

“IT IS DIFFICULT TO VISUALISE A SANDWICH”

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At a meeting of the Cornerstone Society committee, we were discussing the catering arrangements for a forthcoming conference when one brother remarked, with his characteristic dignity and solemnity, “It is difficult to visualise a sandwich.” Silence fell around the table, as each member mused or meditated on the import of this enigmatic statement. I am sure that each brother’s thoughts, then and subsequently, were quite different and I will not attempt to speculate on what they were. Although the connection will doubtless appear far from obvious, my own perusals were directed to the nature of the Universe. Certain words from the Explanation of the First Degree Tracing Board came to mind –

‘The Universe is the Temple of the Deity we serve; Wisdom, Strength and Beauty are about His throne as pillars of His works, for His Wisdom is infinite, His Strength omnipotent, and Beauty shines through the whole of creation as symmetry and order. The Heavens He has stretched forth as a canopy; the earth He has planted as a footstool; He crowns His Temple with Stars as with a diadem, and with His hand He extends the Power and Glory’.

You are doubtless still wondering what these beautiful and profound words have to do with our postulated difficulties in visualising a sandwich. You may even conclude that you have just grounds for suggesting that I should lay on a couch and talk to a man in a white coat! But please bear with me as we journey together along the Paths of Heavenly Science. Firstly, we should bear in mind that just as the Universe is the Temple of the Deity we serve; so we are, every one of us, temples of the indwelling Deity – in Christian terms, the Holy Spirit. Indeed, as emphasised in several places in our ritual, our Masonic craft is an allegorical representation of the building and adorning of the inner temple. The mystics of ancient days drew a parallel between the totality of the Universe and the individual man – the macrocosmos and the microcosmos. The question I pose is whether our understanding of the macrocosmos can tell us about our nature and our relation to, and interaction with, the totality of creation.

In this context, we must never lose sight of the fact that we, conscious human beings possessed of free will, are made of those same atomic and molecular building blocks as the vast and supposedly inanimate universe. Also, we must realise that we are totally and critically dependent on the nature of the universe, and the laws governing it, for our very existence. If the universe was just a tiny bit different, life as we know it could never have arisen. Indeed, it has been calculated that odds against such a universe arising in which human life is possible are ten million, trillion, trillion, trillion to one: that is 10 with 60 zeros after it. Put another way, that is the odds against a rocket fired randomly from Earth hitting a penny piece placed on the far side of the universe! Little wonder therefore that many have no difficulty in believing that our universe in which the ultimate arising of life, especially conscious and intelligent life, would be a certainty, was the ‘Grand Design’ of an omnipotent and omniscient Great Architect.

Let us step back through history to the time that our operative forebears were building King Solomon’s Temple. What would they have made of the universe? According to their traditions, the world was the centre of a relatively recently created universe, created just six days before the first human being, and with an underworld below and the heavens above. From the movement of the ‘heavenly bodies’, a number of celestial spheres would have been apparent, with the home of mortal man lying below the sphere of the moon - the ‘sublunary abode’ from which, according to the explanation of the Working Tools of the Third Degree, we will one day be summoned to the Grand Lodge above.

Some of our ancient brethren would have regarded the earth as a flat body supported by the sea, but a Greek philosopher and map-maker called Anaximander, who lived from 610 to 546 BC, reasoned that if the sea supported the earth, something would have to support the sea and so on ad infinitum, raising the philosophically vexing issue of infinite regression. He therefore proposed that the earth was a disk-like object which was not supported by anything but kept its position by being equally distant from everything else. It is as though it was at the centre of a sphere from which all parts of the circumference were equidistant. On the subject of infinite regression, Bertrand Russel was, as a young man, asked to give a public lecture on the solar system. He was carefully describing how the spherical earth orbited around the sun when an old lady stood up and said, “You’ve got it all wrong, young man, the earth is a flat disc resting on the back of a giant turtle.” “Really,” replied Russell, “and what is the turtle resting on?” “Oh, you think you are so clever, don’t you,” retorted the old lady, “well it’s turtles all the way down!”

