and Society in the Sixteenth and Seventeenth Centuries* (Thames and Hudson, London, 1972) 177

[101] Robin Briggs, *The Scientific Revolution of the Seventeenth Century,* (Longman Group Ltd, London, 1973) 89

[102] Robin Briggs, *The Scientific Revolution of the Seventeenth Century,* (Longman Group Ltd, London, 1973) 89
[103] David Hume (1711 – 1776) was a sceptical empiricist. J Rousseau (1712-1778) while being an idealist also embraced scepticism, similarly Voltaire (1684 – 1778), Lessing (1729 – 1781) and Kant (1724 – 18O4). See B. Russell *A History of Western Philosophy.* (George Allen and Unwin Ltd, London, 1946.) 685 – 745. Also C. Brown, *Philosophy and the Christian Faith.* (InterVarsity Press, London, 1973) 66-74, 84 -106.
[104] C. Brown, *Philosophy and the Christian Faith.* (Intervarsity Press, London, 1973) 103
[105] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 32. This title refers to the conservative Calvinistic Presbyterians of the Antebellum period of American history. (1790-1860).
[106] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 35.
[107] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 37. Bozeman records how the old school Presbyterians built the science faculty at Princeton University in 1767. Further in the Presbytery examinations of candidates for the ministry, candidates were often examined directly on scientific subjects. 42-43.
[108] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 39.
[109] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 156.
[110] For examples see C.H. Hodge, *Systematic Theology* (Thomas Nelson and Sons, London and Edinburgh, 1871) Volume 1 page 17.
[111] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 6.
[112] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 100.
[113] C. H. Hodge, in *The Princeton Review* 1851 found in T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 99.
[114] C.H. Hodge, *Systematic Theology* (Thomas Nelson and Sons, London and Edinburgh, 1871) Volume 1 page 12.
[115] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 85.
[116] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 130 – 131.
[117] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 144.
[118] James Henley Thornwell, *The Collected Writings of James Henley Thornwell* 3:199-200 in T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 142.
[119] See B. G. Pollard, *Physicist and Christian*, (The Seabury Press, Greenwich, 1961) 9-22,
[120] T. S. Kuhn, *The Structure of Scientific Revolutions*, (The University of Chicago press, Chicago, enlarged edition. 1970.) 66-111.
[121] T.D. Bozeman, *Protestants in the Age of Science* (The University of North Carolina Press, Chapel Hill, 1977) 167.
[122] Thomas Huxley (1825 – 1895) was known as Darwin's Bulldog in his advocacy of Evolution. He is famous for his 1860 debate with William Wilberforce. This proved to become a key moment in the wider acceptance of evolution. Huxley also debated against Richard Owen on whether man was closely related to apes. Huxley was slow to accept some of Darwin's ideas, such as gradualism, and was undecided about natural selection, but despite this he was wholehearted in his public support of Darwin. He was instrumental in developing scientific education in Britain, and fought against the more extreme versions of religious tradition.
Huxley used the term '**agnostic**' to describe his own views on theology, a term whose use has continued to the present day. **http://en.wikipedia.org/wiki/Thomas_Henry_Huxley**
[123] Since the nineteenth century, Humanism has been associated with an anti-clericalism inherited from the eighteenth-century Enlightenment *philosophies*. This appears to have been an 18th Century reaction to the power of the established church and the rising confidence of the new science as the bearer of truth about the world.
[124] For example Julian Huxley - (1887– 1975) was an English evolutionary biologist, humanist and internationalist. He was a proponent of natural selection, and a leading figure in the mid-twentieth century evolutionary synthesis. **http://en.wikipedia.org/wiki/Humanists**
[125] And the Presbyterian church of Aotearoa New Zealand the conflict that this denial of the miraculous caused in the church, culminated in the heresy trial of Professor Lloyd Geering.
[126] This view is seen in the writings of; D. Mackay *The Clockwork Image*, (Inter Varsity Press, London, 1974,) *Science Chance and Providence* (Oxford University Press, Oxford, 1978), Malcolm A. Jeeves *The Scientific Enterprise and Christian Faith*, (Tyndale Press, London, 1969) and C.A. Coulson *Science in Christian Belief* (Fontana Books, London 1955,) 86f. Z
[127] H. Dooyeweerd, *A New Critique of Theoretical Thought Volume* I and II. (Presbyterian and Reformed Publishing Co., Philadelphia, 1969.) 46, also 49 – 58. Another example would be Materialism –which reduces the non material to unreality. Similarly empiricism, rationalism and scientism all reduce aspects of reality.

[128] This is a recent view for as described by Nicholas Wolterstorff in *Reason Within the Bounds of Religion* (Eerdmans, Grand Rapids, 1976)

[129] We do not need to be intimidated about the miraculous which appears at first analysis to not fit into the empiricism of many scientists. The Scientific Method by its own limitations is not able to draw conclusions about 'non-repeatable' events which by definition miracles are. Other rules have to be used to assess the validity of these events. The reflections of Antony Flew in *There is a God* (Harper One, Harper Collins Publishers, New York, NY. 2007) and the Dialogue he had with Bishop N. T. Wright, an Oxford New Testament Scholar on the Incarnation Resurrection of Jesus are very instructive. 185 – 213. The

[130] D. MacKay, *Science Chance and Providence* (Oxford University Press, Oxford, 1978),

Slaying the Dragon of Chance and Probability

One of the concepts that we hear all the time when engaging in a debate or discussion about the beginnings of the Universe and life from those who believe in neo-Darwinian evolution is that given enough time anything is possible.
The neo-Darwinian concept of evolution is that the development of life resulted from random processes acting over long periods of time. That somehow in a pre-biotic mixture either in the ocean close to a hydro-thermal vent which was heated by sub-terranian magma, or in hot sinter pools in active geothermal regions somehow organic molecules formed and then deftly over the eons, coalesced "evolving" into organic forms of microscopic pre-bacterium and then into primitive molecular life.
While it is readily admitted that this mechanism for life is implausible, it is also confidently asserted that this is just the way it was and given enough time, and enough "throws of the dice anything is possible," lady luck has done her work, the dragon of chance and probability has defied the odds. The statistically unrealistic possibility for even the production of viable proteins notwithstanding. The issue is side stepped and the cold uncaring logic of chance and resulting random mutations simply ignored. Adding vast amounts of time to crushing improbability dulls our senses into thinking that 'anything is possible.'

Physicist and theologian Gerald Schroeder, in his recent book **God according to God,** quotes Simon Conway Morris Professor of Evolutionary Paleobiology at Cambridge University. Conway Morris commenting on this very glaring statistical implausibility of proteins being formed says;

> "The number of potential blind allies are so enormous that in principle all the time since the beginning of the universe would be insufficient to find the one in trillion trillion solutions that actually works . . Life is simply too complex to be assembled on any believable timescale . ."

But note this; he then goes on to say;

> "Evolution [has the] uncanny ability to find the short cuts across the multi dimensional hyperspace of biological reality."[1]

What! "Short cuts across the multi dimensional hyperspace of biological reality!" Is this the mythical dragon of chance breathing his fire again? If there is a problem with a "random chance mutation mechanism" producing life then surely it is better to face it and look for alternatives (change our pre-suppositions) than overlay the problem with a foam of jargon. That's like covering a beard with shaving cream and saying; "Beard, what beard? I don't see any beard!"
Conway Morris begins his book "**Life's Solutions**" with the assertion;

> " . . . Evolution is true, it happens, it is the way the world is, and we too are one of its products. This does not mean that evolution does not have metaphysical implications; I remain convinced that this is the case."[2]

I'm glad that Conway Morris recognises that there are metaphysical implications to the theory of evolution. This is what I am interested in. But the problem is that with sure authoritative dogmatic statements about the alleged "factual nature" of evolution most people think that evolution has annihilated any metaphysical notions altogether. *"Chance plus time it is all we need"*– becomes the mantra!

Even worse the general public, myself included are regularly fed popularist accounts of the beginnings of; "life, the universe and everything," that gloss over even the most obvious glaring chasms of this theory.

The BBC series, **"Earth: The Power of the Planet",** had the presenter waxing lyrical about the certainties of life beginning in Sinter pools and hydro – thermal vents, the very places where even now their harsh realities have stunted any development of life to the most basic bacterium. Yet we are told, this is where the "miracle" of life evolved. Chance was the mechanism and time was the engine. We are presented with 'Nature' overlaid with anthropomorphisms (Humanlike, intelligent characteristics) and cold blind chance deftly endued with miraculous abilities.

Is it little wonder that in the popular mind we become brain washed, maybe that is too strong a term, perhaps lulled is better, yes lulled into thinking that chance, cold blind randomness, can actually bring about the impossible. Given enough time that is. After all everyone knows that the chances of winning Lotto are pretty slim, but someone usually wins it. They get lucky, so what are a few orders of improbability between friends. The logical discontinuity is glossed over. Actually unless you are a mathematician who is used to working in "powers of ten" and understand their ramifications it is very hard to imagine improbability. We have no real analogies that our minds can grasp. One power of ten is pretty much like any other. So in a way we can be conned into thinking things are much more possible, and theories much more plausible than they really are. Random chance becomes endowed with miraculous powers like a dragon, popping up out of nowhere and delivering the goods (life) just when you least expect it. The only problem is the dragon of probability doesn't exist. In truth, the evolutionary conundrum is much harder to swallow.

Now because I am an optimist I want to believe that there is not some conspiracy to deceive the population. That Science is genuinely wanting to follow where the evidence and logic leads. Perhaps well meaning scientists and philosophers find it much easier to really believe that "life, the universe and all that is," arose by random processes acting over enormous amounts of time because the alternative is much less palatable. That alternative being that "Life, the universe and all that is," is the result of the design and activity of a God. Perhaps it is because the God that believers have presented as Creator is far, far too small.
I must admit that the God that many believers speak about, rather than being the God of the Bible, is more like a domesticated kind of deity who is only there to make them feel good, give them peace of mind, bless them with a comfortable life, and fulfil their sometimes selfish desires, rather than the awesome all-powerful, super intelligent Creator of the universe.
I remember one teenager confronting me and declaring very passionately;
"I don't believe in any @###@ God."
To his surprise I replied; "Tell me about the God you don't believe in, I probably don't believe in it either!"
What resulted was a very meaningful discussion where as it turned out he was reacting to a Santa Claus idea of God fed to him from childhood which no thinking person could embrace.

My own childish preconceptions about the nature of God received a "short shift" early on in my Christian journey. At one time I began to think I had God all summed up! I began treating

prayer to God like a vending machine. "Put a prayer in – get an answer out." Then I was confronted with God's answer to Job in the Bible.
Job was demanding that God give an account of His actions. God's actions seemed to Job to be unjust and incomprehensible. God's reply is found in **Job 38:1-5, 31-33.**

[1] Then the LORD answered Job out of the storm. He said:
[2] "Who is this that darkens my counsel
with words without knowledge?
[3] Brace yourself like a man;
I will question you,
and you shall answer me.
[4] "Where were you when I laid the earth's foundation?
Tell me, if you understand.
[5] Who marked off its dimensions? Surely you know!
Who stretched a measuring line across it?

God then confronts Job with His creation of the Heavens using the constellations names as indicative of God's power over them.

[31] "Can you bind the beautiful Pleiades?
Can you lose the cords of Orion?
[32] Can you bring forth the constellations in their seasons
or lead out the Bear with its cubs?
[33] Do you know the laws of the heavens?
Can you set up God's dominion over the earth? [3]

God questions Job, confronting him with the vast difference between himself and this mere human who dares to question God's actions.
I have never forgotten this lesson. God is omnipotent, omnipresent, indescribable, infinite and incomprehensible in God's own designs and intelligence. God does as God wills. Putting it another way, if God is God and is indeed the Creator of the Universe (or universes of the multi verse!), including dark matter and dark energy and is the designer, creator and sustainer of life, of all that is seen and also unseen as many passages in the Bible declare,[4] then God may well be the metaphysical solution to the probabilistic conundrum, the universe and the "miraculous" presence of intelligent life presents us with. If these conundrums are like the fingerprints of the divine then, God has to be GOD. We must not try to reduce God to our own comprehension.

Maybe the problem with our concept of God arises because we all know our own intellectual limitations. For most of us grasping the workings of the DNA molecule, the quantum nature of reality, or the power of the Big Bang beginning is simply beyond us. So, perhaps out of a misplaced humility, we declare in exasperation; "It's all beyond me – no one person would be great enough, powerful enough, and intellectually capable enough to design and create all this!"

Those who stand within the Judeo – Christian tradition rightly affirm that the Bible says Humankind is "made in the image of God."[5] Perhaps the concept of the image of God in us leads us into thinking that God is like us. This heart warmingly popular theological idea result in our thinking of God to be too much like us, too limited to be able to create "the universe, life and all that is." Our God is too small, and we can't conceive a God who could

create such wonders. Perhaps we have over anthropomorphised God! The Seventeenth Century scientists reacted differently. The God they affirmed was so transcendent that they removed Him from creation altogether and He became like an absent watch maker who has wound the universe up with given laws and left it to run its course. They effectively became deists.

We rightly affirm that the Bible shows that God is a Personal God. I.E. A God who can connect in meaningful ways with us and His creation. We are personal beings made in God's image. But we must realise the similarity stops there. God is an Infinite personal being. We are finite personal beings.

As a result of this misconception, almost by default we find it easier to surrender to a solution that says; no person made this, it all happened eons of time ago by chance. We just got lucky. You know there's a lottery winner every day. In the cosmic lottery we just struck it lucky and that's that. Think no more about it.
As Gerald Schroeder says;

> "The statistically unrealistic possibility that the fabrication of viable proteins could have occurred by unguided random mutations are simply ignored."[6]

So we are easily convinced when eminent Cosmologists of the fame and authority of Stephen W. Hawking, who is the Lucasian Professor of Mathematics at the University of Cambridge, seem to place their faith in chance. When writing about the origin and fate of the Universe in his bestseller **"A Brief History of Time"**, he says:

> If the universe is indeed spatially infinite, or if there are infinitely many universes, there would probably be some larger region somewhere that started out in a smooth and uniform manner. It is a bit like the well known horde of monkey's hammering away on typewriters –most of what they bang out will be garbage, but very occasionally by pure chance they will type out one of Shakespeare's sonnets. Similarly, in the case of the universe, could it be that we are living in a region that just happens by chance to be smooth and uniform? At first sight this might seem very improbable, because such smooth regions would be heavily outnumbered by chaotic and irregular regions. However, suppose that only in the smooth regions where galaxies and stars formed and where conditions are right for the development of complicated self replicating organisms like ourselves who are capable of asking the question: why is the universe so smooth?

Do you see what Professor Hawking is doing, in an effort to get around the "Dragons of Improbability" he is positing an infinite number of universes, and asserting that given enough time even illiterate dumb monkeys would produce one of Shakespeare's Sonnets. And if that could happen then, likewise blind chance would sooner or later produce an environment where intelligent life could evolve. Most of us can't conceive of the enormity of this universe let alone an infinite number of universes. As a result we are numbed into acceptance, or beaten into intellectual submission to an evolutionary party line by the sheer intellectual pain of thinking otherwise.

However, Gerald Schroeder takes him up on the challenge and point by point refutes this "Monkey Theorem." As an example of the power of chance to produce meaningful complex

order, even the development of even the simplest molecular life turns out to be rubbish. Antony Flew was so impressed with Schroeder's argument that he refers to it in some detail in his book as representing the sort of decisive argument that helps a person "follow the evidence."[7]

Schroeder writes:

> So convincing was Hawking's argument that the students at Plymouth University in Britain convinced the National Arts Council to put up 2000 Pounds to try the monkey's typing skill. With that stipend they rented a monkey house at the Paignton Zoo in Devon and placed a computer keyboard inside. The *Times* (May 9, 2003) report on the results are under the headline, "Much Ado, but Monkey's fail Shakespeare Test." For a month, six monkeys hammered away on the keyboard. They failed to produce a single English word. Surprised, since the shortest word in the English language is one letter long? Surely the monkeys must have hit an **'a'** or an **'I'** in all their efforts. But think about it. To make the word **'a'**, a space on each side of the letter is required. That means typing: **space 'a' space**. If there are about 100 keys on the computer keyboard, neglecting the fact that the space bar is somewhat larger than the letter keys, the probability of typing **space 'a' space** is one chance in 100 times 100 times 100, which comes out to be one chance in a million. Random guessing in a spelling bee is always a losing proposition. And that is for a single-letter word. [8]

Actually even though the monkeys failed at producing a single word, not even an **'a'** they did succeed in destroying the keyboard, and they even, how can we put this politely, they defecated all over it.

But then random chance is likely to be much more sterile and hygienic and Gerald Schroeder also did the calculations in a real sonnet.

All Sonnets are about the same length, and all by definition are fourteen lines long.

Taking the Sonnet; "***Shall I compare thee to a summer's day***" Schroeder worked the maths. Can we get a sonnet by chance? If Hawking's said it, it must be true. Mustn't it?

> But is it? Let's consider 500 grab bags each holding the 26 letters of the English alphabet. (*Ignoring upper and lower case.*) I reach into the bag blindfolded and pull out a letter. The likelihood that it will be **'s'** for the first letter of the sonnet is one chance in 26. The likelihood that in the initial two draws from the first two bags I will get an **s** and then an **h** is one chance and 26 times 26. And so on for the 500 letters. Neglecting spaces between words, the chance of getting the entire sonnet by chance is 26 multiplied by itself 500 times. That seems as if it might be a fairly big number. And it is. Surprisingly so! That number comes out to be one with 700 zeros after it. In conventional math terms, it is $\mathbf{10}^{700}$, or 10 to the exponent power of 700.[9]

That is an astronomically high number. Far beyond our ability to grasp. And that's just for one sonnet.

Let's put this into a common perspective.

To win the first division in Lotto you have to correctly choose all six balls. There are 40 balls to start and this number decreases each time a ball is selected so the chances of winning first division lotto is; 40 x 39 x 38 x 37 x36 x 35.

This equals one chance in 2,765,633,600 or in conventional math terms, it is about 1 in 2.7 x 10 to the 9^{th}, or 10^9.

Now of course even though that is a very low probability it is huge compared to how infinitesimally small 1 in 10^{700} is. But then we all know that people win lotto nearly every week, and grasping the ramifications of the differences in scale between these two improbabilities provides a mist which I believe those who argue for the plausibility of chance evolution rely on. We don't feel the power of this probabilistic conundrum. We don't grasp the cold hard impossibility of it all.
So let's work it out.
Yes, someone usually wins Lotto each week. But have you ever heard of the same person ever winning lotto more than once in a row.
The probabilities here are so vastly different that to strike it right with 1 in 10^{700} chance would require a person not just winning lotto twice in a row but winning it 70 times in a row without a miss.

No one in human history has ever done that! In fact I have never heard of a person winning Lotto first division more than once in a row.

Yet eminent scientists want us to believe this cosmic fluke, happens not just once but thousands of times in a row. A mind bogglingly huge string of "good luck" was required for the Cosmic Constants to come out just right. These then set the scene for a Universe where the environment, was conducive for the flukiest results of millions of other accidents of chance. These are needed time and time again to form the amino acids that are the building blocks for the enzymes needed for biological life.

Let's take the example of what are called the 'building blocks of life.' These are the amino acids that are 'folded' together as intricate sequences to form proteins. It is suggested that these are the proteins that first formed in the sinter pools in geothermal regions, or by super heated hydro thermal vents deep under the ocean.
There are 20 types of amino acids:[10] See Figure 1,[11] below. What is the probability of a selection of these amino acids linking together in the precise sequence to form a just one protein? Let's state this in a more practical way. A 100 amino acid size protein is an average sized protein. Supposing that once per second you randomly selected out of our bag of 20 amino acids 100 amino acids (We have to make the outrageous assumption that the bag of proteins never runs dry!) and randomly sequenced them together. How long would it take on average to form a viable protein?

We are choosing one out of 20 each time. This is 1 in 20 x 20x 20 etc 100 times. That equals 4 X 10^{122} years. Or : **400 thousand billion billion billion billion billion billion billion billion billion billion billion billion billion years!**
But the best estimates say the earth has only been around 5 billion years! As Rodney Lake a friend and owner of the computer programming company Spectra Data Solutions pointed out in his presentation to the local Apologetics Society. A 100 amino acid protein is only the average size. Some are much bigger. In fact, **Figure 2** shows one protein that is 907 amino acids long.

I cannot stress enough how the probabilities have to stack up one after the other. Like a "castle in the air" one break in this "chain of chance" brings the whole system crashing down. If this happens the consequences are to wait eons of ages for another string by blind chance to begin the process again. The average protein is made up of many hundreds of amino acids. The average cell is made up of billions of proteins. The average living animal is made up of billions of cells.

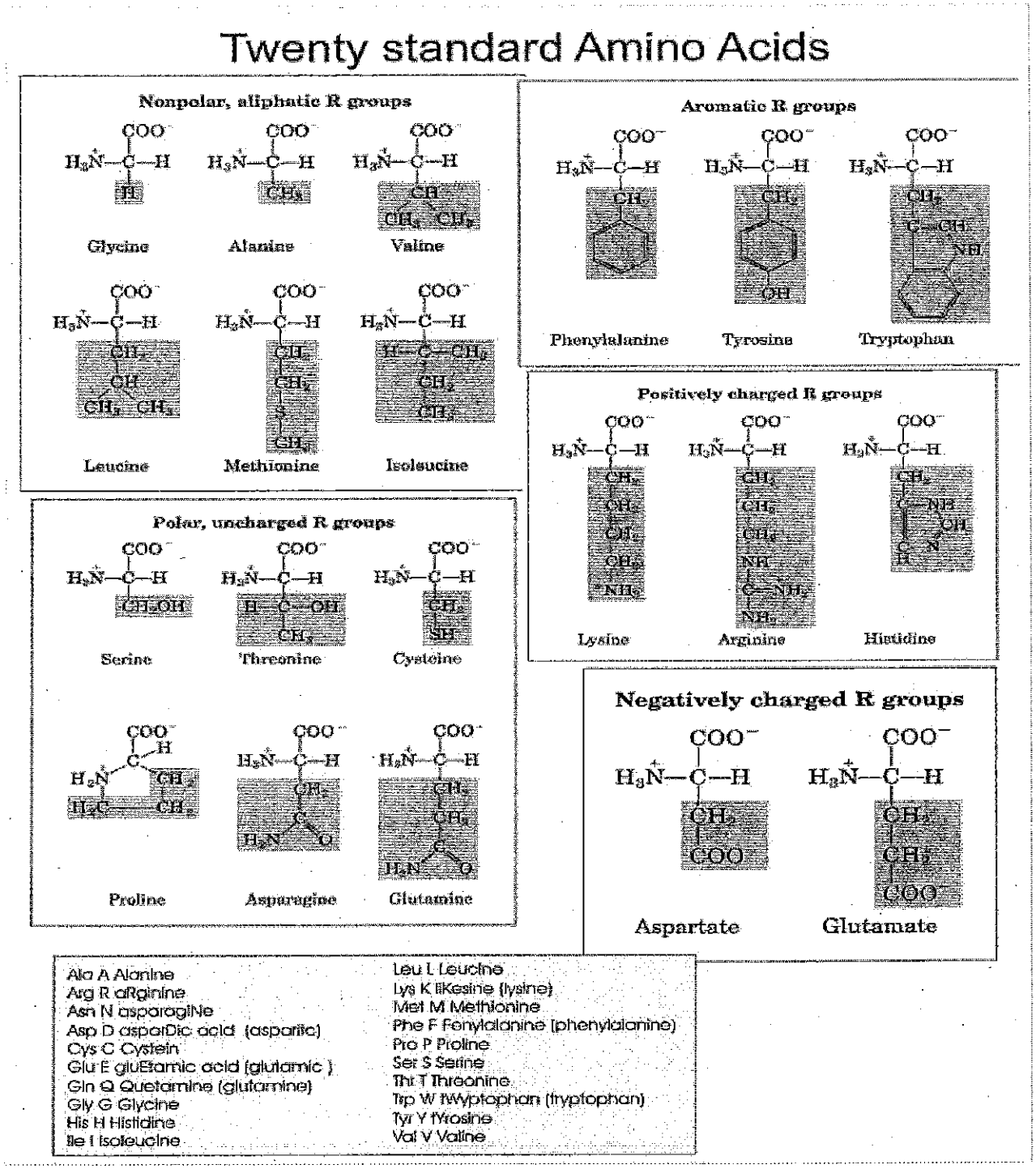
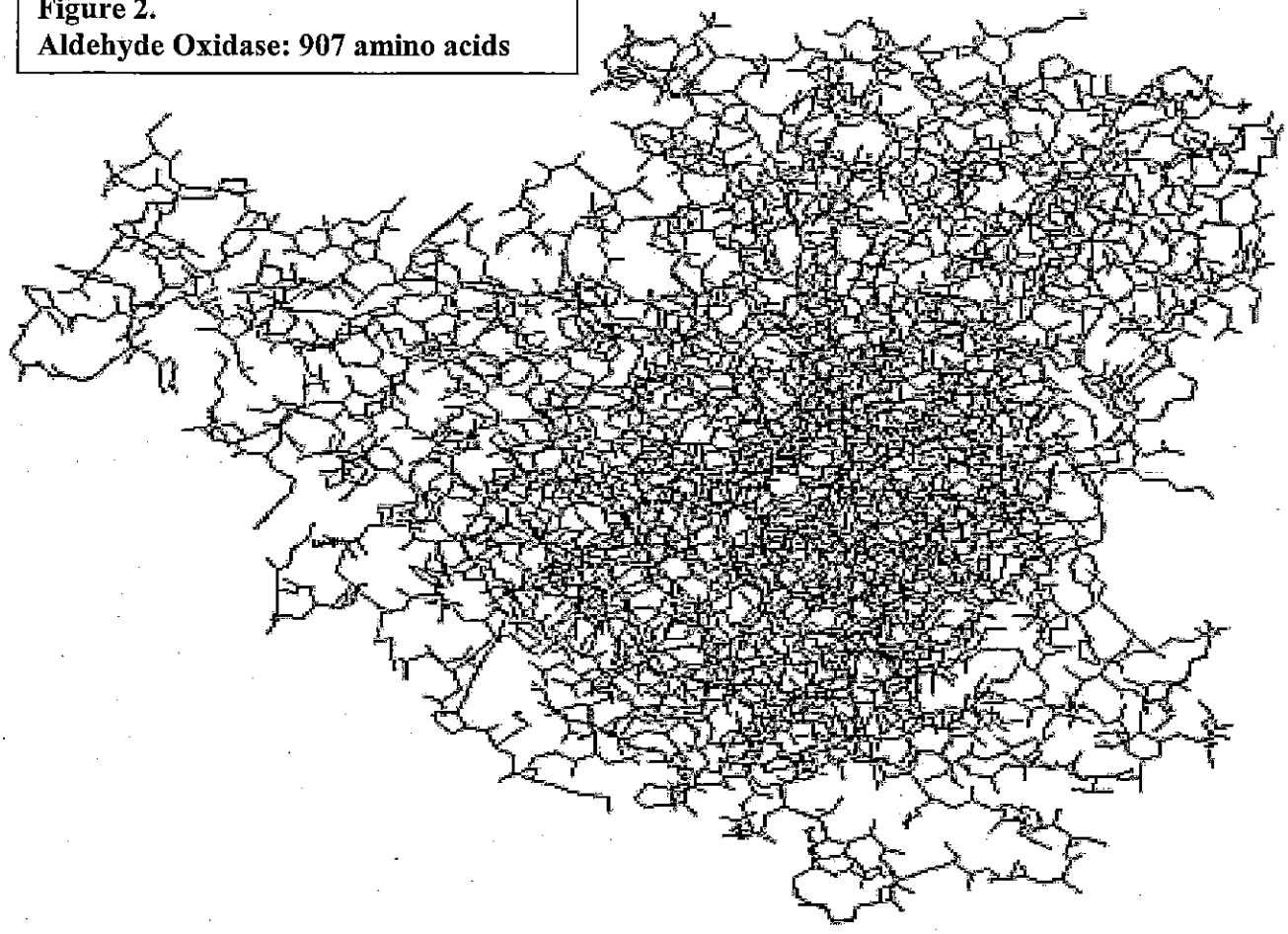


Figure 1.

Then as these freakishly complex cells form in a chaotic sea, somehow randomly forming and folding into DNA, then by chance becoming self replicating organisms and then by sheer chance random life emerged and "Whahh Laah" intelligent self conscious beings "evolved".

Figure 2.
Aldehyde Oxidase: 907 amino acids



As my friend once quipped;
"Do you have enough faith to be an atheist?"
Is it little wonder that Antony Flew once an atheist, in following where the evidence leads now concludes.

> Those scientists who point to the mind of God . . . Propound a vision of reality that emerges from the conceptual heart of modern science and imposes itself on the rational mind. It is a vision that I personally find compelling and irrefutable.[12]

I believe we really should have the courage to follow where the evidence leads. It is not good enough to assert so confidently as Hawking, and Conway Morris and many other Neo-Darwinian and atheistic scientists do that it was evolution that did it, 'given enough time.'

This really requires more faith in the dragons of probability than most people who become acquainted with the facts have.
It is time to clear away the mists of probabilistic maths and face the conundrum of probability. To follow where the evidence leads and grapple with the metaphysical

consequences of seeing in creation "the hidden face of God" to quote Gerald Schroeder[13] or what Pascal calls the presence of the hidden God.

That will be the topic of my next section.
But first I want to leave you with a short story by Stanislaw Lem. Stanislaw Lem (1921-2006)[14] was a Polish science fiction writer, philosopher and satirist. He had a wicked wit and critical capacity that parodied faulty science and trite religion. He is relatively unknown in the West even though he won a Nebula Award and his novel **Solaris** is one of the very few that has twice been made into a feature film. Firstly by the Russian director Andrei Tarkovsky and won a Special Jury Prize at the Cannes Film Festival in 1972 and then in 2002, by Steven Soderbergh starring George Clooney.
Here is his story from **The Cyberiad.** This book is a series of humorous short stories "penned" by cybernetic story telling machines. This represents a brilliant satire on the genius and the futility of man's capacity for technological invention. It was first published in English in 1974. It is a ridiculously entertaining story. So implausible that I hope you will get my point that one day the "story," or "myth" of chance neo-Darwinian evolution with be told with similar mirth.

This is the story of how the Great Constructor Trurl, with the aid of an ordinary jug, created a local fluctuation, and what became of it.[15]

In the Constellation of the Wringer there was a Spiral Galaxy, and in this Galaxy was a Black Nebula, and in this Nebula were five, sixth order clusters, and in the fifth cluster, a lilac sun, very old and very dim, and around the sun revolves seven planets, and the third planet had two moons, and in all these suns and stars and planets and moons a variety of events, various and varying, took place, falling into a statistical distribution that was perfectly normal, and on the second moon of the third planet of the lilac sun of the fifth cluster of the Black Nebula in the Spiral Galaxy in the Constellation of the Wringer was a garbage dump, the kind of garbage dump one might find on any planet or moon, absolutely average, in other words full of garbage; it had come into existence because the Glauberical Aberracleans once waged a war, a war of the fission-and-fusion type, against the Albumenid Ifts, with the natural result that their bridges, roads, homes and palaces, and of course they themselves, were reduced to ashes and shards, which the solar winds blew to the place whereof we speak. Now for many, many centuries positively nothing took place in this garbage dump but garbage, though an earthquake did occur and shifted the garbage on the bottom to the top, and the garbage on the top to the bottom, which in itself had no particular significance, and yet this paved the way for a most unusual phenomenon. It so happened that Trurl, the fabulous constructor, while flying in the vicinity, was blinded by a certain comet with a garish tail. He fled its path, frantically jettisoning out the spaceship window whatever lay in reach – chess pieces, the hollow kind, which he'd filled with liquor for the trip, some barrels of Ubbidubs of Chlorelei employed for the purpose of compelling their opponents to yield, as well as assorted utensils, and among these, an old earthenware jug with a crack down the middle. This jug, accelerating in accordance with the laws of gravity and boosted by the comet's tail, crashed into the mountainside above the dump, fell, clattered down a slope of junk toward a puddle, skittered across some mud, and finally smacked into an old tin can; this impact which bent the metal around a copper wire, also knocked some pieces of mica between the edges, and that made a condenser, while a wire, twisted by the can, formed the beginnings of a solenoid, and a stone, set in motion by the jug, moved in turn a hunk of rusty iron, which happened to be a magnet, and this gave rise to a current, and that current passed through sixteen other cans

and snips of wire, releasing a number of sulphides and chlorides, whose atoms linked with other atoms, and the ensuring molecules latched on to other molecules, until, in the very centre of the dump, there came into being a Logic Circuit, and five more, and another eighteen in the spot where the jug finally shattered into bits. That evening, something emerged at the edge of the dump, not far from the puddle which had by now dried up, and this something, a creature by pure accident, was Mymosh the Selfbegotten, who had neither father nor mother, but was a son unto himself, for his father was Coincidence, and his Mother – Entropy. And Mymosh rose up from the garbage dump, totally oblivious of the fact that he had about one chance in a hundred billion jillion raised to the zillionth power of ever existing, and he took a step, and walked until he came to the next puddle, which had not as yet dried up, and so, kneeling over it, he could easily see himself. And he saw, in the surface of the water, his purely accidental head, with ears like muffins, the left one crushed and the right a trifle underdone, and he saw his purely accidental body, a potpourri of pots and pans and flotsam, and somewhat barrel-chested, in that his chest was a barrel, though narrower in the middle, like a waist, for in crawling out from under the garbage, he had scraped against a stone right there; and he gazed upon his littery limbs, and counted them, and as luck would have it, there were two arms, two legs and fortuitously enough, two eyes too, and Mymosh the Selfbegotten took great delight in his person, and sighed with admiration at the narrowness of the waist, the symmetrical arrangement of the limbs, the roundness of the head, and was moved to exclaim:

- Truly, I am beautiful, nay, perfect, which clearly implies the Perfection of All Created Things!! Ah, and how good must be the One Who fashioned me!

And he hobbled on, dropping loose screws along the way (since no one had tightened them properly), humming hymns in praise of the Everlasting Harmony of Providence, but on the seventh step he tripped and went headlong back down into the garbage, after which he did nothing but rust, corrode and slowly disintegrate for the next three hundred and fourteen thousand years, for he had fallen on his head and shorted out and was no more.

And at the end of this time it came to pass that a certain merchant, carrying a shipment of sea anemones from the planet Medulsa to the Thrycian Stomatopods, quarrelled with his assistant as they neared the lilac sun, and hurled his shoes at him, and one of these broke the porthole window and flew out into space, where its subsequent orbit subsequently experienced perturbation, due to the circumstances that that very same comet, which had ages past blinded Trurl, now found itself in the very same locality, and so the shoe, turning slowly, hurtled towards the Moon, was singed a little by the atmospheric friction, bounced off the mountainside above the dump, fell, and booted Mymosh the Selfbegotten, lying there, with just the right resultant impulse and at just the right angle of incidence to create just the right torsions, torques, centrifugal forces and angular momenta needed to reactivate the accidental brain of that accidental being –and in this way: Mymosh, thus booted, went flying into the nearby puddle, where his chlorides and iodides mingled with the water, and electrolytes seeped into his head and, bubbling, set up a current there, which travelled around and about, till Mymosh sat up in the mud and thought the following thought: - Apparently, I am!

> And so the satire continues with there being 16 centuries before he thought a another thought again, and then after 1520 years because of the Birds' droppings hitting him in the forehead he sneezed and so began a process of wondering about his existence and the cosmos around him. But this baffled him too much and so he gave up thinking about the world outside himself and turned instead to that which was within him. Creating many fantasies which are recorded for all to read.

I encourage you to get the book and read it.

The story continues.
Meanwhile rust ate deeper and deeper into his cranial plates, which of course he had no way of knowing, and a fragment from Trurl's jug, the selfsame jug that thousands of years ago had called him into being, came floating on the puddle's surface, closer and closer to his unfortunate head, for only that now remained above the water. And at the very moment when Mymosh was imagining the gentle, crystal Baucis and her faithful Ondragor, and as they journeyed hand in hand among the dark suns of his mind, and all the people of the Gozmos looked on in rapt silence, including the Beadlies, and as the pair softly called to one another – the rust-eaten skull cracked open at the touch of the earthenware shard, pushed by a puff of air, and the murky water rushed in over the copper coils and extinguished the current in the logic circuit, and the Gozmos of Mymosh the Selfbegotten attained the perfection, the ultimate perfection that comes with nothingness. And those who unwittingly had brought him into the world never learned of his passing.

Yes it's a fantastic story of cyber life. Is it so outrageous and funny however in comparison to the one we are asked to stake all our scientific faith and endeavour on, is it any more unbelievable?

Is there a viable alternative, a metaphysical explanation that has significant ramifications for our understanding of our place in this Galaxy? To believe that we are the product not of random blind chance but a Super Intelligent all powerful Creator, designer God who though He is hidden from obvious sight has left fingerprints of His presence which give a meaningful explanation of our life, consciousness and purpose. Is this where the evidence is leading? To this we now turn.

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[1] Gerald Schroeder, God *according to God*, (HarperCollins Publishers, New York NY: 2009) 47.
[2] Quoted from; Gerald Schroeder, God *according to God*, (HarperCollins Publishers, New York NY: 2009) 48.
[3] Job 38:1-38. The Holy Bible, English Standard Version ESV. (Crossway Bibles, London. England. 2001)
[4] See; Genesis 1:1-2., Nehemiah 9:6., Job 38:1-33., Psalm 81-4., Psalm 102:25-27., John 1:2-4., Romans 1:19-20., Colossians 1:16—17.
[5] Genesis 1:27. The Holy Bible, English Standard Version ESV. (Crossway Bibles, London. England. 2001)
[6] Gerald Schroeder, God *according to God*, (HarperCollins Publishers, New York NY: 2009) 47.
[7] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 77
[8] Gerald Schroeder, God *according to God*, (HarperCollins Publishers, New York NY: 2009) 36.
[9] Gerald Schroeder, God *according to God*, (HarperCollins Publishers, New York NY: 2009) 35.
[10] My thanks to Rodney Lake of **Spectra Data Solutions** for these calculations. He is the founder of "Thinking Matters" Tauranga, a fortnightly Apologetics series of lectures and discussions on Science and Christianity.
[11] http://www.cellbiol.net/layout/course/amino%20acids.jpg
[12] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 112.
[13] Gerald Schroeder, *The Hidden Face of God*, (The Free Press, New York NY: 2001)
[14] http://en.wikipedia.org/wiki/Stanislaw_Lem
[15] Stanislaw Lem, The *Cyberiad.* (Seabury Press, Orbit Books, London, Great Britain: 1974). Pages 231-238. It is a satire on the beginnings of cyber life. While Lem was raised a Catholic, he later became an atheist, he says; "for moral reasons ... the world appears to me to be put together in such a painful way that I prefer to believe that it was not created ... intentionally". The problem of reconciling a loving God with the problem of suffering is one reason many find believing in an all loving, all powerful God difficult. That is a different question to the one I am focussing on. It has been dealt with by many authors, but is a genuine paradox for many – my father included until his last few years. The does not detract from Lem's clever pondering of the "dragons of improbability."

Re - Discovering purpose and design (Teleology).[1]

> *Man's sensitivity to small things, and his insensitivity to the most important things, are surely evidences of a strange disorder* - Blaise Pascal (632 – 198)[2]

In his book, "**There is a God**" when discussing the dilemma of "how Life went Live," Antony Flews quotes the Nobel Prize winning physiologist George Wald. Wald once famously argued that "we choose to believe the impossible: that life arose spontaneously by chance " but in later years, he concluded that a pre-existing mind, which he posits as the matrix of physical reality, composed the physical universe that breeds life.

> How is it that, with so many other apparent options, we are in a universe that possesses just that peculiar nexus of properties that breeds life? This has occurred to me lately - I must confess with some shock at first to my scientific sensibilities -but both questions may be brought into some degree of congruence. This is with the assumption that mind, rather than emerging as a late out-growth in the evolution of life, has existed always as the matrix, the source and condition of physical reality, - that the stuff of which physical reality is constructed is mind stuff. It is mind that has composed the physical universe that breeds life, and so eventually evolves creatures that know and create: - science, art, and technology-making creatures.[3]

Antony Flew says, "This, too, is my conclusion. The only satisfactory explanation for the origin of such 'end-directed, self-replicating' life as we see on earth is an infinitely intelligent Mind.[4]"

Both George Wald and Antony Flew, in following where the evidence leads have come to change their minds about "the origin of life, the universe and all that is." This concept of Mind being the source and "matrix" undergirding physical reality is something that Quantum Physicists are increasingly postulating. It is an issue I want to explore later. But for now I want to point out that Science has come full circle.

The motivation that drove the early 'Modern Scientists' of the 17th Century was teleological.[5] To say something is teleological is to say that it has a purpose and a design inherent in it.[6] We may not fully appreciate the design or the purpose but the existence of "life, the universe and all that is" is more than just the product of chance. Its mere existence is rightly interpreted as a hint of transcendence. The fact that they believed that the universe was the creation of a super intelligent God was a presupposition the early scientist worked within.
For example Johannes Kepler is reported to have said this to an unidentified nobleman in 1613.

> "There is nothing I want to find out and yearn to know with greater urgency than this: can I find God, whom I can almost grasp with my own hands in looking at the universe, also in myself?"[7]

This was why they believed Science was worthwhile. They were literally discovering how God "did it." As such they had this trust that the universe was not capricious. That in

Einstein's words "God did not play dice". Actually not only did God not play dice, He did not use "sleight of hand" either.

Later, of course this led some to deny the existence of and validity of miracles, as for example the Scottish philosopher and rationalist David Hume. In my opinion Hume used "sleight of mind" to exclude by definition the miraculous. Clearly a miraculous event does not fit into the investigative rigour of the scientific method. The scientific method by definition requires events to be repeatable so they can be tested. They have to be able to be reproduced so that any hypotheses or theory explaining their workings can be analyzised and tested. Since miracles are non repeatable events, they are claimed to be the unique actions of God intervening in the normal workings of Nature. Rationalists, recognising that miracles are not able to be repeated conclude that because they therefore cannot be proved scientifically to exist, they have not and do not happen! Q.E.D. This "sleight of mind" is a convenient way of dismissing the miraculous claims of Christianity. For example the Resurrection of Jesus.

Basically this becomes 'Reductionism'; it reduces reality down to only those things that can be reproduced within the rigours of the paradigm of science.
The fact that an event is not repeatable does not mean it can't have happened. It may have been a unique event. A one-off occurrence. In trying to analyse these 'one-off' situations we find we have come to the limit of the effectiveness of the scientific method.
In these instances other criteria of evidence and analysis have to be brought to bear on the claim or event. In the case of a murder it is the laws of evidence, eye-witness accounts, including of course the scientific rigours of a full crime scene investigation. This point impinges directly on any discussion on the beginnings of the Universe. Strictly speaking this is not a scientifically provable event. It is actually not repeatable. Similarly we would have to conclude that life and consciousness are not scientific happenings. So far the creation of life from the tinkering of scientists with amino acids, or the emergence of consciousness from super complex computers has not been able to be repeated in a laboratory. There are many events which have happened only once. No one would argue that the universe hasn't happened. But clearly we are not able to reproduce it.
In these cases we have to allow for an analysis that takes us outside the strict confines of the scientific method.

This brings us into the realm of Philosophy and as I have been arguing our presuppositions. The great modern scientists like Kepler, and Newton all worked within a teleology that assumed the existence of God as the designer and one who gave purpose to creation. The by-product of their presuppositions was that for them the study of science was a 'noble' calling. It was the privilege of investigating the handiwork of God. It was literally to think God's thoughts after Him. If the "Mind of God" was expressed in the Scriptures then the "Hand of God" was seen in the study of creation. In this first decade of the 21st Century many scientists have been increasingly coming to this same conclusion. (Of course this sentiment is being expressed in more modern terms.)

During the last century Rationalism, Reductionism, Atheistic or Metaphysical Naturalism has become the prevailing Teleology. (Or more correctly **Dysteleology**)[8]

In this intellectual environment as one wit commented concerning Richard Dawkins. Richard Dawkins is the Charles Simonyi Professor of the Public Understanding of Science at Oxford University and is one of the most successful and popular (If weeks in which his books have been on the New York Times best selling list are to be regarded as evidence!) articulators of Scientific Naturalism. He is numbered as one of the (5 horsemen of Atheism) polemic atheists of this millennium. [9] Our anonymous wit commented!

> "His faith in the nonexistence of the immaterial is so blind that he refuses to believe even the material evidence of immateriality."

In academic, science faculties the environment became not a 'bold courageous unbiased academic freedom' but a prevailing assertion that there was no designer, no purpose and that "the universe, life and all that is" is just a matter of chance.
This 'dysteleology' has in some places become strongly prohibitive. Sadly there is evidence[10] showing that if a Research Scientist admitted to be a "card carrying believer in the divine" it threatened their tenure in prestigious Universities in United States. This was the prevailing climate at Universities. Atheistic Evolution ruled, and students who objected to this unspoken but pervasive dysteleology were quietly counselled to "Get over it." Thinking about purpose and significance was pointless."

But, friends, the times they are a-changing!
Increasingly scientists are making statements like this;
Richard Swinburne summarises his exposition of the cosmological argument by saying:

> "There is quite a chance that, if there is a God, he will make something of the finitude and complexity of the universe. It is very unlikely that the universe would exist uncaused, but rather more likely that God would exist uncaused...." [11]

Or
Gerald Schroeder with his typical clarity cuts to the heart of the matter;

> "The basic question of whether science and religion are mutually exclusive realms reduces to whether there is a place for the metaphysical (Teleological) to be bought within the structure of what until recently was a purely materialistic science. The discovery of the big-bang creation of time-space and energy, the metamorphosis of that energy of the creation into particles, and the transformation of those particles into sentient beings, alive with feelings of joy, the transcendent ecstasy of love, and self awareness, all cry out for an explanation that seems to find its root in something other than the material."[12]

John Walton who is the Professor of Old Testament studies at Wheaton College in his profoundly important book on ancient cosmology and the origins debate - "The Lost World of Genesis One" - suggests that as we investigate the beginnings of 'the universe, life and all that is' we need to consider it's teleology as that of a "layer cake." In the layer cake analogy the realm of scientific investigation is the lower layer of the cake.

> This represents the whole realm of materialistic or naturalistic causation or processes. It is subject to scientific observation, investigation and explanation. Discovery in this layer does not subtract from God or His works. This is the layer in which Science has chosen to operate and where it is most useful.

> In contrast, the top layer represents the work of God. It covers the entire bottom layer because everything that Science discovers is another step in understanding how God has worked or continues to work through the material world and its naturalistic processes. In this way, the bottom layer might be identified as the layer of secondary natural causation while the top layer is identified as the ultimate divine causation.
>
> Science, by current definition, cannot explore the top layer. By definition it concerns itself with only that which is physical and material. By restricting itself to those things that are demonstrable, and more importantly, those things that are falsifiable, science is removed from the realm of divine activity.[13]

This distinction is helpful but it is important to point out that the boundary between the layers is not impenetrable. This is particularly the case now with increasing discussion about what is called the 'Quantum Enigma' and the way that consciousness, maybe even a Divine consciousness has a discernable role in the creation and in the sustaining of the universe.

Another helpful analogy of the different but equally valid realms of enquiry and understanding was proposed by the late **Donald MacKay** (1922 – 1987) the distinguished neuroscientist/philosopher in his book ***"The Clockwork Image"***[14]
He starts by using the everyday experience of looking at a huge advertising sign-board that is made up of hundreds of electric lights. This is in the days before LED's. These lights are wired to form a running sequence of words and images. Say; *"Robo -Plus – a bank for our times!"* Now suppose we ask an electrician to tell us in his technical language "what is on the board?" He gives us a long, careful description in electrical terms, so complete that we can understand just why and how each lamp is flashing, and could if we wanted make a perfect copy of the sign from it.

But is that all there is? Is the sign "nothing but" the flashing of electric lights? Say a person comes along and says; "Your explanation is incomplete, you have forgotten, or deliberately omitted to mention the advertisement."
What are we to say? The objector is right. There is more to the advertisement than flashing electric lights. There are words on the board and the electrician hasn't mentioned them. But as MacKay points out, that does not mean that the electrician is not thorough enough. No one would expect him to add an addendum at the end of his technical description saying, 'and by the way the sign said; *"Robo – Plus a bank for our times!'"* In his own terms the electrician's description is complete – he has accounted for every lamp and the sequence of flashes. If one of the lamps fails to flash because it is blown we would turn to him to fix it. And he could. But for all we know he may not speak English so the message of the flashing lights would be irrelevant and not understood by him.

What he has not described is the advertisement as a whole, the message and the meaning of it. That is outside his brief or his terms of reference. His expertise is currents and switches, not finances and banks, or even English – the language of the advertisement!
But by the same token, we wouldn't expect the electrician to then arrogantly declare that the advertisement is nothing but flashing lights and timed sequences. Once we have seen the advertisement (and if we speak English) we "know" that there is more to it than currents

and timed switches. But, and this is an important point regarding the advertisement, the message cannot be isolated from the lights and flashes. The message is not something left over after you take away all the items in the electrician's list. It's not a remnant. It is part of the whole. The electrician can't say the message doesn't exist, it's just lights. Nor can we say the flashes and current switching is meaningless. They are both part of the same whole. And importantly for us the message is the point or the reason for the flashing lights. The Message is the purpose for the board. (This is the teleological reason for its existence.) In fact our describing of the advertisement as a consumer is a valid description, and we would argue is fundamental to the intention of the creator of the advertisement. The two descriptions are complementary. The electrician's description has bracketed out questions of meaning and purpose and focussed on reducing it to understanding its functioning. This is the how, not the why of life. That is the limitation that science has set itself by its practical naturalism.

Let's develop this idea and bring it into the digital age.
Now suppose that you find a memory stick lying on the beach. How it got there, where it came from and who it belongs to is a mystery to you, this small 2cm. square piece of plastic has Scan Disk, 2 Gb, SD memory written on it. You actually don't know what it is so you take it to a computer forensic scientist who sets about investigating it. The scientist discovers that there is a huge string of 1's and 0's recorded on the silicon magnetic substrate. These are the on / off states of the magnetic memory and have been semi permanently written into the memory. He and you conclude - something is there in the memory.
He prints out the thousands of lines and hundreds of pages of these 0's and 1's. As you look at them carefully you cannot see any pattern or figure out how they got there or what they mean. You conclude that the string of 1's and 0's are the result of chance variations and are the product of random processes perhaps caused by sunlight..

Is this a valid scientific explanation? Well on the face of it, it certainly seems to be the case. But this conclusion takes you beyond the realm of science into the realm of teleology; you are making a statement about the meaning and purpose of the string of 0's and 1's. This is not a scientific conclusion because moves beyond the scientific examination.
The correct "scientific" conclusion is that there are 0's and 1's imbedded in the chip but as yet you don't know their purpose or origin or if they have a purpose. You leave the teleological explanations to the meta-physicists, theologians and philosophers. All options are open. You bracket out the personal conclusions you draw.
Your own personal position is you suggest that perhaps the 1's and 0's were caused by the random influence of radiation or static electricity exciting the silicon into differing magnetic states. It must be just a random selection of 0's and 1's. The "data" is nonsensical and just the product of chance. That remains your conviction. We must realise however that this conclusion you draw has gone beyond the scientific analysis into the realm of teleology or dysteleology, and even theology. As a scientist you have no right to use science to give authority to your personal conclusion.
Now your colleague is not convinced that the memory chip has really been fully examined and its existence understood. He's convinced there is more to it, that it's 'a code of some description.' It's a hunch he has.
He is not satisfied with the "scientific" explanation or your teleological/dysteleological conclusion. He is convinced that the chip has not really been deciphered. Indeed that there

must be a purpose, a deeper meaning to these 0's and 1's. If only he could understand it, or had more advanced equipment to check if you could read the 1's and 0's. As a string on a page they appear to be "nothing but" 1's and 0's without any discernable pattern.

Then the forensic scientist has a brilliant idea. "Let's plug this into that ancient PC in the basement and see if there is anything else to this."
It just happens to "fit" into a spare memory slot and once plugged in the Windows Media player on the PC springs into life. On the screen are not 1's and 0's, but colours and movement and sound. What you see is an old advertisement for Coca-Cola. There is flashing lights, dancing sound and music. 'It's the real thing' the crowd shouts with enthusiasm.
"See!" says your scientist friend, "I knew it, there was a message embedded in that seemingly random collection of 0's and 1's. You just couldn't see it. You didn't have the equipment to read it, or decipher it. This has a message for us."

Now it may not be very popular with Christians but the next conclusion that is drawn, is also one that goes beyond the scientific evidence. See to now go on and say, there is an author and designer of this message may be a logical conclusion but it is an inference that goes beyond the evidence into the realm of teleology, even theology. There was no author present when the chip was played. The so-called designer is invisible and unknown. Yes, it could be argued that as a result of the presence of information on the chip and the message contained in it means this design inference is logical and persuasive. But it is still an argument outside the strict confines of Science.
You see this illustration points out the legitimate limitations of Science. We have to be clear where the boundaries of the scientific method are so that Science is not misused by non scientists, or scientists who want use it to promote a personal set of presuppositions and give "scientific credence or authority" to their particular teleology, or ideology, whether theistic or atheistic. It could be argued that this is what Julian Huxley did with Darwin's theory of evolution. This is certainly what the recent fundamentalist atheists like Richard Dawkins, Christopher Hitchens and Sam Harris do.
It might surprise you to read this from the autobiography of Charles Darwin.

> [Reason tells me of the] extreme difficulty or rather impossibility of conceiving this immense and wonderful universe, including man and his capability of looking far backwards and far into futurity, as the result of blind chance or necessity. When thus reflecting I feel compelled to look to a First Cause having an intelligent mind in some degree analogous to that of man; and I deserve to be called the Theist.[15]

Darwin's theory of origins became an ideology with a specific teleology which dismissed any belief in a designer. Against, it seems, the beliefs of Darwin himself, it was used by those who denied Theism. They used the success and popularity of Darwin's theory to change the default teleology from Theism to Atheism.

My illustration of the message on the computer chip highlights the limitation of Science and the temptation of blurring the lines between scientific explanation and teleology to bolster a personal ideology based on an undisclosed and unproven set of presuppositions.

There are also differing "levels" of interpretation and explanation of the memory chip message. In this case there are at least four levels.

1. There is the reduction of the message to its most basic level. This is the goal of Science. That is a series of 0's and 1's. This could be called the reductionist view. Getting to the core. (Of course we could keep on going deeper in to the atomic make-up of the silicon and the magnetic states – but let's leave it reduced down to 0's and 1's) This is the legitimate task of science, to explain how something works, to break it down to its most basic fundamental parts. Science's goal is to give us the "how" of creation. Potentially Science works from the premise that nothing is irreducible. Having said this however scientists must recognise that this is not the only explanation of reality and experience. We must beware of what **Donald MacKay** calls "the nothing buttery hazard"[16].
   Its current philosophical label is ontological reductionism. Nothing buttery is characterised by the notion that by reducing any phenomenon to its components you not only explain it, but explain it away. You can do it to love, or bravery or anything . . . by finding the mechanisms underlying the behaviour in question.
2. Then there is the explanation on the level of the flashing pixels and vibrating sound waves emanating from the PC. This would be the technician's explanation.
3. Then there is the message of the advertisement. The feeling and attitude it promotes within the viewer. This is the creative director's explanation. The creative artist who wrote the song and scripted the production.
4. Then lastly there is the intention of the corporation. The organisation that paid for the advert with the intention of selling a product and making money. The intention is to market a product to have you feel good about Coke and want to "try the real thing."