It was Copernicus who, some 400 years ago, observed the relative motions of the planets and concluded that the sun, rather than the earth, was the centre of the solar system. This concept was not well received by the Ecclesiastical authorities, even though it did not contradict Holy Scripture, as it somewhat diminished humankind’s place in the created universe. In particular, it went against the bizarre and arrogant claim that the centre of the universe was the Pope’s throne in St. Peter’s Cathedral in Rome. Copernicus, however, escaped ecclesiastical fury, by dying on the day that his book was published! As is well known, his invention of the telescope enabled Galileo to confirm Copernicus’s work but he retracted his conclusions under threat of torture by the Church authorities. Nevertheless, numerous subsequent observations produced irrefutable evidence that Copernicus and Galileo were right. Indeed, we now know that our home planet orbits a rather ordinary star, one of billions in a galaxy of stars, which itself is just one of billions of galaxies. In addition, Newton’s principles of gravity and laws of motion provided the strong mathematical framework for calculating the movements of the celestial bodies and of predicting significant astronomical events, such as total eclipses of the sun, with great accuracy. By the end of the 19th century, the principles of Newtonian mechanics were so dominant that it was thought by many that the universe functioned like

some great clockwork gadget and that all its laws would soon be discovered. So rigid were the laws that, although the Great Architect of the Universe may well have designed and established the cosmos, there seemed no part for Him to play in its actual running. This rigid philosophy spilled over into theology and, despite the clear commands and example of Jesus, no self-respecting theologian would accept the occurrence of healing miracles as these clearly contravened the laws of science. Although the earth was no longer seen as the motionless centre of the universe, it seemed that it, other planets the sun and stars must move relative to something motionless and that there must be some firmament or medium through which they and light must move. This stable motionless firmament was termed the ether.

In the early 20th century, however, the whole secure Newtonian model of the universe came crashing down as a result of quite unexpected observations on the speed of light. If light moves at a constant speed in a fixed ether then, as the earth constantly rotates on its axis in its orbit round the sun and thus constantly changes its speed and direction relative to the ether, the speed of light coming from a given direction should likewise change. Surprisingly, however, in an elaborate series of measurements, in 1887, showed that the speed of light on earth in two different directions was always and absolutely the same throughout both the day and the year, irrespective of the direction in which the earth was travelling.

How do we account for this which at first view appears a paradox? An Irishman called George FitzGerald suggested that as one's speed relative to the ether increased time slowed down, so that the speed of light would appear identical to observers moving at different speeds relative to the ether. FitzGerald's explanation was based on the concept of a motionless ether as an absolute reference point but in a classical paper written in 1905 Einstein argued that there is no absolute point of reference for movement - all movements in the universe and all measurements of time are just relative one to another. It is for this reason that Einstein's theory is termed the Theory of Relativity. Thus, according to Einstein, there is no need to postulate a motionless ether, or indeed an ether at all.

At the time of the publication of Einstein's seminal work on relativity, this was a deeply disturbing idea as it stripped away the solid foundations of space and time and the cosy idea of an absolute reference point, but many experimental observations have proved Einstein right. The consequences are quite remarkable, especially the concept that, in order for us to experience the constancy of the speed of light, time would have to move much slower if we accelerated to a speed close to that of light. Indeed, if we had a twin brother and we left him on earth while we travelled to the nearest star, Proxima Centauri, and back at, say, 90% of the speed of light, we would find on our return that we were some seven years younger than our twin. A father undertaking a longer and faster journey could arrive back younger than his son, or even his grandson! Ultimately, if we accelerated to the speed of light itself, time for us would stand still. In practice, Einstein's famous equation $E=mc^2$ which relates mass and energy to the speed of light implies that nothing having mass, such as we or the spaceship containing us, could travel at the speed of light as that would require an infinite amount of energy. So how do the components of light, the so-called photons, travel at the speed of light? There is no problem because photons have no mass and thus require no energy to move them. So, how is time experienced from the perspective of light itself? Strangely, I have found no mention of this in scientific books and articles, probably because scientists shy away from anything hinting of metaphysical, let alone mystical, speculation. Yet, from the foregoing, it would appear that from the perspective of light there is no passage of time, just an eternal Now. The Volume of the Sacred Law informs us that in the Grand Lodge Above we will put on the bodies of Light. Will we then be part of that eternal Now?