Each of these explanations is valid, and to say one excludes the other is to ignore the complementary view they give us of reality. Which one is the scientific explanation?

The pervasive teleology/dysteleology of much modern science is that of atheism, 'random chance acting over long periods of time.' (Note: this teleology is not scientifically legitimised as I have argued in the above section.)
In a College Biology Curriculum or text book you read dysteleologically loaded statements. This is in spite of the fact that many of today's leading practitioners and theorists are Theists in their teleology. Physicist like Paul Davies, John Barrow, John Polkinghorne, Freeman Dyson, Gerald Schroeder, Francis Collins, Owen Gingerich, Roger Penrose – the list goes on.

Many, actually most of these scientists would not call themselves members of the Intelligent Design movement. In recent decades the 'Theory of Intelligent Design' has become prominent and notorious in the acrimonious debates in the US concerning the teaching of evolution versus intelligent design in schools and colleges.
Let's be clear however, historically theism was the prevailing teleology. It was either the accepted of unspoken foundation of these universities and colleges. Throughout the ages scientists have always admired the cosmos as supporting the concept of design.
Even the Psalmist expressed these sentiments.
Take for instance **Psalm 19:1-4**[17]

[1] The heavens declare the glory of God;
the skies proclaim the work of His hands.
[2] Day after day they pour forth speech;
night after night they display knowledge.
[3] There is no speech or language
where their voice is not heard.

[4] Their voice goes out into all the earth,
their words to the ends of the world.

The Intelligent Design movement (I D) insists that this appearance of design is not illusive, that is the result of an unidentified Intelligent Designer. It is of course outside the investigative tools of science and the Theory of Intelligent Design to identify this designer. That takes us out into the realm of teleology, theology and philosophy. The recent discoveries of cosmology showing the incredible fine tuning of the cosmos and micro-biology which reveals the mind boggling complexity of even a single cell are just two examples of amazing design. One cell represents a nano-factory of astonishing complexity and information processing ability.

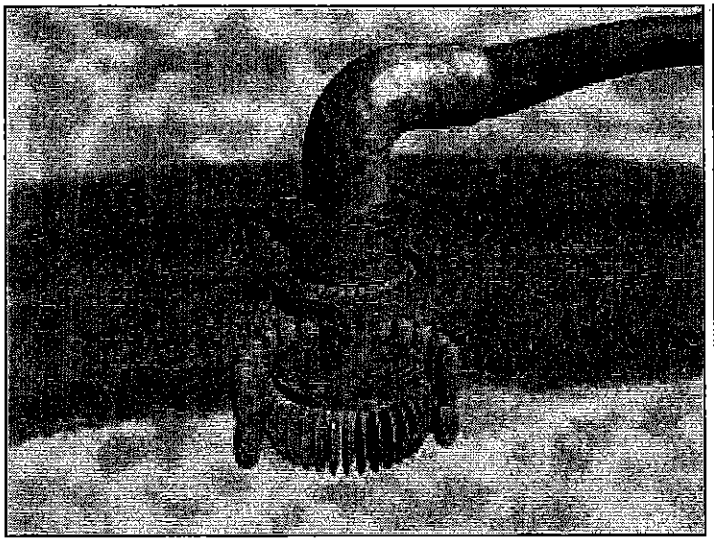
One of the primary ways the Intelligent Design movement has offered as evidence for the presence of an Intelligent Designer is through the identification of what they call 'Irreducible Complexity.' Irreducible complexity is carefully argued by Michael Behe in his bestselling book **"Darwin's Black Box."** He shows how these irreducible complexities have been discovered through the recent developments of Molecular Biology and Bio-chemistry. Irreducible Complexity shows the weakness of neo Darwinian evolution (the reigning paradigm for understanding biological origins). Darwin himself knew that his theory of gradual evolution by natural selection stood on tenuous foundations. He said:

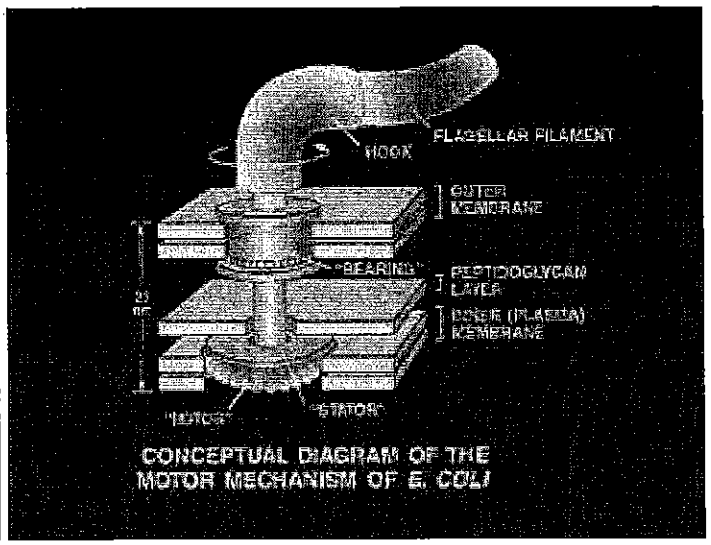
> If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely breakdown.[18]

Michael Behe picks up this challenge. He defines an irreducibly complex system to be;

> A single system composed of several well matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning. An irreducibly complex system cannot be produced indirectly (that is, by continuously improving the initial function, which continues to work by the same mechanism) by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition non functional. An irreducibly complex biological system, if there is such a thing, would be a powerful challenge to Darwinian evolution.[19]

Behe then identifies the Bacterial Flagellum which is in effect analogous to a rotary outboard motor attached to a bacterium giving it incredible mobility. This is a remarkable rotary motor. See **Diagram 3.below**.[20]





Basically the chances of all the parts necessary to form this bacterium flagellum motor, says Behe are vanishingly small. (All the parts need to be perfectly in place for it to have a functional advantage (i.e. actually work – this is a fundamental necessity according to evolutionary theory before an innovation is passed on to subsequent generations of bacterium.)) Because of the incredible improbability of this motor forming "by chance – Darwinian processes" we have once again smacked right up against the Probability conundrum. What we see is irreducible complexity.

Behe comments:

> Even though we are told that all biology must be seen through the lens of evolution, no scientist has ever published a model to account for the gradual evolution of this extraordinary molecular machine.[21]

Behe continues:

> As bio-chemists have began to examine apparently simple structures like cilia and flagella, they have discovered staggering complexity, with dozens or even hundreds of precisely tailored parts. .....
> Darwinian Theory has given no explanation for the cilium or flagellum.[22]

In his more recent book "**The Edge of Evolution**"[23] Michael Behe continues to investigate the limits of evolution as a theory that explains the origins of life. A summary conclusion is; Darwin's proposed mechanism – random mutation and natural selection – which has been accepted largely as a matter of faith and deduction or, at best, circumstantial evidence. (*This has also been the prevailing teleology.)* Only now, thanks to genetics, does Science allow us to seek direct evidence. *(It allows us to follow where the evidence leads.)* The genomes of many organisms have been sequenced. The machinery of the cell has been analysed in great detail. The evolutionary responses of microorganisms to antibiotics in humans to parasitic infections have been traced over tens of thousands of generations. As a result, for the first time in history Darwin's theory can be rigorously investigated. The results are shocking. Although it can explain marginal changes in the evolutionary history, random mutation and natural selection explain very little of the basic machinery of life. The edge of evolution, a line that defines the border between random and non-random mutation, lies very far from where Darwin pointed.

Behe argues convincingly that most of the mutations that have defined the history of life on earth have been non-random.

Although it is controversial and stunning, this finding actually fits a general pattern discovered by other branches of Science in recent decades: the universe as a whole was fine tuned for life. From Physics to Cosmology to Chemistry to Biology, life on earth stands revealed as depending on an endless series of unlikely events.
The clear conclusion: 'That the universe was designed for life.' That is where the evidence is pointing. Once again we have a hint of transcendence. This is not a scientific proof mind you, (That sought of proof is outside the legitimate enterprise of Science) but it is a sign post pointing to a teleology which was the one embraced as the core presupposition of the great scientists of the past.
In pointing out the weakness and fallacy of putting one's faith in Darwinian or neo-Darwinian evolutionary theory as an explanation for everything from the machinery of the cell to the history of life on earth. 'The universe, life and all there is.' The Intelligent Design movement has in my opinion done believers and scientists a great service.
But the Intelligent Design movement have not got to the point where they can offer alternative scientific mechanisms of the beginnings. In other words, Intelligent Design does not offer a 'scientific theory' of origins.

John Walton comments

> Intelligent Design does not contribute to the advance of scientific understanding because it does not offer an alternative that is scientifically testable and falsifiable. Its basic premise is a negative one: that naturalistic mechanisms (i.e., natural selection, random mutation) cannot fully account for life as we know it. Intelligent Design does not deny the operation of naturalistic mechanisms -it only finds them insufficient to offer a comprehensive explanation of all observable phenomena. It cannot offer at present the scientific hypothesis proposing alternatives.[24]

I think the comments of **John Walton** are unduly negative. Intelligent Design has and is contributing to scientific understanding by pointing out the fallacy of the prevailing theory and its teleology. Theories have to be rigorously debunked before the paradigm will change. Before the majority of scientists will become convinced, the weight of evidence has to show the self-contradictory nature of the old theory before it as an 'unwanted squatter' is evicted and a new theory can take up residence. The fact that the new theory is not fully developed is not a reason to dismiss it out of hand. More work has to be done.

This being said however, the inherent danger of arguing that the presence of irreducible complexity (The theoretical proponents of Intelligent Design theory do not say this – but the popular understanding of the theory suggests it) shows that there is an Intelligent Designer who has "had a hand" in the process. This reduces the activity of God to those areas of scientific investigation that we cannot explain. This is what **Francis S. Collins** who is the head of the Human Genome Project and author of the book "The Language of God" calls a "God of the Gaps theory"[25] Collins argues that;

> The theory of Intelligent Design is a God of the Gaps theory, inserting a supposition of the need for supernatural intervention in places that its proponents claim Science cannot explain. Various cultures have traditionally tried to ascribe to God various natural phenomena that the science of the day had been unable to sort out –

> whether a solar eclipse or the beauty of a flower. But those theories have a dismal history. Advances in Science ultimately fill in those gaps, to the dismay of those who have attached their faith to them. Ultimately our "God of the Gaps" religion runs a huge risk of simply discrediting faith. We must not repeat this mistake in the current era. Intelligent Design fits into this discouraging tradition.[26]

The staking of ones faith in an Intelligent Designer (God) on the existence of irreducible complex systems, creates a knife edge. Under these conditions the enterprise of Science will always be a threat to faith and a teleology that presupposes a super-intelligent designer. This is because the activity of God is reduced to those areas we cannot explain. I for one, like the scientists of old would strongly affirm that the presence of "reducible complexity" also shows the activity of a brilliant, super-intelligent being. Einstein said "God does not play dice" meaning that creation was governed by understandable laws and principles. Many of these processes in creation are able (by and large) to be reduced to understandable, predictable actions that we can control and rely upon for manufacturing, medicine and management.
To me this is just as much a sign of the brilliance of God and His gracious gift of an understandable creation as are aspects that seem to be irreducible.
Take the exclamation of the Psalmist in **Psalm 19:1.**

> [1] The heavens declare the glory of God;
> the skies proclaim the work of His hands.

The fact is, the Psalmist probably couldn't explain the workings of the cosmos, and thus his bewilderment could have been a reason for his wonderment and cry of praise.
For us the reverse is true. The fact is, we do have a measure of understanding about the cosmos, but this does not diminish (in my opinion) our cry of wonderment and praise. In fact I think that knowing all this came about as a result of the "Big Bang Beginning" and is incredibly finely turned and structured for life on earth only goes to enhance our wonderment and acknowledgement of God's action. The fact that for us we have reduced the complexity (or you could alternatively say we have lifted the veil of ignorance) and discovered even greater levels of awesome fine tuning enhances our sense of astonishment.

To stake our faith on the presence of irreducible complexity is to be unnecessarily threatened by the legitimate mandate of scientific enquiry. Science is given the mandate to understand creation by reducing it to its component parts, to postulate testable theories that explain how events, activities, and mechanisms including biological machines come about.
Science has to constantly knock (no, pound) on the door of irreducible complexity. It has to try and crack it open and find out (to get teleological) how God did it. We have to presume that God does not use sleight of hand and that there are mechanisms at work that given the right equipment and right theoretical framework we will be able to understand and maybe even replicate. That is the *raison d'être* of Science.

Yes it may be that there are micro-biological systems that are irreducibly complex. They may be this way because we don't, as yet, have the equipment to crack them open. Or it may be because they are the direct result of the "consciousness of God – which is the equivalent to His "sleight of mind" and His sustaining power. But Science can't assume that, nor give up the quest, nor would God who has blessed us with a mind; creativity and curiosity want us

to! Our dilemma arises particularly as the sizes we are talking about reach a nano even sub-atomic level. The smaller we go the more amazing is the design. Yes, it may be we are reaching the limits of science. Certainly we are in terms of our ability to be detached observers.

This is not to say God's activity is only found in that which is irreducible complex. For me it is not just in the "as yet unknown" that we find the Language of God, Fingerprints of God, or Hidden Face of God as it has been variously called. God's hand is found everywhere. The laws are His; they are His good gift to us. The fact that they seem to work independent of His direct intervention doesn't deny Him as the teleological cause and end. It just shows generally God doesn't tinker with them. He could and maybe He does in miracles, but this is not His default position.
It is in the known things, in those aspects of creation that can be reduced to expose logical laws and amazing fine tuning. In those things that can be predicted and relied upon. Those things that we use every day, that make our life full and abundant.
It is also in a complementary view, in the overall design, in the beauty and amazing correlation within my consciousness to the external reality and existence on planet earth. It is in the experience of love and wonder, awe and delight. These are all for me valid reasons for the presupposition of a super-intelligent and creative, loving God.

Nor does this dismiss the fact the He may in fact be intimately involved in sustaining it all. Increasingly we are seeing the presence and power of consciousness in creation.

The arguments for the existence of a super-intelligent, all powerful creator are not confined to the Intelligent Design inference. There are a number of "proofs" or hints of transcendence.

- Firstly there is new cosmology;
- A second category of evidence would be the anthropic fine tuning. This refers to the fundamental laws and parameters of physics which have precise numerical values that could have been otherwise. There's no fundamental reason why these values have to be the way they are. Yet all of these laws and constants "conspire" in a mathematically incredible way to make life in the universe possible.
  During the split second before quarks and electrons came into existence the big bang had to be finely tuned to produce a universe in which we could live. Amazingly fine tuned! Theories vary but according to one, if the initial conditions of the universe were chosen randomly, there would only be one chance in 10 to the 120th (That's one with 120 zeros after it.) that the universe would allow a life. Cosmologist Rodger Penrose[27] estimates it as vastly more unlikely: the exponent he suggests is 10 to 123. By any such estimate, the chance that a liveable universe like ours would be created is far less than the chance of randomly picking a particular single atom out of all the atoms in the universe. Can you accept odds like that as a coincidence? Do you have enough faith to be an atheist?
  It would seem more likely that something as yet unknown to Physics determines that the universe had to start the way it did.
- The third example of Science pointing towards God as the originator of life is the origin of the information necessary to bring life into existence. Life at its root requires information, that information is stored in DNA and protein molecules. We are gob-

smacked at the extent of this "programming information." It goes without saying that the programming information presupposes the existence of a programmer and a highly skilled one at that!

- Fourthly the presence of molecular machines.
  The presence of vast numbers of intricately designed, mysteriously functioning molecular machines that defies explanation by Darwinian natural selection. Even if the barrier of irreducible complexity is solved, the issue of improbability remains. These integrative, complex systems in biological organisms include signal transduction circuits, sophisticated motors, and all kinds of biological circuitry.
- Human consciousness certainly supports a Theistic view of human nature.
  Judaism and Christianity clearly teach that we are more than just matter. We are more than just a computer made of meat. We're made in God's image. We have the capacity for self reflection, for representational art, for language, for creativity. Science can't account for this kind of consciousness merely from the interaction of physical matter in the brain.

Lee Strobel in his book "**The Case for the Creator**"[28] gives an extensive outline of these and other "proofs" of the existence of a creator.

- Francis S. Collins indicates that he finds most persuasive another "proof" that of Moral Law.[29] The concept of right and wrong appears to be universal among all members of the human species (though its application may result in widely different outcomes). It just seems to be a phenomenon approaching that of the law, like the law of gravitation or of special relativity. Yet in this instance, it is a law that, if we honest with ourselves, is broken with astounding regularity. As best as I can tell, this law appears to apply peculiarly to human beings. . . It is the awareness of right and wrong, along with the development of language, awareness of self, and the ability to imagine the future, to which scientists generally refer to, when trying to enumerate the special qualities of Homo Sapiens.
  Where does this moral sense come from? This universal impulse or compass was best explained as a sign post to God. This fact was clearly argued by the foremost Christian Apologist of last Century, the Oxford scholar C. S. Lewis who in his hugely influential book, 'Mere Christianity:' says;

  > If there was a controlling power outside the universe, it could not show itself to us as one of the facts inside the universe – no more than an architect of the house could actually be a wall or staircase or fireplace in the house. The only way in which we could expect it to show itself would be inside ourselves as an influence or a command trying to get us to behave in a certain way. And that is just what we do find in ourselves. Surely this ought to arouse our suspicions?[30]

Let's take for the moment the issue of the **new cosmology** – the Big Bang Theory and its accompanying theoretical underpinning in general relativity. These theories now point to a definite beginning of the universe. As a result, most scientists now believe that energy, matter, space, and time had a beginning.
Some physicists hypothesise that we are part of a multi-verse, they do this to try to explain away the probability conundrum. But let's be clear this is an "extremely creative," speculative hypothesis, not a scientific theory with any semblance of proof or evidence.

The concept of a beginning is profoundly anti materialistic and 'non-scientific'. Add to this the quantum enigma and it begins to look like the underlying core substrate of the universe is not matter after all but mind.

John Wheeler, Professor Emeritus of Princeton University and winner of the Einstein Award says; - 'now after a lifetime of study, reality appears to be the expression of the information.'
On another occasion summarising the quest for ultimate reality he says,:

> "To my mind, there must be at the bottom of it all, not an utterly simple equation, but an utterly simple idea. To me that idea, when we finally discover it, will be so compelling, and so inevitable, so beautiful, we will say to each other, how could it have ever been otherwise?"[31]

The old conundrum is turned on its head. It now seems it is not a question of consciousness arising from matter. It is rather quite the opposite, of matter arising from consciousness.

Remember **George Wald** the Nobel laureate and Professor of Biology at Harvard University in an essay for a Quantum Biology Symposium said this,

> It is mind that has composed the physical universe that breeds life and so eventually evolves creatures that know and create: science, art, and technology making animals. In them the universe begins to know itself.
> This is an almost mystical analysis of life.[32]

According to Gerald Schroeder, Wald's epiphany occurred when, in conducting the research by which he earned a Nobel Prize, he elucidated a portion of the mind boggling complexity in the series of reactions at the eye's retina that allows the picture in the mind to remake itself 10 to 15 times a second. At the quantum level it appeared that mind, intelligence, was somehow embedded in the process.[33]

Bruce Rosenblum and **Fred Kuttner**, the former a Professor of Physics and the later a Lecturer in Physics at the University of California draw the same conclusion in their clear and unflinching exposition of the recent developments of the Quantum Enigma. They contend that every interpretation of quantum physics involves consciousness.
They quote Freeman Dyson who writing before the idea of dark energy arose says this;

> It would not be surprising if it should turn out that the origin and destiny of the energy in the universe cannot be completely understood in isolation from the phenomena of life and consciousness . . . It is conceivable . . that life may have a larger role to play than we have imagined. Life may have succeeded against all odds in moulding the universe to its purposes. And the design of the inanimate universe may not be as detached from the potentialities of life and intelligence as scientists of the 20th century have tended to suppose.[34]

Of course a Theist would seek to identify that consciousness also with the mind of God, who is not only Creator but because God "keeps us constantly in mind" and is "moment by moment conscious of every one of us and so we are sustained in being by Him." That too is an inference from design and more clearly arises out of the quantum enigma – as we will see.

You can invoke neither time nor space nor matter nor energy nor the laws of nature to explain the origin of the universe. General relativity points to the need for a cause that transcends these domains. And Theism affirms the existence of such an entity – namely, God. Taken together, the Big Bang, General Relativity and Quantum Mechanics provide a scientific description of what Christians call ***Creatio ex nihilo*** –creation out of nothing or perhaps we should more accurately say creation out of mind. Because it could be argued today that the once clear boundaries of time, space and matter are being blurred. That Quantum Physics and the possible presence of systems that are irreducibly complex (What Gerald Schroeder call the presence of wisdom within even a cell[35]) and yet fundamental to life show a clear design inference and inbuilt mind, containing functional information. That it is time to consider again that the universe is more mind than machine. Perhaps it is God who is singing the song: "You are always on my mind!:

Just how Science will break through this mind /matter barrier and investigate this mechanism is unclear. But once the Dragon of Probability is laid to rest and we realise that there actually is something other than blind chance going on here, then perhaps we will have the motivation to start knocking, and designing new tools to investigate this mind matter conundrum. What an exciting opportunity.

An analogy can be seen in the huge amount of money and time being spent at CERN in Switzerland in the design and construction of the "Large Hadron Collider." Billions of dollars are being spent to push the envelope of scientific discovery and pursue the elusive Higgs Boson. This is a particle that is theoretically supposed to exist and is thought to form the basis of the fundamental interaction of matter. (Gravity glue) It is the particle of gravity. It is also hoped that this particle accelerator will also give insight in to the early moments of the universe using high energy collisions that can emulate the energies of the Big Bang. The ultimate goal is to reveal something about Dark Matter and Dark Energy which have hitherto been mysteries.

Perhaps we will more clearly see the Hidden Face of God, or discern the face of the Hidden God. But then that would be blurring the lines of Science and Theology, Physics and Meta-Physics, Teleology and purpose. Wouldn't that be ironic? As the developments of Science advance so the veil between physics and metaphysics becomes transparent.

But to do so will mean we will have to use new tools of measurement and investigation, which press into the nature of reality at more than at a simple naturalistic level.
It will be to encounter the mysteries of consciousness and information, design and chance, and perhaps the mind of God. To this we now turn.

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[1] Teleology (Greek: telos: end, purpose) is the philosophical study of design and purpose. A teleological school of thought is one that holds all things to be designed for or directed toward a final result, that there is an inherent purpose or final cause for all that exists.
As a school of thought it can be contrasted with metaphysical naturalism, which views nature as having no design or purpose. Teleology would say that a person has eyes because he has the need of sight, while naturalism would say that a person has sight because he has eyes. http://en.wikipedia.org/wiki/Teleology

I am using the term teleology as an indication of an intentional process that is usually the by-product of purpose. I.e. God works intentionally. He has His own purposes and final goal in mind in and through His creation. This takes us beyond the realm of empirical scientific enquiry into concerns of theology and metaphysics. I would argue that the way the findings empirical sciences are portrayed is not teleologically neutral. To say something is the product of chance and the result of random processes is to make a teleological statement. It is making a statement about the intention of the cause of this action, namely that there was no intention. For example John Walton makes the point in The Lost World of Genesis, (InterVarsity Press, Downers Grove. IL: 2009) 116, He says; "Neither ultimate cause nor purpose can be proven or falsified by empirical science. Empirical science is not designed to be able to define or detect a purpose, though it may theoretically be able to deduce rationally that purpose is logically the best explanation. As the result of an empirical discipline, biological evolution can acknowledge no purpose, but likewise it cannot contend that there is no purpose outside of a metaphysical conclusion that there is no God. It must remain neutral on that count since either contention requires at moving to a "top layer", which would mean leaving the realm of scientific inquiry. Science cannot offer access to God and can neither establish His existence beyond reasonable doubt nor falsify His existence."

The problem is, that in practice, scientists, teachers and media documentaries on Science regularly move outside the confines of science to make anti-teleological statements that sound as if they have the full weight of science behind them.

[2] Blaise Pascal, *The Mind on Fire* ed. James M. Houston (Victor Books, Kingsway Communications Eastbourne, England 2006) 145, page 125

[3] Quote George Wald, "*Life in mind in the universe*," in **Cosmos, Bois, Theos.** Ed. Henry Margenau and Roy Abraham Varghese (La Salle, IL: Open Court 1992), p 218, quoted from Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 131

[4] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 132

[5]They believed that there is a God involved in ultimate causes and who is carrying out his purposes in and through the naturalistic mechanisms and laws of the universe. Nothing is random or accidental. This was their metaphysical position. It didn't alter the processes they used in scientific enquiry or the rigour with which they pursued their enquiry, but was a pre-supposition that undergirded it. Many of the great scientists fall into this category. Galileo, Newton, Kepler,

[6] John Walton makes the point that some scientists might believe that naturalistic causes are all that can be affirmed, and they do not believe in purpose... their worldview, their metaphysics, have no room for God. Their view is exclusively materialistic. He thus, rather than using the term teleological in reference to this stance calls this exclusively materialistic view dysteleological (no discernible purpose.) John H. Walton, The *Lost World of Genesis One* (. IVP, Downers Grove, IL 2009.), 117

Note however; this dysteleological stance by some scientists is not a scientifically draw conclusion.

[7] Quoted in, Owen Gingerich, *God's Universe* (Harvard University Press, Cambridge Massachusetts, 2006) 115

[8] **Dysteleology**, a modern word invented and popularized by Haeckel, is the philosophical view that existence has no *telos* or final cause. Dysteleology is an aggressive, yet optimistic, form of science-oriented atheism originally perhaps associated with Ernst Hackle and his followers, but now perhaps more associated with the type of atheism of Richard Dawkins, Sam Harris, or Christopher Hitchens. Western philosophy since Copernicus has been increasingly dysteleological. Unlike traditional philosophical and religious perspectives, modern philosophical naturalism sees existence as having no inherent goal.
http://en.wikipedia.org/wiki/Dysteleology

[9] Richard Dawkins, *Unweaving the Rainbow,* (The Penguin Press, London, England. 19980 Dawkins is also Author of The Selfish Gene, The Extended Phenotype, The Blind Watchmaker, River out of Eden, Climbing Mount Improbable and most recently the best seller The God Delusion.

[10] Examples of this are shown on the Discovery Institute website. http://www.discovery.org/

[11] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 144.

[12] Gerald Schroeder, *God according to God* (Harper Collins Publishers, New York NY: 2009) 20.

[13] John H. Walton, The *Lost World of Genesis One* (. IVP, Downers Grove, IL 2009.), 115

[14] Donald M. MacKay, *The Clockwork Image* (IVP, London. 1974.) 37, 59. Here Mackay uses the example of a neon light advertisement and illustrates the different "explanations" for it. There is the description an electrician would give and there is the consumers explanation. Both these descriptions are valid. They are complementary. I develop this idea further.

[15] Charles Darwin, The Autobiography of Charles Darwin 1809 – 1882, ed. Nora Barlow (London: Collins, 1958), 92-3. Quoted in Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 106.

[16] Donald M. MacKay, *The Clockwork Image* (IVP, London. 1974.) 43.