But there is another very important implication in the concept of the relativity of time. One question that baffled philosophers throughout history was whether time began, in which case what was there before time, or whether there had been time from without beginning. The latter raised serious problems of infinite regression, as did the old lady's pile of turtles. If time had existed from without beginning, why did God wait an infinite time before creating the universe? If, on the other hand, the universe had existed for an infinite period of time, then every conceivable thing that could possibly occur must already have occurred. Fortunately observational science came to the rescue. It was found that the universe is not static but that, in which ever direction one looks, the billions of other galaxies are moving away from us, and the further away they are, the faster they seem to be moving away. This clearly points to an expanding universe. By extrapolating backwards, it became evident that all the mass in the universe would have been together in a single point some 12 to 15 billion years ago. It was thus postulated that the universe started with a 'big bang', the echoes of which can still be detected as a background microwave radiation. This was good news indeed to those believing in Divine creation! It now appears that the universe sprang forth from an extremely tiny particle of unimaginable density - some indeed have postulated that the universe sprang from a 'singularity'; defined as a point of infinitesimally small size and infinite density. Under the conditions of singularity, the physical laws that underpin our universe neither would nor could have existed. Gravity, energy and the subatomic particles that constitute mass would all have arisen during the first second after the big bang. Thus, it is meaningless to talk of time before the creation of the universe as time as we experience it simply did not exist.

But why is there a universe at all? Why do you and I exist? Why is there simply no space, no matter, no time, no light, no consciousness - just an utter and eternal nothingness? I expect many of you have posed these remarkably chilling questions to yourselves. For at least part of the answer we need to turn to that bizarre world of quantum mechanics. Now, like almost all of the world's population, I do not even begin to pretend that I understand even the most rudimentary aspects of quantum mechanics. (I do however take comfort in the saying that the person who says he fully understands quantum mechanics doesn't!) All I can say is that one of its tenets is that there is an underlying indeterminacy or uncertainty in nature. Whenever we look at a subatomic particle, its motion or position is always elusive. As a consequence of the uncertainty principle, there is no such thing as an absolute vacuum. Due to the

uncertainty principle, a particle may arise spontaneously in a vacuum and, as an extension of the principle, as an exceedingly rare event, a singularity capable of exploding into a universe may spontaneously arise out of nothing. Some scientists have remarked that because of the uncertainty principle and the spontaneous generation of universes implied by this principle, there is no need for a belief in a Divine Creator of the Universe. But I would ask them - who established the uncertainty principle? And why? On the subject of creation, as I have already mentioned only a very special type of universe could support life as we understand it. As the laws of physics arose during the first few milliseconds after the Big Bang, why were gravitational forces not so strong as to collapse the universe very quickly, or so weak that matter never coalesced into galaxies, stars and planets? Indeed, as I have mentioned, the chance of the Big Bang giving rise to a universe capable of supporting human life is many trillions to one against. Yet we are here! Was this a freak, like winning the lottery, or was the universe 'set up' so that we could exist in it? This question has led to the formulation of the so-called 'anthropic principle' which, although expressed in various ways, basically states that the universe is how it is because we are able to live in it. This, at first view, seems a statement of the obvious and a very circular argument, but in fact it contains implications regarding the way that we as conscious life forms may actually affect the evolution of the universe and I will allude to this later.