[17] Holy Bible, New International Version, The Bible Society Australia, Psalm 19:1-4. 389

[18] Charles Darwin, (1872) Origin of Species, 6th ed. (1988), New York University Press, New York, 154. Quoted in Darwin's Black Box by Michael J Behe, (Simon & Schuster Inc. New York, NY. 1996) 39.
[19] Michael J. Behe, *Darwin's Black Box* (Simon & Schuster Inc. New York, NY. 1996) 39.
[20] http://www.ideacenter.org/stuff/contentmgr/files/18400e205feb8af26e346af7d95c02e8/misc/flagellumdiagram.jpg
[21] Michael J. Behe, *Darwin's Black Box* (Simon & Schuster Inc. New York, NY. 1996) 72.
[22] Michael J. Behe, *Darwin's Black Box* (Simon & Schuster Inc. New York, NY. 1996) 73.
[23] Michael J. Behe, *The Edge of Evolution* (Free Press, Simon & Schuster Inc. New York, NY. 2007)
[24] John H. Walton, The *Lost World of Genesis One* (. IVP, Downers Grove, IL 2009.), 127
[25] Francis S. Collins, *The Language of God* (Free Press, Simon & Schuster Inc. New York, NY. 2006) 193-195
[26] Francis S. Collins, *The Language of God* (Free Press, Simon & Schuster Inc. New York, NY. 2006) 193
[27] Bruce Rosenblum and Fred Kuttner. *Quantum Enigma* (Oxford University Press, New York NY: 2006) 204.
[28] Lee Strobel, *The Case for the Creator* (Zondervan Publishers. 2003)
[29] Francis S. Collins, *The Language of God* (Free Press, Simon & Schuster Inc. New York, NY. 2006) 23-24.
[30] C. S. Lewis, Mere Christianity (Hodder & Stoughton, London. 1953) 21.
[31] Gerald Schroeder, *God according to God* (Harper Collins Publishers, New York NY: 2009) 227.
[32] George Wald, "*Life in mind in the universe*," Quantum Biology Symposium, International Journal of Quantum Chemistry 11 (1984)1-15, quoted in Gerald Schroeder, *God according to God* (Harper Collins Publishers, New York NY: 2009) 49.
[33] Gerald Schroeder, *God according to God* (Harper Collins Publishers, New York NY: 2009) 49.
[34] Bruce Rosenblum and Fred Kuttner. *Quantum Enigma* (Oxford University Press, New York NY: 2006) 203
[35] Gerald Schroeder, *God according to God* (Harper Collins Publishers, New York NY: 2009) 51, 154-155. Also Gerald Schroeder, *The Hidden Face of God* (Free Press, Simon & Schuster Inc. New York, NY. 2001)

In the Eye of the Beholder.

> What if you slept? And what if, in your sleep, you dreamed? And what if, in your dream, you went to Heaven and plucked a strange and beautiful flower? And what if, when you awoke, you had the flower in your hand? Ah, what then?
> – Samuel Taylor Coleridge.

It is generally affirmed as a result of the evidence for the Big Bang beginning of the universe that the universe had a beginning.

Now there are a number of philosophers, astrophysicists and theorists whose presuppositions preclude any belief in a "first cause" for this beginning. They have felt it necessary to speculate about 'time' before the universe's bursting into existence through the Big Bang. We are now entering the realm of Metaphysics, Theology and Philosophy. We have stepped out of Naturalism, or Empirical Science. It doesn't matter what position a person may hold at a University, what authority they try to use to bolster their view, we need to understand that when we talk about 'before the beginnings' we are speaking outside of the paradigm of Science.
This does not mean that the rules of logic are suspended, or that there shouldn't be an internal consistency to what is said. There has to be, otherwise there would be no way of distinguishing "gobbley gook" from sound reasoning. Nor would there be a way to test whether the theory is consistent with the presuppositions on which it is based and the fit it has with the universe as we know it. This is one of the problems with the "creative but spurious – fantasy ideas that are found on many web sites and blogs."
And it isn't as if there are not mathematical models to represent some of the ideas. In fact **Mario Livio** the senior astrophysicist and head of the Office of Public Outreach at the Hubble Space Telescope Science Institute admits that and I quote;

> When you work in Cosmology . . . you weekly get someone who wants to describe to you his own theory of the universe. . . A particular tactic that I have found to be quite effective (short of the impolite act of not answering at all) is to point out the true facts are that as long as the theory is not precisely formulated in the language of mathematics, it is impossible to assess its relevance. This response stops most amateur cosmologists in their tracks. The reality is that without mathematics, modern day cosmologists could not have progressed even one step in attempting to understand the laws of nature."[1]

Now what follows is not going to be set out as mathematical formulae so they will not meet Livio's criteria, but then nor would any Theological investigation. Theological enquiry still has an internal logic and is based on both the best insights of Science (this was historically called the "Hand of God") and even more importantly to Christian theologians the Scriptures of the Old and New Testament (called the Self Revelation or Voice of God). Even the most creative mathematical physicist has to admit some of the maths done by theorists is pretty outrageous anyway.[2]
Many math theories veer into realms unknown and flights of fantasy. And strictly speaking an empiricist like David Hume would be tossing and turning in his grave. Even their most ardent supporters would have to admit that these ideas are not testable in a laboratory or verifiable by peering back to before the very beginnings of the universe.

Some of the speculative ideas are;
One suggestion is that the universe came into existence out of nothing. There was absolutely nothing before this, no time, no material dimensions of space, no non material dimensions of matter. Just nothing! We have great difficulty imagining nothing because the categories of thought we use all relate to something. Usually when people think of nothing they think of a huge expanse of blankness, a darkness that stretches on forever. The problem with this is they are actually imagining darkness in an expanse of space that has dimensions. Sheer nothing has no dimensions. It is more like an infinitely small dot or hole than an expanse of blackness. But the problem with calling it a dot or a hole is you immediately think of it in terms of a boundary. A black dot, a black hole are defined by their boundaries. We ask how "big" or wide is the hole. But nothingness doesn't have boundaries. It doesn't have an inside or outside it is all there is, nothing.

And for some unknown reason this unimaginably small unbounded dot or hole (was all there was), this nothing due to what is called a "Quantum Fluctuation" exploded through or into its nothingness itself as a mathematical singularity into the matter and energy that makes up the universe that exists today. This is the stark icy cold atheistic position. Nothing gives rise to something. It is uncaused, in that nothing caused it! Many find this philosophically contradictory and unsatisfactory and propose other solutions.[3] There are also some highly respected astronomers who also reject the Big Bang. Geoffrey Burbridge, Fred Hoyle, and Jayant V. Marlikar, each astronomers in their own right, have commented as follows:[4]

> . . . the theory departs increasingly from known physics, until ultimately the energy source of the universe is put in as an initial condition, the energy supposedly coming from somewhere else. Because that "somewhere else" can have any properties that suit the theoretician, supporters of Big Bang cosmology gain for themselves a large bag of free parameters that can subsequently be tuned as the occasion may require.

Basically their contention is that it goes beyond (outside of) the normal domain of scientific enquiry. Some of these astronomers have generally been proponents of what was once known as a "steady state" model of the universe. Arguing that the universe has always existed, that Galaxies and Stars are coming into existence just as others are reaching the end of their existence hence the sum total of energy in the universe is always in a "steady state." The discovering of the Background Microwave radiation as a remnant of the Big Bang has however dissuaded most scientists from this view. A variation of this solution would be that of an outrageously long term set of oscillations of the universe with a period in the order of 30-40 billion years. Here you would have a Big Bang and then billions of years later a "Big Crunch" only to have another "Big Bang" rebound. Pretty improbable in that there is no chance that the rebound Big Bang would result in the same conditions for life we have as a reality in this universe.

Still another solution to the probabilistic conundrum exposed by the **anthropic principle** as I indicated in an earlier essay is that of the "multi verse." Amazingly astrophysicists can postulate and theorise about this with a straight face! These theorists opt for the outrageous idea that our universe is but one of millions upon billions of universes which have seethed into existence. We happen to be on the "ultra, ultra-lucky" one where the

conditions were just right for the development of and nurture of sentient beings that can look and ponder where they came from and fantasise about multi-verses!.
I have listed these alternatives so in deciding which one your pre-suppositions predispose you towards accepting, you can see the options. No matter which alternative we choose we must realise we are all stepping outside of empirical data into metaphysics, philosophy and theology.

A final alternative is the one that I have previously alluded to. This has been the classic Theistic response. Basically this idea is that we see the existence of one Universe which because of its incredible design points to being the creation of a super intelligent all powerful Creator.
As Richard Swinburne in his summary of the cosmological argument puts it:

> "There is quite a chance that, if there is a God, He will make something of the finitude and complexity of the universe. It is very unlikely that the universe would exist uncaused, but rather more likely that God would exist uncaused...."[5]

That is, we are indeed in a privileged universe. A universe which shows all the hallmarks of incredible design and thus a logical inference from this is that it was the product of a infinitely intelligent, all powerful creator / mind. This Being is the ground and source of the universe's existence.
It seems to me the scientific discoveries of the last 100 years have supported ancient Christian Theology. Discovering that matter and energy (from which matter is actually formed, via Einstein's $E=mc^2$) are made of something totally ethereal. Be it information, or mind, or consciousness.
Sir James Jeans decades before commented in his book ***The Mysterious Universe***:

> "There is a wider measure of agreement, which on the physical side of Science approaches almost unanimity that the stream of knowledge is heading toward a non mechanical reality. The universe begins to look more like a great thought than a great machine."[6]

Or more recently in his book ***God and the Astronomers*** Astrophysicist Robert Jastrow who as far as I know is an Agnostic admitted this;

> "Now we see how the astronomical evidence leads to a Biblical view of the origin of the world. The details differ, but the essential elements and the astronomical and Biblical accounts of Genesis are the same; the chain of events leading to man commences suddenly and sharply as a definite moment in time, in a flash of light and energy."[7]

He goes on to "lament."

> "At the moment it seems as though Science will never be able to raise the curtain on the mystery of creation. For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he calls himself over the final rock, he is greeted by a band of theologians who had been sitting there for centuries."[8]

However "following where the evidence leads" has not led all to posit Theism. Others when confronted not just with the anthropic principle (fine tuning of the universe) but also the "mystery" of human consciousness suggest increasing speculative theories.

This dilemma or 'mystery' of human consciousness can be starkly and simply stated. The atoms making up solid matter are held together by electric forces. Electric forces are thus responsible for all of chemistry and therefore underlie all biology. It follows; the processes in our brains are electrochemical, therefore ultimately electrical. So the question is; is our thinking, our consciousness, ultimately to be explained **wholly** in terms of the electrochemistry taking place in our brain? Is our feeling of being conscious merely a manifestation of the electrical forces or is there something else involved? This is the subject of much debate, but it is fair to say that most scientists have moved away from a solely reductionist "nothing buttery" view.

Part of the reason for this is the fact that at a Quantum level Physics has encountered consciousness. Bruce Rosenblum and Fred Kuttner in their book **Quantum Enigma** state;

> Quantum Theory is at the base of every natural science from Chemistry to Cosmology. We need it to understand why the sun shines, how TV sets produce pictures, why grass is green, and how the universe started in the Big Bang. Much of modern technology is based on devices designed with Quantum Mechanics. Pre Quantum Physics," classical mechanics", or classical physics, sometimes called Newtonian Physics, is usually an excellent approximation for objects much larger than molecules, it is typically simpler to use than Quantum Theory. But it is only an approximation, and it does not work at all for the atoms that everything is made of. Nevertheless, classical physics is basic to a conventional wisdom, our Newtonian world view. But it's a world view we now know is fundamentally flawed.[9]

In spite of this, the popular misconception is that Quantum Theory is one of the unintelligible rarefied theories of physicists who can't cope with everyday life. And yes, it is certainly true that the implications of the Copernican Revolution or Darwinian Evolutionary theory are easy to summarise in a few sentences. As a result, our modern minds find them easier to grasp. You might not agree with Darwinian evolution but you know what it means. You can get your head around what you object to! But when it comes to summarising the implications of Quantum Theory it all begins to sound mystical. But Quantum Theory is not going to go away; it has been rigorously tested and demonstrated. It is in fact the framework upon which all of today's physics is ultimately based.[10] Rosenblum and Kuttner argue that it is the most successful theory that Science has yet produced.

Quantum Theory basically says;

To account for the demonstrated facts, quantum theory tells us that an observation of one object can instantaneously influence the behaviour of another greatly distant object -even if no physical force connects the two.[11]

This was why someone as auspicious as Einstein had a profound disquiet about the implications of this; he called them "spooky" and believed it denied the obvious existence of the real world.

Einstein in fact said;

> "I have thought 100 times as much about the "quantum problem" as I have about General Relativity Theory." Einstein is famous for his theory of General Relativity!

Quantum Theory also tells us that observing an object to be someplace ***causes*** it to be there. For example, according to Quantum Theory, an object can be in two, or many, places

at once -even far distant places. Its existence at the particular place where it happens to be found, becomes an actuality only upon its (conscious?) observation.[12]
This seems to deny the existence of a physically real world (an objective reality) independent of our observation of it. You can see why Einstein was troubled. In fact Niels Bohr the brilliant Danish physicist who in 1922 won the Nobel Prize in Physics and has been described as one of the most influential Physicists of the 20th Century commented;

'Anyone who is not shocked by Quantum Mechanics has not understood it.'

Physicists have basically been pragmatic about its implications. They have used the theory incredibly successfully, and ignored the "mystical" implications. This has been the "skeleton in the physicists' cupboard" and the cupboard has been kept shut. So Quantum Physics encountering consciousness has remained an enigma for over 80 years. Rosenblum and Kuttner go so far as to comment that just 50 years ago any non tenured member of a Physics Department would endanger his or her career by showing any interest in the implications of Quantum Theory.
Yet at a popular level many undergraduates had fun discussing questions like:
"If a tree falls in the forest, and no one hears it, is there any noise? Or was it really there?"
If you ever discussed these issues do you remember the conclusions?

The **realist** says even if the air pressure wave we experience as sound was heard by no one, the air pressure still existed as a physically real phenomenon.
The **solipsist** answers: there wasn't even a tree unless I experienced it. Even then, only my conscious sensations actually existed.
But then no one took these very seriously. We all reverted to the presence of external reality when we left the lecture theatre or party. It wasn't really considered "true!"

The same could be said for Theology. In my time at Theological College in the late 70's there was no exploration of the mystical, metaphysical implications of these new scientific cutting edge theories, rather Theology had got bogged down in a demythologising, empiricist reductionism that was 'hell bent' on excluding any miracles from the Bible, and redefining them as myth.
Even more recently theological reflection on the implications of Quantum Theory is very rarely found in Christian academic circles perhaps because theologians fear they will be branded new age crazies, and lose their credibility. It seems to me however if this vacuum is not filled by sound Biblical reflection then we shouldn't be surprised if it is filled by what the Apostle Paul calls "hollow and deceptive philosophy."[13] The implications of Quantum Theory, the nature of reality and Consciousness gives us fertile ground for exploring a new Christian apologetic and Systematic Theology that connects with our world.

As recently as June 2007 the Popularist Science magazine "**New Scientist**" splashed across its cover the highly provocative title; **"The Ultimate Quantum Puzzle: Does the universe exist when nobody is looking?"** True – outrageous feature articles and titles are the stuff of selling magazines, but the article, written by Michael Brooks[14] who is a Science consultant and author of numerous articles, is serious. His article simply puts into popular language the results of experiments that show that at a quantum level and by logical implication at a far greater macro-level;

> "To track down a theory of everything, we might have to accept that the universe only exists when we're looking at it."

There is a quantum entanglement, or in Einstein's words "spooky influence at a distance" and it has to do with the power of consciousness and observation.

Of course, not everyone is convinced, according to Brooks; Physicist David Deutsch at the University of Oxford warns that even re-examining entanglement might not help us find the path to a 'Theory of Everything.' He believes we are blocked by something more fundamental than that. Rather he thinks we are still scrabbling for clues and Science "lacks experimental observations in the region where quantum affects matter." Rather pointedly he says; "All the philosophical hand wringing over entanglement is based on the "delusion" that we have a basic grasp on Quantum Theory."[15] Clearly Science hasn't settled on what is the true nature of reality. So the question remains, "Does the Universe exist independently of measurements? Brooks concludes:

> "Perhaps we need to move quantum entanglement and the nature of reality to the centre of the quest to find a 'Theory of Everything.' What was once a quirky sideshow may yet prove to be the main event!" [16]

Perhaps we should proceed cautiously and conclude; Quantum Physics hints at something beyond what we usually consider Physics. But that's the extent of it. Physics can certainly suggest directions for speculation. We should, however be careful. The wildly popular New Age book **The Secret** takes the "creating your own reality" concept to the extreme where people try to write their own destiny simply by thinking about it. This is purported to be the 'key' to the universe. It is **"The Secret"** the author claims to have discovered, or uncovered and is making a tidy sum out of selling in DVDs and beautifully produced books." What "The Secret" amounts to, is twisting something that is true when applied at a quantum level to a macro level and in doing so becomes wishful thinking.

However Hungarian American Physicist and Nobel Prize winner **Eugene Wigner** considers it possible that Quantum Mechanics hints at a mysterious connection between conscious observation and the "physical" world. That human consciousness might in some mysterious way reach out and change the physical state of a system. A real mind over matter situation! Putting it in specific quantum terms; Humans beings in the process of conscious observation "collapse the wave function" of a quantum system. Wigner says;

> "When the province of physical theory was extended to encompass microscopic phenomena through the creation of Quantum Mechanics, the concept of consciousness came to the fore again: it was not possible to formulate the laws of Quantum Mechanics in a fully consistent way without reference to the consciousness."[17]

Wigner however wisely issues a cautious caveat.

> "It is true that under the usual conditions of experimental physics or biology, the influence of any consciousness is certainly very small. It is good to recall, however, that the same may be said of the relation of light to mechanical objects. . It is unlikely that the [small] effect would have been detected had theoretical considerations not suggested its existence. ."[18]

Any talk of the influence of consciousness on "reality" may sound like New Age crazy talk to the average pragmatic Kiwi bloke and heresy to some physicists or an affront to scientific orthodoxy but Wigner was simply putting in a plea for further enquiry.

On the other hand there are those who go much much further on to the edge and suggest that the 'universe itself in all its entirety' is in fact, the **"product"** of the observation of human beings. Here in my opinion we see how a personal set of presuppositions channels a person into groping around for solutions to the Quantum Enigma yet because of a prior dogmatic commitment to finding solely naturalistic answers they ignore the most obvious solution that is staring them in the face. Here one's teleology is exposed.

None other than Martin Rees the esteemed English cosmologist and astrophysicist who is England's Astronomer Royal and a Cambridge University Professor is recorded as saying;

> "In the beginning there were only probabilities. The universe could only come into existence if someone observed it. It does not matter that the observers turned up several billion years later. The universe exists because we are aware of it."[19]

Hello, are you serious! Yes he is and he's not the only one either!

But first some explanation. The Big Bang beginning of the universe is pictured as a gigantic explosion of a singularity (Actually it is also the explosive expansion of space as well. Picture the surface of a balloon, the balloon begins infinitesimally small and then expands stretching out. The fabric of space and time is the skin of the balloon that is expanding. As it expands everything on the surface accelerates away from the other.)
The universe is continuing to expand, and to the surprise of cosmologists this expansion is not slowing down but is actually accelerating. Like the balloon surface getting bigger faster. This is coupled with the fact that based on the motions of the stars within galaxies there appears to be more matter in the universe than can be accounted for as the sum of all observable matter in galaxies.
These two "mysteries;"

- The unknown repelling force which is greater than the gravitational attraction of all the billions of galaxies and is responsible for the continued acceleration of the expansion of the universe.
- Secondly the unknown matter that has a gravitational attraction but does not emit, absorb or reflect electromagnetic radiation (light). This means we cannot see it, actually no one knows what it is. One of the reasons for the construction of the massive particle accelerator at **CERN** is to try and unveil this elusive force and matter.

Let's be clear we are not talking about a small bit of stray mass and energy that were "a left over bit" that is now being accounted for. This mysterious dark matter and dark energy are distributed throughout and actually make up most of what is there, (As far as we know at this stage!) It is estimated that dark energy accounts for just over 70% of the energy and dark matter amounts to 25% of the matter in the universe. What we see in galaxies, stars and planets totals a mere 5%.
Rosenblum and Kuttner provocatively speculate;

> :Is it conceivable that the mysterious dark energy involves the connection between the large scale universe and consciousness that Martin Rees's comments about."[20]

I quoted Rees before. And Martin Rees is not alone in trying to grapple with this issue.

Long before Physicists were talking about Dark Matter or Energy **Freeman Dyson**, a physicist at the Institute of Advanced Study, Princeton University and one the greatest Theoretical Physicists of the 20th Century said this;

> "It would not be surprising if it should turn out that the origin and destiny of the energy in the universe cannot be completely understood in isolation from the phenomena of life and consciousness . . . It is conceivable . . That life may have a larger role to play than we have imagined. Life may have succeeded against all odds in moulding the universe to its purposes. And the design of the inanimate universe may not be as detached from the potentialities of life and intelligence as scientists of the 20th century have tended to suppose."[21]

Further;

> ".. it appears that mind as manifested by the capacity to make choices is to some extent inherent in every atom."

Can mind be part of inert matter, an atom?

Amazing, it now seems -it is not a question of consciousness arising from matter. It is rather quite the opposite, of matter arising from consciousness.
These are astounding statements. Their implications are profound. But it seems to me they put the proverbial cart before the horse. In effect Rees is saying the Universe could only come into being because we are observing it, Dyson is saying something similar; that Life has moulded the Universe to its purpose. It seems to me they are both overturning the laws of cause and effect. We have to ask is the Universe caused by (the product of) a consciousness observing it, or is Consciousness caused by (the product of) the universe. Rees and Dyson appear to state a logical tautology saying: The Universe is caused by, being observed by, a consciousness which came about as a result of a universe which was observed by conscious observers. It is a chicken and egg dilemma. We have to ask does consciousness in any way predate the universe. Or does the universe in anyway predate consciousness. Rees and Dyson seem to want it both ways. Can you have one before the other? Rees in effect says; "It doesn't matter that consciousness "turned up" billions of years later. It created the universe of which it is a product because it is now observing it. Hullo?

John Wheeler, Professor Emeritus of Princeton University and winner of the Einstein award takes a more orthodox approach. I think?
He says;

> "- now after a lifetime of study, reality appears to be the expression of the information."[22]

Wheeler likens the universe, all existence to the expression of an idea, to the manifestation of information. Wheeler does not like the term consciousness.
Never- the-less, regardless, as Gerald Schroeder comments – this still has the ring of Quantum Mechanics about it. It certainly resonates with recent theories that the Quantum Wave function is associated with everything in the Universe. When the wave function of a thing collapses at a particular position it takes on a "reality". BUT the question is - just who is causing the wave function to collapse (I.E. observing it, is another matter.) J. A. Wheeler's view is that the wave function is an expression of information and this information is a property of its existence.

Schroeder points out the profound implication of this.

> "If Wheeler is correct then information, design is the actual basis from which all energy is formed and all matter constructed.
> Information may be the fundamental substrate of our universe, a substrate made visible when expressed as the energy and material and space of the universe. In a strong sense, our universe may be the manifestation of information....
> Consciousness, as wisdom, is as fundamental as existence itself."[23]

Now pulling these questions all together.
Would the universe exist if no one was looking?
Is the universe the product of our observation?
Or are we the product of a universe which we create by observing?
Are we making ourselves by being conscious of ourselves?
That is, are we the creators of not only our own existence but also the universe out there?
This has to be the ultimate form of egoism. Not only are we the masters of our own destiny, we are the makers of our own reality and universe to boot.
So how did consciousness come about in the first place; is it the sole product of inanimate matter and chance random processes?

I suggest these dilemmas result from and expose the logical inconsistency of looking for a solution to these questions of existence and consciousness from within a naturalistic framework. Instead of "creative logic" and mind boggling conundrums we need to 'follow where the evidence is leading.' That clearly is to a solution that is outside the ability of naturalistic science to provide at this juncture. This is another hint of transcendence. The logic of looking outside the fixed system of the scientific method for an alternative "more logical" explanation becomes inescapable. Science as it were, is showing us the limitations of its own investigative ability and clearly we need to devise other theories to satisfy our quest for understanding. This is where some of the pioneering work by Frank Tipler who is Professor of Mathematical Physics at Tulane University is very helpful.
He says ....

> "By taking Christianity seriously as a possible true scientific theory means that we have to be open to the possibility that it may more closely mirror reality than any other human "religion."... I have assumed the truth of Christianity in order to investigate the physical consequences of this assumption. In Science, it is impossible to develop the consequences of a theory unless it is tacitly assumed the theory is true. By knowing the consequences of a theory, it becomes possible to propose tests of the theory."[24]

So now I want to turn and explore the implications of the Christian alternative which posits the existence and activity of a supe- intelligent all powerful God, who using a mechanism like the "Big Bang" brought the universe into existence. Here we are delving into the realm of Metaphysics and Theology. In discussing this I want to connect this presupposition with these recent developments of Science and consciousness and explore the correspondences.

Would the universe exist if no one was looking?
The outrageous conclusion of some quantum theorists is, no it wouldn't! But I don't think there would ever be a time when "no one" was looking. Even before the coming into

existence of conscious human beings there was someone who was looking. Hence "to put it graciously" the logical back flip that these theorists suggest would not happen. Intrinsic to this, I suggest is a 21st Century proof of the existence of God, a super-intelligent consciousness, infinite personal being who is both outside of the 4 or more dimensions of space and time which form part of the reality that we call our universe. This God inter-permeates this creation with his consciousness.

In the words of the very old Limerick.

There is nothing especially odd;
I am always about in the quad.
And that's why this tree
Can continue to be
When observed by
Yours faithfully, God.[25]

So yes I would say the universe does and would exist if no conscious human being were looking. The reason is God is always looking, always conscious of the universe He created.

Remember **Genesis 1:1-2** says;

> [1]In the beginning, God created the heavens and the earth. [2]The earth was without form and void, and darkness was over the face of the deep. And the Spirit of God was hovering over the face of the waters.
> [3]And God said, "Let there be light," and there was light. [4]And God saw that the light was good.[26]

And **Proverbs 8:12** says;

> [12]"I, wisdom, dwell with prudence,
> and I find knowledge and discretion.
>
> [22]"The LORD possessed me at the beginning of his work,
> the first of His acts of old.
> [23]Ages ago I was set up,
> at the first, before the beginning of the earth.
> [24]When there were no depths I was brought forth,
> when there were no springs abounding with water.[27]

Here clearly it is with Wisdom God created. Many Jewish Commentators have been influenced by Maimonides, one of the greatest Torah scholars and preeminent medieval Jewish philosophers (1135). They also reflect the thinking of Kabbalist Judaism and refer to wisdom in Proverbs 8:12 here almost as a persona (emanation) within the Almighty. Wisdom is like an 'independent' aspect of God's being.

Within Christian theology this is simply understood as the outworking of the inner dynamics of the Trinity. One God in three persons.

So in the New Testament in **John 1:1-3** we read;

> [1] In the beginning was the Word, and the Word was with God, and the Word was God. [2]He was in the beginning with God. [3] All things were made through Him, and without Him was not anything made that was made.[28]

The Greek word for "Word" is ***Logos***, this is an immensely rich term with a myriad of creative connotations. Logos is; the word by which the inward thought is expressed hence the word is spoken, it also encompasses the process of inward thought, of reason-itself, and involves reflection, deliberation and choice. It is used in the context of calculation, reckoning and deciding. Making and imagining something wise and in balance, harmonious and

appropriate. So Logos includes the idea of internal wisdom, reason and logic. Logos is the creative, powerful word expressing itself and structuring life.
This is entirely consistent with the Old Testament confession in **Psalm 33:6**;

> [6]By the word of the LORD the heavens were made,
> and by the breath of His mouth all their host.[29]

So here we have the divine *Logos* (the Son) and the breath of God (the Spirit) at work in harmony making creation.
Because God is an Infinite personal being, God is a conscious being.
Indeed fundamental to His creation was the thought He put and puts into it.