Another fascinating and very bizarre feature of the universe is that of dimension. We experience three dimensions but it can be shown by mathematical extrapolation of our understanding of the nature of the universe and the laws governing it that the three dimensions of space that we experience is just one possibility. There could indeed be ten or eleven dimensions. One just cannot conceive of a living being in a one or two dimensional universe, and a universe of four or more dimensions would be so unstable that life could never evolve. Thus, reverting to the 'anthropic principle', we can say that our universe is three dimensional because it the only form that could contain us. So where are the other dimensions? Some hold that they always exist but we do not experience them as they are very tightly coiled up. Conversely, others hold that they exist and are enormous. It is difficult to imagine our three dimensional universe on the surface of a fourth dimension, but if in our imagination we subtract a dimension, our universe becomes a flat body, like a membrane. We can then imagine it stuck on the surface of a much bigger dimension, like a postage stamp stuck on an airship. The hypothetical forms of the universe have been termed p-branes (pronounced 'pea-brains!') in which p is the number of dimensions and brane is short for membrane. Clearly our universe is not a membrane - but the concept helps us to imagine the unimaginable, as I will allude to shortly. The fact that we live in a chance-in-a-multitrillion of a universe which is capable of supporting us raises the question of whether there is more than one universe. Some have postulated that trillions of universes, with a wide variety of physical laws and dimensions, have developed, thereby greatly extending the chance of one arising capable of supporting life. Others have suggested that one universe originally came from a big bang only to collapse back under its own gravity to a singularity which then exploded again and so on numerous times until a universe with exactly the right gravitational force arose. Yet others have suggested that matter in a universe can collapse into billions of singularities - the so-called 'black holes'- each being the source of a new universe. This would permit the 'fast breeding' of universes from one or a few initial ones. Of course, as Freemasons, we may postulate a single universe, purposefully designed by its Divine Creator - "Heaven and earth thy vast design". Yet, as I hope to show, the concept of a vast multitude of universes arising as a result of the uncertainty principle may equally well be fulfilling the will of the Great Architect, and may have profound implications for the nature of our eternal and immortal existence. If there are many universes, are they totally distinct and separate, or could one universe have any effect on another? One of the problems that has challenged cosmologists is the fact that our universe does not seem to have enough mass within it to hold together in the way it does. One intriguing possibility is that although light does not appear to travel between universes because it is bent back on itself by gravity, the elusive graviton, the mediator of gravity itself, may be able to do so. Thus, the required additional gravitational force may not arise from dark matter in our universe, as some postulate, but in another universe that somehow shadows us. It is virtually impossible for the human mind to imagine one three-dimensional universe shadowed by a universe of three or even more dimensions. If, however, we reduce the dimensions and picture the universes as flat membranes, or branes, as already described, we can now picture one brane shadowing another, or even the brane we live in being sandwiched between two shadowing branes. Even with this simplification, the concept is quite mind-contorting but, as my worthy brother remarked, "It is difficult to visualise a sandwich!" Now you know why that enigmatic comment triggered this line of thought! Such concepts are indeed quite mind-boggling but I am sure that to Freemasons they must increase our sense of awe and wonder at the wisdom, power and grandeur of the Great Architect of the Universe. Even the beliefs of avowed atheists are challenged by the wonders of the cosmos. Martin Amis, who adhered strongly to the view that religion is quite irrational, has written, "Much more recently I reclassified myself as an agnostic. Atheism, it turns out, is not quite rational either. The sketchiest acquaintance with cosmology will tell you that the universe is not, or is not yet, decipherable by human beings. It will also tell you that the universe is far more bizarre, prodigious and chillingly grand than any doctrine, and that spiritual needs can be met by its contemplation."

But there is another important aspect to the concept of numerous universes, sometimes referred to as the multiverse, and to their creation. One of the simplest experiments in physics, yet one with the most enormous consequences, revealed a most extraordinary property of light. This experiment was first conducted by the British physicist, ophthalmologist and Egyptologist, Thomas Young, in the early 19th century. If one places a board with a narrow slit in it between a light source and a screen, one sees a single band of light on the screen. If the board has two narrow slits in it one might expect to see two bands of light on the screen, corresponding to the two slits but, instead, one sees a whole series of light and dark bands. This is because the waves of light interfere with each other, just as ripples on the surface of water can interfere with each other. (This observation, incidentally, led Thomas Young to conclude that light has a wave form.) But what happens if the light source is turned down so low that individual photons of light go through one or other slit one at a time and are detected as dots on a photographic plate? Surely

no interference would then occur as the photons would then be passing discretely one after the other through one or other slit. But, surprisingly, interference does still occur and from this we must draw the quite extraordinary conclusion that a photon can be in two places at the same time. To put it another way, a photon travelling through one slit appears to experience interference by the same photon taking the alternative route through the other slit.