To state this in Quantum Mechanical terms, "the wave function of the singularity collapsed into a specific locality" and out of that the Universe came into existence as God began to think about and speak forth creation. God created the universe with all the dimensions that make up reality "as God perceives it," thus "according to God" (that may include the 11 dimensions that "String Theory" posits, if they really exist as something independent of the string theorist's mind, rather than being necessary mathematical constructs to help explain the Big Bang singularity!)

It also includes the possibility of other dimensions or realms (dark matter, dark energy, angelic and spiritual) which may well be beyond the expertise and tools of our present science to fully explain. But let me hasten to say, this is not a "God of the Gaps hidey hole" because I have argued that Science's mandate is to (if need be) develop new and better tools of investigation. This does not threaten belief in God, but is in fact mandated by that belief as a worthwhile logical enterprise. I would also include in this field of enquiry investigating the intangible effect of consciousness in creating reality. (Collapsing the wave-function) These dimensions and realms may turn out to be "transparent" to maths and the scientific method but equally may transpire to be veiled.
If Freeman Dyson's hunch turns out to be correct and consciousness is critically important in the creation of the universe, remember Freeman Dyson says this;

> "It would not be surprising if it should turn out that the origin and destiny of the energy in the universe cannot be completely understood in isolation from the phenomena of life and consciousness."[30]

My contention then is, this life and intelligence may be the product of creation, but is not the initiator of creation. That to me doesn't make sense or pass any of the rules of logic. Rather this universe, and all that is seen and unseen, this material reality, this life, intelligence and mysterious consciousness which certainly humanity is endowed with, is the product of a consciousness that is transcendent to and 'pre-dates' the creation of the universe. This to me is something that makes profound and satisfying sense.

So, is the universe the product of our observation? Yes, but it is not just us doing the observing. There is a God who is constantly at watch over his creation.
Speaking of the supremacy of Jesus Christ (the divine Logos) the Apostle Paul writes in **Colossians 1:15-17**

> [15] He is the image of the invisible God, the firstborn of all creation. [16]For by Him all things were created, in Heaven and on Earth, visible and invisible, whether thrones or dominions or rulers or authorities—all things

> were created through Him and for Him. [17]And He is before all things, and in Him all things hold together.[31]

This says we are upheld in the divine Word (the *Logos*) who was with God and was God from before the beginning.

The fact that an infinite personal conscious being created the universe satisfies another "mystery", namely where and how did human consciousness arise?
Inanimate matter cannot give rise to consciousness. There is this myth which suggests that given enough matter with increasing complexity and enough time for it to randomly shift, develop and change, consciousness will eventually arise.
But so far there is very little evidence of this. Even the boldest assertions about consciousness are a matter of faith.
For example:
Daniel Gilbert is the Harvard College Professor in the Department of Psychology at Harvard University and director of its laboratory on Social Cognition and Emotion. He is on record as saying in **"What I believe but cannot Prove."**

> "In the not too distant future, we will be able to construct artificial systems that give every appearance of consciousness – systems that act like us in every way... .. But we will have no way to know whether their behaviour is more than a clever trick -.... We take each other's consciousness on faith, because we must, but after 2000 years of worrying about this issue, no one has ever devised a definitive text of its existence."[32]

Nicholas Humphrey, who is a theoretical Psychologist and Professor at the London School of Economics, takes a more pessimistic cynical view. As a matter of faith he declares;

> "I believe that human consciousness is a conjuring trick, designed to fool us into thinking we are in the presence of an inexplicable mystery. Who is the conjuror, and what can be the point of such deception? The conjuror is the human mind itself, evolved by natural selection, and the point has been to bolster human self-confidence and self-importance – so as to increase the value we each place on our own and others' lives."[33]

Clearly Humphrey has not taken note of the dilemmas of Quantum Mechanics.

Leo M Chalupa, the distinguished Professor of Ophthalmology and Neurobiology at the University of California suggests that the human brain is the most complex entity in the known universe. He goes on to comment that;

> "Brain waves change in frequency and amplitude in seemingly random fashion, even when the subject is lying prone with no variation in behaviour or environment. So how does the brain function so effectively, given the *"noise"* inherent in the system? "(Emphasis mine) Chalupa admits; " I don't have a good answer and neither does anyone else, in spite of the papers that have been published on this problem."[34]

Consciousness remains a mystery!
Consciousness cannot be the sum total of complexity. It is something of a different order altogether. Rather than being an illusion or a conjuring trick it is the product of the mind, the design, the consciousness that gave us life. It is a distinctive human trait and this is clearly indicated in the beginning of the Old Testament.

Here the author identifies the uniqueness of humankind by pointing to a significant "quantum leap" in its creation. Consciousness is the result of humankind being made in God's image.

Genesis 1:26 – 28.

> [26]Then God said, "Let us make man in our image, after our likeness. And let them have dominion over the fish of the sea and over the birds of the heavens and over the livestock and over all the earth and over every creeping thing that creeps on the earth."
> [27]So God created man in his own image,
> in the image of God he created him;
> male and female he created them.[35]

The second account in **Genesis 2:7** is more specific.

> [7]then the LORD God formed the man of dust from the ground and breathed into his nostrils the breath of life, and the man became a living creature.[36]

God breathed into him *'the breath'* of life and he became a living being. That is a conscious, rational, thinking, feeling being. A human being made in the image of an intelligent Creator. A real correspondence is formed because God is also a living personal being, but one who is infinite and non-physical, God.

I wonder, will Science ever discover just what this "breath" this "image" is? Will it uncover the mechanism by which consciousness is or became structured into our DNA? That is if it is found to be in our DNA so that we "become" us? And if this turns out to be another example of irreducible complexity then Science cannot let this 'sleeping dog' lie. It has to keep pushing back, unpeeling it, devising experiments to test, understand and harness consciousness. We need to discover if it is a result of the complexity of our brain or is in fact something gifted to us in a special 'mystical' way at our conception as some religions suggest. These are legitimate arenas for Science. But will Science really discover a tangible cause? I hope so, but don't hold your breath.

Margaret Wertheim, is an internationally noted science writer, commentator and author of "The Pearly Gates of Cyberspace." It so happens that one field of special interest of hers is the role of imagination in theoretical physics. She says;

> "We all believe in something, and Science itself is premised on a whole set of beliefs. Above all, Science is founded on the belief that things are comprehensible and that by the ingenuity of our minds and the probing of ever more subtle instruments we will ultimately come to know IT ALL. But is the ALL inherently knowable? I believe... that there will always be things we do not know – large things, small things, interesting things, and important things."[37]

It may come as a shock to you but scientists do not even understand something as paltry and trivial as why there is such an infinite variety in the formation of ice crystals, snowflakes! One level of explanation is, 'God just likes variety!' That is great but Science has the imperative of trying to find how this can be.

The incredible success of modern science is that it has shown us our huge ignorance. Paradoxically perhaps an increasing knowledge of our ignorance will then be the measure of what we really know!

Understanding the mystery of consciousness, clearly take us into this territory.

Some would say human beings are living, thinking, reasoning, conscious entities made in God's image! The mystery of consciousness is solved, well not actually, that is over stating it. That is just one level of explanation which may satisfy many people, (people who believe in God.) but it is not scientifically rigorous enough to satisfy a scientist and nor should it be! Rather the origin of our consciousness and the consciousness present in the "substrate" of the universe may have been identified. There is much investigation to happen, but it makes sense to say that if the conscious being who made the universe also endowed human beings with consciousness. We would expect a real valid correlation between the world "out there," reality and our inner perception of that world. It was Einstein who issued this celebrated dictum about the comprehensibility of the world.

"The most incomprehensible thing about the world is that it is comprehensible."[38]

The universe is comprehensible to us not just because it has an infinite personal Creator but also because we are made of the same stuff and this "comprehensibility ability," this real correlation between "us" and the universe is something which is inherent in us. It is a gift and it is part of being an image bearer of the mind that made it all.
So is this consciousness unique in any way to Humankind? Is it true that given enough time and complexity consciousness will "emerge" as some scientists have declared as "faith" assertions they believe made but cannot prove.

Interestingly at the very beginning in Genesis the first human couple recognised that it was with God's help that they "begat" another human being. That is, they made another human being through biological reproduction using the already inbuilt mechanisms of cellular mitosis and development. Not that they knew about mitosis, but they certainly knew how to "know" each other. (To "know" is a delicate euphemism for having sex!)

Genesis 4:1

[1]Now Adam knew Eve his wife, and she conceived and bore Cain, saying,
"I have gotten a man with the help of the LORD."

Notice the phrase, with God's help. Now it is tempting to say it was solely because of the mystery and miracle of conception and childbirth that this awe inspired couple credited God with something they didn't understand. An example of an ancient 'God of the Gaps theory!' But at a deeper more profound level clearly they could see the difference between them and the animals around them. And they faced the same consciousness conundrum then we face now.
Perhaps it is true as Gerald Schroeder points out, that consciousness is something that permeates the very cells of our bodies.
Where does this intangible gift come from? In our being "made in the image of God" is it this consciousness that sets us apart from the animals?
As the Psalmist many many generations later says in **Psalm 8:1-5**

[1] O LORD, our Lord,
how majestic is your name in all the earth!
You have set your glory
above the heavens.

3 When I consider your heavens,
the work of your fingers,
the moon and the stars,
which you have set in place,
4 what is man that you are mindful of him,
the son of man that you care for him?
5 You made him a little lower than the heavenly beings
and crowned him with glory and honour.[39]

What is humankind indeed?

So how did consciousness come about in the first place, is it the sole product of inanimate matter and chance random processes?

George Wald believes that only mind can give rise to mind. He says;

> "It is mind that has composed the physical universe that breeds life and so eventually evolves creatures that know and create: science, art, and technology making animals. In them the universe begins to know itself. This is an almost mystical analysis of life."[40]

I believe the evidence points to that mind being the super-intelligent infinite personal mind of God, who, with wisdom by the Word of His power has created the universe and us.

We, as sentient human beings are able to stand back and wonder and marvel at the world around us, and in this time and place are able to use the best tools of the science we have developed to peel back the veil of material reality to show in a mirror darkly the face? No fingerprints of the hidden God.

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[1] Mario Livio, *Is God a Mathematician?*, (Simon & Schuster, New York NY, 2009) Preface

[2] There is extensive and sometimes acrimonious debate over the value of string theory. Some say it is the biggest theoretical fantasy that has wasted thousands of hours of scientific imagination, not to mention research grants. Others counter that String Theory is our best hope of any theory of finally giving us an integrated "Theory of Everything."

[3] The theoretical model called "Big Bang Cosmology" is the prevailing model for the beginnings. It appeals to Christian Theologians because it provided supporting evidence "proving" that the universe has had a beginning out of nothing. We need to realise however it is a scientific theory. A theory that only recently came back into prominence with the discovery of the Cosmic Microwave Background Radiation. This radiation is identified as the evidential remnant of the "Big Bang". Theorists who take issue with the Einstein's description of gravity as a function of the space –time continuum also question Big Bang Cosmology. There are theorists who question Big Bang Cosmology. E.g. Eric J. Lerner in *The Big Bang Never Happened: A Startling Refutation of the Dominant Theory of the Origin of the Universe* (New York: Random House. 1991) and Roy C. Martin, Jr., *Astronomy on Trial* (Lanham, MD: University Press of America, 1999) cited in Don Richardson, *Unhidden*, (Xulon Press. 2009) 103,.

[4] Geoffrey Burbridge, Fred Hoyle, and Jayant V. Marlikar, "A Different Approach to Cosmology," *Physics Today* (volume 52, April 1999), p. 39. Quoted from. http://www.icr.org/article/872/

[5] Antony Flew, *There is A God*, (HarperCollins Publishers, New York NY, 2007), 144.

[6] Quoted from James Jeans, *The Mysterious Universe* (Cambridge University Press, Cambridge, 1931) in Gerald Schroeder, *God According to God* (HarperCollins Publishers, New York NY, 2009), 21

[7] Robert Jastrow, *God and the Astronomers* (W.W. Norton. New York, 1992) 14, quoted in Francis S. Collins, *The Language of God* (Free Press, Simon & Schuster, New York: NY 2006) 67.

[8] Robert Jastrow, *God and the Astronomers* (W.W. Norton. New York, 1992) 107, quoted in Francis S. Collins, *The Language of God* (Free Press, Simon & Schuster, New York: NY 2006) 66.

[9] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY, 2006) 12

[10] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY, 2006) 9

[11] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY, 2006) 12

[12] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY, 2006) 12
[13] Colossians 2:8. Holy *Bible, New International Version.* (International Bible Society, The Bible Society of Australia, 1973,)
[14] Michael Brooks is a scientist and author, currently working as a consultant for *New Scientist* magazine. His writing has appeared in *The Guardian, The Independent, The Observer, The Times Higher Education Supplement.* He holds a PhD in quantum physics. His first novel, *Entanglement*, was published in 2007. His first non-fiction book, an exploration of scientific anomalies entitled *13 Things That Don't Make Sense*, was published in 2008. The book is an expansion of an article originally written for *New Scientist.* http://en.wikipedia.org/wiki/Michael_Brooks_(science_writer)
[15] David Deutsch in *Reality Check* by Michael Brooks (New Scientist 23 June 2007), 31.
[16] Michael Brooks, Reality *Check* (New Scientist 23 June 2007), 33.
[17] Eugene Wigner quoted in Bruce Rosenblum and Fred Kuttner. *Quantum Enigma* (Oxford University Press, New York NY: 2006) 183
[18] Eugene Wigner quoted in Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY: 2006) 190
[19] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY: 2006) 199
[20] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY: 2006) 202
[21] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY: 2006) 203
[22] Gerald Schroeder, *God According to God* (HarperCollins Publishers, New York NY, 2009), 225
[23] Gerald Schroeder, *The Hidden Face of God* (The Free Press, Simon & Schuster, New York NY, 2001), 154-155
[24] Frank J. Tipler, *The Physics of Christianity* (Doubleday Publishing Group, New York NY: 2007) 267
[25] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY: 2006) 175
[26] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[27] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[28] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[29] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[30] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY: 2006) 203
[31] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[32] John Brockman ed., *What We Believe but Cannot Prove* (The Free Press, Simon & Schuster, London, Great Britain. 2005) 107
[33] John Brockman ed., *What We Believe but Cannot Prove* (The Free Press, Simon & Schuster, London, Great Britain. 2005) 113
[34] John Brockman ed., *What We Believe but Cannot Prove* (The Free Press, Simon & Schuster, London, Great Britain. 2005) 177
[35] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[36] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[37] John Brockman ed., *What We Believe but Cannot Prove* (The Free Press, Simon & Schuster, London, Great Britain. 2005) 179
[38] Albert Einstein quoted in William A. Dembski, *Intelligent Design* (InterVarsity Press, Downers Grove, IL) 1999, 232
[39] The Holy Bible *English Standard Version* (Crossways Bibles, Good News Publishers Wheaton IL) 2001
[40] George Wald, "*Life in mind in the universe*," Quantum Biology Symposium, International Journal of Quantum Chemistry 11 (1984)1-15, quoted in Gerald Schroeder, *God according to God* (Harper Collins Publishers, New York NY: 2009) 49.

Before the beginning.

What was before the beginning?
Of course there are those who say by definition there was nothing before the beginning because if there was something, there would already have to have been a beginning to it unless it was eternal. To talk about before a beginning is illogical because the question doesn't make sense. So, the answer is nothing! If there was something then it wouldn't be a beginning. QED!

Another simplistic answer is "We don't know" so why waste your time speculating!

True, there is no way we can somehow peer back through the minutest nano seconds of that original singularity[1] and take a glimpse at what would have been before it.
There are some Mathematical Physicists who have been pushing the math theories back to the moment of the beginning and maybe before. They speak in terms of the 10 dimensions of hyper space.[2] But this is way, way beyond my expertise and is really only intelligible using the language of mathematics.

In 2006 the Nobel Prize was awarded to **John Mather,** the senior astrophysicist at the U.S. Space Agency's (NASA) Goddard Space Flight Centre and adjunct Professor of Physics at the University of Maryland and **George Smoot** a Professor of Physics at the University of California, Berkeley. In 2003 he was awarded the Einstein Medal. Mather and Smoot are astrophysicists, cosmologists and won the award for their work on COBE[3] that led to the measurement "...of the black body form and anisotropy[4] of the cosmic microwave background radiation."
This work helped cement the Big Bang theory of the universe using the Cosmic Background Explorer Satellite (COBE). According to the Nobel Prize committee, "the COBE project can also be regarded as the starting point for cosmology as a precision science."

As a result of their research the following theory of the beginnings has become legitimated. The beginning of our cosmic origins is portrayed as resulting from quantum fluctuations in virtual (nonexistent) space. For those who like to use their imagination, where would this "virtual Space" be? In the void? And what is this void? Remember in the previous section I invited you to imagine 'nothing'. How did you go?
In his wonderfully compelling book "**Patterns in the Void: why nothing is important!**" Sten Odenwald who is an award winning astronomer and is currently the education and public outreach manager for the NASA IMAGE satellite programme says;[5]

> "The nothingness 'before' the creation of the universe is the most complete void that we can imagine (or not imagine) – no space, time or matter existed. It is a world without place, without duration or eternity, without number . . . . Yet this unthinkable void converts itself into the plenum of existence – a necessary consequence of physical laws. Where are these laws written into the void? It would seem that even the void is subject to law, a logic that existed prior to time and space."

So what do astronomers and physicists actually believe? The speculations about the pre – Big Bang state during the last 25 years have come as close to a supernatural explanation for the origin of the universe as physics is ever likely to offer.

The questions raised are profound. For example, how are the laws of nature written into the 'fabric' of the void? Was there a quantum chaos or perfect symmetry in this initial state? Even more enthralling and exciting is that Science is mandated to press into and investigate this design. How can experiments be designed to test competing theories and are there really Laws of Physics that transcend Creation itself? The hopes of those who have designed the Large Hadron Collider at CERN[6] are that they will be able to peel back the veil hiding the postulated Higgs Boson and maybe even, Dark Matter. But we are not just talking about High Energy physics as we have seen previously, we are also talking about the subtleties of consciousness and, who knows, experiments that push the envelope way beyond what we can conceive at this moment in time.

Many of those who affirm that 'reality' is more than the 4 dimensions that are 'transparent' and malleable to the scientific method also talk about Saviours and miracles and spirits. At this stage all Science can tell us is that if spirits do share our world, they have not 'as yet' made a detectable impact on laboratory experiments – (although some researchers say they have compelling evidence that they exist.)[7] But then neither has the postulated 'dark matter' or 'dark energy' that is purported to make up 97% of matter and energy.
As Odenwald conclude;[8]

> "It is a dynamic story pieced together over centuries of labour, but always under further construction in some remote quarter. Each step along the way has spawned new principles, new technologies, and new possibilities of how we live and work. And we suddenly discover that it is more than a story . . . We have uncovered the subtle workings of the universe and reduced the tyranny of matter to the Angelic subtlety of patterns of fields rustling softly in the Void. The Void has been plumbed, and within it we discover the womb of hidden cosmic activity in Creation existing half way between what is and what might be. We have gleaned the grand spectacle of the universe, its earliest history, and a glimpse of its far destiny. Even at their physicalistic best [19th century scientists] left the room for a romantic movement. It was in that century that one prominent scientist described every living thing as 'a melody that sings itself'".

Our Cosmic Origins increasingly seem to have their place in the imagination of God!
(I want to talk later about the serious new Quantum Theory that the universe is holographic in essence.)
A short explanation is necessary however.
Today nearly everyone is familiar with holograms. If you have ever purchased a genuine Microsoft Software product, you see on the back what is commonly called holographic authentication image. You can move the image and see behind it. On a larger scale holograms are three –dimensional images projected into space with the aid of lasers. Now, two of the world's most eminent thinkers – University of London physicist David Bohm, a former protégé of Albert Einstein and one of the world's most respected quantum physicists, and Stanford University neurophysiologist Karl Pribram, one of the architects of our modern understanding of the brain – believe that the universe itself may be a giant

hologram, quite literally a kind of image or construct created, at least in part, by the human mind. You will note the correspondence of this with a previous section where I talked about the Conscious construction of reality by an observer external to the universe. I concluded that the observer who 'collapses the wave function of present reality' is best identified as God. So while the human mind may have an effect in this holographic image of reality, the actual 'wave function' of the universe collapses because of a transcendent observer. Now, before you object, clearly our minds perceive of external reality and that image is stored in our brains. The image we perceive is our internal construct of an external something. Our senses, which have a particular tuning (Your eyes see visible light, whereas a bumble bee sees infra red light) feeds this information to our brain. The brain analyses and selects from this myriad of inputs and constructs the image of reality we perceive. For example, how do you know that the colour you call red is that same colour I perceive as red? There is no way I can take the redness I perceive and check it against the redness you see. The redness is a particular set of neurons firing in my brain and cannot be taken out and analysed. Even if they were what would be checked? The strength of the electrical current? Hence we all construct within ourselves a picture of what is 'out there' external to us.

Now on a far grander scale perhaps this universe can be understood as a construct in God's mind. He has gifted us a real 'reality' that is, one that corresponds to the image that forms 'most often' in the human mind. Yes and don't we define those whose perception of 'external reality' seems to be off skew from the generally accepted norm as mentally ill. In these cases we try and correct their 'perception' with drugs or counselling. We assume there is a correct correlation with what is 'real.'
This correlation is a gift! It's a result of design, and our every day experience shows that this correlation is correct. For example when we see a flat path we 'know' that we aren't seeing a mirage and in fact there isn't a huge cliff there instead, or when we touch something hot our brain correctly tells us to remove our hand quickly. Now even though this is true, at a fundamental level this correlation is a matter of faith and trust – yes it is based on many, many correct instances, but it is faith all the same. This means of course that the 'fabric of reality' is pretty much fixed for us. In our minds, 'our social construction of reality' within our brain and our experience of that reality, (the external world) correlate to obey the laws of physics proving reliable and predictable!
But this 'fabric of reality' is not necessarily predetermined or rigid to God, since it is after all a construct in His mind. The 'holographic' theory of the universe explains not only many of the unsolved puzzles of physics, but helps to explain such mysterious occurrences as telepathy, out-of- body and near death experiences. Even miracles and religious or mystical experiences can begin to be explained as a reordering of the Hologram.[9] And if that Hologram has its existence in the mind of God and is sustained by Him, then the miraculous, although it falls outside the normal patterns (laws of physics) of reality, really is no more problem than a quantum fluctuation in the hologram. Or better, a slight fluctuation in the interference pattern that forms the Hologram.

In a totally different context something of this is revealed to us, not in scientific categories, but in the words of the Bible.
The Apostle Paul speaking as a Christian Apologist to a group of Epicurean and Stoic philosophers who took him to a meeting of the Areopagus, in Athens said this;
Acts 17:22-28

"Men of Athens! I see that in every way you are very religious. [23]For as I walked around and looked carefully at your objects of worship, I even found an altar with this inscription: TO AN UNKNOWN GOD. Now what you worship as something unknown I am going to proclaim to you.

[24]"The God who made the world and everything in it is the Lord of heaven and earth and does not live in temples built by hands. [25]And he is not served by human hands, as if he needed anything, because he himself gives all men life and breath and everything else. [26]From one man he made every nation of men, that they should inhabit the whole earth; and he determined the times set for them and the exact places where they should live. [27]God did this so that men would seek him and perhaps reach out for him and find him, though he is not far from each one of us. [28]'For in him we live and move and have our being.' As some of your own poets have said, 'We are his offspring.'

Paul picks up this same theme in a number of other occasions:
In writing to the Colossians who lived in Asia Minor, and remember, he was an eminent scholar raised in Judaism and thus committed to its monotheism. But like the Apostle John he identifies Jesus Christ as a primary agent not only in structuring creation but in 'sustaining,' i.e. 'keeping it in being. '

Colossians 1:15-17.

[15]He is the image of the invisible God, the firstborn over all creation. [16]For by him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things were created by him and for him. [17]He is before all things, and in him all things hold together.

Another writer, the author of the book of Hebrews also identifies Jesus Christ with God's creative activity and speaking forth His creative word.

Hebrews 1:1-3.

[1]In the past God spoke to our forefathers through the prophets at many times and in various ways, [2]but in these last days he has spoken to us by his Son, whom he appointed heir of all things, and through whom he made the universe. [3]The Son is the radiance of God's glory and the exact representation of his being, sustaining all things by his powerful word.

In each of these passages, not in scientific categories, but in the context of their own culture the writers speak of God's establishing and upholding of creation through the activity of the divine 'Word" who is identified with Jesus Christ.

But let's revisit these scientific categories. So, getting back to our Cosmic Origins, a fully elucidated theory of the beginning presupposes that before the big bang creation of the physical universe, before the existence of space and energy, quantum fluctuations were possible.

As a result of this Gerald Schroeder perceptively concludes;

"This means that, according to this august body of scientists, the laws of nature, or some aspects of the laws of nature -at least quantum mechanics - predate the physical world."[10]

He goes on to say;

"The implications of this fact are extraordinary. If time as we understand it is part of the creation, as is usually assumed, then the laws of nature predating the creation

> must be timeless. They predate time. The laws of nature are totally abstract. They are not nature. They are the laws that will eventually create and govern nature in the universe, once they create the universe by the Big Bang. This leap of scientific faith is identical to the Biblical posit of a timeless, non-physical Creator, God, having created the universe."[11]

This is consistent with the idea of a 'world' of mathematical forms as postulated by the Greek philosopher Plato. Plato contended that 'mathematical forms' had a reality independent of the physical world they describe. As I mentioned previously, none other than mathematical physicist Sir Roger Penrose[12] who is the Emeritus Rouse Ball Professor of Mathematics at the Mathematical Institute, University of Oxford identifies this world of mathematical forms as having an actual reality comparable to that of the physical and mental worlds, as the motherland of mathematics.[13]

Sir James Jeans (1877 – 1946) once commented; "the Universe appears to have been designed by a pure mathematician." Likewise Einstein pondered;

> "How is it possible that mathematics, a product of human thought that is independent of experience, fit so excellently the objects of Physical reality?"

This discovery of the appropriateness of mathematics (whether it is a human construct or a discovery as is debated by theorists)[14] seems to me to be quite logical and again is a gracious gift by a Creator/Designer who made us in His image. This is entirely consistent with what you would expect. Dare I say – the thought processes this infinite personal being used in the "making" of the universe though infinite to some degree correlates with the thought processes we develop to describe that which is around us. Could it be the thought processes in our brains in some way mirror the thought processes of God?!
Please note! I am not saying our thoughts are God's thoughts. The Prophet Isaiah draws a clear distinction between the two by speaking for God and insisting.

Isaiah 55:8-9.

> 8 "For my thoughts are not your thoughts,
> neither are your ways my ways,"
> declares the LORD.
> 9 "As the heavens are higher than the earth,
> so are my ways higher than your ways
> and my thoughts than your thoughts.[15]

What I'm talking about is not the full **content** of those thoughts but the existence of a real correspondence (or at least a meaningful, reliable approximation) in our perception of the world around us to the reality God created. Mathematics is just one of the levels of this correspondence.

Eugene Wigner said:

> "The miracle of the appropriateness of the language of mathematics to the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve. We should be grateful for it and hope that it will remain valid in future research and that it will extend, for better or worse, to our pleasure, even though perhaps also to our bafflement, to wide branches of learning."[16]

Amen to that!

So before the beginning, before and during that tiny micro split second as unimaginably energetic (hot) electromagnetic energy (light) burst forth, before quarks and electrons came into existence, the Big Bang had to be mind bogglingly finely tuned to produce a universe in which we could develop (evolve) and exist. As I said previously, Rodger Penrose has estimated the improbability of this as being a vastly unlikely 1 in 10^{123}. (That's one with 123 zeros after it.) That's orders of magnitude less likely than being able to choose one discrete electron that has been marked with a cross out of all the electrons in the universe.