This being the case, an experimenter might observe a photon travelling through the left hand slit and yet the occurrence of interference shows that somehow the photon must also pass through the right hand slit. So why doesn't the observer see the companion photon arriving on the screen? In 1957, the physicist Hugh Everett made the quite extraordinary suggestion that the second particle must be in another, parallel, universe! Thus, in the single experiment we would have one experimenter noting the arrival of a photon from the left hand slit and another experimenter in a parallel universe observing its arrival from the right hand slit. Now, let us just consider the implications. The two-slit experiment is just one of trillions of quantum possibilities occurring every second so that, if this hypothesis is correct, there must be a continuous generation of vast numbers of parallel universes as time passes. Reality may thus consist of what is termed the quantum multiverse in which every conceivable history that ever could have been can be found. As Stephen Hawking has put it, there would be a parallel universe in which Belize won all the Olympic gold medals, however improbable that may seem! Even more remarkably, the evolution of the quantum universe may not be blindly random. We as humans with free will may actually play a directive role in the creation of parallel universes. In the case of the divergence of two universes each time a photon passes through one of the slits in the board, the divergence only occurs because an experimenter has set up the experiment. In addition, the observation reveals which of the two divergent which universes the observer is in; making the act of observation one of critical importance. As conscious beings we may therefore be determining the evolution of the quantum multiverse. All this sounds like pure fantasy, but in fact the multiverse, also called the Many Worlds principle, is accepted - at least as a very distinct possibility - by many leading scientists, especially cosmologists. Even particles as wide as the diameter of the famous double helix that encodes our genetic characteristics have been shown to have this property of being in more than one place at the same time and may thus exist in the so-called 'superposition of states' in the multiverse. Not only that, possibly as a result of superposition of states, particles that from our perspective are far apart seem to be linked in some sort of cooperative bond - a bond that Einstein termed "spooky action-at-a-distance". Could the complex combinations and convolutions of matter responsible for the arising of living forms, even very simple ones, have involved this superposition of states and the spooky action-at-a-distance? A biologist, Jon Joe McFadden - a colleague of mine - thinks so, as he explains in his thought-provoking book 'Quantum Evolution'. Even the simplest self-replicating life form is so complex that its chance assembly has been likened to the chance of a tornado ripping through a scrap yard and assembling a jumbo jet! But if we postulate a vast array of universes being involved in the assembly of life, the chance of it arising is so very much greater.

Consciousness may likewise be dependent on events occurring in the quantum multiverse. Sir Roger Penrose, who did much to promote the concept of black holes, postulated that the activity of our minds is dependent on quantum effects. The biologist and philosopher Rupert Sheldrake - another who moved from a position of firm atheism to Christianity on the basis of his observations of the wonders of the universe - has gone further and postulated that our mind is not confined to the brain. Instead it appears to interact and resonate with what he terms morphic fields that may conceivably involve the consciousness of other humans, or perhaps celestial beings, or even the Great Architect of the Universe Himself. This 'extended mind' has enormous implications for the nature of our existence now and in eternity.

Let me leave you with this thought. In our gross physical bodies we cannot explore the multiverse, yet I wonder if at least some forms of intuition and religious experience are the result of an open-ness to influences from other parallel universes. Just as gravitons may pass from one universe to another, elements of consciousness may do likewise. Perhaps when we shall be liberated from our physical bodies, then our spirit bodies, our bodies of Light, will be able to pass freely to other parts of the quantum multiverse, parts which may be far fairer than the planet earth. Is this what Jesus meant when he said, "In my Father's house there are many dwelling places"?

I will end with a poem by the Russian poet Konstantin Dmitrijevich Bal'mont

Other planets are yonder,
Where breezes are wafted more tender,
Where skies are more azure,
Grass more tall and more slender.
Planets circling before us
Ever changing in wonder.
Worlds that sing in their far flung orbits,
Unceasing their chorus.
Other planets are yonder,
Lands of former sojourning.
We shall live there again,
Though not now,
But anon we shall pass
And think never more of returning.