In Historic Christian Theology it is generally affirmed that God created the universe ex-nihilo (that is out of nothing.) Now if the mathematical laws predate the universe, then those laws must have been in the mind of God before the creation.
Jurgen Moltmann in his challenging and provocative theological work "**God in Creation**"[17] makes a point which at first seems obvious, but is profound in its implications and motivations. Namely that;

> 'The creation of the world is founded on God's determination that He will be the Creator.'
> This means that before God issues creatively out of Himself, He acts inwardly on Himself, resolving for Himself, committing Himself, determining Himself.[18]

Before the beginning God was thinking about the creation He was about to make! God was foreseeing His relationship with this possible creation. He was fully aware of the time and space constraints this would evoke upon Him, and their implications into eternity. It is logical and conceivable to suppose that in His own internal life, God was thinking, reasoning, deliberating and resolving. It wouldn't surprise me if there was quite a "conversation" within the Trinity about creation. For example; the necessity for a temporal creation to be structured within the dimension of time, indeed the number of dimensions that would be required and the ones that would be necessary to best correlate to the sentient beings who would develop. God would resolve its laws, constants, structure, nature, future and possibilities.

> **John 17:24** [19]indicates that there was a very fertile life within the Godhead before the creation of the world.

Generations before the ancient writer Job declared;

Job 12:13.

> [13] "With God are **wisdom** and might;
> He has counsel and understanding.[20]

Or

Psalm 104:23-25.

> [24] How many are your works, O LORD!
> In **wisdom** you made them all;
> the earth is full of your creatures.
> [25] There is the sea, vast and spacious,
> teeming with creatures beyond number—
> living things both large and small.[21]

Perhaps those who hypothesise a multi-verse or even that there are an infinite number of universes are touching on something that is profound and real, but real in the mind of God before creation. Perhaps in God's infinite eternal mind He was "foreseeing" all the possible

permutations and alternative universes that would result from tweaking the constants and thus assessing the resulting evolution of the different kind of species and special needs or interventions necessary for the development of a sentient conscious species that would be able to 'interface' with Him. This was all before He spoke out His will and committed His thoughts into our reality and actualised in time and space what His mind conceived.
Surely this is conceivable in the light of **Proverbs 3:19-20**

> [19]The LORD by wisdom founded the earth;
> by understanding he established the heavens;
> [20]by his knowledge the deeps broke open, . .

How long did God think about creation before He created, 'made' the heavens and the earth and what did it 'cost' God to create the universe external to, yet contingent upon Himself?

In the Zohar which is part of an ancient Jewish mystical translation and commentary of the Torah, Rabbi Rav Hamnuna Sava commenting on the first Hebrew word of Genesis; "In the Beginning" (Be-reshit) says;

> When the blessed Holy One wished to fashion the world, all the letters were hidden away.[22]
> For two thousand years before creating the world, the blessed Holy One contemplated them and played with them. As He verged on creating the world, all the letters presented themselves before Him, from last to first.[23]

The Zohar says two thousand years, because one Rabbi suggests the Torah preceded creation by two thousand years. But really, who knows? In God's eternity what does it mean to say how long? If God created time in the first place then it is enough to affirm that in the mind of God the universe was pre-planned.[24] Interestingly here in the Zohar is the concept that the letters of the Hebrew alphabet had a divine reality as concepts or principles in the mind of God. In the New Testament we note that John the Apostle reveals to us the Word of God as the Divine Logos. The mind, concepts, principles and reason of God.
This raises the speculative question, when Genesis and John's Gospel says that God spoke the word, what language did he speak to bring about creation? And does it matter? Our Jewish theologians would say it's obvious; The Almighty spoke Hebrew, because that was the language of the Torah! I'll leave you to ponder that question, it is way beyond the scope of this study. The point here is however that 'The Blessed Holy One,' God contemplated the letters (concepts, constants) and played with then before He spoke them forth.

Both Jurgen Moltmann an eminent German Protestant Theologian and winner of the 2000 Louisville Grawemeyer Award in Religion and Gerard Schroeder whom I have referred to before use insights from the Jewish Kabbalistic doctrine of God's self-limitation in creation, His 'Tzimtzum.'[25]

I want to now focus briefly on **God's Self-limitation** in creation.

According to Christian Theology and Quantum Physics before the beginning there was nothing, zilch, no space, time, matter, just a void which had no physical dimensions. Christian revelation says there was nothing but God. There was just the eternal God who exists outside of space and time and had no physicality. So it is correct to say there was not

nothing, there was only God. God, the Eternal who is omnipotent and omniscient. God, existing in the fullness of God's being, in the community of love which is the Trinity. Not an impersonal it. Not a force but a super-intelligent being. God existing everywhere in eternity. That means that when God determined within Himself to become Creator, to act outwards from Himself. Originally there were no outwards from God's self, God filled everything because there was only God.[26] That means that the first act of God in creation was an act of 'self – limitation' [27] See, if God is omnipresent then there could be no realm outside of God that was temporal because that would contradict the affirmation that God exists everywhere and God is eternal. So God could not act outside Himself. Picking up and summarising from Moltmann.

There is one possible way of conceiving of a reality outside of God's being. But it is only possible on the assumption of the self-limitation by God Himself preceding His creation. This circumvents the logical contradiction to God's divinity. In order to create a world outside Himself, the infinite God must have made room beforehand for a finitude in Himself. It is only the withdrawal by God into Himself that can free the 'space,' the nothing, into which God can act creatively. In other words God withdraws within God's self and in doing so creates nothing. Where God isn't or hasn't acted there is nothing, now that 'nothing' is held in God. Maybe a good picture is the womb of a mother, originally empty but filled with the potential for nurturing life. Originally this nothing need only be, or was infinitesimally small, but it too like a 'Quantum Fluctuation' was brimming with potential. God's contraction of His being to create nothing gave rise to the potential for all of Creation. That is, given the right predetermined constants and conditions.

It was Rabbi **Isaac Luria** (1534 – 1572) a foremost Jewish mystic in the community of Safred in Galilee who first of all developed these ideas in his doctrine of Tzimtzum. Tzimtzum means concentration and contraction, and signifies a withdrawing of oneself into oneself. Rabbi Luria was taking up the ancient Jewish doctrine of the Shekinah, (the awesome glory of the Almighty) according to which the infinite God can so contract His presence that He dwells in the temple.

It is the same sense of the contraction of God's Shekinah Glory and Being in the coming of Christ. **Colossians 1:19-20.**

> [19]For in him all the fullness of God was pleased to dwell, [20]and through him to reconcile to himself all things, whether on earth or in heaven, making peace by the blood of his cross. **ESV.**

Hebrews 1:2.

> [2]but in these last days he has spoken to us by his Son, whom he appointed the heir of all things, through whom also he created the world. [3]He is the radiance of the glory of God and the exact imprint of his nature, and he upholds the universe by the word of his power. **ESV.**

Rabbi Luria however being a 16th Century Orthodox Jew applied his insight to God and creation. The existence of the world outside God was made possible by an inversion within God. This set free a kind of mystical primordial space 'nothing' into which God – issuing out of Himself – can enter and in which He can manifest Himself.

> 'Where God withdraws Himself from Himself to Himself, He can call something forth which is not divine essence or divine being.' [28]

Thus Creation is preceded by this self-movement on God's part, the movement which allows the creation of the 'nothing space,' for its own being. God withdraws into Himself in order to go out of Himself. He creates the preconditions, including the constants which would govern the energy field for the existence of His creation by withdrawing His presence and His manifest power.

As **Blaise Pascal** says,

> 'What can be seen on earth indicates neither the total absence of God nor His manifest presence, but rather the presence of the hidden God.' [29]

It is in this 'hiddenness', this self-limitation, this Grace, that God allows Creation to exist. In the self-limitation of His divine being which, instead of acting outwardly in its initial act, turns inwards towards itself. God chooses to withdraw His omnipresence and so nothingness emerges. This means God's first action of creation is the creation of nothing! For the first time in eternity absolute nothingness is 'allowed.' It is God's act of withdrawal, of self-sacrifice in which nothingness is called forth. This was a risk because there is always the possibility for this 'Nothingness,' where the control and loving constraint of God's being isn't, to take over creation and plunge it all into nothingness, that is, to destroy.

The echos of this original self-limitation and sacrifice are seen in not just the creating space for Creation but in the supreme self-sacrifice of the Divine *Logos* of creation becoming the incarnate Son of God in Salvation and our Redemption.

For example.

Philippians 2:5-8

> [5] Have this mind among yourselves, which is yours in Christ Jesus, [6] who, though he was in the form of God, did not count equality with God a thing to be grasped, [7]but **made himself nothing**, or **emptied himself**, taking the form of a servant, being born in the likeness of men. [8]And being found in human form, he humbled himself by becoming obedient to the point of death, even death on a cross. **(ESV)**

The Kabalistic doctrine of the self limitation of God is but an echo of Christian theology. We have seen when God determined to be Creator; this was God's first action and this divine self-humiliation reached its profoundest point in the cross of Christ.

In fact as Moltmann perceptively comments.

> **'All of Creation is marked by the Cross.'**[30]

I suggest that in the mind of God even prior to creation, the possibility of this self-humiliation was considered as a result of the creation of the Universe and God's desire for a relationship with the free sentient creature made in His image. In fact this is what the New Testament writers declare. The Apostle Peter originally writing to encourage Christians who were suffering for their beliefs tells that the coming Jesus Christ was planned before the creation of the world.

1 Peter 1:18-20

> [18]For you know that it was not with perishable things such as silver or gold that you were redeemed from the empty way of life handed down to you from your forefathers, [19]but with the precious blood of Christ, a lamb without blemish or

> defect. [20]He was chosen before the creation of the world, but was revealed in these last times for your sake.

Or the Apostle Paul who also assures persecuted Christians that they were 'chosen' by an all knowing God even before this God began creating.

Ephesians 1:4-5

> [4]For he chose us in him before the creation of the world to be holy and blameless in his sight. In love [5]he predestined us to be adopted as his sons through Jesus Christ, in accordance with his pleasure and will. **(NIV)**

Clearly before the beginning God was 'previewing' all the possibilities that where the ramifications of His determination to be Creator.

Let's ponder and summarize some of these ramifications;[31]
God makes room for His creation by withdrawing His presence. What results as a consequence is a nothing which represents the contraction, self limitation of the Divine Being. This 'space' or potential void is at first infinitely small. This 'nothing' which is set free by God's self-limitation is literally God-forsaken space. The 'Nothing' into which God creates His creation has to be God forsakenness. Hell, as it were, absolute death, a cosmic zero, the outer darkness – whichever description best sums up the fact of its God forsakenness. It is against the threat of this outer darkness that He began, maintains, guards and sustains His creation and its life. Life is indeed a vulnerable wisp in the midst of the fabric of the void.

Because of this, it is now because of an ongoing relationship with God that the creation doesn't slip back into the void or nothing. This 'nothing,' 'void' only acquires this menacing character through the self-isolation of created beings. God created in us a desire for relationships, both dependent and inter-dependent, 'I – Thou" relationships. As Christian theology says; 'through Christ's death on the cross and by faith we now have the freedom to respond and enter into a loving interdependent relationship with God.'

The dependent relationships of all creation are at the level of God's consciousness collapsing the wave function of Creation. God continually observes His creation. **'It is always on His mind!'** But all relationships are threatened by what we call Sin. Sin represents a defiant, yet incredibly short-sighted declaration of our independence from God. It is in fact an ignorant embracing of the darkness without realising that darkness is in fact an annihilating nothing. A denial of the relationships and inter connectedness of life. Fundamentally we are made for relationships. This is built into the very 'gluons' of our being. Thus we and Creation are threatened, not merely by our own defiant independence, but also by the non being of God its creator –that is to say, nothingness itself. The spirit of the negative that threatens Creation was before and is beyond Creation itself. This is what constitutes its demonic power.

Orson Scott Card is a practising Mormon and twice winner of the prestigious Nebula and Hugo science fiction awards. He has written brilliantly about the isolation of this 'outer darkness' this place of non-connectedness and nothing, in Volume 5, titled **Earthborn**, of his **Homecoming Series**. It warrants an extended quote.

> "He was connected to nothing. He had no name because there was no one to know him, no place because he was connected to nothing, no power because there was

nothing on which he could act. Yet he knew that once he had had these things and now they were torn from him; he was lost and would never be anything or anyone again; he was lost because no one knew him. Where is the one who watches? Where is the one who knows me? Where is the one who names me? I only just found him inside me, didn't I? How could he have left me now?

There was no pain compared to this loss. He wouldn't mind being restored to the agonised body he had been connected to only a few moments ago, because it was better to feel that pain, with the watcher judging him than to feel this utter lack of pain, with no one watching him. When I felt the pain I was part of something; now I am part of nothing.

Didn't I want this? To be only myself, responsible to no one, uncommanded, uncontrolled, unexpected, free? I didn't know what it meant till now, to owe nothing to anyone, to have no duty because I had no power to act. I didn't realise that after independence was the most terrible punishment.
All my life the Keeper was inside me, judging me. But now the judging is over. I was not fit to be part of the Keeper's world. The Keeper had left him."[32]

It is God's choice of self-limitation that makes Creation possible. This nothing within God was conceded in order to make an 'interdependent' Creation outside God possible and interdependent sentient being made in His image a reality. But this comes with the threat of a defiant delusional independence and the possibility of the annihilating nothingness.

Moltmann says; "God withdraws Himself from Himself to Himself in order to make Creation possible. His creative activity outwards is preceded by this humble divine self restriction."[33]

To summarise. In a sense God's self-humiliation does not begin merely with Creation, inasmuch as God commits Himself to this world. It begins before Creation, and is the presupposition that makes Creation possible. God's creative love is grounded in His humble, self-humiliating love. This self –giving, self-restricting love is the motivation behind the self emptying of God which **Philippians 2:1-9** quoted above so eloquently speaks about. The fulfilment of this love is demonstrated in the coming of the Messiah. The creative Word of God became flesh and died on the Cross.
Think of it. Even in order to create Heaven and Earth, God emptied Himself of His awesome omnipotence, and as Creator took upon Himself the form of a servant.

Now if we look closely at the first words of Genesis it says.
Genesis 1:1-3

[1] In the beginning God created the heavens and the earth.
[2] Now the earth was formless and empty, darkness was over the surface of the deep, and the Spirit of God was hovering over the waters.
[3] And God said, "Let there be light," and there was light.

The phrase "**Let there be**" (***yehi***) is critical in the interpretation of the Creation: God does not create merely by calling something into existence, by collapsing the wave function to use Quantum Mechanical terms, by some sort of structured energy empowered demand, or

even calling forth a Quantum Fluctuation. In a more profound sense He creates by letting be, by making room, and by withdrawing Himself. I want to look at this in more detail in the next section.

It is part of the Jewish Mystical tradition to affirm that even though the 'Shema[34]' declares the oneness of God. For example;

Deuteronomy 6:4

> [4]"Hear, O Israel: The LORD our God, the LORD is one. [5]You shall love the LORD your God with all your heart and with all your soul and with all your might.[35]

Or as other translations have this;

> Or *The LORD our God is one LORD*; or *The LORD is our God, the LORD is one*; or *The LORD is our God, the LORD alone.*

The Godhead was not a monism, an impersonal it. But almost a confederation of aspects or emanations of God's being.

This perhaps is a parallel to the Christian revelation and insight of God as a Trinity of persons, of relationships, a community of love.

In the light of this I wonder why there is so much antagonism between Judaism with their repudiation of the Trinity of Christian theology. Within their own interpretive traditions (at least as we have seen in Kabbalistic Judaism) there is a strong sense that 'The Almighty's' activity in creating required the emanations[36] of this One God. His activity in Creation, in Redeeming and in Guiding Israel could be only realised through His condescension.

The dilemma Judaism has is this; the seeming enigma of reconciling Hashem[37] (The absolute holiness and otherness of God) with the Universe. That is; how can there be a transition from the infinite to the finite, from pure intelligence to matter, from absolute Unity or Oneness to multifariousness? How do they reconcile the Divine to a creation or to bringing about the universe and its multifarious parts? How can this be consistent with the eternal and inviolable absolute perfection of (Hashem) 'The One,' 'The Almighty?'

The One, the Holy Almighty who as Judaism stakes its reputation on, saying in the words of;

Malachi 3:6.

> "I the Eternal, I have not changed."

So in an attempt to resolve this dilemma the activity of God is spoken of as a series of emanations from God's being.

In Christian Theology however, instead, God's activity is spoken of as the activity of the Trinity. This strong, logical sense of One God in three persons! So it was out of this conversation within God's self that God made the universe. If God is as the Scriptures of the Old and New Testament show, then God seeks and relishes relationships and out of a desire for what Martin Buber calls "I - Thou" relationships God created the universe. There was nothing and then there was a 'structured' reality that was conducive to sentient life developing, particularly humankind made in His image. Genesis actuality indicates that God may have done a bit of 'special tinkering, or rather had a special hand' in the creation of Humankind!

In **Genesis 1:26-27**

> [26]Then God said, "Let us make man in our image, after our likeness. And let them have dominion over the fish of the sea and over the birds of the heavens and over

the livestock and over all the earth and over every creeping thing that creeps on the earth."

[27]So God created man in his own image,
in the image of God he created him;
male and female he created them.

This indicates a uniqueness to human beings that marks us out as different from the rest of creation. In verse 27, the word 'create', Hebrew (***bara***) is repeated three times. This indicates the high point of God's creativity. As Kent Hughes eloquently writes in his commentary on Genesis.[38]

> "Though you could travel a hundred times the speed of light, past countless yellow-orange stars, to the edge of the galaxy and swoop down to the fiery glow located a few hundred light-years below the plane of the Milky Way, though you could slow to examine a host of hot young stars luminous among the gas and dust, though you could observe, close-up, the protostars poised to burst forth from their dusty cocoons, though you could witness a star's birth, in all your stellar journeys you would never see anything equal to the birth and wonder of a human being. For a tiny baby girl or boy is the apex of God's creation! But the greatest wonder of all is that the child is created in the image of God, the ***Imago Dei.***"

Last Century, Francis Schaeffer summarised this concept by saying; 'God is an 'Infinite Personal Being, human beings are finite personal beings''. This mystery of our being made in the image of God gives us our uniqueness marking us out as different from the rest of creation's creatures. Being 'image bearers of God' may help to explain the mystery of human consciousness and also the fact that we are made for relationships, particularly a relationship with our Creator.

Augustine in his "City of God' speculates as to what being made in the image of God means. He suggests it relates to a trinity of faculties, namely; the intellect, the memory, and the will.
Genesis 2:7 says;

> [7]then the LORD God formed the man of dust from the ground and breathed into his nostrils the breath of life, and the man became a living creature.

What is cryptically meant by '**breath of life?**' Many suggest this refers to the uniqueness of humankind. We are not just Psychosomatic (Mind/ Body) beings. But we also have a 'Spirit,' that is, the ability to know and be known by God. We have the privilege and obligation to ponder and grapple with the big questions of life and existence.
Ecclesiastes 3:10-12

> [10] I have seen the burden God has laid on men. [11] He has made everything beautiful in its time. He has also set eternity in the hearts of men; yet they cannot fathom what God has done from beginning to end. [12] I know that there is nothing better for men than to be happy and do good while they live.

Needless to say, in recognising human beings as the 'Crown of Creation' we affirm that God took incredible care in creating the Universe and special care and interest in creating us within it.

Something of the conversation and planning of creation is hinted at before the speaking forth of the Word, and God's Word going forth in **John 1:1-2**

> [1] In the beginning was the Word, and the Word was with God, and the Word was God. [2]He was in the beginning with God. [3]All things were made through him, and without him was not anything made that was made. [4] In him was life, and the life was the light of men.

That would then explain the incredible design and precision with which the constants were given. We live in a Universe that is precisely planned. Now if this is true, if indeed this creation is very carefully planned and made by an infinitely wise and powerful God, the implications **of** this and **for us** are profound.

Can I give you an example? If your pre-supposition is that 'the Universe, life and all that is,' is just the product of blind chance, random processes acting over vast amounts of time. That it's all a matter of incredibly good luck. Further, if there is no super intelligent mind, no God behind it or within it all. This means there is nothing fundamentally more valuable about Humankind that there is say, in comparison to a slug. In fact we share a large percentage of the same DNA.

Then with this pre-supposition it makes logical sense to say that we, being intelligent human beings are orders of magnitude more intelligent than random processes. (Except for Joe who always scored less in a multi-choice math test than if he had selected the answers randomly!) But seriously, therefore we can tinker around and 'improve' the DNA that is the basis of our life. We can blithely and arrogantly go about 'breaking into' the secrets of DNA and act like a little child constructing 'things' with a new set of LEGO blocks. We can freely without pause, use our best scientific techniques of manipulating recombinant DNA to 'improve' on the design blueprints contained within. Discarding the errant genes that we know cause disease and that need to be fixed and the junk DNA needing to be removed. I mean who's to stop us and why shouldn't we have a go at making some new species? If this is the case, there is nothing fundamentally wrong with 'courageously and daringly!' stepping way beyond the mandate given by God in **Genesis 1:28** to be a good steward over the creation. After all, the pre-supposition of Atheistic Scientists means they exclude both the existence of and any accountability to God. And surely we can do it better than chance!

We can ignore **Genesis 1:28** which gives permission to, but also sets limits to humankinds stewardship of God's creation.

> [26]Then God said, "Let us make man in our image, after our likeness. And let them have dominion over the fish of the sea and over the birds of the heavens and over the livestock and over all the earth and over every creeping thing that creeps on the earth."
>
> [27]So God created man in his own image,
> in the image of God he created him;
> male and female he created them.
>
> [28]And God blessed them. And God said to them, "Be fruitful and multiply and fill the earth and subdue it and have dominion over the fish of the sea and over the birds of the heavens and over every living thing that moves on the earth."

It is a small simple step for humankind to arrogantly presume to be able to improve even the DNA of our existence. When there is no pre-supposition of God's existence, there can be no need of humility before random chance processes.
We hear some scientists speaking rather condescendingly about "junk DNA" as a way of denigrating Creation. In the popular mind this effectively diminishes the wonder of the human genome. Implicit in this rather loaded title is the implication that if they were 'the creator' they would do it differently, and needless to say there wouldn't be any junk!

In evolutionary biology and molecular biology, junk DNA is the provisional label for the portions of the DNA sequence of a chromosome or a genome for which no function has been identified. The term was introduced in 1972 by Susumu Ohno. Now amongst specialists as of 2008 the term is somewhat outdated and less emotive terms such as "non-coding DNA" are used to describe this type of DNA. But the term is still being used mainly in popular science, in a colloquial way in scientific publications and in the popular sensationalistic media.

To call any DNA 'junk' seems to me to show a stunning disregard for the sublime mastery of its design. A more humble position is to say, if DNA does not seem to have a function now, it may have had a function in the past or may yet have a function in future. According to **Wikipedia**[39] about 95% of the human genome has at one time been designated as 'junk', including most sequences within introns and most intergenic DNA. While much of this sequence may be an evolutionary (Design or development) artefact that serves no present-day purpose, some 'junk' DNA may function in ways that are not currently understood. Moreover, the conservation of some 'junk' DNA over many millions of years of evolution (development) may imply an essential function.
Humility in the face of blind chance is difficult. But before an al- powerful super-intelligent Creator it would appear much more logical – even wise.

Again, it appears that we have hardly scratched the surface. Hiding behind the basic DNA sequence are at least two layers of information beyond the traditionally recognized genes. One layer is woven throughout the vast "non-coding" sequences of DNA that interrupt and separate the genes. These have previously been written off as irrelevant because they yield no proteins, and have been widely dismissed as vestiges of "millions of years of evolution." Now scientists are beginning to suspect that much of what makes one person, or species, different from another are the variations hidden within our "junk" DNA. Beyond the specific DNA sequence itself, is another layer of information in the chromosomes: "Epigenetic marks, embedded in the mélange of proteins and chemicals that surround and support the DNA, operate through cryptic codes and mysterious machinery. Unlike genes, epigenetic marks are routinely laid down, erased, and rewritten on the fly."[40] NOT junk after all, thank God it wasn't blithely taken out by some over-enthusiastic evolutionary biologist!

As biologists sift through the novel kinds of active RNA genes from among the long-neglected introns and intergenic stretches of DNA, no one can yet predict where it will all lead. What was once condemned as junk (because it was not understood) may turn out to be the very basis of human complexity. What is astonishing - and disturbing – is the speed with which certain evolutionary biologists, blinded by their pre-supposition of atheistic

evolution are so quick to dismiss as junk those aspects of our biochemical design they don't understand or can't see a reason for. Brrrrrr .. That is scary!

It now turns out that the "junk" is vitally important and as we discover more, we uncover the incredible wisdom and planning that has gone into it. What was considered 'junk' yesterday is now see as 'clever' design today.

This of course parallels the fact that the very basis of what we call physical reality is mysterious and unknown. Indeed 97% of what you are is a pattern of energy trapped in the interaction between quarks. The 3% of 'solidity' that you measure if you get on the bathroom scales each morning is a hint of this concrete mass that is a gift from gravity, itself the product of the 'Higgs Field', or something like it, lurking in the void. The destiny of the entire universe is not controlled by the shimmering stars and matter we discern interlaced like a tapestry of diamonds woven into space. It is controlled by the 97% of the dark matter and energy that moves in the void, unseen except for its feeble gravity.

Now we suspect even who you are or may not be under the full control of what you are. 97% of your DNA is in the form of 'junk.' I personally object to the unscientific connotations of this term so I will use the term 'Non-coding DNA – although genetic researches cannot be certain this non-coding DNA serves no function. No one knows what it does or why nature or 'providence' has forced our cells to carry so much of it around. But carry it around we do, from one generation to the next and we don't seem to be worse off because of this 'extra baggage', or 'survival kit' depending on your perspective and pre-suppositions. This should give us pause, before we go tinkering around and altering it or 'cutting it out' like children playing with surgical instruments.
This means 97% of our DNA, our mass, and our cosmos is in a form that is mysterious and unresponsive (at this stage) to scientific investigation. Yet all this connects us in an irrevocable way with the wondrous and mysterious side of Creation.

My point is:
All this means it makes sense to say that the Universe is actually the only way it could be. That this is the best it could ever be, and God could do, taking into account all the contingencies of creativity, chance, consciousness, meaningful sentience and freedom.

Yes we can rail against evil and tragedy and the unjust suffering of innocents. But if we know God thought 'carefully' about creation, incredibly carefully before the beginning; If this humble God acted out of love in Creation then perhaps there are better solutions than becoming bitter and twisted and shaking our fist in rage against God because of the tragedies and suffering we encounter. If we knew that in order to give life with all the gifts and contingencies mentioned above, this world is at present the 'best case scenario' we could ever have. And because of this, perhaps with the gifts of sentience, intelligence and consciousness we can ask what part we have been given to play in working with this Creator God, this super-intelligent infinite personal Creator in co-operation with Him to make this world a better place. Because if you take the account of the 'Fall" seriously we can see we sure have had a part in its demise.

So when atheistic scientists claim that there is no God because the design is so apparently flawed, my response would have to be; do you really think with your 'superior" intelligence you could have done any better? Which changes to the fundamental constants would you make? And of course what about the thorny issue of freedom? Just how you could guarantee a 'free' person would always do what is 'right?' And even more fundamental, how would you protect the universe from the ever present threatening nothing?

I remember hearing a person verbally abusing God (He didn't actually believe in God so I guess for him it was simply shouting into the wind. Getting his anger and grief off his chest) He was upset by the fact that a recent earthquake had made a multi-storey housing apartment collapse and had crushed scores of people. (He didn't say anything about the fact that it turned out these apartments had been shoddily made and didn't contain any steel reinforcing.) I thought he had a point; it was a sad, gut-wrenching tragedy.
Later it was pointed out to me that if there hadn't been earthquakes in the earth's past, no heavy elements would have moved to the surface. These heavy elements, like carbon and iron are essential for life and are formed deep below the earth's crust. Sure it would be nice if there were no earthquakes now, but their existence does not represent a design flaw.

There is also an important caveat over this. This is what Christian theology calls *"the Fall"* Simply put the Bible says that the whole of the World is 'out of tune' with God. And this 'out of tuneness' was a direct result of God's self-limitation and provision of the 'space' for his creation to rebel. Without this freedom humankind being made as sentient creatures would not have had real and realistic freedom.

In the context of what we have been discussing previously, this means the gossamer thread of creation which was perfectly structured for life, has been tragically torn. The 'nothing' the *nihil,* the outer darkness is much more powerful, a much greater threat than ever it was. Life is much more tenuous now, for even the environment is 'out of tune.' There is famine, disease, disaster and despair.

Milton called this "Paradise Lost." The Apostle Paul calls this the 'groaning of creation.'
Romans 8:20-22

> [19]The creation waits in eager expectation for the sons of God to be revealed. [20]For the creation was subjected to frustration, not by its own choice, but by the will of the one who subjected it, in hope [21]that the creation itself will be liberated from its bondage to decay and brought into the glorious freedom of the children of God.
> [22]We know that the whole creation has been groaning as in the pains of childbirth right up to the present time.

Perhaps even on a cosmic scale God's creation is under threat of falling into the abyss because it is no longer in perfect relationship with Him.

We could also state this in holographic terms. The Fall was more like the introduction of an aberration into the Hologram of the universe than a fault in the mechanistic universe of Newton. It is far more dynamic and continuous, in that it influences not only our perception of reality but also the very structuring of that reality in the mind of God. The Fall had consequences that are relational at the deepest level. So, since the fall an anomaly has been

introduced into the wave function of the universe, hence the pattern of reality is marred and broken. As a result, this now means that God, without overriding the freedom of human beings which is enshrined into the development of our sentience, at times chooses to intervene and 'miraculously' reset the wave function of a person or situations holographic image. Frank Tipler in his 'The Physics of Christianity' provides mathematical insight into the miraculous.[41]
We see also in the Bible that the promised Messiah would 'perform' miracles to bring healing, deliverance and relieve suffering. These miracles would redefine a person's life or using quantum terms their 'wave function,' 'personal hologram,' or more basically, their lives. Miracles would also be graphic signs of the New Creation, a hint of God's re-establishing and redefining of God's original creation purpose at the end of the age. God is re-writing the hologram! Of course we could argue that miracles would not have been necessary if the fall hadn't happened.

The problem of suffering and evil is one that has made atheists and agnostics out of many sincere potential believers. Until late in his life, my own father was one. It is tragic. But inherent in this rejection of God is the statement that they can't believe in a God who would allow this suffering, pain and tragedy. But of course they assume that there is actually another way or another design profile that is better. And as yet this is the only one we have.

To conclude this reflection however, it is enough to affirm that it was "with wisdom" that God created the world. God, as I have argued, carefully thought about creation prior to making it. In His mind God deliberated over all the contingencies necessary for intelligent life to develop before He committed to speaking them forth and thus externalising them in the structured form which we experience as reality. We do well to be cautious about arrogantly assuming we could have done a better job.

A little humility in the face of unanswered questions, and tragedies would mean, rather than shaking our fist at the Almighty in anger we would ask; what can we do, how should we live? Since we are created in God's image the call comes to us to cooperate with our Creator in setting things right, in alleviating suffering and curing disease.

Indeed it is logical to conclude that the Universe, life and all that is, is the best it can be as a Creation of God. We have a part of the process of creation now. And the sages and prophets of old have indicated that we have the immense privilege of being part of the process of bringing about the New Creation.

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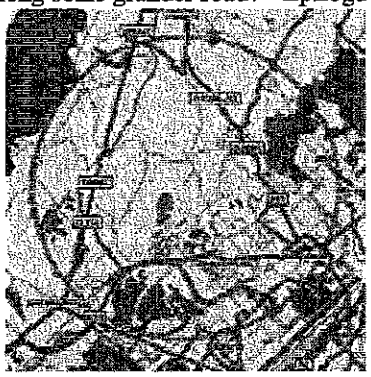
[1] According to the Big Bang model, the universe expanded from an extremely dense and hot state and continues to expand today. ***http://en.wikipedia.org/wiki/Big_Bang*** . A common analogy explains that space itself is expanding, carrying galaxies with it, like raisins in a loaf of bread or better like spots on a rubber balloon which is expanding. The balloon itself is analogous to the universe.
Singularity, or Space-time Singularity refers to the initial point where the gravitational field is infinite and nothing can escape. As the point of "bang" the energy much have momentarily overcome the gravitational force.
[2] For example String Theorists. Some say "String Theory" is our 'best guess' yet at a theory of everything, this theory doesn't seem to work with fewer than 10 dimensions.

[3] COBE The **Cosmic Background Explorer (COBE)**,was a satellite dedicated to cosmology. Its goals were to investigate the cosmic microwave background radiation (CMB) of the universe and provide measurements that would help shape our understanding of the cosmos.
This work provided supporting evidence for the Big Bang theory of the universe; it showed that the CMB was a near-perfect black body spectrum and that it had very faint anisotropies. http://en.wikipedia.org/wiki/COBE

[4] Anisotropy - *is* the property of being directionally dependent. It can be defined as a difference in a physical property for some material when measured along different axes. In terms of their research it showed the directional dependence of the cosmic background radiation. See the picture below. This is a WMAP image of the (extremely tiny) anisotropies in the cosmic background radiation.

http://en.wikipedia.org/wiki/File:WMAP_2008.png

[5] Sten F. Odenwald, *Patterns in the Void: Why nothing is important* (Westview Press- Perseus Books Group, USA, 2002) 235. Odenwalds title is particularly significant because his conclusions are that what we popularly consider solid matter is not solid and are more like patterns, akin to a holographic pattern that other Physicists talk about. In his epilogue he comments; 'Logic and experiment have taken us down a road that began with investigation of hard cold matter, then moved on to a plastic, fluid universe where fields are the basic currency and our own substance is mostly an illusion. Is this the end of the journey of discovery or only a way station along some grander road?' Epilogue 240.



[6] Map of the Large Hadron Collider at CERN

[7] Michael Talbot, *The Holographic Universe* (Harper Perennial, Harper Collins Publishers, New York, NY 1991) Talbot outline in some detail evidence for 'paranormal and spiritual' experiences including remarkable well documented miracles.'

[8] Sten F. Odenwald, *Patterns in the Void: Why nothing is important* (Westview Press- Perseus Books Group, USA, 2002) 243

[9] See Stanislav Grof, *The Holotrophic Mind*, (Harper Collins Publishers, New York. NY. 1993). Michael Talbot, *The Holographic Universe* (Harper Perennial, Harper Collins Publishers, New York, NY 1991). Also Frank J. Tipler, The Physics of Christianity (Doubleday Broadway Publishing Group, Random House, New York, NY. 2007) Tipler attempts to give a theoretical basis to the miraculous contenting that it violates not 'laws." Also Jeffrey Satinover who has been the William James Lecturer in Psychology and Religion at Harvard University in his visionary book, The Quantum Brain, (John Wiley & Sons, Inc New York, NY. 2001) This book represents a lucid convergence of quantum physics and neuroscience.

[10] Gerald Schroeder, *God According to God* (HarperCollins Publishers, New York NY, 2009), 17

[11] Gerald Schroeder, *God According to God* (HarperCollins Publishers, New York NY, 2009), 17

[12] http://en.wikipedia.org/wiki/Roger_Penrose

[13] Mario Livio, *Is God a Mathematician* (Simon & Schuster, New York NY, 2009), 2

[14] Mario Livio, *Is God a Mathematician* (Simon & Schuster, New York NY, 2009), Livo's book is devoted to investigating this query . He tackles it under the question. Is mathematics an invention or a discovery ? Typically he wants to affirm both. He ends by Quoting Bertrand Russell famous quote from his *The Problems of Philosophy.*

Thus, to sum up our discussion of the value of philosophy;

Philosophy is to be studied, not for the sake of any definite answers to its questions, since no definite answers can, as a rule, be known to be true, but rather for the sake of the questions themselves . . But above all because, through the greatness of the universe which philosophy contemplates, the mind is also rendered great, and becomes capable of that union with the universe which constitutes its highest good. Quoted in Livio, Is God a Mathematician? 252.

I, of course, would substitute Russell's use of universe, with God and thus union with the mind of God is not only our highest good but our greatest delight and purpose.

[15] ***New International Version (NIV) Copyright © 1973, 1978, 1984 by Biblica***

[16] Mario Livio, *Is God a Mathematician* (Simon & Schuster, New York NY, 2009), 3

Eugene Paul "E.P." Wigner (November 17, 1902 – January 1, 1995) was a Hungarian American physicist and mathematician. He received the Nobel Prize in Physics in 1963 "for his contributions to the theory of the atomic nucleus and the elementary particles, particularly through the discovery and application of fundamental symmetry principles". Some contemporaries referred to Wigner as *the Silent Genius* and some even considered him the intellectual equal to Albert Einstein, though without his prominence. Wigner is important for having laid the foundation for the theory of symmetries in quantum mechanics as well as for his research into atomic nuclei, and for his several theorems. http://en.wikipedia.org/wiki/Eugene_Wigner

[17] Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 86-94. Has a very insightful and meaningful reflection on the implications of saying God created out on nothing. I have included my ponderings on this section of His book.

[18] Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 86

[19] John 14:24. 24"Father, I want those you have given me to be with me where I am, and to see my glory, the glory you have given me because you loved me before the creation of the world. http://www.biblegateway.com/passage/?search=John+17&version=NIV

[20] The Holy Bible, English Standard Version, (Crossways Bibles, London, England 2001)

[21] The Holy Bible, English Standard Version, (Crossways Bibles, London, England 2001)

[22] In is important to realise that the Hebrew letters were considered to be the divine thoughts, ideas, and precepts. So, before creation, the letters were concealed within the divine mind and arranged in reverse order!

[23] Daniel C. Matt, *The Zohar: Pritsker* Edition (Stanford University Press, Stanford, California. 2004) 11.

[24] Gregory E. Ganssle ed. *God and Time: Four Views* (InterVarsity Press, Downers Grove., Ill. 2001) This book includes a very helpful discussion on 4 views of God in relation to Time. Paul Helm: Divine Timeless Eternity, Alan G,. Padgett: Eternity as Relative Timelessness, William Lane Craig: Timelessness and Omni temporality, and Nicholas Wolterstorff: Unqualified Divine Temporality. Each of these authors grapple with the question of how a God who is eternal can relate to a temporal creation which is contingent upon time. Does God experience each moment of time in succession like we do, or are all times present to God 'at one time'? Most Christians when they think of eternity think of it in terms of time going on forever. But that is not eternity, that is just infinite time. Eternity exists outside of time. Time is a creation or construct of God. So how we think of God and time has implications for our understanding of the nature of time, the creation of the universe, God's knowledge of the future and God's interaction with His creation. How does God answer prayer when a pray is contained in time. Does God see all times and needs in a moment, in a realm of non time. The four views presented in this book and the various responses of the authors, while very philosophical are stimulating and insightful.

[25] Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 86-103. Gerald Schroeder, *God According to* God (HarperCollins Publishers, New York NY, 2009), 101 - 110

[26] It is beyond the scope of this study but it is interesting to note that the ultimate goal of the coming of Christ is to bring everything back into perfect harmony. In is nothing less than the 'new creation' which culminates in God filling everything with his presence. Revelation 21:1-6. With this in mind then God's self limitation in withdrawing in order to 'make space' for creation is only part of the story because His intention is then to ultimately re-full this creation with His presence.

[27] In this section I'm summarising and reflecting on the work of Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 86-103.

[28] Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 87

[29] Blaise Pascal, *The Mind on Fire*, Edited by James M. Houston. (Victor Books, Eastbourne, England, 2006) 148

[30] Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 91

[31] Again I refer you to Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 87 - 95

[32] Orson Scott Card, *Earthborn* (Legend Books, Arrow Books Ltd. London, GB. 1995) 346

[33] Jurgen Moltmann, *God in Creation* (Augsburg Fortress Publishers, Minneapolis, MN. 1993) 89

[34] The Shema is what was recited by every orthodox Jew based on Deuteronomy 6:4
[35] The Holy Bible, English Standard Version, (Crossways Bibles, London, England 2001)
[36] See Fronts piece to The Zohar: Pritzker Edition. There is the diagram of the Ten Sefirot or emanations through which God (who is referred to as Ein Sof-The Limitless) reveals Himself and continuously creates both our physical realm and the chain of higher metaphysical realms. **http://en.wikipedia.org/wiki/Sefirot**
[37] Hashem means 'the name' in an effort not to offend God and misuse His name Orthodox Jews will not use the name of God. They substitute 'hashem' saying 'the name' instead. Indeed among many, the use of 'Adonai' THE LORD is restricted to prayer only.
[38] R. Kent Hughes, Genesis: Beginning and Blessing (Crossways Books, Good News Publishers, Wheaton, IL. 2004) 37.
[39] http://en.wikipedia.org/wiki/Junk_DNA
[40] Chuck Missler, http://www.khouse.org/articles/2005/563/#notes#notes
[41] Frank J. Tipler, The Physics of Christianity (Doubleday Broadway Publishing Group, Random House, New York, NY. 2007)

Let it all begin.

Speaking Words of Wisdom,
Let it be, let it be,
There will be an answer, Let it be, Let it be. – The Beatles

Genesis 1:1-3 says;

[1]In the beginning, God created the heavens and the earth. [2]The earth was without form and void, and darkness was over the face of the deep. And the Spirit of God was hovering over the face of the waters.
[3]And God said, "**Let there be light**," and there was light. [4]And God saw that the light was good. And God separated the light from the darkness. (**ESV**)[1]

These are the most well known and quoted words from the Bible.

Doesn't it strike you as staggering to think of the vast scope of activity that is summarised in this first chapter of the Bible? In just twenty-seven verses we start from nothing and finish with 'the universe, life and all that is. Twenty-seven verses, about 800 words, less in Hebrew. This is a 100% proof, concentrated description. The brevity is staggering, there is vastly more space allocated to the correct construction of the Tabernacle in the wilderness than this, the structuring of Creation. This deliberate succinctness should warn us off trying to extract from it either scientific or cultural categories that were foreign to the thought patterns of the original writer and hearers. This is not a scientific description of the beginnings, it is not written in the language of Quantum Mechanics or Classical Physics. John H. Walton[2] who I quoted earlier is passionate in his plea for us to recover the '**Lost world of Genesis One.**' To stop trying to manipulate the text as if it were a pliable witness in the creation/evolution court cases.

This passage has the dignity and authority to stand on its own. It doesn't have to be interpreted as a scientific document. For those of us who are trained in the sciences we sometimes wish God had given us a 'Dummies' Guide to Life, the Universe and all that is,' written in the language of Maths. A sort of *Magnum Opus* from the Creator with all the formulae and mechanisms He used. Telling us how He established the constants. How He manipulated the electromagnetic spectrum and controlled the fantastically enormous energies involved. If the Higgs Field that is supposed to give us gravity is really there or how much consciousness defines reality and so on. But no, this is obviously not what Genesis One is about. Rather, according to Professor Walton, it is a functional account of creation and;

> 'Is intended to convey realities about the origins of the cosmos and God's role in it and His purpose for it. Most importantly it is designed to help the reader understand that the cosmos should be understood as a temple that God has set up to operate for people as He dwells in their midst. Genesis One is not intended to be an eyewitness account.'[3]

Genesis One has an authentic voice which is both awesome and majestic in its grandeur and terse in its polemic against the ancient polytheistic pagans of the time.

Genesis One is not a mere summary like some cryptic 'text message.' It is a deliberate, careful statement of our beginnings and God's determination and purpose in being our Creator. In a way it is more like an abstract painting than a landscape arising out of the realist's school. The liturgical refrain; "And there was evening and there was morning the .... Day," is like a swath of

colour representing time boldly structuring creation with God's purpose. Leading of course up to the seventh day of creation!

From God's vantage point, the act of creation, and the Hebrew word for this is, **ba're'ah**, entails a lessening of God's omnipotence in control. I introduced this concept in the previous section. Creation according to the Bible is God's spiritual self-limiting. (It was spiritual because prior to God actualising His determination to be Creator there were no other dimensions.) The term used to describe this divine contraction, as we have seen, is **Tzimtzum,** which literally means to contract or to withdraw. Like an empty womb into which God breathes the creation, 'the Universe, life and all that is,' every dimension of being.
So in the words of Paul Tillich[4] the Christian existentialist philosopher, God is the 'ground of our being.' In this case it is the partial withdrawal of God's overwhelming mind-blowing presence. In essence, God hides God's face. Think about it! What freedom to love or not to love, to obey or not to obey God, would we have if the manifest presence of God 'stared us in the face' every day? What compulsion and fear, awe and constraint would we be confronted with?

The ancient Hebrews understood this well when, upon seeing a theophany, a manifestation of God's presence, they feared they would be annihilated.
For example Moses at the burning bush. **Exodus 3:5-7 (ESV)**

> [5]Then he said, "Do not come near; take your sandals off your feet, for the place on which you are standing is holy ground." [6]And he said, "I am the God of your father, the God of Abraham, the God of Isaac, and the God of Jacob." And Moses hid his face, for he was afraid to look at God.[5]

So the Tzimtzum (self-limitation of God) is a manifestation of the love and grace of God giving us and creation freedom to be and to become.

The first act of outward creation was God's creating the heavens and the earth. (**Genesis 1:1-3**) This brought into being the physical world with its many dimensional space-time-matter continuum, a single fabric interwoven by the laws of nature. The laws of nature are indeed laws, precepts, constants and relationships first delineated in the mind of God. However, as Gerald Schroeder correctly point out,

> 'Sequestered within is a quantum slack, a leeway in those laws that control nature.'[6]

At the sub-atomic level, identical causes do not yield identical effects. That also is the message of this **tzimtzum** of creation. As you know Einstein is quoted as having said in response to the Quantum uncertainty that he could not believe that God would play dice with the universe. Einstein was correct. God does not play dice with the universe, but God allows the universe to play dice with itself! That chance and freedom is structured into the very nature of reality. Once again Bruce Rosenblum and Fred Kuttner, in their book **Quantum Enigma**, cryptically comment;

> "God may be omnipotent but, He is not omniscient. If God collapses the wave functions of large things to reality by His observation, quantum experiments indicate that He is not observing the small."[7]

More likely is that this is part of the self-limitation that God places on Himself to allow Creation to be. In fact God may well have limited His Omniscience so as to give Creation freedom. God contracts some of His infinite essence in order to make a 'space' for a finite universe to exist.

In the loving and creative act of God's tzimtzum, in this withdrawal of absolute divine control, we discover the source of chance and choice within our world. And to our astonishment, this granted autonomy extends throughout all levels of existence. God is not a control freak! Here we can begin to correlate the Jewish, Kabbalistic concept of tzimtzum with a Christian understanding of God's grace.

The phrase "**Let there be**" (***yehi***) is critical in the interpretation of the Creation: God does not create merely by calling something into existence, by collapsing the wave function to use Quantum Mechanical terms, by some sort of structured, energy empowered demand, or even calling forth a Quantum Fluctuation. In a more profound sense He creates by letting be, by making room, by giving permission, by speaking forth and then by withdrawing Himself to 'let it be.' By giving 'space' for chance and choice to function in the created world. The old Newtonian idea of God as an absent watchmaker and Creation as a perfectly controlled watch is a totally inadequate mechanistic view that misses the dynamic nature of reality.
Isaiah 45:6-7 says;

I am the LORD, and there is no other.
[7] I form light and create darkness,
I make well-being and create calamity,
I am the LORD, who does all these things. (**ESV**)[8]

Notice this; 'forming light, creating darkness.'

One of the images of God is that God is light.[9] God, the source of all spiritual light, creates spiritual darkness by withdrawing some of the divine light. Interesting within this context is the idea that calamity is also 'created' when God withdraws His overbearing power, His providential care!

So what happened when God 'created the heavens and the earth', when God commanded 'Let there be' Is it just the 3 dimensions of space and one of time that the empiricist insists are all that is 'real?' Or is creation much more mysterious and mystical than that? And the reality we see is it really as 'solid' as it appears to our sight and feels to our touch?

Oh, yes it is true. These 3 dimensions of physical space that we so easily apprehend with our senses are amazing and indescribable. We would all agree with the words of Louis Armstrong; "What a wonderful world!" He wasn't the first and nor was he the last to wonder and marvel at the beauty, grandeur, intricacy and sheer incredibleness of the world of our senses. Millenniums before, the ancient writer Job, in what is likely to be the oldest exhortation of praise humanity has uttered, said of God; **Job 9:9-12.**

[8] He alone stretches out the heavens
and treads on the waves of the sea.
[9] He is the Maker of the Bear and Orion,
the Pleiades and the constellations of the south.
[10] He performs wonders that cannot be fathomed,
miracles that cannot be counted.
[11] When he passes me, I cannot see him;
when he goes by, I cannot perceive him.
[12] If he snatches away, who can stop him?
Who can say to him, 'What are you doing?'

This creation with its beauty and majesty has been the raw material of poets and painters, song writers and scientists. And now with the instruments of Science we are privileged to see the vast expanse of the heavens with their gossamer like threads of stellar dust clouds and galactic super clusters. From the delicate beauty and perfume of a rose to the grandeur of the mountains, from the power of the surging tide to the infinite variety of a snowflake, from the warm caress of another human being to the spontaneous laughter of a happy child, we who are also the product of God's 'Let there be," just seem to fit in this universe. We, incredibly, have a place to be and become. And this correlation between what we perceive with our senses and what is 'out there' is also a gift to us.'
So let's scratch at these questions for a bit. I hope in doing so it will spark your imagination and tweak your curiosity.

When God repeatedly commanded 'Let there be' as Genesis 1 says, just what depths of reality did He bring into being?

God, by creating us in His image and gifting us with reason has given us the incredible privilege and awesome mandate to study, investigate and ponder what He has commanded into existence and permitted out of all the infinite possibilities. When in the words of Genesis One and with that majestic sevenfold refrain God declares 'Let there be.' We like 'Crime Scene Investigators' are to study hard what is there, to fold back the veil, to 'peer through the mirror darkly' and maybe discern the 'finger prints' of the Creator.

Now, thanks to Modern Science we have discovered there are a number of layers and levels to this reality. We have indeed discovered that 'subtle are the ways of the Lord!' The depths of Creation that God has commanded to 'be' go beyond our normal perception of reality seen when we look out and enjoy Creation's scenic beauty.
Without in any way diminishing the nurturing effect to our soul appreciating the scenic beauty of creation does for us. Isn't it true that some places, as the ancient Celtic Christians used to insist, are thin places? It is like the veil between this world and the 'other' world of God's greater presence is very thin and you can almost feel its numinousness.

I want to briefly mention how in commanding 'the universe, life and all that is' to 'be' God appears to have structured into creation, mysterious hidden, almost mystical depths. In our generation the veil appears to have been tentatively folded back on these mysteries and what is revealed is an astonishing depth that could only have come from the mind of an awesome infinitely creative and powerful being. Briefly, let me mention Dark Matter and Energy, Multi-dimensions and String theory and finally the theory of a Holographic universe.

Take this for instance. For those who are stuck in that empiricist strait-jacket.
According to "Science" magazine, the greatest scientific breakthrough of 2003 was the confirmation that 'dark energy' and dark matter' is the stuff that makes up the overwhelming majority of our universe. This is a staggering development in physics and one that shook many in the scientific community to the core. Until this discovery, all discernable objects in the universe shared one attribute. They gave off electromagnetic radiation. Light! Now it appears that the particles that science has been used to dealing with, which give rise to mass and light, like electrons and protons make up only 4 percent of known matter. The rest is either 'dark matter' or 'dark energy' called by those names because literally the bulk of the universe cannot be seen or detected, but we know exists because the universe's expansion is accelerating and it

shouldn't be, and they have a minute detectable gravitational effect. The only way that could happen is if there existed this vast matter and energy anomaly.

Amazingly, this confirms what mystics and Bible readers have perhaps glossed over without thinking. Another reading of **Genesis 1:1-2** shows;

> [1]In the beginning, God created the heavens and the earth. [2]The earth was without form and void, and darkness was over the face of the deep.[10]

The universe is first and foremost a dark place. This first description of the universe states that 'the earth was formless and void and darkness prevailed over existence.'
Only afterwards does God say, (**yehi**), 'Let there be light,' and light came into existence.

This comes after what must be the most understated phrase ever. The author just matter-of-factly says; ***In the beginning 'God created the Heavens and the Earth'*** well hullo, no fanfare, no description of an infinitely hot plasma bursting out of a quantum fluctuation, no explanation of an established tear in the newly created fabric of the space time void? Just a 'low key announcement' and this is followed with then God said; 'Let there be light.' This is not just an awesomely powerful statement of creation but it is also a statement carving through the infinite possibilities that were permutations in the mind of God. 'Let there be,' clarifying the infinite possibilities down to what we have as the 'stuff' of our universe. Light – which it is now understood, is itself a mysterious wave/particle duality that gives rise to the Quantum Enigma.

Here is a scientific description of this event by Gerald Schroeder.

> By a fraction of a micro-second following the creation, the primary material product of the big bang was concentrated as exquisitely intense energy. Largely electromagnetic radiation . . . - in simplistic terms, something akin to super-powerful light beams. Then, within the first few moments following the creation, as the universe raced outward, stretching space, a transition took place (a transition the basis for which was discovered by Albert Einstein and codified in that famous equation $E=mc^2$) as energy condensed into the form of matter. A minute fraction of those light beams of energy metamorphosed and became the lightest of the elements, primarily the gases hydrogen and helium. Over aeons of time, mutual gravitational forces pulled those primordial gases into galaxies of stars. The immense pressures within the stellar cores crushed the nuclei of hydrogen together, fusing them to form heavier elements and, in doing so, releasing the vast amounts of energy we see as starlight. These forces of fusion coupled with those of stellar explosions, supernovae, yielded the 92 elements that eventually on planet earth would form the building blocks of beings that became alive and sentient. All this was made from the light-like energy of the creation. Now that is a cause for wonder. Light beams become alive....[11]

Now for those who like their feet and minds on 'solid ground'

The New Zealand chemist and physicist, and winner of the Nobel Prize in Chemistry, Ernest Rutherford became known as the father of Nuclear Physics. In 1932 he attacked the atoms in a gold foil ribbon with high speed alpha particles. When he did, he found something totally unexpected. Far from being the solid physical particles they were believed-to be since the fifth century BC. atoms tuned out to consist of vast empty regions of space in which incredibly tiny particles -electrons -orbit around a nucleus. Indeed, atoms are so incredibly small that it is difficult for us to grasp their structure without resorting to mental illustrations. For instance, atoms are typically about one hundred millionths of a centimetre across. That means if an atom were magnified to the size of a basketball, the nucleus would be smaller than a grain of sand at

its centre. An atom is really nothing more than empty space with a handful of even smaller particles (electrons, protons which are themselves made up of even smaller particles!) that give them heft. Do you realise what this means? This means that your solidity, that of the chair you are sitting on, or even a needle that pricks you is really only an illusion, though fortunately it does have a bit more 'objective reality' than an imaginary friend.
This discovery that matter is mainly composed of empty space was only the first of many discoveries to destroy popular notion of a 'solid world' and even the physicist's notions of solid objects on the atomic level. Rutherford showed that matter consists mainly of vast empty regions of space. We are actually mostly nothing. A wisp that has been 'let be' in the mind of God?

So how many dimensions are there in God's Creation?
One thing we know for certain is there are more than the 3 spatial dimensions known as X,Y,Z, in Cartesian geometry. Most of us don't have any trouble coping with three dimensions. Some of us start out pretty clumsy but we learn to adapt to 3D space. This is the nature of the reality we are presented with from the moment we are born. This is the 'seemingly objective reality out there.' This is what our brains miraculously are designed to correlate with, or have evolved to manipulate depending on your perspective!

Since Einstein's insights from his theory of General Relativity we now add Time to this as a fourth dimension. So we talk about a 4 dimensional space-time continuum in which we live. Time, this fourth dimension is a bit trickier for us. But this is really the limit to our ability to imagine. The categories of thought we assimilate from our 3D world don't work when we come to speak of extra dimensions. These 'extra sensory' or 'extra-cognitive' dimensions might be daunting to all but those who have the mathematical tools to 'conceive' of them but they are significant. The August 2009 New Scientist Magazine devoted a whole feature article to attempting to explain the secrets of these extra dimensions, their workings and significance.[12] Does this seem weird to you? Join the club - conceiving of more than 3 dimensions makes my brain hurt. Even physicist and string theorist Michael Duff who is the Principal of the Faculty of Physical Sciences and Abdus Salam Chair of Theoretical Physics at Imperial College London admits as such. He's the author of *The World in Eleven Dimensions: Supergravity, Supermembranes and M-theory*. So if he has difficulty with all this, little wonder we are boggled. But let's begin a thought experiment.[13]

Look at the full stop at the end of this sentence. Congratulations: you have just visualised zero-dimensional space, except of course the dot would be infinitesimally small. This is important because for us to visualise a dimension like we are doing now requires the hint of the next dimension. It helps us to grasp it. But let's keep this up. Now run your finger down the edge of a page, or look at a straight line this one. _____ . A line is one dimensional, but notice also that the line has a thickness, that's the hint of the next dimension, so if you took a sheet of paper, which is called a plane, that's a two dimensional space, but notice that it is not an absolutely thin plane because it too has the small hint of the next dimension. The paper though thin has a thickness that we observe. Three dimensions would be like a box, or a block of paper where the thickness is large. Three dimensions have length, breadth and height. But consider this, just as Zero, One and Two dimensions also contain that 'hint' of another dimension for us to perceive them, so three dimensions may contain the hint of another dimension also, it is just we are so conditioned from birth to the Cartesian coordinates we live with we are not able to perceive them. However mystics and religious teachers tell us about other dimensional realms. Spiritual dimensions which are beyond, or through and within the

everyday 3D spatial reality we are so accustomed to. You read of people and perhaps it has happened to you. You're walking down a beach, or hiking through the bush, or pondering a beautiful flower or religious painting and all of a sudden it is like a veil is lifted and your perception is momentarily shifted, deepened, enhanced and the scene takes on a new depth. It is like you see 'through it' or into its depth, to a glory beyond. You are left overwhelmed, or embraced by such a sense of love and unity, like an encounter with the divine.
This experience can also happen when you have your eyes closed in prayer and there is an opening of reality around you. The space becomes infused with a sense of being loved. Or as with Moses in the burning bush you are confronted with the holiness of the transcendent God. **Exodus 3:1-5.**

> [1]Now Moses was keeping the flock of his father-in-law, Jethro, the priest of Midian, and he led his flock to the west side of the wilderness and came to Horeb, the mountain of God. [2] And the angel of the LORD appeared to him in a flame of fire out of the midst of a bush. He looked, and behold, the bush was burning, yet it was not consumed. [3]And Moses said, "I will turn aside to see this great sight, why the bush is not burned." [4]When the LORD saw that he turned aside to see, God called to him out of the bush, "Moses, Moses!" And he said, "Here I am." [5]Then he said, "Do not come near; take your sandals off your feet, for the place on which you are standing is holy ground."[14]

Barbara Hagerty an award winning religion correspondent, investigating a science of spirituality has documented less dramatic but similar types of experiences in her courageous book. Called **Fingerprints of God** she delves into the startling ground breaking discoveries that science is making about how faith and spirituality affect us physically, emotionally, and spiritually.[15]

But then these 'Spiritual Dimensions' may only be grasped in those moments of insight. They are a 'hint of transcendence' that comes or are gifted to us at those unintended moments in our life. Or putting this another way. When God chooses to reveal Himself, God folds back the veil of this physical world so we can perceive His reality sustaining this world and all that He holds 'in being.'

Of course scientists don't speak specifically of these mystical dimensions, they prefer to nail dimensions down with math. It was the 17th Century French mathematician Rene Descartes, who showed how the real spaces of geometry could be converted into abstract algebraic equations. A line, a square, a circle, a sphere could all be described in mathematical form. The amazing thing was, this idea could be extended beyond what was able to be illustrated. So equations were written for four, five and even six dimensional hyper spheres. Then in 1854 the German mathematician Bernhard Riemann generalised this to many dimensions. What they look like no one really knows, they become mathematical constructs rather than a 'mental, brain conceived' picture like an image or a movie. Gia Dvali Professor of Physics, and a member of the Center for Cosmology and Particle Physics, at New York University says;'

> 'it doesn't really matter what they look like as long as you come up with some kind of mental picture that works!!'[16] The essence of an equation is much easier to store in the brain in terms of images and movies. The picture may have nothing to do with real extra-dimensional space, but it makes it easy to generalise the law to higher dimensions."

Now before you write this off as esoteric ramblings, this relates directly to String Theory. String theory is a developing branch of theoretical physics that combines Quantum Mechanics and General Relativity into a Quantum Theory of gravity. String Theory is a controversial branch of physics, as I said earlier in my foot notes, some write it off as a massive waste of time and

resources. Others, in fact many scientists argue String Theory is 'our best guess yet' at a 'Theory of Everything.' This theory doesn't seem to work with fewer than 10 dimensions.

Originally String Theory was developed as a way of describing the nuclear force but it was discarded. Then in 1984 two physicists John Schwarz from the California Institute of Technology and Michael Green from Queen Mary College at the University of London announced something called 'Superstring Theory.' String theory provided physicists with a new mental and symbolic image for matter. The ideas are actually (at the beginning anyway) quite easy to envisage. The theory suggests that elementary subatomic particles, such as electrons and quarks are not in fact point-like particles, knots of energy, or entities with no structure. Rather they can be envisioned as equally mysterious one-dimensional vibrating strings of energy that flowed through space-time in macaroni like worldtubes. The 'elementary particles' represent different modes of vibration on the same basic string. The cosmos, at this sub-atomic, infinitesimally small level is filled with tiny, flexible, rubber band –like loops. String theory holds that all particles that make up matter or transmit forces arise from the vibration of these tiny strings. These strings are one-dimensional but the 'space' they wiggle about in is not. In fact, it has 10 dimensions: nine of space and one of time!

Just as a guitar string can be plucked to produce different harmonies, different vibrations of these looping strings correspond to distinct types and set of sub-atomic particles. It is the vibration that gives the string the illusion of existence. Just as when you pluck a guitar string your eye sees a standing wave so at this infinitesimally small level the string's vibration correlates to the particle's apparent existence.
Mario Livio exclaims.

[17]'In other words, the world is something like a symphony!"

But he isn't the first to wonder at the harmony of the creation. Pythagoras, Johannes Kepler, Isaac Newton all looking at the stars marvelled at a mysterious 'music of the spheres' Actually Gustav Holst in 1918 completed 'The Planets,' a seven-movement orchestral suite to convey the 'influence of the planets on the psyche.'

At an equally mystical and speculative level perhaps these strings are the continuous reverberation of the voice of God speaking forth creation with His 'Let there be!'

Psalm 19: 1-5

[1] The heavens declare the glory of God;
the skies proclaim the work of his hands.
[2] Day after day they pour forth speech;
night after night they display knowledge.
[3] There is no speech or language
where their voice is not heard.
[4] Their voice goes out into all the earth,
their words to the ends of the world.[18]

A universe made up of 10 dimensions! Wow. Whatever happened to keeping your feet on solid ground? Yet, those who are familiar with Jewish mystical traditions will recognise a parallel with the **Sephirot** (In Hebrew **סְפִירוֹת**), meaning "enumerations". These are the 10 attributes/emanations in Kabbalah, through which God reveals Himself and continuously creates both our physical realm and the chain of higher spiritual realms. Perhaps the structuring of creation in 10 dimensions correlates with God's own being!

As I said before, String Theory has received much criticism. For a start not one experiment has been able to be conducted to verify this theory. String theorists hope that with the Large Hadron Collider at CERN this may change! However, String Theory at present represents the best, actually only game in town when it comes to attempts to bundle up Quantum Mechanics and General Relativity into a longed for 'Theory of Everything.'
It is very hard to imagine what these strings are supposed to be in terms of any analogy from our familiar spatial world. The term 'string' is just an indicator of some new property of creation which is outside human experience.

But then this isn't the only mystery we are confronted with in this marvellous adventure of discovery as we are called to study Creation. I believe God has gifted us with the mandate of trying to peel away any veil of ignorance and thus seek to understand Creation, so that even by grace in a tiny way, we may 'think God's thoughts after Him.'

Even more mind boggling is the whole concept of a **Holographic Universe.** So finally in my study here's a tantalising taste of this theory which has incredible ramifications.

There seems to be evidence to suggest that 'the universe, life and all there is' are only ghostly images, projections from a level of reality so beyond our own that the 'real' reality is literally beyond both space and time. The main theorist behind this extraordinary scheme includes David Bohm. Bohm died in 1992.[19] He was an America born English quantum physicist born to Jewish parents and became a protégé of Albert Einstein. He made significant contributions in the fields of theoretical physics, philosophy and neuropsychology, and to the Manhattan Project.

Bohm's research into plasma physics along with a growing interest in the philosophy and nature of reality lead to a synthesis of ideas in his 1980 book ***Wholeness and the Implicate Order,***[20]
He noticed that in plasmas (a state of matter in which charged particles such as electrons and atomic nuclei have sufficiently high energy to move freely rather than being bound in atoms as in ordinary matter – a plasma is considered the 4th state of matter) the particles stopped behaving like individuals and started behaving as if they were part of a larger and interconnected whole.

Bohm's inspirational insight was to postulate that the ultimate nature of physical reality is not a collection of separate objects (as it appears to us), but rather it is an undivided whole that is in perpetual dynamic flux. Bohm noted the highly organized overall effects and their behaviour. It was as if they knew what each of the untold trillions of individual particles was doing. One of the implications of Bohm's view has to do with the nature of location. His work indicated that at a 'sub quantum' level location ceased to exist or have any meaning. All points in space become equal to all other points in space, and it was meaningless to speak of anything as being separate from anything else. This is what physicists call non-locality.

In 1982 a remarkable experiment took place indicating this non-locality. At the University of Paris a research team led by French Physicist Alain Aspect, discovered that under certain circumstances subatomic particles such as electrons were able to instantaneously communicate with each other regardless of the distance separating them. It doesn't matter whether they are 10 metres or 10 billion kilometres apart. Somehow each particle always seems to know what the other is doing. David Bohm was a physicist at the University of London at the time. His interpretation of Aspect's discovery and his own research was that this implies that objective

reality does not exist. That despite its apparent solidity the universe is at heart a phantasm, a non-physical set of dimensions, a gigantic and splendidly detailed hologram. The web of sub-atomic particles that compose our 'physical' universe – the very fabric of 'reality' itself – possesses this non-locality, what appears to be an undeniable 'holographic' property.

For Bohm, the insights of Quantum Mechanics and Relativity Theory point to a universe that is undivided and in which all parts merge and unite in one totality. This undivided whole is not static but rather in a constant state of flow and change, a kind of invisible 'ether' or substrate from which all things arise and into which all things eventually dissolve. Indeed, even mind and matter are united.

Michael Talbot who wrote **'The Holographic Universe'**[21] explains this concept commenting that Bohm believes the reason subatomic particles are able to remain in contact with one another regardless of the distance separating them is not because they are sending some sort of mysterious signal back and forth, but because their very separateness is an illusion. He argues that at some deeper level of reality such particles are not individual entities, but are actually extensions of the same fundamental something.
So underlying the tangible reality of our everyday lives is a deeper order of existence. A vast and more primary level of reality that gives birth to all the objects and appearances of our physical world in much the same way that a piece of holographic film gives birth to a hologram.
See my notes for a description of how a holographic image works and why it is used as a metaphor for the universe.[22] Bohm calls this deeper level of reality the **implicate** order or enfolded order and he refers to our everyday level of existence as the **explicate** or unfolded order. Generally we deal with and concern ourselves just with the explicate order.
He says;

> In the enfolded [or implicate] order, space and time are no longer the dominant factors determining the relationships of dependence or independence of different elements. Rather, an entirely different sort of basic connection of elements is possible, from which our ordinary notions of space and time, along with those of separately existent material particles, are abstracted as forms derived from the deeper order. These ordinary notions in fact appear in what is called the "explicate" or "unfolded" order, which is a special and distinguished form contained within the general totality of all the implicate orders. (Bohm, 1980, p. xv).[23]

This means that in our everyday life our 'explicate order' is but a special case of the deeper 'implicate' order that undergirds it and sustains it.' The apparent faster-than-light connection between sub-atomic particles is really telling us that there is a deeper level of reality we are not privy to, a more complex dimension beyond our own that is part of a 'substrate' interconnection.[24] We view objects such as sub-atomic particles as separate from one another because we are seeing only a portion of their reality. Such particles are not separate 'parts,' but facets of a deeper and more underlying unity that is ultimately the ground of everything. It means at a deeper level of reality all things in the universe are infinitely interconnected.
Stating this unity another way the Bible says of the divine Logos, the Word, spoken forth as the creative agent of existence.

John 1:1-4

> [1]In the beginning was the Word, and the Word was God.
> [2]He was with God in the beginning.
> [3]Through him all things were made; without him nothing was made that has been made.
> [4]In him was life, and that life was the light of men.[25]

Again speaking of this fundamental unity, it indicates that at the 'implicate level' there is an order and unity which is built in; there is a dynamic living interconnected quality because the Creator is still active 'sustaining' it, keeping it in mind. The implicate order flows forth into the explicate order we exist on.

Colossians 1:16-17.

> [16]For by him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things were created by him and for him. [17]He is before all things, and in him all things hold together.[26]

Of course this is consistent with the Biblical presentation of the physical 'explicate' world as being a subordinate sub-set to a spiritual 'implicate' world of eternal order.

2 Corinthians 2:18.

> [18]So we fix our eyes not on what is seen, but on what is unseen. For what is seen is temporary, but what is unseen is eternal.[27]

Bohm refers to his theory as the holomovement. The terms holo and movement refer to two fundamental features of reality. The movement portion refers to the fact that reality is in a constant state of change and flux as mentioned above. The holo portion signifies that reality is structured in a manner that is very similar to holography. Bohm says that the universe is like a hologram.

In a holographic universe, even time and space could no longer be viewed as fundamentals. They are constructs. Because concepts such as location break down in a universe in which nothing is truly separate from anything else, time and three-dimensional space would also have to be viewed as projections of this deeper order.

Paul Davies is an English physicist, writer and broadcaster, and he is currently a Professor at Arizona State University and in 2005. He took up the chair of the SETI:[28] Post-Detection Science and Technology Task group of the International Academy of Astronautics. Even though Davies only claims a leaning to 'minimalistic Deism' he wrote a book in 1992 titled 'The Mind of God" in which he rather provocatively asserted that;

> 'It is as if the universe was nothing more than a thought in the mind of God.'[29]

I need to reassure you here that we have not veered off into science fiction writing. This is not a digression into the theme of the cult movie 'The Matrix' nor is it a plot for Star Trek and their Holodeck! These are serious developments and are the results of expensively funded research at Universities!

The theory also suggests that at a deeper level reality is a sort of superhologram in which the past, present, and future all exist simultaneously. This suggests that given the proper tools it might even be possible to someday reach into the superholographic level of reality and pluck out scenes from the long-forgotten past. A bit like being able to pluck events out of your memory!

What else the superhologram contains is an open-ended question. Allowing, for the sake of argument, that the superhologram is the matrix that has given birth to everything in our universe, at the very least it contains every sub-atomic particle that has been or will be -- every configuration of matter and energy that is possible, from snowflakes to quasars, from blues to gamma rays. It must be seen as a sort of cosmic storehouse of "All That Is." [30]

What is the 'superhologram?' We should be very cautious about identifying God with the superhologram, for a start it does then tend to minimize the transcendent nature of God because of how the 'superhologram' would be perceived to undergird 'everyday' reality, but then the superhologram is dynamic and beyond the explicate order which is the universe as we 'observe' it. The superhologram could exist beyond all its emanations. In fact it could be the source of other universes that are unknown to each other. Indeed one explicate order may not know the effect it has on the other. At an implicate level they are interconnected but this connection is unseen by the other. Isn't this the way prayer works?
This concept does preserve the transcendence of the superhologram while at the same time explaining the cause-effect relationship between them. Further it does begin to sound like some of the qualities that we associate with eternity.
Now if you think that is 'Sci – Fi' enough - one last comment will suffice.

Holographic Mind
Bohm was not the only researcher who has found evidence that the universe is a hologram. Working independently in the field of brain research, Stanford University's Professor of Neurophysiology Karl Pribram also become persuaded of the holographic nature of reality. Pribram was drawn to the holographic model by the puzzle of how and where memories are stored in the brain. For decades numerous studies have shown that rather than being confined to a specific location, memories are dispersed throughout the brain.

In the 1960s Pribram encountered the concept of holography and realized he had found the explanation brain scientists had been looking for. Pribram believes memories are encoded not in neurons, or small groupings of neurons, but in patterns of nerve impulses that criss-cross the entire brain in the same way that patterns of laser light interference criss-cross the entire area of a piece of film containing a holographic image. In other words, Pribram believes the brain is itself a hologram.

Pribram's theory also explains how the human brain can store so many memories in so little space. It has been estimated that the human brain has the capacity to memorize something in the order of 10 billion bits of information during the average human lifetime (or roughly the same amount of information contained in five sets of the Encyclopaedia Britannica).[31]
Similarly, it has been discovered that in addition to their other capabilities, holograms possess an astounding capacity for information storage. Simply by changing the angle at which the two lasers strike a piece of photographic film, it is possible to record many different images on the same surface. It has been demonstrated that one cubic centimeter of film can hold as many as 10 billion bits of information.
Our uncanny ability to quickly retrieve whatever information we need from the enormous store of our memories becomes more understandable if the brain functions according to holographic principles. If a friend asks you to tell him what comes to mind when he says the word "zebra", you do not have to clumsily sort back through some gigantic and cerebral alphabetic file to arrive at an answer. Instead, associations like "striped", "horse-like", and "animal native to Africa" all pop into your head instantly.
Indeed, one of the most amazing things about the human thinking process is that every piece of information seems instantly cross- correlated with every other piece of information--another feature intrinsic to the hologram. Because every portion of a hologram is infinitely interconnected with ever other portion, it is perhaps nature's supreme example of a cross-correlated system.

The storage of memory is not the only neurophysiological puzzle that becomes more understandable in light of Pribram's holographic model of the brain. Another is how the brain is able to translate the avalanche of frequencies it receives via the senses (light frequencies, sound frequencies, and so on) into the concrete world of our perceptions. Encoding and decoding frequencies is precisely what a hologram does best. Just as a hologram functions as a sort of lens, a translating device able to convert an apparently meaningless blur of frequencies into a coherent image, Pribram believes the brain also comprises a lens and uses holographic principles to mathematically convert the frequencies it receives through the senses into the inner world of our perceptions.

An impressive body of evidence suggests that the brain uses holographic principles to perform its operations. Pribram's theory, in fact, has gained increasing support among neurophysiologists. [32] A holographic view of consciousness displaces the ideas of the empiricists and behaviourists who say that all our mental behaviour can be interpreted in terms of stimulus and response. The storage of information in the brain is an incredibly complex process. One it appears we are just starting to unravel. Every thought seems to be contained in every other thought. Like Russian dolls each containing another one inside. Each thought we recall brings images and sounds together which are perceived in the mind as one event. Perhaps it is just a small step from a theory of a holographic universe to one which sees the universe as the externalisation of a infinite personal conscious mind. Perhaps a holographic view can provide an adequate metaphor for such an unfathomable process.

A holographic view of consciousness (and indeed, a holographic view of the entire universe) is, perhaps, the closest physics has come to mysticism without the two losing their identities. Now Science is providing us with a picture of the universe that the mystics have been pointing out for centuries.

Could it be that we live in a projected world of solid looking neuro-wired holograms? Holograms that are very plausible, which look and feel the way they do because the correspondence within our brain of this image, correlates in a reliable way with what is external to us. It is easy for us to accept that the images on our television screen are really a set-up, a mirage shaped by various electromagnetic energies portraying the external world. It is more difficult for us to imagine reality as a similar mirage created within the neuron structure of our brain. Formed from gravitationally trapped light locked into super-holograms and that is all! Yes it does begin to sound like the popular sci-fi movie, the 'Matrix."

If the universe is the creation of the infinite personal consciousness of God, then when He spoke reality into being you could say we are an externalised projection in and of God's mind. The hologram was bought into being when He determined to be Creator and said 'Let there be.' Perhaps Paul Davies' audacious comment that;

'It is as if the universe was nothing more than a thought in the mind of God,'

is not so strange after all.

Yet it is fair to say that this holographic paradigm is still a developing theory and is riddled with controversies. There is much work yet to be done. Watch this space!

For decades, Science chose to ignore evidences that did not fit the standard theories and resisted adopting counter intuitive paradigms even though they better explained the nature of reality. The Roman Catholic Church did the same with its resistance to a heliocentric view of the

planetary system. Now in Modern Science the volume of evidence calling for the discarding of the old empiricism has reached the point where denial is no longer an option. As the solid gives way to the 'mystical' and the effect of, and mysterious nature of consciousness is better understood, are we seeing another paradigm shift? Is this a new way of explaining and embracing reality?

These are exciting times. The paradigm shift in the science of 17 and 18 Centuries was a catalyst for an explosion of technological advances. Perhaps this new synthesis in science, this embracing of the Quantum Enigma and an appreciation of the mysterious undergirding our universe will also see the bursting forth of better technologies in medicine, genetics, computation and space travel.

It is my conviction that God is the 'Intelligent Designer,' the infinite personal awesome Creator who has, in grace, made space for, and given freedom to the Universe and to us, the crown of His creation. We have the privilege and responsibility of studying that design, of developing new methods of investigation and inventing new technologies and tools to fold back the veil of mystery, to unlock the irreducibly complex so as to think God's thoughts after Him.
In this way, with humility and awe we can marvel, invent, grow and become all that God intends us to be, as the stewards of this earth.

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[1] *The Holy Bible: English Standard Version* (Crossways Bibles, Good News Publishers, Wheaton, IL 2001)
[2] John H. Walton, *The Lost World of Genesis One* (InterVarsity Press Downers Grove, IL. 2009)
[3] John H. Walton, *The Lost World of Genesis One* (InterVarsity Press Downers Grove, IL. 2009) 170
[4] http://en.wikipedia.org/wiki/Paul_Tillich
[5] *The Holy Bible: English Standard Version* (Crossways Bibles, Good News Publishers, Wheaton, IL 2001)
[6] *God according to God*, (HarperCollins Publishers, New York NY, 2009) 101
[7] Bruce Rosenblum and Fred Kuttner, *Quantum Enigma* (Oxford University Press, New York NY, 2006) 176
[8] *The Holy Bible: English Standard Version* (Crossways Bibles, Good News Publishers, Wheaton, IL 2001)
[9] I John 1:5-6 says;

> This is the message we have heard from him and proclaim to you, that **God is light**, and in him is no darkness at all. [6] If we say we have fellowship with him while we walk in darkness, we lie and do not practice the truth.

The Holy Bible: English Standard Version (Crossways Bibles, Good News Publishers, Wheaton, IL 2001)
[10] *The Holy Bible: English Standard Version* (Crossways Bibles, Good News Publishers, Wheaton, IL 2001)
[11] Gerald Schroeder, *God according to God* (Harper One, Harper Collins Publishers, New York, NY. 2009)28
[12] New Scientist, 29 August 2009, 30-37.
[13] Thanks to Valeries Jamison writing in New Scientist for the basis of this description. New Scientist, 29 August 2009, 37.
[14] *The Holy Bible: English Standard Version* (Crossways Bibles, Good News Publishers, Wheaton, IL 2001)
[15] Barbara B. Hagerty, Fingerprints of God (Riverhead Books, Penguin Group (USA) Inc. New York. 2009
[16] New Scientist, 29 August 2009, 37.
[17] Mario Livio, Is God a Mathematician? (Simon and Schuster New York, NY. 2009) 216
[18] *The Holy Bible: New International Version* (The Bible Society of Australia Inc. NSW Australia, 1973
[19] http://en.wikipedia.org/wiki/David_Bohm
[20] http://en.wikipedia.org/wiki/Wholeness_and_the_Implicate_Order
[21] Michael Talbot, *The Holographic Universe* (Harper Perennial, Harper Collins Publishers. New York, NY. 1991) 33-55
[22] To understand why Bohm makes this startling assertion, we must first understand a little about holograms. A hologram is a three- dimensional photograph made with the aid of a laser.
To make a hologram, the object to be photographed is first bathed in the light of a laser beam. Then a second laser beam is bounced off the reflected light of the first and the resulting interference pattern (the area where the two laser beams combine) is captured on film.
When the film is developed, it looks like a meaningless swirl of light and dark lines. But as soon as the developed film is illuminated by another laser beam, a three-dimensional image of the original object appears.
The three-dimensionality of such images is not the only remarkable characteristic of holograms. If a hologram of a rose is cut in half and then illuminated by a laser, each half will still be found to contain the entire image of the rose.

Indeed, even if the halves are divided again, each snippet of film will always be found to contain a smaller but intact version of the original image. Unlike normal photographs, every part of a hologram contains all the information possessed by the whole.
This "whole in every part" nature of a hologram provides us with an entirely new way of understanding organization and order. For most of its history, Western science has laboured under the bias that the best way to understand a physical phenomenon, whether a frog or an atom, is to dissect it and study its respective parts.
A hologram teaches us that some things in the universe may not lend themselves to this approach. If we try to take apart something constructed holographically, we will not get the pieces of which it is made, we will only get smaller wholes.
[23] David Bohm, *Wholeness and the Implicate Order* (1980, p. xv).
[24] Bohm offers this illustration to show how at some deeper level of reality particles are not individual entities, but are actually extensions of the same fundamental something.
Imagine an aquarium containing a fish. Imagine also that you are unable to see the aquarium directly and your knowledge about it and what it contains comes from two television cameras, one directed at the aquariums front and the other directed at its side. As you stare at the two television monitors, you might assume that the fish on each of the screens are separate entities. After all, because the cameras are set at different angles, each of the images will be slightly different. But as you continue to watch the two fish, you will eventually become aware that there is a certain relationship between them. When one turns, the other makes a slightly different but corresponding turn; when one faces the front, the other always faces towards the side. If you remain unaware of the full scope of the situation, you might even conclude that the fish must be instantaneously communicating with one another, but this is clearly not the case. That says Bohm, is precisely what is going on between subatomic particles in Aspects experiment.
[25] *The Holy Bible: New International Version* (The Bible Society of Australia Inc. NSW Australia, 1973)
[26] *The Holy Bible: New International Version* (The Bible Society of Australia Inc. NSW Australia, 1973)
[27] *The Holy Bible: New International Version* (The Bible Society of Australia Inc. NSW Australia, 1973)
[28] SETI: stands for 'Search for Extra Terrestrial Intelligence.
[29] Paul Davies, *The Mind of God* (Simon and Schuster, UK. 1992) Subtitled *The Scientific Basis for a Rational World*, it is a whirlwind tour and explanation of theories, both physical and metaphysical, regarding ultimate causes.
[30] Michael Talbot, *The Holographic Universe* (Harper Perennial, Harper Collins Publishers. New York, NY. 1991)
[31] http://homepages.ihug.co.nz/~thegroundoffaith/issues/2003-10/pribram.html
[32] See Jeffrey Satinover, *The Quantum Brain* (John Wiley and Sons, Inc. New York, NY. 2001), Stanislv Grof, *The Holotropic Mind* (Harper San Francisco, Harper Collins Publishers 1993)

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